

PREVOST

COACH MANUFACTURER

OPERATOR'S MANUAL H SERIES COACHES



PA1560

2nd edition revised 2023/06/09

PA1560 2nd Edition

Date: January 3rd, 2008

Featuring

DDC S60-2007 engine (starting from vehicle: 8-1044)

Controls on steering wheel (starting from vehicle: 8-1170)

Volvo D13F engine (starting from vehicle: 8-1199)

revised 2023/06/09: light bulb data table removed

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This *Operator's Manual* for the PREVOST H3-41 and H3-45 coaches 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 Car Incorporated is committed to the continuous improvement of coach quality, reliability, durability and safety. With innovative features, the H3 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 Car of any change of address or transfer of ownership. This will ensure we provide fast and reliable coach service to all coach operators.

Warnings, cautions and notes are used throughout this manual to emphasize important points when necessary:



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 warnings, cautions and notes. Read the various notices and instructions posted throughout the coach and attached to equipment.

Since continuous improvement is a primary focus at Prevost Car, 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 Car Incorporated.

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. After each trip, perform a system diagnostic to check if error codes and anomalies were recorded in the vehicle electronic modules.

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.

4 SAFETY PRECAUTIONS

OTHER PRECAUTIONS



WARNING

Prior to working on a system inside vehicle, make sure to cut electrical power and air supply. A component could be supplied with electricity even if the ignition switch is set to the OFF position and/or a component could be pressurized even if air tanks are emptied. Always refer to the appropriate wiring and pneumatic diagrams prior to working on electrical and/or pneumatic systems.

NOTE

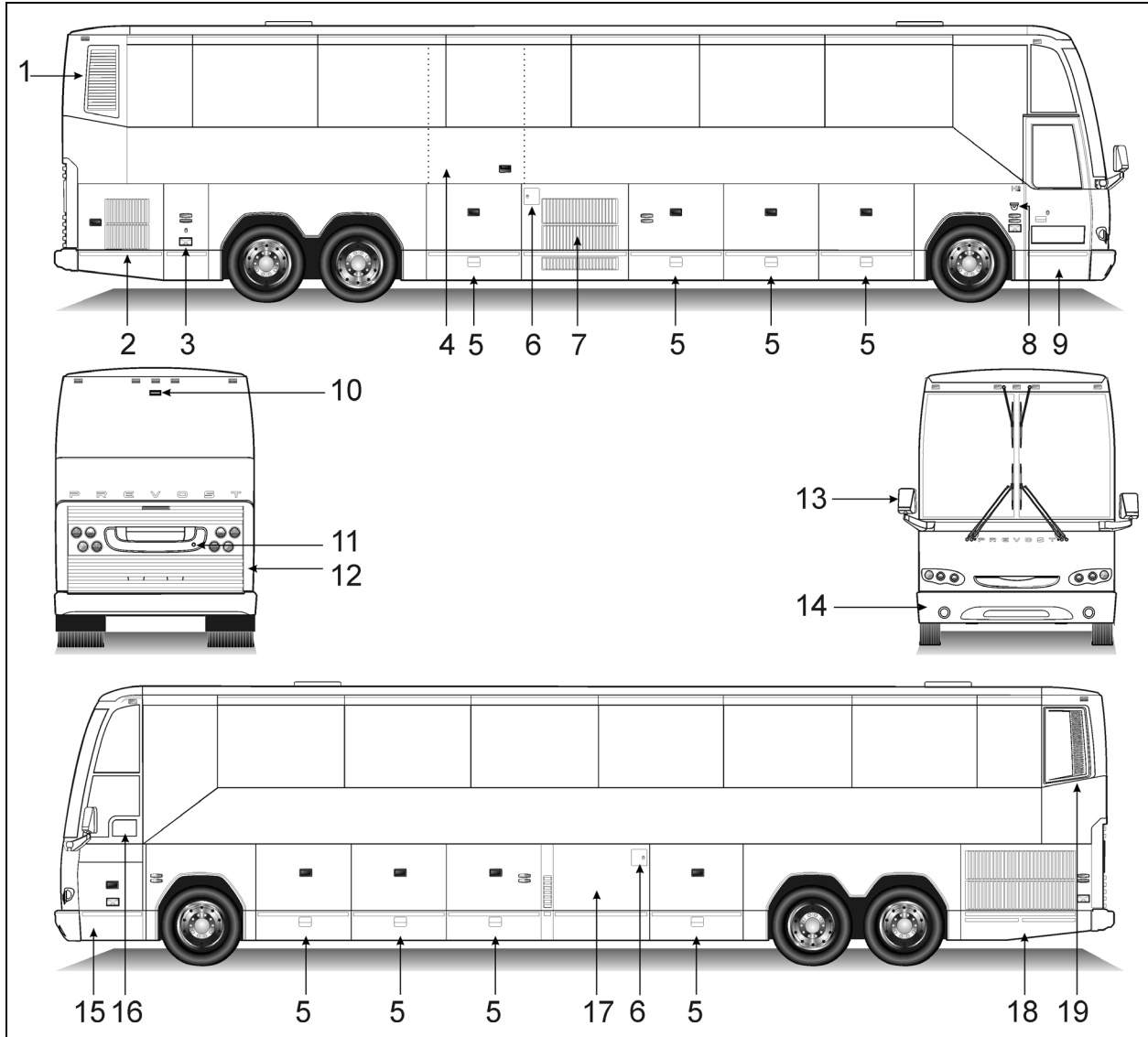
When the ignition switch is set to the OFF position, the electrical components are not energized except for the CECM (Chasis Electronic Control Module), the battery equalizer, the preheater system and some electronic modules; which are energized during 15 minutes after the ignition has been set to the OFF position. Prior to working on one of these electrical components, set the battery master switch in the main power compartment to the OFF position. If the vehicle will not be operated for a long period (more than 2 weeks), it is recommended, in order to prevent the batteries from discharging, to trip the main circuit breakers located in the main power compartment to stop the small current drawn by the radio preset station memory, the CECM memory and the instrument cluster clock. Note that the radio station presets will be erased, same thing for the diagnostic codes history and the instrument cluster clock will have to be reset.



CAUTION

Prior to arc welding on the vehicle, refer to section 00-GENERAL of your maintenance manual. Precautions have to be taken to avoid costly damage to the electronic components.

EXTERIOR VIEW

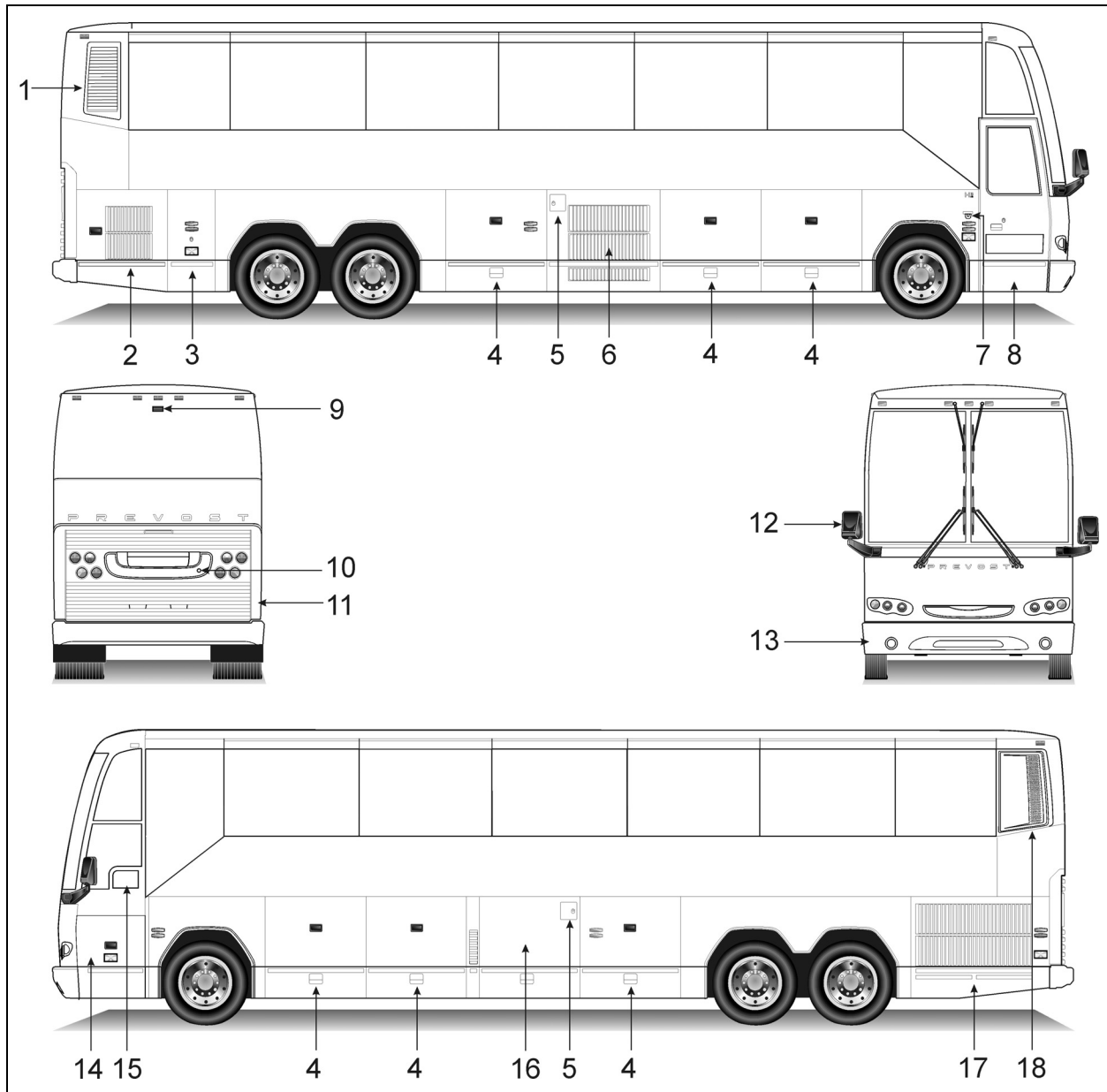


H3-45 (TYPICAL)

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- | | |
|---|---|
| 1. Engine air intake | 11. 120-volt connector for block heater |
| 2. Engine compartment curb-side door | 12. Engine compartment rear door |
| 3. Main power compartment (battery compartment) | 13. Rear-view mirror |
| 4. Wheelchair access door (optional Ricon lift) | 14. Spare wheel compartment |
| 5. Baggage compartment | 15. Front electrical and service compartment |
| 6. Fuel filler door | 16. Driver's power window |
| 7. Condenser compartment | 17. Evaporator compartment |
| 8. Entrance door control switch | 18. Radiator door |
| 9. Entrance door | 19. Diesel Particulate Filter (DPF) compartment access door |
| 10. Back up camera (optional) | |

6 COACH EXTERIOR

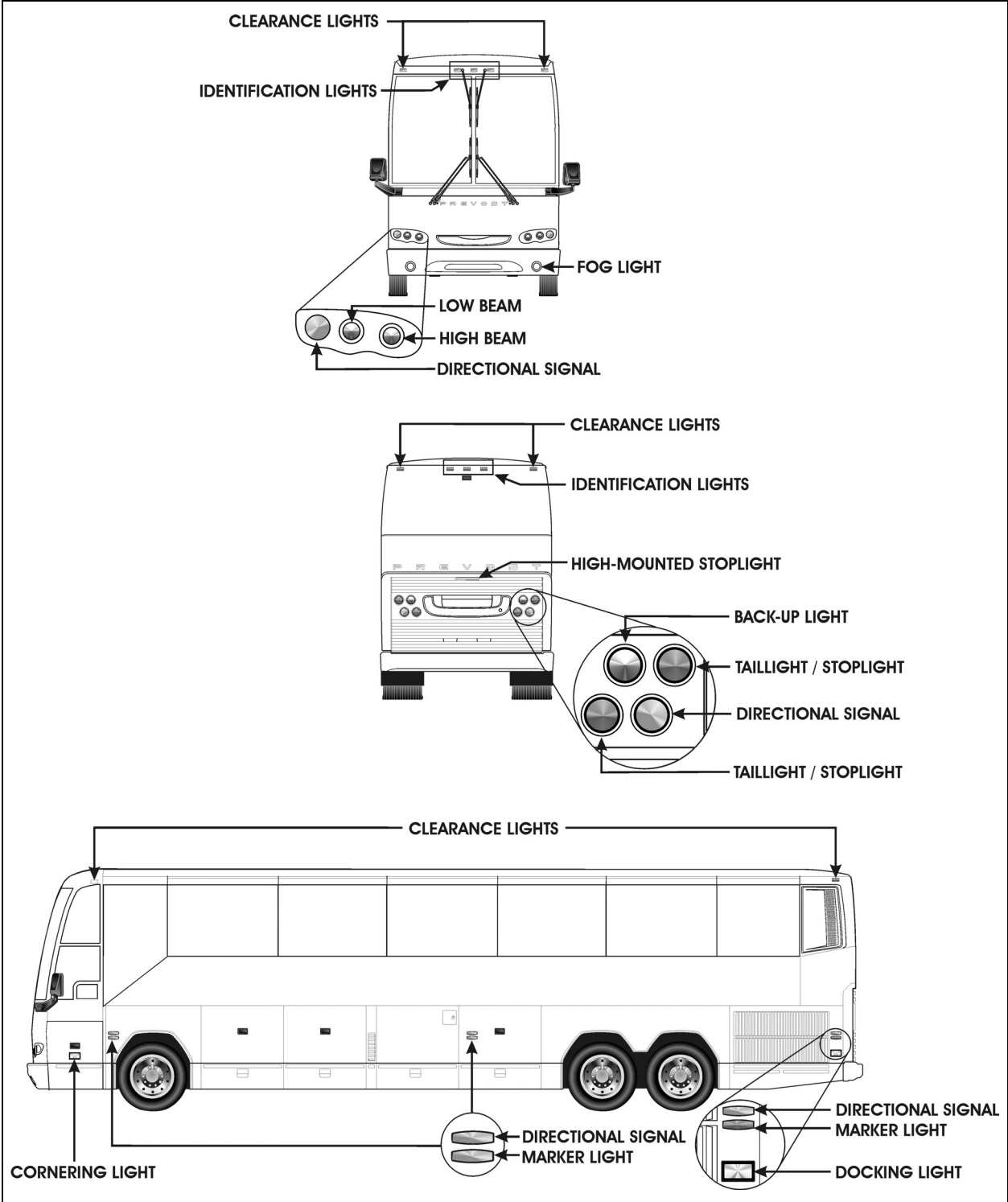


H3-41 (TYPICAL)

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- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Engine air intake 2. Engine compartment curb-side door 3. Main power compartment (battery compartment) 4. Baggage compartment 5. Fuel filler door 6. Condenser compartment 7. Entrance door control switch 8. Entrance door 9. Back up camera (optional) 10. 120-volt connector for block heater 11. Engine compartment rear door | <ol style="list-style-type: none"> 12. Rear-view mirror 13. Spare wheel compartment 14. Front electrical and service compartment 15. Driver's power window 16. Evaporator compartment 17. Radiator door 18. Diesel Particulate Filter (DPF) compartment access door |
|--|--|

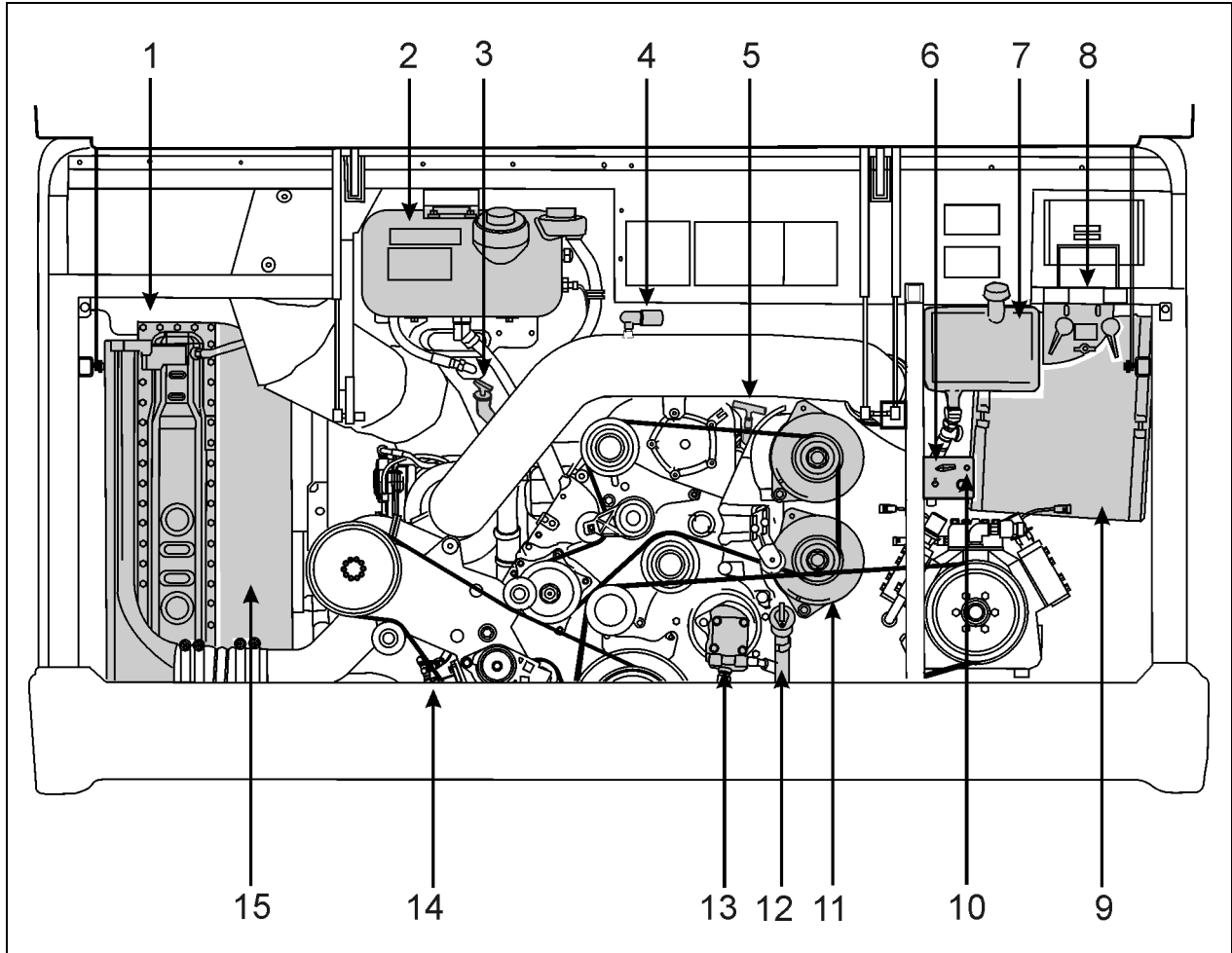
EXTERIOR LIGHTING



EXTERIOR LIGHTING

8 COACH EXTERIOR

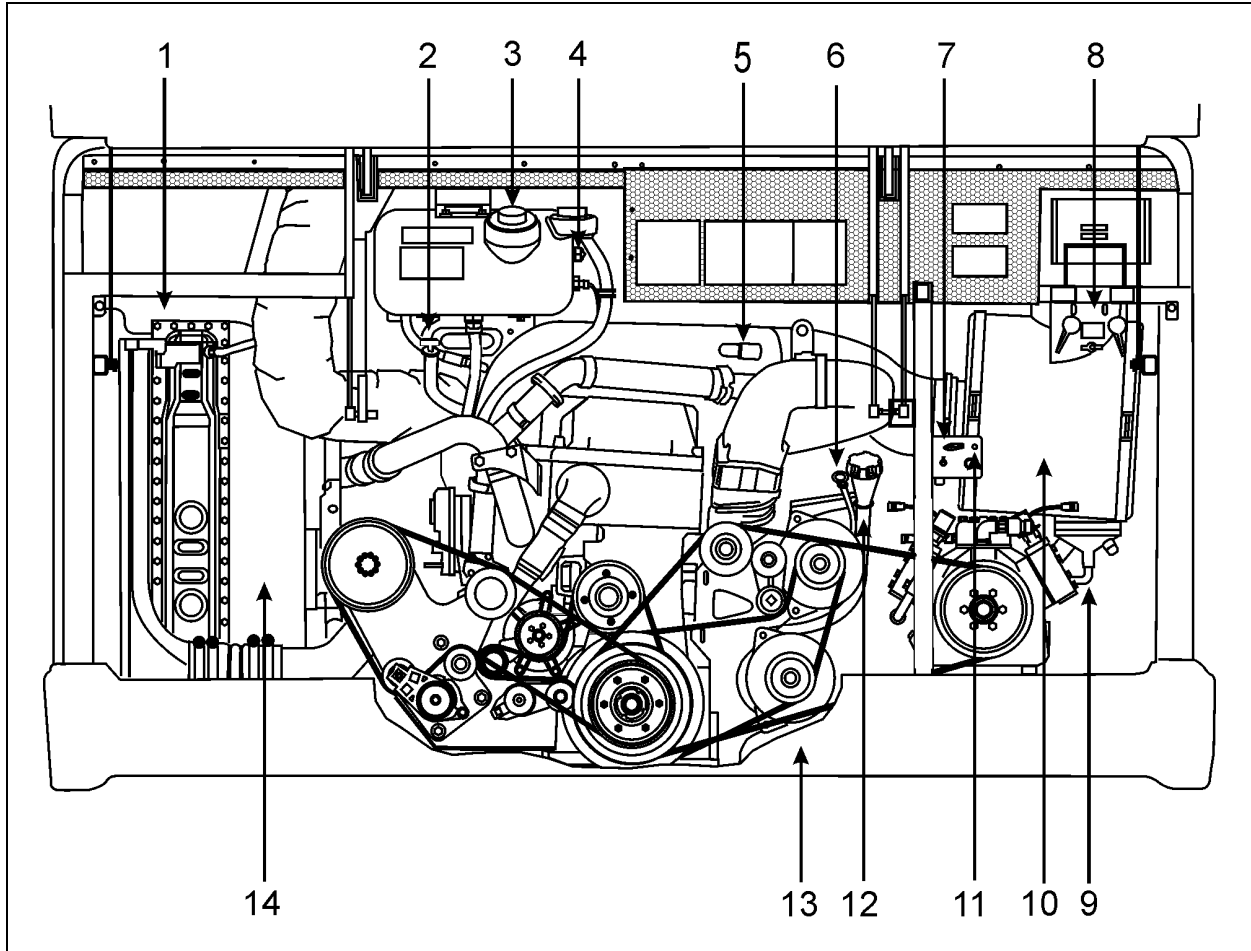
ENGINE COMPARTMENT



ENGINE COMPARTMENT WITH DDC SERIES 60 ENGINE

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- | | |
|--|---|
| 1. Radiator and charge air cooler | 8. Water tank fill coupling & cleaning kit coupling |
| 2. Coolant fluid surge tank | 9. Air filter |
| 3. Transmission fluid dipstick | 10. Engine compartment lighting switch |
| 4. Air filter restriction indicator | 11. Alternators |
| 5. Engine oil dipstick | 12. Engine oil filling tube |
| 6. Front/rear engine start selector switch, engine rear start push-button & belt tensioner control valve | 13. Power steering pump |
| 7. Engine oil reserve tank | 14. Engine coolant filter/conditioner |
| | 15. Fan shroud |



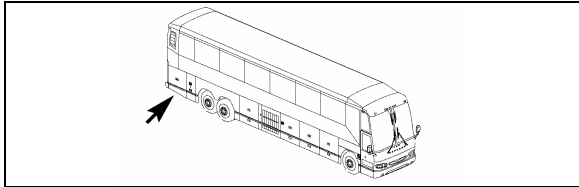
ENGINE COMPARTMENT WITH VOLVO D13 ENGINE

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- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Radiator and charge air cooler 2. Transmission fluid dipstick 3. Coolant surge tank filler cap 4. Sight glass 5. Air filter restriction indicator 6. Engine oil dipstick 7. Front/rear engine start selector switch, engine rear start push-button & belt tensioner control valve | <ol style="list-style-type: none"> 8. Water tank fill coupling & cleaning kit coupling 9. Power steering fluid reservoir 10. Air filter 11. Engine compartment lighting switch 12. Engine oil filling tube 13. Alternators 14. Fan shroud |
|--|--|

10 COACH EXTERIOR

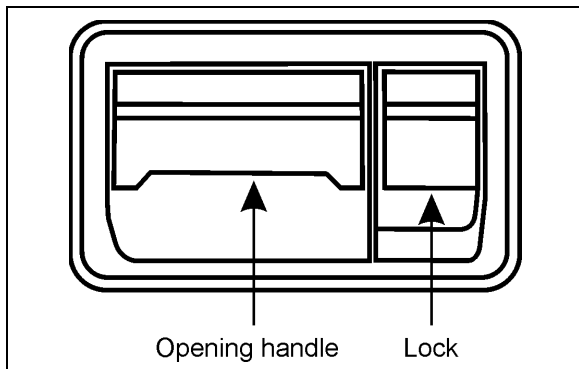
ENGINE COMPARTMENT CURB-SIDE DOOR



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

- Engine compartment rear door release lever;
- Detroit Diesel Fuel Pro 382 filtration system;
- Primary & secondary air system fill valve;
- Power steering fluid tank;
- Cold weather starting fluid bottle;
- Booster block terminals;
- Wet air tank drain cock;
- Engine air filter;
- Battery charger 110-120 volts connector ;
- Sump tank access cap.

This door can be locked or unlocked using the exterior compartment key. To open, pull up the door handle to release the latch and then pull the door open. The curb-side door also has a safety catch to prevent it from closing inadvertently. Release the catch before attempting to close.



DOOR HANDLE

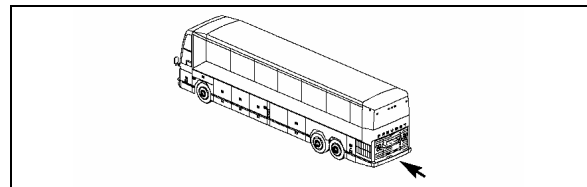
18184



WARNING

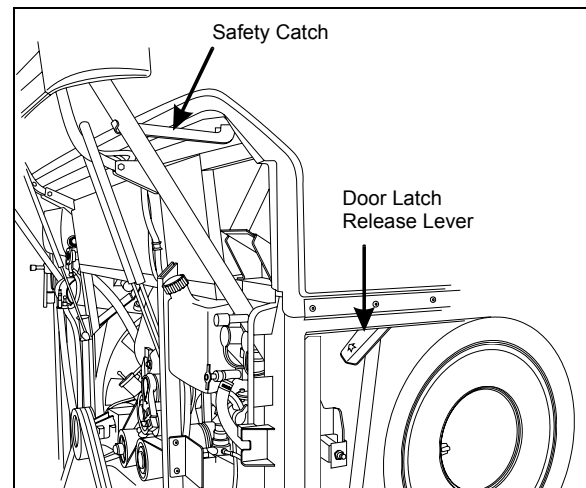
Unless otherwise stated, do not run the engine when the engine compartment curb-side door is open.

ENGINE COMPARTMENT REAR DOOR



To open the rear engine door, first open the curb side door then press the release lever. The rear door release lever is located in the upper rear section of the engine compartment, as seen when looking into the curb side engine compartment. Unlatch the door and pull it out and up. The door should stay open on it's own but it is recommended to always use the safety catch as shown.

The lighting in the engine compartment turns on automatically when the door is open if the engine compartment light switch is set to ON and the ignition switch is set to ON or ACC. Use this switch to turn off the light if not required when the door is open for a prolonged period. When open or not closed properly, a telltale light illuminates in the dashboard.



OPENING OF THE ENGINE COMPARTMENT REAR DOOR

18331

This door provides access to the following equipment:

- Engine;
- Alternator;
- Belts
- Compressor(s);
- Belt tensioning pressure control valve (see "CARE AND MAINTENANCE" chapter);

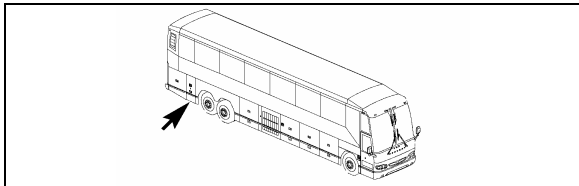
- Starter selector switch (see "STARTING AND STOPPING PROCEDURES" chapter);
- Plates and certification;
- Coolant fluid surge tank;
- Air filter restriction indicator;
- Couplings and valves for lavatory maintenance;
- Fresh water reservoir coupling;
- Engine oil dipstick;
- Engine oil reserve tank (with DDC S60 engine);
- Transmission oil dipstick;
- Coolant fluid surge tank & access cap.



WARNING

Unless otherwise stated, do not run the engine when the engine compartment curb-side door is open.

MAIN POWER COMPARTMENT (BATTERY)

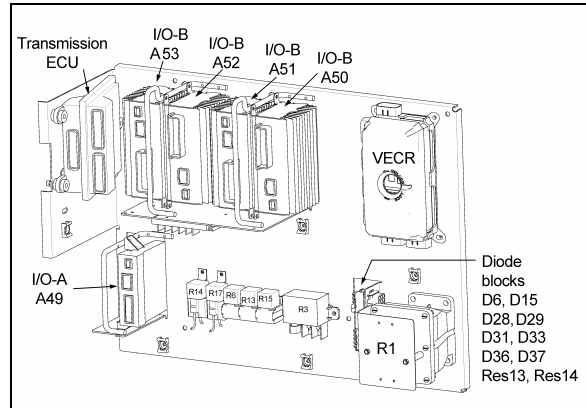


This compartment is closed off from the engine compartment and is used to house batteries and electrical components. The following items are located in the main power compartment:

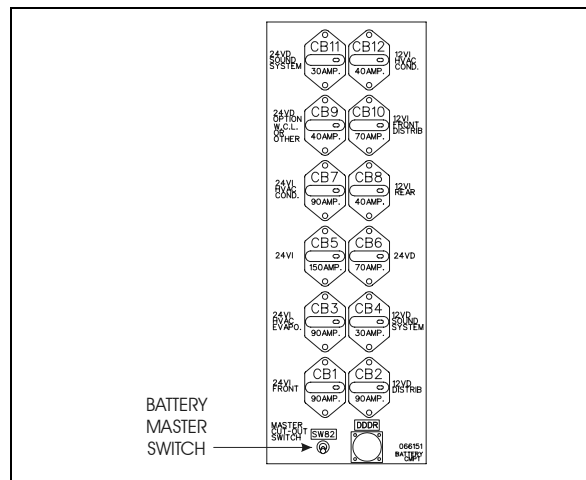
- (4x) 12 volt batteries;
- Main circuit breakers (12 & 24 volts);
- Battery charger (optional);
- Vanner battery equalizer;
- Battery master switch;
- Rear junction box;
- Rear multiplex modules;
- Transmission Control Module (TCM) for Allison transmission or ECU (Electronic Control Unit) for ZF-Astronic ;
- Rear fuse box (VECR);
- Relays;
- Electronic ground stud.

To open the door, insert the key in the lock and turn. The door will pop open.

Lights in the compartment turn *ON* automatically when the door is opened. A telltale light indicating a compartment door is open will illuminate on the dashboard.



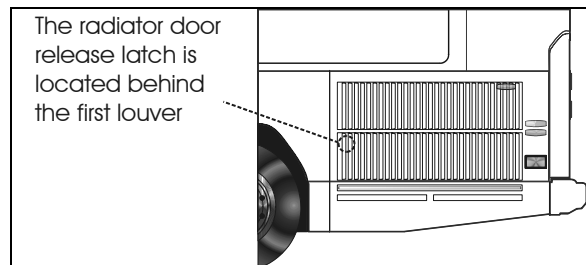
PARTIAL VIEW OF MAIN POWER COMPARTMENT



MAIN CIRCUIT BREAKERS 12 & 24 VOLTS

RADIATOR DOOR

Open the engine radiator door by pushing on the release latch.




RADIATOR DOOR RELEASE LATCH LOCATION


12 COACH EXTERIOR

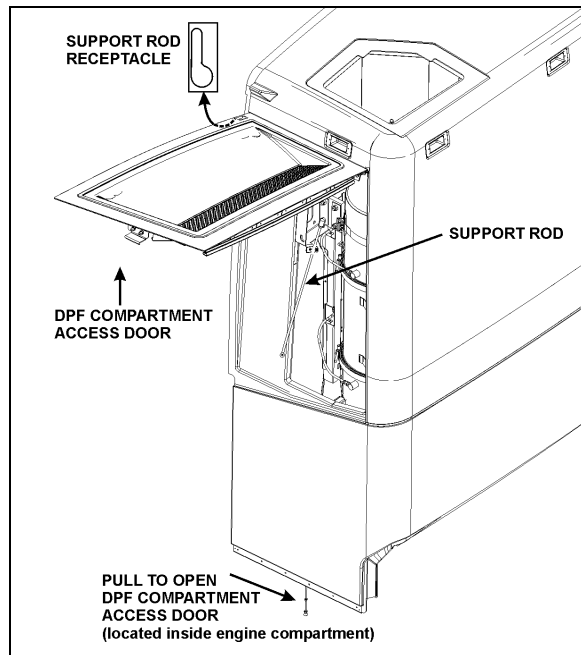
DIESEL PARTICULATE FILTER (DPF) COMPARTMENT ACCESS DOOR

To gain access to the DPF, open the engine compartment door first. On the left wall, under the DPF, 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 door.

	CAUTION
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.	

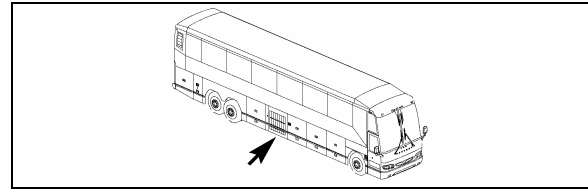
	CAUTION
External and internal temperatures remain hot long after engine has been shutdown. Allow the Aftertreatment Device and DPF to cool before handling. Wear protective clothing and glove while servicing.	



ACCESS TO THE DPF

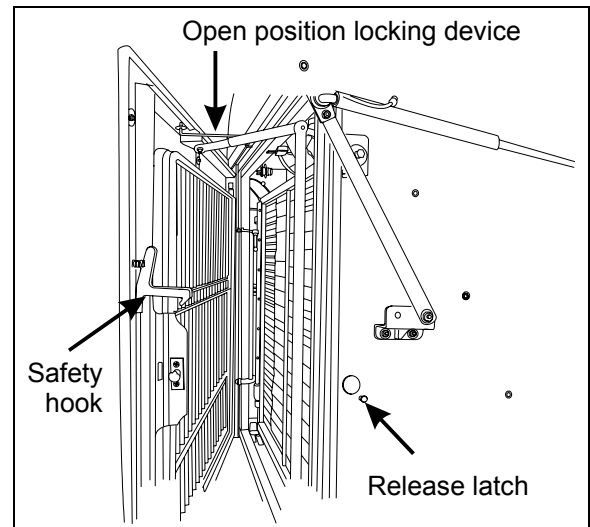
04018

A/C CONDENSER COMPARTMENT



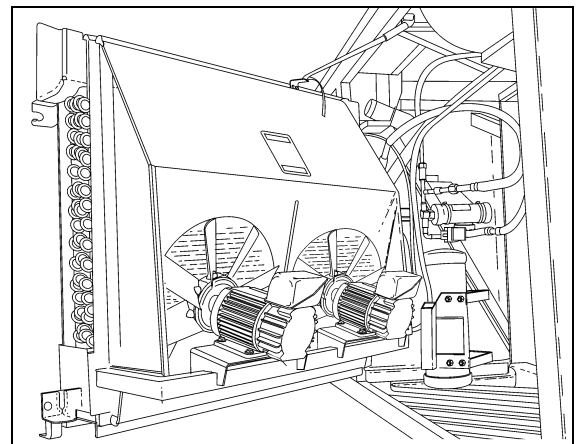
Pull the release latch located inside the adjacent baggage compartment to open the condenser door.

NOTE
<i>The locking device must be unbolted to fully swing open condenser compartment door.</i>



CONDENSER DOOR

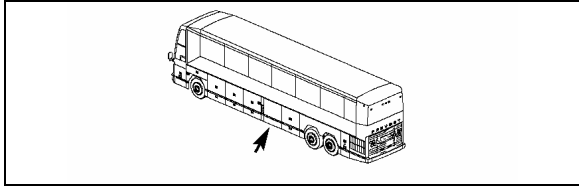
18311



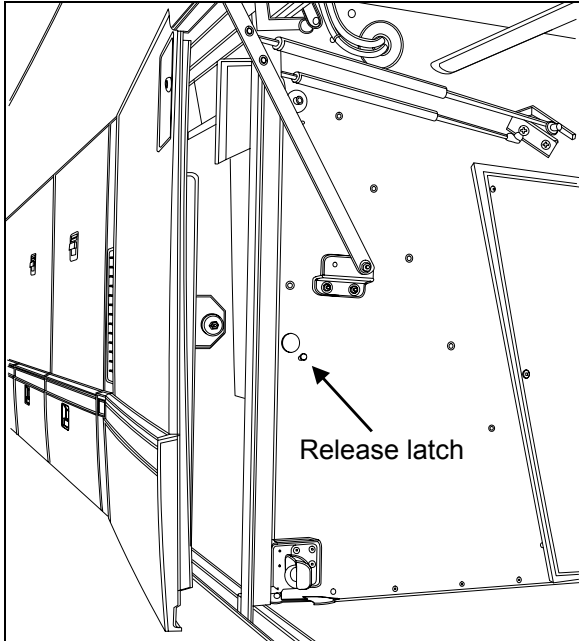
CONDENSER COMPARTMENT

22170_1

EVAPORATOR COMPARTMENT



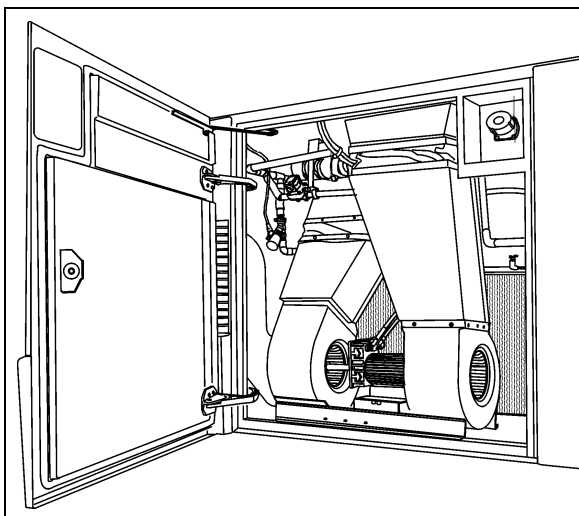
To access the evaporator compartment, pull the release latch located on the left side wall of the rearmost baggage compartment.



EVAPORATOR COMPARTMENT ACCESS

18306

The evaporator compartment contains relays, diodes and a multiplex electronic module mounted on a panel located on the R.H. side wall when facing the compartment:

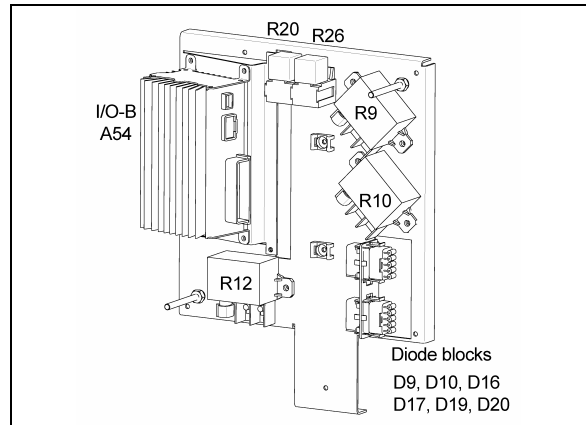


EVAPORATOR COMPARTMENT

22350

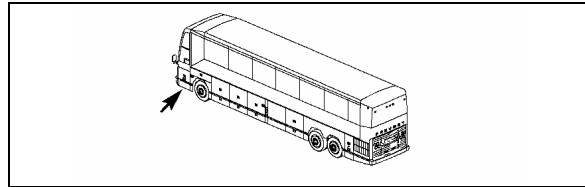
NOTE

It is important to keep the evaporator compartment door closed while checking the HVAC system to prevent faulty readings.



HVAC COMPONENTS PANEL

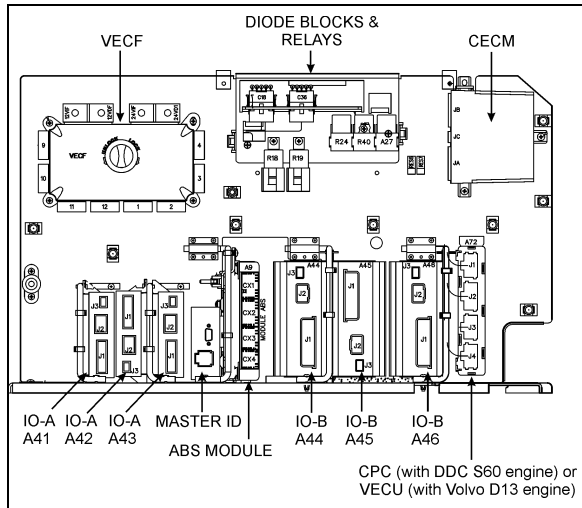
FRONT ELECTRICAL AND SERVICE COMPARTMENT



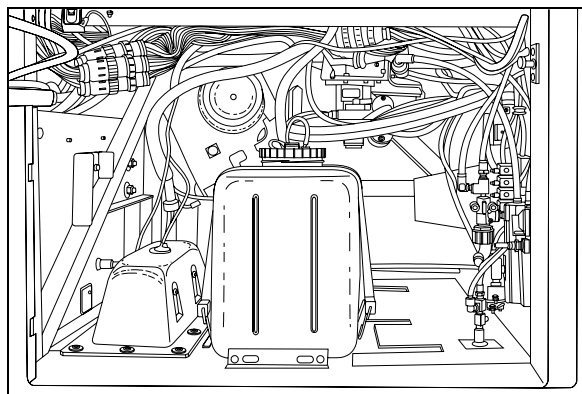
The front electrical and service compartment provides access to the following:

- Front fuse box (VECF) & spare fuses;
- ABS module;
- Common Powertrain Controller (CPC) (with DDC S60 engine);
- VECU (with Volvo D13 engine)
- Front multiplex modules;
- Relays & resistors;
- Kneeling audible alarm;
- Emergency door opening unlock valve;
- Windshield washer reservoir;
- Headlights washer reservoir;
- Reclining bumper opening handle;
- Accessories air tank purge valve;
- Accessories system fill valve;
- Spare wheel support and rail;

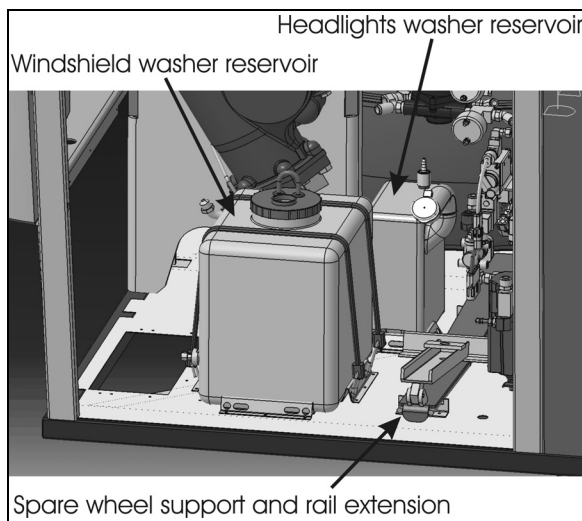
14 COACH EXTERIOR



FRONT ELECTRICAL & SERVICE COMPARTMENT 06665



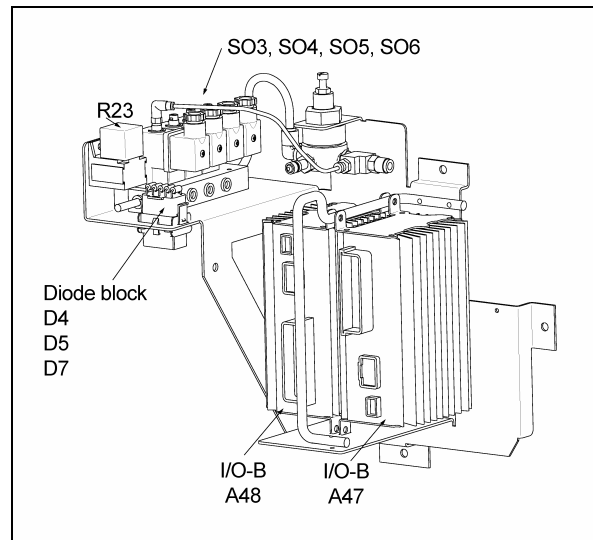
FRONT ELECTRICAL & SERVICE COMPARTMENT 14050



FRONT ELECTRICAL & SERVICE COMPARTMENT

This compartment door can be locked or unlocked using the exterior compartment key. The light in the front service compartment turns ON automatically when the door is opened.

RIGHT CONSOLE



PNEUMATIC ACCESSORY PANNEL

To access the pneumatic accessory panel of the right console, remove the panel under the larger utility compartment at the right of the dashboard.

BAGGAGE COMPARTMENTS

Baggage compartments can hold a maximum load of 2500 lb each, spread evenly over the floor. The total combined weight of cargo and passengers must not exceed 15660 lb. The baggage compartments can be locked or unlocked by using the exterior compartment key.

Pressurized cylinders assist the opening and closing of the baggage compartment doors.

To close, pull the door down by the notch in the lower part of the door. Once below a certain point, release the door and the cylinders will slam the door shut. Push-in the top part of the door past the safety catch on both sides to fully close.

Lights in the baggage compartments turn ON automatically when the door is opened. A telltale light illuminates in the telltale panel when a compartment door is open.

WARNING

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

NOTE

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

NOTE

The baggage compartment doors can be locked / unlocked by the optional central locking system. The switch is on the L.H. dashboard. Refer to "CONTROLS & INSTRUMENTS" chapter.

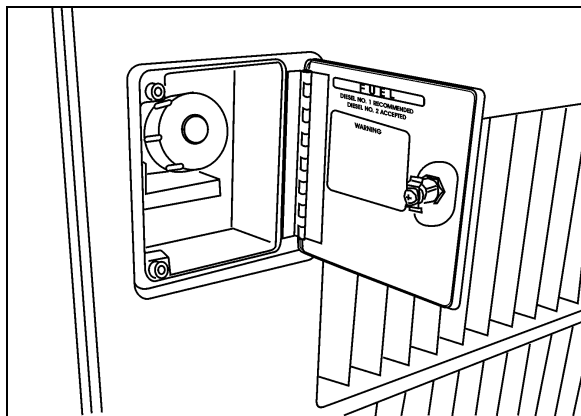
NOTE

To prevent the door from closing in case of defective cylinders, lock the door in open position by pushing it further towards the body of the coach, until it locks in place.

FUEL FILLER DOORS

There is one fuel filler door on each side of the coach, providing added convenience for refueling. Both fuel filler doors must be opened with the exterior compartment key. To open, turn the key ¼ turn clockwise and pull the door open.

It is recommended to refuel from the curb-side whenever possible, to avoid spilling fuel into the evaporator compartment. Any amount of fuel vapor in this compartment will be carried right up into the cabin by the HVAC system fresh air intake.



FUEL FILLER DOOR

03083

NOTE

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



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.

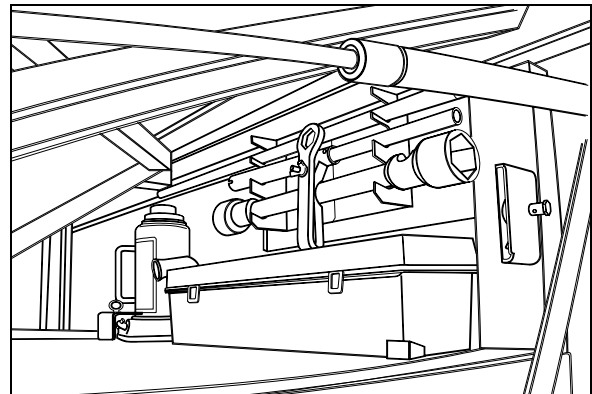
SPARE WHEEL COMPARTMENT

The spare wheel is located in the compartment behind the front bumper.



WARNING

This compartment is not designed for miscellaneous storage. Never store loose objects in this compartment because they can interfere with the steering linkage mechanism.



TOOLS IN FIRST BAGGAGE COMPARTMENT

13015

To access the spare wheel compartment, pull on the release handle located in the front electrical and service compartment, near the lower door hinge. The bumper will lower gradually.

NOTE

The jack and tools are located in the first baggage compartment.

When closing the compartment, be sure the bumper is firmly in place.

ENTRANCE DOOR

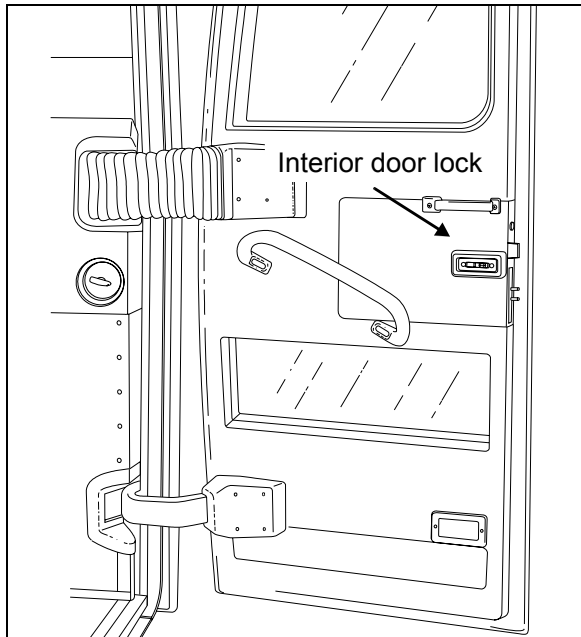
Lock or unlock the entrance door from outside the vehicle by turning the key in the door lock (counterclockwise to lock, clockwise to unlock).

16 COACH EXTERIOR

To unlock the entrance door from the inside, slide the lock lever on the inside of the door to the left. If the orange tab on the door-lock lever is visible, the door is unlocked.

NOTE

If the interior lever is used to exit the coach and the key is not used to unlock the door, it will lock again upon closing. Remember to remove the keys upon exiting.

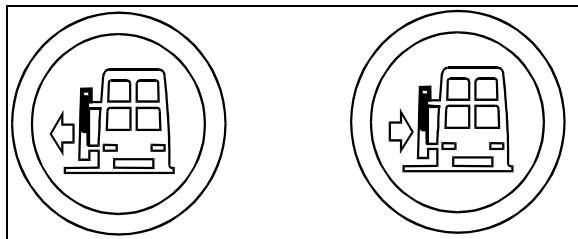


ENTRANCE DOOR

18437

ENTRANCE DOOR OPENING INTERIOR OPERATING SWITCHES

From the inside, open the door by pressing the door opening switch on the dashboard. Close by pressing the door closing switch on the dashboard. Refer to "CONTROLS AND INSTRUMENTS" chapter for more information.

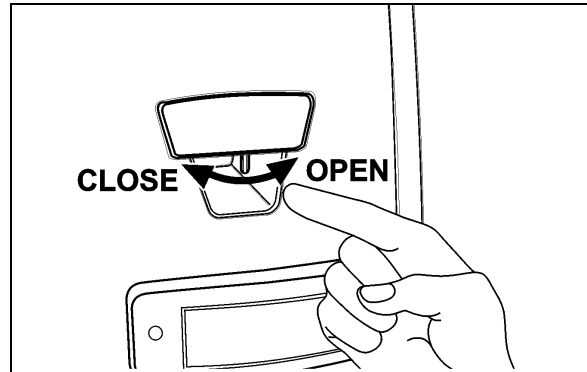


DASHBOARD SWITCHES

06464

ENTRANCE DOOR OPENING EXTERIOR OPERATING SWITCH

Opening and closing of the door may also be pneumatically controlled from the outside using the 3-position switch located on the door L.H. side. Open the door by pushing the switch forward, close by pushing the switch rearward.



EXTERIOR DOOR OPERATING SWITCH

18316

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.

When the door is almost shut, a mechanism will finish the closing of the door. This works even when the door is shut manually.

EMERGENCY DOOR OPENING

Refer to "SAFETY FEATURES AND EQUIPMENT" chapter.

WHEELCHAIR LIFT DOOR

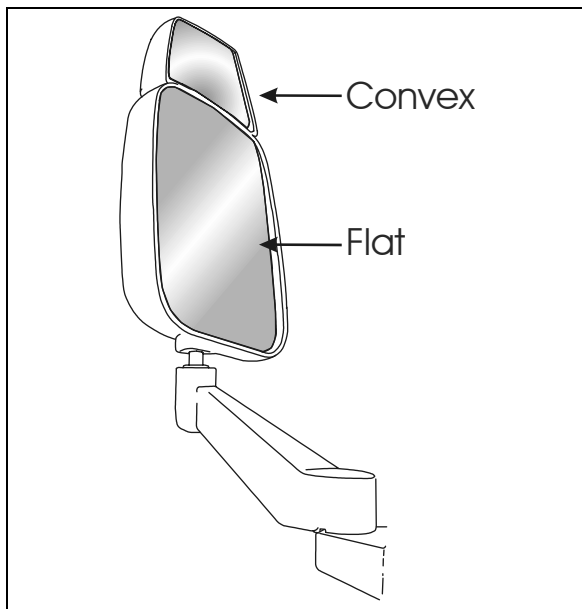
To open the optional wheelchair lift door, the coach must be parked on a flat and level surface with the parking brake on. The wheelchair access door swings to the side and is maintained open by a locking mechanism. Open the baggage compartment containing the lift mechanism (Ricon only). The baggage compartment door is located directly below the wheelchair lift door and it opens to the side. If the parking brake is not activated, a switch in the

door will activate the parking brake when it detects the door is open.

Open the door completely until it locks in the open position. To close the door, lift on the locking mechanism arm and slam the door shut. Refer to "Other Features" for more information on operating the optional wheelchair lift.

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

18443

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.

ELECTRICALLY ADJUSTED REAR VIEW MIRRORS (RAMCO)

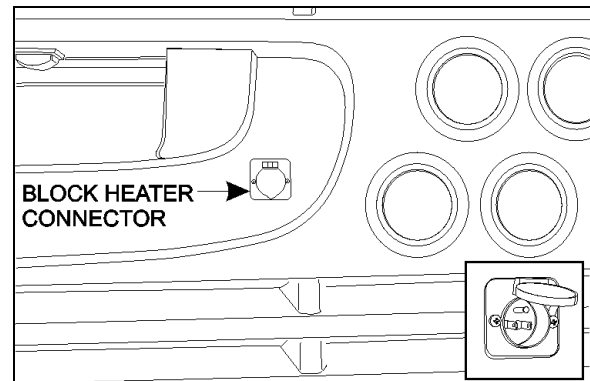
The mirrors are adjusted using the controls located on the L.H. control panel. Refer to "CONTROLS & INSTRUMENTS" chapter. Manual adjustment is also possible.

Adjust the side-view mirrors until the side of the vehicle is visible. Adjust the flat-type mirror until the road behind is in full view.

BACK UP CAMERA

An optional back up camera is available which provides the driver with visual assistance when backing up. Rear-view TV monitor is located at the dashboard L.H. side on the windshield post. For additional information, refer to "CONTROLS & INSTRUMENTS" and "CARE AND MAINTENANCE" chapters.

110-120 VOLTS CONNECTORS



110-120 VOLT CONNECTOR

06675

All connectors must be used with a 110 - 120 volt grounded supply. A connector is located on the rear engine door and is connected to the engine block heater and to the fresh water tank heater, if equipped. Another optional connector may be located on the engine R.H. side access compartment door. It connects to the battery charger and allows for in-station lighting. Refer to "OTHER FEATURES" chapter.

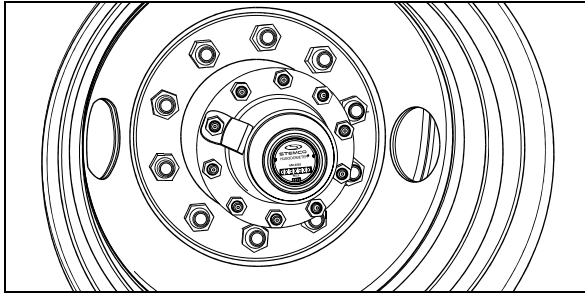
HUBODOMETER

An odometer may be 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.

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NOTE

It is normal for hubodometer, transmission TCM/ECU and DDEC MCM to disagree on mileage.



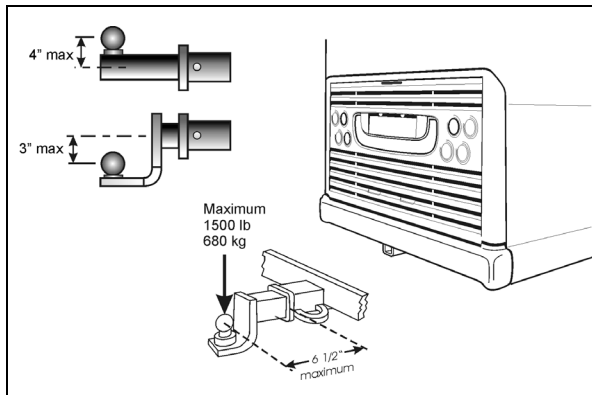
HUBODOMETER

13012

TRAILER HITCH

Your vehicle may be equipped as a special option with a factory installed trailer hitch which has been designed to meet SAE Class 4 specifications:

- **Maximum gross trailer weight: 20,000 lb (9,072 kg)**
- **Maximum tongue weight at 6 ½ inches (165 mm) or less from coupling receiver : 1,500 lb (680 kg)**



TRAILER HITCH

18487



WARNING

The draw bar and the ball used for towing the trailer should be rated for 20,000 lb 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.



CAUTION

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

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

- C) 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

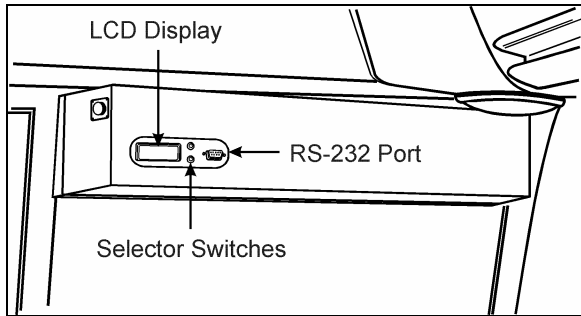
occurrence of a metal fracture of either coupling ball or coupling assembly, which results in separation of the ball from the coupling ball socket.

- D) 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.
- E) 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.

To change the destination, depress the selecting switches until the desired destination appears in the Liquid Crystal Display.



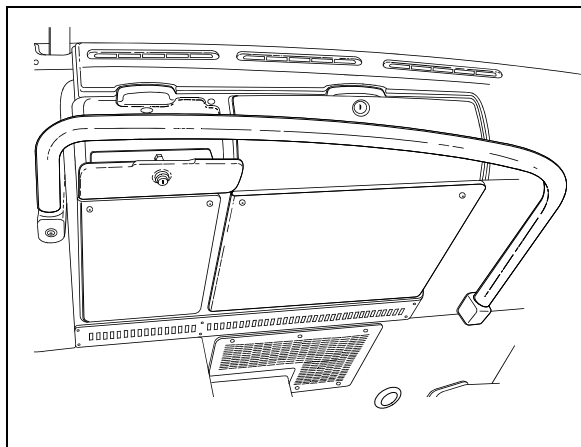
ELECTRONIC DESTINATION SIGN 2EH3B210

NOTE

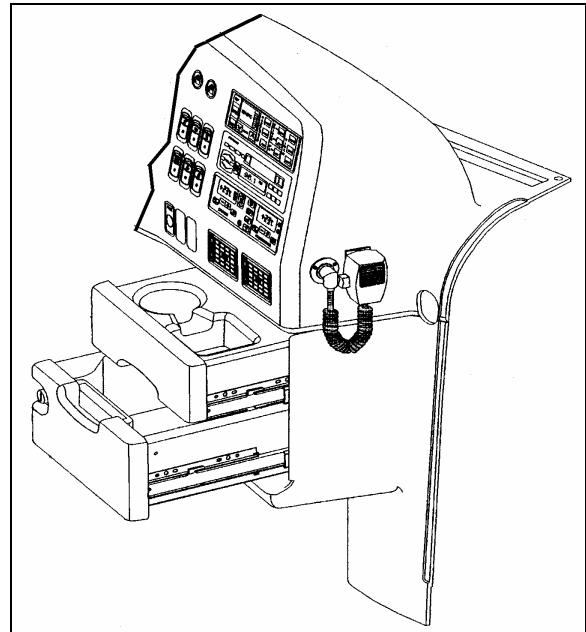
The destination sign must be programmed with a computer connected to the RS-232 connector prior to first use. Follow the instructions on the computer disk to install and run the software.

UTILITY COMPARTMENTS

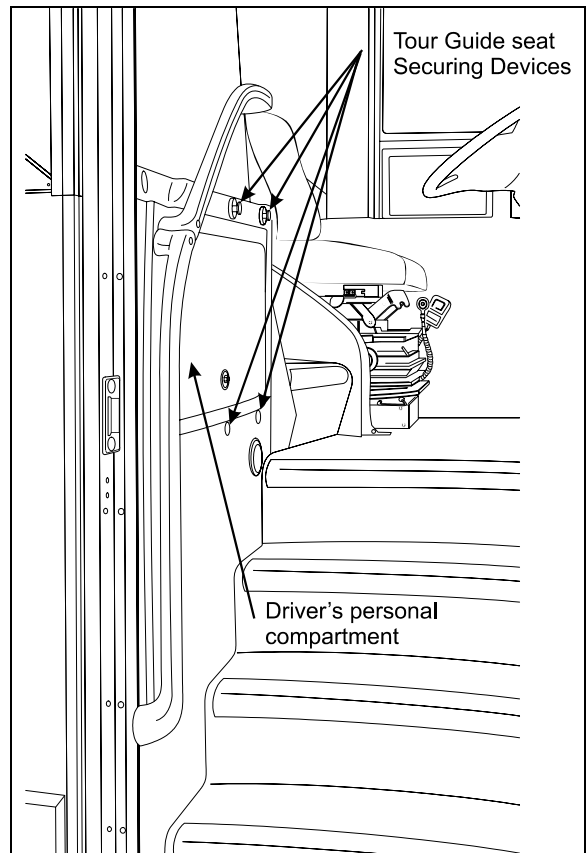
Two lockable utility compartments are located at the base of the windshield. Two stack drawers are located on the dashboard R.H. side. The top drawer includes a built-in cup holder and the lower one has a 12 volt appliance socket. To open this drawer, you must first depress the lock.



UTILITY COMPARTMENTS 18504



UTILITY COMPARTMENTS IN CONSOLE 18444



DRIVER'S PERSONAL COMPARTMENT 18507

A lockable compartment for the driver is located on the L.H. side of the entrance stepwell. This compartment may be locked using the appropriate key. A tour guide seat is available as an option and is installed in front of the driver's

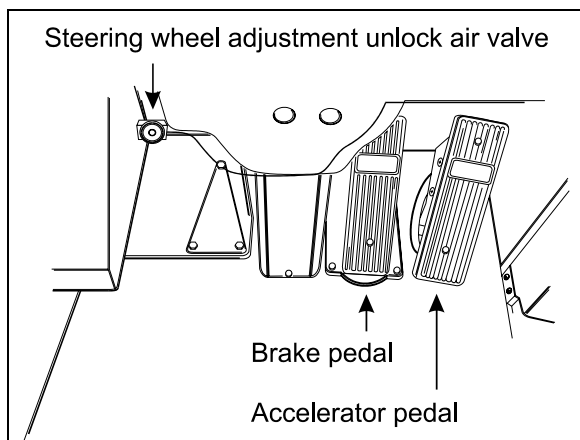
22 COACH INTERIOR

compartment using the securing devices as shown hereafter.

The last compartment is located on the lateral control panel. It is lockable and equipped with a 12 volt appliance socket. To open this compartment, you must first depress the lock

STEERING WHEEL ADJUSTMENT

To unlock the steering wheel for tilt and telescopic adjustment, push with the left foot on the valve button located in the footwell. Refer to "CONTROLS & INSTRUMENTS" chapter, paragraph: Foot-Operated Controls.



FOOT OPERATED CONTROLS

00023



WARNING

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.

INTERIOR MIRRORS

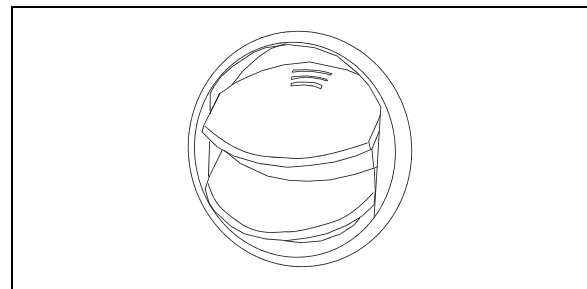
Two manually adjustable mirrors are located in the driver's area. The one located in the upper left corner enables to eliminate the blind spot on the R.H. side of the coach. Adjust it to see through the R.H. side trapezoidal window. A central mirror allows the driver to see in the aisle. Adjust mirror manually.

DRIVER'S AREA ADJUSTABLE AIR 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. side and one on the left (refer to "CONTROLS &

INSTRUMENTS" chapter). Two more registers are located near the steering wheel column, under the dashboard. These registers are not adjustable but may be electrically open or closed by means of the HVAC control panel. Two registers located in the driver's area are part of the passengers heating & ventilation system, one register is located behind the driver's seat and one is located close to the door, below the modesty panel wall for step de-icing. The direction and volume of air flow for these two registers are adjustable manually.

Use the HVAC control panel to set air temperature.



AIR REGISTER

22246

DRIVER'S SEAT - ISRI

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



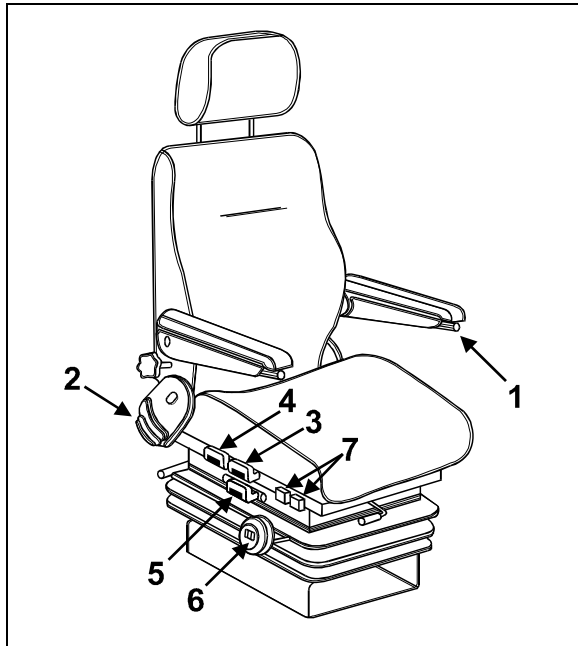
WARNING

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

MECHANICAL ISRI SEAT

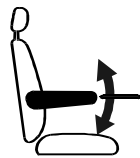
Driver's Seat Adjustment

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



DRIVER'S SEAT ADJUSTMENT (MECHANICAL) OEH3B220

Armrest



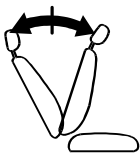
The driver's seat can be equipped with two folding armrests which can be raised or lowered for convenience.

To lower the armrest, turn the control knob (1) counterclockwise

without applying pressure on the armrest, push the armrest to the desired position.

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

Backrest



Lift lever (2) then adjust backrest to desired angle.

Tilt (front)



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

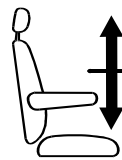
Tilt (rear)



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.

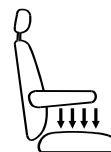
Fore and Aft



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 counterclockwise to decrease resistance.

NOTE
Air suspension seats self-adjust to the driver's weight. There is no handwheel suspension adjustment.

24 COACH INTERIOR

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



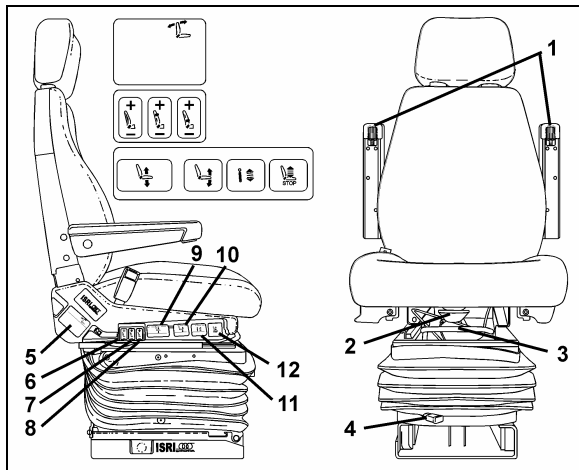
The headrest can be adjusted forward, rearward and vertically by 2 inches (50 mm). Directly move headrest to desired position.



WARNING

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 50mm 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 adjustment angle of backrest.

Air Side Bolster (6)

Offers desired side support to avoid body side-way.

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. 100mm 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)

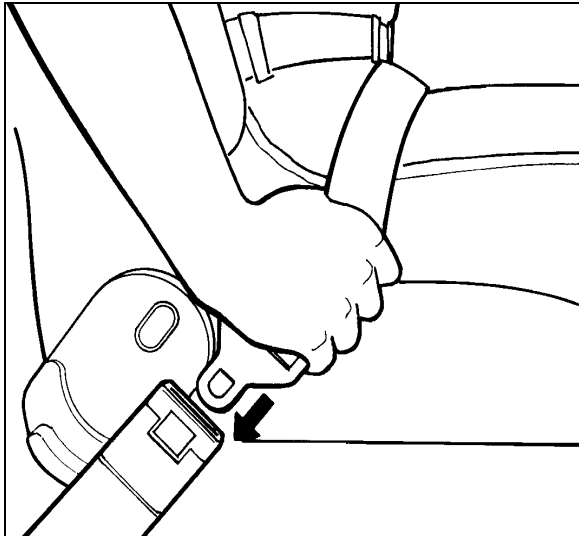
Exhausts all air from suspension, allowing for easy entry/exit. Returns seat to previous position.

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 a Prevost Car service center immediately.

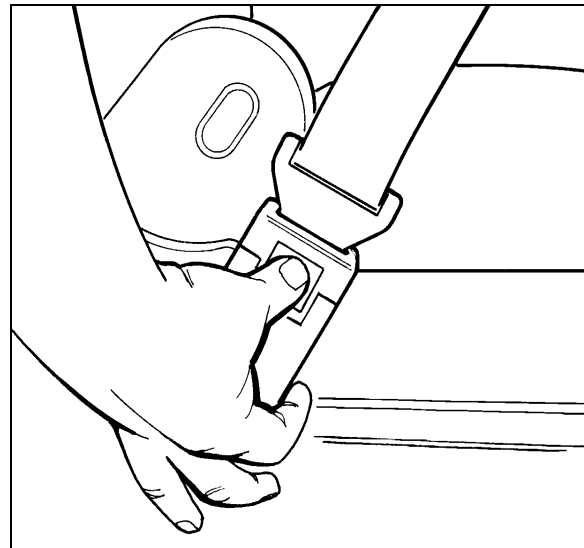
NOTE

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.



TO FASTEN SEATBELT

18028



TO UNFASTEN SEATBELT

18029



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.

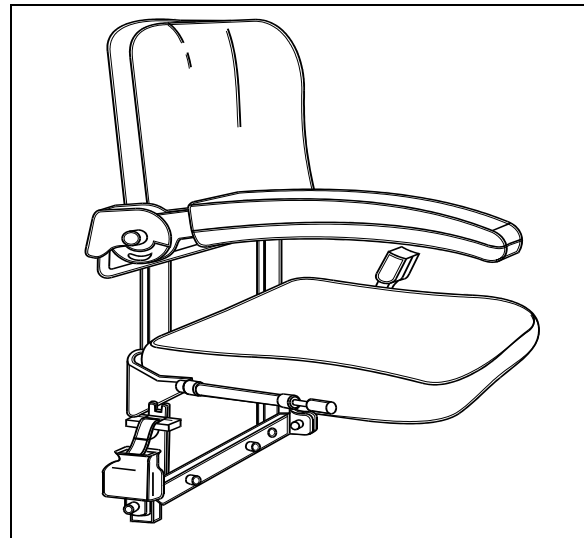
To unfasten belt, press the red button in center of buckle and allow belt to retract. If the belt does not fully retract, pull it out and check for kinks or twists. Make sure that it remains untwisted as it retracts.



WARNING

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

TOUR GUIDE SEAT



TOUR GUIDE SEAT

OEH3B222

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 driver's personal 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.



WARNING

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

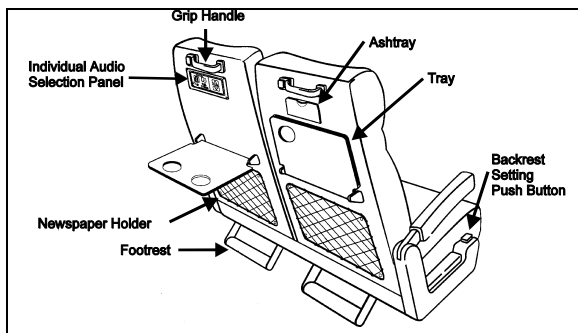
MICROPHONE JACKS

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

- On the side wall of the driver's lateral 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

OEH3B226

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 the 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

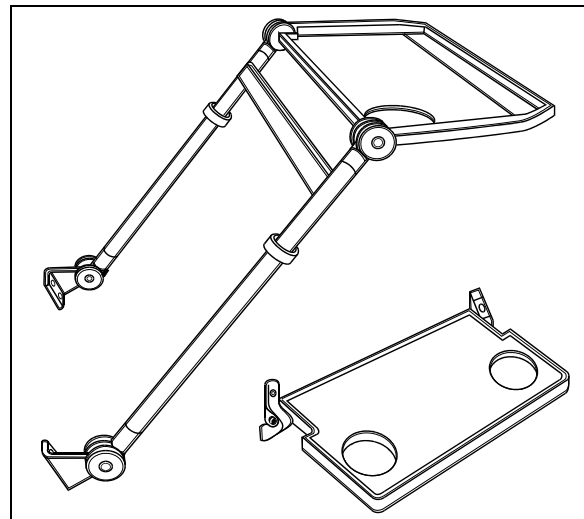
Instructions for making swivel seat adjustments are affixed on the rear frame under the seat cushion.

FOLDING TRAYS

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

NOTE

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



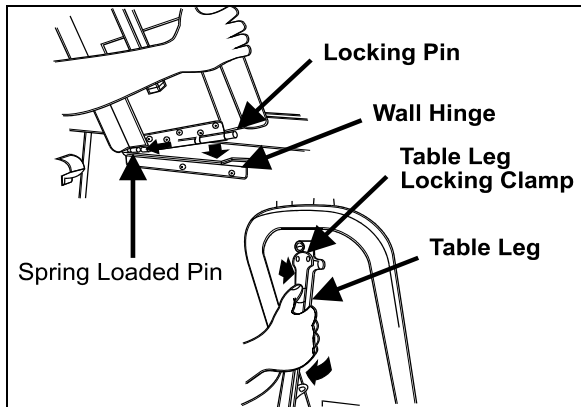
FOLDING TRAY MODELS

OFH3B232

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.

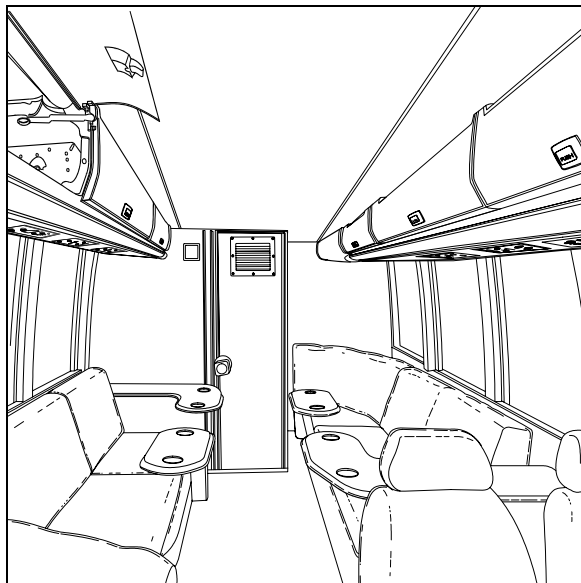


CARD TABLE INSTALLATION OEH3B234

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 18445

OVERHEAD CONSOLE

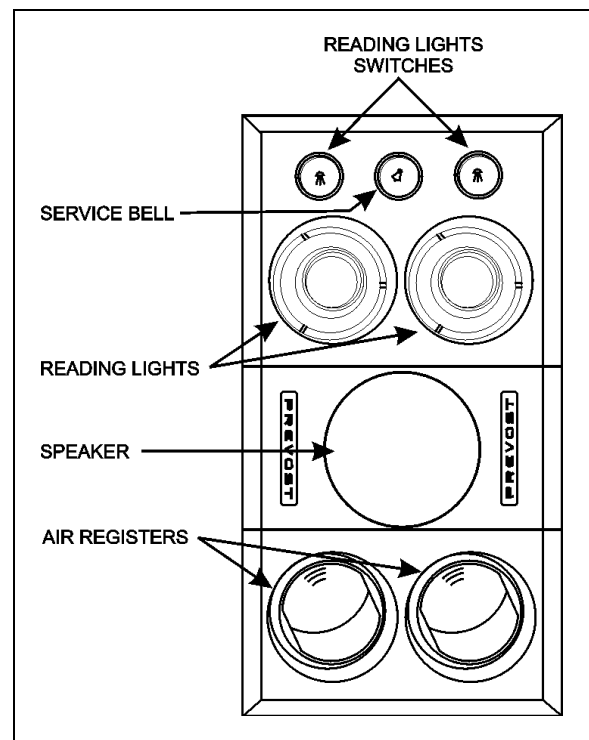
One airplane type overhead console is installed for each row of twin seats. Such amenities as reading lights, air vents and an optional service bell are controlled from this panel.

ADJUSTABLE AIR REGISTERS

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.



OVERHEAD CONSOLE 23137

READING LIGHTS

Reading lights are located on the overhead console and mounted underneath the overhead storage compartments. Depressing a rocker switch located on the dashboard (refer to "CONTROLS & INSTRUMENTS" chapter) will activate

28 COACH INTERIOR

the reading light circuit and allow passenger control of reading lights.

WINDOWS

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

PANORAMIC WINDOWS

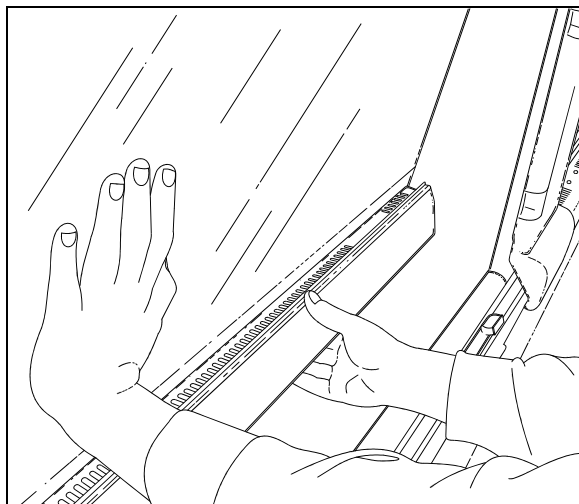
Panoramic side windows can come in either single pane or, as an option, double pane (thermopane) glass. Some of these windows are of the fixed type and cannot be opened. Others can be easily opened to serve as emergency exits.

Fixed Windows

These windows are mechanically attached to the structure and 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.



EMERGENCY WINDOW

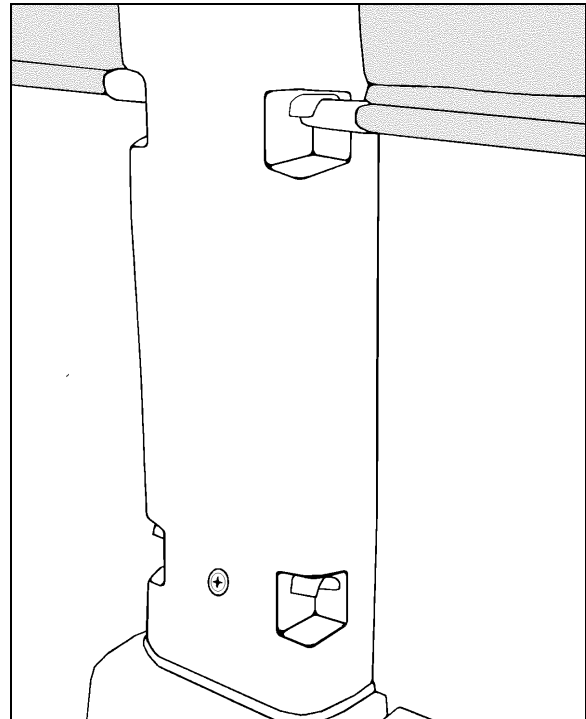
18391

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.

Window Sun Shades

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.



PASSENGER SUN SHADES

23130

DRIVER'S POWER WINDOW

The driver has a power window on the left side of the coach. The window is controlled by a rocker switch located on the lateral control panel. Refer to "CONTROLS AND INSTRUMENTS" chapter.

Driver's window shades

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.

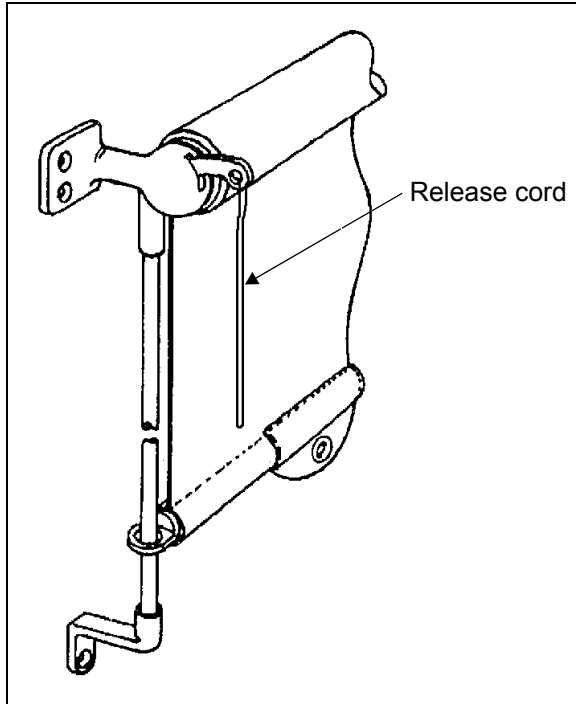


CAUTION

The electric shades should only be operated electrically. Pulling down manually may damage the mechanism.

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

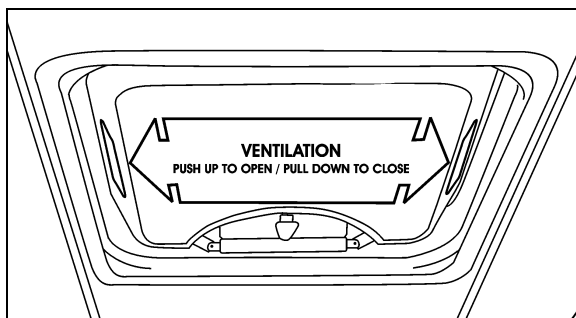
on the optional driver's guard. To operate, pull down the shade by its hem to the appropriate position and release. It will remain in position. To raise, depress the unlocking lever and guide the shade back up using the other hand.



SPRING RELEASE SUNSHADE 23019

VENTILATION HATCH

A ventilation hatch is installed on the roof at the rear of the coach. A second, optional hatch can be installed on the roof 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 removed for emergency exit. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter.



VENTILATION HATCH 23385



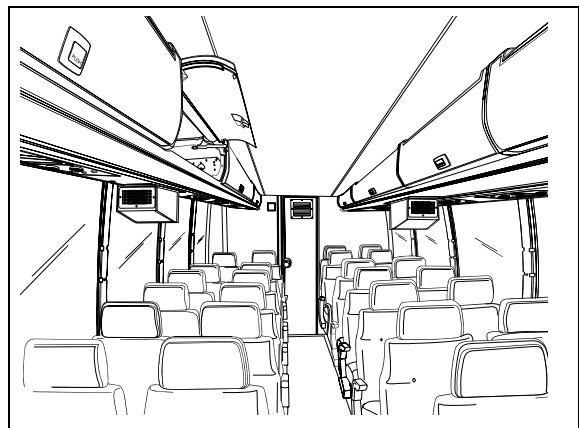
WARNING

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.



OVERHEAD STORAGE COMPARTMENTS 18390

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 to protect the optional audio/video equipment.

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

30 COACH INTERIOR

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 cleaning cabinet, containing a coiled hose. 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.

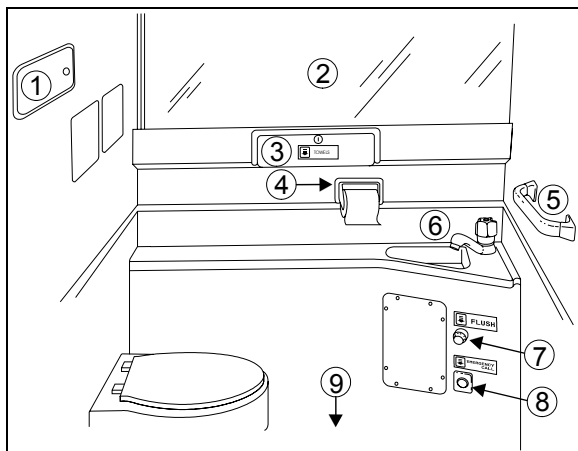
A telltale light on the dashboard will illuminate to inform the driver when the lavatory is occupied. A night-light is permanently lit in the lavatory when the ignition switch is in the ON position.

If emergency assistance is required, the lavatory occupant can actuate a buzzer that will sound in driver's area. The buzzer push-button and instruction label are located on the wall of the lavatory.

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

The fresh water tank may be equipped with an immersion heater that is supplied by the 110/120 volt connector for the engine block heater.

1. Cleaning cabinet;
2. Mirror;
3. Paper towel dispenser;
4. Toilet paper roll;
5. Grip handle;
6. Faucet;
7. Flush button;
8. Emergency call button;
9. Waste basket.



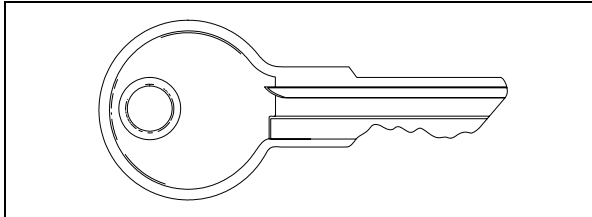
LAVATORY

23035

KEYS

Depending on options, up to nine 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. With the battery master switch activated, turn the ignition key counterclockwise to the ACC position to activate the electrical circuits.

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



CAUTION

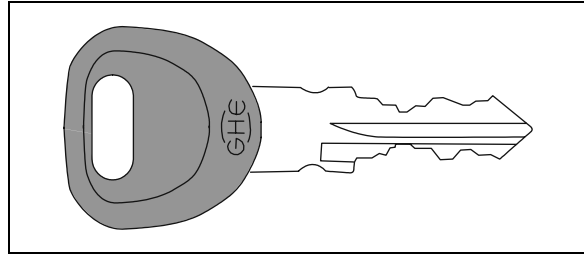
When the vehicle is parked overnight or for an extended period of time, the battery master switch should be set to the *OFF* position.

NOTE

When the battery master 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, TCM/ECU power (transmission), coolant heater electronic timer, coolant heater and water re-circulating pump, pro-driver, power-verter, entrance door and fire alarm.

ENTRANCE DOOR, EXTERIOR COMPARTMENTS AND LAVATORY DOOR LOCKS KEY

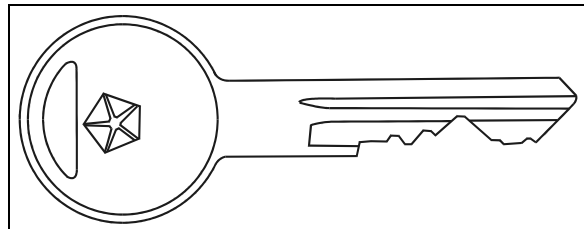
Use this key to lock or unlock the entrance door, the baggage bay doors, the electrical and service compartment doors, the lavatory door and the fuel filler doors.



ENTRANCE DOOR, EXTERIOR COMPARTMENT AND LAVATORY DOOR LOCKS KEY 23302

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

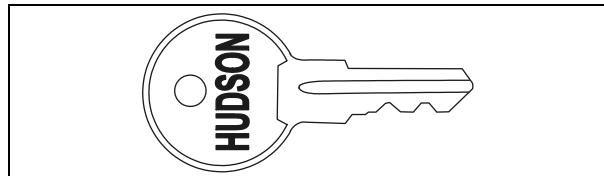
DRIVER'S PERSONAL COMPARTMENT KEY



DRIVER'S PERSONAL COMPARTMENT KEY 23343

Use this key to lock or unlock the driver's personal compartment, accessible through the stairway wall.

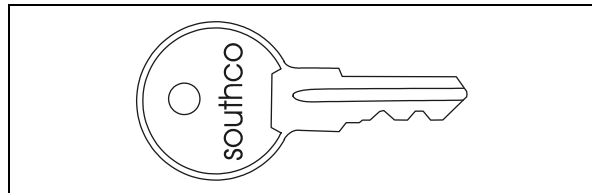
UTILITY COMPARTMENT KEY



UTILITY COMPARTMENT KEY 23344

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

HAND TOWEL DISPENSER KEY



BATHROOM TISSUE DISPENSER KEY 23345

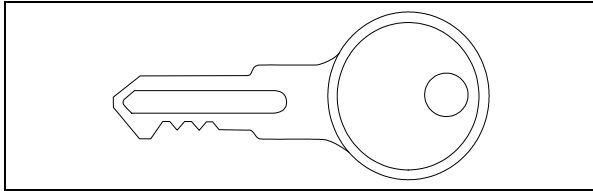
This key opens the hand towel dispenser in the lavatory.

NOTE

The optional moist towel dispenser uses a different key.

32 CONTROLS AND INSTRUMENTS

DVD COMPARTMENT KEY

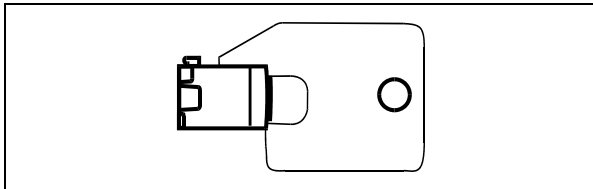


DVD COMPARTMENT KEY

23246

Use this key to lock or unlock the overhead compartment containing the DVD player.

TV MONITOR KEY



TV MONITOR KEY

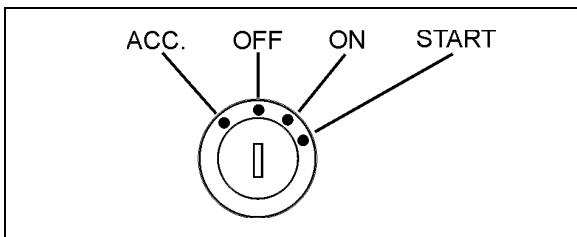
23248

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 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 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 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 key 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 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 key is in this position. Do not leave the key in this position unless the engine is running.

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. If a prolonged use of the functions with the engine not running is necessary, connect the battery to a charger.

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.



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.

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. For further information, refer to "Starting The Engine" in "STARTING AND STOPPING PROCEDURES" chapter.

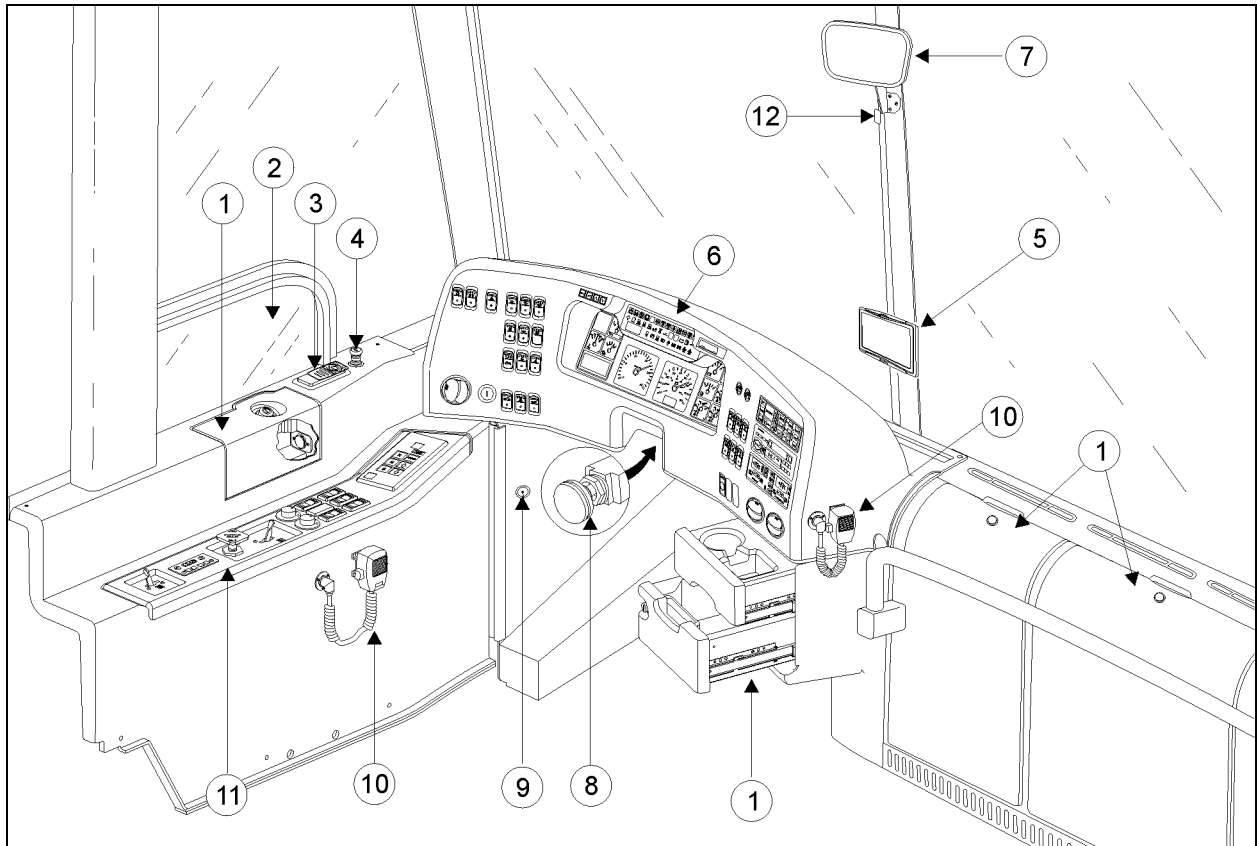


WARNING

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.

34 CONTROLS AND INSTRUMENTS

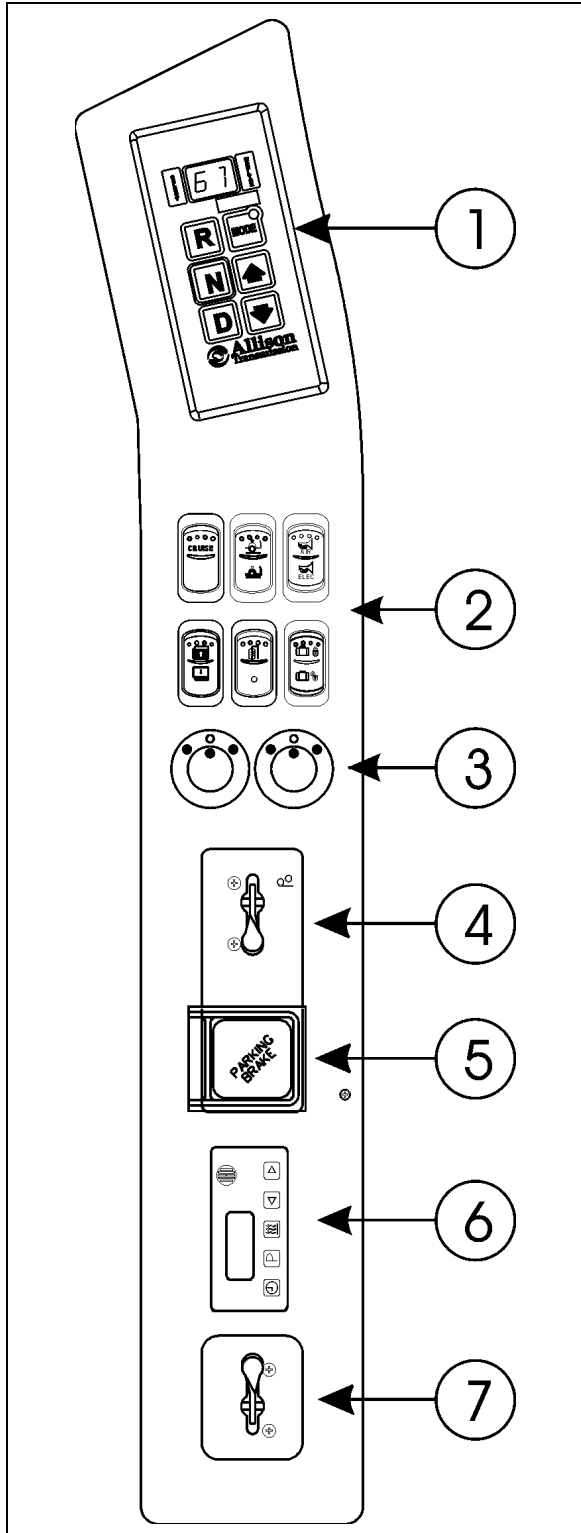


DRIVER'S AREA

18605_a

1. Utility compartments
2. Driver's power window
3. GPS navigation system remote control
4. Cigarette lighter
5. GPS navigation system display
6. Dashboard
7. Mirror
8. Foot-operated steering wheel adjustment
9. Diagnostic Data Reader (DDR) receptacle
10. Microphone
11. Lateral control panel
12. DVD player remote control IR sensor

LATERAL CONTROL PANEL



LATERAL CONTROL PANEL (TYPICAL)

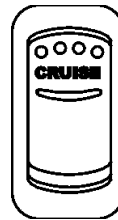
06999

① TRANSMISSION CONTROL PAD

The control pad for the automatic transmission is located as shown. Refer to "Automatic Transmission" in this chapter for operating instructions and more information.

② CONTROL SWITCHES

Cruise Control Switch

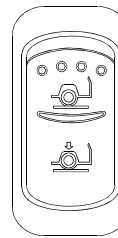


06701

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

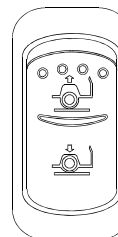
Momentarily press the rocker switch downwards to lower the front end of the coach 4 inches (100 mm). Momentarily press the rocker switch upwards to raise the coach to the normal driving height. Refer to "OTHER FEATURES" chapter for more information.

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

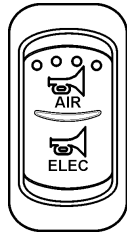
36 CONTROLS AND INSTRUMENTS

return the coach to the normal driving height.

NOTE

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

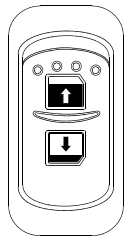
Horn Selector



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

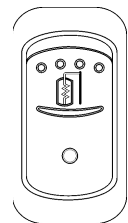
Use this rocker switch to open or close the driver's power window.



CAUTION

Close power window when parked or leaving the coach unattended.

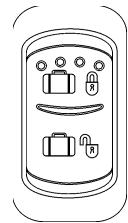
Outside Rear View Mirror Heat (Optional)



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.

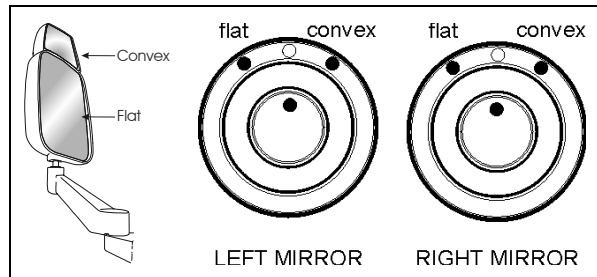
NOTE

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

NOTE

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

③ MIRROR CONTROLS



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 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.

④ TAG AXLE CONTROL VALVE

Lift the tag axle by pushing the lever forward. Pulling the lever back will lower (load) the tag axle. Refer to "OTHER FEATURES" chapter for additional information.

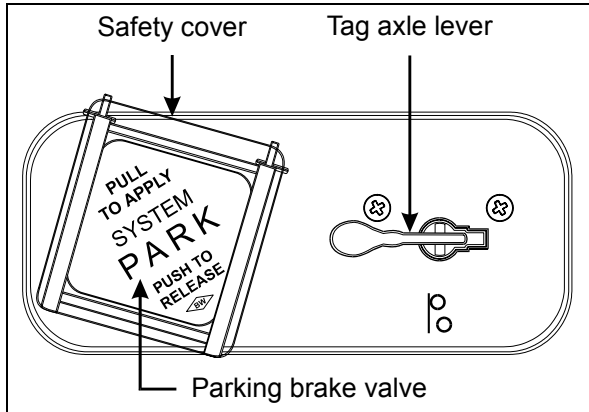


WARNING

Do not drive vehicle with tag axle raised when speed is exceeding 12 mph (20 km/h).

⑤ PARKING BRAKES CONTROL VALVE

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.



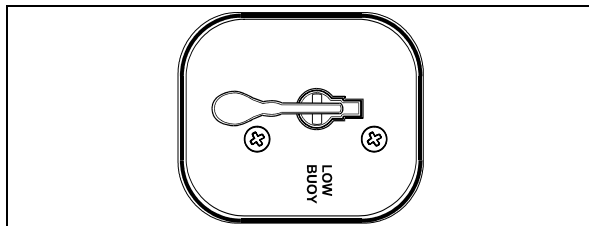
CONTROL VALVES

12129

Ⓒ COOLANT HEATER TIMER

Use the timer to program the start time of the optional engine coolant heater. Refer to "OTHER FEATURES" chapter for additional information.


Ⓓ LOW BUOY CONTROL VALVE



Low buoy control valve

12165

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.

	<p>WARNING</p>
<p>Use only below 5 mph (8 kph).</p>	

UTILITY COMPARTMENT


To open the compartment, push down on the lock button and swing the cover open towards the inside of the coach.

A 12 volts DC power outlet is located inside the pocket.

This socket 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.

ASHTRAY

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

	<p>WARNING</p>
<p>To prevent a fire, never put paper or plastic wrappers in the ashtray. Empty ashtray often.</p>	

CIGARETTE LIGHTER

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.

<p><i>NOTE</i></p>
<p><i>The cigarette lighter can still be used after the ignition key has been removed.</i></p>

DIAGNOSTIC DATA READER (DDR) RECEPTACLE

To ease troubleshooting of the DDEC, WT 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.

AUTOMATIC FIRE DETECTION AND SUPPRESSION SYSTEM (AFSS)

Protection Panel

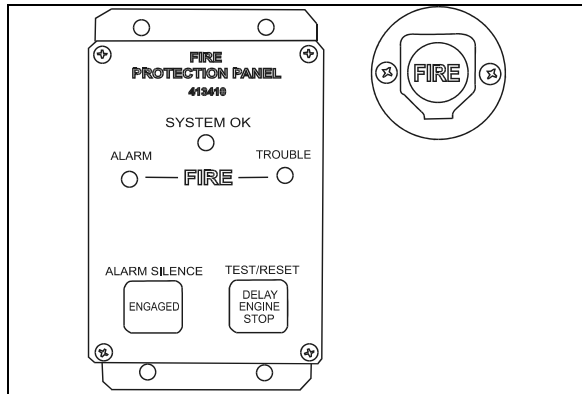
The protection panel displays the current system status. The protection panel contains "SYSTEM OK", fire "ALARM" and "TROUBLE" lamps, the audio alarm, the "TEST/RESET" switch, and the "ALARM SILENCE" switch.

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.

38 CONTROLS AND INSTRUMENTS

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.

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.

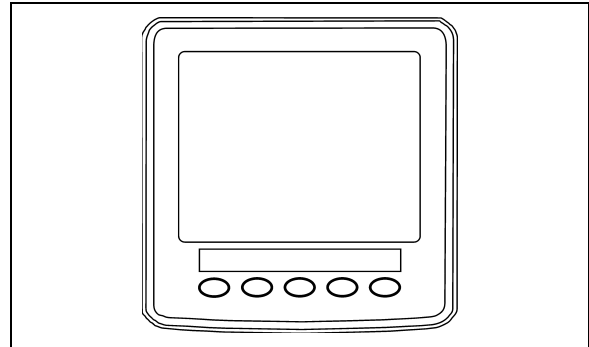
Refer to “SAFETY FEATURES AND EQUIPMENT” chapter for more information on *Kidde Dual Spectrum* Automatic Fire detection and Suppression System (AFSS).

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

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 correspond 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.

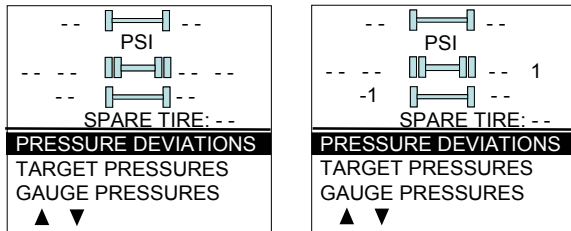
NOTE

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 "SAFETY FEATURES AND EQUIPMENT" chapter 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 following screen appears on the TPMS Display. Dash lines are displayed meaning that no pressure data have been received by the display.



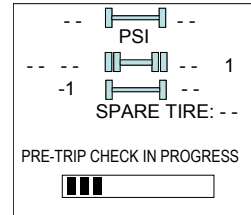
As illustrated, the pressure readings will appear replacing the dash lines as the TPMS display starts to receive pressure data from the TPMS receiver. It can take 1 minute to get all pressure readings updated since the sensors transmit at a one minute interval.

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 TPM 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.

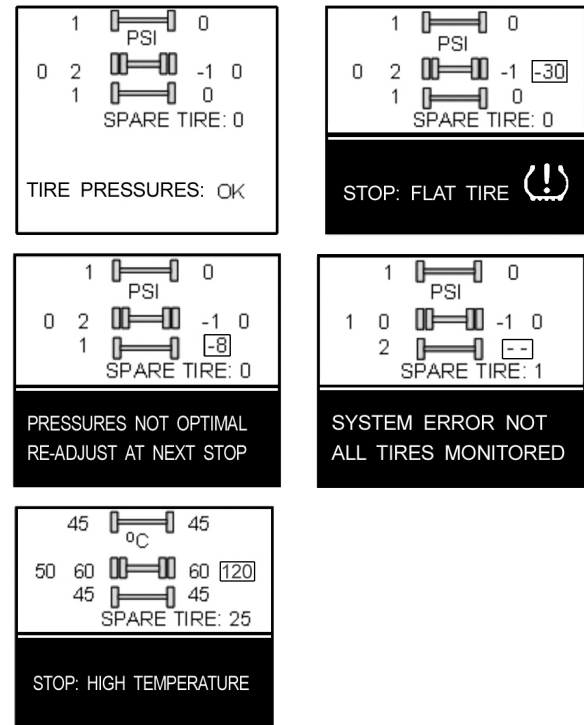


During the pre-trip check, the pressure readings for the different wheels become all available.

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 following screens:



40 CONTROLS AND INSTRUMENTS

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: 0.7sec 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.

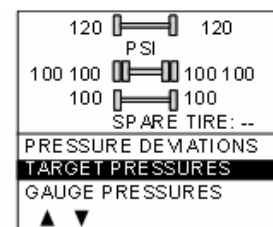
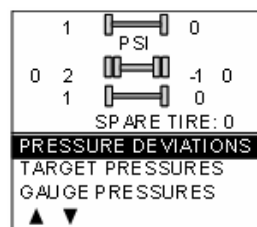
The user will have the possibility to check the pressure of the spare tire by accessing the TPMS display menu. For vehicles that have no spare tires, the title "spare tire:" will still appear on the screens but the pressure will remain with two dash lines at all time.

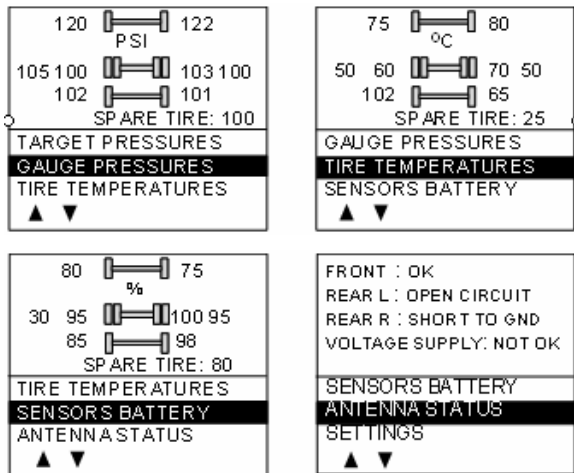
Post Trip Operation

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.

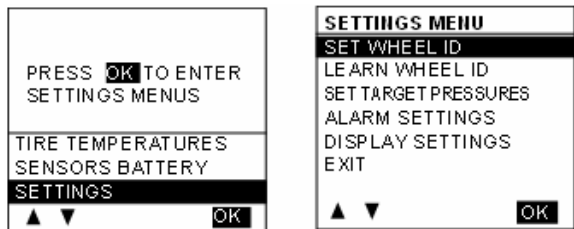




The display remains in this mode with the menus appearing at the bottom until the pre-trip check sequence starts again.

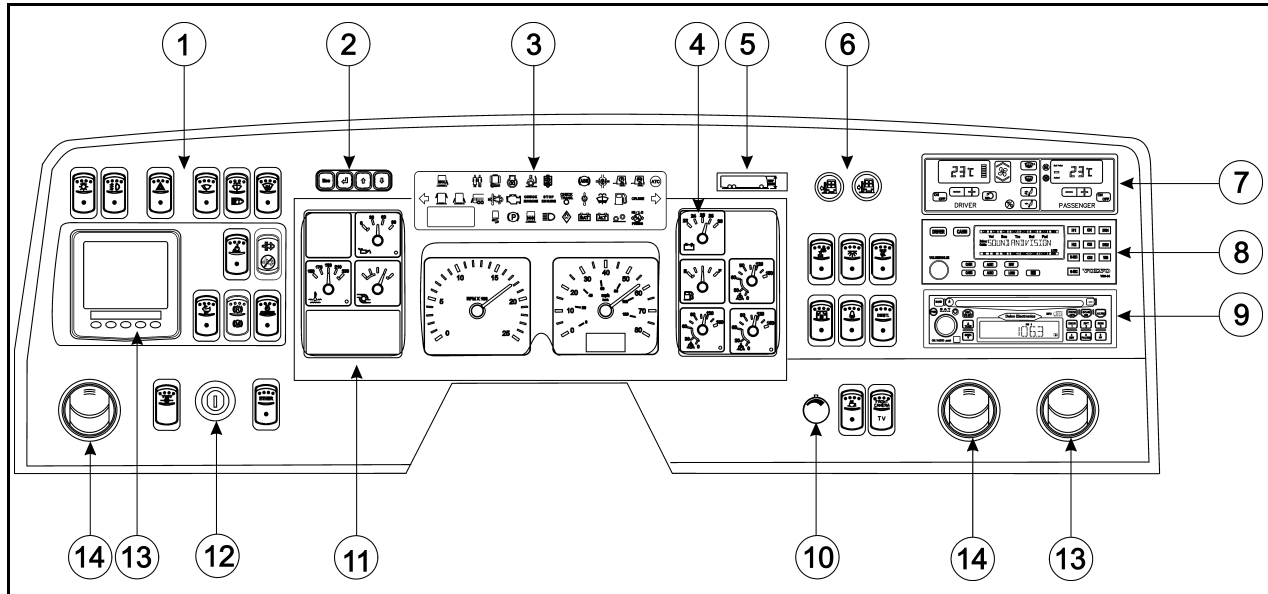
Scrolling down below the Battery life menu will show the Settings menu. Highlighting the Settings and pressing OK allows entering the settings menu. Refer to “SAFETY FEATURES AND EQUIPMENT” chapter for more information on “Settings Menu”.

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



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DASHBOARD



DASHBOARD

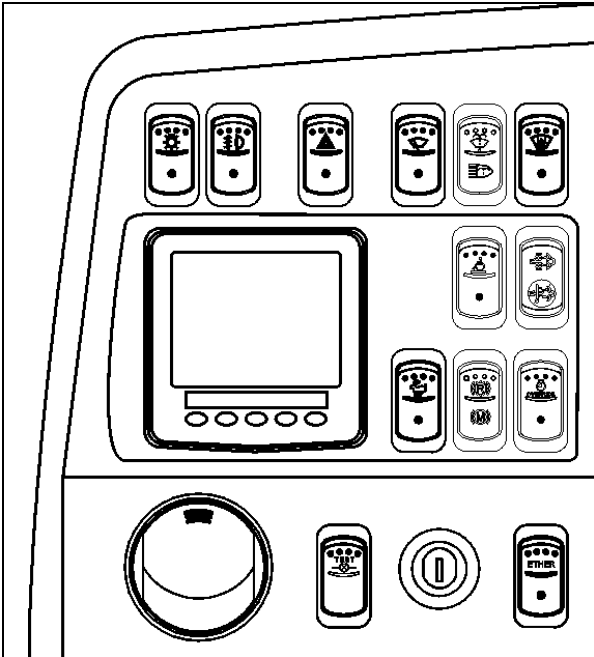
06698

1. L.H. DASHBOARD PANEL
2. MCD (message center display) KEYPAD
3. TELLTALE PANEL
4. GAUGES
5. VEHICLE CLEARANCE INFORMATION
6. R.H. DASHBOARD PANEL
7. HVAC CONTROL UNIT
8. AUDIOVISUAL CONTROLLER
9. AM/FM/CD RADIO
10. BRIGHTNESS CONTROL
11. MCD (message center display)
12. IGNITION SWITCH
13. TIRE PRESSURE MONITORING SYSTEM DISPLAY (TPMS)
14. AIR REGISTERS

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.

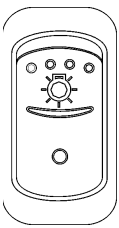
L.H. DASHBOARD PANEL



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 register.

L.H. DASHBOARD PANEL

06702



06254

Headlights and Exterior Lighting

OFF position – Daytime running lights only.

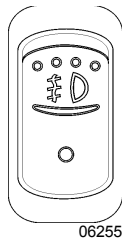
Press this rocker switch to turn on the following lights:

First position – Front parking lights, taillights, clearance lights, marker lights, license plate light.

Second position (push down fully) - the headlights, the controls and instrument lights and all lights from the first position.

NOTE

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



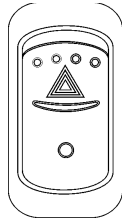
06255

Fog Lights (Optional)

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.



06256

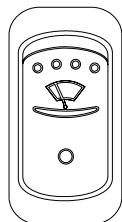
Hazard Warning Flashers

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.



06257

Upper Windshield Wipers (Optional)

Press the rocker switch to the first position to activate the upper wipers intermittently. Press to the second position for continuous operation of the upper wipers.

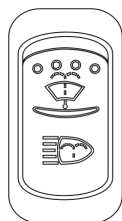


CAUTION

To avoid damaging the wiper blades or scratching the windshield, do not operate the wipers when the windshield is dry. Also, loosen frozen wipers before operating.

NOTE

Lower windshield wipers are activated using the multi-function lever. Refer to paragraph: "Steering Column Controls" in this chapter.



06615

Upper Windshield Washer (optional) & Headlights Washer

Press this rocker switch upwards to spray the upper windshields with washer fluid. Windshield wipers will automatically come on and stop a few seconds after releasing the switch.

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

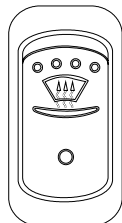


CAUTION

Do not operate the washer mechanism while the washer fluid reservoirs are empty. This may damage the washer fluid pumps.

NOTE

Lower windshield wipers are activated using the multi-function lever. Refer to paragraph: "Steering Column Controls" in this chapter.

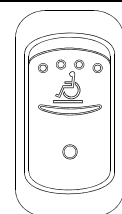


06259

Upper Windshield Defrosting

Optionally, the coach may be equipped with a defrosting system in the upper windshield section. Press the rocker switch to activate the recirculation pump and the blower in order to clear fog, frost or thin ice from either side of the upper windshield.

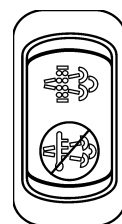
The upper windshield defrosting is automatically activated when the outside temperature is lower than 39°F (4°C), the engine temperature is higher than 86°F (30°C), the driver's side HVAC control unit is ON and the fan speed is higher than zero (refer to the HVAC control unit information in this chapter).



06268

Wheelchair Lift (Optional)

Activate the optional wheelchair lift electrical circuit by pressing down on the rocker switch. Refer to “Other Features” for instructions on operating the wheelchair lift.



06660

Manual Regeneration / Stop Regeneration

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.

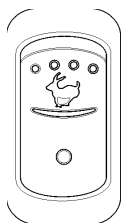
NOTE

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.



CAUTION

Before initiating stationary regeneration or using the inhibit regeneration function, read carefully and understand paragraph "Exhaust Aftertreatment System" in "OTHER FEATURES" chapter for complete information concerning regeneration precautions. Ignoring them could result in extensive damage and/or serious personal injury.



06264

Fast Idle

For extended idling periods, run the engine at fast idle. Press down this 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.



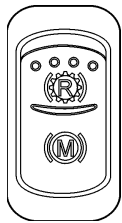
CAUTION

Even if normally the engine will return to normal idle and remain there if the parking brake is applied and/or transmission is placed in neutral (N), it is safer to first press down the rocker switch to run the engine at normal idle before engaging the transmission.



CAUTION

Return the engine to normal idle before shutting the engine *OFF*.



06703

Engine Brake / Transmission Retarder

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 can 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.



06265

Engine Stop Override

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 the 30 seconds are up.

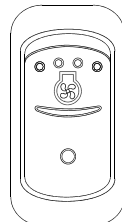


CAUTION

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 Series 60 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 "DDEC VI Diagnostic Codes".



06236

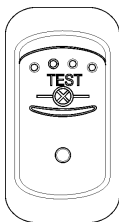
Radiator Fan Override (Optional)

Depressing this switch overrides the radiator fan's thermostatic switch, keeping the fan continuously on. This feature is useful when the fan switches on and off repeatedly, such as when driving up a long grade or when driving in very hot weather.



CAUTION

Do not use this feature unnecessarily as it will shorten fan life, reduce available horsepower and increase noise and fuel consumption.



06263

Telltale Light Test

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.



06237

Ether Start Control (Optional)

Activates the engine cold starting aid. Refer to "STARTING AND STOPPING PROCEDURES" chapter.



CAUTION

Excessive use may result in severe engine damage.



06571

Driver Controlled Differential Lock (DCDL) (Optional)

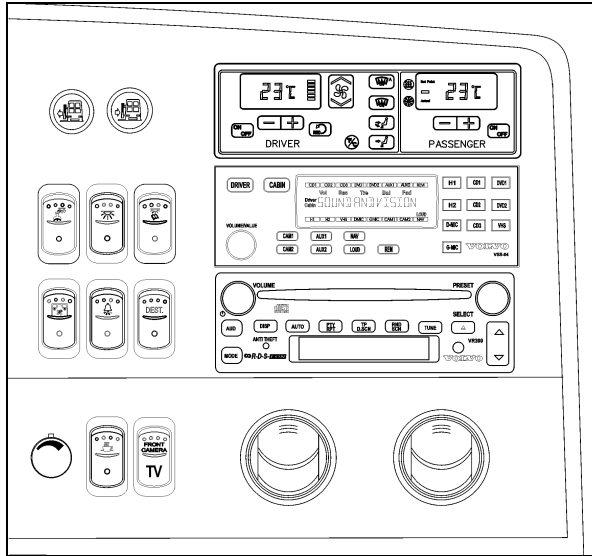
Press this rocker switch to lock or unlock differential action. Refer to "OTHER FEATURES" chapter for the complete operating instructions.



CAUTION

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



Controls for passenger comfort and entertainment are grouped on this panel. The HVAC control module as well as the cluster dimmer switch, miscellaneous control switches and air vents are therefore located on the R.H. dashboard panel.

R.H. DASHBOARD PANEL

06608

Door Operating Buttons

Press and hold button to open or close the door.

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

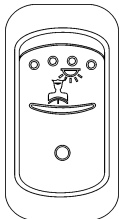


06313



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.



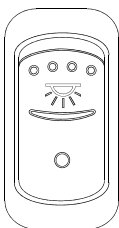
06244

Driver's Area Lighting

Press this rocker switch to turn on the driver's overhead light as needed.

NOTE

The entrance overhead light and the stepwell lights turn on with the entrance door opening and turn off with door closing. If the entrance door is left opened, these lights will be turned off automatically if the batteries voltage drops below 24.0 volts.



06239

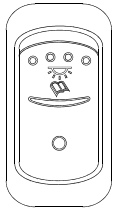
Interior Lighting

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

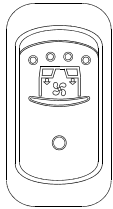
To avoid running down the batteries when the engine is off, turn off the lights or connect the optional battery charger to a 110 - 120 volt AC power supply.



06240

Reading Lights

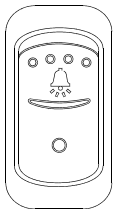
This switch powers the reading light circuit enabling passengers to operate their personal reading lights.



06245

Passenger Overhead Air Registers

Press this switch to activate the passenger overhead air registers fans.



06243

Stop / Service Chime (Optional)

Press this switch to enable the stop / service chime. Even when the chime circuit is not enabled, the buttons in the overhead panels will illuminate if depressed by the passengers.



06262

Destination Sign (Optional)

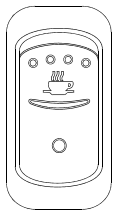
Press this rocker switch to illuminate the destination sign.



06565

Brightness Control

Adjusts the brightness of the dashboard instruments and switches.



06241

Galley

This switch activates the optional galley's electrical circuit.

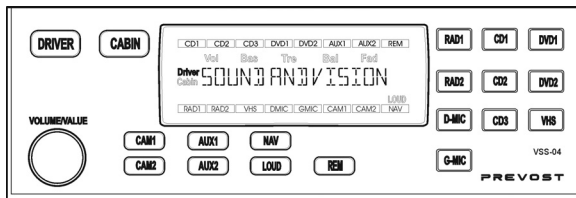


06446

Front Camera (Optional)

Press this switch to turn ON the forward looking camera and display the road ahead on the passenger TV monitors. When the front camera is not enabled, the TV circuit reverts to the VCR output.

AUDIOVISUAL CONTROLLER



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

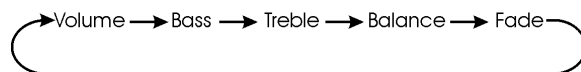
Power switch: there is no power button. The unit turns on automatically when the ignition switch is set to ACC or ON position and turns off when the ignition switch is set to OFF position. Start image shows "SOUND AND VISION".

DRIVER: 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.

CABIN: 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.

CAM1: press to turn on the optional panoramic view camera. The video monitors turn on automatically. Press a second time to turn off. This function can be selected simultaneously with an audio function like the radio, the driver or guide microphone or a CD player.

CAM2: press to select an optional second panoramic view camera if equipped as current video source. Press a second time to cancel. This function can be selected simultaneously with an audio function like the radio, the driver or guide microphone or a CD.

AUX1, AUX2: press to select an auxiliary audio/video source like a second VHS. Press a second time to cancel the selection.

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

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

REM: 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.

NOTE

Point the remote control in direction of the Sound Selector.

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.

52 CONTROLS AND INSTRUMENTS

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.

NOTE

Adjustment for background music

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

- 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

When microphone is activated, a gong can be heard. Gong sound level as been set at the factory. To adjust it, proceed as follow:

- 4- Press AUX2 and VOLUME/VALUE at the same time.
- 5- Turn VOLUME/VALUE knob to adjust gong volume.
- 6- Press AUX2 and VOLUME/VALUE once again to save the setting.

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, CD2, CD3: press to select up to 3 different remote CD players as current source.

DVD1: press to select DVD Player #1 as current source.

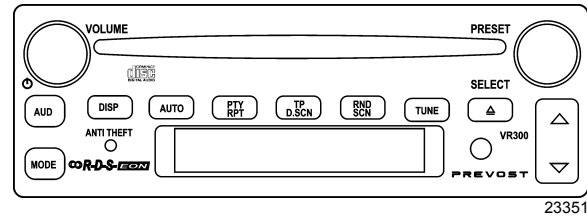
DVD2: press to select DVD Player #2 as current source.

VHS: press to select VHS as current source.

NOTE

Remote control battery replacement. Use CR2025 lithium battery.

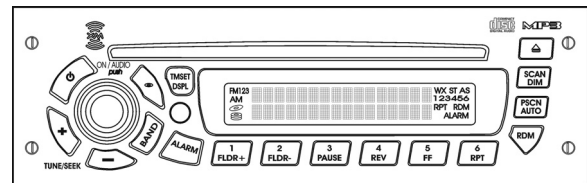
VR300 CD/AM/FM STEREO RECEIVER



23351

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 radio operating instructions manual is included in SECTION 23: ACCESSORIES of your vehicle's maintenance manual.

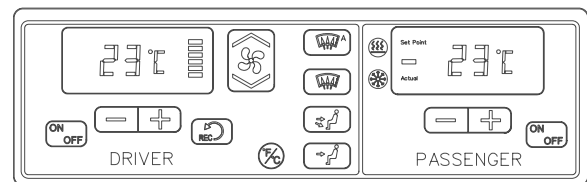
SATELLITE RADIO (OPTIONAL)



23355

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

HVAC CONTROL UNIT



22276

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 the following 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.

Heating Mode Indicator



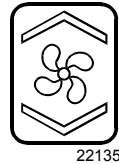
This red LED illuminates when system is heating.

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

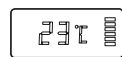


Closes or opens the driver's and passenger's section fresh air damper.

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

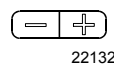
This feature is automatically cancelled when defogging is activated.

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.

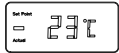


WARNING

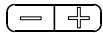
Warm temperatures may cause drowsiness and affect alertness while driving. Keep the temperature comfortable but not too high.

54 CONTROLS AND INSTRUMENTS

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.



22132

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



22137

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

Panel



22136

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

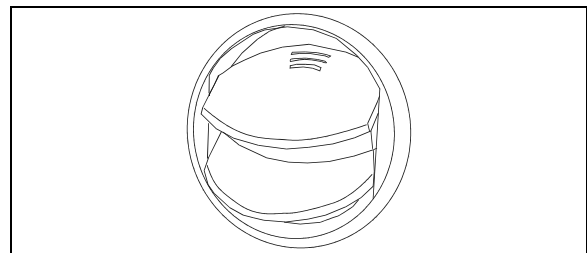
Temperature Degree Selector



22133

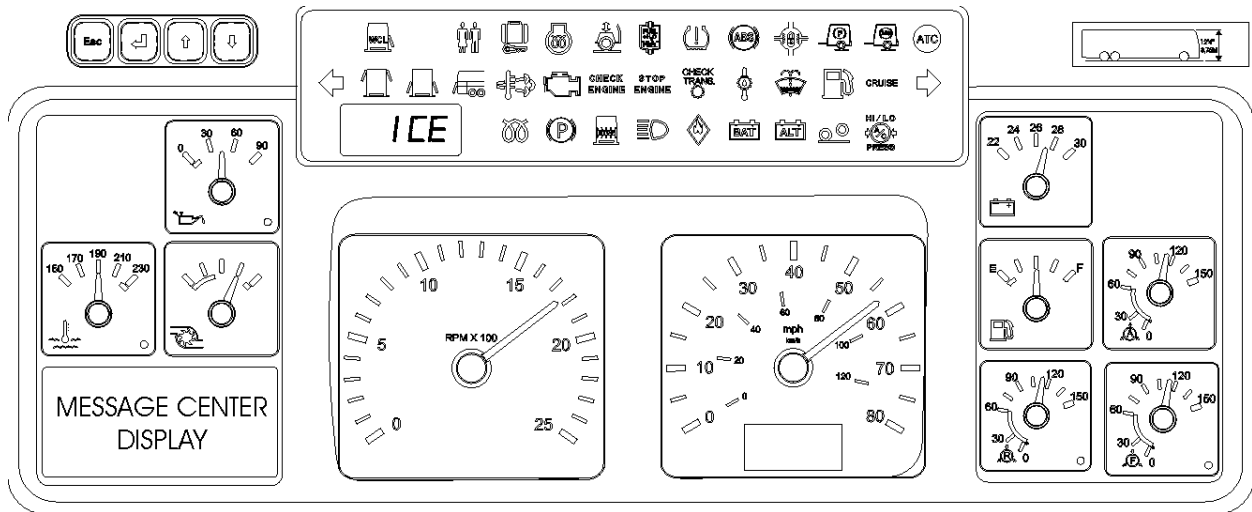
Toggles the HVAV control unit temperature units between Fahrenheit and Celsius. The driver's section must be on. Also toggles the outside temperature units displayed on the telltale panel.

AIR REGISTERS



AIR REGISTER

Three adjustable driver air registers 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.

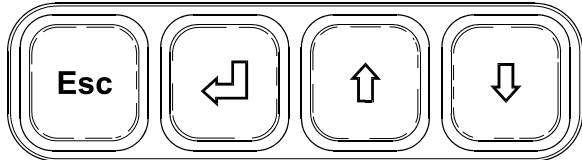


06697

CLUSTER

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

MESSAGE CENTER DISPLAY (MCD)



06399

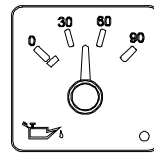
This standard feature gathers, stores and displays important information about the vehicle's operation on a display screen on the lower left portion of the cluster. Refer to Message Center Display in "OTHER FEATURES" chapter for a description of how to set up and operate the Message Center Display.

GAUGES

NOTE

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

Engine Oil Pressure



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 ECM decides oil pressure is too low. In such a case, the ECM will start to power down the engine until finally shutting it off as explained under "STOP Engine" telltale light, in this chapter.

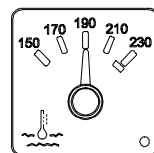
An audible alert signal also informs the driver of low oil pressure. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter for table of audible alerts.



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



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

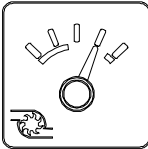
06231

56 CONTROLS AND INSTRUMENTS

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.

The engine protection system will start power down. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter for table of audible alerts.

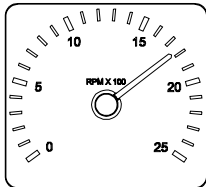
Turbo Boost Pressure



06230

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

Tachometer

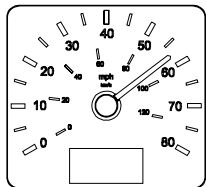


06221

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

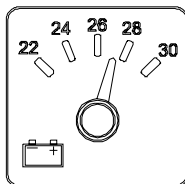


06222

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).

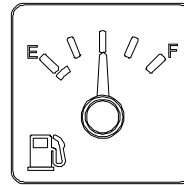
Voltmeter (24-Volt System)



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.

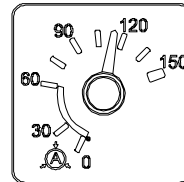
A telltale light illuminates when about 12 US gallons (45 liters) of fuel remain in the fuel tank.



CAUTION

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

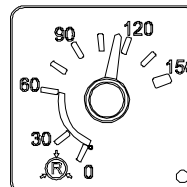
Accessories Air Pressure



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).

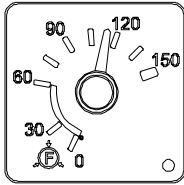
A low air pressure indicator LED (bottom right corner of gauge) illuminates when the primary air system pressure drops below 66 psi (455 kPa). An audible alert signal also informs the driver of low air pressure. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter for table of audible alerts. If the air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



WARNING

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).

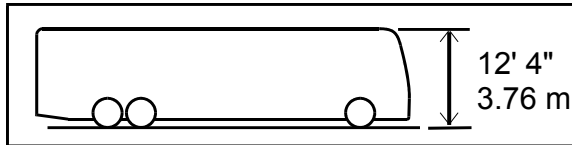
A low air pressure indicator LED (bottom right corner of gauge) illuminates when the secondary air system pressure drops below 66 psi (455 kPa). An audible alert signal also informs the driver of low air pressure. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter for table of audible alerts. If the air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



WARNING

Do not drive the coach when air pressure is low.

VEHICLE CLEARANCE INFORMATION



06447

Safe vehicle clearance height is 12'4" (3.76 m).

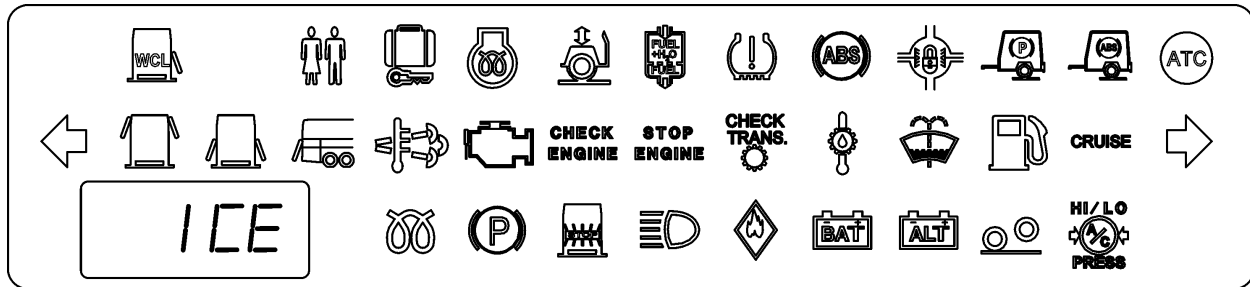


CAUTION

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









58 CONTROLS AND INSTRUMENTS

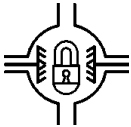

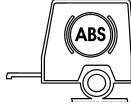

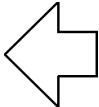


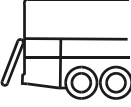
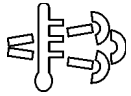

TELLTALE PANEL

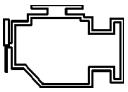




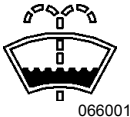

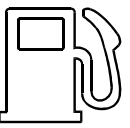
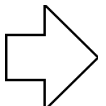



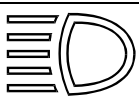
06693

The telltale lights illuminate during 5 seconds at the start of every ignition cycle as a light bulb check. Some telltale lights described below appear on the telltale panel only if the corresponding optional equipment is installed on the vehicle.

 <p>06299</p>	<p>Wheelchair Lift</p> <p>Illuminates when the wheelchair lift is enabled and when the wheelchair lift compartment door and/or the wheelchair access door are open.</p>
 <p>06375</p>	<p>Lavatory Door Locked</p> <p>Illuminates when the lavatory door is locked.</p>
 <p>06387</p>	<p>Baggage Bay Unlocked</p> <p>Illuminates when one or more bays are unlocked.</p>
 <p>06553</p>	<p>Preheater (optional)</p> <p>Illuminates when the engine coolant preheating system is in operation.</p>
 <p>06448</p>	<p>Kneeling / Hi-Buoy Active</p> <p>Illuminates when Kneeling or Hi-Buoy is active. An audible alert also informs the driver during operation. Refer to "SAFETY FEATURES AND EQUIPMENT" chapter.</p>
 <p>06291</p>	<p>Fuel /Water Separator Warning Light</p> <p>Illuminates when accumulated water in the optional fuel filter/water separator needs to be drained. Refer to "CARE AND MAINTENANCE" chapter.</p>
 <p>06694</p>	<p>Flat Tire (with optional Tire Pressure Monitoring System)</p> <p>Illuminates when a tire pressure is 25% below the target tire pressure.</p>
 <p>06272</p>	<p>Antilock Brake System Warning Light</p> <p>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.</p>

 <p style="text-align: center;">06272</p>	<p>Driver Controlled Differential Lock (DCDL)</p> <p>Illuminates when the differential action is locked.</p>
 <p style="text-align: center;">06591</p>	<p>Trailer Emergency / Parking brake</p> <p>Illuminates when the trailer emergency/parking brake is unexpectedly applied as when the vehicle is moving and a parking brake air line rupture happens.</p>
 <p style="text-align: center;">06585</p>	<p>Trailer Antilock Brake System (ABS)</p> <p>Illuminates when the trailer ABS is malfunctioning.</p>
	<p>Automatic Traction Control (ATC)</p> <p>Illuminates when the automatic traction control system intervenes to prevent excess wheel spin during acceleration.</p>
 <p style="text-align: center;">06290</p>	<p>Left Turn Signal Indicator Light</p> <p>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.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>The directional signals are automatically activated when the vehicle is backing up.</i></p> </div>
 <p style="text-align: center;">06572</p>	<p>Emergency Window Open</p> <p>Illuminates when an emergency window is open or unlocked.</p>
 <p style="text-align: center;">06573</p>	<p>Baggage Bay Door Ajar</p> <p>Illuminates when one or more baggage bay doors are ajar.</p>
 <p style="text-align: center;">06592</p>	<p>Engine Door Ajar</p> <p>Illuminates when the engine compartment door is ajar.</p>
 <p style="text-align: center;">06654</p>	<p>High Exhaust System Temperature Warning Light</p> <p>Illuminates to notify the driver of potentially hazardous exhaust gas temperature at the DPF outlet.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p style="text-align: center;"> WARNING</p> <p>During regeneration, exhaust temperature may reach up to 1200°F (650°C) at the particulate filter. When parking the vehicle, if this warning light is illuminating, make sure that the DPF outlet diffuser is away from people or any flammable materials, vapors or structures.</p> </div>

 <p>06655</p>	<p>Malfunction Indicator Lamp (MIL)</p> <p>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.</p>
<p>CHECK ENGINE</p> <p>06656</p>	<p>Check Engine (Amber Warning Lamp)</p> <p>Indicates a minor fault detected by DDEC VI system. This warning lamp is illuminated for all active faults.</p> <p>The warning lamp will remain <i>ON</i> until the malfunction has been corrected. Vehicle can be driven to end of shift. Call for service.</p> <p>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".</p>
<p>STOP ENGINE</p> <p>06657</p>	<p>STOP Engine (Red Stop Lamp)</p> <p>Illuminates when a potential engine damaging fault is detected. Immediately park the coach in a safe place and stop the engine.</p> <p>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.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTE</p> <p><i>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".</i></p> </div>
<p>CHECK TRANS</p>  <p>06282</p>	<p>Check Transmission</p> <p>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.</p> <p>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 downshifts may be restricted). Direction changes and shifts to and from neutral (N) will not occur.</p> <p>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 E.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTE</p> <p><i>The CHECK TRANS indicator may also illuminate when starting the engine in extremely cold weather. Refer to "Starting and Stopping Procedures".</i></p> </div>
 <p>06292</p>	<p>Transmission fluid Temperature</p> <p>Illuminates when the transmission fluid temperature is too high (Allison transmission only). Disengage the retarder to allow the oil temperature to cool down.</p>

 <small>066001</small>	<p>Low Windshield Washer or Headlights Washer Fluid Level Warning Light</p> <p>Illuminates when the windshield washer or the headlight washer fluid level is low. The washer fluid containers are located inside the front service compartment.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">  WARNING </div> <div style="border: 1px solid black; padding: 2px; margin: 0 0 10px 0;"> <p style="margin: 0;">Do not drive without sufficient washer fluid.</p> </div>
 <small>06286</small>	<p>Fuel Level Low Warning Light</p> <p>Illuminates when approximately 12 US gallons (45 liters) of fuel remains in the tank. After the light comes <i>ON</i>, the remaining fuel will provide no more than 60 miles (100 km) of travel. Do not exceed this distance.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="margin: 0;"><i>NOTE</i></p> <p style="margin: 0;"><i>Refuel as soon as possible.</i></p> </div>
<p>CRUISE</p> <small>06284</small>	<p>Cruise Speed Set Indicator Light</p> <p>Indicates that the vehicle cruise speed was set and stored in the memory.</p>
 <small>06289</small>	<p>Right Turn Signal Indicator Light</p> <p>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.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="margin: 0;"><i>NOTE</i></p> <p style="margin: 0;"><i>The directional signals are automatically activated when the vehicle is backing up.</i></p> </div>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p style="margin: 0; font-size: 1.5em; font-weight: bold;">ICE</p> </div> <small>06696</small>	<p>Freezing Conditions</p> <p>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.</p>
 <small>06695</small>	<p>Intake Air Preheater ON – Wait Before Starting (with Volvo D13 engine)</p> <p>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.</p>
 <small>06303</small>	<p>Emergency/Parking Brake</p> <p>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 <i>OFF</i> and the parking brake is not engaged.</p>
 <small>06305</small>	<p>Stoplights ON</p> <p>Illuminates when rear stoplights illuminate. This occurs when service brake, engine retarder or transmission retarder is applied and when the parking brakes are applied with engine running.</p>
 <small>06300</small>	<p>High Beam ON</p> <p>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.</p>



06288

Fire Detected

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.



WARNING

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

NOTE



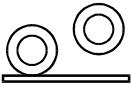
It is possible to cancel an alarm while on the road. To do so, stop the vehicle. Cycle the ignition between the ON and OFF position and then start the vehicle normally. This can be done on a temporary basis when a false alarm is activated by a defective fire detector. The driver can go on without being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

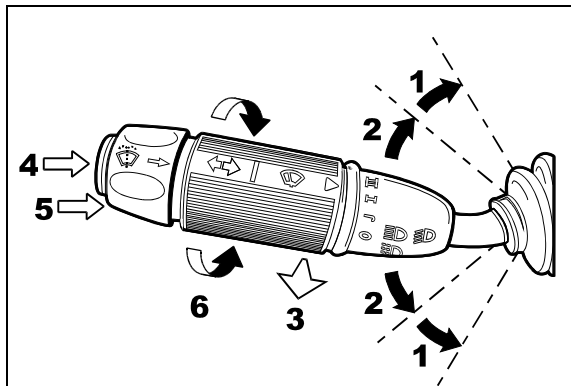
 06588	<p>Battery Voltage Incorrect</p> <p>Illuminates when the battery voltage is too high, too low or not equalized.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>To identify the battery problem (too high, too low or not equalized voltage), using the message center display (MCD), perform a system diagnostic by selecting SYSTEM DIAGNOSTIC, FAULT DIAGNOSTIC & ELECTRICAL SYSTEM and see the fault messages.</i></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>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.</i></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>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.</i></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>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 main power compartment.</i></p> </div>
 06586	<p>Alternator</p> <p>Illuminates when one of the alternators is not charging.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>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.</i></p> </div>
 06271	<p>Retracted Tag Axle</p> <p>Illuminates when the tag axle is retracted. The telltale panel audible alarm will sound to warn the driver. The control valve is located on the L.H. lateral console.</p>

	<p>A/C System Pressure High Or Low</p> <p>Illuminates when the A/C system pressure is too low or too high.</p> <p>If the A/C pressure is too low, the compressor clutch disengages and the fan stops.</p> <p>If the A/C pressure is too high, the compressor clutch is disengaged, but the fan remains activated.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>NOTE</i></p> <p><i>When outside temperature is low or high, it is possible and normal for that telltale light to come ON.</i></p> </div>
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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.

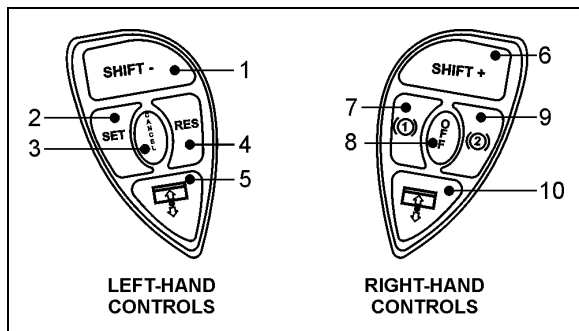
Windshield Wipers (6)

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

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.

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

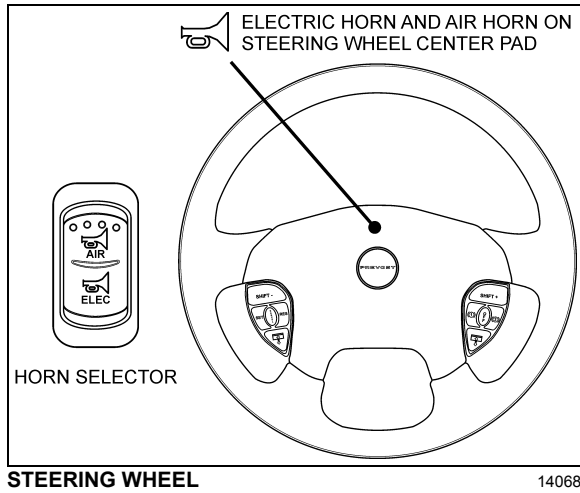
If your vehicle is equipped with a transmission retarder, this button has the same effect than the Retarder/Engine Brake Low button.

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.

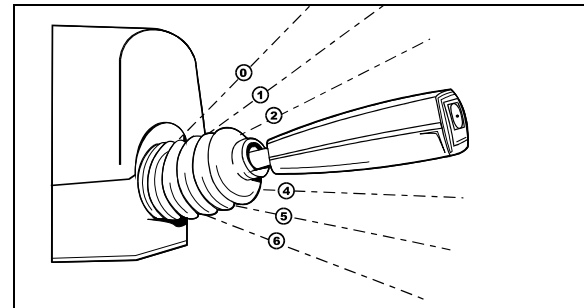
TRANSMISSION RETARDER

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.

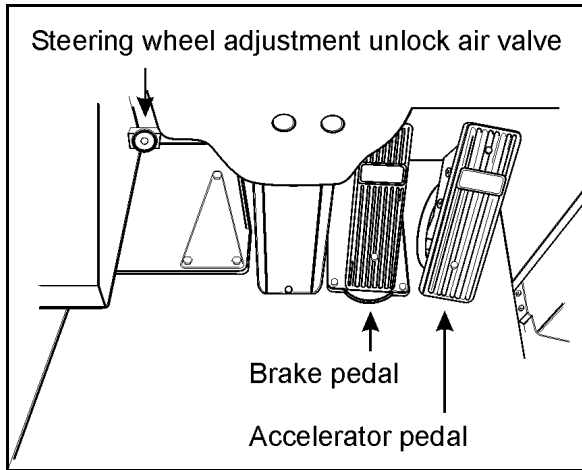
Operating The Retarder Using The Brake Pedal

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



FOOT OPERATED CONTROLS

00023A

BRAKE PEDAL

The coach is equipped with a dual braking system. The front brakes operate from a different air source than 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 Retarder" in this chapter.



WARNING

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



WARNING

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.



CAUTION

Do not let the engine operate above 2,450 RPM.

STEERING WHEEL ADJUSTMENT UNLOCK AIR VALVE

Push on the valve button with the left foot to unlock the steering wheel for tilt and telescopic adjustment.



WARNING

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

ALLISON TRANSMISSION

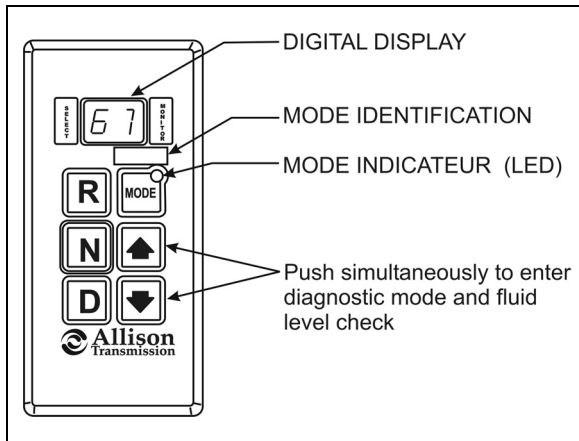
The transmission is fully automatic: Proper ranges should be automatically selected according to driving speeds to improve vehicle performance and control. The speed ratio of the power converter changes automatically as vehicle speed increases and direct-drive goes in and out as necessary. The speed 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.



ALLISON PUSHBUTTON SHIFT SELECTOR 07134

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.

▲ ▼ — 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.

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

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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 shift selector 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.



WARNING

Always apply parking brake 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.



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 lockup) 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

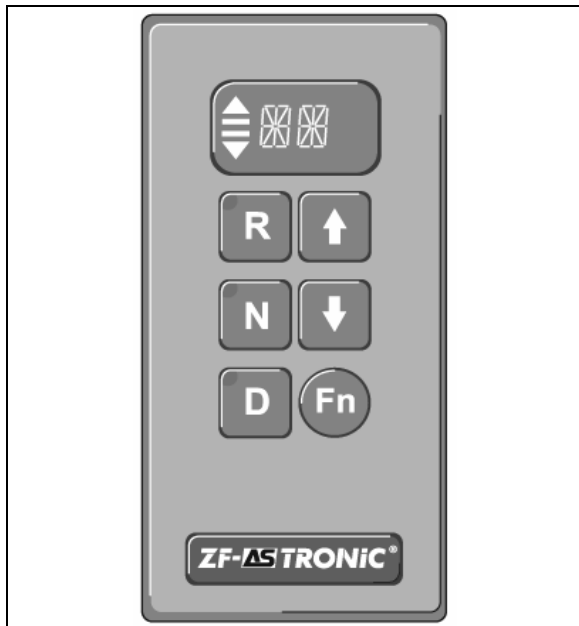
When descending in lower ranges, care must be taken that engine speed does not exceed 2,450 rpm.

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

INDICATOR LIGHT

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

Permanently illuminated: Function in use.

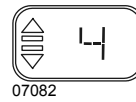
NOTE

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



Transmission in automatic mode (2 bars and 2 arrows)

4th gear selected in transmission

Display: Manual mode



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.

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.

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.



WARNING

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

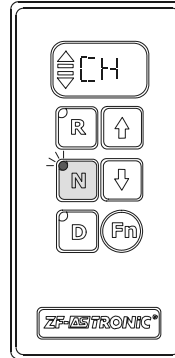
Do not allow the vehicle to coast in neutral (N). This practice can result in transmission damage. Also, no engine braking is available in neutral (N).

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.

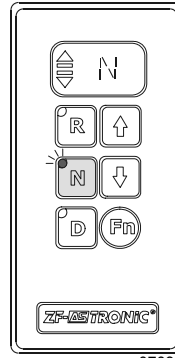
STARTING THE ENGINE



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.



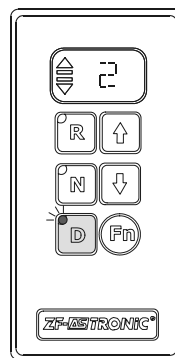
07085

- 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.

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

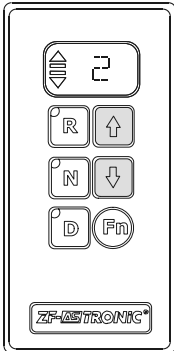
The vehicle may roll away even if the accelerator is not depressed after the service brakes have been released by Easy Start System.

IMPORTANT NOTE

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

- 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:

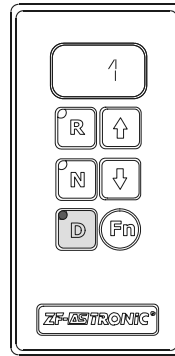
- Depress “↓” key to select 1st gear.
- The display shows the starting gear selected.

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.



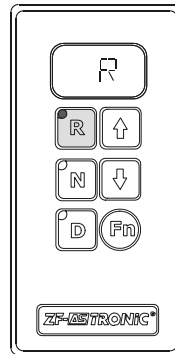
07088

Unlimited maneuvering time.

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

⚠ **CAUTION** ⚠

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



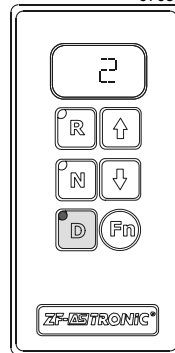
07089

Unlimited maneuvering time.

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

⚠ **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.



07090

STARTING TO ROLL ON SLOPES

Precondition: the engine must be running.



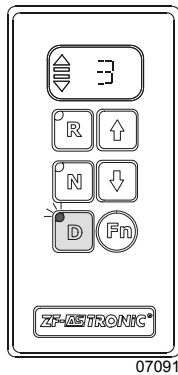
WARNING

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.



CAUTION

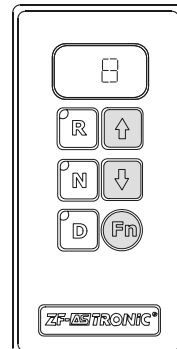
Do not allow the vehicle to roll in the opposite direction of travel than the gear selected.



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.

07091

Changing gear in manual mode

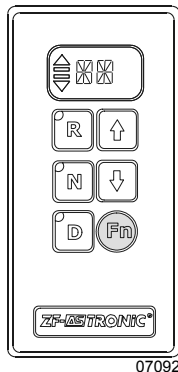


- Depress “↑” or “↓” key to select the required gear.

07094

CHANGING BETWEEN MANUAL MODE AND AUTOMATIC MODE

Always possible, even if the vehicle is in motion.



Changing from manual to automatic mode.

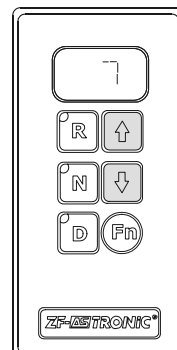
- Depress the “Fn” key

Changing from automatic to manual mode.

- Depress the “Fn” key

07092

Jumping gears



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.

07095

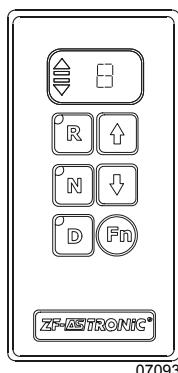
NOTE

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.

CHANGING 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.

07093

NOTE

If a manual gear shifting is selected, the gear shifting system temporarily exits automatic mode and returns to automatic mode after approx. 10 - 20 seconds if no other manual gear shifting is selected.



WARNING

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

Engine braking effect when changing gear

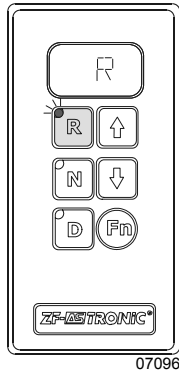
The engine brake is deactivated by the system during gear shifting. Once the gearshift is completed, the engine brake is then automatically reactivated. If the engine brake is actuated, the system switches back into automatic mode so that the maximum engine braking effect is achieved.

WARNING

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

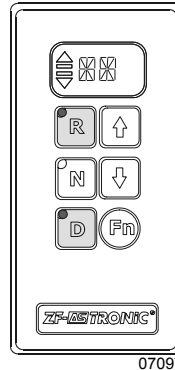
REVERSING

Selecting reverse gear:



- 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.

CHANGING DIRECTION OF TRAVEL (FORWARD/ REVERSE)



- 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

CAUTION

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

CAUTION

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

CAUTION

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 and 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

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 periods 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.

WARNING

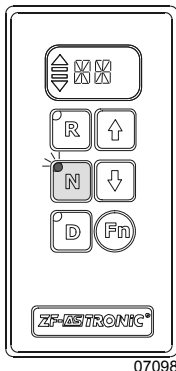
If the vehicle is at a standstill with the engine running and a gear selected, the vehicle can be moved by simple depressing the accelerator!

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

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.

SWITCHING OFF ENGINE/PARKING VEHICLE



- 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.

TOWING

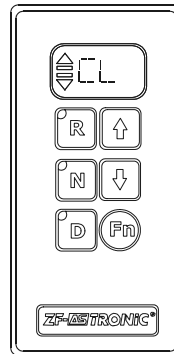
CAUTION

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.

CLUTCH PROTECTION



“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.
- 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 periods 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.


Manual mode

- If the vehicle accelerates on downhill gradients, an automatic shift is not made into a higher gear.
- Ensure that the engine does not exceed the permitted speed range.

CAUTION

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

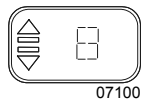
Automatic mode

 <b style="font-size: 1.2em;">CAUTION
<p>The vehicle may accelerate on downhill slopes. The system will then undertake an upshift to protect the engine from damage in the overspeed range (red range).</p>

ZF-ASTRONIC DISPLAY

The display provides information on the status of the transmission. It usually shows the gear selected (e.g.: 1 - 12 or “N”, “R”).

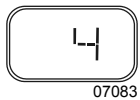
Automatic mode



07100

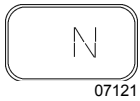
Automatic mode is shown in the display by means of 2 bars and 2 arrows (8th gear is selected in transmission).

Manual mode



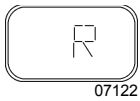
07083

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



07121

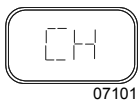
Transmission in neutral position



07122

Reverse gear is engaged

Additional display information:



07101

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



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

“--” = Display Error



07125

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



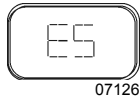
07106

“SM” = system malfunction
 • Stop the vehicle
 • Vehicle may no longer be driven



WARNING

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



“ES” = Easy Start

- Temporarily, no electronic starting traction control is available



WARNING

The vehicle can start moving.

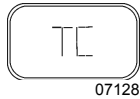


“NS” = Neutral Shift

- Shift transmission to “N” Neutral

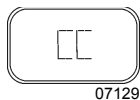
NOTE

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 appendix B for System faults and error messages.

EXHAUST AFTERTREATMENT SYSTEM

AFTERTREATMENT DEVICE

The piece of equipment behind clean emissions technology is the 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 module 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, 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  (solid)

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.

If the flashing «DPF Regeneration Lamp» is still ignored, the «Check Engine» will

80 OTHER FEATURES

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»;
Solid «Check Engine» lamp;
Solid «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.

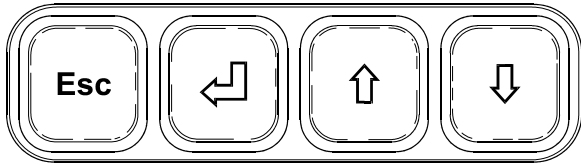
Should an alert message be sent out by the ECM, the driver will be shown what is wrong via an error code. Symbols may be displayed on the screen when a condition occurs or as a reminder that a feature is enabled. These symbols include a bell when the reminder alarm is on, “PTO” when fast idle is activated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



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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

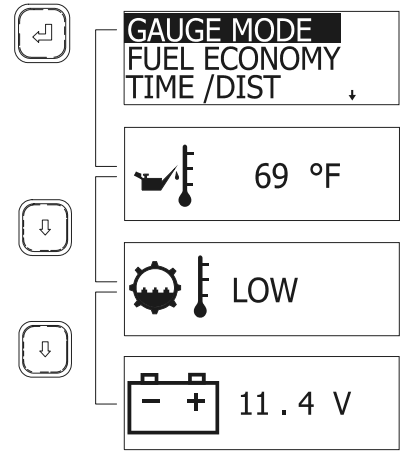
Transmission fluid temperature, engine oil temperature and battery voltage can be displayed in this mode.

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.



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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.

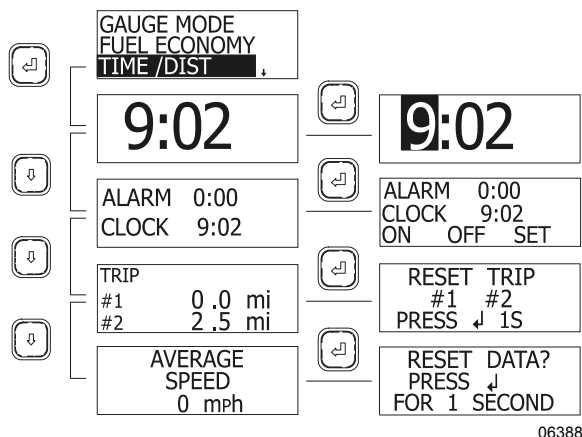
To display the digital clock:

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

The digital clock appears;

3. Use up (↑) or down (↓) arrow 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.



Setting the Digital Clock

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

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 (\leftarrow);
3. Using the arrow keys, highlight the trip odometer you wish to reset;
4. Press the enter key (\leftarrow) 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.

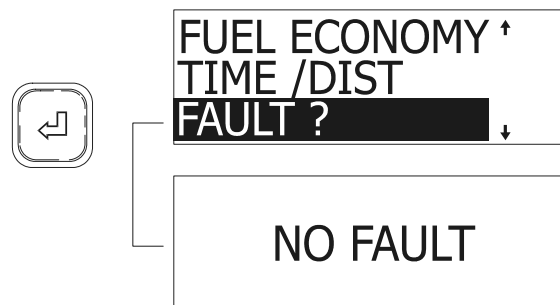
To reset:

1. Display the average speed;
2. Press the enter key (\leftarrow);
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 (\leftarrow);
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:

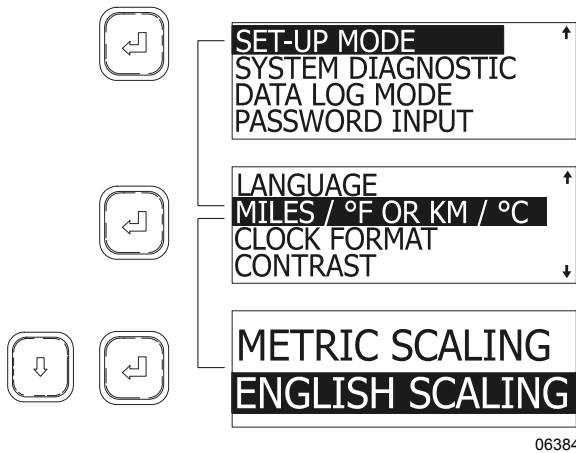
1. In SET UP MODE, highlight LANGUAGE using the arrow keys;
2. Press the enter key (↵);
3. Highlight the desired language using the arrow keys;
4. Press enter key (↵) to confirm the language choice.

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.

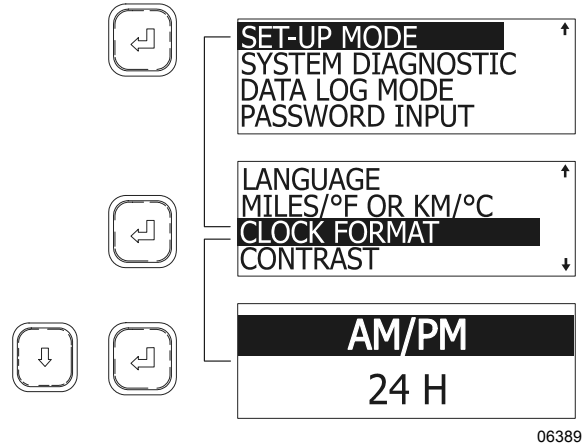


Clock Format

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.

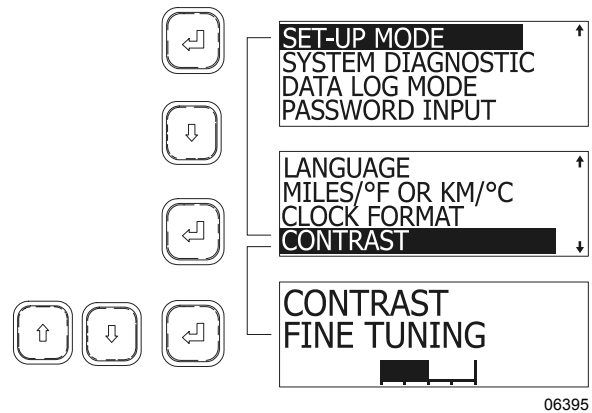
The MCD returns to SET UP MODE.



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

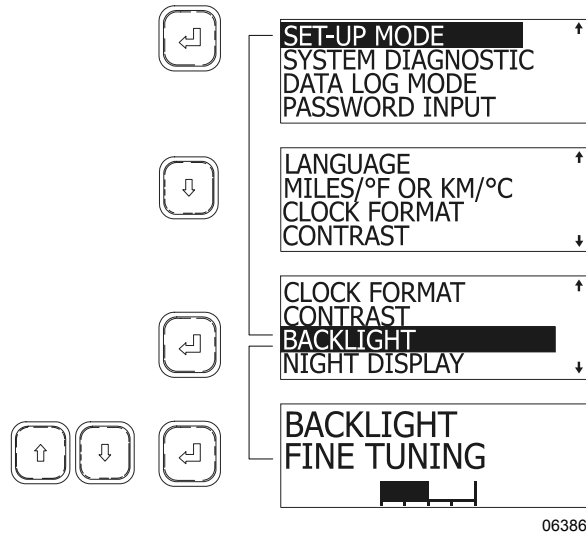
1. In SET UP MODE, highlight BACKLIGHT using the arrow keys;
2. Press the enter key (↵);

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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.

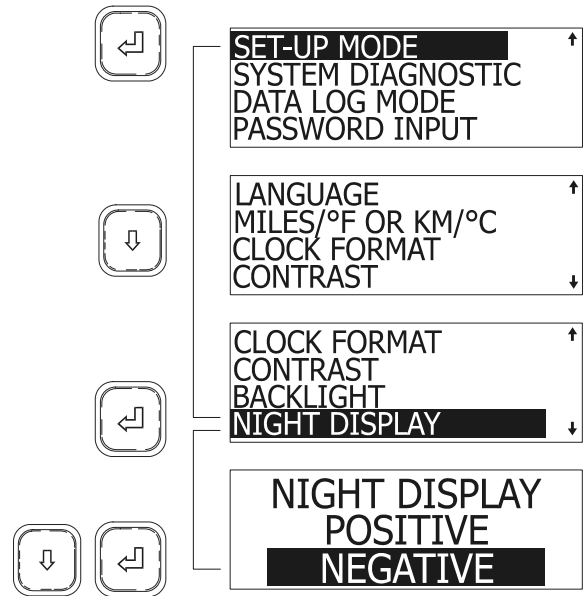


Setting Night Display

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.

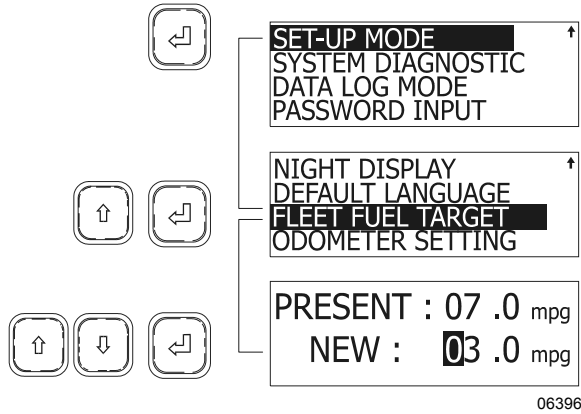
The MCD returns to SET UP MODE.

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 ECU's 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 ECU's

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

Fault Diagnostic

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 or fault code (if any) the MCD returns to FAULT DIAGNOSTIC screen (for the fault code description, see the appendixes at the end of the manual).

To request a general diagnostic:

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

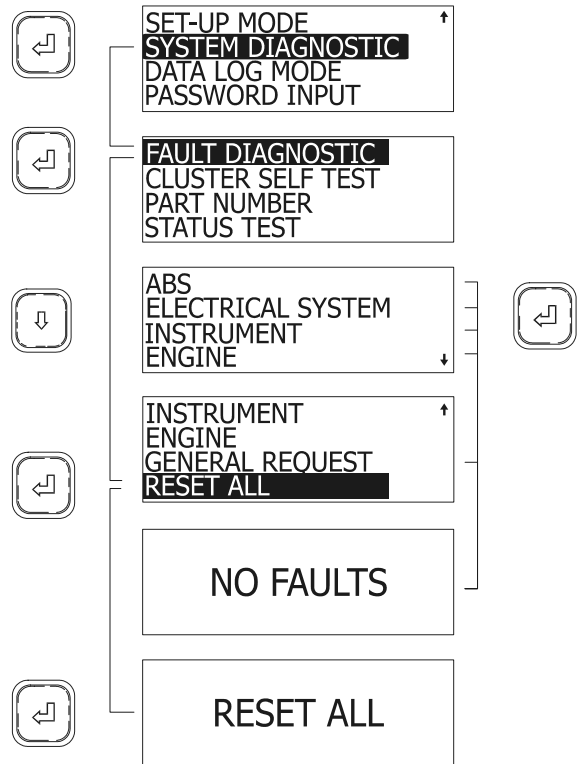
After showing a fault message (if any) the MCD returns to FAULT DIAGNOSTIC screen.

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.

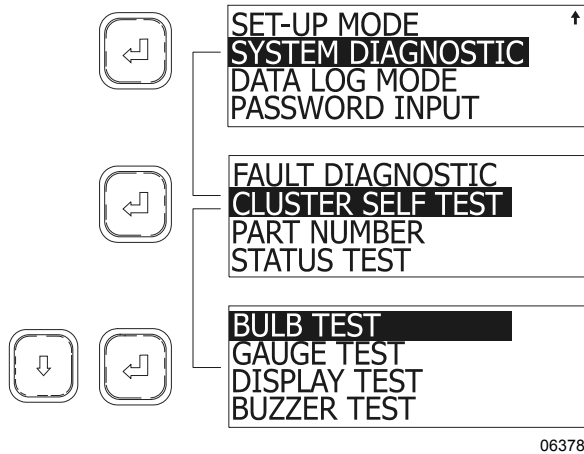
To perform a self test:

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 ECU 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.



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.

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.

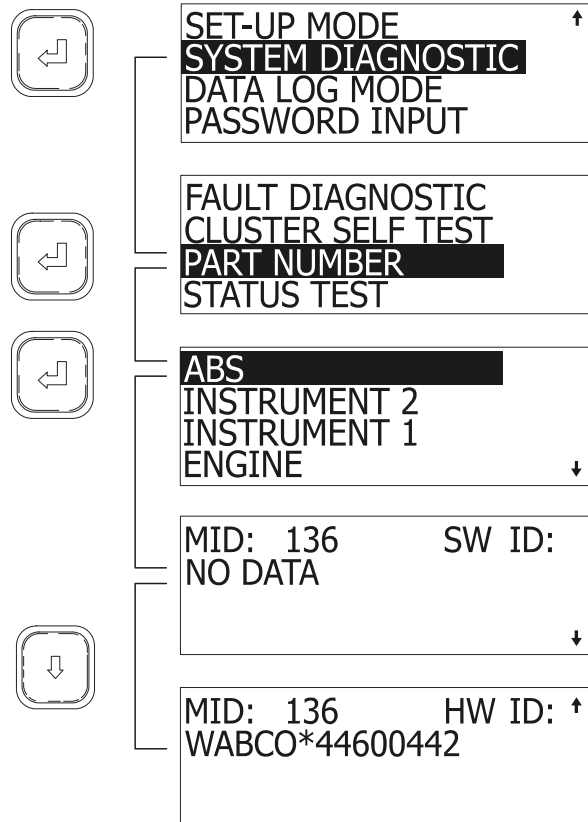
PART NUMBER

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.



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.

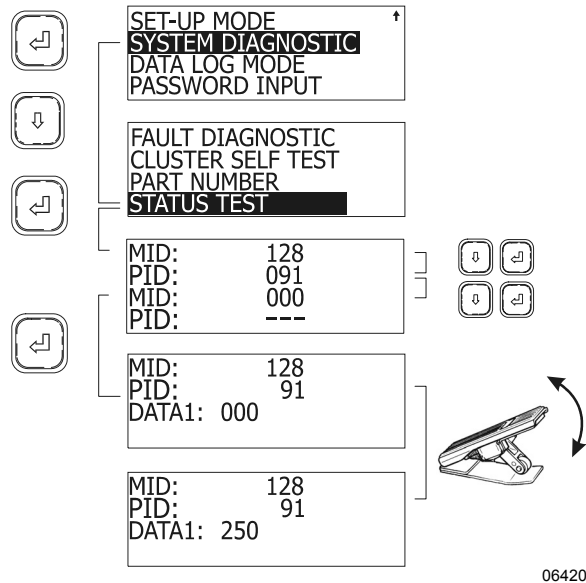
To perform a status test:

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.



In this example, a throttle pedal in good working order will send a linear and continuous (no jumps) signal to the ECU, 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

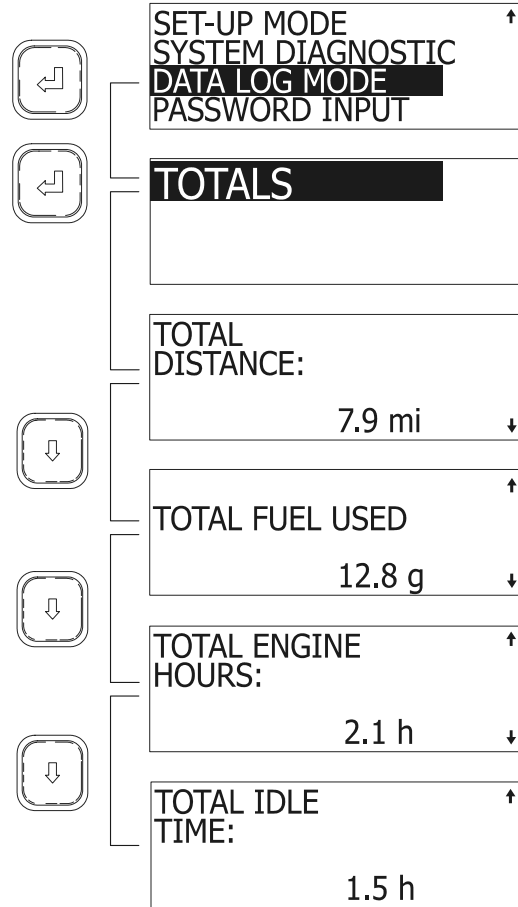
This feature shows total accumulated distance, fuel used engine hours and idle time.

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.



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

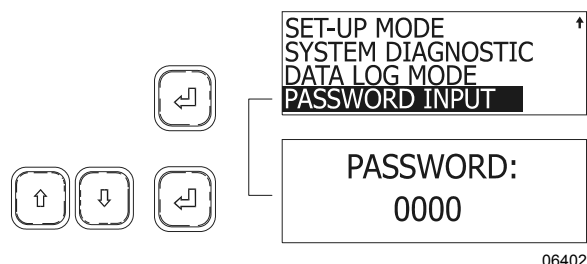
To enter either password and have access to restricted functions of the MCD:

1. Use the arrow keys to highlight PASSWORD INPUT;

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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.



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.

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

Each time the transmission retarder system is in operation, the stoplights automatically illuminate.

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.

	<p>WARNING</p>
<p>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.</p>	

<p><i>NOTE</i></p>
<p><i>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. When this system is in operation, the stoplights automatically illuminate.</i></p>

WITH VOLVO D13 ENGINE

<p><i>NOTE</i></p>
<p><i>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.</i></p>

<p><i>NOTE</i></p>
<p><i>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).</i></p>

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;

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- 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.

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.

DCDL DRIVER CONTROLLED DIFFERENTIAL LOCK (OPTIONAL)

By actuating the dashboard 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.

To operate :

- Stop the coach ;
- Set the transmission to neutral(N) ;
- Apply the parking brakes ;
- Momentarily press the rocker switch downwards to lower the front end of the coach 4 inches (100 mm). (Refer to "CONTROLS & INSTRUMENTS" chapter).

A warning flasher will indicate that the front of the coach is being lowered.

NOTE

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

NOTE

Kneeling is disabled when the entrance door is open.

To raise the front of the coach to normal height ;

- Momentarily press the rocker switch upwards. The front end will rapidly rise up ;
- Release the parking brakes ;
- Shift the transmission to the desired range.



CAUTION

Avoid parking the coach too close to the sidewalk or to other obstacles which could damage the coach during kneeling.

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

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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 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.

RETRACTABLE TAG AXLE

Tag axle retraction 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. The axle will be automatically 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 and a beep will sound to alert the driver of the tag axle's position. 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 12mph (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 engine R.H. side access door.

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.

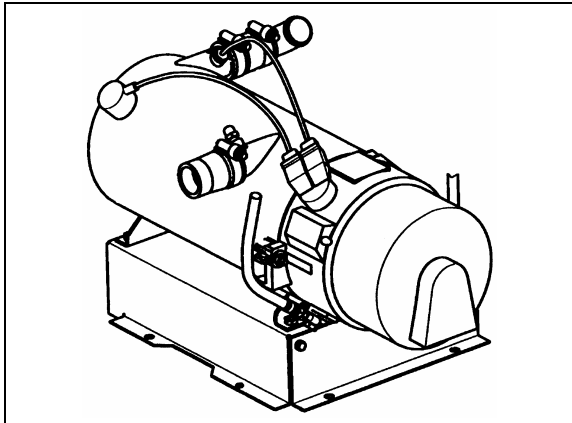
The heater operates independently of the engine. It is connected to the cooling system, heating circuits and to the vehicle's fuel and electrical system.



WARNING

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.

The coolant heater is located in a compartment in the lower part of the rear electrical compartment. To access the coolant heater, remove the panel in the rear electrical compartment.



COOLANT HEATER (104,000 BTU) 22224

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.

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.

WARNING

Preheating system must not operate when vehicle is parked inside or during fuel fill stops.

NOTE

Preheating system uses the same fuel as the engine.

Timer operating instructions (Webasto)

- ① Memory location number
- ② Display Time of day/preset time/operating time/remaining operating time
- ③ Display of day
- ④ Equipment-on indicator/operation indicator/coded signal fault diagnosis
- ⑤ Button for time/day
- ⑥ Button for preselected starting time
- ⑦ Button for switching heater on and off instantly
- ⑧ Reverse button for viewing operating time/remaining operating time
- ⑨ Forward button

94 OTHER FEATURES

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.

NOTE

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.

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.

Fault Diagnosis by Coded Light Signals

On heaters equipped with a fault diagnosis system using coded light signals, the equipment-on indicator/operation indicator flashes. Please consult appendix F for the Fault Diagnosis and Code list.

TROUBLESHOOTING AND MAINTENANCE

The diagnostic code system in Webasto timers is standard. Refer to Appendix F at the end of this manual, to the Maintenance Manual or 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.

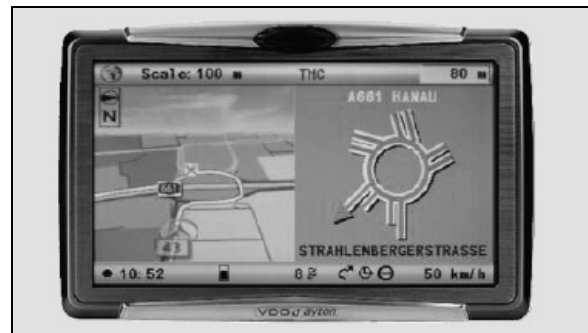
CAUTION
 To avoid running down the batteries, do not turn on the preheating system for more than one hour before starting the engine.

WARNING
 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.

CAUTION
 Never insert a CD/DVD other than the map CD/DVD. Doing so will block the computer and it will have to be sent to the manufacturer for extraction.



GPS NAVIGATION SYSTEM

WHEELCHAIR LIFT

Read and understand the RICON Owner's Manual before attempting to use the wheelchair lift. The instructions below are a quick reference and serve to complement the information provided by the lift manufacturer.

WARNING
 To operate the optional wheelchair lift, the coach must be parked on a flat and level surface, with the parking brake applied.

Activate the lift mechanism circuit by pressing down on the wheelchair rocker switch on the dashboard.

WHEELCHAIR LIFT AND ACCESS DOORS

Open the access door until fully opened, then open the lift mechanism baggage door and swing open until locked open.

A light inside the vehicle illuminates the doorway when the wheelchair access door is open.

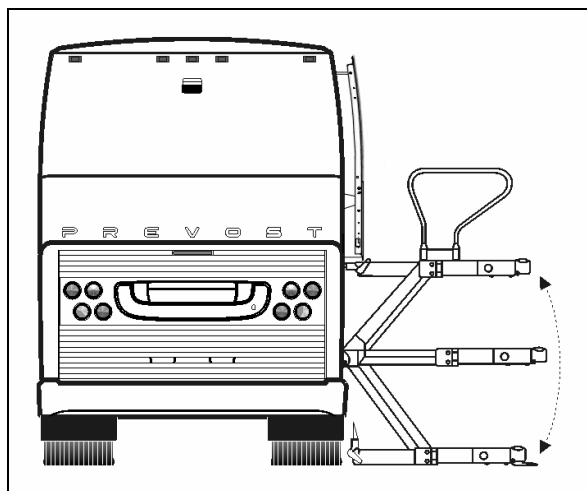
A telltale light on the dashboard illuminates when the lift mechanism door or the wheelchair access door is open. Refer to "CONTROLS AND INSTRUMENTS" chapter.

96 OTHER FEATURES

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, pull the door handle to unlock from the open position, and then slam the door shut.



RICON WHEELCHAIR LIFT

23365

OPERATING THE WHEELCHAIR LIFT



WARNING

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.



WARNING

Read and comply with all warning labels and symbols affixed to the wheelchair lift.



WARNING

Do not operate with a load in excess of 660 lbs (300 Kg).

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 operating the lift, be careful the control wire doesn't bind with the lift mechanism.

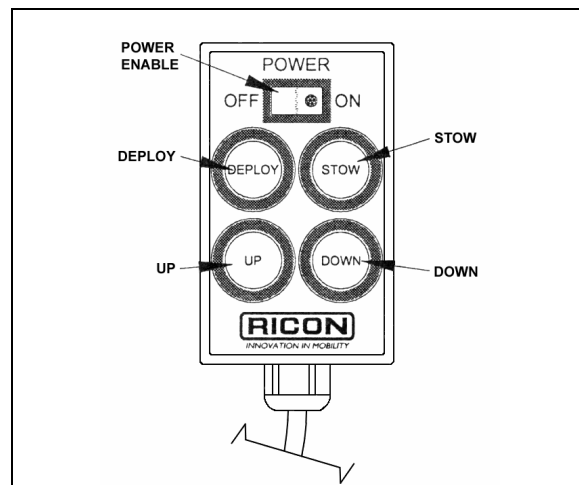
Using the handheld control pendant, deploy the lift by pressing on the DEPLOY button. When the lift begins to deploy, it is normal to hear a clutch action of one or two clicks should be heard. Once deployed, lift the handrails until locked in vertical position. Buckle the restraint belt.

Use the UP and DOWN switch 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



WARNING

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.

NOTE

The indicator light on the control device illuminates when power is supplied (when the lift electrical circuit is activated by the switch on the dashboard).

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.

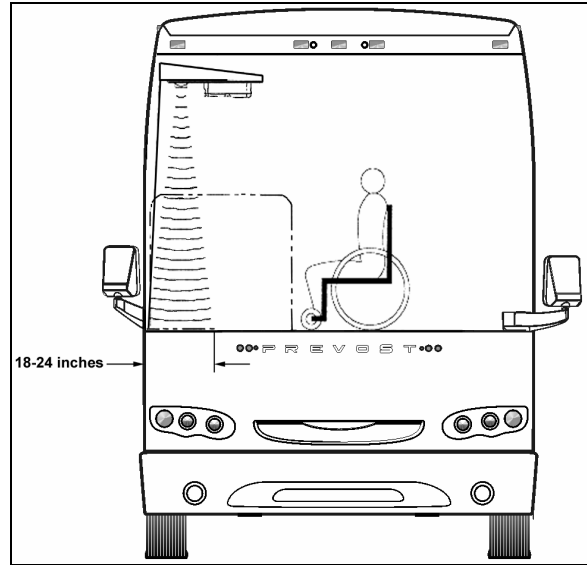
Adjustment of the sensor timing is done at the factory and should not need to be repeated in the field. Readjustment should only be considered if the sensor aiming could not be adjusted to ignore both the wheelchair in the aisle and the platform during its normal movement.

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.
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.
3. 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.

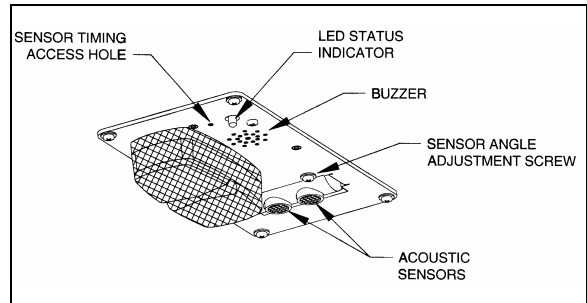
NOTE

Only in rare instances will adjustment be needed in the counterclockwise direction.



TWS AREA

4. 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

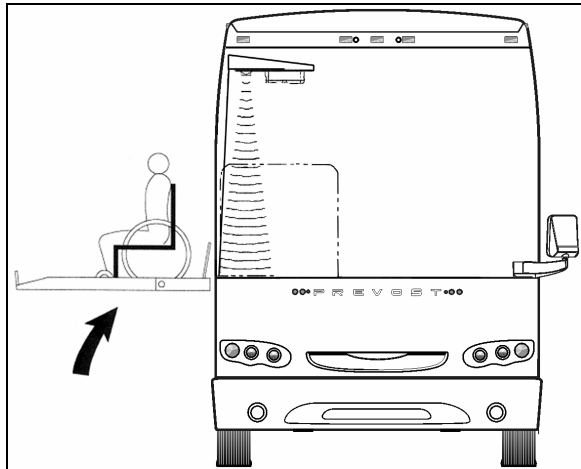
Test Aim of Acoustic Sensor Beam

1. 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.
2. 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.



CHECKING NORMAL PLATFORM POSITION

Adjust Acoustic Sensor Timing

1. 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.

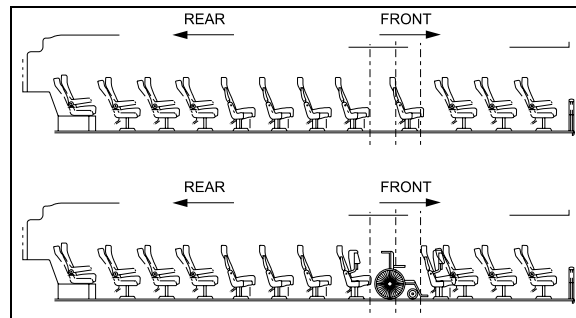
2. Note the sensor timing access hole. This hole provides access to a plunger-actuated switch that sets the sensor timing. Insert a 1/16-inch diameter wire-like object into the access hole and press the plunger inward. The LED will flash momentarily while the module establishes the distance and then 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

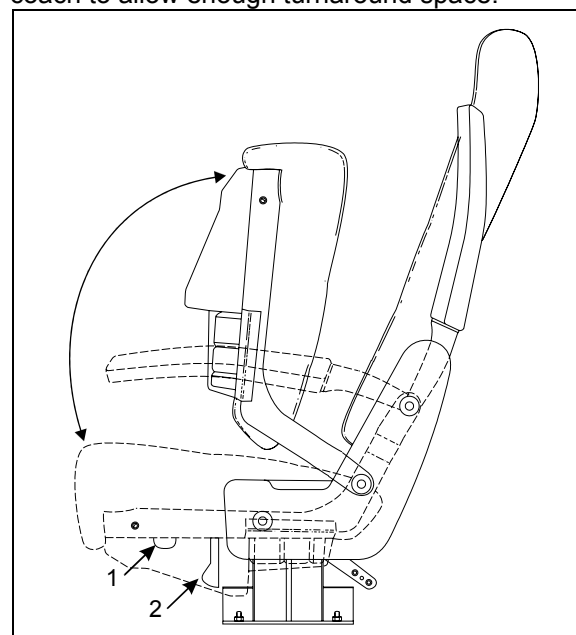
To accommodate a wheelchair, two rows of regular seats on one side of the coach must be folded and slid away. Seats may be folded on both sides of the coach to make room for a second wheelchair.



POSSIBLE SEATING ARRANGEMENTS

23259

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

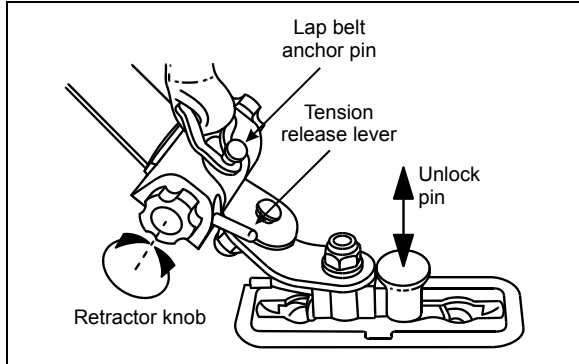
Two sets of wheelchair restraint belts are kept in plastic pouches and stowed in an overhead compartment. To secure each wheelchair, four tiedown straps must be used (at all four corners).

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.



BELT ANCHORING AND RETRACTION SYSTEMS 23266

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.

WARNING

Do not let restraint or safety belts rub against sharp edges. Do not bleach or dry clean.

Wheelchair Occupant Restraint

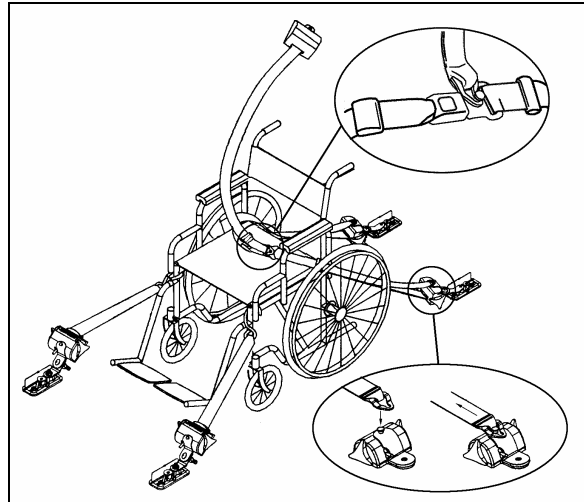
Secure the wheelchair occupant in the following manner:

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.



WHEELCHAIR RESTRAINTS AND ACCESSORIES

EMERGENCY OPERATION

In the event of electrical power loss, manual operation of the lift is possible as explained below.

To manually deploy the platform

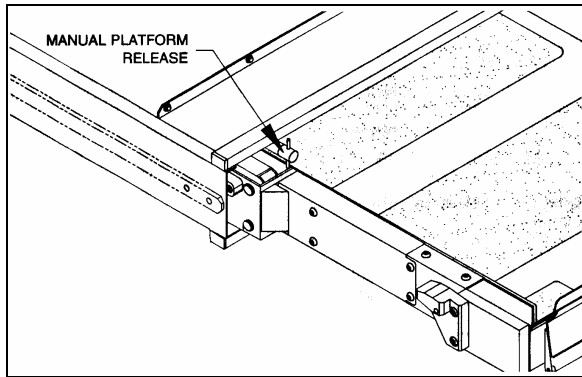
Allow enough space for lift operation and passenger boarding. If a break down situation exists and the vehicle cannot be moved so that the lift system can be operated safely, the operator must summon emergency assistance to move the vehicle before operating the lift.

Fully open wheelchair access and lift doors. Ensure that there are no obstacles in the path of the lift.

Remove the pump handle from inside the cover of the lift mechanism box.

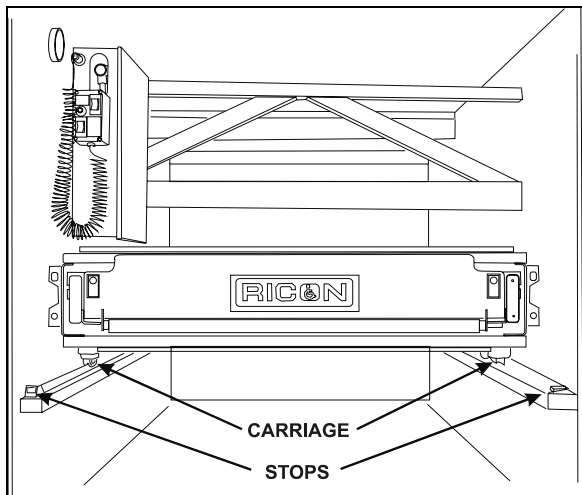
Turn one of the manual platform release shafts using pump handle extension.

100 OTHER FEATURES



MANUAL PLATFORM RELEASE SHAFT

Grasp the platform and pull firmly until the lift is all the way out against the carriage stops.



WHEELCHAIR LIFT MANUAL OPERATION

23265

To manually raise the platform

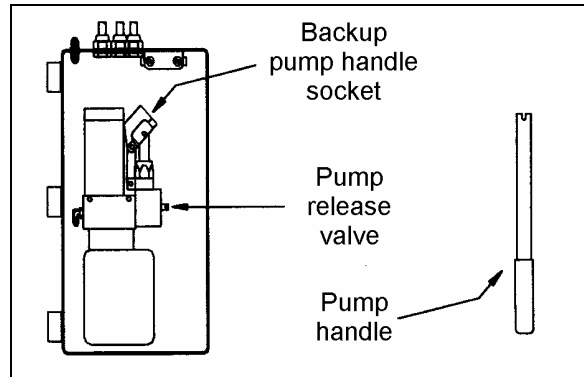
Remove the pump handle from inside the cover of the lift mechanism box.

Insert the handle onto manual backup pump release valve. Make sure the notches at the end of the handle are fully engaged by the release valve pin. Twist the handle **CLOCKWISE** until lightly-snug and remove.



CAUTION

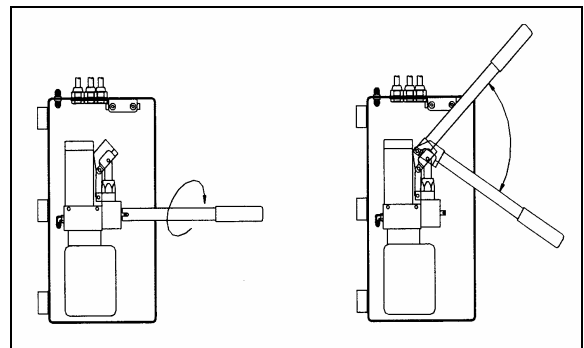
During manual rising of the lift, do not raise the platform more than 1-1/2 inches above the vehicle floor level. Any excessive travel will make it difficult to enter the platform and/or damage the lift bridge plate actuator. The outer edge of the bridge plate must rest squarely on the vehicle floor.



WHEELCHAIR LIFT MANUAL HYDRAULIC PUMP

23268

Insert handle extension into manual backup pump handle socket and pump to raise the platform to the vehicle floor level.



PLATFORM MANUAL RAISING

23267

The lift passenger and attendant must follow the instructions to **ENTER** or **EXIT** the vehicle, as previously described.

To manually lower the platform



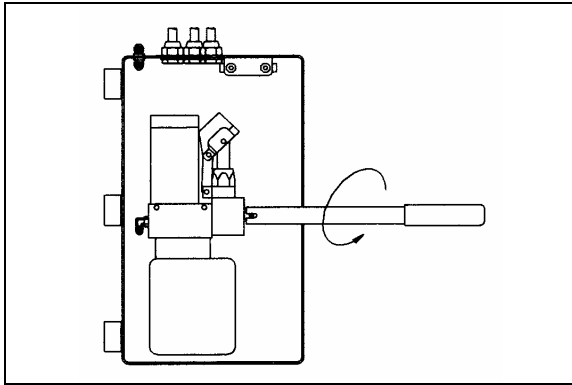
CAUTION

Do not turn pump release valve more than 1/4-turn **COUNTER-CLOCKWISE**. The valve is totally removable which will disable all automatic and manual **UP/DOWN** functions.

Insert the pump handle extension onto manual backup pump release valve. Make sure the notches at the end of the handle are fully engaged by the release valve pin. Slowly twist the handle 1/4-turn **COUNTER-CLOCKWISE** until the platform begins to lower.

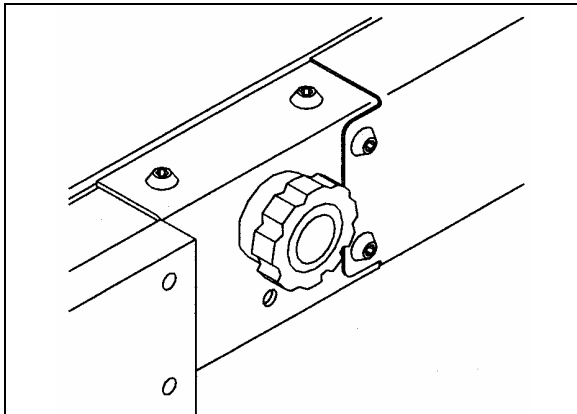
Allow the platform to reach ground level.

Twist the handle **CLOCKWISE** until lightly-snug and remove.



PLATFORM MANUAL LOWERING

Using the rollstop manual control knob and one hand on the rollstop, OPEN the rollstop.



ROLLSTOP MANUAL CONTROL KNOB 23275

The attendant and lift passenger should follow the instructions to ENTER or EXIT the vehicle, as described previously.

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 at the end 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.

	<p>WARNING</p>
<p>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.</p>	

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.

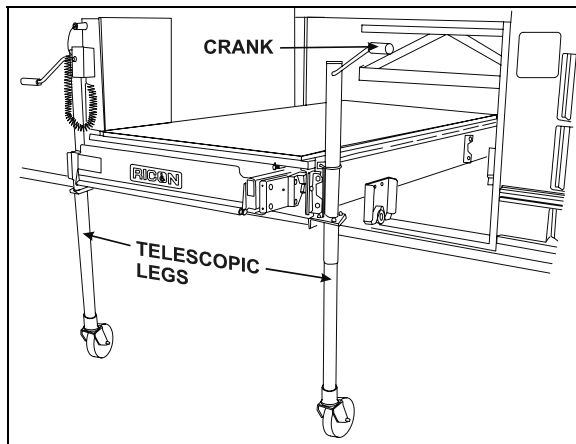
Remove 4 fixing bolts located inside compartment, on each side of platform.

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.

<p>NOTE</p>
<p><i>There are two telescopic legs for each platform side. The proper side is indicated onto the telescopic leg.</i></p>

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INSTALLATION OF TELESCOPIC LEGS

Turn telescopic leg crank to raise the carriage to be able to clear the stops.

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 clears the stops.

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 ft-lbs.**

Reconnect connector located at compartment ceiling.



WARNING

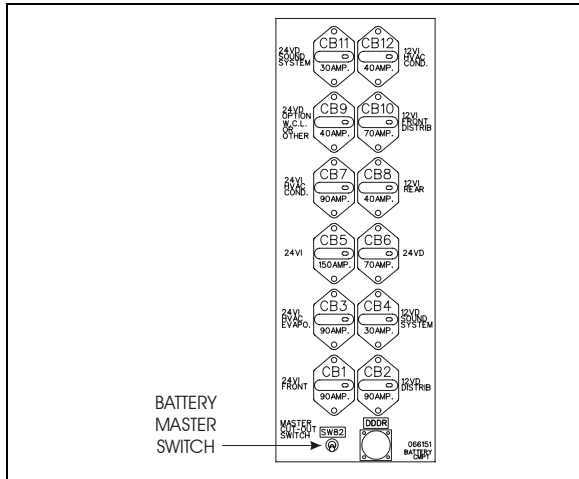
When re-inserting platform into compartment, make sure that carriage wheels are properly aligned over the L. H. side triangular rail before removing telescopic legs.

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

1. Apply the spring-loaded parking brake by pulling the parking brake control button all the way up;
2. Make sure the starter selector switch located in the engine compartment is set to the *NORMAL* position;
3. Check that the battery master switch in the main power compartment is set to the *ON* position;



INSIDE MAIN POWER COMPARTMENT

4. Place transmission in neutral;
5. Turn ignition key to *START* position (refer to "CONTROLS AND INSTRUMENTS" chapter), release the key after the engine starts.

NOTE
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

1. Apply parking brake and place transmission in neutral (N);
2. 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);
3. Shut off all electrical loads;
4. Turn the ignition key to the *OFF* position.


CAUTION
 Do not shut *OFF* engine when running above normal idle.

CAUTION
 Set the Safety switch to the *OFF* position after parking and when left unattended for an extended period of time.

104 STARTING AND STOPPING PROCEDURES

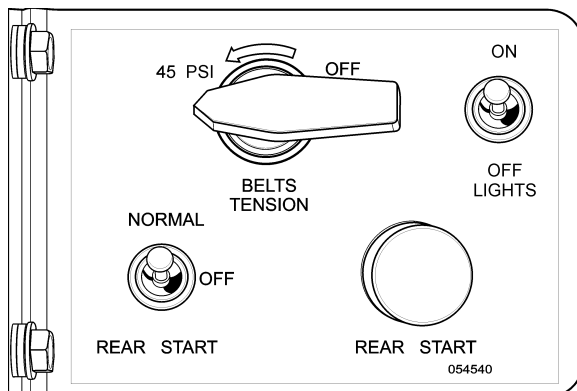
STARTING FROM THE ENGINE COMPARTMENT

1. Switches to start and stop the engine from inside the engine compartment are mounted on a small panel.

 **WARNING**


Apply parking brake and place transmission in neutral (N) before starting engine from inside the engine compartment.

2. Set the battery master switch to the ON position;
3. Set the starter selector switch to the *REAR START* position;
4. Press the *REAR START* push-button switch. Release the push-button after the engine starts.




REAR START PANEL

01044

 **WARNING**


Do not wear loose clothing when working near engine. Stand clear of rotating components.

 **CAUTION**

Refer to cautions in “Starting From The Driver’s Seat” and “Stopping the Engine” in this chapter.

Stopping The Engine

To stop the engine, 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. Allow 3 seconds for the shot to discharge;
4. Start the engine, use a second shot if necessary to keep the engine running.

 **CAUTION**

Use the cold starting aid only when absolutely necessary. Excessive use of starter fluid could result in serious 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.

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.



WARNING

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.



WARNING

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.



WARNING

The gases given off by batteries while jump starting are explosive. Do not smoke near batteries.



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.



CAUTION

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

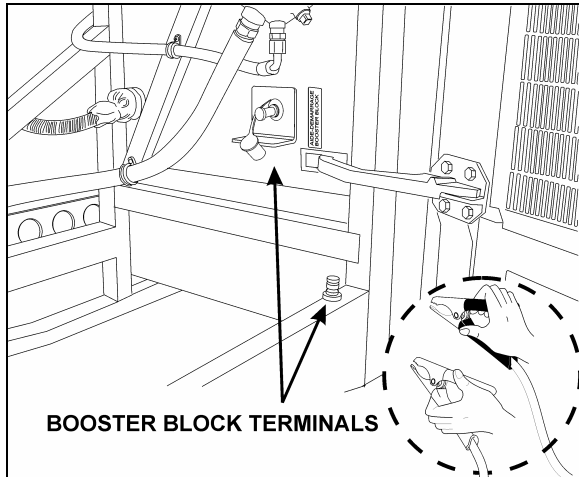
Choose a booster vehicle which produces comparable amperage as your vehicle.



CAUTION

Off-board battery charger with a start boost facility must not be used to jump start the vehicle. This could damage the electrical system.

106 STARTING AND STOPPING PROCEDURES



BOOSTER BLOCK TERMINALS

18645

To jump start, proceed as follows:

1. Remove the protective caps from the booster block terminals located in compartment at the right of the engine;
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 caps on the booster block terminals.

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.

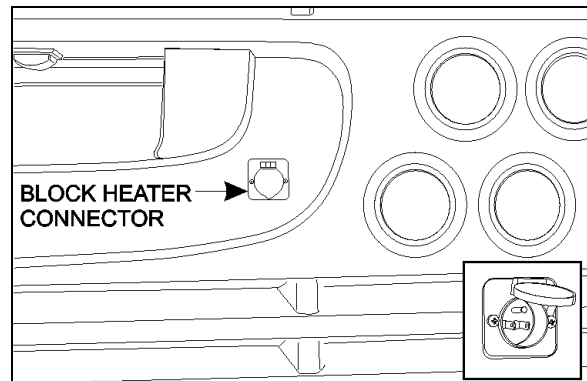
ENGINE BLOCK HEATER

The vehicle is equipped with an engine immersion-type electric block heater to assist cold weather starting. A connector is on the rear engine compartment door. Using an extension cord, connect to a 110 - 120 VAC outlet.



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.



110-120 VOLTS CONNECTOR

18443

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.



WARNING

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).

ALLISON TRANSMISSION WARM-UP

With an automatic transmission, when the 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 -4°F (-20°C) and -22°F (-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.

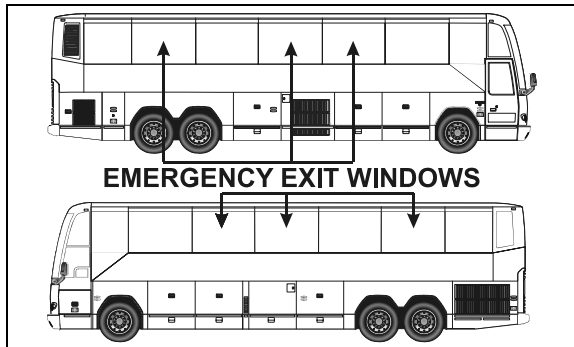
For outside temperatures below -22°F (-30°C), warm air must be used to heat the transmission up to a temperature above -22°F (-30°C) before the engine is started.

EMERGENCY EXITS

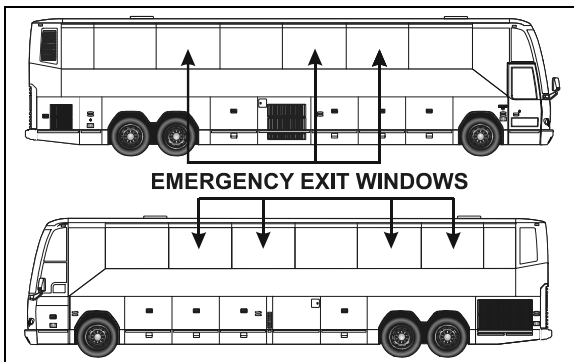
Locate and learn how to use all possible emergency exits. It is good practice to inform passengers of the location of exits and how to use them in case of an emergency.

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 (H3-41) 18520

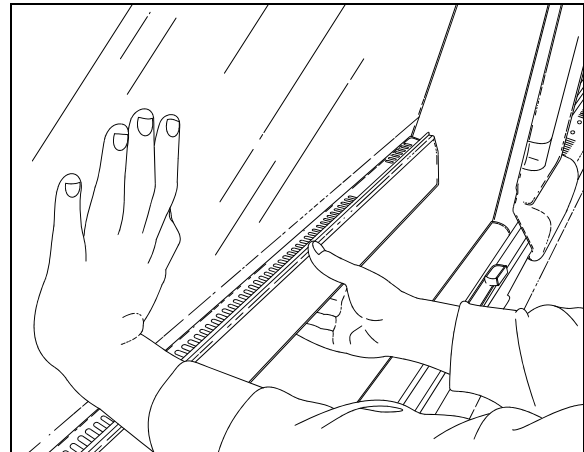


EMERGENCY EXIT WINDOWS (H3-45) 18519

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.

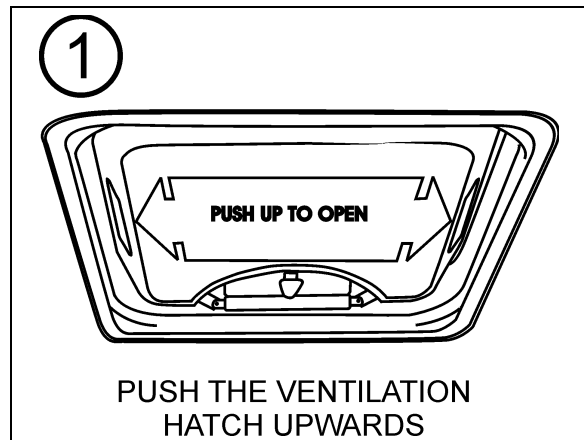
To close the window, tilt up the release bar and pull the window back. Push down the release bar to lock shut.



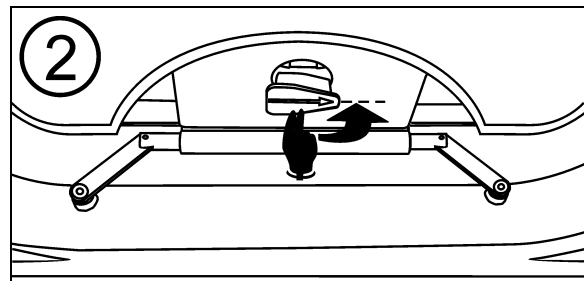
SIDE WINDOW EMERGENCY EXIT 18391

ROOF HATCH

A roof ventilation hatch, designed to be opened by occupants may be installed in the roof 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.

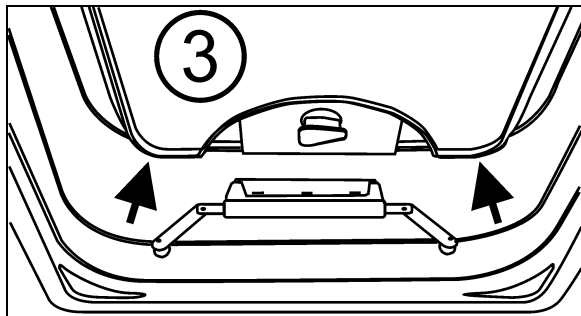


PUSH THE VENTILATION HATCH UPWARDS



TURN AND THEN PUSH KNOB TO RELEASE HATCH

110 SAFETY FEATURES AND EQUIPMENT



**PUSH THE ESCAPE HATCH
OUTWARDS**

EMERGENCY ROOF ESCAPE OPENING

NOTE

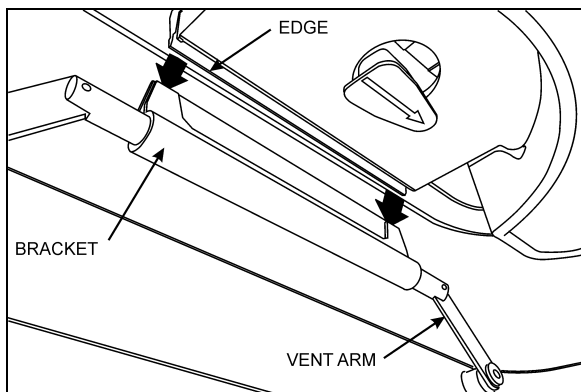
In the event of ventilation blower motor failure, the roof hatch may be used to aid ventilation by pushing the hatch upwards.



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

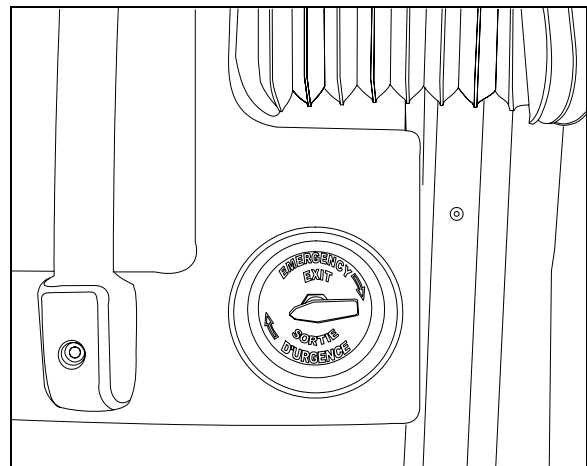
EMERGENCY ENTRANCE DOOR OPENING

An unlatch air valve located on the front wall, close to the entrance door allows emergency depletion of the door and locking cylinders. Another unlatch valve is located in the front service compartment and allows emergency

opening from outside the cabin. 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 operating switch, then close the door normally.

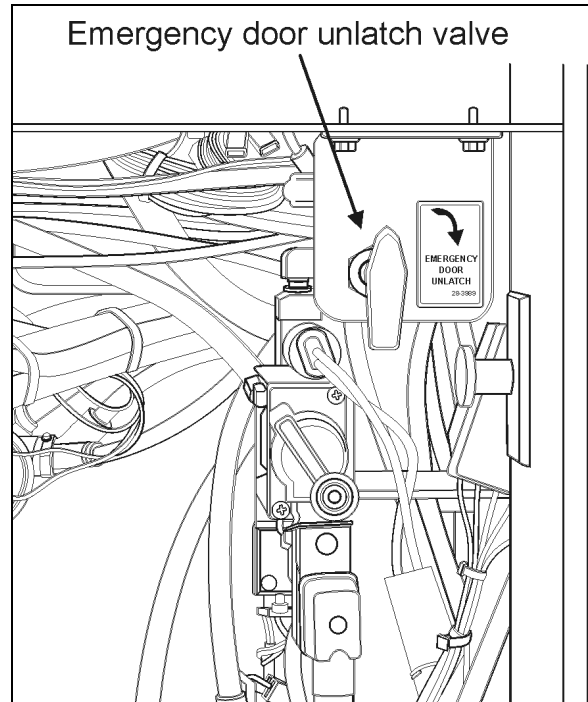
NOTE

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



FRONT SERVICE COMPARTMENT

12189

EMERGENCY EQUIPMENT

The coach is equipped with numerous safety features and equipment. Verify the equipment regularly and keep on-hand and in good condition at all times. Following is the enumeration and description of safety equipment found on board.

AUTOMATIC FIRE DETECTION AND 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.*

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.

- If the operator presses the **Manual Activation Switch**, all delays will terminate and the engine shutdown and extinguisher discharge will occur immediately.
- 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);

112 SAFETY FEATURES AND EQUIPMENT

- 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

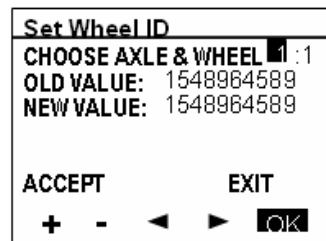
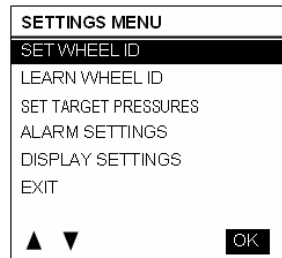
It is recommended to check the remaining battery lifespan when changing the tires in order to replace the sensors at the same time if they are due for replacement before the next change.

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.

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



- ◀ ▶ Navigate
- +/- Increase, decrease digits
- ⏹ Navigate forward
- ACCEPT & OK Execute Change Old Value = New. Stay in Menu
- EXIT & OK Ignore changes in progress (new value) and EXIT menu

- 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.

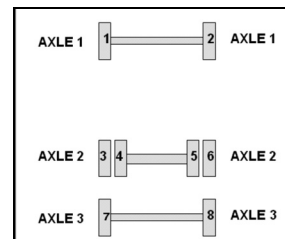
The display uses a pressure change as the criteria to recognize which wheel sensor the operator wants to get assigned to a given location. The amount of pressure change required is established at 2 PSI.

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.

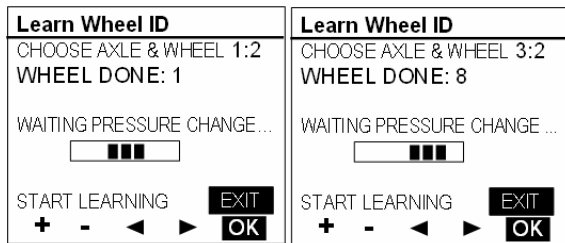
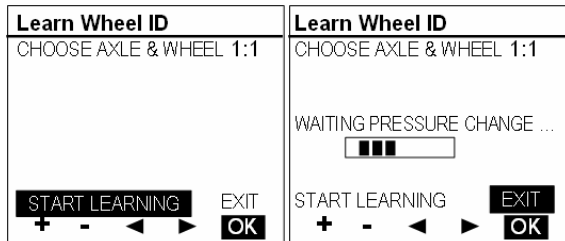
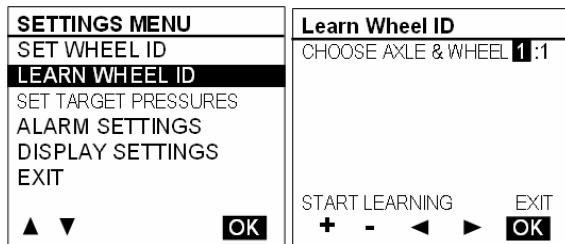
Once a wheel ID has been assigned, the display increments the number of Wheels done and it moves the axle/wheel to the next one in the sequence waiting for another sensor to come up with a pressure change. Within one learning session, the display remembers which sensor has been assigned and it will not 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.

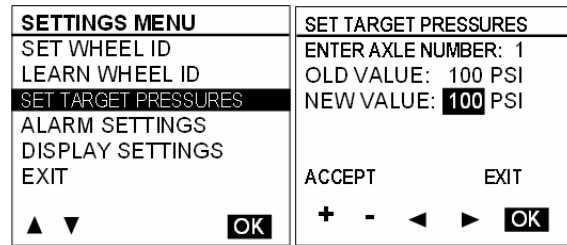


- **Set Target Pressures**

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.

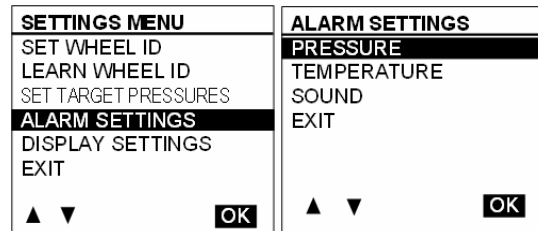
The factory set target pressure is always kept in permanent memory into the TPMS display and cannot be edited by the end user.

When the user enters a new target value, the user cannot select values outside the valid range.

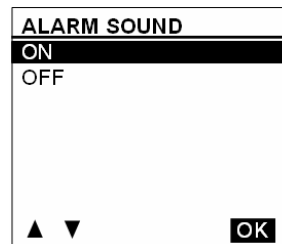
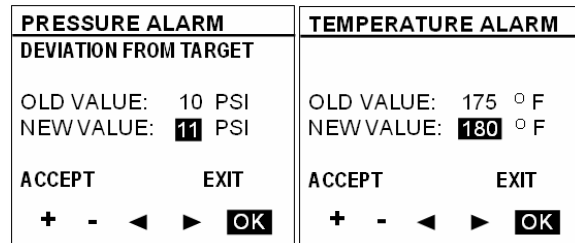


- **Alarm Settings**

When selecting the Alarm Settings Menu, a sub menu containing Pressure Alarm and Temperature Alarm appears.

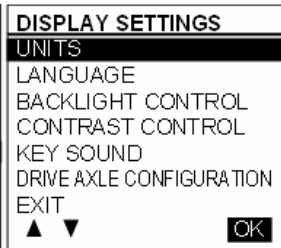
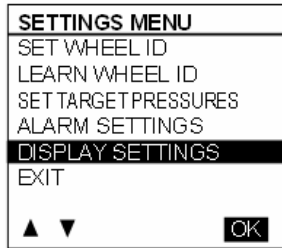


When selecting Pressure Alarm the screen pressure alarm shown below appears. A similar screen is defined for temperature settings. The cursor can be moved to highlight the number beside “new value”, “ACCEPT” or “EXIT”. +/- allows increasing or decreasing the numbers. Pressure alarms changes are allowed 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.

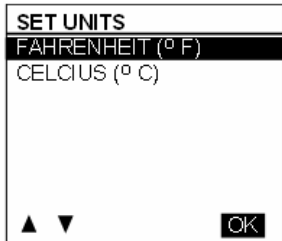


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- Display Settings



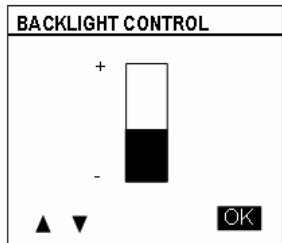
Units



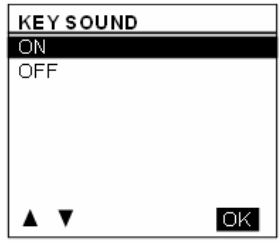
Languages



Backlight Intensity

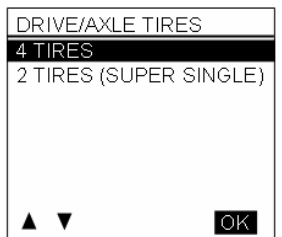


Key Sound



turns key press sound ON/OFF

Tire / Axle Configuration

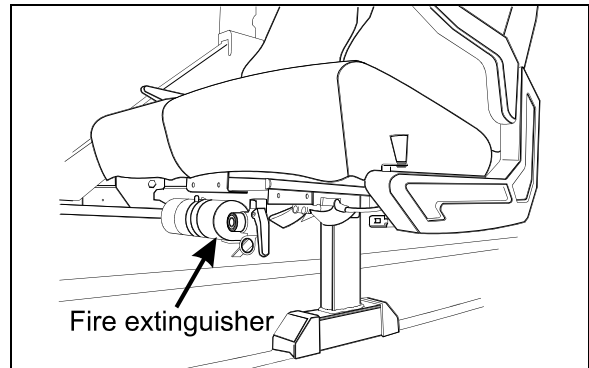


Pressing the up down arrow when the number of tires is highlighted allows flipping the number to 2 or 4 which are the only valid choices.

Refer to "Appendix G" for Troubleshooting Guide on TPMS system.

FIRE EXTINGUISHERS

Two fire extinguishers are located under the seats in the first row behind the driver. Instructions for use are found on the extinguishers. Make sure you know how to operate fire extinguishers in case of an emergency.

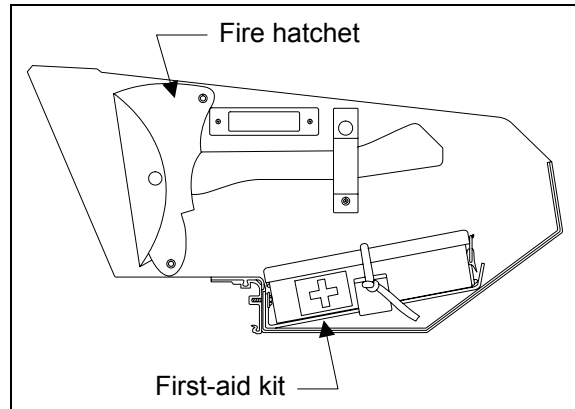


FIRST ROW SEATS

23136

FIRST-AID KIT

The optional first-aid kit is stored in the first curb-side overhead storage compartment. A white cross over red background decal identifies the kit.



FIRST CURB-SIDE OVERHEAD COMPARTMENT

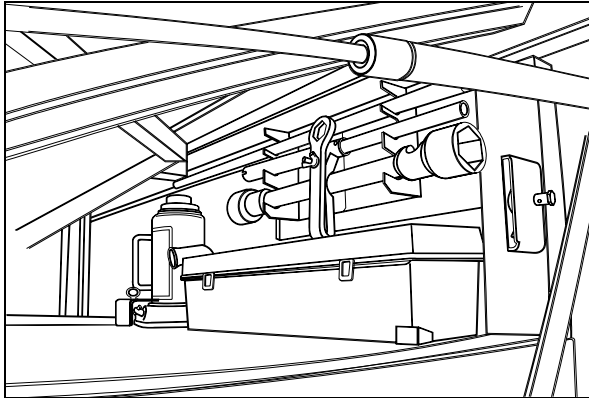
23141

FIRE HATCHET

An optional fire hatchet may be installed in the first curb-side overhead storage compartment.

WARNING REFLECTORS

A box containing three triangular reflectors is provided to warn other drivers on the road in case of a breakdown. The box is located with the jack and tools kit in the first curb-side baggage bay. 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).



REFLECTOR BOX, JACK AND TOOLS 13015

JACK AND TOOLS

A kit for jacking up the vehicle and changing wheels is stored in the first curbside baggage bay.

The kit includes:

- One 30 ton bottle jack;
- A wheel nut wrench and lever;

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 bay.

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.

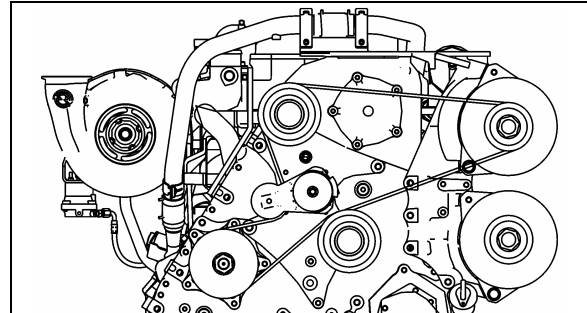
Lower alternator failure:

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;
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);

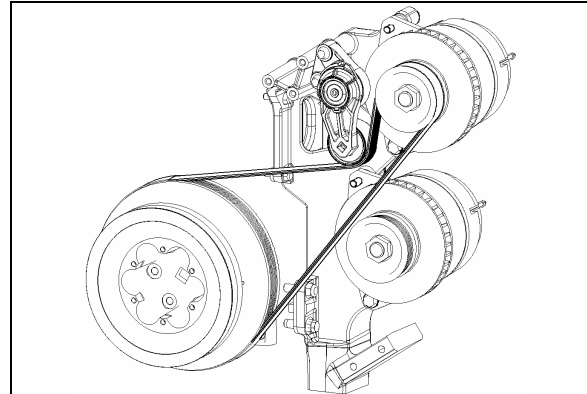
5. Gently release the belt tensioner.

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

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 compartment, pull on the release handle located in the front electrical and service compartment, near the lower door hinge.

NOTE

The jack and tools are located in the first baggage compartment.

116 SAFETY FEATURES AND EQUIPMENT

The bumper will lower gradually.

When closing the compartment, be sure the bumper is firmly in place.

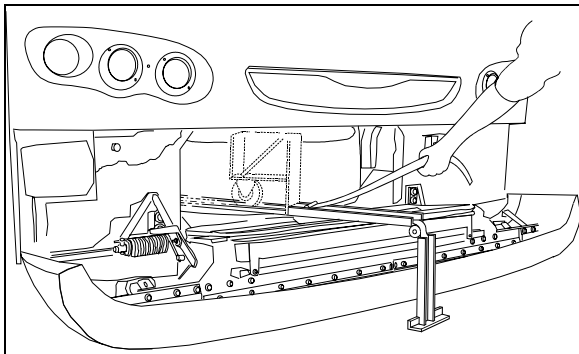
Removing the spare wheel from the compartment

To remove the spare wheel and tire from the compartment, loosen the turn-buckle on the holding chain to release the wheel and dolly. In the front electrical and service compartment, unscrew the wing nut holding the support and rail extension assembly, remove the support and rail extension assembly. Attach the assembly to the matching holes located in the front center of the spare tire compartment. Remove the spare wheel using the strap. Remove the tire covering. Remove the two nuts and separate the spare wheel from the dolly.



CAUTION

Before driving, make sure that the support and rail extension assembly is reinstalled and the wheel has been secured with the holding chain.

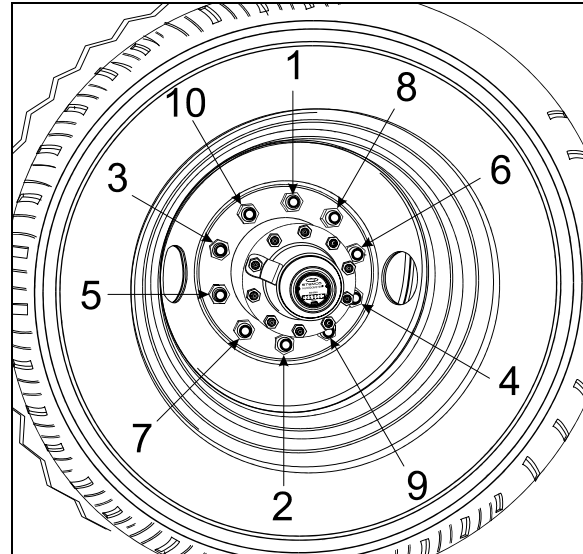


REMOVING SPARE WHEEL AND TIRE

13024

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 first baggage compartment.

NOTE

Periodically check the spare tire 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.



CAUTION

Before driving, be sure the flat tire, track, jack and tools are securely reinstalled in their respective compartments.



CAUTION


Check that the bumper is securely closed shut before driving.

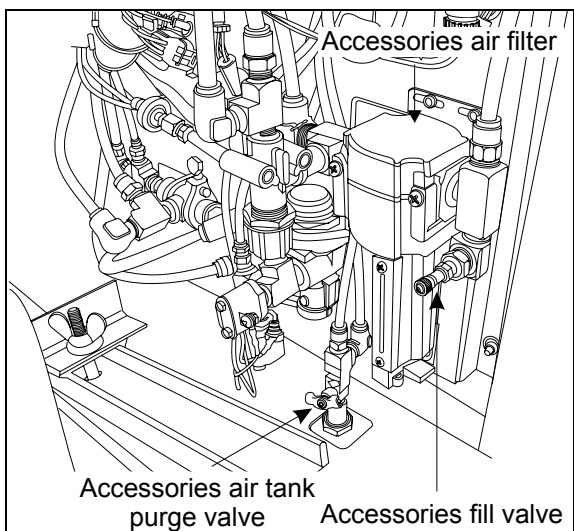
EMERGENCY AIR-FILL VALVES

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.

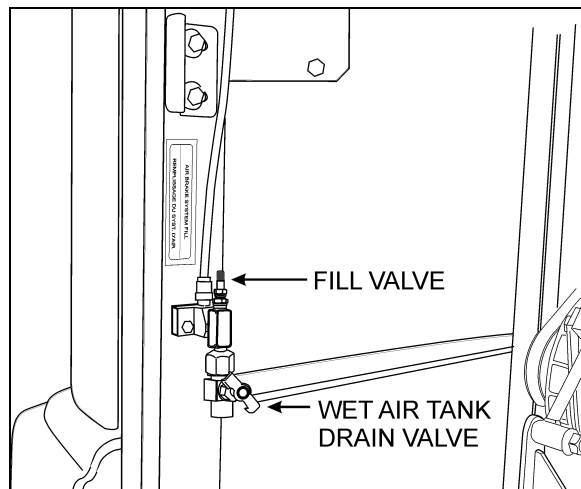
Both air system emergency fill valves are fitted with standard tire valve stems. The air systems can be filled using any standard external air supply line. The fill valve located in the engine compartment supplies air for all systems (brakes, suspension and accessories). The fill valve located in the front service compartment supplies air for accessories only.

 <b style="font-size: 1.2em;">CAUTION
<p>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).</p>



FRONT SERVICE COMPARTMENT

12130



FILL VALVE IN ENGINE COMPARTMENT


12219

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.

 <b style="font-size: 1.2em;">WARNING
<p>Always apply the parking brake before leaving the driver's seat.</p>

<p>NOTE</p> <p><i>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.</i></p>
--

<p>NOTE</p> <p><i>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).</i></p>

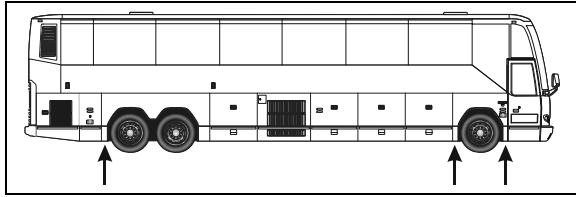
<p>NOTE</p> <p><i>The telltale panel audible alarm will sound if the ignition switch has been turned to OFF without applying the parking brake. The same beep will sound if pressure is still applied to the service brake pedal.</i></p>
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<p>NOTE</p> <p><i>The stoplights automatically turn on when the parking brake is applied and the engine is running.</i></p>
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JACKING POINTS

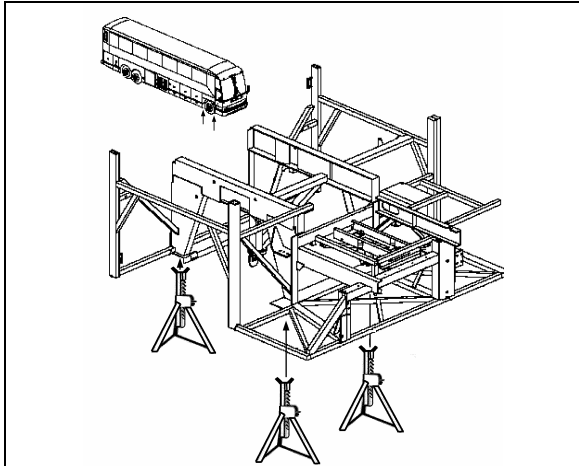
Twelve jacking points are located on the vehicle: three are located on each side of the frame and two are located under each axle. Refer to the following illustrations for the location of jacking points.

118 SAFETY FEATURES AND EQUIPMENT

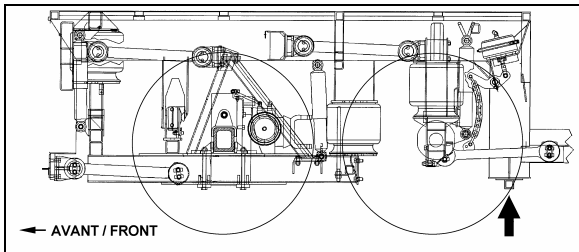


JACKING POINTS ON FRAME

18524



JACKING POINTS ON FRONT FRAME

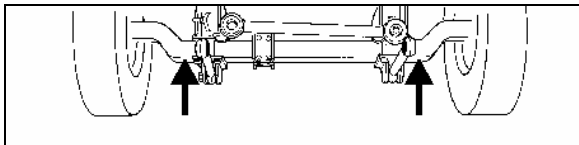


JACKING POINTS ON REAR FRAME



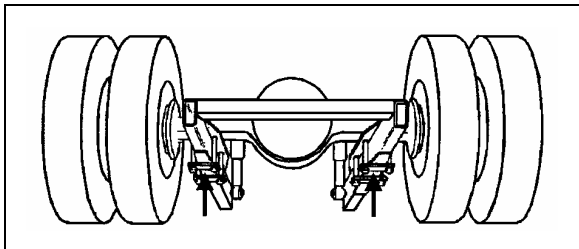
WARNING

The suspension of the vehicle must be in the normal ride position before jacking.



JACKING POINTS ON FRONT AXLE

10005



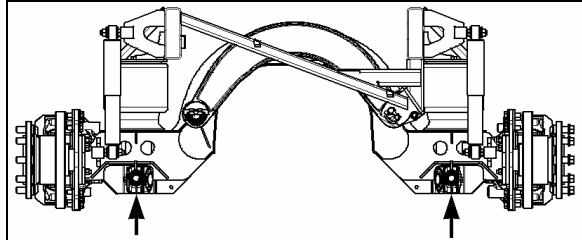
JACKING POINTS ON DRIVE AXLE

11005



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 weight:

Front axle: 20,000 lbs. (9 100 kg);

Drive axle: 40,000 lbs. (18 200 kg).



WARNING

Do not jack vehicle with passengers inside. Coach weight depends on equipment and cargo within. Check before jacking.

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.



WARNING

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.



WARNING

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 THE VEHICLE

The vehicle can be transported on a low bed semi-trailer of adequate gross axle weight capacity. When transporting a vehicle in this manner, apply parking brake and shut down the engine. Block all wheels and secure vehicle with tie-downs. Check that overall height will clear obstacles on the route to follow, and obtain required permits.

The vehicle can also be towed by lifting the front axle or by towing from the front with all wheels on the ground. These two methods are described below under their respective headings. Whatever the method used, the vehicle should be towed by truck operators authorized and experienced in towing highway coaches.

Observe normal precautions including, but not limited to, the ones listed below when towing the vehicle:

- Make sure the parking brake is released before towing.
- Do not allow passengers to ride onboard the towed vehicle.
- Tow the vehicle at a safe speed as dictated by road and weather conditions.
- Accelerate and decelerate slowly and cautiously.



WARNING

Do not carry passengers while the coach is being towed.



CAUTION

Never tow the vehicle from the rear, as this will cause serious damage to the chassis and engine cradle. In case of damage to the drive train components, use a low bed semi-trailer to support the rear end.

LIFTING AND TOWING

The towed vehicle must be lifted from under the front axle only. The tow truck must be equipped with the proper lifting equipment to reach under the front axle since no other lifting points are recommended. Lifting and towing from any other point are unauthorized as it may cause serious damage to the structure. Do not unload or raise the tag axle when lifting and towing to prevent overloading the drive axle.

1. Remove both drive axle shafts to prevent damage to the transmission. Plug axle tube to prevent oil loss. Refer to Rockwell's "Maintenance manual no.5" annexed at the end of Section 11: Rear Axle of the maintenance manual.



CAUTION

Transmission lubrication is inadequate when towing. With automatic, semi-automatic or manual transmission, the axle shafts or driveshaft must be disconnected to avoid serious damage to the transmission. Do not attempt to push or pull-start the coach.

2. Operate the engine when towing to maintain brake system air pressure. If the engine cannot be operated, connect an external air pressure line from the tow truck to the emergency fill valve in the engine R.H. side compartment. The emergency fill valve in the front service compartment does not supply air pressure to the brake system. The air pressure must be a minimum of 75 psi (520 kPa), and the line should be attached to the air line with a clip-on chuck.



CAUTION

Do not tow the vehicle without external air pressure applied to the emergency fill valve if the engine does not operate. Without brake system air pressure, the brakes may apply automatically if system air drops below 40 psi (275 kPa). If failure prevents releasing the parking brakes with air pressure, disengage the parking brakes mechanically.

120 SAFETY FEATURES AND EQUIPMENT

- Lift the vehicle from under the front axle, and adequately secure the underside to the tow truck lifting attachment with chains.
- Observe safety precautions when towing.



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.

TOWING WITHOUT LIFTING



CAUTION

When towing vehicle without lifting, use only a tow truck with a solid link tow bar and related equipment. All other means of towing are unauthorized. Tow only from the front of the vehicle.

- Remove both drive axle shafts to prevent damage to the transmission. Plug axle tube to prevent oil loss. Refer to Rockwell's "Maintenance manual no.5" annexed at the end of Section 11: Rear Axle of the maintenance manual.



CAUTION

Transmission lubrication is inadequate when towing. With automatic, semi-automatic or manual transmission, the axle shafts or driveshaft must be disconnected to avoid serious damage to the transmission. Do not attempt to push or pull-start the coach.

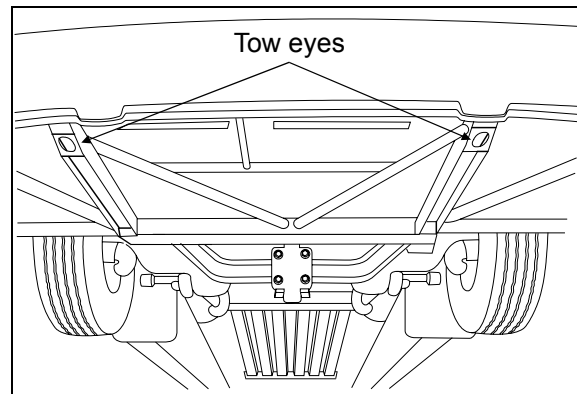
- Operate the engine when towing to maintain brake system air pressure. If the engine cannot be operated, connect an external air pressure line from the tow truck to the emergency fill valve in the engine R.H. side compartment. The emergency fill valve in the front service compartment does not supply air pressure to the brake system. The air pressure must be a minimum of 75 psi (520 kPa), and the line should be attached to the air line with a clip-on chuck.



CAUTION

Do not tow the vehicle without external air pressure applied to the emergency fill valve if the engine does not operate. Without brake system air pressure, the brakes may apply automatically if system air drops below 40 psi (275 kPa). If failure prevents releasing the parking brakes with air pressure, disengage the parking brakes mechanically.

- Position the tow truck so that the tow bar contacts the front bumper of the vehicle.
- Attach the tow truck chains only in the tow eyes of the vehicle under the bumper and take up all the slack.
- Use a safety chain as applicable.
- Observe safety precautions when towing.



TOW EYES UNDER VEHICLE

18401



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.

DAYTIME RUNNING LIGHTS

The daytime running lights system provide added safety by making the front of the 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 depressed to the first position.



WARNING

Do not drive with only the daytime running lights at night because the taillights and the side marker lights are not turned on in that situation and the high beam can blind other drivers. For night driving, turn **ON** the headlights by depressing the headlights and exterior lighting rocker switch to the second position.

FOG LIGHTS

Fog lights provide better visibility in fog and precipitation. They improve visibility immediately in front of the vehicle. They also provide added safety.

NOTE

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

COMPARTMENT LIGHTING

Baggage bays, front and rear service compartments and main power compartment lights are automatically turned **ON** when the corresponding compartment door is opened. A telltale light on the dashboard illuminates when a baggage bay door is open.

MUD FLAPS AND SPLASH GUARDS

Mud flaps are installed behind each front wheel and the tag axles. Mud flaps minimize dirt on the lower panels of the vehicle and prevent stones and debris from being thrown at vehicles travelling behind the vehicle. 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 is 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,
- Windshield washer fluid: Lower windshield washer 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.

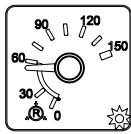
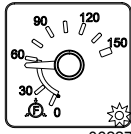
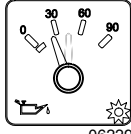
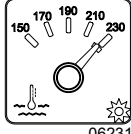


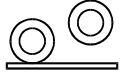
- Never connect a battery charger when the ignition is at the ON position on a vehicle with a CAN defective or certain functions will start up by themselves,
- Disconnect the charger before starting the vehicle, if not the default functions will not activate,
- If the default mode does not activate, 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.

NOTE

To verify the telltale panel audible alarm functionality, with the engine running, press down and maintain the L.H. dashboard panel "TEST" switch at least 2 seconds. The telltale panel audible alarm will sound.

Visual Indication	Audible Alert	Condition
 06228	Yes	Air pressure in primary system below 66 psi (860 kPa).
 06227	Yes	Air pressure in secondary system below 66 psi (860 kPa).
 06229	Yes	Engine oil pressure below 50 psi (345 kPa).
 06231	Yes	Coolant temperature above 223 °F (106 °C).
 06282	Yes	Gear changing inhibited.
None	Yes	Reverse gear engaged.
 06288	Yes	Fire in engine compartment.
 06271	Yes	Tag axle retracted.

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Visual Indication	Audible Alert	Condition
 06448	Yes	Kneeling down.
None	Yes	Engine OFF but parking brake not applied.
None	Yes	Lavatory emergency call button
STOP ENGINE 06657	Yes	Major problem detected by engine.
 06696	Yes	Outside temperature close to water freezing point.
 06292	Yes	Transmission fluid too hot.
 06299	Yes	Wheelchair lift access door is open

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.

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.

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.

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

To keep its original appearance, wash the floor regularly. Clean vinyl floors with a quality nonionic detergent cleaner or a household all purpose cleaner. Follow the manufacturer's recommendations for cleaning. Remove incrustated rubber or oil stains with thinner.

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. Install keyhole protectors to prevent water from penetrating. Rinse vehicle with water to remove all loose dirt. Wash vehicle using 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.



CAUTION

Do not spray water jet directly into fresh air inlet dampers.



CAUTION

Do not aim high pressure water jet at radiator or condenser doors. This could damage the 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.

LAVATORY MAINTENANCE

Flush water in the lavatory is recirculated from the sump tank (if two sump tanks are installed, the top tank is the main tank and the bottom one becomes the auxiliary 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. The main sump tank is then filled with clean water and the process continues.

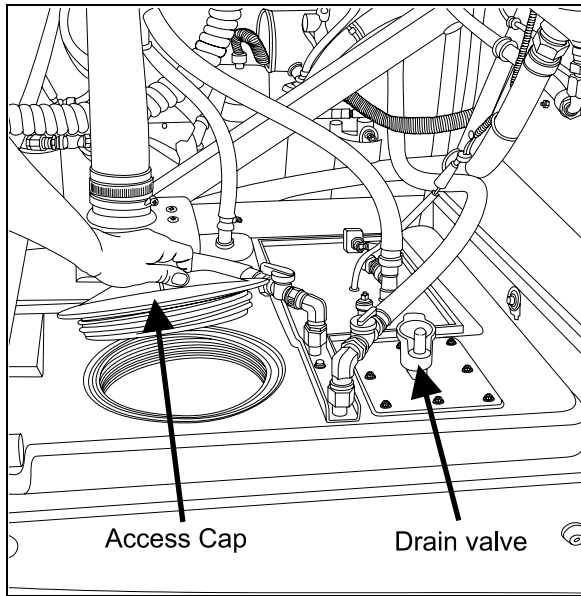
The optional top tank contains about 13 gallons (50 liters) and the lower tank contains about 26 gallons (100 liters).

NOTE

The fresh water tank also drains into the sump tank. One must take into account this fact to avoid an overflow.

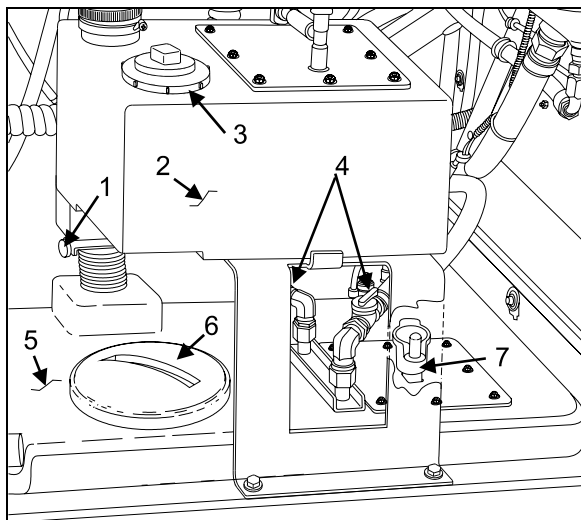
Routine draining and filling of lavatory tanks should be performed by maintenance personnel only, and should be done before parking the coach overnight in freezing temperatures.

The sump tank may be equipped with a heating element which permits circulating coolant fluid through the tank in cold weather. When not needed, close the valves to bypass the system.



SINGLE SUMP TANK OPTION

23294A



DUAL SUMP TANK OPTION

23295

1. Main sump tank drain valve;
2. Main sump tank
3. Main sump tank access cap;
4. Auxiliary sump tank heating element valves;
5. Auxiliary sump tank
6. Auxiliary sump tank access cap;
7. Auxiliary sump tank drain valve.

FILLING THE SUMP TANK

Fill the sump tank through the access hole and throw in a packet of commercial toilet deodorant (Prevost part #900329).

DRAINING THE SUMP TANK

When recirculating water in the toilet is soiled, drain the sump tank. If equipped with the optional auxiliary sump tank, drain the main sump tank contents into the auxiliary tank by opening the knife gate valve under the tank. 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.

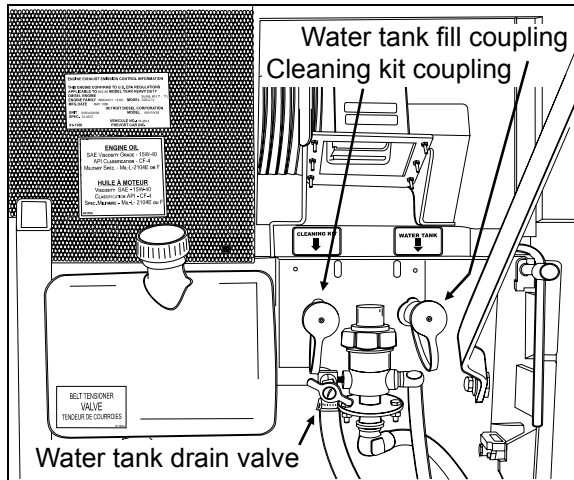
NOTE

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.

FRESH WATER RESERVOIR



ENGINE COMPARTMENT

23209

Water from the fresh water reservoir supplies the washbasin in the lavatory.



WARNING

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. The fresh water tank contains about 17 gallons (66 liters). Fill the reservoir until the overflow tube leaks, signaling that the reservoir is full.



WARNING

Never put antifreeze in fresh water reservoir; antifreeze is toxic.



WARNING

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 may be equipped with an optional thermal valve which is set to open at about 35°F, thereby automatically draining the reservoir in near-freezing temperatures.

CLEANING CABINET

A hose connection and valve is located behind a small door in the top curbside corner of the rear lavatory wall. It can be used to attach a garden hose for lavatory cleaning. To use, connect a fresh water supply to the connection in the 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.

FLUID LEVEL VERIFICATION

Periodic inspection of oil and fluid 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. 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.



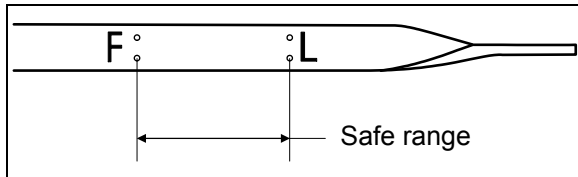
WARNING

Check the engine oil level with vehicle parked on a level surface and with the parking brake engaged.

130 CARE AND MAINTENANCE

DDC series 60 engine

The oil level must be maintained between the F and the L 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 tube. 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.



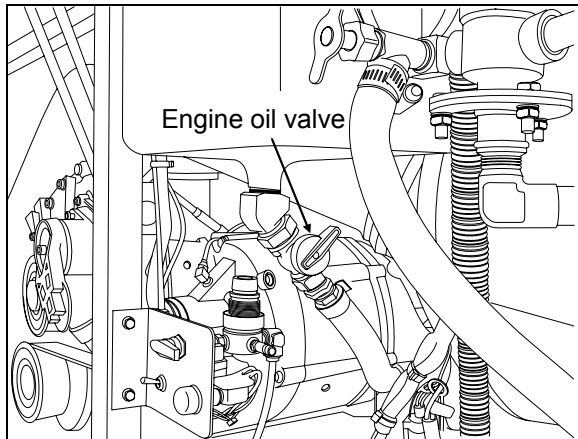
DDC S60 ENGINE OIL LEVEL DIPSTICK

01027



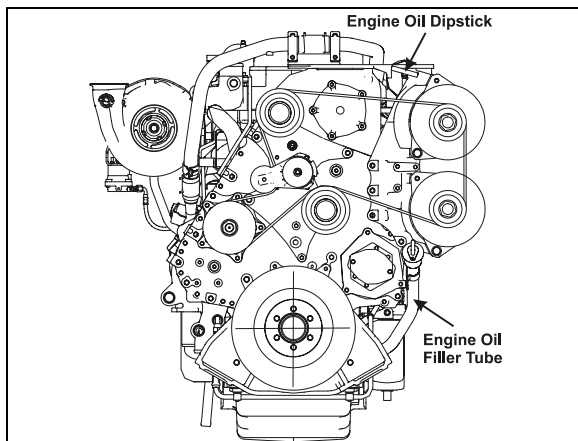
CAUTION

Keep engine oil level between "L" and "F" on dipstick. Do not overfill. Check when refueling.



ENGINE OIL RESERVE TANK

01050

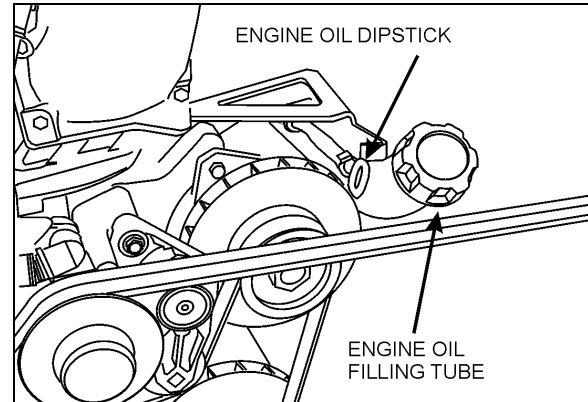


DDC SERIES 60 ENGINE

01151

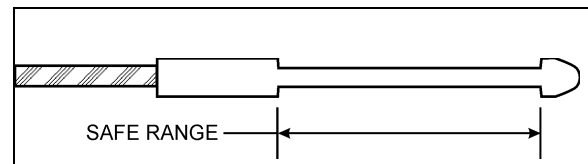
Volvo D13 engine

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

TRANSMISSION FLUID LEVEL



WARNING

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

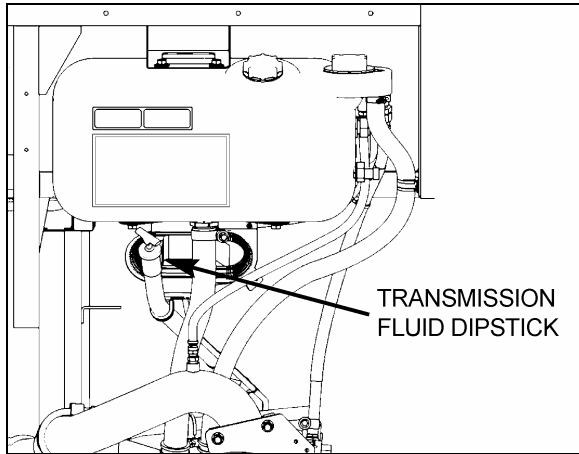
Do not mix fluid types or brands because of possible incompatibility.



CAUTION

Use clean fluid and containers when filling transmission. Never use containers that have contained water or anti-freeze (Glycol).

ALLISON TRANSMISSION FLUID LEVEL



TRANSMISSION FLUID DIPSTICK WITH VOLVO D13 ENGINE 01195

The transmission fluid level can be checked with the dipstick or with the use of the shift selector 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

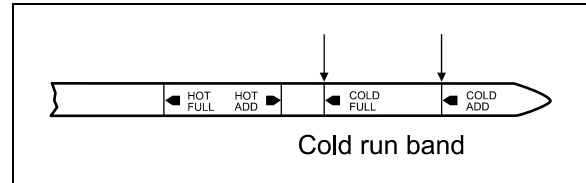
Perform the cold check first to verify the transmission fluid level before performing the hot check.

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.



TRANSMISSION FLUID LEVEL DIPSTICK 07006

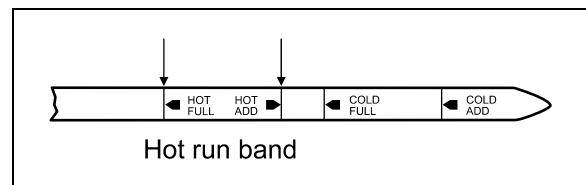


CAUTION

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 07006

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.

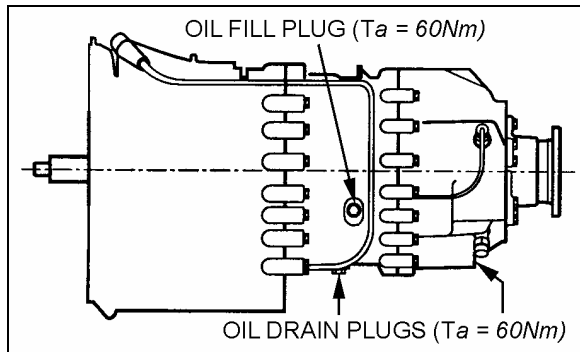
ZF-ASTRONIC TRANSMISSION FLUID LEVEL

- Vehicle should be on horizontal ground when oil is changed;
- Do not check oil level straight after a journey (incorrect measurement). Undertake the

132 CARE AND MAINTENANCE

check once the transmission oil has cooled down (lower than 104°F or 40 °C);

- Remove oil fill screw;
- Add oil if the oil level has fallen below the oil filling point;
- Add oil through the oil filling point;
- 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.

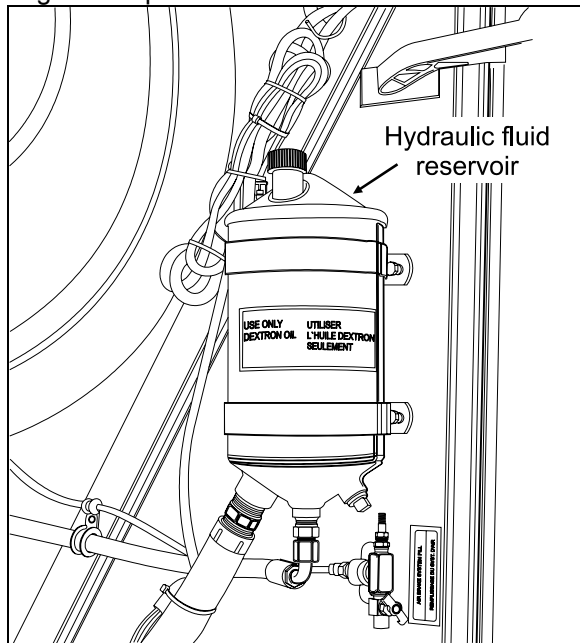


ZF TRANSMISSION FILLING POINT

07111

POWER STEERING FLUID LEVEL

The coach is equipped with a power steering system. The hydraulic fluid tank is located in the engine compartment.



ENGINE COMPARTMENT

14043

Check fluid level as follows:

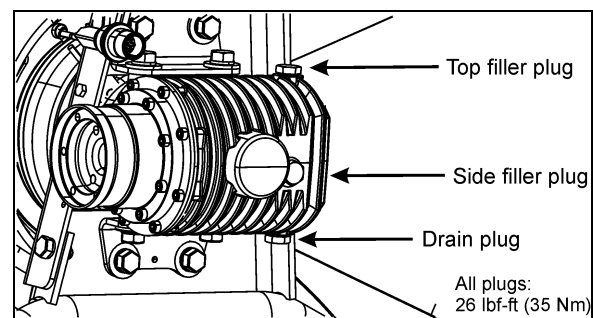
1. Stop engine, open engine compartment and place rear start switch to *OFF* position;

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;
5. Replace and tighten dipstick;
6. Place engine rear start switch to *NORMAL* position. Close engine compartment door.

COOLING FAN RIGHT ANGLE GEARBOX OIL LEVEL

Check cooling fan right angle gearbox oil level as follows:

1. Stop engine, open engine compartment door and place engine rear start switch to *OFF* position;
2. Remove side oil filler plug;
3. Add oil through the oil filling point if the oil level has fallen below the oil filling point;
4. 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;
5. Replace the seal and screw the side filler plug 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.

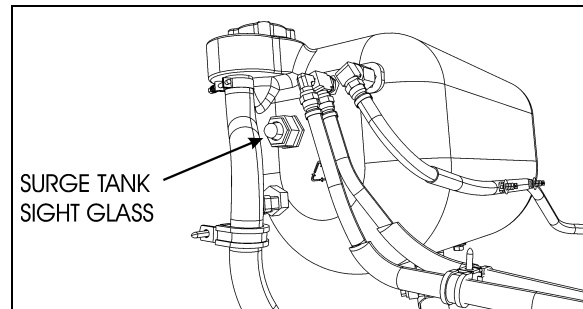
FRONT AND TAG AXLE WHEEL HUBS

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.

	<p>CAUTION</p>
<p>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).</p>	

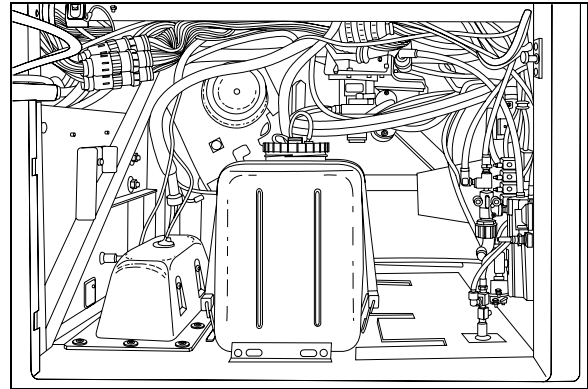


SURGE TANK IN ENGINE COMPARTMENT 05114

	<p>WARNING</p>
<p>Hot engine coolant is under high pressure. Allow engine to cool down before adding coolant.</p>	

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 FLUID RESERVOIR 14050

The 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.

	<p>CAUTION</p>
<p>During cold weather days, use windshield washer fluid suitable for freezing temperature only.</p>	

OTHER VERIFICATIONS

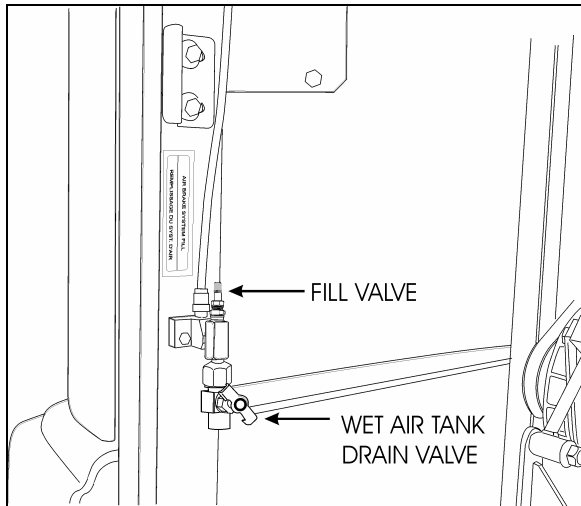
It is good practice to regularly inspect the vehicle for signs of component wear and to perform safety and maintenance routines.

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.

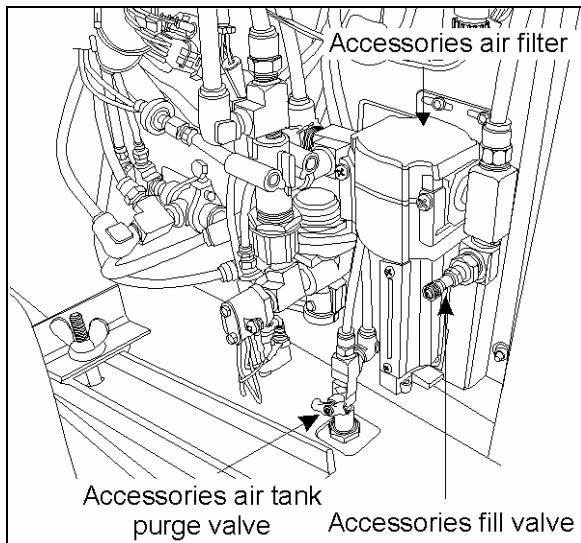
The accessory air tank drain cock is accessible from the front service compartment. The wet air tank drain cock is accessible from the engine R.H. side access door. All air tanks are equipped with a drain cock underneath the tank. Refer to the "Lubrication and Servicing Points" chart" in this chapter for tank locations.

Drain tanks by turning cocks counterclockwise.



ENGINE COMPARTMENT

12219



FRONT SERVICE COMPARTMENT

12130

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;

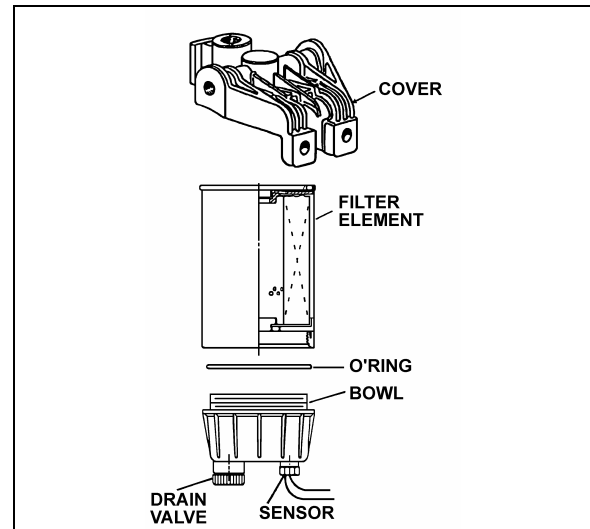
Check that hose nozzle is in good condition and the nozzle is free of obstructions;

Keep fire extinguishers clean.

PRIMARY FUEL FILTER

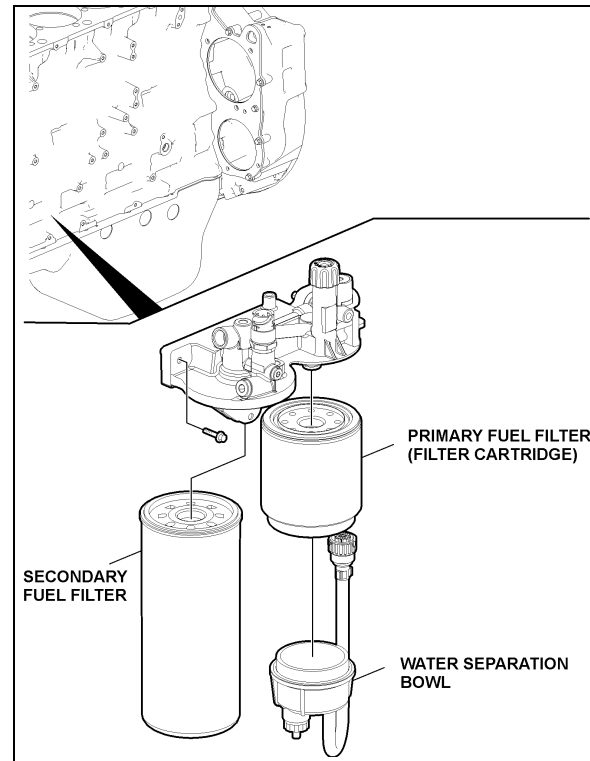
A primary fuel filter is installed on the engine. This filter may consist of a filter cartridge with a drain valve at the bottom, or a filter cartridge, a

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.



FUEL FILTER/WATER SEPARATOR

03025

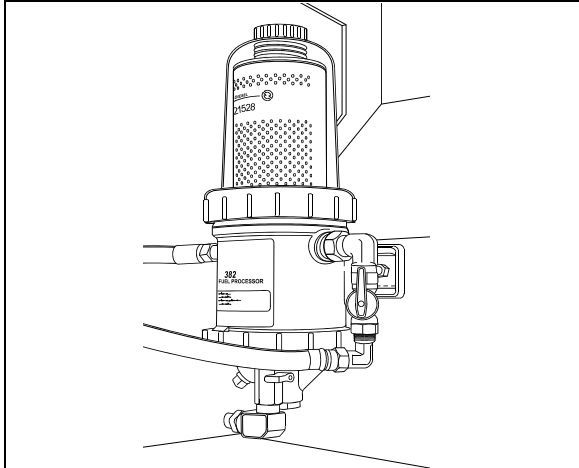


FUEL FILTERS WITH VOLVO D13 ENGINE

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. The filter serves as a water separator as well as a fuel filter. To drain water, loosen the drain valve below the separator one quarter turn. Close the drain valve when finished.



DAVCO FUEL PRO 382 INSTALLATION

03032

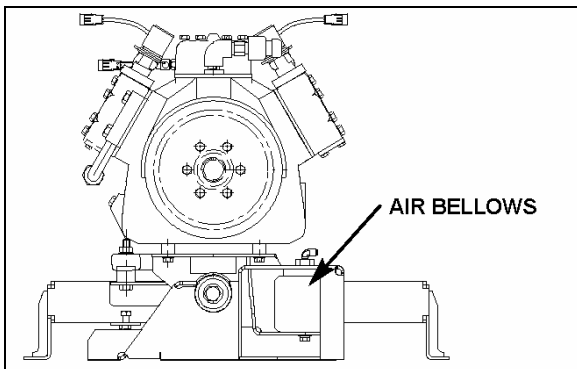
FAN AND ALTERNATOR DRIVE BELTS

These belts have automatic belt tensioner to keep the correct tension without adjustment.

A/C COMPRESSOR BELT TENSION ADJUSTMENT

The air conditioning compressor is driven by V-belts.

Belt tensioning is applied through an air bellows which is adjusted by an air pressure regulating valve mounted in the engine compartment, right behind the belt tensioning pressure control valve. The correct pressure of 45 psi (241 kPa) is set at the factory. Periodically verify the pressure at the regulating valve using a pressure gauge and correct if necessary.



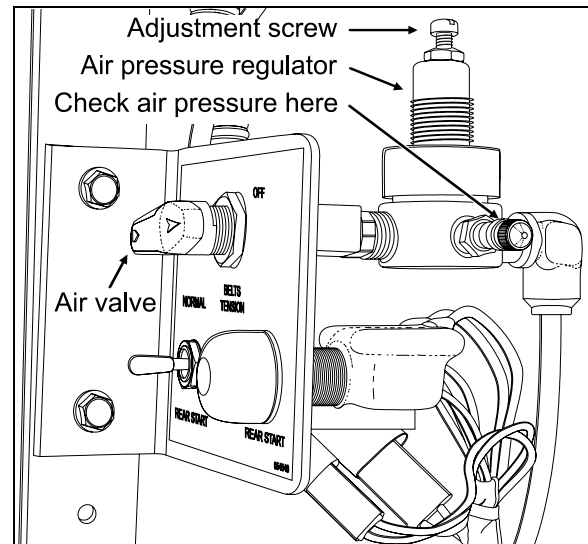
AIR BELLOWS

22351

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, be sure that all engine stopping safety precautions have been observed.

Turn control valve handle counterclockwise to its initial position to reapply pressure to the air bellows.

- 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.



BELT TENSION AIR REGULATOR AND VALVE

01058

BACK UP CAMERA

The optional back up camera is located on the rear cap. As soon as the transmission is put in reverse (R), back up camera and monitor are turned on automatically. 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.



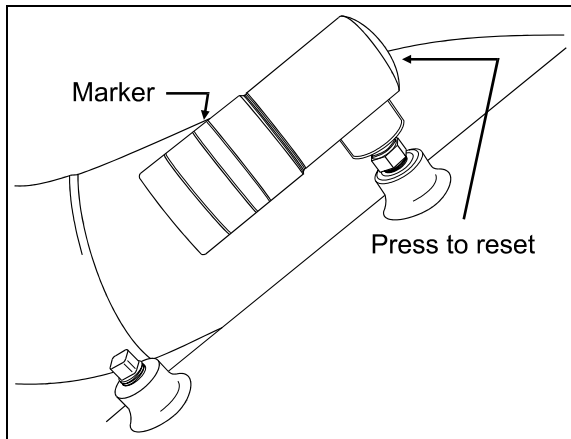
CAUTION

To prevent scratches to the camera protective glass, do not wipe with dry rag. Use a clean damp rag.

AIR FILTER RESTRICTION INDICATOR

An optional filter restriction indicator 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 the maintenance schedule to ensure proper ventilation of the evaporator and heating radiator cores. To clean filters, remove lint using a nylon brush, back flush with water then dry with air.



CAUTION

Do not use a high pressure water jet to avoid damaging the filter.

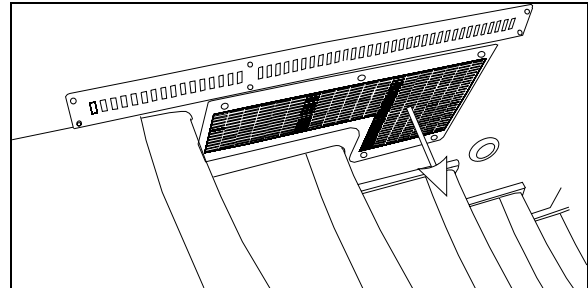


CAUTION

Be sure not to reverse the filters upon installation.

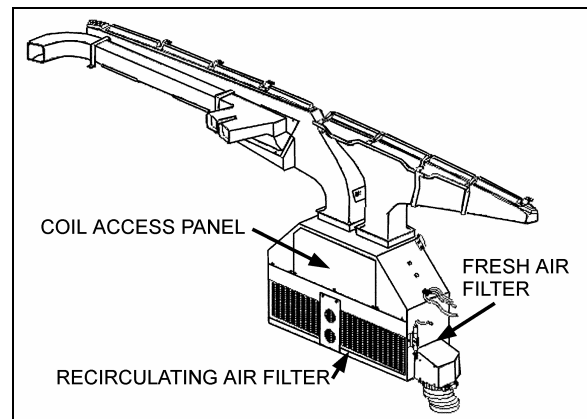
DRIVER'S AREA AIR FILTERS

The driver HVAC system's air filters are located behind the front console. To gain access to the A/C filters, remove the grille located at the top step of the entrance door stairs. Remove the filters for cleaning or replacement.



DRIVER'S AREA AIR FILTER REMOVAL

18505

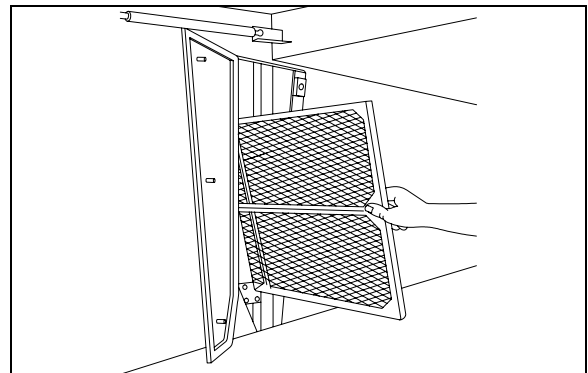


DRIVER'S AREA AIR FILTERS

22171

CABIN AIR FILTER

To access central HVAC system filter, open one of the two baggage compartment adjacent to the evaporator compartment. The filter is located behind an access door held shut by three retaining screws. Slide out the filter, clean or replace.

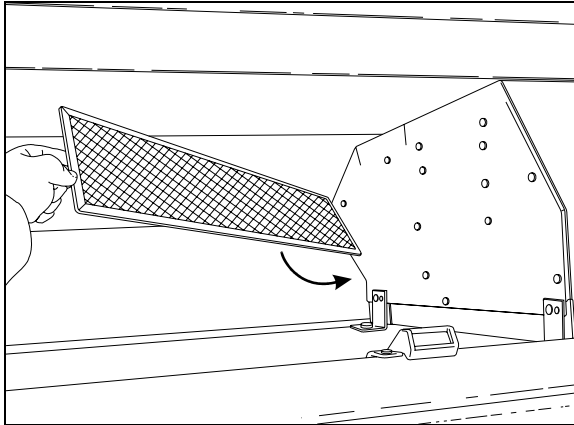


CABIN AIR FILTER

22100

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.

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.

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.

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.

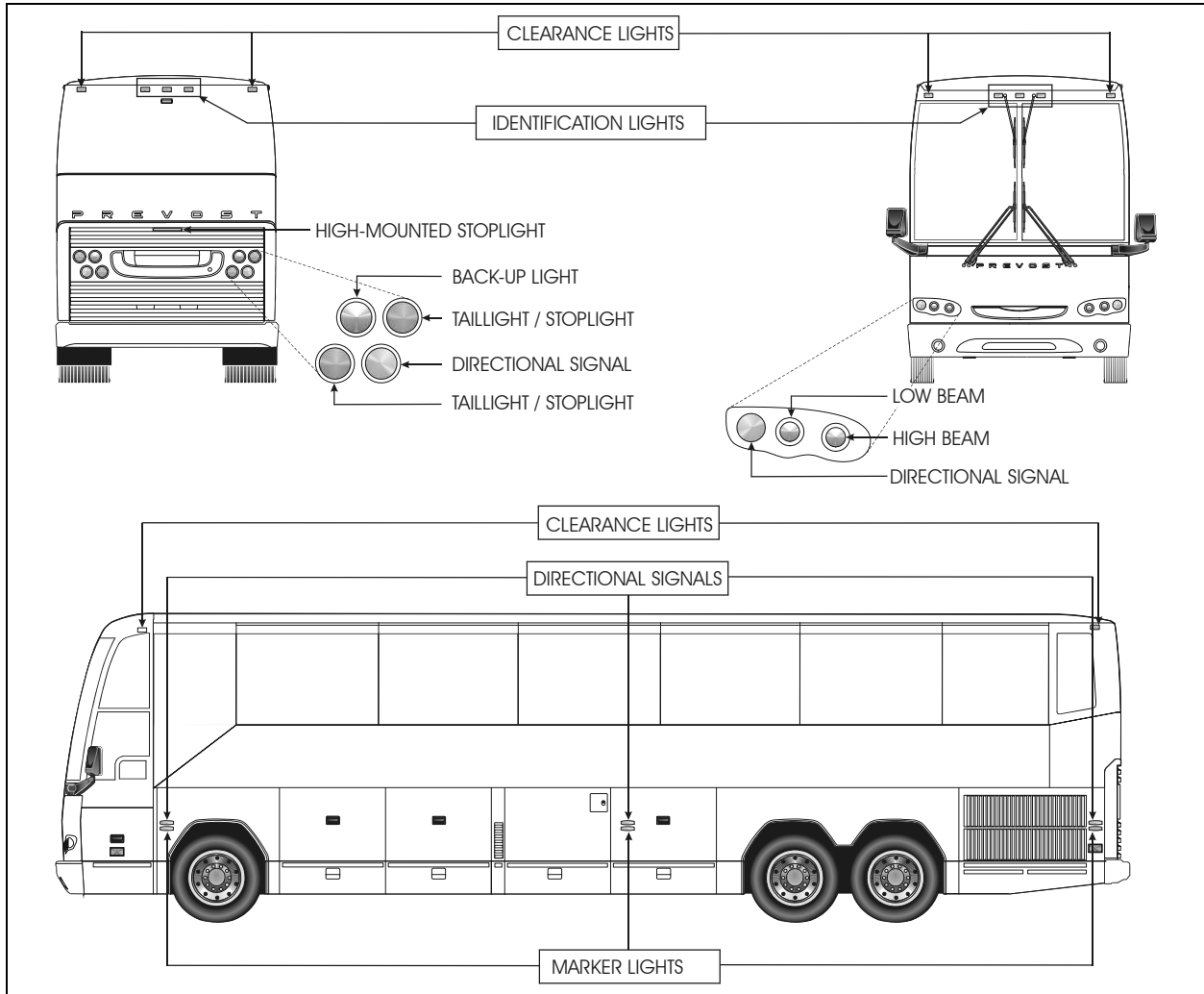
Go to the rear of the vehicle:

- Directional signals.
- Identification lights and clearance lights.
- Stoplights and taillights.
- Back-up lights and back-up alarm (option).

NOTE

To check the back-up lights and back-up alarm, you must flip the starter selector switch to REAR START position. (If the vehicle 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).



EXTERIOR LIGHTING IDENTIFICATION

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 slow idle before shutting OFF;
- Engine should be at idle when shifting from neutral (N) to forward (D) or from neutral (N) to reverse (R);



CAUTION

Fast idle should always be turned off before releasing the parking brake and putting the coach in gear. Driveline damage can result if the fast idle switch is always left on.

- 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;
- Damage may result 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.

FIRST SERVICE ON NEW VEHICLE

NOTE

Refer to Maintenance Manual for precise service schedule.

HOT WATER FILTER

The hot water filter is designed to recover the soldering residues trapped inside the coolant lines during their initial assembly. Clean strainer 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

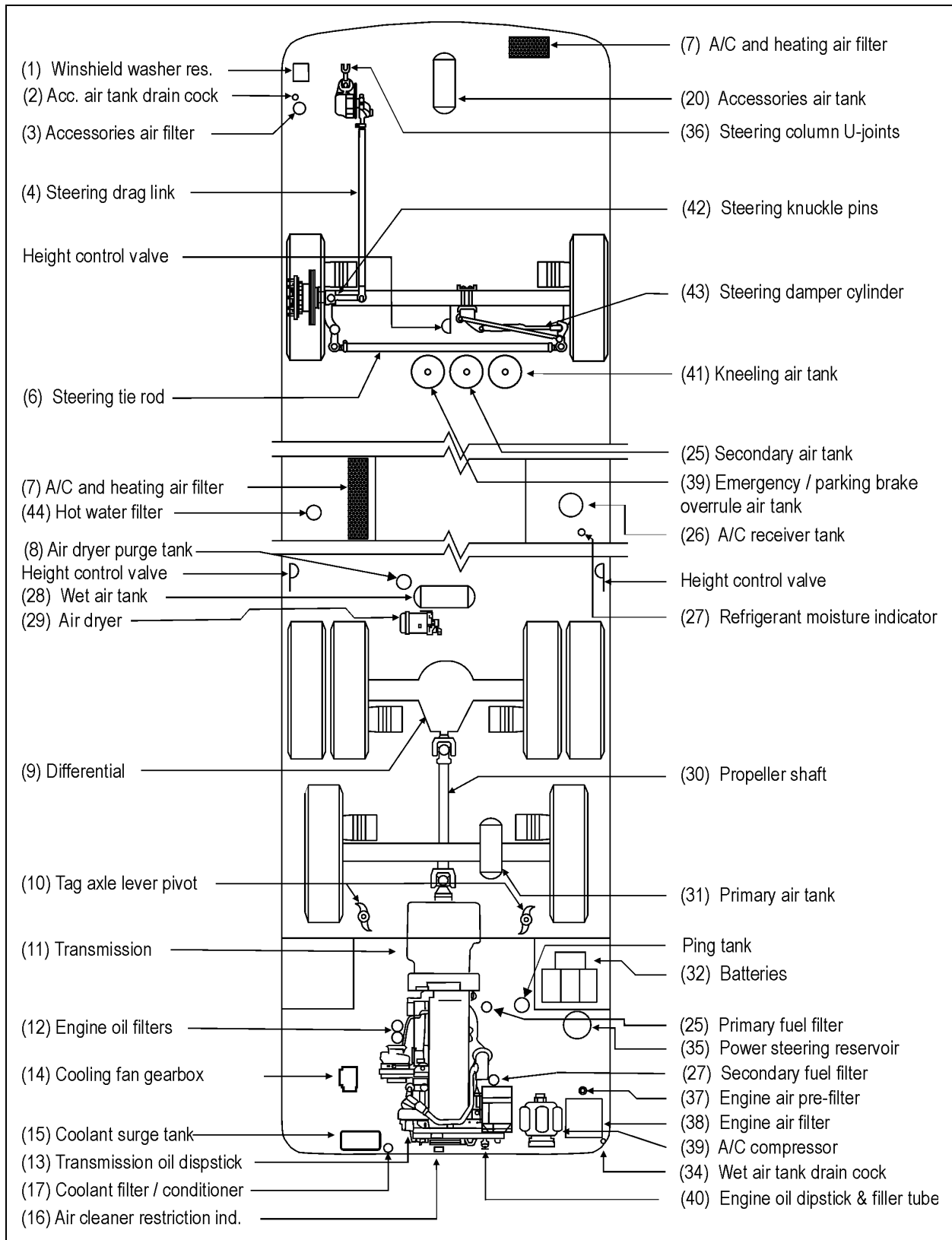
If soldering has been performed on cooling system, clean strainer after 3,000 miles (5 000 km).

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.

ALLISON TRANSMISSION FLUID FILTER

Your Allison transmission is equipped with High Capacity filters, eliminating the requirement of an initial fluid and filter change. Refer to regular lubrication and servicing schedule.



(1) Winshield washer res.

(2) Acc. air tank drain cock

(3) Accessories air filter

(4) Steering drag link

Height control valve

(6) Steering tie rod

(7) A/C and heating air filter

(44) Hot water filter

(8) Air dryer purge tank

Height control valve

(28) Wet air tank

(29) Air dryer

(9) Differential

(10) Tag axle lever pivot

(11) Transmission

(12) Engine oil filters

(14) Cooling fan gearbox

(15) Coolant surge tank

(13) Transmission oil dispstick

(17) Coolant filter / conditioner

(16) Air cleaner restriction ind.

(7) A/C and heating air filter

(20) Accessories air tank

(36) Steering column U-joints

(42) Steering knuckle pins

(43) Steering damper cylinder

(41) Kneeling air tank

(25) Secondary air tank

(39) Emergency / parking brake overrule air tank

(26) A/C receiver tank

Height control valve

(27) Refrigerant moisture indicator

(30) Propeller shaft

(31) Primary air tank

Ping tank

(32) Batteries

(25) Primary fuel filter

(35) Power steering reservoir

(27) Secondary fuel filter

(37) Engine air pre-filter

(38) Engine air filter

(39) A/C compressor

(34) Wet air tank drain cock

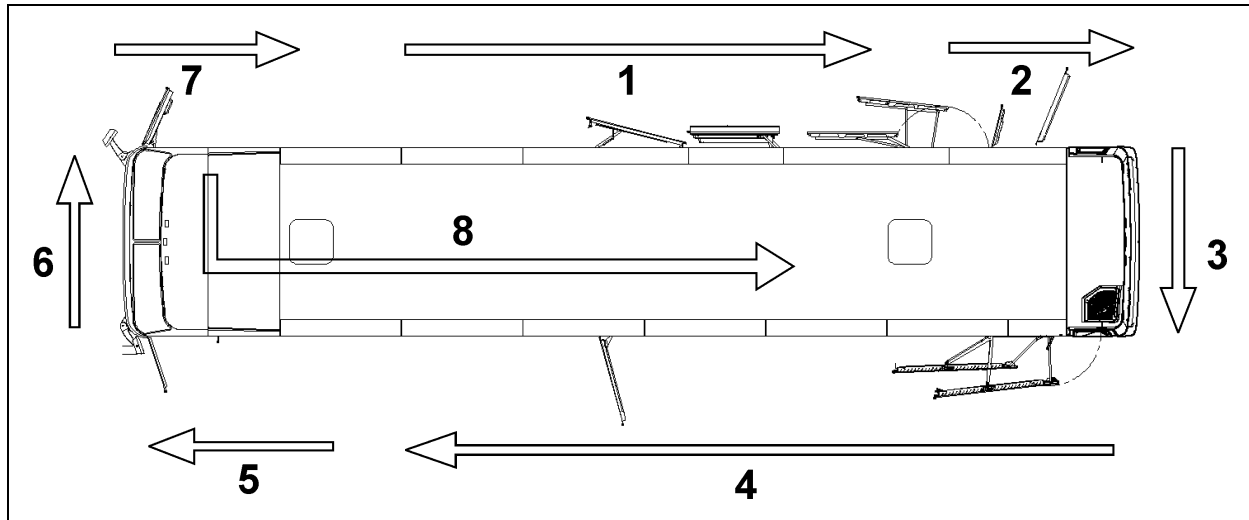
(40) Engine oil dipstick & filler tube

LUBRICATION AND SERVICING POINTS ON H3-41 AND H3-45 COACHES (refer to the Maintenance Manual for lubrication & servicing schedule)

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WALK-AROUND INSPECTION (BEFORE EVERY TRIP)

It is good practice to make a visual inspection of key areas on the vehicle every day (or before every trip for private coaches) and to correct any problem found.



WALK-AROUND INSPECTION

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NOTE

Inspect the coach in a circular manner as shown in the illustration.

Approaching the Coach

- Check under the coach for oil, fuel or coolant leaks or other signs of damage.
- Check exterior body surfaces for signs of breaks or damage.

Preparation

- 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: Right Side of the Coach

- Check that the vehicle is equipped with a wheel nut wrench, spare door keys, spare belts, reflectors and jack.
- Check that baggage doors and service compartment doors close properly. Check for good tightness and fit.
- 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 2: Engine Compartment Right Side Area

- Drain wet air tank by opening drain cock. Close drain cock when completed.
- Check engine and surrounding areas for coolant, oil and fuel leaks.
- Check primary fuel filter/water separator and drain if necessary. Close drain valve after draining.
- Check power steering reservoir fluid level, add if necessary.
- Check wiring harness for signs of damage.

Step 3: Engine Compartment

- Check engine and surrounding areas for coolant, oil and fuel leaks.
- Check wiring harness for signs of damage.

- Check for loose, worn or broken belts.
- Check belts tension adjustment.
- 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 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, they should be clean.

Step 4: Rear Left Side of the Coach

- Check condition of wheels and rims. Especially look for cracks, missing nuts, bent or broken studs.
- Check that baggage doors and service compartment doors close properly. check for good tightness and fit.
- 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: 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.
- Drain accessory air tank by opening drain cock. Close drain cock when completed.

Step 6: 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.
- Check high and low beams, they should be clean. If equipped, check fog lights.
- Check left and right directional signals, they should be clean.

Step 7: 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 8: 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.
- Adjust and clean mirrors for adequate rear view vision.
- Verify proper operation of windshield wiper/ washer.
- Check for fire extinguishers to make sure they are ready for operation.
- Check that emergency exit windows and roof escape hatches can be opened then close all windows and hatches securely

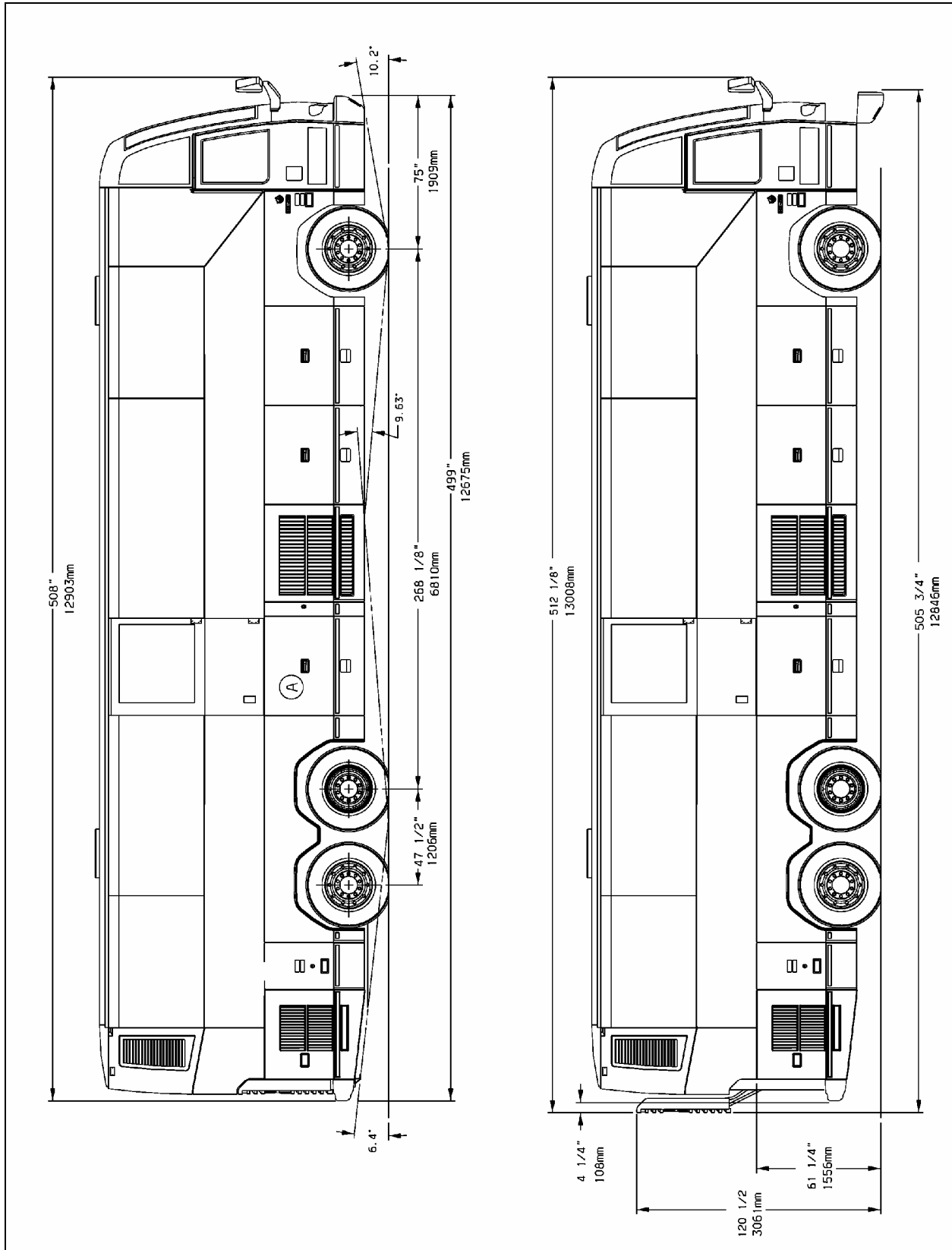
With engine running

- Start engine and check for proper operation of all gauges. Perform a telltale light test (see “CONTROLS AND INSTRUMENTS” chapter). Indicator lights and buzzers should all be OFF before driving.
- Using the message center display, perform a system diagnostic to check if

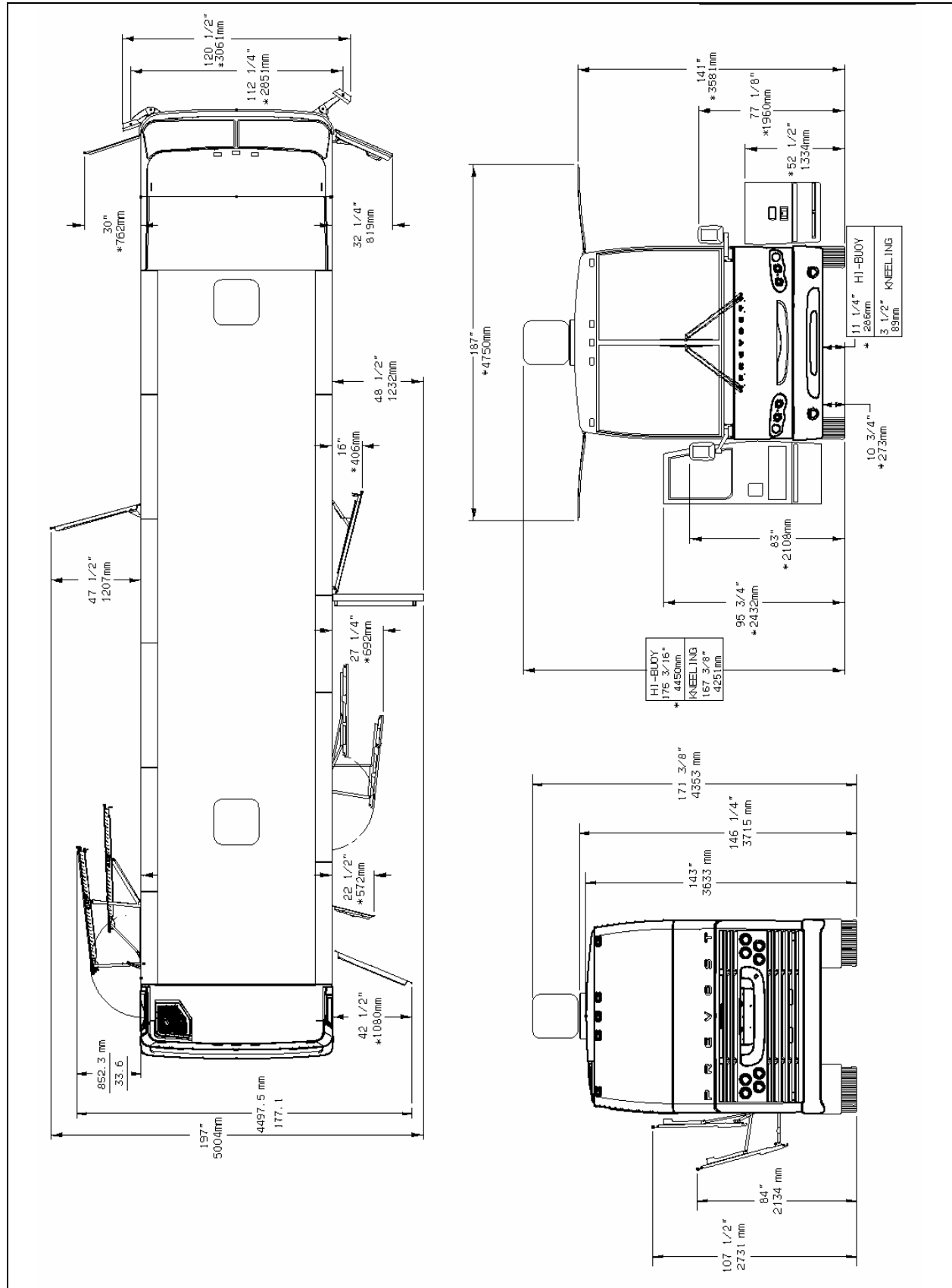
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error codes and anomalies were recorded in the vehicle electronic modules.

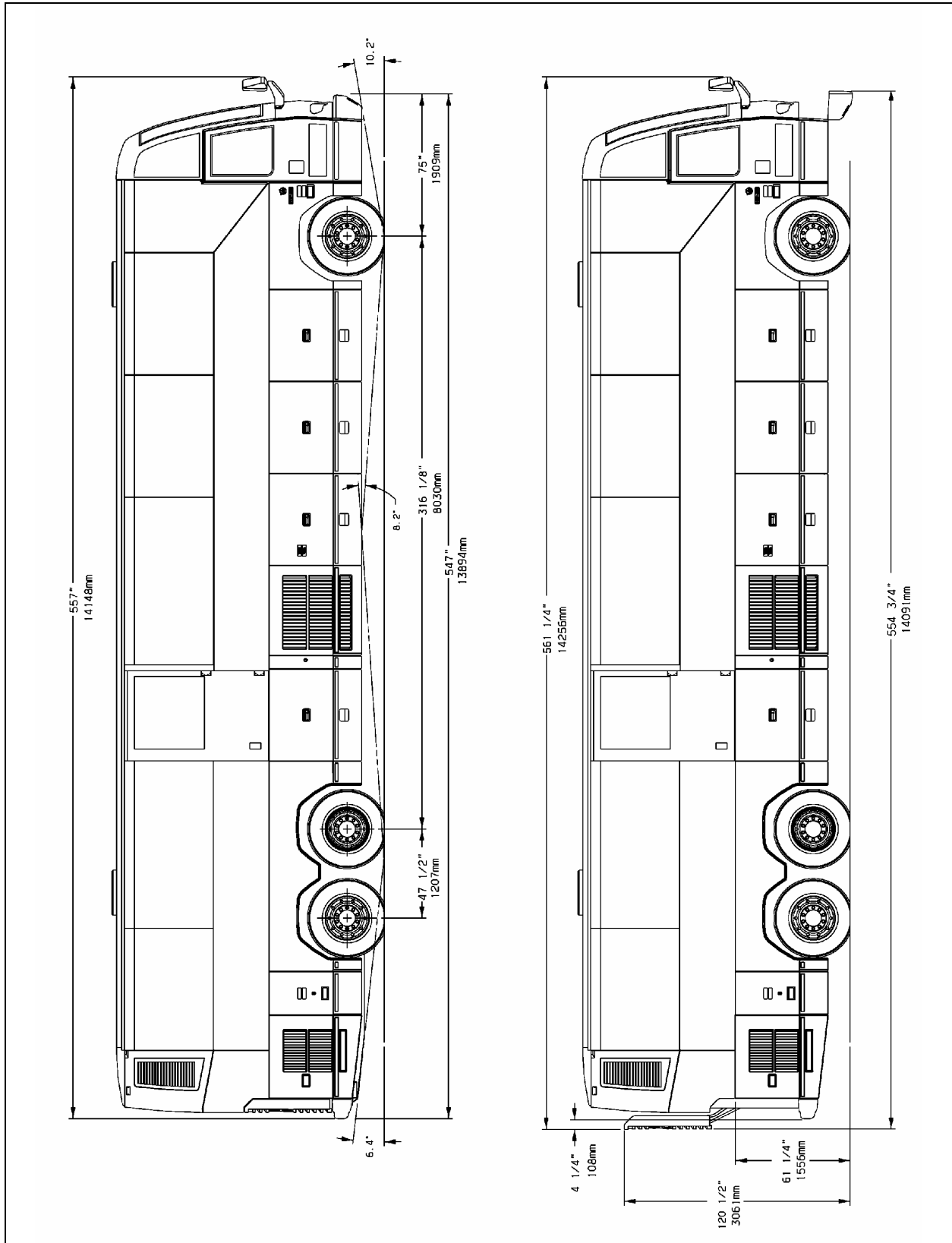
- Check for proper operation of electric and air horns and back-up alarm.
- Check automatic transmission oil level, using the pushbutton shift selector (see APPENDIX C).
- Check that there is enough fuel in the tank.
- Perform a parking brake test. Check both primary and secondary pressure gauges. Refer to “Other Verifications” in this chapter.
- Perform the exterior lighting verification using the test mode. Refer to “Other Verifications” in this chapter.
- Walk around the vehicle and listen for air leaks.
- Check for leaks and listen for unusual sounds coming from the turbocharger.



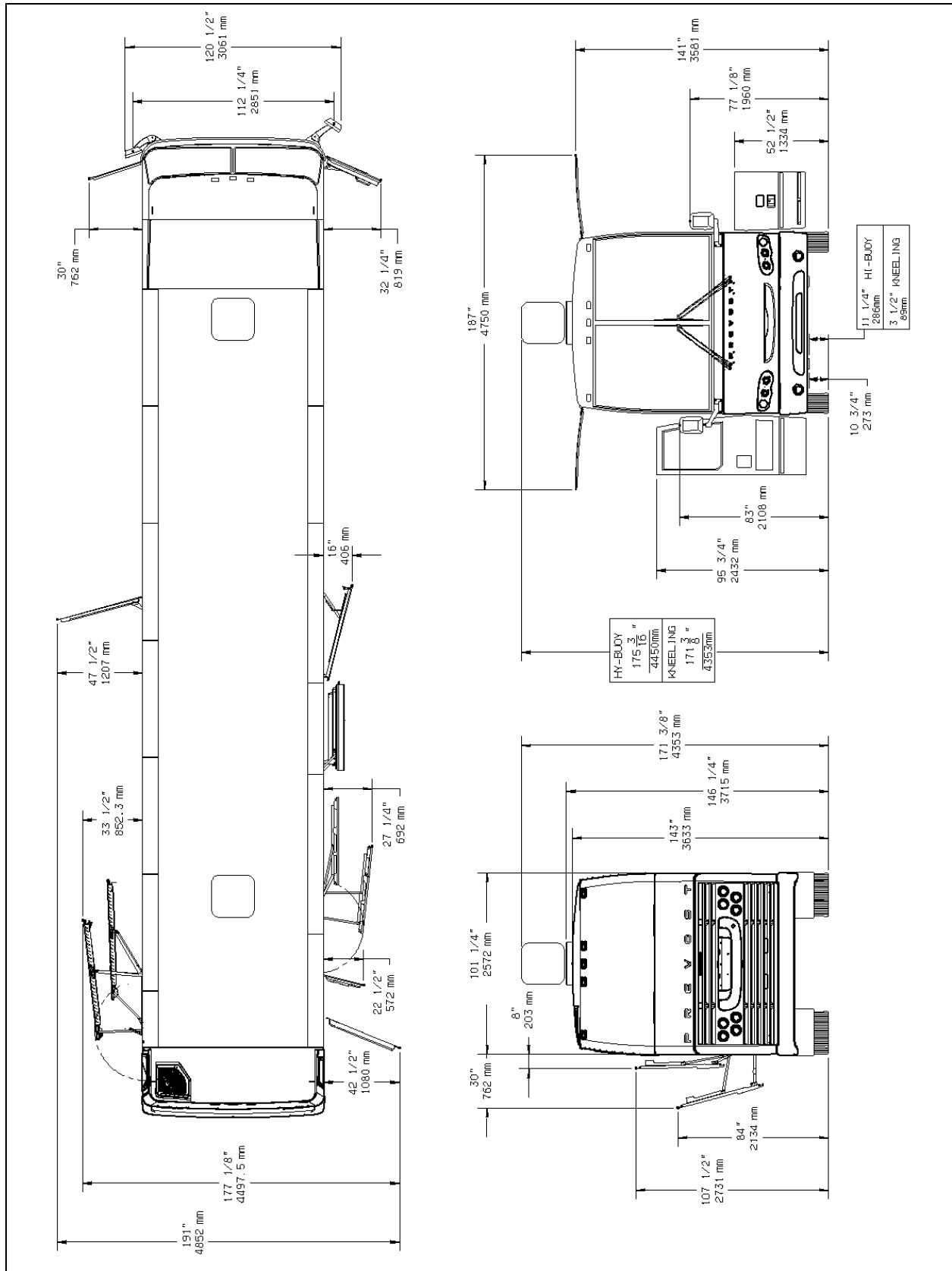
H3-41 OVERALL DIMENSIONS



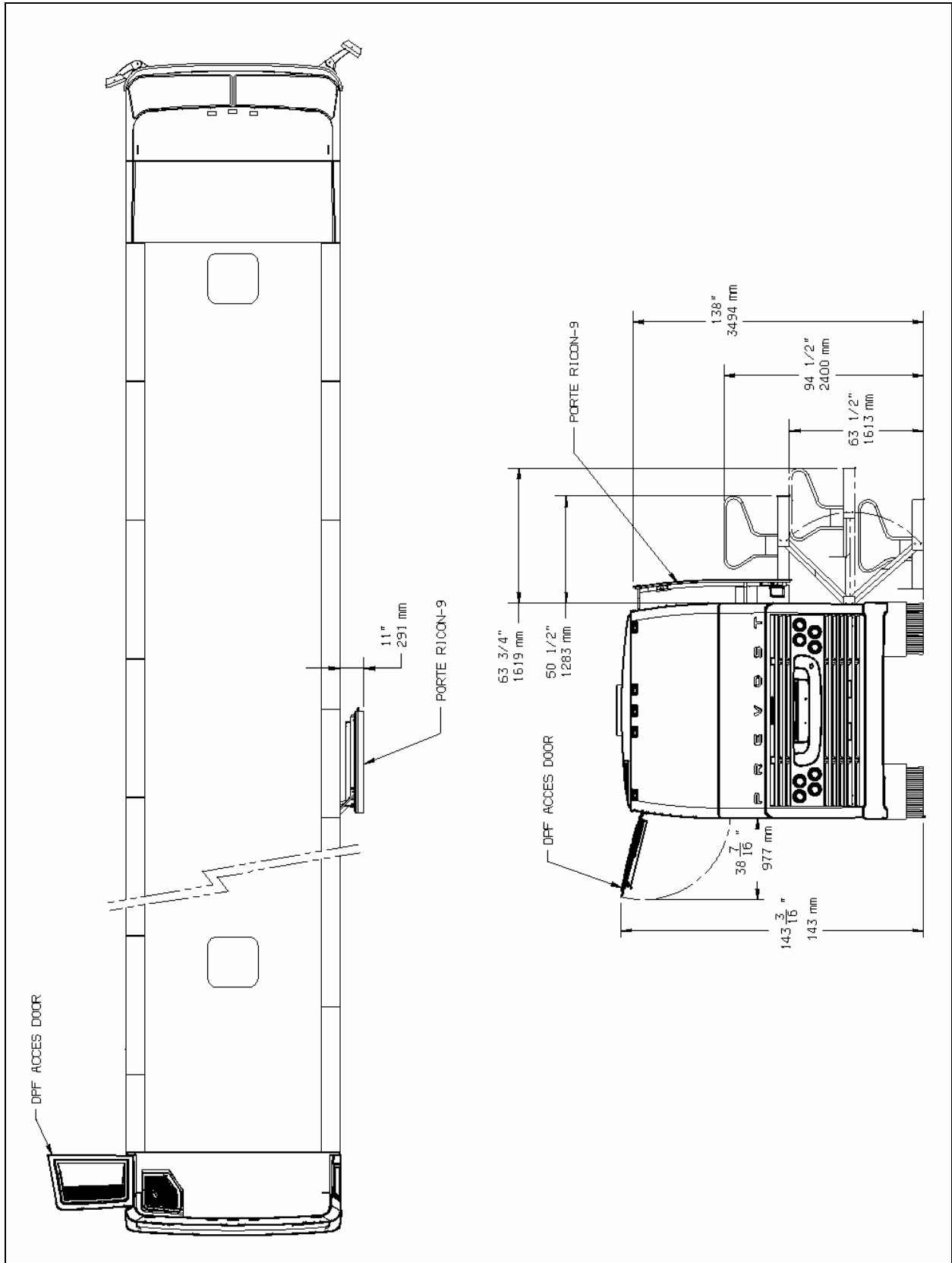
H3-41 OVERALL DIMENSIONS



H3-45 OVERALL DIMENSIONS



H3-45 OVERALL DIMENSIONS



H3 SERIES WITH WHEELCHAIR LIFT - OVERALL DIMENSIONS

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DIMENSIONS AND WEIGHTS	H3-41	H3-45
Overall length (over bumpers)	41' 7" (12.7 m)	45' 8" (13.9 m)
Overall width	102" (2.59 m)	
Overall height (normal ride height)	146 ¼" (3.715 m)	
Wheelbase (center of front axle to center of drive axle)	267" (6.782 m)	316 ¼" (8.033 m)
Floor height from ground	63" (1.6 m)	
Ground clearance	11" (280 mm)	
Step height from ground	14" (356 mm)	
Step height (other steps)	7" (178 mm)	
Seats	48	56 - 58
Headroom	77" (1.956 m)	
Entrance door opening width	27" (686 mm)	
Aisle width (minimum)	14" (355mm)	
Front overhang	75" (1,91 m)	
Rear overhang	107" (2.096 m)	
Front track	85.6" (2.176 m)	
Drive track	74.9" (1.902 m)	
Rear track (tag axle)	81.9" (2.082 m)	
Turning circle radius (I-beam axle)	39' 4" (12 m)	44' 6" (13.6 m)
Curb weight ¹	35,535 lbs (16 118 Kg)	36,585 lbs (16 600 Kg)
Gross Vehicle Weight Rating (G.V.W.R.) ²	52,060 lbs (23 665 kg)	
Front axle Gross Axle Weight Rating (G.A.W.R.)	16,500 lbs (7 500 kg)	
Drive axle G.A.W.R.	22,500 lbs (10 230 kg)	
Tag axle G.A.W.R.	14,000 lbs (6 365 kg)	

NOTE

Curb weight is given as an indication only and is subject to vary from coach to coach, mostly due to optional equipment.

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

¹ Weight of a motor vehicle complete with body excluding the payload. Includes standard equipment, a full load of engine fuel, oil, and coolant and, if so equipped, air conditioning and the additional weight of any optional engine.

² Maximum weight specified by the manufacturer for a single vehicle. The gross vehicle weight rating is equivalent to the sum of the gross axle weights specified by the manufacturer under each wheels of the axles (front, drive & tag) of the vehicle.

certification plate located on the L.H. control panel in driver's section.

CAPACITIES	H3-41	H3-45
DDC S60 Engine oil (in crankcase)	41 qts (39 l)	
Volvo D13 Engine oil (in crankcase)	38 qts (36 l)	
Engine oil (in reserve tank)	8.4 qts (8.0 l)	
Fuel tank (legal capacity equal to 95% of volume)	230 US gal. (870 l)	
Cooling system	27.6 US gal. (104 l)	
Allison transmission (does not include external circuit)	6 US gal. (23 l) 6.9 US gal. (26 l) with retarder	
ZF-Astronic automatic transmission	3 US gal. (11 l)	
Differential oil	5 US gal. (19 l)	
Power steering reservoir	4 US qts (3.7 l)	
A/C compressor oil	4.5 US qts (4.3 l)	
Windshield washer reservoir	5 US gal. (19 l)	
Refrigerant	26 lbs (11.8 kg)	

BAGGAGE COMPARTMENTS

Total volume (H3-45) 470 ft³
 Total volume (H3-41) 355 ft³
 Loading capacity 2500 lbs/comp

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.

Biodiesel fuels meeting ASTM D6751 specification, prior to blending can be mixed up to 5% maximum by volume in petroleum diesel fuel. Biodiesel fuels made from soybean or rapeseed oil are recommended. Other feedstock source of biodiesel fuels such as animal fat and used cooking oils are not recommended.

WHEELS AND TIRES

Accuride steel wheels9" X 22½"

Alcoa aluminum forged wheels9" X 22½"


Alcoa aluminum forged wheels
(for super single tire) 14" X 22½"


Tires 315/80 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, cold tire inflation pressures are listed on the Department of Transport (DOT) certification plate, affixed on the wall behind 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.

	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 (fan)	Poly-V 14PK2310	1
A/C system compressor	BX-100	2
Alternator 2 x 28V, 140 Amps.	Poly-V 10/2245	1
Alternator, 1x "limp-home"	Poly-V 10/2000	1

WITH VOLVO D13 ENGINE

Use	Model	Qty
Cooling fan drive (fan)	Poly-V 14PK2172	1
A/C system compressor	BX-100	2
Alternator 2 x 28V, 140 Amps.	Poly-V 8PK1935	1
Alternator, 1x "limp-home"	Poly-V 8PK1865	1

<p><i>NOTE</i></p> <p><i>Belts specifications may vary. For proper belt selection, always consult your vehicle Coach Final Record.</i></p>

ENGINES

DETROIT DIESEL SERIES 60

Detroit Diesel DDEC VI Series 60 engine, displacing 14.0 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 horsepower....425 - 445 HP @ 1,800 rpm
 Peak torque.....1,450 lbf•ft @ 1,100 rpm
 Operating range 1,100 – 2,100 rpm
 Optional Jacobs engine brake, model 797.

VOLVO D13

4 cycles / inline six cylinders, displacing 12.8 liters. 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.

See appendix C for the fluid level sensor code description.

Gear Ratios

1 st	3.510
2 nd	1.91
3 rd	1.43
4 th	1.00
5 th	0.74
6 th	0.64
Reverse.....	4.80
Converter.....	1.58
Differential ratio.....	4.30
Differential ratio (optional).....	4.10, 4.56, 4.88

ZF-ASTRONIC TRANSMISSION

Electronically controlled twelve speed automatic transmission.

Gear Ratios

1 st	12.37
2 nd	9.60
3 rd	7.44
4 th	5.78
5 th	4.57
6 th	3.55
7 th	2.70
8 th	2.10
9 th	1.63
10 th	1.27
11 th	1.00
12 th	0.78
Reverse.....	11.41
Differential ratio.....	3.73
Differential ratio (optional).....	3.12

PROPELLER SHAFT

Dana 1810 series heavy-duty type universal joints, 4" outside diameter.

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. Model 24/24 spring brakes on drive axle provide emergency and parking brakes. Emergency brake application will be automatic if pressure drops below 40 psi. At 60 psi a warning light and buzzer will come on so the driver can bring the vehicle to a safe stop simply by a conventional application of the foot brake pedal.

BRAKE CHAMBER EFFECTIVE AREA

Front axle (Rigid front axle).....	24 in ²
Drive axle.....	24/24 in ² (service/emergency)
Tag axle.....	16 in ²

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: "Brakes".


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.

 <b style="font-size: 1.2em;">CAUTION
<p>Even with ESP-equipped vehicles, the driver remains responsible for ensuring vehicle stability during operation.</p>

 <b style="font-size: 1.2em;">WARNING
<p>ESP may reduce the vehicle speed automatically.</p> <p>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.</p>

STEERING

ZF 8098 integral steering gear model.

- Variable assistance in function of speed is optional.
- ZF servocomtronic integral steering gear model.
- TRW, PS25 series hydraulic pump gear driven from engine drive.

- Hydraulic reservoir and dipstick accessible from engine compartment.
- System pressure 2320 psi.
- Steering wheel diameter 20". Tilt and telescopic, 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;

AXLES

FRONT AXLE

- Dana Spicer model S84V with forged "I" beam.
- Reverse Elliot type.
- Unitized wheel bearings (maintenance free).
- Factory pre-adjusted caster.

DRIVE AXLE

- Meritor model RC23-165.
- Full floating banjo type.
- Oil lubricated wheel bearings.
- Factory pre-adjusted caster.

TAG AXLE

- Prevost hollow square beam.
- Unitized wheel bearings (maintenance free).

SUSPENSION

Goodyear rolling lobe type air springs (bellows) are used throughout.

FRONT AXLE

- 2 Bellows (12");
- 2 Shock absorbers;
- 4 Radius rods;
- 1 Transverse radius rod;

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- 1 Height control valve;
- 1 Anti-roll bar, 2" diameter.

DRIVE AXLE

- 4 Bellows (11");
- 4 Shock absorbers;
- 3 Radius rods;
- 1 Transverse radius rod;
- 2 Height control valves;
- 1 Anti-roll bar, 1½" diameter.

TAG AXLE

- 2 Bellows (12");
- 2 Shock absorbers;
- 3 Radius rods;
- 1 Transverse radius 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 FRONT AXLE			
	Minimum value	Nominal value	Maximum value
Right camber (degrees)	-0.25	0.125	0.375
Left camber (degrees)	-0.25	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 (inches)	0.06	0.08	0.10

DRIVE AXLE			
	Minimum value	Nominal value	Maximum value
Thrust angle (degrees)	-0.04	0	0.04

TAG AXLE			
	Minimum value	Nominal value	Maximum value
Thrust angle (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.

- 3 speed fan clutch DDEC controlled.
- Rubber insulated from the body.
- Expansion tank above radiator and remote mounted.
- System pressure 14 psi.
- One (1) 185° F thermostat.
- System capacity 27.6 us gal (DDC S60).
- Coolant filter.
- Radiator fan: 38 inches fan.

FUEL SYSTEM

Polyethylene 230 us gallon/870 liters fuel tank located in middle of second baggage bay (heating and a/c section) includes:

- Anti-spill device
- Safety filler cap on each side of coach
- Pressure relief valve
- Electric fuel gage
- Low level signal at 22 us gallon/83 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.
- 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

A large capacity, central A/C provides enough conditioned and filtered air for all climatic conditions. Fresh air is drawn into the system from the evaporator compartment on 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. Optionally, condensers installed in the overhead storage compartments provide cool air to the seated passengers from the overhead registers.

A/C SYSTEM	
Cooling capacity	9 tons
Refrigerant type	134a
Heating capacity	152 000 Btu/h
Airflow	2 600 cfm (73.6 m ³ /min)

COMPRESSOR	
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 US 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.

	CAUTION
<p>CJ-4 oil 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.</p>	

ALLISON TRANSMISSION

The Allison transmission must be filled with *Dexron-III®*, *Dexron-VI®* automatic transmission

fluid, *Castrol TranSynd™/TES 295* fluid or equivalent.

ZF-ASTRONIC TRANSMISSION

The ZF-Astronic transmission must be filled with Castrol Syntrans grade 75W-85 oil.

DIFFERENTIAL

Multigrade gear oil meeting MIL-PRF-2105E: 85W/140 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), 80W/90 should be used, and below -15°F (-26°C), 75W/90 should be used. In extreme conditions or for better performance, full synthetic gear oil should be used.

COOLING FAN RIGHT ANGLE GEARBOX

Use only SAE 75W-90 synthetic gear lubricant.

POWER STEERING RESERVOIR

Use Automatic Transmission Fluid (ATF) Dexron-IIe or Dexron-III for this system.

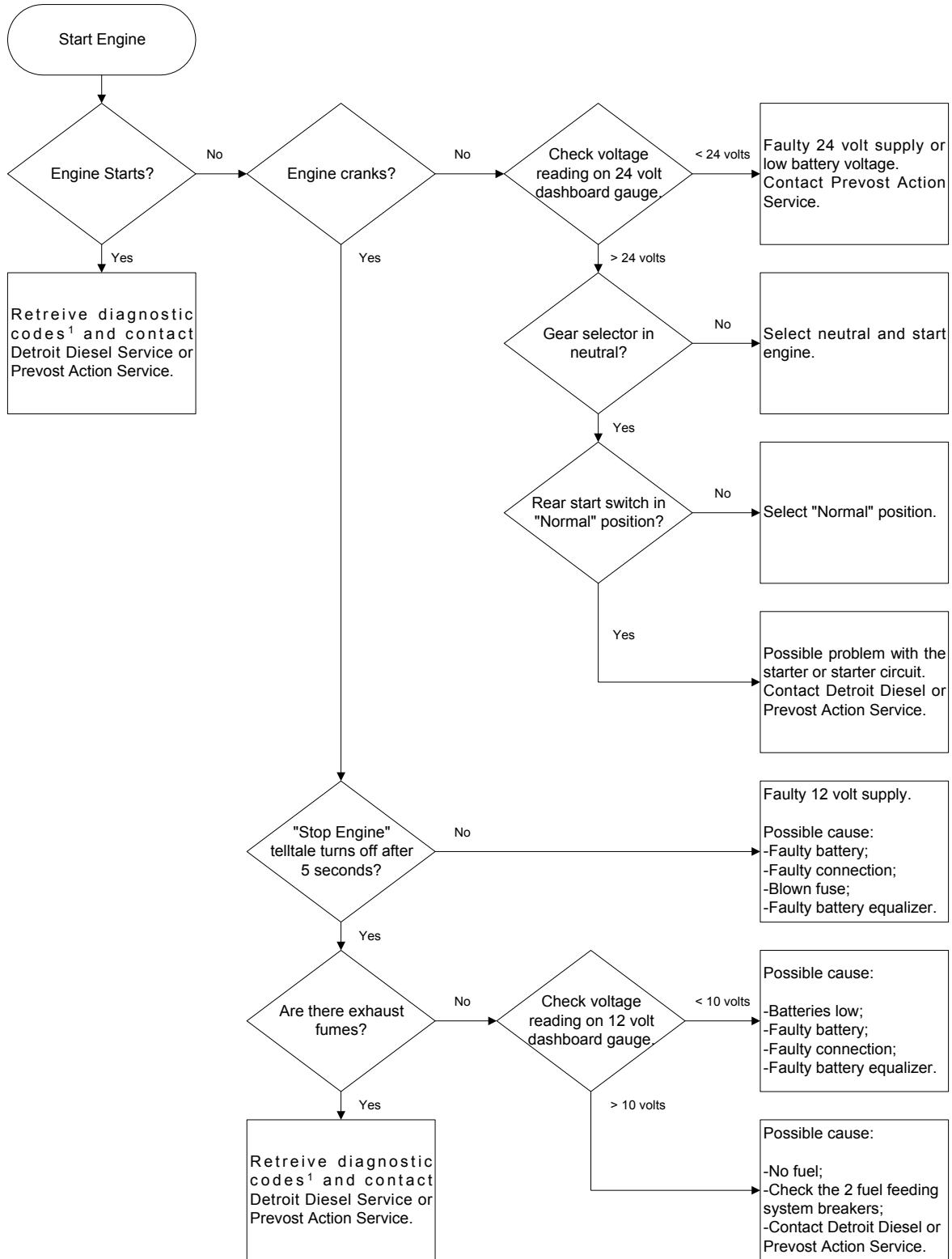
PRE-HEATING SYSTEM

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)

ENGINE TROUBLESHOOTING FLOWCHART



(1) Refer to DDEC VI Diagnostic Codes in appendix D.

LIGHT BULB DATA

Please, refer to your vehicle Parts Manual for selection of replacement light bulbs.

ELECTRICAL COMPARTMENTS

MAIN POWER COMPARTMENT

MULTIPLEX MODULES			
VECR	Rear fuse box	A51	I/O-B
A1	Transmission TCM/ECU	A52	I/O-B
A49	I/O-A	A53	I/O-B
A50	I/O-B		
RELAYS			
R1	Master relay	R15	Aisle & emergency lights
R2	ZF transmission	R17	12V Rear wake-up mode
R3	12V IGN & A/C	R21	Emergency cut-out
R5	Preheater/Charger	R25	MCM/EECM ignition
R6	Fluorescent (direct lighting)	R29	Volvo intake air preheater
R8	Service brake	R31	Engine MCM/EECM
R13	Fluorescent (indirect lighting)	RZF1	ZF trans neutral
R14	Reading lamps		
MAIN CIRCUIT BREAKERS			
CB11	24 VD Sound system	CB12	12 VI HVAC condenser
CB9	24 VD Wheelchair lift or other option	CB10	12 VI Front distribution
CB7	24 VI HVAC condenser	CB8	12 VI Rear
CB5	24 VI	CB6	24 VD
CB3	24VI HVAC evaporator	CB4	12 VD Sound system
CB1	24VI Front	CB2	12 VD Distribution
FUSES			
F50	Pre-heating	F69	Overhead storage compartment lighting RH & LH
F51	Pre-heating	F70	Customer 24 VI
F52	Spare fuse or ZF transmission	F71	Spare fuse
F53	Power A54 module	F72	Power A50 module
F54	Customer 24 VD	F73	Spare fuse
F55	Center aisle fluorescent & emergency lighting	F74	MCM/EECM engine IGN
F56	Fluorescent (indirect lighting)	F75	TCM/ECU trans IGN
F57	Fluorescent (indirect lighting)	F76	Customer 12 VI
F58	Fluorescent (direct lighting)	F77	TCM/ECU transmission wake-up

F59	Fluorescent (direct lighting)	F78	MCM/EECM engine wake-up
F60	Reading lamps RH	F79	MCM engine wake-up
F61	Reading lamps RH	F80	Power A51 module
F62	Lavatory night light	F81	Alternators excitation resistor
F63	Engine pre-heater	F85	Spare fuse or ZF transmission
F64	Wheelchair lift or spare	F86	Spare
F65	Multiplex modules main power compartment	F87	Spare fuse
F66	Radiator fan clutch	F88	Spare fuse
F67	Power A54 module	F89	Spare fuse
F68	Power A54 module	F125	Volvo intake air preheater

RESISTORS

RES13	Excit. res. ALT-1	RES14	Excit. res. ALT-2
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DIODES

D6	Master relay	D31	A/C compressor clutch
D8	Passenger liquid valve	D33	Toilet flush pump
D15	Wake-up mode	D36	Radiator fan clutch 2
D28	A/C compressor unloader RH	D37	Radiator fan clutch 1
D29	A/C compressor unloader LH	DXX	Nut used

EVAPORATOR COMPARTMENT

MULTIPLEX MODULES (evaporator compartment)			
A54	I/O-B		
RELAYS (evaporator compartment)			
R9	24V Condenser fan RH	R20	Water pump
R10	24V Condenser fan LH	R26	Pre-heating
R12	24V Evaporator fan		
DIODES (evaporator compartment)			
D9	Pre-heating	D19	Baggage compartment -2
D10	Pre-heating	D20	Baggage compartment -1
D16	Baggage compartment -3	DXX	Not used
D17	Baggage compartment -5		

FRONT ELECTRICAL AND SERVICE COMPARTMENT

MODULES (front electrical & service compartment)			
VECF	Front fuse box	A43	I/O-A
A13	MASTER ID	A44	I/O-B
A9	ABS-ECU system	A45	I/O-B
A36	CECM chassis electronic control module	A46	I/O-B
A41	I/O-A	A72	CPC
A42	I/O-A	A81	Volvo VECU
RELAYS (front electrical & service compartment)			
R18	Wake-up mode 24V	R22	CPC
R19	Wake-up mode 12V	R24	Upper windshield wipers
FUSES (front electrical & service compartment)			
F1	Power CECM	F25	Back-up camera
F2	Front start main switch	F26	TPMS
F3	Pre-heating & driver liquid solenoid valve	F27	Free/customer
F4	Volvo link	F28	Driver power window
F5	Wake-up mode relay 24 volts	F29	Instrument cluster & data reader
F6	Free/customer	F30	Cigarette lighter & 12 volts accessory outlet
F7	ABS & pre-heating control	F31	Spare fuse
F8	Air horn	F32	Spare fuse
F9	Reading lamps option	F33	Wake-up mode relay 12 VD
F10	Fire alarm	F34	Wake-up mode relay 12 VD
F11	Sun visor	F35	12 volts accessory outlet
F12	Power A41module	F36	HVAC & telltale panel
F13	Power A41module	F37	Destination sign Balios
F14	Free/customer 24VI	F38	Digital clock
F15	R22	F39	Spare fuse
F16	Defroster unit	F40	Spare fuse
F17	Spare	F41	Spare fuse

F18	Upper windshield wipers	F44	Destination sign
F19	Pro Driver DDDL	F45	Fire prot. syst
F20	Dashboard rocker switch red LED	CB82	Lower windshield wipers
F21	Power A44 module	F83	Sound system
F22	Steering wheel controls	F84	Free/customer
F23	ABS brake		
F24	Mirror		
DIODES (front electrical & service compartment)			
D1	Accessories	D22	Service brake
D2	Driver liq sol valve	D44	Ignition
D12	Engine brake	DXX	Not used
D13	ABS		

PNEUMATIC ACCESSORY PANEL IN RIGHT CONSOLE

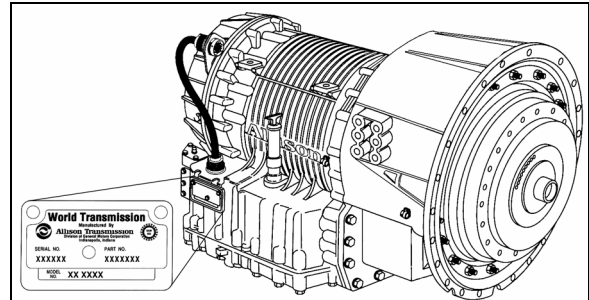
MULTIPLEX MODULES (pneumatic accessory panel inside right console)			
A47	I/O-B	A48	I/O-B
RELAYS (pneumatic accessory panel inside right console)			
R23	Lower windshield wipers		
SOLENOIDS (pneumatic accessory panel inside right console)			
SO3	Door unlock solenoid valve	SO5	Door opening solenoid valve
SO4	Door unlock solenoid valve	SO6	Door closing solenoid valve
DIODES (pneumatic accessory panel inside right console)			
D4	Lower windshield wipers speed 2	D35	Upper defroster
D5	Lower windshield wipers speed 1	DXX	Not used
D7	Entrance door		

PLATES AND CERTIFICATION

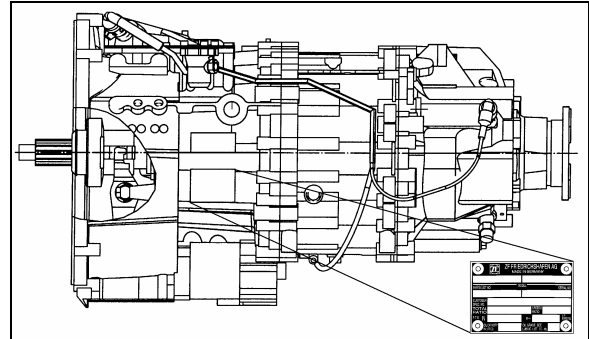
The main components of the vehicle, such as engine, transmission, axles and the chassis are identified by different serial numbers. It may be necessary to locate these numbers for warranty purposes.

The engine serial and model number are stamped on the cylinder block (as viewed from the flywheel end) on the left side just below the fire deck and above the cast-in Detroit Diesel logo.

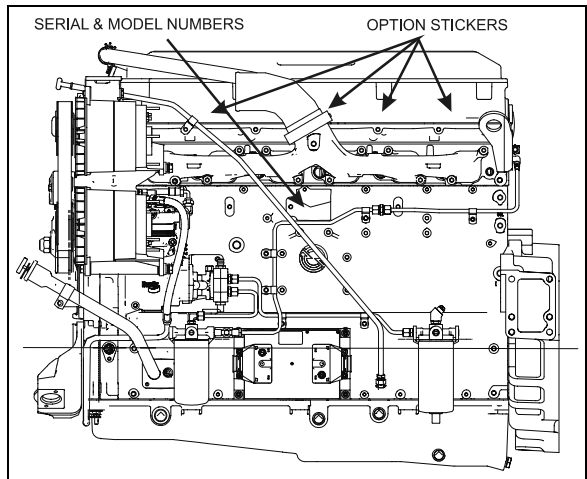
In addition, option decals are located on the rocker cover (starter side). The engine serial and model number and a list of the optional engine equipment are written on these decals. Refer to this information when ordering replacement parts.



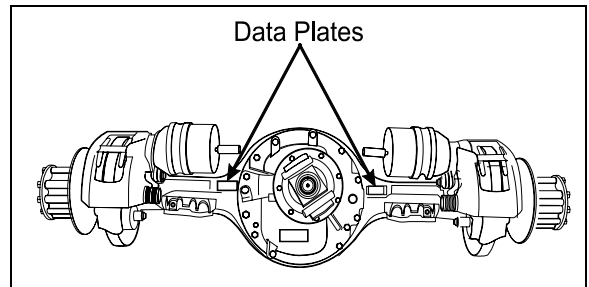
TRANSMISSION DATA PLATE (ALLISON) 07076



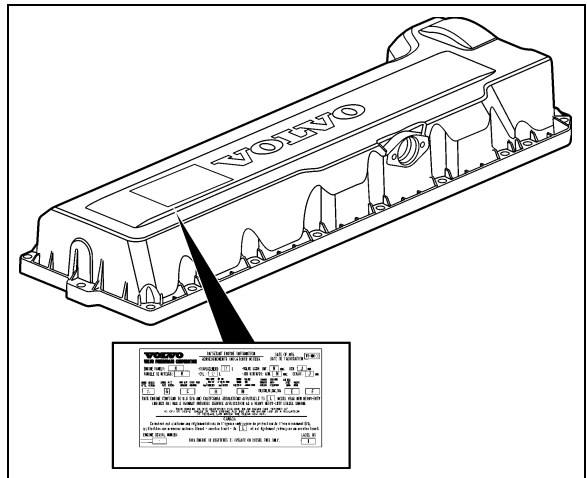
ZF-ASTRONIC TRANSMISSION 00040



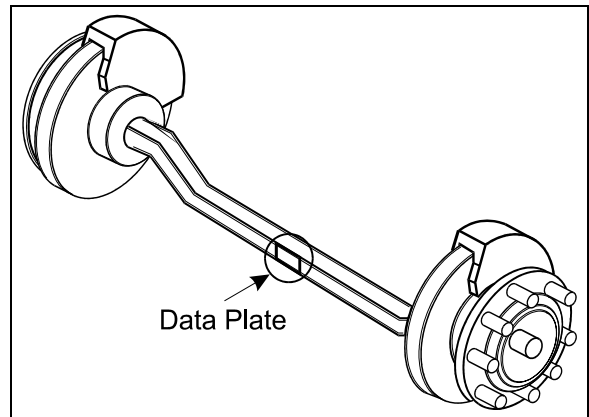
SERIES 60 ENGINE 00043



DRIVE AXLE 11019



VOLVO D13 ENGINE DATA PLATE 00052



I-BEAM FRONT AXLE 00008

SAFETY CERTIFICATION

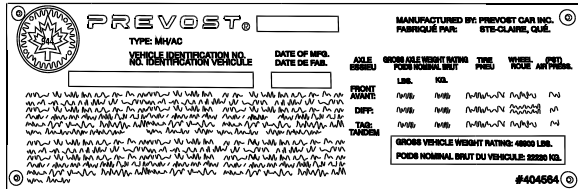
Vehicle components meet specifications and standards as follows:

- 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 applicable components.

DOT CERTIFICATION PLATE

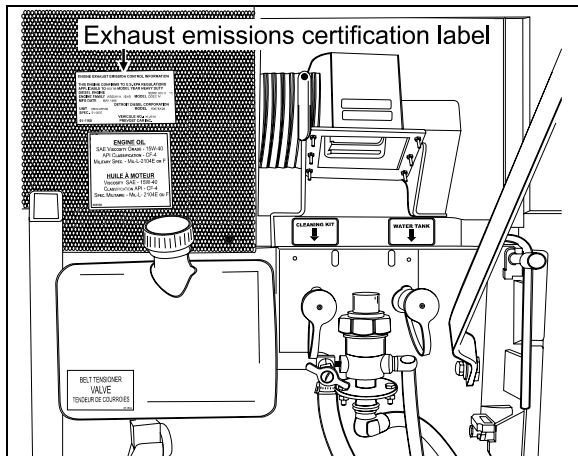
This certifies that vehicles manufactured by Prevest Car Inc. comply with all Federal Motor Vehicle Safety Standards at the time of manufacture. Information such as date of manufacture, model year, gross vehicle weight rating, tire types and inflation pressure is also etched on this plate. The DOT Certification plate is affixed to L.H. control panel.



DOT CERTIFICATION PLATE 00016

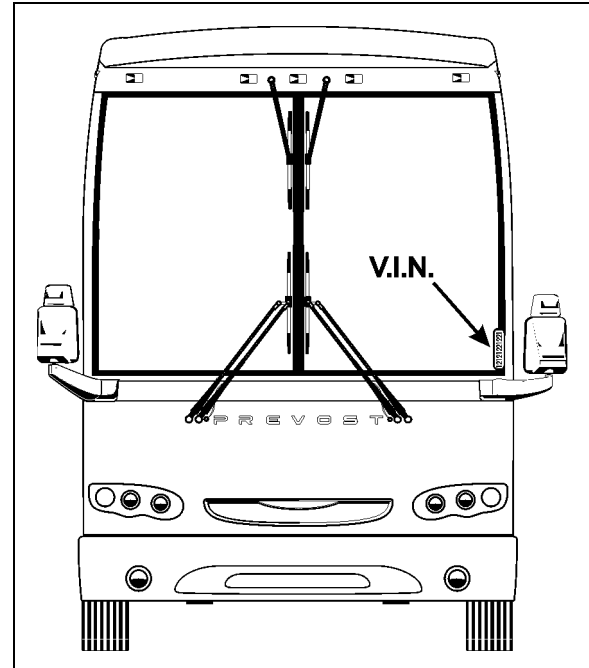
EPA ENGINE LABEL

The emissions certification label affixed to the panel over the engine oil reserve tank certifies that the engine conforms to federal and any state exhaust emissions regulations.



EPA CERTIFICATION LABEL 23209

VEHICLE IDENTIFICATION NUMBER (VIN)



VEHICLE IDENTIFICATION NUMBER 18491

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

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 PrevoSt Car Inc.

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 PrevoSt 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 stay in Canada, and if you believe that your vehicle has a safety defect, you should immediately inform Transport Canada and PrevoSt Car Inc. You may write to:

**Transport Canada
Box 8880
Ottawa, Ontario, K1G 3J2**

DECLARATION OF THE MANUFACTURING DEFECTS TO PREVOST CAR INC.

In addition to notify the NHTSA (or Transport Canada), please contact PrevoSt Car at **1-418-831-2046**. Or you may write to :

**PrevoSt Car Inc.
After-sales service department
850 ch. Olivier,
Saint-Nicolas (Quebec)
Canada, G7A 2N1**

APPENDIX B – Troubleshooting Multiplex 165

Problem/Symptom	Probable Causes	Actions
<p>Vehicle does not Start</p>	<p>Rear Start selector switch is not at the NORMAL position</p> <p>Battery master switch in the battery compartment is at the OFF position (down)</p> <hr/> <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>	<ol style="list-style-type: none"> 1. Check that the rear start selector switch is flipped up to NORMAL start position and battery master 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 <hr/> <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 battery master switch in the battery 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 4. Try disconnecting the CECM completely, leave it disconnected and see if the limp-home functions (start of the vehicle from the engine

166 APPENDIX B – Troubleshooting Multiplex

Problem/Symptom	Probable Causes	Actions
<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>compartment, wipers speed 1, flashers, etc) are functioning</p> <ol style="list-style-type: none"> 1. Check / reset circuit breaker CB6 (4th from the top on the right side column) Check / replace fuse F1 2. Operate in limp-home mode by starting the vehicle from the engine compartment (REAR START). All functions essential to drive are available <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>	<ol style="list-style-type: none"> 1. 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>Entrance door does not open nor close using the control buttons</p> <p>Defroster fan not functioning</p> <p>Lower windshield wipers not functioning in speed 1 or intermittent</p>	<p>Module A47 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 ModA47, 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 CB6 3. Check / replace fuse F5 4. Probe gray connector on module to see if it is powered. 5. Use the air release valves near the entrance door and in the front service compartment to lock / unlock the door
<p>Lower windshield wipers not functioning in speed 1 or intermittent</p>	<p>No power on R23</p>	<ol style="list-style-type: none"> 1. Check / replace fuse F82
<p>HVAC condenser fans not functioning in speed 1</p>	<p>Circuit breaker CB12 was manually tripped and not reset</p>	<ol style="list-style-type: none"> 1. Check / reset circuit breaker CB12
<p>HVAC condenser fans not functioning in speed 2</p>	<p>Circuit breaker CB7 was manually tripped and not reset</p>	<ol style="list-style-type: none"> 1. Check / reset circuit breaker CB7
<p>Lower and upper windshield washer not functioning</p>	<p>Module A46 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display

APPENDIX B – Troubleshooting Multiplex 167

Problem/Symptom	Probable Causes	Actions
<p>Upper windshield wiper not functioning</p> <p>Defroster fan is functioning but no heat or cooling available in the driver area</p>		<p>(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).</p> <ol style="list-style-type: none"> 2. Check / reset circuit breaker CB1 3. Check / replace fuse F12 4. Probe gray connector on module to see if it is powered.
<p>Low beam headlights and front flasher on left side not functioning</p> <p>Electric horn not functioning</p>	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.
<p>Low beam headlights and flasher on right side not functioning</p>	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 this symptom). 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.
<p>Rear flashers not functioning</p> <p>Stoplights and high-mounted stoplight not functioning</p>	Module A51 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 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

168 APPENDIX B – Troubleshooting Multiplex

Problem/Symptom	Probable Causes	Actions
		<ol style="list-style-type: none"> 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, 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 F67 , F68 4. Probe gray connector on module to see if it is powered.
<p>Sound system not functioning</p>	<p>Circuit breaker CB4 or CB11 was manually tripped and not reset</p>	<ol style="list-style-type: none"> 1. Check / reset circuit breaker CB4 or CB11

APPENDIX B – Troubleshooting Multiplex 169

Problem/Symptom	Probable Causes	Actions
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	1. 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	1. 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	1. 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	Check / reset circuit breaker CB10 Check / replace fuse F20
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. 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. 4. Press the push-button one time to engage the clutch to 1st speed, press a second time to engage to 2nd speed, press a third time to stop the fan, press once again to return to 1st speed. <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>

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 MODE INDICATOR (LED) is not illuminated, the displayed code is not active. 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:

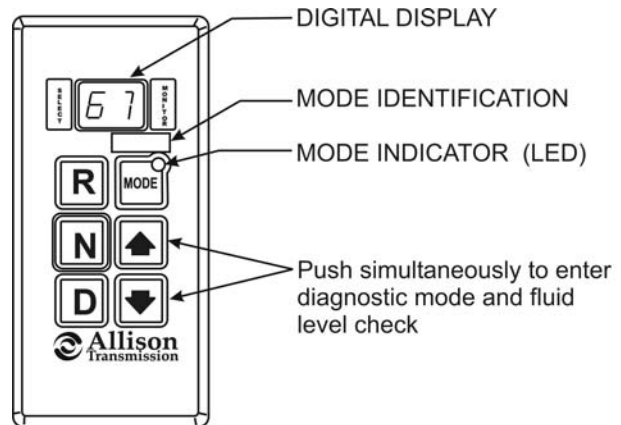
Exemple : Code P0722

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.



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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 twice to access the Diagnostic Display Mode.

<i>NOTE</i>

<i>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.</i>

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).

<i>NOTE</i>

<i>Be sure to record all codes displayed before they are cleared. This is essential for troubleshooting.</i>
--

<i>NOTE</i>

<i>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</i>
--

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.

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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DIAGNOSTIC TROUBLESHOOTING CODES (DTC) LIST - ALLISON 4TH GENERATION CONTROLS

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.
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)
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
P0719	Brake Switch ABS Input Low	No	TCM assumes ABS is OFF
P071A	RELS Input Failed On	Yes	Inhibit RELS operation
P071D	General Purpose Input Fault	Yes	None
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
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

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
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
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
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)
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)
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)
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)

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DTC	Description	CHECK TRANS Light	Inhibited Operation Description
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)
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)
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
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
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
P278A	Kickdown Input Failed ON	No	Inhibit kickdown operation
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)
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

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
O L...O K	Oil level is correct
O L...L O...01	One quart low
O L...L O...02	Two quarts low
O L...H I...01	One quart high
O L...H I...02	Two quarts high

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.

CODE	CAUSE OF CODE
OL...-...0X	Waiting time too short
OL...50	Engine speed (rpm) too low
OL...59	Engine speed (rpm) too high
OL...65	Neutral must be selected
OL...70	Sump oil temperature too low
OL...79	Sump oil temperature too high
OL...89	Output shaft rotation
OL...95	Sensor failure

Exiting the Fluid Level Display Mode

To exit the Oil Level Display Mode, press any range button: «R», «N» or «D».

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.

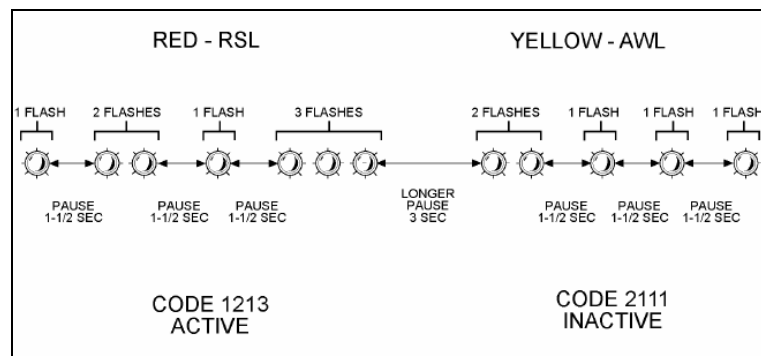


FIGURE 1: FLASHING FAULTS CODES

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
84	6	PID	84	2113	VSS Anti-Tamper Detection via ABS Vehicle Speed Comparison

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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
168	0	PID	168	2125	Battery Voltage High
168	18	PID	168	2125	Battery Voltage Low

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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
596	19	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #3 is erratic

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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
625	13	SID	248	2151	ECAN ID_1629 Diagnostic Message Not Received This Ignition Cycle

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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
704	3	SID	52	2214	Digital Output 4 07 Circuit Failed High
704	4	SID	52	2214	Digital Output 4 07 Circuit Failed Low

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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
1267	4	SID	123	2312	Digital Output 4 10 Circuit Failed Low
1267	3	SID	123	2312	Digital Output 4 10 Circuit Failed Open

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
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

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
164	0	PID	164	1215	Rail Pressure Governor (High Side) Error
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

APPENDIX D – DDEC VI Diagnostic Codes 189

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
615	4	SID	55	1331	Turbo Compound Valve Circuit Failed Low
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
652	5	SID	2	1243	Injector Cylinder 2, Nozzle Control Valve or Spill Control Valve, Jammed Closed

APPENDIX D – DDEC VI Diagnostic Codes 191

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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
677	14	SID	39	1255	Starter Electronic Fault / ECU internal (Main)
677	7	SID	39	1255	Engine Starter Relay - Starter Does Not Engage

192 APPENDIX D – DDEC VI Diagnostic Codes

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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
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

APPENDIX D – DDEC VI Diagnostic Codes 193

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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
2791	4	PID	146	1521	EGR Valve Circuit Failed Low
2791	3	PID	146	1521	EGR Valve Circuit Failed High

194 APPENDIX D – DDEC VI Diagnostic Codes

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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)
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

APPENDIX D – DDEC VI Diagnostic Codes 195

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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)
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)

196 APPENDIX D – DDEC VI Diagnostic Codes

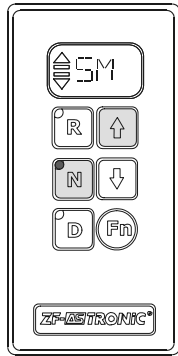
SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
3563	21	PID	106	1551	Intake Manifold Pressure Plausibility Error, Pressure Too Low (High Box)
3588	4	SID	156	1552	Ether Start, Shorted to Ground
3588	3	SID	157	1552	Ether Start, Shorted to Battery
3588	5	SID	158	1552	Ether Start, Open Load
3597	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
3663	6	SID	366	1615	Injector Cylinder #5 Spill Control Valve ("Amplifier"), Valve Shorted Circuit

APPENDIX D – DDEC VI Diagnostic Codes 197

SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
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)



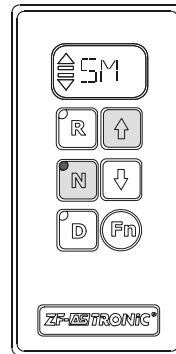
07107

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.

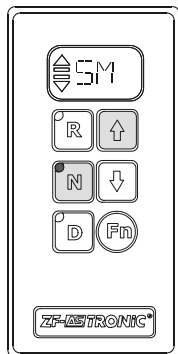
Calling up error numbers from the error memory:



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.

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.

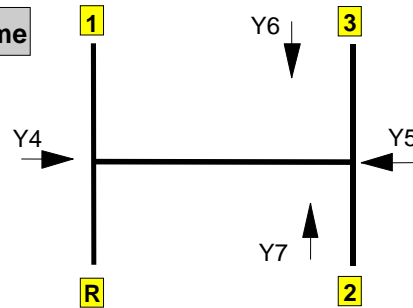
200 APPENDIX E – ZF Astronic Transmission Error Codes

ERROR CODES

Shift schemes of transmissions:

- Y2 Splitter K2
- Y3 Splitter K1
- Y8 Range (GP) low
- Y9 Range (GP)

10/12-Gear Scheme



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)
20,3	14	86	Short circuit to positive at output ACC (wakeup control signal for ZMTEC, keep alive signal for voltage doubler, and power signal for speed sensor #2)
21,2	15	127	Error on ECU temperature sensor signal
21,0	15	193	ECU temperature too high
31,3	1F	137	No range change group (GP) sensor signal (Short circuit to positive)
31,6	1F	138	No range change group (GP) sensor signal (Short circuit to ground)
31,5	1F	139	No range change group (GP) sensor signal (Interruption)
31,13	1F	140	Self adjustment error of range change group sensor in position fast
31,7	1F	159	Range-change group sensor signal leaves engaged position during driving
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
34,5	22	50	Interruption at output stage to small disengagement clutch valve

APPENDIX E – ZF Astronic Transmission Error Codes 201

ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
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)
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

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ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
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
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

APPENDIX E – ZF Astronic Transmission Error Codes 203

ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
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
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 205

Webasto Preheater 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.

