SECTION 5 OTHER FEATURES

5-2 OTHER FEATURES

EXHAUST AFTERTREATMENT SYSTEM

The exhaust aftertreatment system consists of two units, the filtration/regeneration unit and the selective catalytic reduction SCR unit.

FILTRATION AND REGENERATION UNIT

The aftertreatment system primary function is to capture and oxidize (regenerate) the particulate matter (soot) in the engine exhaust gases and to reduce NOx. To achieve this goal, the exhaust aftertreatment system is split into two main sections: the exhaust gases first enter the **Diesel Oxidation Catalyst (DOC)** and **Diesel Particulate Filter (DPF)** assembly to capture and regenerate the soot on a regular or passive basis, then the exhaust gases flow through the **catalytic converter** to reduce NOx to minimum level. Through constant monitoring of the exhaust gas temperature and the system back pressure, EMS 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. 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, a stationary regeneration is then required.

Stationary (parked) regeneration

In a small number of specific engine duty cycles, engine control module may not be capable of completing a passive regeneration. In these situations, the operator will be notified that a parked 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 using the DID menus. Once initiated, the stationary regeneration process will be complete in about 45 minutes.

The driver will be notified of the need for a stationary regeneration (parked) by illumination of the DPF REGENERATION telltale light.

Diesel particulate filter clogging sequence – Instrument cluster telltale light

LEVEL 1	 *steady*	*REGENERATION NEEDED* *Diesel particulate filter is becoming full* *The DPF REGENERATION telltale light illuminates to notify the driver that a stationary regeneration (parked) will be required soon. When this lamp is lit, initiate stationary regeneration process at an appropriate time of day. THERE IS NO URGENCY AT THIS LEVEL.*
LEVEL 2	 *flashing*	*REGENERATION REQUIRED* *Diesel particulate filter full* *If no DPF regeneration occurs after the initial DPF REGENERATION telltale light 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* + 	*ATD SERVICE REQUIRED* *ENGINE DERATE ACTIVE* *Diesel particulate filter overfull* *If the flashing DPF REGENERATION telltale light is still ignored, the CHECK telltale light will illuminate. In that situation, engine performance is limited. Perform a parked regeneration IMMEDIATELY to avoid further derate and prevent from entering into Level 4.*
LEVEL 4	 *flashing* +  + 	*ATD SERVICE REQUIRED* *ENGINE SHUTDOWN 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 telltale light;* *Solid CHECK telltale light;* *Solid STOP telltale light.* *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 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.* ***If engine protection has been initiated and forces the engine to shut down, you CAN immediately restart the engine and perform the necessary steps in order to initiate a stationary regeneration.***

Initiating a Stationary (Parked) Regeneration

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 regeneration must be undertaken outdoors only.

WARNING

During stationary regeneration, exhaust temperature may reach up to 842°F (450°C) at the particulate filter, it will go down to 788°F (420°C) after the catalytic converter and then will be further reduced to 554°F (290°C) at the diffuser outlet. Before initiating stationary regeneration, make sure that the exhaust outlet diffuser is clear of objects and that no one is working close to the exhaust 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.

NOTE

STATIONARY REGENERATION

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

The DPF REGENERATION telltale light illuminates to notify the driver of the need and urgency of a manual stationary regeneration.

DPF REGENERATION telltale light

If stationary regeneration is not performed, this telltale light 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 as per level 1 to level 4 sequence.

To initiate a stationary regeneration:

- Park the vehicle in a clear area, vehicle speed must be 0 mph (0 km/h);
- The engine must be on normal idle and fully warmed up (coolant temperature above 140°F/60°C);
- Apply parking brakes and set the transmission to neutral (N).
- Press the DID ENTER button and then get to the DID Aftertreatment menu. Select submenu Request Parked REGEN and press ENTER button to confirm and initiate regeneration.

The regeneration will begin. Turn off the air conditioning to reduce engine load. The engine idling speed will increase to 1200 rpm. Once the regeneration is completed, the engine speed will return to normal idle.

Voluntary Interruption of a Stationary Regeneration

It is possible to interrupt a stationary regeneration at all time. To do so, get to the DID’s Aftertreatment menu, select Cancel REGEN and press ENTER button to confirm. You can stop regeneration simply by releasing the parking brake. Use this procedure in order to move the vehicle in a safe area.

CAUTION

To avoid damages to the system components, do not set the ignition key to the OFF position to interrupt a stationary regeneration.

If regeneration is interrupted, it is very important to reinitiate the regeneration as soon as possible.

SELECTIVE CATALYTIC REDUCTION UNIT

Selective Catalytic Reduction (SCR) is a technology that uses Diesel Exhaust Fluid (DEF) and a catalytic converter to reduce nitrogen oxides (NOx) emissions.

SCR is an exhaust aftertreatment system that injects small amount of DEF into the exhaust gas between the DPF and the selective reduction catalytic converter. DEF turns to ammonia and carbon dioxide when heated. The

exhaust stream then passes over a catalyst, the ammonia reacts with the NOx to form nitrogen and water vapor.

The basic elements of the SCR system consist of a 15.9 gallons (60 liters) DEF tank complete with pump, lines and heating system, a dosing injector, a catalytic converter and the control and monitoring system.

Diesel exhaust fluid DEF

When handling DEF solution, it is important that electrical connectors to be connected or well encapsulated, otherwise there is a risk that the DEF will cause oxidation that cannot be removed. Water or compressed air will not help, since DEF quickly oxidizes certain metals. If a disconnected connector comes into contact with the DEF solution, it must be replaced immediately to prevent the DEF solution from creeping further into the copper wiring, which takes place at a speed of about 2.4 in (60 mm) per hour.

CAUTION

Diesel Exhaust Fluid (DEF) is a nontoxic aqueous solution of urea (32.5%) and ultra-pure water (67.5%). Urea is a compound of nitrogen that turns to ammonia when heated. The fluid is non-flammable, and is not dangerous when handled as recommended. However, it is highly corrosive to certain metals, especially copper and brass.

When detaching hoses and components, do not spill DEF on disconnected or unsealed connectors. If DEF is spilled on a disconnected or unsealed connector, the connector must be removed immediately and replaced.

Things to know about spilt diesel exhaust fluid (DEF):

- If urea solution comes into contact with the skin, rinse with plenty of water and remove contaminated clothing.
- If urea solution comes into contact with the eyes rinse for several minutes and call for medical help if necessary.
- If inhaled breathe fresh air and call for medical help if necessary.
- Do not allow the DEF solution to come into contact with other chemicals.
- The DEF solution is not flammable. If the DEF solution is exposed to high temperatures, it breaks down into ammonia and carbon dioxide.
- The DEF solution is highly corrosive to certain metals, including copper and aluminum.
- If the DEF solution is spilled onto the vehicle, wipe off the excess and rinse with water. Spilled DEF solution can form concentrated white crystals on the vehicle. Rinse off these crystals with water.

WARNING

DEF spilt onto hot components will quickly vaporize. Turn your face away!

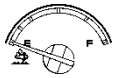
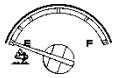
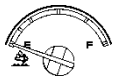
Diesel Exhaust Fluid (DEF) Consumption

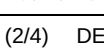
DEF consumption is related to fuel consumption. In order to meet EPA requirements, DEF tanks are sized so one refill will be necessary every two refill of the fuel tank.

SELECTIVE CATALYTIC REDUCTION – DRIVER WARNINGS AND INDUCEMENTS

SCR system components must not be removed, altered or modified in any way. In order to protect the SCR system from tampering, inducement measures will occur if the following states are detected:

- Disconnection of DEF tank level sensor
- Blocked DEF line or dosing valve
- Disconnection of DEF dosing valve
- Disconnection of DEF pump
- Disconnection of SCR wiring harness
- Disconnection of NOx sensor
- Disconnected exhaust temperature sensor
- Disconnected DEF temperature sensor
- Disconnected DEF quality sensor

DEF TANK LEVEL DRIVER WARNINGS AND INDUCEMENTS				
	Conditions / Triggers	DEF Tank LOW LEVEL Indicator, DID Message and audible warning		Inducement
1	**Normal** DEF tank level sensor reads between 100% and 10%	None		None
3	**DEF tank near empty** DEF tank level sensor reads less than 5% 	 blinking	None	Engine torque reduction of 25%
4	**DEF tank empty** and one (1) hour of operation in the engine derate mode 	 blinking	(3/4) DEF TANK EMPTY ENGINE IN DERATE 5 MPH LIMIT IF THE VEHICLE NOT MOVING FOR 20 MIN  3 cycles of 2 beeps	Engine torque reduction of 40%
5	**DEF tank empty** 1. Diesel fuel refueling done with a fuel level sensor reading increase of 15%, or more 2. Vehicle stationary (speed=0) for 20 minutes with the engine off or at idle 	 blinking	(4/4) REFILL DEF TANK VEHICLE SPEED LIMITED TO 5 MPH (8 KM/H)  continuous cycle of 2 beeps	Vehicle road speed limited (RSL) to 5 mph (8 km/h)

DEF QUALITY DRIVER WARNINGS AND INDUCEMENTS				
	Conditions / Triggers	Amber Warning Light & Did Message And Audible Warning		Inducement
1	**Good DEF quality**	None		None
2	**Poor DEF quality detected**	 solid	(1/4) DEF QUALITY OK TO CONTINUE DRIVING  3 cycles of 2 beeps	Engine will derate 25% in < 60 min
3	**Poor DEF quality detected** and one (1) hour of operation with active diagnostic troubleshooting code	 solid	(2/4) DEF QUALITY OK TO CONTINUE DRIVING 3 cycles of 2 beeps	Poor def quality detected Engine derated 25% engine will derate 40% in <240 min
4	**Poor DEF quality detected** and four (4) hours of operation with active diagnostic troubleshooting code	 solid	(3/4) SERVICE DEF 5 MPH LIMIT IF VEHICLE NOT MOVING FOR 20 MIN  3 cycles of 2 beeps	Engine derated 40% 5 mph (8 km/h) limit after next 20 min vehicle stop
5	**Poor DEF quality detected** Diesel fuel refueling done with a fuel level sensor increase of 15% or more or Vehicle stationary (speed=0) for 20 minutes with the engine off or at idle or Key cycle trigger.	 solid	(4/4) POOR DEF QUALITY 5 MPH LIMIT SERVICE DEF SYSTEM  continuous cycle of 2 beeps	Service DEF 5 mph (8 km/h) limit

SCR SYSTEM TAMPERING DRIVER WARNINGS AND INDUCEMENTS				
Conditions / Triggers		Amber Warning Light, Did Message And Audible Warning		Inducement
1	**Normal** No diagnostic troubleshooting code active	None		None
3	**An SCR fault has been detected** Continue driving	CHECK solid	(1/4) SRC SYSTEM OK TO CONTINUE DRIVING 3 cycles of 2 beeps	25% Engine torque reduction in 60 minutes
4	**An SCR fault has been detected** Continue driving	CHECK solid	(2/4) SRC SYSTEM OK TO CONTINUE DRIVING 3 cycles of 2 beeps	Engine torque derated 25% 40% Engine torque reduction in 240 minutes
5	**An SCR fault has been detected**	CHECK solid	(3/4) SCR SYSTEM 5 MPH LIMIT IF THE VEHICLE NOT MOVING FOR 20 MIN 3 cycles of 2 beeps	Engine torque derated 40% Vehicle speed limited to 5 mph (8 km/h) if vehicle is immobilized for more than 20 min
6	**An SCR fault has been detected** Diesel fuel refueling done with a fuel level sensor increase of 15% or more or Vehicle stationary (speed=0) for 20 minutes with the engine off or at idle or Key cycle trigger.	CHECK solid	(4/4) SCR SYSTEM 5 MPH LIMIT SERVICE SYSTEM continuous cycle of 2 beeps	Vehicle speed limited to 5 mph (8 km/h)

DRIVER INFORMATION DISPLAY (DID) MENUS

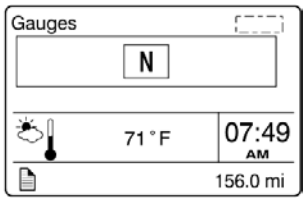
There are Driving and Non-Driving menus. Several submenus are password-protected while the vehicle is parked. The Non-Driving menu is accessible only when the vehicle is parked.

Refer to “Driver Information Display” in CONTROLS AND INSTRUMENTS section for details on how to scroll through DID menus or select an item whole setting is to be changed.

DRIVING MODE MENUS	NON-DRIVING/STATIONARY MODE MENUS
Gages 1. Current Gear Position (I-Shift only) 2. Outside Temperature 3. Engine Oil Temperature 4. Transmission Fluid Temperature 5. Prevost Liaison Compass 6. Accessories Air Pressure 7. A/C Compressor Pressure 8. Battery Voltage 9. Allison Transmission Oil Life 10. Battery State Of Charge 11. Electric Cooling Fan Status	**Display Settings** 1. Language 2. Units 3. Time/Date 4. Favorite Display Setting 5. Display Light 6. Change Password
Fuel Data 1. Fuel Flow 2. Fuel Flow / ECO % 3. Trip Fuel Used 4. Distance to Empty	**Diagnostics** 1. View Active Faults 2. View Inactive Faults 3. Cluster Selftest 4. Part Number 5. Reset Inactive Faults 6. Vehicle Tests
Time-Distance 1. Time and Date 2. Alarm Clock 3. Trip Odometer 1 and 2 4. Average Trip Speed 5. Estimated Time of Arrival (ETA)	**Pre-Trip Assistance** 1. Exterior Light Inspection 2. Air Leakage Monitor
Vehicle Messages	**Datalog** 1. Vehicle ID 2. Total Data 3. Trip Data 4. Reset Trip Data
Reset Trip Data	**Aftertreatment** 1. Request Parked REGEN 2. ATS Status 3. Cancel REGEN
	Password 1. Enter Password
	Brake Lining Remaining
	Prevost Liaison 1. Read Message 2. Send Message 3. Other Info

GAGES

There are several gages in this menu. The gages are used to view current status of important functions in the vehicle.



Current Gear Position (I-Shift transmission only)

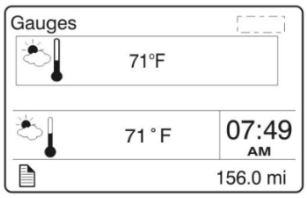
Indicates the current gear position selected on the I-Shift transmission.

D= drive

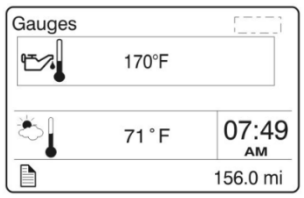
N= neutral

R= reverse

M= manual

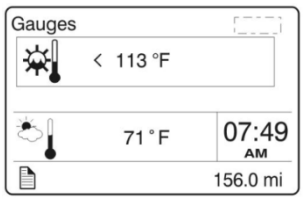


1. Outside Temperature

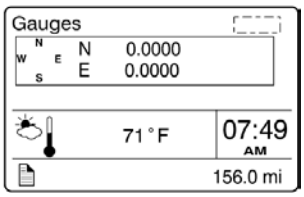


2. Engine Oil Temperature

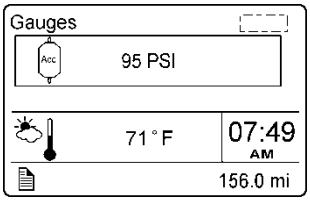
Selecting this gage will display the engine oil temperature.



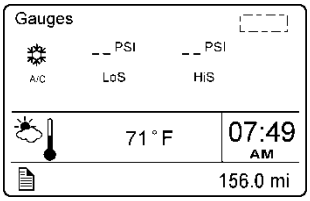
3. Transmission Fluid Temperature



4. Prevost Liaison Compass

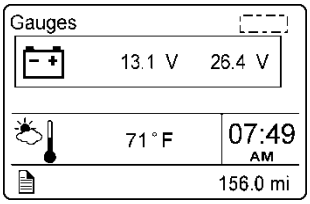


5. Accessories Air Pressure



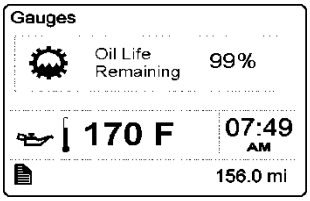
6. A/C Compressor Pressure

Displays the A/C compressor suction pressure value (LoS=low side) and discharge pressure value (HiS=high side).



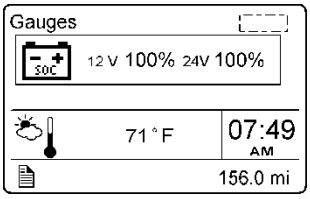
7. Battery Voltage

Displays current 12 volts and 24-volt system voltage.



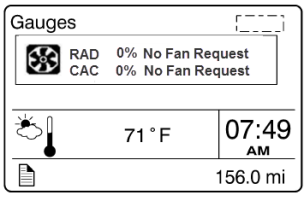
8. Allison Transmission Oil Life

Displays the percentage of the calculated remaining life of the transmission oil. New oil is displayed as 99%. Refer to Appendix C for more details.



9. Battery State Of Charge

Displays the state of charge of the 12-volt and 24-volt systems, expressed in percentage.

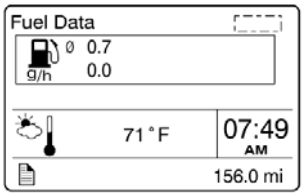


10. Electric Cooling Fan Status

Displays the speed and the state of both Charge Air Cooler and radiator cooling fans, expressed in percentage from 0 to 100%.

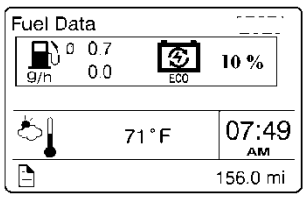
FUEL DATA

The Fuel Data menu provides information on the fuel consumption of the vehicle in various situations. For example, how much fuel has been used, how much fuel is remaining before refueling the vehicle.



1. Fuel Flow

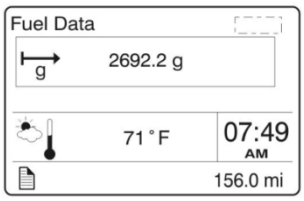
The lower numerical value (0.0) indicates the instantaneous fuel consumption. In this menu, you can reset the upper numerical value which is the average fuel consumption (0.7). To reset, hold ENTER button for 1 second.



2. Fuel Flow / ECO%

The lower numerical value (0.0) indicates the instantaneous fuel consumption. In this menu, you can reset the upper numerical value which is the average fuel consumption (0.7). To reset, hold ENTER button for 1 second.

This menu also displays the percentage of trip made on regenerated electricity (10%).

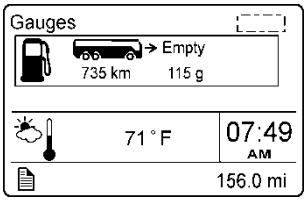


3/4 Trip Fuel Used

Indicates the total fuel consumption (gallons/liters) since the last reset.

Note: You should use Reset function before each new trip.

You can reset the fuel consumption value in this menu. To reset, hold ENTER button for 1 second.

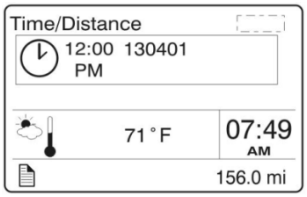


4/4 Distance to Empty

The left numerical value indicates the distance that can be traveled with the quantity of fuel that remains in the tank as indicated by the right numerical value.

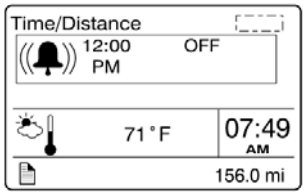
TIME/DISTANCE

The time and date can be set in the Time/Distance menu. The alarm clock can also be set from this menu. Following the alarm clock menu is the Trip Odometer 1 and 2 selection, which allows the operator to see the distance traveled since the last reset. Average trip speed is also shown. By specifying the distance to your destination, the vehicle can calculate the estimated time of arrival (ETA).



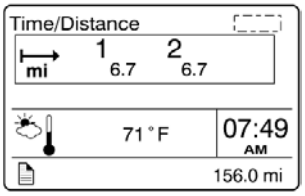
1. Time And Date

Adjust time and date with this menu. The instrument cluster has its own internal battery, so the date and date setting is kept in memory even if the vehicle's battery is disconnected.



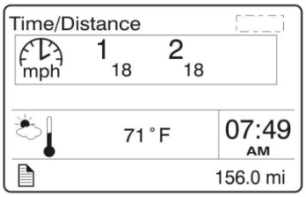
2. Alarm Clock

Use this function to program and activate an alarm on the instrument cluster clock. When the alarm clock goes off, a warning signal is sounded. The alarm shuts off after 60 seconds or if the ESCAPE button is depressed.



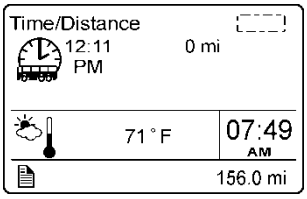
3. Trip Odometer 1 and 2

Allows the operator to see the distance traveled since the last reset. You can reset the trip odometer 1 or 2 in this menu. To reset, depress ENTER button, use UP/DOWN button to select between odometer 1 or 2 and then hold ENTER button for 1 second.



4. Average Trip Speed

This function displays the average speed for the current travel. The average trip speed is calculated as the distance traveled divided by the time the engine has been running (since the last reset). Two average trip speeds can be measured, corresponding to leg 1 and leg 2. Use Reset function before each new travel to start new measurements.



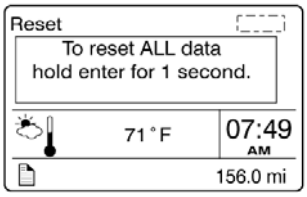
5. Estimated Time of Arrival (ETA)

This function will display the estimated time of arrival if the distance to be traveled is entered first, in this menu. To set distance to be traveled, press ENTER and enter the distance left to drive in mile or km using ENTER and UP/DOWN buttons.

VEHICLE MESSAGES

Use this function to consult the vehicle active messages that were previously displayed as pop-up messages and then acknowledged. When consulting a message, the corresponding STOP, CHECK or INFORMATION warning light will illuminate. Scroll through the messages using the up/down button. Press ESC button to return to the main menu.

RESET TRIP DATA

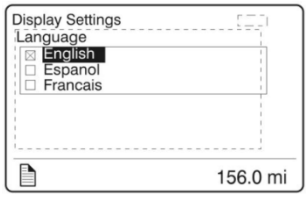


When the Reset Trip Data menu is open, pressing and holding down the **ENTER** ↵ button for more than 1 second resets the functions listed below. This function will permit to the system to calculate new value from the point of resetting.

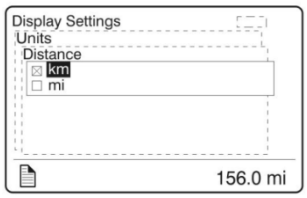
- Trip Fuel Used
- Average Trip Speed

DISPLAY SETTINGS

The Display Settings menu is used to change languages and units. The password, time and date can also be changed. The backlight and contrast of the display screen can be adjusted.



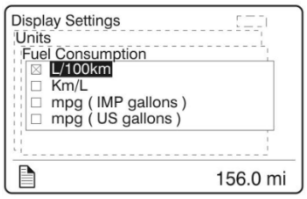
1. Language

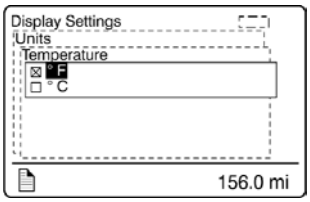


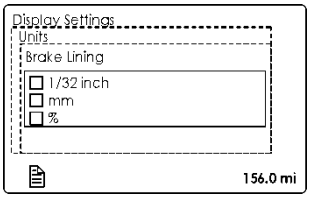
2. Units

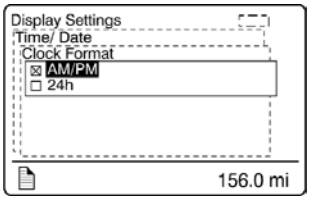
Use this function to select desired unit formats for:

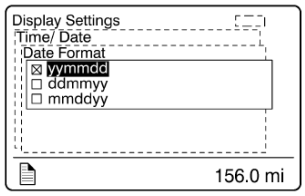
- Distance (miles or km)
- Fuel consumption (km/l, l/100 km, mpg US or IMP)
- Temperature: °C or °F
- Brake lining: 1/32 inch, mm, %.







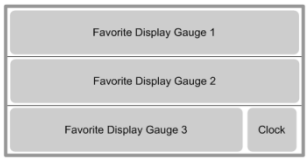




3. Time/Date

Select the clock format and date format using this function.

- AM, PM, 24h
- yymmdd, ddmmyy, mmddyy



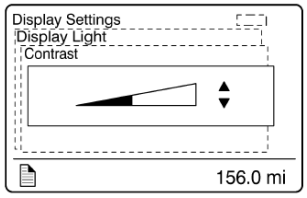
4. Favorite Display Setting

Use this menu to select your favorite display gages 1, 2 and 3 and replace the default gages. On vehicles provided with the I-Shift transmission, Favorite Display Gage 3 cannot be edited as it is kept for display of the transmission status.

Example: You wish to display the engine oil temperature at the Gage 1 position.

- Use UP/DOWN button until Gage 1 position is selected.
- Press ENTER button to confirm.

Use UP/DOWN button to scroll through the available gages. When the engine oil temperature gage is displayed, press ENTER button to confirm (repeat steps 1-3 to change Gage 2 and Gage 3 if needed).



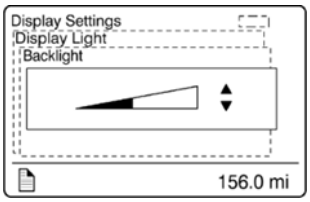
5. Display Light

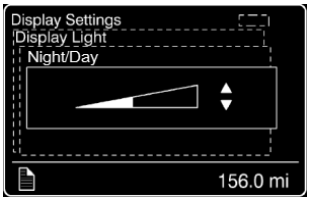
The Display Light menu has three submenus:

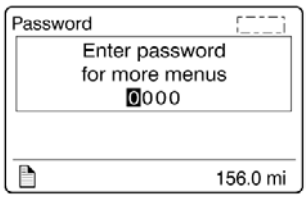
• Contrast: Adjust the contrast with the UP/DOWN button and press ENTER button to confirm.

• Backlight: In this menu, the display lighting can be adjusted relative to other instrument lighting with the UP/DOWN button.

• Night/Day: Use the Night/Day menu to choose a dark background with light text and images or a light background with dark text and images. Press ENTER button to toggle between Night and Day.







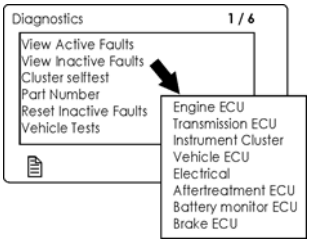
6. Change Password

Use this menu to change the current password. This menu is only accessible if the correct password is entered. The default password is 0000.

- Mark which password is to be changed with the display UP/DOWN button.
- Confirm with ENTER button.
- Set the first digit with the UP/DOWN button.
- Step to the next digit using ENTER button.
- Step backwards with ESC button.

DIAGNOSTICS

The Diagnostics menu enables fault tracing on the control units in the vehicle to check for faults. Instrument tests are available to check the telltales, gages, display and speaker. The part number of a control unit can be identified in the part number menu.



1. View Active Faults

A list of the control units on the vehicle is displayed. Use this function to check for active faults on specific control units.

2. View Inactive Faults

Use this function to check for inactive faults on specific control units.

3. Cluster Selftest

Use this menu to check proper functioning of the following components:

- Telltale lights

- Analog gages

- Display

- Speakers

The following table describes the available tests. To cancel a test, press the ESC button).

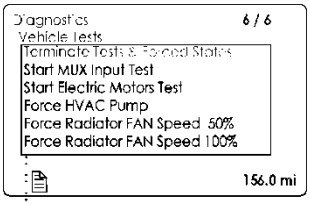
Telltale lights test	Telltales illuminate for approximately five seconds. Press the Esc button to cancel the test.
Analog gages	The indicators move forwards and backwards between the end positions. They do not show any particular value. This is just a check to confirm that the indicators move, and to make sure the operators are working. Press the Esc button to cancel the test.
Display test	The entire display lights up until the Esc button is pressed.
Speaker Test	A sound is emitted through the speakers. Press the Esc button to cancel the test.

4. Part Number

A list of the control units on the vehicle with their part numbers is displayed in the Part Number menu.

5. Reset Inactive Faults

Use this menu to delete an inactive fault for a particular control unit. Note: it is not possible to delete inactive faults of the Engine ECU.



Force Alternators Test
Superheat / Surchauffe Test

6. Vehicle Tests

Use this menu to perform tests on several components and systems:

- dashboard switches (Mux Input Test)
- electric motors, valve and pump contactors (Electric Motors Test)

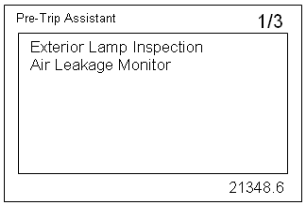
In case of overheating of the engine due to a malfunction of the radiator fan you can force activation of the fan using ACTIVATE RADIATOR FAN SPEED 50% or 100%.

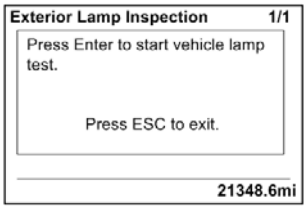
The DID status line will show TEST to confirm that one of the test modes is active. To cancel an active test, turn the ignition switch to the OFF position or press ESCAPE button, select TERMINATE TESTS & FORCED STATES submenu and then press ENTER button twice. “TEST” will disappear from the DID status line.

For further information concerning these functions, refer to section 06: Electrical, under “Available Test Modes” and “Limp-home Modes” paragraph of the Maintenance Manual.

PRE-TRIP ASSISTANT (OPTION)

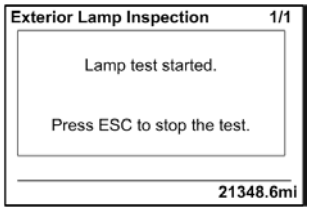
The Pre-Trip Assistance option is a tool to assist the driver in completing the pre-trip inspection of the vehicle. This option is not a substitute for a complete pre-trip inspection. If any system of the vehicle does not pass inspection, the error must be corrected before operating the vehicle. The available pre-trip tests include the Exterior Light Inspection check, and the Air Leakage check.

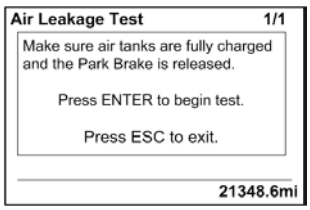




1. Exterior Light Inspection

The Exterior Light Inspection function turns on all the exterior lights simultaneously. This allows the operator to start the test, exit the vehicle and do a visual check that all exterior lights function properly. Press ESCAPE button to end the test and turn off all the exterior lights.





2. Air leakage Monitor

The Air Leakage check allows the driver to accurately measure the amount of air pressure drop in the front and rear brake air systems. After selecting this test from the DID, you are prompted to apply the service brake for 60 seconds. After applying and holding the service brake for 60 seconds, the DID will display the amount of pressure drop in the brake system.

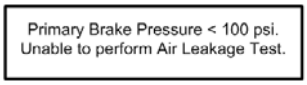
Before starting the test through the DID, complete the following:

a. Chock the wheels to prevent the vehicle from rolling.

b. Start the engine and check that the brake systems air pressure is greater than 100 psi.

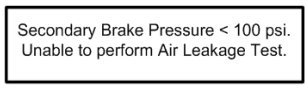
c. Turn engine off.

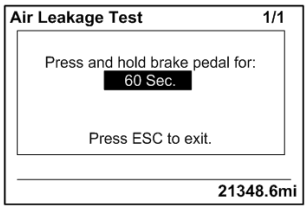
d. Release the parking and service brakes and allow the system to settle (air gage needle stops moving).



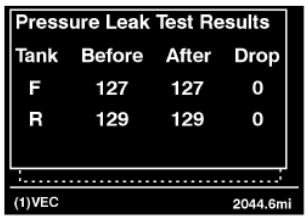
e. Press the ENTER button to start the test.

f. If the air tanks pressure is too low to perform the test (pressure must be greater than 100 psi), the following messages will appear.



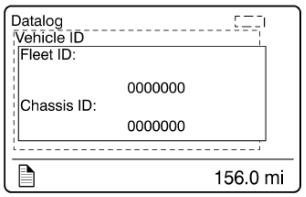


g. You must press and hold brake pedal for 60 seconds, as instructed.

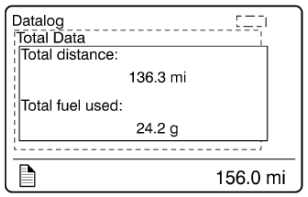


h. Once the brake pressure test is completed the pressure leak test results are displayed.

DATA LOG



1. Vehicle ID

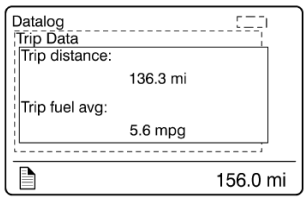


2. Total Data

Total Data menu indicates the accumulated engine values that have been logged during the lifetime of the engine ECU.

Available information:

- Total distance traveled
- Total fuel used
- Total engine hours
- Total idle time
- Total PTO hours
- Total engine revolutions



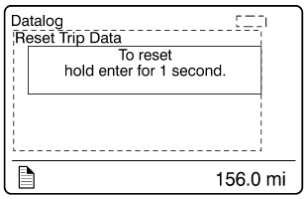
3. Trip Data

This menu displays the trip information listed below. This function must be reset before each measurement (before each new trip or leg) using the Reset Trip Data menu.

Available information for the trip or leg is:

- Trip distance (miles or km)
- Trip fuel average (mpg, liter/100 km; km/liter)
- Trip fuel used (gallons or liters)
- Trip duration on cruise control (hours)
- Trip duration with engine rpm greater than economy rpm (hours)

- Trip duration while engine rpm is greater than the desire maximum rpm RPM Limit set in Fleet Limits submenu (hours)
- Trip fuel used with engine rpm greater than the economy rpm (gallons/liters)
- Trip average speed (mph, km/h)
- Trip duration with speed greater than the maximum desired speed as set in Fleet Limits submenu (hours)
- Trip engine hours
- Trip duration on engine idle (hours)
- Trip fuel used while in engine idle (gallons, liters)



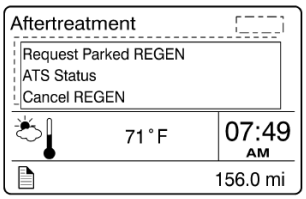
4. Reset Trip Data

This menu can only be accessed if the correct password has been entered.

Use this function to reset measurements of the Trip Data menu before each new trip or leg.

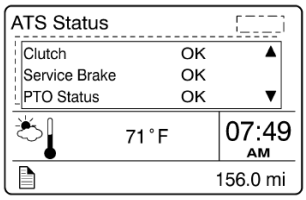
AFTERTREATMENT

This menu permits to the driver to initiate a stationary regeneration, to check the status of the aftertreatment system and to interrupt regeneration.



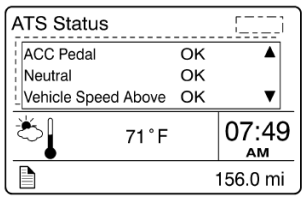
1. Request Parked REGEN

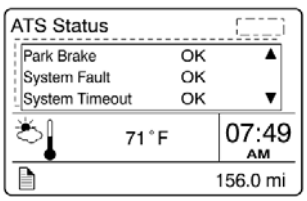
Use this function to initiate a stationary (parked) regeneration.

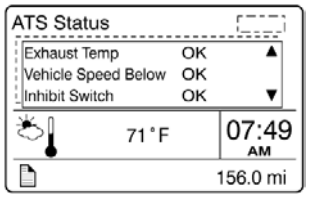


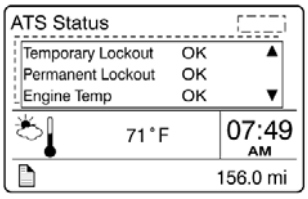
2. ATS Status

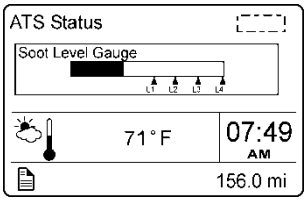
The Aftertreatment status submenus provide information about the conditions required for performing regeneration. The status can be OK (regeneration allowed), CHECK (regeneration not allowed) or N/A (not applicable). When ATS Status is selected, the following sub-menus are available.











Soot Level Gage

From the ATS Status submenu, you can view the soot level for the Aftertreatment system. When the soot level is high, regeneration is necessary. L1, L2, L3 and L4 under the scale correspond to Level 1 up to Level 4 (see Diesel particulate filter clogging sequence – Engine indicator lamp).

3. Cancel REGEN

From the Aftertreatment main menu, you can cancel a REGEN cycle.

PASSWORD

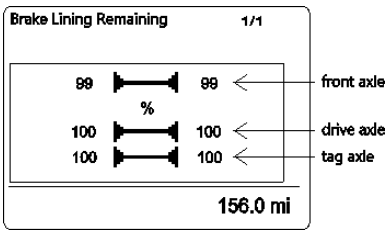
Certain functions are password-protected. These passwords give the user access to all password-protected functions. The default password is 0000.

1/1 Password

The following menus are password-protected and marked with a key symbol in the menus:

- Change Password
- Fleet ID
- Reset Trip Data
- Fault Diagnostics
- Inactive Faults

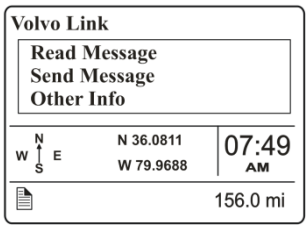
BRAKE LINING REMAINING



The numerical values indicate the brake lining remaining in 1/32 inch, mm or in term of percentage (%), depending on the unit selected in Display Settings menu (new brake pads are displayed as 100% if the unit selected is %).

PREVOST LIAISON (OPTION)

The Prevost Liaison system provides cellular communication between the driver and the fleet operator. The driver can send and receive short text messages, which are visible through the Driver Information Display.



The following menus are available:

1. Read Message

- Quick Response (only available if there is a message available)

2. Send Message

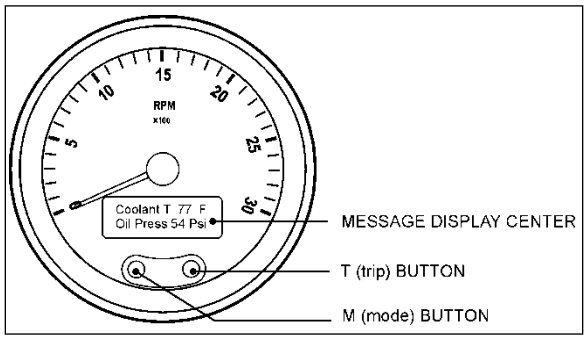
- Driver & Equipment
- Dispatch Messages
- Free Text

3. Other Info

- Comm Liaison Info
- Mailbox Info
- GPS Info
- INI Info
- Configuration Info

REAR GAGE - ENGINE COMPARTMENT

The vehicle rear control panel is equipped with a combination tachometer / message display center intended to help the technician with the control and verification of the engine, transmission, UDS system (ACM) parameters among others.



ENGINE COMPARTMENT REAR GAGE ON REAR START CONTROL PANEL

START-UP MODE

Gage pointer will drive to zero position. The pointers will then drive up scale, pausing at half scale, before completing the sweep to full scale. The pointers will then return to zero position before moving to the commanded position.

During the upscale sweep of the pointer, the LCD will turn all its segments off for one second and then display the opening message. The opening message is the Prevost logo.

IGNITION MODE

The ignition mode is active as long as the ignition switch is set to the ON position. The ignition is the normal operational mode of the system.

SELF-DIAGNOSTIC MODE

The self-diagnostic mode is entered through a menu selection using the LCD.

The self-diagnostic includes the following tests:
- Gages
- LCD
- Binary Inputs
- Analog Inputs
- Communications
- Error codes on Engine, Transmission or UDS

MESSAGE CENTER DISPLAY

The message display is a graphical, backlit, LCD that displays information to the technician. In addition to basic odometer functions, a variety of customer-defined options will be displayed. Fault codes will also be displayed as they are received. Instrumentation diagnostics can be viewed on the LCD as well.

Drive Mode Screen

At startup the default drive mode screen is coolant temperature and oil pressure. When the display of engine hours is enabled, then engine hours and oil pressure is displayed on startup.

Coolant 200 F Oil Press 54 Psi	or	Eng Hrs 654.3 Oil Press 54 Psi

LCD Display Selection

Pressing **M** and **T** together toggles units between English and Metric. Pressing the **T** button changes the LCD display parameters.

Coolant 200 F Oil Press 54 Psi	Press **T** ⇨	1234.5 mi Oil Press 54 Psi	Press **T** ⇨	1234.5 mi T Oil Press 54 Psi	Press **T** ⇨	Eng Hrs 654.3 Oil Press 54 Psi
coolant temperature and oil pressure		odometer		trip odometer (press and hold **T** to reset trip odometer)		hours

Priority Messages

No Priority Message will be displayed during the first 10 seconds after ignition ON.

Priority messages can be generated by the engine, transmission or UDS controllers (ACM) or binary inputs.

Priority messages will interrupt the bottom line of the LCD in order to provide the technician with priority information.

A priority message is removed from the display only if its source expires or if the trip button acknowledges it. Some messages can be acknowledged. If acknowledged, it remains removed from the display and will only reappear if the source expires and reoccurs. If the ignition is turned off and then back on and a priority message is still active, it will display again.

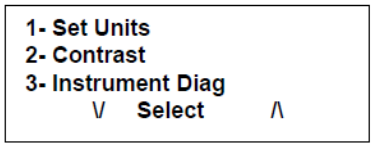
If more than one priority message is active, each message will be displayed one after the other for three seconds each.

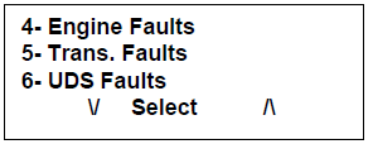
Assignment	Exact Text	Acknowledge	Recur?	Turns off if
Engine Comm. Failure	ENG. COMM. ERROR	Yes	No	Communication is re-established
Trans Comm. Failure	TRANS. COM. ERROR	Yes	No	Communication is re-established
ABS Comm. Failure	ABS. COMM. ERROR	Yes	No	Communication is re-established
Inst Panel Comm Failure	IPANEL.COMM.ERROR	Yes	No	Communication is re-established
High Coolant Temp Alert	CHECK COOL TEMP	Yes	No	DM1 Clears
Low Coolant Level	LOW COOLANT LEVEL	Yes	No	message clears after 30 sec
	LOW COOLANT LEVEL	Yes	No	Flag Clears
Check Coolant SNS	CHECK COOLANT SNS	Yes	No	Flag Clears
Low Oil Pressure Alert	LOW OIL PRESSURE	Yes	No	DM1 clears
High Trans Temp Alert	CHECK TRANS TEMP	Yes	No	DM1 clears
Wait to Start	WAIT TO START	Yes	No	Msg clears
Water in Fuel	WATER IN FUEL	Yes	No	Msg clears
Engine Maintenance	ENG. MAINTENANCE	Yes	No	DM1 clears
+ Stop Engine	STOP ENGINE !!	No	No	Msg clears
Check Engine	CHECK ENGINE !	Yes	No	Msg clears
Transmission Maintenance	TRANsMAINTENANCE	Yes	No	DM1 clears
Network Fail	NETWORK FAILURE	Yes	No	Input clears
Check Transmission	CHECK TRANSMIS.	Yes	No	Msg clears
Stop Transmission	STOP TRANSMIS.!!	No	No	DM1 clears
Fire Alarm Detect	FIRE ALARM	No	No	Input Clears
ABS Maintenance	ABS.MAINTENANCE	Yes	No	DM1 clears
Check ABS	CHECK ABS!	Yes	No	Msg clears
Alternator charging failure	CHARGING FAILURE	Yes	No	Binary input or flag turn off
Low Battery	LOW BATTERY VOLT.	Yes	No	12V voltage > 12V for 30sec or 24V voltage > 24V for 30sec
High Battery	HIGH BATTERY VOLT	Yes	No	12V voltage < 17V for 30sec or 24V voltage < 30V for 30sec
Check Diesel Particle Filter	DIESEL.PART.FILT..	Yes	No	Message clears
Change Diesel Particle Filter	DIESEL.PART.FILT.	Yes	No	Message clears
Low Primary Air Pressure	LOW.PRIMARY AIR	No	No	Air pressure ≥ 75 psi
Low Secondary Air Pressure	LOW.SECONDARY.AIR	No	No	Air pressure ≥ 75 psi

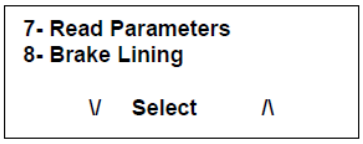
Settings and Diagnostic Screens

The Settings and Diagnostic screens can be accessed when the drive mode screen is displayed and the **M** button is pressed for longer than 5 seconds or if no CAN messages are seen then holding the **M** button will enter the menu.

Once in the Settings and Diagnostics menu, pressing the **M** or **T** buttons separately moves the reverse video highlight up or down through the list, as indicated by the arrows. The highlighted item is selected when both **M** and **T** buttons are pressed at the same time. If no button is pressed for 5 seconds, the LCD will go back to the standard Drive Screen. The items available in the menu are:



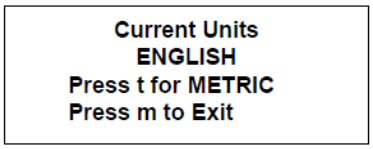




This menu exits to the drive mode screen when there has been inactivity for 5 seconds.

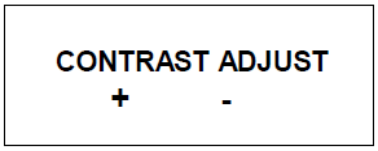
1 - Set Units

Selecting menu item 1 brings up the following screen that is used to select if values are to be displayed in metric units or English units. Pressing **M** or waiting 5 seconds exits to Settings and Diagnostics menu.



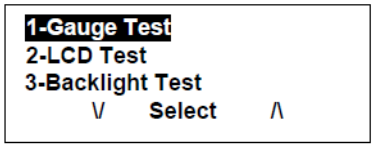
2 – Contrast

Selecting menu item 2 displays a screen to allow setting the LCD contrast. Pressing the **M** (+) button will increase contrast while pressing the **T** (-) button will decrease contrast. After inactivity for 5 seconds this menu exits to the Settings and Diagnostics menu.



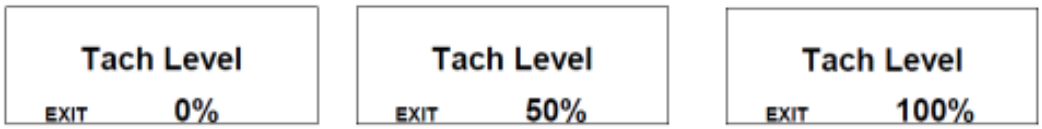
3 – Instrument Diag

Selecting menu item 3 in the Settings and Diagnostic menu will display the instrument diagnostic menu. There are 3 items in this menu and are navigated the same as the previous menu. This menu exits to the Settings and Diagnostics screen when there has been inactivity for 5 seconds.



Gage Test

Item 1 – The gage pointer will be driven through three positions pausing at each position as shown in the LCD as a percentage of scale. This test will proceed and return to the Instrument Diagnostic menu. Pressing the **M** button will end the test and return to the Instrument Diagnostic menu.



LCD Test

Item 2 –Displays the Prevost in normal then reverse video three times and then returns to the

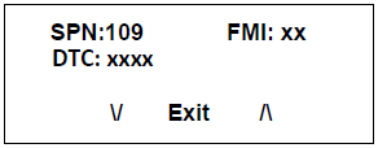
Backlighting Test

Item 3 – Cycles the gage and LCD backlight through 3 brightness levels twice displaying the corresponding intensity on the LCD. Pressing M during the test or allowing the test to complete returns the gage to the Instrument Diagnostics menu.

4 – Engine Faults

For all ECU, an array is defined containing DTC, SPN & Specific FMI. If the SPN is not known, the value is displayed in decimal. For active faults, the array is filled with information obtained from DM1.

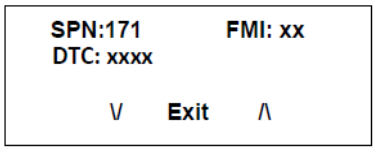
This screen displays DTC, SPN & associated FMI, otherwise, the Suspect Parameter Number (SPN) and Failure mode Identifier (FMI) as received from the engine for active faults via J1939.



5 – Trans. Faults

For all ECU, an array is defined containing DTC, SPN & Specific FMI. If the SPN is not known, the value is displayed in decimal. For active faults, the array is filled with information obtained from DM1.

This screen displays DTC, SPN & associated FMI, otherwise, the Suspect Parameter Number (SPN) and Failure mode Identifier (FMI) as received from the transmission for active faults via J1939.



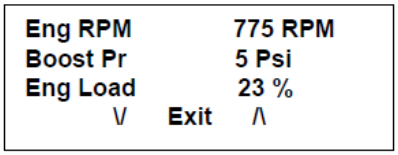
6 - UDS Faults (ACM, Aftertreatment System ECU)

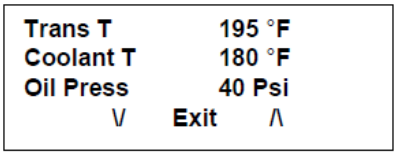
For all ECU, an array is defined containing DTC, SPN & Specific FMI. If the SPN is not known, the value is displayed in decimal. For active faults, the array is filled with information obtained from DM1.

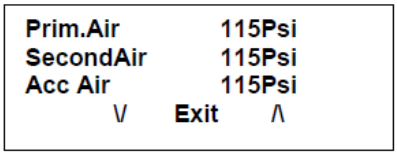
This screen displays DTC, SPN & associated FMI, otherwise the Suspect Parameter Number (SPN) and Failure mode Identifier (FMI) as received from the UDS (ACM) for active faults via J1939.

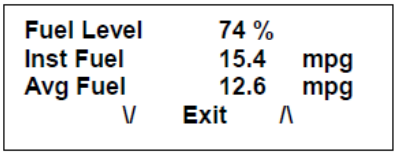
7 – Read Parameters

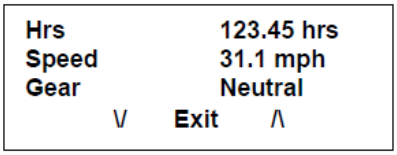
Selecting menu item 7 displays various parameters received by the rear gage (engine RPM, boost pressure, engine load, transmission oil temp, engine coolant temp, engine oil pressure, primary air system pressure, secondary air system pressure, accessory air system pressure, fuel level, instantaneous fuel economy, average fuel economy, total engine hours, wheel-based vehicle speed, gear engaged, 24V system voltage, 12V system voltage). The main use for these screens is in troubleshooting the system.

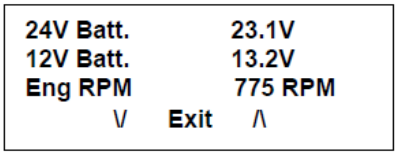








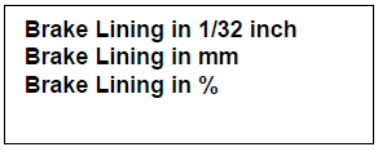




8 – Brake Lining (state)

Item 15 - A submenu is displayed to choose between 3 types of displaying:

- In 1/32 of inches
- In millimeters
- In %



The displaying in 1/32 of inches and millimeters requires two parameters:

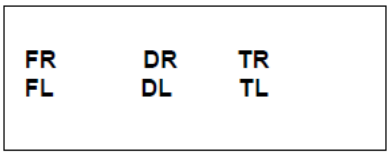
- Corresponding value in 1/10 of millimeters for 100%
- Offset value in 1/10 of millimeters for 0%

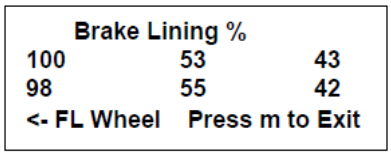
The hardcoded value for these two parameters are:

Parameters	Default value (1/10 mm)
100% value	150
0% value	50

The following message is displayed on the screen for showing the Brake Lining State, for a % displaying:

The front wheels are displayed on the left side of the screen, right side on the top. The value is expressed in % for each brake lining.





INTELLIGENT SLEEP MODE (ISM)

The ISM is a battery-saving feature designed to monitor the battery State Of Charge (SOC). The ISM will automatically change the vehicle electrical system from normal functional state to sleep mode if the battery SOC falls below 65%.

Once the vehicle has entered into sleep mode, the only actions needed to put the vehicle back into its normal functional state are:

- To cycle the ignition lever from OFF to ON;

  or
- To open the entrance door;

  or
- To turn on the hazard lights.

The ISM forces the vehicle to go into sleep mode if all the following conditions are met:

1. The engine is not running;
2. The parking brake is applied
3. The ignition switch is at the ON, ACC positions or at the OFF position but the 15 minutes “wake up” period after engine shutdown is not expired.
4. The battery state of charge of 12V or 24V system falls below 65%.

The red ALTERNATOR telltale will illuminate 30 seconds before activation of the sleep mode.

TRANSMISSION OUTPUT RETARDER

The transmission output retarder is a 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 output retarder is a vehicle-slowing 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.

NOTE
Extended use of transmission output retarder will raise the temperature of the transmission fluid.

A disable switch is located in the RJB close to the master brake interlock.

NOTE
Deactivating the transmission retarder will turn the indicator light located at the front of the coach ON.

Three levels of retarding power are available with the output retarder enabled: 1/3 of total retarding power is applied as soon as the brake pedal is pressed. If more force is applied to the brake pedal, 1/3 of retarding power is added. Finally, with full force applied to the brake pedal, an additional 1/3 of retarding power is added for a total of 100% of the available output retarding power.

Action	Retarding Power
Initial pressure on the brake pedal	33% of total retarding power
Additional pressure on service brake pedal	66% of total retarding power
Full force on the brake pedal	100% of total retarding power

NOTE

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

NOTE

As the wheels start to lock up on slippery roads, the output retarder automatically deactivates until the wheels roll freely.

ANTILOCK BRAKING SYSTEM (ABS)

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 breaking 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.

KNEELING SYSTEM

This system lowers the front end, enabling passengers to get on and off the coach without any difficulty.

NOTE

This coach is equipped with an interlock system which automatically applies the parking brake when the kneeling system is activated.

To operate, stop the coach, set the transmission to neutral (N), then push down the rocker switch located on the dashboard. (Refer to "Controls & Instruments" section). The parking brake will be applied

automatically and a status line pictogram will appear on the DID to indicate that the front of the coach is being lowered.

To raise the front of the coach to its normal height, push up the rocker switch. The front end will rapidly rise up. The system will release the parking brake and shift the transmission to the previously selected range.

CAUTION

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

NOTE

Kneeling is disabled when the entrance door is open.

NOTE

The kneeling system does not operate when the coach is traveling over 5 mph (8 km/h). Consequently, the driver cannot inadvertently operate the kneeling system at higher speeds.

UNLOADING TAG AXLE (OPTIONAL)

To reduce the turning radius, the air springs pressure will be automatically reduced by 75% when the coach is moving at speed lower than 5 mph (8 km/h) and with more than 1½ turn from the steering.

RETRACTABLE TAG AXLE

The standard tag axle retraction system is controlled by a valve located in the front service compartment. The valve can be switched to either the WHEELS UP or WHEELS DOWN position. The axle will be raised or lowered by air pressure according to the valve position.

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 status line pictogram will appear in the DID. An audible alarm will sound to warn the driver if the vehicle speed exceeds 12 mph (20 km/h) with tag axle raised. The tag axle can be raised in tight maneuvering areas like in a parking lot or to make it easier to turn a short corner. The tag axle shortens the wheelbase and allows tighter turning. Raising the tag axle transfers extra weight and additional traction to the drive wheels providing improved control on slippery roads.

CAUTION

Do not use tag axle in raised position for an extended period. Raising tag axle increases load on the drive axle, suspension and tires.

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

In order to prevent damage to the suspension, always raise the tag axle before lifting the coach.

WHEELCHAIR LIFT SYSTEM

It is important to passenger safety that the lift operator be familiar with the operating instructions. Read and understand the RICON Mirage F9TF F9TH Wheelchair lift Operator Manual before attempting to use the wheelchair lift. The instructions below are a quick reference only and not a replacement to the information provided by RICON.

*Watch the **Prevost Wheelchair Lift Instruction video** on Prevost's YouTube channel. To do so, type "Prevost Coach – YouTube" on your web browser and then select the proper link. Once on Prevost channel, select "Video" tab and then look for the video entitled "Prevost Wheelchair Instruction".*

INTRODUCTION

Safe and easy access to the coach is provided by the Ricon Mirage F9TF and F9TH Public Use wheelchair lifts. The Mirage F9TF or F9TH is a dedicated entry model, which is intended for installation in a vehicle baggage compartment.

An electric-motor driven hydraulic pump provides a maximum platform lifting capacity of 660 pounds (300 kilograms) for Mirage Model F9TF and 800 pounds (363 kilograms) for Mirage Model F9TH.

A trained attendant or the vehicle operator operates the lift. For a boarding passenger, the operator uses control switches to withdraw the platform from the vehicle (deploy) and lower it to ground level. The passenger is placed on the platform and then lifted to floor height. After the passenger enters the vehicle, the operator lowers the platform and retracts it back into the vehicle (stow). For an exiting passenger, the operator withdraws the platform from the vehicle (deploy) and raises it to floor height. The passenger is placed on the platform and then lowered to the ground. The passenger departs, and the operator returns the platform to the stowed position in the vehicle.

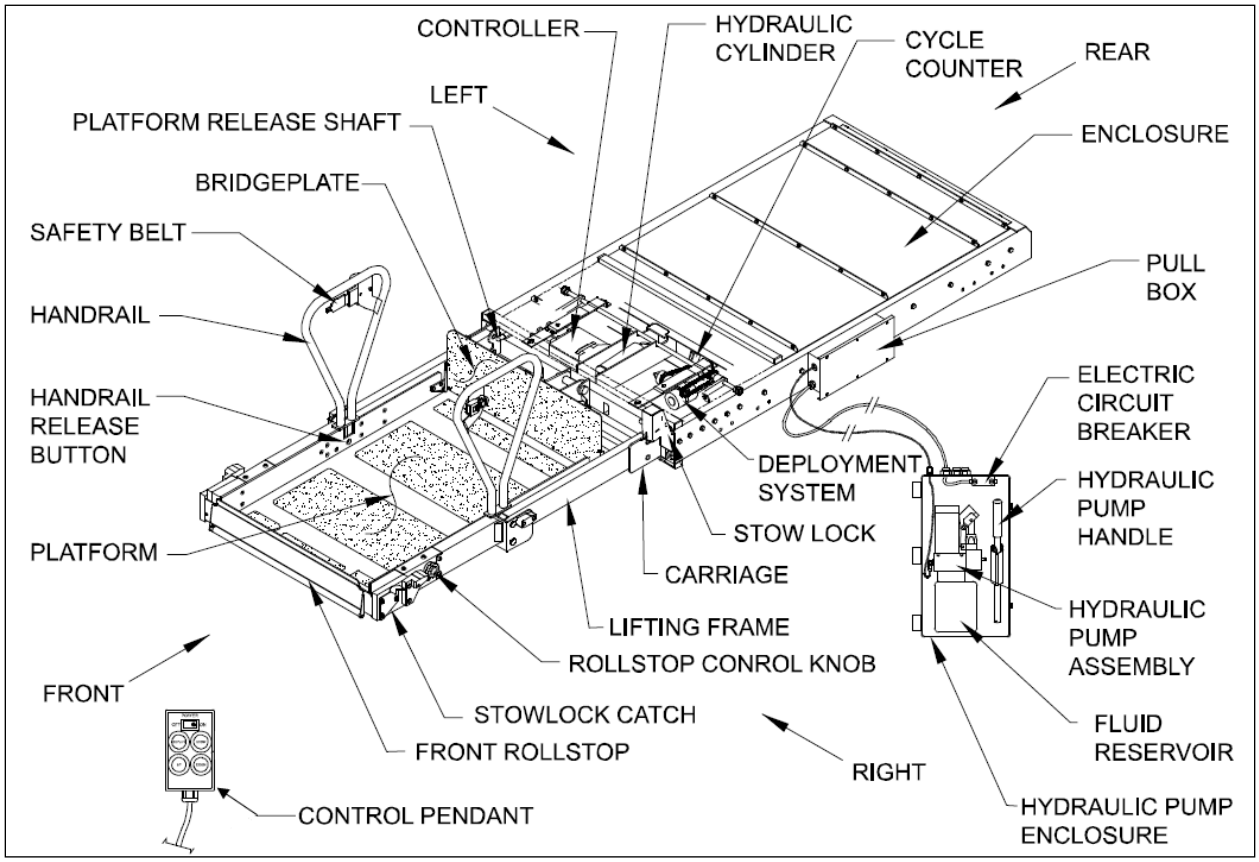
One individual can manually operate the lift when normal power is not present. A manual release mechanism is provided to ease the task of pulling the platform out of its enclosure. The hydraulic pump assembly includes a manually operated back-up pump to raise the platform, and a pressure release valve to lower it. The front platform roll stop, normally power operated, has a manual override knob for back-up use.

OVERVIEW

Major lift components

Left, Right, Front, Rear	Reference points from outside vehicle looking inward at lift.
Bridgeplate	Plate bridges gap between platform and vehicle floor when platform is at floor level. Acts as a barrier during up and down platform motions to prevent wheelchair from rolling off rear of platform.
Carriage	Part of traveling frame that is mounted on rollers; moves on rails located inside the enclosure. Supports lifting frame and platform.
Controller	Receives electrical input signals from pendant and lift sensors and sends control signals to lift electrical and hydraulic components.
Control pendant	Hand-held device used to control platform motions.
Cycle counter	Located on the rear frame of the carriage. Visible when platform is fully deployed. It records number of times platform has moved from the floor to ground and back to floor.
Deployment system	Located within the carriage. Employs an electric gear motor to propel platform out of the enclosure, or pull it back into the enclosure.
Enclosure	Traveling frame housing that is rigidly attached to vehicle chassis.
Fluid reservoir	Container holds hydraulic fluid that is used by the hydraulic system.
Folding handrail	(left and right) Provides a handhold for standing passenger (standee).
Front roll stop	Front barrier prevents wheelchair from inadvertently rolling off platform during platform movement.
The handrail release	(left and right) Locks handrail in vertical position. Must be pushed inward to release the

button	handrail.
Hydraulic cylinder	Located within carriage and connected to lifting frame. Receives pressurized fluid from hydraulic pump to lift the platform.
Hydraulic pump assembly	Electro-hydraulic unit provides hydraulic pressure used to raise the platform. Also mounts components for manual operation.
Lifting frame	Assembly is hinged to front of the carriage and to center of the platform; raised by single hydraulic cylinder attached to the carriage.
Manual pump handle	Used to manually operate hydraulic backup pump and pressure release valve when electrical power is not available. Also used to rotate platform release shafts.
Platform	Curbed area where passenger resides while being raised to the vehicle or lowered to ground.
Platform release shaft	(left and right) Used during manual operation of lift. Disengages platform from enclosure to facilitate manual deployment. Engage and rotate either shaft with manual pump handle.
Pull box	Houses electrical termination points to lift, and a hydraulic line disconnect point. Also accepts input harness from the control pendant.
Rollstop control knob	Provides manual control of the roll stop if electrical power is not available.
Safety belt	Safety restraint belt that spans between handrails to help confine passenger to the platform area.
Stow Lock	Safety lock retains platform when in stowed position (retracted); releases when stow lock lever is raised.
Traveling frame	(not shown as a unit) Assembly comprised of carriage, lifting frame, and platform.



GENERAL SAFETY PRECAUTIONS

- To avoid injury, always exercise caution when operating and be certain that hands, feet, legs, and clothing are not in the path of product movement.

- Read and thoroughly understand the operating instructions before attempting to operate the wheelchair ramp.
- Inspect product before each use. If unsafe conditions, unusual noises or movements, do not operate lift until the problem is corrected.
- Stand clear of doors and platform and keep others clear during the operation.

OPERATING INSTRUCTIONS

Safety Precaution

- To operate the wheelchair lift, the coach must be parked on a flat and level surface, with the parking brake applied.
- Inspect the lift before each use as described in the RICON Operator Manual **32DF9T15** under paragraph “Pre-Operation Lift Inspection”. If any unsafe condition exists, or if unusual noises or movements are noticed, DO NOT use and contact an authorized RICON dealer for repair.
- Read and comply with all warning labels and symbols affixed to the wheelchair lift.
- Wheelchair occupant should face outward when entering or exiting the vehicle.
- Do not back onto the platform when exiting the vehicle. FACE OUTWARD, and verify that platform is at the same height as floor. Check that front rolls top is up and locked.
- The front rolls top is intended to prevent slow, unintentional, rolling off of the platform.
- The front rolls top is not intended to stop a quick moving wheelchair. A quick moving wheelchair could tip if the small front wheels collide with the roll stop. Also, the large rear wheels of a quick-moving wheelchair could roll over the roll stop. Possible injury to the occupant might occur in either case.
- Verify that wheelchair fits safely on the platform; it must not extend beyond edges or interfere with the operation of the roll stop.
- Do not operate with a load in excess of 660 lbs (300 kg) for Mirage Model F9TF and 800 pounds (363 kilograms) for Mirage Model F9TH.
- Keep arms, legs, and clothing away from moving lift parts.
- The lift is intended for one wheelchair and its occupant, or one standee. Do not overload lift.
- Keep other clear while operating lift.
- Do not allow an untrained person to operate lift.
- Do not allow anyone to stand on the bridge plate. A bent bridge plate can interfere with the platform as it raises and lowers.
- Lock wheelchair brakes before raising or lowering the platform (power chair users should turn off power and set brake).
- Use great care in wet conditions; the wheelchair brakes are less effective if its tires or the platform are wet.
- Do not leave deployed platform unattended. Return to stowed position after use.

Hand-Held Control Pendant and Motion

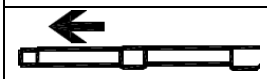
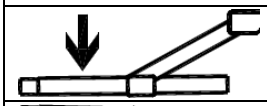
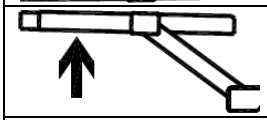
The lift is operated with a hand-held, hard-wired remote-control pendant. Turn on the POWER ENABLE switch and then control each lift motion by pressing an appropriate button.

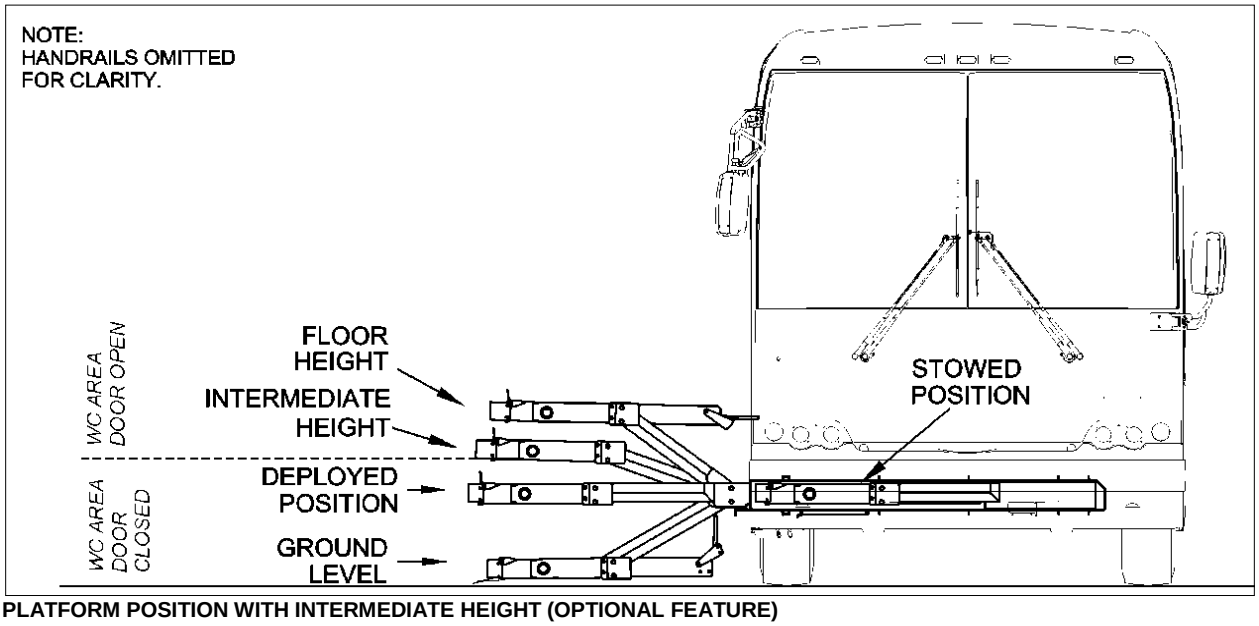
The POWER ENABLE switch provides power to the pendant and thereby enables the lift. When turned on, the power switch and each button illuminate.

Pressing the DEPLOY/OUT button extends the platform from the lift storage compartment, and pressing the STOW button retracts the platform back into the storage compartment. Pressing the DOWN button lowers the platform towards the ground, and pressing the UP button raises the platform towards the vehicle floor.

A button must be held depressed until the motion is completed. Movement of the platform can be halted at any time by releasing the button.

HAND-HELD CONTROL PENDANT

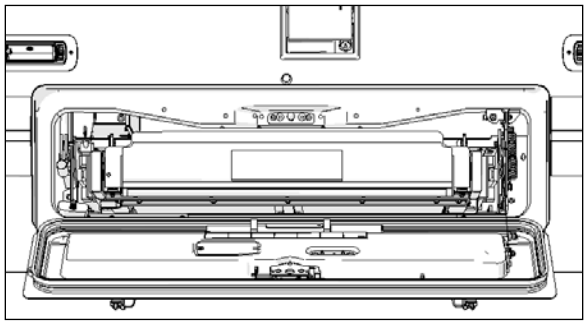
MOTION		DESCRIPTION
	**DEPLOY / OUT**	Platform extends out of the vehicle, or deploys.
	**DOWN**	Platform lowers from present height towards ground; front rolls top lowers when platform contacts ground.
	**UP**	Platform rises from the present height towards the vehicle floor; rolls top rises before platform leaves ground.
	**STOW / IN**	Platform retracts into the vehicle, or stows.



PLATFORM POSITION WITH INTERMEDIATE HEIGHT (OPTIONAL FEATURE)

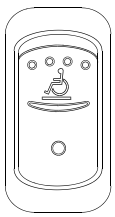
Normal Lift Operation – To Enter Vehicle

- Before operating lift, be certain vehicle is safely parked on a level area away from traffic. Provide at least 10 feet (3 meters) space for lift operation and passenger boarding.
- The lift operator must take special care to ensure that area is clear before deploying platform. Be certain there are no obstacles beneath the platform.
- Open lift compartment door completely.



X3 SERIES SHOWN

- Open sliding door directly above lift compartment. This does not apply to models that stop upward platform movement prior to reaching floor level. The sliding door on these models is open after the platform reaches **intermediate height** (refer to Figure 3).
- The vehicle and lift are equipped with a safety interlock system (i.e. transmission into neutral, parking brake applied). Be certain that it is in the proper mode before attempting to operate lift. The lift will not operate until this feature has been properly engaged.
- Supply power to the wheelchair lift system first by depressing the wheelchair lift activation switch located on the dashboard.



WHEELCHAIR LIFT ACTIVATION SWITCH

NOTE

Whenever the wheelchair lift activation switch is in the ON position, an interlock system prevents releasing of the parking brake and a transmission inhibit feature prevents gear selection when either the lift compartment door or the sliding door is open.

- Enable lift control pendant by turning on POWER switch located on the pendant.
- A person that uses the wheelchair lift while standing (does not require mobility aid equipment) is referred to in this manual as a Standee.

1. ACTIVATE INTERLOCK: Make sure parking brake is set and transmission is in neutral.
2. DEPLOY PLATFORM: Press and hold DEPLOY/OUT button until platform is fully deployed. NOTE: Platform cannot be moved up or down unless platform is fully extended.
3. RAISE HANDRAILS: Lift right handrail to the vertical and push firmly down into its socket. Repeat for left handrail. Verify that both handrails are latched in place by attempting to pull upward on them.
4. BUCKLE SAFETY BELT (to enable lift controller): Insert belt tongue into buckle and listen for audible “click” then tug belt to confirm belt is securely fastened.

NOTE

The safety belt acts as a safety device and it prevents raising or lowering the lift when not buckled.

5. LOWER PLATFORM: Press and hold DOWN button until platform stops at ground level and roll stop opens completely.
6. BUCKLE SAFETY BELT.
7. BOARD PLATFORM: Position wheelchair in the center of the platform, facing outward and advise occupant to lock wheelchair brakes. Power must be turned off on electric-powered wheelchairs.

   NOTE: *Standee must stand near the center of the platform, facing in the direction of travel (into vehicle), and firmly grasp handrails. Do not stand on the bridge plate.*

8. BUCKLE SAFETY BELT (to enable lift controller): Insert belt tongue into buckle and

listen for audible “click” then tug belt to confirm belt is securely fastened.

NOTE: *The next two steps apply only to F9TF/F9TH models that stop upward platform movement at an intermediate level. Other models continue at step 11.*

9. PARTIALLY RAISE PLATFORM: Press and hold UP button until platform stops at intermediate height.
10. OPEN SLIDING DOOR: Fully open vehicle sliding door located above lift. The lift operator, or attendant should do this.
11. RAISE PLATFORM: Press and hold UP button until platform stops at floor height and bridge plate lowers onto the vehicle floor.

WARNING

Verify that rear edge of the bridge plate lies flat on the floor along its entire edge and does not create a tripping hazard.

12. EXIT PLATFORM: Advise passenger to carefully enter the vehicle.
13. BUCKLE SAFETY BELT.
14. LOWER HANDRAILS: Press release button at the base of the handrail and lift the left handrail upward out of its socket. Lower handrail to the platform. Repeat for the right handrail.
15. STOW PLATFORM: Press and hold STOW/IN button. Close sliding door at the intermediate height. Press and hold STOW/IN button until platform reaches STOW height and then fully retracts into the vehicle.

    NOTE: *Do not use DOWN button to lower platform partway prior to stowing, and then complete the stowing process by using IN button. This method may not properly stow platform.*

16. CLOSE DOOR. Close the lift compartment door.

Normal Lift Operation – To Exit Vehicle

1. ACTIVATE INTERLOCK: Make sure parking brake is set and transmission is in neutral.
2. DEPLOY PLATFORM: Press and hold DEPLOY/OUT button until platform is fully deployed.
3. RAISE HANDRAILS: Lift right handrail to the vertical and push firmly down into its socket. Repeat for left handrail. Verify that both handrails are latched in place by attempting to pull upward on them.
4. BUCKLE SAFETY BELT (to enable lift controller): Insert belt tongue into buckle and listen for audible “click” then tug belt to confirm belt is securely fastened.

   NOTE: *The next two steps apply only to F9TF/F9TH models that stop upward platform movement at an intermediate level. Other models continue at step 7.*

5. PARTIALLY RAISE PLATFORM: Press and hold UP button until platform stops at intermediate height.
6. OPEN SLIDING DOOR: Fully open vehicle sliding door located above lift. The lift operator, or attendant should do this.
7. RAISE PLATFORM: Press and hold UP button until platform stops at floor height and bridge plate lowers onto the vehicle floor.

WARNING

Verify that rear edge of the bridge plate lies flat on the floor along its entire edge and does not create a tripping hazard.

8. BOARD PLATFORM: Position wheelchair in the center of the platform, facing outward and advise occupant to lock wheelchair brakes. Power must be turned off on electric-powered wheelchairs.

   NOTE: *Standee must stand near the center of the platform, facing in the direction of travel (into vehicle), and firmly grasp handrails. Do not stand on the bridge plate.*

9. LOWER PLATFORM: Press and hold DOWN button until platform stops at ground level and roll stop opens completely.
10. UNBUCKLE SAFETY BELT.
11. EXIT PLATFORM: Carefully assist passenger off of the platform.
12. LOWER HANDRAILS: Press release button at the base of the handrail and lift the left handrail upward out of its socket. Lower handrail to the platform. Repeat for the right handrail.

13. STOW PLATFORM: Press and hold IN button until platform reaches STOW height and then fully retracts into the vehicle.

MANUAL LIFT OPERATION

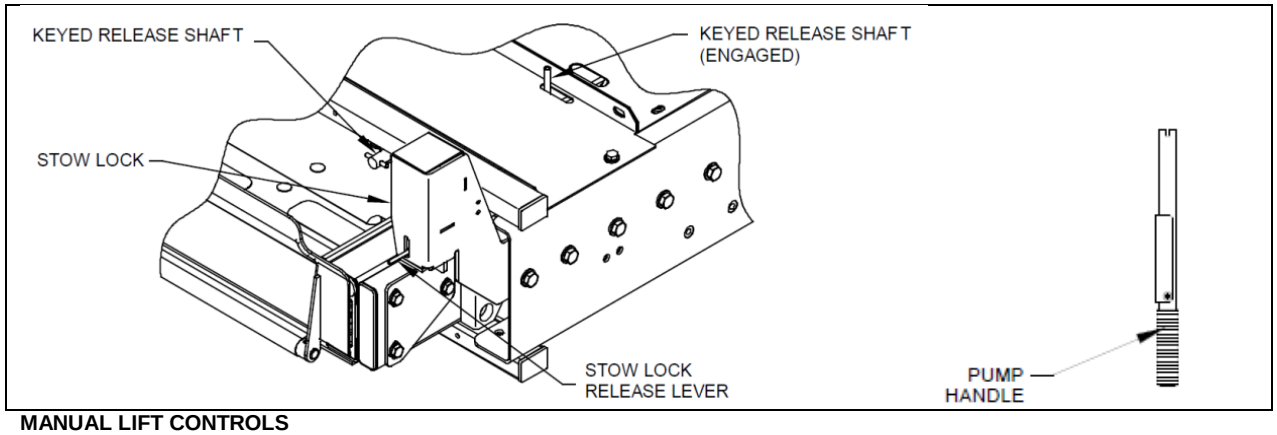
The lift can be operated manually if it loses electrical power. The following sections describe important safety preparations to be followed before using the lift, and operating procedures to deploy, raise, lower, and stow the lift. Ricon recommends that manual operation be used only to exit from the vehicle, not to enter the vehicle.

Preparation

- Park vehicle on a level surface, away from traffic. Allow sufficient space for lift operation and passenger boarding.
- The operator must summon assistance to move the vehicle to a safe operating area if a breakdown situation exists and vehicle cannot be moved under its own power.
- Check to be certain obstacles are not in the path of platform movement.
- Open vehicle doors by hand and secure.
- Caution people in vicinity that platform is about to deploy.
- Follow the "Safety Precautions ".

Manual lift controls

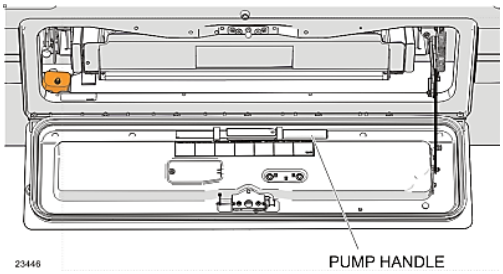
Manual operation components used are a hydraulic backup pump and pump handle, platform release mechanism, and a roll stop control knob.



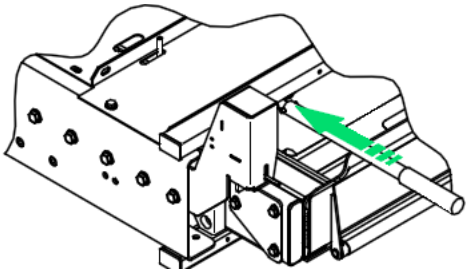
MANUAL LIFT CONTROLS

To Manually Deploy the Platform

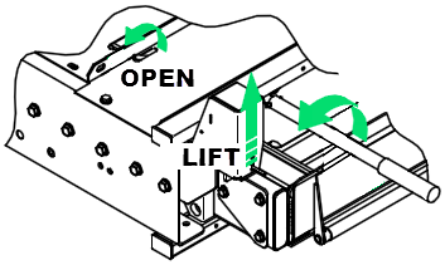
1. Fully open sliding door and lift the compartment door. Ensure that there are no obstacles in the path of the lift.
2. Take the manual backup pump handle secured inside the manual pump box (H3 Series) or attached to the inner side of the lift compartment door (X3 Series).

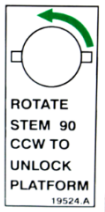


3. Engage either keyed release shaft with the pump handle.



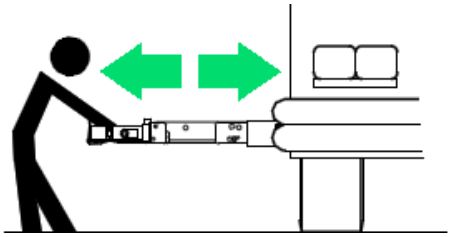
4. Rotate the keyed release shaft ¼-turn (as indicated on the adjacent decal) while lifting stow lock lever simultaneously.

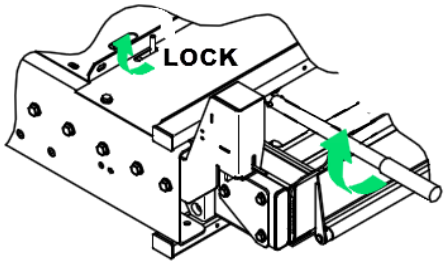




DECAL

5. Grasp the top edge of the front rolls top with two hands and pull firmly. The platform moves smoothly after an initial resistance. Pull platform straight out to the end of its travel.



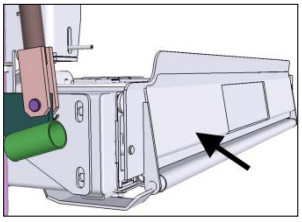


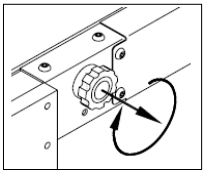
> **CAUTION**
>
> **Ensure that release shaft re-engages and locks when platform is fully extended. If release shaft does not engage, use manual pump handle and turn ¼-turn (direction opposite to orientation shown on adjacent decal) to re-engage release shaft.**

6. Lift right handrail to the vertical and push firmly down into its socket. Repeat for left handrail.

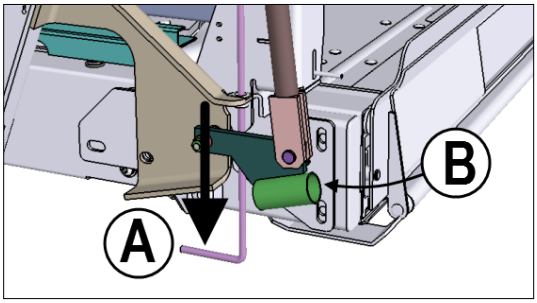
To Manually Raise the Platform

1. Verify that rolls top is up (closed). Pull roll stop control knob out and rotate fully clockwise if it isn't up.





2. Close the backup pump release valve by pushing the actuating rod (A) DOWN (release valve should already be closed).



NOTE: pumping the handle raises the platform when the release valve is closed).

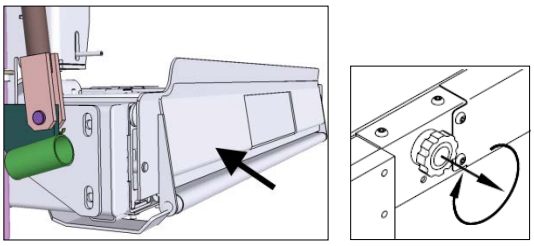
3. Insert pump handle into backup pump socket (B), then pump handle to raise the platform to the floor level.

4. Position wheelchair in the center of the platform, facing outward, and advise occupant to lock wheelchair brakes. Power must be turned off on electric-powered wheelchairs.

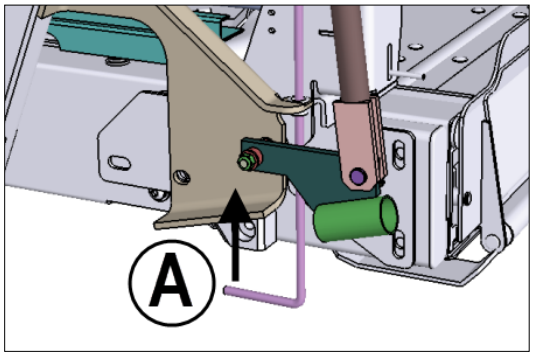
   NOTE: *Standee must stand near the center of the platform, facing in the direction of travel (into vehicle), and firmly grasp handrails. Do not stand on the bridge plate.*

To Manually Lower the Platform

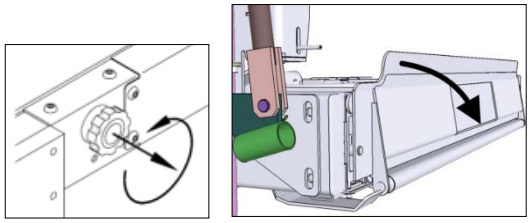
1. Verify that rolls top is up (closed). Pull roll stop control knob out and rotate fully clockwise if it isn't up.



2. Slowly pull the manual backup pump release valve actuating rod (A) UP until the platform begins to lower (opening the release valve lowers the platform).
3. Allow the platform to reach ground level.

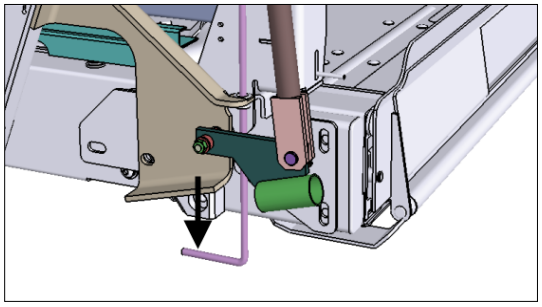


4. Pull roll stop control knob out and rotate fully counterclockwise. Rolls top must lie flat on the ground.



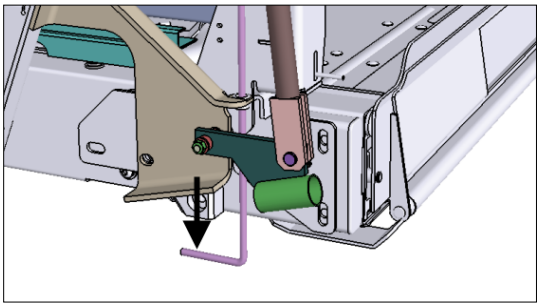
5. Carefully assist passenger off of platform.

6. Push the backup pump release valve actuating rod back DOWN until lightly snug.

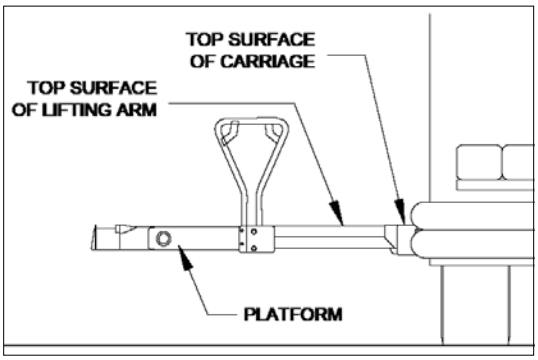


To manually stow the platform

1. Verify that the backup pump release valve is closed (actuating rod (A) pushed DOWN).

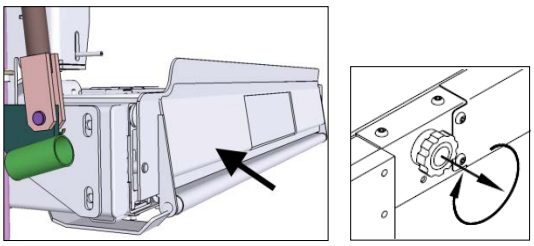


2. Raise the platform to stow height; position the top surface of the platform lifting frame arm at the same height as the top surface of the carriage. If the exact height cannot be obtained, a slightly low platform is preferred to slightly high. This alignment eliminates interference between the platform and enclosure when pushing the platform into the enclosure.



LIFTING ARM AND CARRIAGE AT SAME HEIGHT

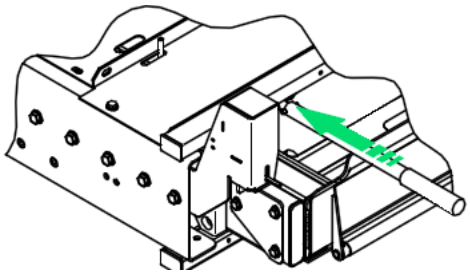
3. Verify that rolls top is up (closed). Pull roll stop control knob out and rotate fully clockwise, if it isn't up.

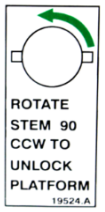


4. Lift the left handrail upward out of its socket. Lower handrail to the platform. Repeat for the right handrail.

> **CAUTION**
>
> **An able-bodied person must stow the platform. Use caution and avoid injury.**

5. Engage either keyed release shaft with the pump handle.
6. Rotate the shaft ¼-turn (as indicated on the adjacent decal).



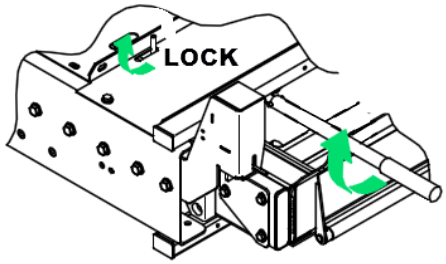


DECAL

7. Grasp the top edge of the rolls top, or the handrails, with two hands and push firmly. The platform moves smoothly after an initial resistance. Push platform in fully.

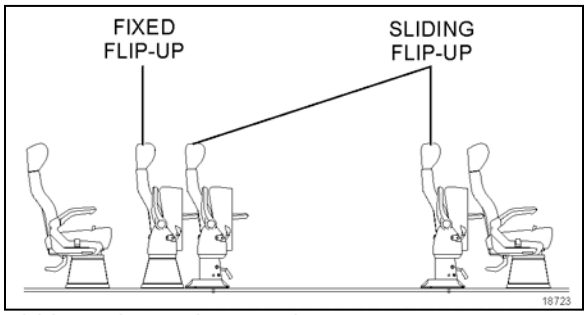
> **CAUTION**
>
> **The platform must lock in place when fully stowed. Check platform retention by attempting to pull platform outward; it must not move.**

8. If platform does not lock, rotate either platform release shaft ¼-turn (direction opposite to orientation shown on adjacent decal) to re-engage (lock) release shaft. Platform must be fully stowed before rotating shaft.
9. Verify that stow lock striker is engaged and platform is securely stowed.



SEATS RECONFIGURATION

To accommodate a wheelchair, one row of seats must be folded and two rows 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 ARRANGEMENT

Electrical wheelchair or tri-wheeler may require moving the sliding seats on both sides of the coach to allow enough turnaround space.

FOLDING THE CUSHION OF SLIDING SEATS

To fold the cushion of the seats, push the handle under the seats then lift up the cushion until it locks.

LOCKING LEVER FOR SLIDING SEATS

To slide a row of seats, pull the locking knob and pull up the locking lever. Repeat the operation for both locking levers. Once the sliding seats in place, pull down the locking levers.

WHEELCHAIR RESTRAINT SYSTEMS

Two types of wheelchair restraint systems may be found, depending on the type of seats:

1. 4-point wheelchair and occupant securement with floor anchorage.
2. 4-point wheelchair and occupant securement with anchorage to passengers seat pedestals.

Refer to Q'Straint publications included in the wheelchair restraint plastic pouches for further details.

4-POINT SECUREMENT WITH FLOOR ANCHORAGE

This securement system includes:

- 4 wheelchair tiedown retractors to secure a wheelchair to a vehicle floor.
- Occupant securement: lap and shoulder belts that integrate to the rear wheelchair restraints.
- Floor anchorages; installed on the vehicle floor.

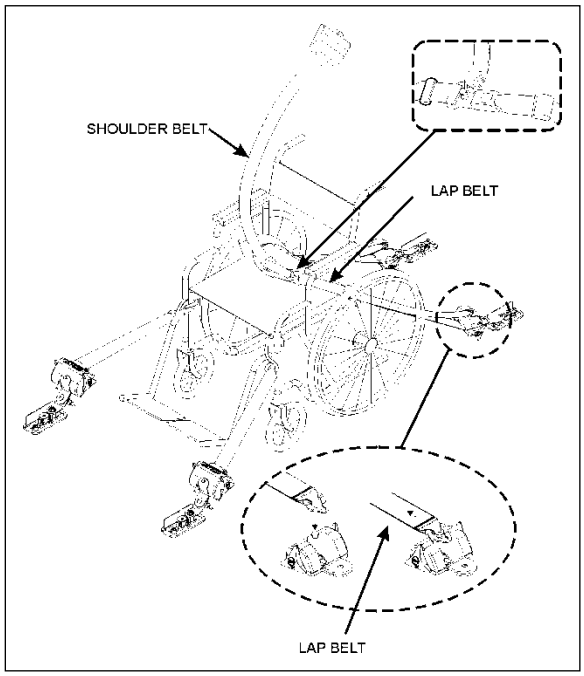
Two complete sets of wheelchair restraints are kept in plastic pouches and stowed in an overhead compartment. To secure each wheelchair, four ties down retractors must be used (at all four corners).

WHEELCHAIR BELT RETRACTOR

Pull up the small lever behind the retractor to allow the belt to extend.

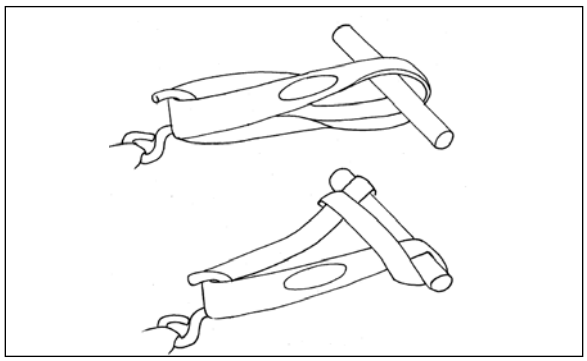
Two of the four ties down retractors have attaching pins to secure the occupant's lap belt. They must be placed at the rear of the wheelchair.

To anchor the retractors, lift the floor pocket cover, push in the retractor anchor then slide it until it locks in place. Hook one wheelchair restraint belt to each corner of the wheelchair frame **(not the wheels)** and allow the retractors to tension the belts.



WHEELCHAIR RESTRAINTS AND ACCESSORIES

Use the blue webbing loops whenever the wheelchair restraint belt hook cannot reach a stiff member of the wheelchair chassis.



TYPICAL USE OF THE BLUE WEBBING LOOPS

To remove the restraint belts, release tension in the locking mechanism by tightening the belt slightly more with the retractor knob before pushing down the tension release lever found 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 pocket. Close the lid to prevent dirt from entering the pocket cavity.

WARNING

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

Wheelchair Occupant Restraint

Secure the wheelchair occupant in the following manner:

Fix the lap belt to the pins on the retractors of the rear restraint belts. Adjust the lap belt so it sits snug across the hips. Make sure that you place the lap belt buckle on the center aisle side. Fasten the shoulder belt to the pin on the lap belt buckle. A retractor adjusts shoulder belt length automatically.

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.

CAUTION

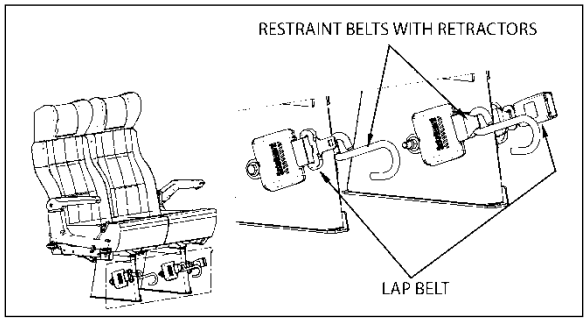
The safety belt buckle provided with the red release button must always be located on the center aisle side.

To release the belts, unfasten the shoulder belt then press the red release button found on the lap belt buckle.

4-POINT SECUREMENT WITH ANCHORAGE TO PASSENGERS SEAT PEDESTALS

This securement system includes:

- 4 wheelchair restraint belts and retractors with anchorage to passengers seat pedestals.
- Occupant securement: lap and shoulder belt.



WHEELCHAIR AND OCCUPANT RESTRAINT SYSTEM

To secure the wheelchair, four restraint belts must be used (at all four corners). Hook one wheelchair restraint belt to each corner of the wheelchair frame **(not the wheels)** and allow the retractors to tension the belts.

To remove the restraint belts, push down on the tension release lever found on the retractor. Unhook the wheelchair and allow the belts to retract. Guide the belts in, making sure they remain untwisted as they retract.

Wheelchair Occupant Restraint

Secure the wheelchair occupant in the following manner:

Fasten and adjust the lap belts so it sits snug across the hips. Make sure that you place the lap belt buckle on the center aisle side. Fasten the shoulder belt by inserting the lap belt tab into the shoulder belt buckle. A retractor adjusts shoulder belt length automatically.

⚠ 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.

⚠ CAUTION

The safety belt buckle provided with the red release button must always be located on the center aisle side.

To unfasten the belts, press the red release button on the shoulder belt buckle first and then unfasten the lap belt by pressing the red release button on the lap belt buckle.

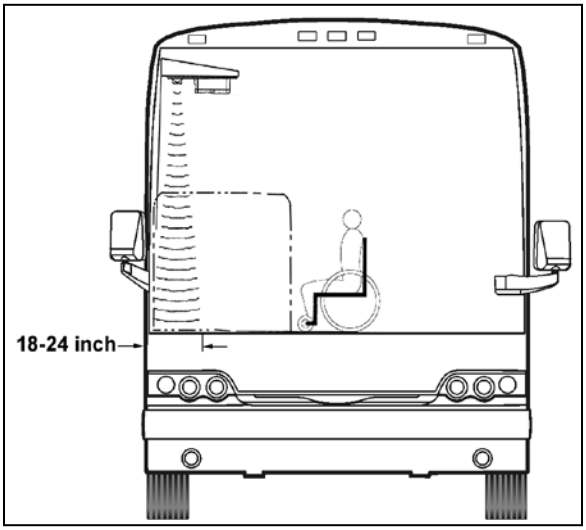
WHEELCHAIR LIFT SYSTEM - THRESHOLD WARNING SYSTEM (TWS) ADJUSTMENT

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 a passenger in the center aisle of coach, pointed at the doorway where Threshold Warning System (TWS) is installed. The TWS should not detect a wheelchair and passenger when they are located this far from the doorway.



TWS AREA 23371

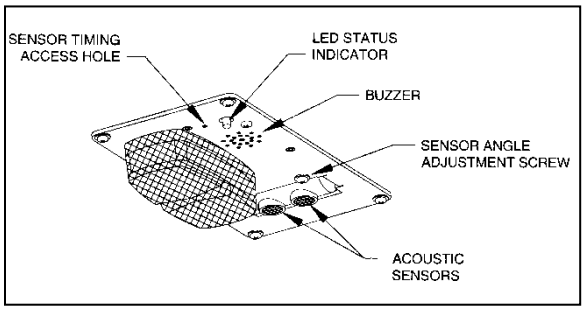
2. Turn power to lift on (LED on TWS module will light steady) and indicator light on the control device illuminates. If wheelchair and passengers are detected by acoustic sensors the LED will flash, the buzzer will sound and the module red light will flash. If this occurs it is necessary to adjust aiming of sensors.
3. Turn sensor angle adjustment screw clockwise to move direction of beam away from the center aisle and towards the

doorway. Stop adjustment when LED ceases to flash.

NOTE

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

4. Move centerline of small wheels of the wheelchair (with passengers) to within 24 inches of doorway and repeat aiming procedure in previous step.



TWS MODULE DETAIL23368

TEST AIM OF ACOUSTIC SENSOR BEAM

1. Move wheelchair and passenger slowly towards the 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. Rolls top (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

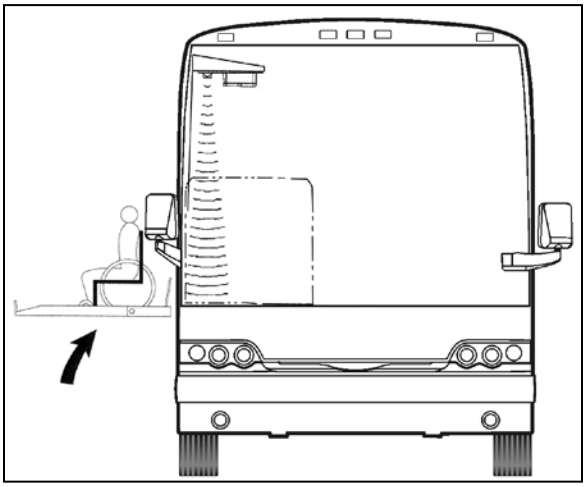
If an adjustment is made, repeat the previous step where wheelchair is between 18 and 24 inches from the doorway.

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 the floor, or nearly, and are not pointing off at an extreme angle.



CHECKING NORMAL PLATFORM POSITION 23372

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.

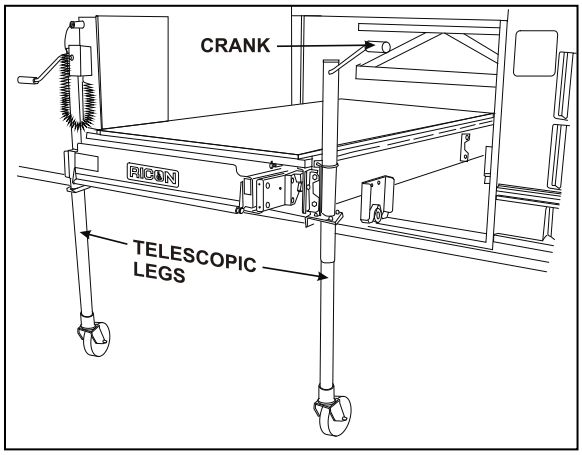
WHEELCHAIR LIFT REMOVAL FOR STORING OR MAINTENANCE PURPOSES

1. Disconnect connector located at compartment ceiling.
2. Remove 4 fixing bolts located inside the compartment, on each side of the platform.
3. 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.
4. Secure the first two telescopic legs onto the platform.

NOTE

There are two telescopic legs for each platform side. The proper side is indicated onto the telescopic leg.

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



INSTALLATION OF TELESCOPIC LEGS 23333

6. Pull the platform until the rear carriage hit against the stops.
7. Secure the two rear telescopic legs onto the platform then turn telescopic leg crank to be able to clear the stops.
8. Remove platform completely.
9. Lower the platform to a minimum height using the telescopic leg cranks before moving it.

WARNING

For better stability, keep the platform at a minimum height when moving.

WARNING

Never deploy the platform from the 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

1. Raise the platform to proper level.
2. Insert the platform so that the rear carriage clears the stops.
3. Turn telescopic leg crank until the carriage comes in contact with the rails.
4. Remove the two rear telescopic legs from the platform.
5. Insert the platform until the front carriage clears the stops.
6. Lower the front of the platform.
7. Remove the two front telescopic legs from the platform.
8. Push firmly and make sure that the platform manual release shafts have turned to lock the platform.
9. Secure the 4 fixing bolts located inside the compartment, on each side of platform. **Apply a torque of 60 lbf-ft.**
10. Reconnect connector located at compartment ceiling.

WARNING

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

FRONT BUMPER BIKE RACK OPERATION (OPTIONNAL)

NOTE

Instruction labels affixed on the bike rack take precedence over this procedure.

The Sportworks Bike-Rack-for-Buses has been designed to make as low an impact as possible on transit operations. All loading and unloading of bicycles can be done by the bicycle rider. Sportworks suggests that loading of children's bicycles be done by an accompanying adult, but the rack can be easily loaded by young children.

These are the steps that should be followed when using the rack.

LOADING BIKES

1. Prepare your bike for loading. Remove water bottles, pumps and other loose items that could fall off while the bus is in motion.

2. Inform the bus driver that you will be loading your bike. You must load your bike from the curb or in front of the bus. Do not step into oncoming traffic to load your bike.

3. Squeeze handle up to release latch, then fold down the bike rack. You only need to use one hand to unlatch and pull the bike rack down, so you can hold your bike with your other hand. It is not necessary to lean your bike against the bus.

4. Lift your bike onto the bike rack, fitting wheels into proper wheel slots. Each wheel slot is clearly labeled for the front wheel. The purpose of the directional placement is to make the bike nearest the bus easier to unload.

5. Raise the Support Arm over the front tire. The Support Arm's number one purpose is to add lateral support for the bicycle when the bus is in motion or at rest. Many bikes will sit in the wheel well without the use of the Support Arm, but the rack must not be used without the Support Arm. Bikes with especially thin rims and tires will sway back and forth without its use.

The handle should be placed as close to the front brake and head tube as possible to ensure safety and security of the bike, and in all cases the handle must be closer to the head tube than the highest point of the tire.

SUPPORT ARM CORRECT POSITION
IMAGE: SPORTWORKS

6. Board the bus and enjoy the ride! Choose a seat near the front of the bus to keep an eye on your bike. DON'T FORGET you have a bike with you when you get off at your stop. New riders often do!

UNLOADING BIKES

1. Inform the bus driver that you will be unloading your bike as you approach your stop. Use the front door to exit the bus. Unload your bike from in front of the bus or from the curb, not from the street.

2. Raise the Support Arm off the tire. The Support Arm automatically folds

down to a secure position.

3. Lift your bike out of the bike rack.

4. Fold up the Bike-Rack-for Buses if there are no bikes on the rack and no one else is waiting to load their bike. The bike rack locks in place.

5. Step away from the bus with your bike.