

ATTACHMENT # 2 YARTS-OWNED FLEET (AS OF 9/30/2017)

Asset ID	Suf	Asset Description	Fuel Type	Length	Capacity	Place in Service Date	Cost Basis	Mileage	BOOK VALUE
YARTS Fleet									
YARTS 16	1	2010 D4500 COMMUTER COACH	Diesel	45'	49	4/23/2010	\$544,043.53	402,794	\$284,111.61
YARTS 17	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	10/24/2011	\$564,456.83	304,296	\$351,217.56
YARTS 21	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	10/24/2011	\$564,456.83	322,347	\$351,217.56
YARTS 25	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	10/24/2011	\$564,456.83	299,388	\$351,217.56
YARTS 29	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	5/23/2012	\$570,898.12	315,124	\$377,856.53
YARTS 33	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	5/23/2012	\$570,898.12	311,638	\$377,856.53
YARTS 37	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	5/23/2012	\$570,898.12	339,976	\$377,856.53
YARTS 41	1	2012 D4500 COMMUTER COACH	Diesel	45'	49	5/23/2012	\$570,898.12	305,713	\$377,856.53
YARTS 56	1	2015 D4500 COMMUTER COACH	Diesel	45'	49	1/26/2015	\$603,223.65	155,568	\$477,552.05
		2015 D4500 COMMUTER COACH	Diesel	45'	49	1/21/2015	\$603,223.66	161,866	\$477,552.06
YARTS 57	1								
							<u>5,727,453.75</u>		<u>\$3,804,294.53</u>

TABLE OF CONTENTS

1–INTRODUCTION	1
2–PRE-SERVICE PREPARATIONS & PROCEDURES	7
3–SWITCHES, WARNING LIGHTS & GAUGES	15
4–STEERING COLUMN & FLOOR MOUNTED CONTROLS	25
5–MISCELLANEOUS COMPONENTS & CONTROLS	29
6–ENGINE OPERATION, REGENERATION, FUEL & EXHAUST	37
7–TRANSMISSION OPERATION	45
8–EMERGENCY CONDITIONS	49
9–HEATING & AIR CONDITIONING	57
10–SERVICE AND MAINTENANCE	59
11–WHEELCHAIR LIFT	67
12–BASIC SPECIFICATIONS	79
13–DIAGNOSTIC CODES	81
14–INDEX	124

MCI D4000 / D4005 / D4500 / D4505 Series Coach 1 – INTRODUCTION

NOTICE

Typical illustrations may be used, therefore minor illustration differences may exist when compared to actual parts or other publications.

To The Driver

This manual provides information on how to operate the basic, option and special equipment systems and components used on this MCI Model D4000 / D4005 / D4500 / D4505 Series Intercity Coach.

Complete knowledge of this coach and correct operating practices are necessary in order to obtain the most satisfactory and economical coach performance and also ensure maximum passenger safety and comfort.

This manual is not intended to instruct operators how to drive or operate an intercity coach safely and courteously on public streets, roads and highways. A qualified coach driver should already possess these required skills before attempting to operate this coach.

Positions “Left”, “Right”, “Front” and “Rear” are determined from sitting in the driver’s seat facing the coach forward travel direction. To clarify this, sometimes “Curbside” and “Roadside” are also used.

The specifications and information within this manual are up to date at the time of publication, but are subject to change without notice.

NOTICE

Report any malfunction interfering with satisfactory operation of the coach to service personnel for immediate attention, especially if safety is affected.

The terms “Optional” or If Applicable in this manual, pertains to all equipment and features other than basic.

PUBLICATION DATE: NOV. 2012
PART NUMBER: 03-15-9158B

Consider this manual a permanent part of this coach. If the coach is sold or traded, also include this manual to provide the next owner with important operating, safety and maintenance information. Please inform MCI Service/Warranty Department(s) if this coach is resold or traded.

Certification Plate

The MCI D4000 / D4005 / D4500 / D4505 series coach certification plate is mounted on the rear stepwell panel. This plate certifies compliance with all applicable Federal Motor Vehicle Safety Standards in effect on the date of manufacture. This plate also lists the date the coach was built, the GVWR, GAWR’s, rim size, tire pressures, coach model and coach serial (V.I.N.) number (Figure 1).

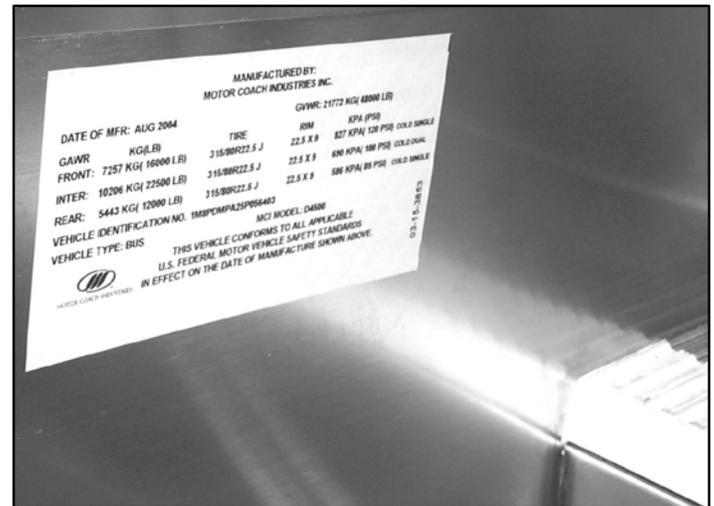


FIGURE 1

Coach Nameplate

The MCI D4000 / D4005 / D4500 / D4505 series coach nameplate is located in the engine cooling compartment at the rear of the coach. The Vehicle Identification Number (VIN), model year and date of manufacture are shown on this plate (Figure 3).

Vehicle Identification Number Explanation

The nameplate in the engine cooling compartment and the certification plate at the rear of the stepwell each contain the seventeen-digit Vehicle Identification Number (VIN). (Figure 2, 3). Coach—specific information is indicated by the digits or letters in the vehicle identification number. The alphabetical references shown correspond to each V.I.N. character or character set. Each is explained in the following list.

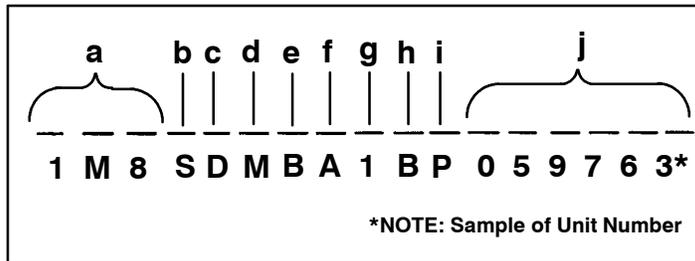


FIGURE 2

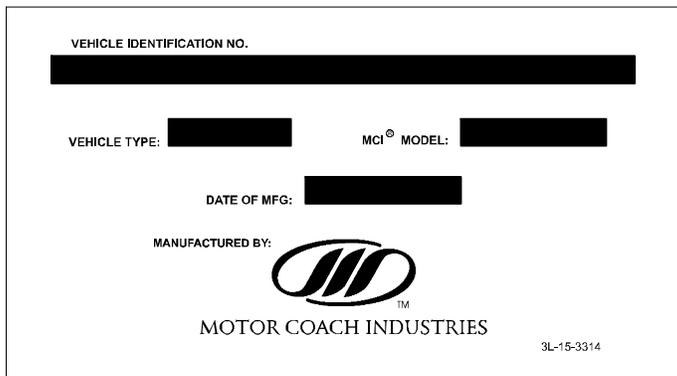


FIGURE 3

- a. The first three digits and letters identify the manufacturing company:
1M8 = MCI
- b. The fourth digit identifies the coach model:
S = D4000
P = D4500
- c. The fifth digit identifies the series:
D = MCI
- d. The sixth digit identifies the type of coach:
M = Passenger
- e. The seventh digit identifies the type of engine:
B = Cummins ISX, 425 HP
- f. The eighth digit identifies the type of brakes:
A = Air Brake Intercity
- g. The ninth digit is a check number.
- h. The tenth digit identifies the year:
B = 2011
- i. The eleventh digit identifies the manufacturing location:
P = Pembina, North Dakota
- j. The twelfth through seventeenth digits define the actual unit number of the coach. (*Sample of Unit No. shown in Figure 2)

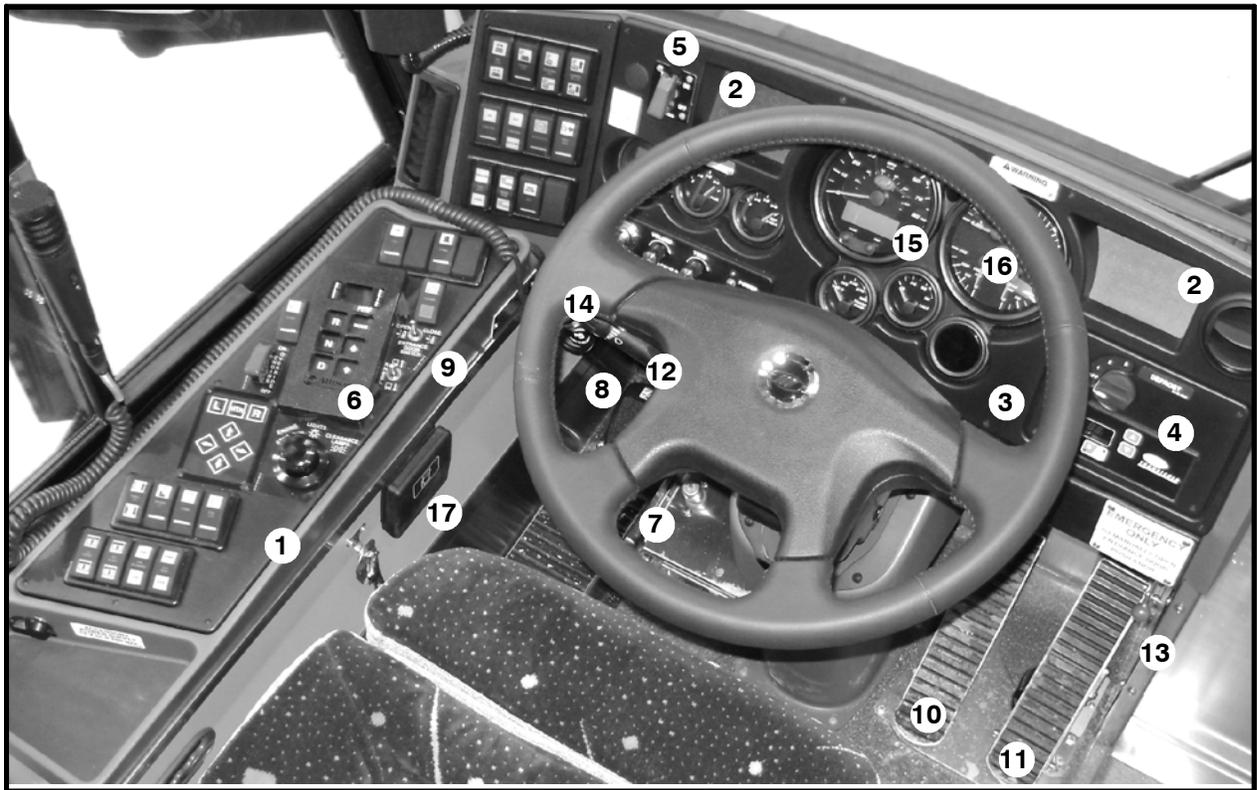


FIGURE 4. Reference photo of Driver Controls–Commuter Coach.

Driver Controls–Commuter Coach

All hand and foot controls, gauges, telltale lights and switches for operating the coach, are located in the driver's compartment (Figure 4). These are arranged for easy access from the driver's seat. This manual describes these controls and other controls and equipment for normal operating conditions, and also where applicable, for use in abnormal or emergency situations. Information is also included concerning minor service and maintenance procedures required for safe and efficient coach operation.

1. LH Control Console–ACTIA MUX Switches, Exterior Left/Right Hand Mirror Touchpad Controls and Master Run Control.
2. Tell-tale Clusters
3. Instrument Panel Assembly
4. HVAC Dash Controller
5. Wheelchair Lift Master Switch
6. Transmission Pushbutton Shift Selector Touchpad
7. Footswitches–Left/Right Turn Signal, Headlight Dimmer, Foot Operated Horn Switch and SpeakEasy™ Hands–Free Microphone / Recording System
8. SpeakEasy™ Hands–Free Microphone / Recording System
9. Toggle Switch–Entrance Door
10. Brake Pedal
11. Accelerator Pedal
12. Steering Column–Adjustable Tilt and Telescoping Steering Column Control Lever and Center Steering Wheel Mounted Horn Button
13. Entrance Door Lock Override Valve
14. Parking Brake
15. Speedometer Alpha–numeric Display
16. 4–IN–1 Gauge
17. Cup Holder

International Symbols

Many of the preceding International Symbols will be found on various controls and other components of this coach.

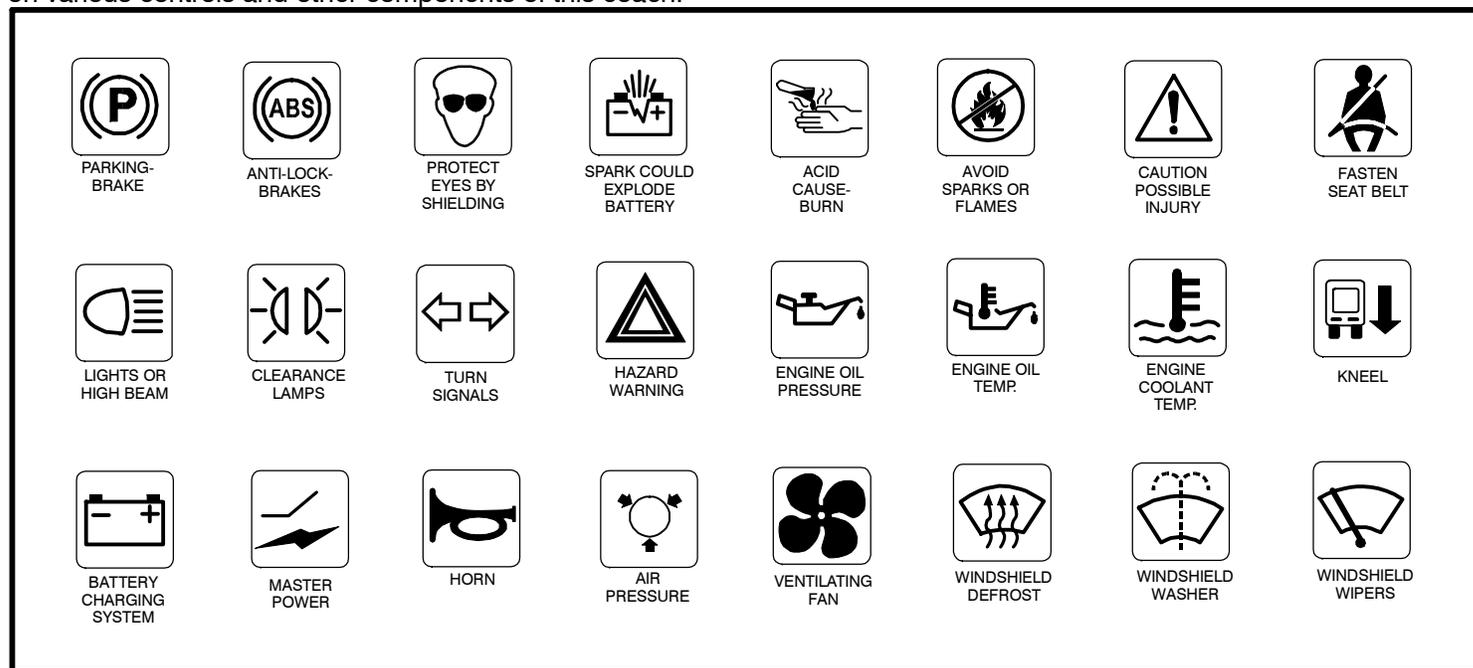


FIGURE 5

Anti-Theft Precautions

- Do not leave coach unattended with the engine running.
- Park in a lighted spot, if possible.
- Fully close all windows and doors.
- Keep items of value out of sight.

Special Features

The D4000 / D4005 / D4500 / D4505 series coaches include several unique features as basic equipment such as: auto-leveling, trailing axle unloading and front axle kneeling. Some basic information on the proper operation and limitations of these features is provided to ensure safe, efficient operation of the coach.

Auto-Leveling

All coaches are fitted with special auto-leveling height control valves at the front and rear drive axle suspension systems. The valves automatically control the inflation and deflation of the air spring bellows to maintain correct coach ride height. These leveling valves are also used in conjunction with other basic or optional features to enhance or modify the vehicle suspension systems.

Trailing Axle Unloading

The coach has a trailing axle unloading feature allowing full or partial unloading of the trailing axle. The basic unload function is performed by positioning the manual unloading valves to the exhaust (horizontal) position. Air from the suspension bellows is then dumped through these valves. When unloaded, the trailing axle air springs are sufficiently exhausted to allow the axle to be lifted and secured, if necessary.

The manual operated unloading valve systems work in conjunction with the basic leveling valve system. The manual valves are located inside the RH rear side service door.

NOTICE

The manual unloading valves can be used to completely exhaust air from the trailing axle suspension bellows. This unloading feature is protected by a separate low air switch and alarm circuit. Such protection is necessary, as continued operation with the air unloaded from the suspension bellows may cause frame damage. Reduce coach speed when the tag axle air springs are unloaded.

Kneeling Feature

All coaches are equipped with a driver actuated kneeling feature, which lowers the coach front suspension 3 to 6 inches from normal ride height to board passengers. The coach should lower when the switch is positioned to “KNEEL” and then released. When this switch is repositioned to “RISE”, high pressure supply air reinflates the air springs through a fast recovery circuit and then through the normal ride height leveling system valves. A kneeling switch is located on the left hand side console front switch panel.

WARNING

Avoid accessing suspension components from outside coach wheel well areas. Unintentional actuation of the height control valves with fully inflated air springs could result in serious injury. Always block the coach body adequately during any inspections and/or repairs in these areas. Always position the switch to lower suspension system to normal ride height before performing any service or inspection procedures on the rear suspension.

During emergencies the kneeling feature may be by-passed by positioning the manual level control valve to the “EXHAUST” position. This allows normal leveling valve circuit supply air to flow directly to the front air springs, by-passing the exhaust control valve. During extended periods of non-use, the manual isolating ball valves may also be closed by positioning them to their “OFF” (horizontal) position.

Electronic System Diagnostic Codes

This D4000 / D4005 / D4500 / D4505 series coach is equipped with electronically controlled engine and transmission. A working knowledge of these system codes is necessary in order to emergency troubleshoot if a fault develops.

Rear Hi-Rise Feature

The rear suspension hi-rise feature allows the drive axle air spring to raise the D4500 series coach approximately 3 inches above normal ride height providing additional rear body clearance. This feature is enabled when the RAISE REAR/LOWER REAR switch is actuated, and automatically controlled through the trailing axle’s self-steer speed switch control.

When set to RAISE, the rear of coach automatically rises when speed falls below 15 mph and lowers to normal ride height when speed exceeds 20 mph. Repositioning the switch to LOWER returns the suspension to normal ride height.

NOTICE

When the coach is raised, a tell-tale will light and an alarm will sound.

CAUTION

The tag axle’s override switch will also eliminate speed switch control over the Hi-Rise system. If it becomes necessary to disable the tag axle self-steering function, first position the Hi-Rise switch to LOWER and allow the coach to reach normal ride height. The tag override switch will keep the coach raised if it is raised when tag override is actuated.

Always lower the coach to normal ride height before performing service or inspection on the rear suspension. Do not operate the coach for extended periods in the high position.

ELECTRONIC STABILITY CONTROL (ESC)

D series coaches are equipped with a MeritorWABCO stability control system that features Electronic Stability Control (ESC) combined with Roll Stability Control (RSC). ESC is a computerized technology that can improve a vehicle’s handling by detecting and potentially preventing skids by automatically applying brakes to help steer the vehicle where the driver wants to go.

ESC is automatic in that these systems become active when the system Electronic Control Unit (ECU) senses conditions that could produce imminent roll or directional instabilities. Rapid lane changes or cornering at excessive speed on dry or slippery surfaces can create the potential for spinout or driftout, often before the operator is aware. The ESC system uses a lateral accelerometer, a steer angle sensor in the steering column and a yaw rate sensor to enhance the operator’s control in these conditions.

NOTICE

The stability control system is designed to assist the operator, not to replace the operator.

The operator will notice a difference in the coach when the ESC system becomes active, but should continue to drive as normal and provide any additional needed corrections. In an ESC event, the operator may first sense a decrease in engine power as the system ECU overrides the accelerator pedal, and may then sense additional deceleration from an engine brake application and service brake applications on the steer axle brakes or all axle brakes, depending on whether the conditions suggest the possibility of a directional control or a rollover event.

THIS PAGE INTENTIONALLY LEFT BLANK

2—PRE-SERVICE PREPARATIONS AND PROCEDURES

The Bureau of Motor Carrier Safety and MCI recommends that the following daily checks be made in order to keep the coach in the best condition for safety, convenience, service and operating economy. Report required repairs or adjustments to maintenance personnel before operating the coach.

These recommended checks are in addition to, not instead of any Bureau of Motor Carrier Safety requirements.

Exterior Inspection (Walk-Around)

1. Assure that all windows, mirrors and lights are clean and unobstructed.
2. Check that the exterior of the coach is clear and clean of debris, and that all service doors are secure.
3. Check tires for proper pressure and inspect for damage. Check that wheel nuts are tight and inspect wheels for any damage.
4. Make sure the remote control switch in the engine compartment is set for "FRONT" operation.
5. Make sure the main electrical switch, located behind battery door, is in the "ON" position.
6. Look under the coach for any fluid leaks, animals, maintenance personnel or for obstructions. Check the area behind the coach if you intend to back the coach.

Initial Start-Up

CAUTION

Before proceeding with the "Initial Start-Up" procedure, be sure there is ample distance ahead of and behind the coach in case of unexpected movement during engine starting. Before starting make sure the fast idle switch is off and the park brake is applied. Do not accelerate the engine during initial start-up.

1. Ensure that the main battery disconnect switch is in the "ON" position.
2. Ensure that the Park Brake control knob is pulled "UP", in the parking brakes "APPLIED" position.
3. Turn the MASTER RUN CONTROL or ignition key to the "RUN" position.
4. Ensure the transmission Shift Pad Indicator in "NEUTRAL".
5. Wait for the CHECK ENGINE and STOP ENG tell-tale lights to extinguish.
6. Start engine.
7. Check all gauges and telltale lamps for proper function.
8. Position the FAST IDLE switch to "ON" setting to build up the air pressure.
9. Look and listen for any indications of system or equipment malfunction. Report any sign of trouble to service personnel before driving the coach.

Interior Components Checklist

1. Check that the entrance door and emergency exits open, close, seal and latch properly.
2. Check parcel rack restraining cords.
3. Inspect seats and floor for debris.
4. Check that inside and stepwell lights work.
5. Check that the wheelchair access door is closed and latched.
6. Check to see that emergency equipment and contents are in place and properly stowed.

Operational Checklist

1. Look for any lube oil or coolant leaks with the engine running.
2. Close and secure all baggage and service doors.
3. Check that all exterior lights are operational.
4. Check the wheelchair lift operation daily.
5. Position inside and outside mirrors. Adjust the driver's seat for comfort and fasten seat belt.
6. Make sure the tilt steering column is locked in a comfortable driving position.
7. Check operation of defroster, heater, windshield wipers and washers, and horn.
8. Do not move the coach until the dual air gauge shows at least 100 psi pressure in both the primary and secondary circuits.
9. Position the FAST IDLE switch to the "ON" setting to build up the air pressure.
10. Shift the transmission into "DRIVE" by first pushing hard on the Service Brake pedal and holding down firmly to the floor, then depressing the "D" on the Transmission Touchpad.

Sleep Mode

If the operator does not turn the main battery disconnect switch to the OFF position, the electrical system will go into "sleep mode" thirty (30) minutes after stopping the engine. The operator can "awake" the electrical system by hitting the entrance door switch, the hazard lights switch, or by turning the MASTER RUN CONTROL.

Park Brake Release

CAUTION

Use the following release procedure to free service brakes. Do not attempt to break coach free with engine power if brakes fail to release.

1. Release the park brake. With coach air pressure at 100 psi (689.5 kPa) or more, push the Park Brake control knob down. Then make a full service brake application. Park Brake release should allow normal service brake operation.

NOTICE

Park brakes are set with a maximum 85 psi regulated air supply. Make a full service brake application to ensure complete release of the park brake locking mechanisms.

2. Move the coach slowly and bring it to a stop to assure that the brakes stop and hold the coach. Check that brake pedal operation feels normal. Check to see that all gauges remain in the normal range.

3. Move the coach a short distance at low speed and check the steering for proper movement. The steering wheel should feel firm with positive movement, indicating secure attachment and function of all related steering and suspension components. Determine that the coach is under full control and handling properly.

Driver's Seat Adjustment

The basic driver's seat can be manually adjusted for height, fore and aft positioning, seatback tilt and seat cushion pitch. After adjusting a manually operated seat, test by pushing forward and rearward on the seat. Make sure seat does not move, and that the adjuster mechanisms have latched.

Other adjustments are manually actuated such as seat base forward and rearward movement, front seat cushion tilt, setback adjustment, headrest adjustment and internal shock absorber adjustments.

! WARNING

Do not attempt adjustment of driver's seat while coach is in motion. The seat could suddenly and unexpectedly move causing driver to lose control of the vehicle.

! WARNING

After making a seat adjustment, always test to ensure that the adjusters have latched. Improperly latched seat adjusting mechanisms can impair driving capabilities and create an unsafe operating condition. Report any seat mechanism locking problem immediately to service personnel.

Final Adjustment Checks

After making any of the manually operated seat adjustments, test the seat by pushing forward and rearward. Make sure it will not move and that the seat adjusters have securely latched. Any movement of the seat indicates that at least one indexing pin has not engaged. An improperly latched seat mechanism could impair driver capabilities. Report any seat adjustment or locking mechanism problems to service personnel immediately.

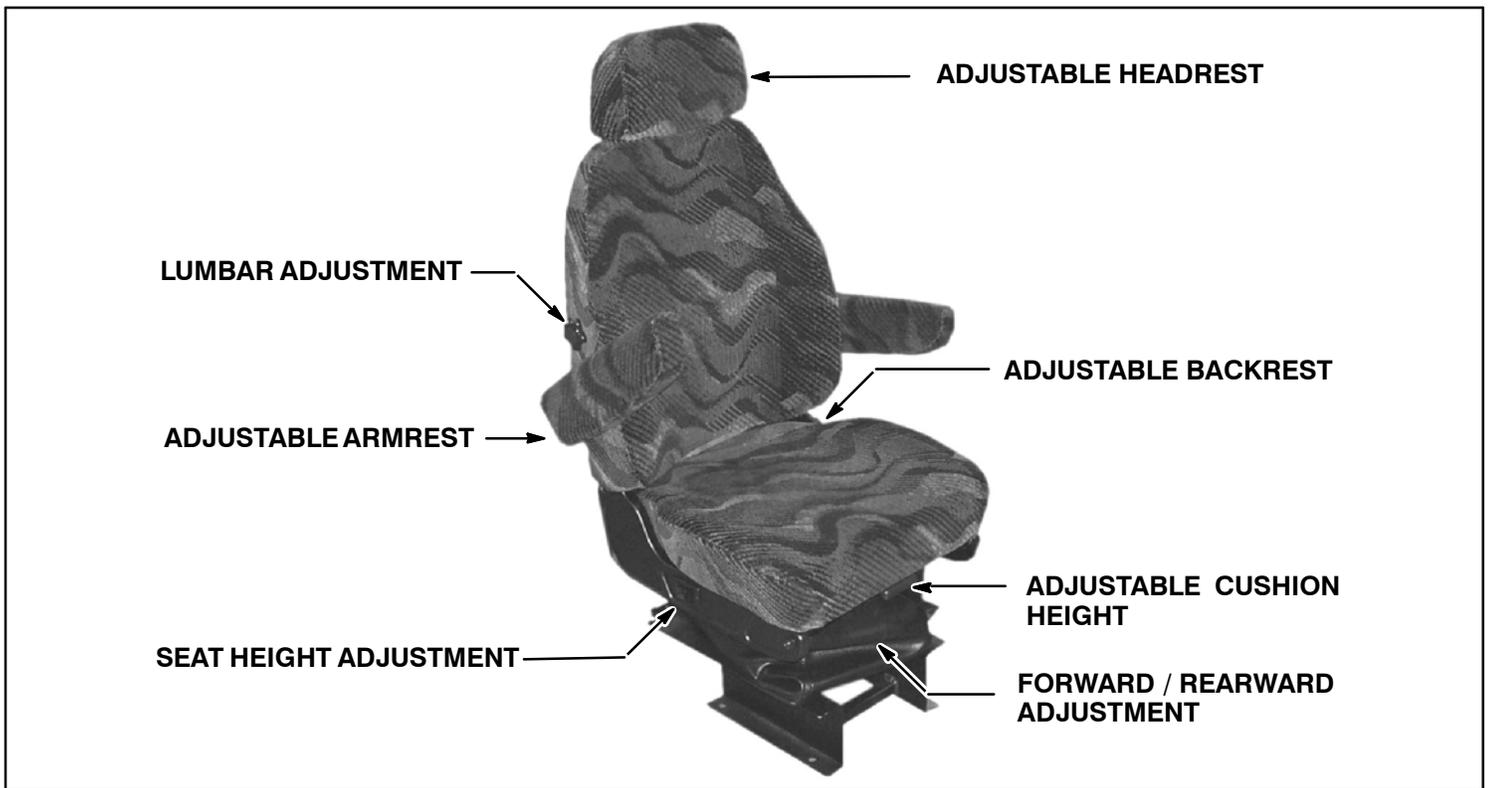


FIGURE 6 – NATIONAL SEATING DRIVER'S SEAT

NATIONAL DRIVERS SEAT ADJUSTMENTS

Seat adjustments are pneumatically and manually operated.

Backrest Tilt Adjustment

Turn the rotary knob to adjust the recline angle of the backrest.

Cushion Height Adjustment

Adjust the front cushion height by pulling the handle up and forward.

Fore and Aft Adjustment

Adjust the seat forward or rearward by moving the control lever to the LH side. Using body momentum, slide the seat to the desired position. Release the control lever and ensure that the seat is locked in place.

Height Adjustment

Actuate the switch, while body weight is removed, to raise the seat. The seat can be lowered with the driver remaining in the seat.

Lumbar Support Adjustment

Turn the rotary knob to adjust the lumbar support.

Headrest Adjustment

Lift the headrest to obtain desired setting.



FIGURE 7 – ISRINGHAUSEN DRIVER'S SEAT

ISRINGHAUSEN DRIVER'S SEAT ADJUSTMENTS (IF APPLICABLE)

Seat adjustments are pneumatically and manually operated.



FIGURE 8

Backrest Tilt Adjustment

Lift lever (A) to adjust the recline angle of the backrest.

Lumbar Support Adjustment

A control panel, located on the RH of the seat, contains three switches (B) controlling pneumatic lumbar adjustment. Actuate the switches to adjust the upper and lower lumbar support.

Air Height Adjustment

Actuate the switch (C) to vertically adjust the seat.

Tilt Adjustment

Actuate the switch (D) to adjust the seat angle.

Adjustable Shock

Actuate the switch (E) to select a stiff or soft ride.

Quick Air release

Actuate the switch (F) to exhaust all air from suspension, allowing for easy entry/exit.

Forward / Rearward Adjustment

Adjust the seat forward or rearward by disengaging the front control. Using body momentum, slide the seat to the desired position. Release the front control and ensure that the seat is locked in place.

Headrest Adjustment

Adjust the headrest height by pulling up or pushing down on top of the headrest. Position headrest to the desired height.

Adjust the headrest tilt by pulling forward or pushing back on top of the headrest. Position headrest to the desired angle.



FIGURE 9. RECARO ERGO METRO AIR RIDE DRIVER SEAT.

RECARO DRIVER'S SEAT ADJUSTMENTS (IF APPLICABLE)

Seat adjustments are pneumatically operated and manually operated.



FIGURE 10

Pneumatic Lumbar Support Adjustment

NOTE: This adjustment is important to attaining and maintaining positive lumbar back support. Carefully make adjustments that provide the maximum support and driving comfort for your specific physical structure.

A control panel, located on the right hand side of the seat, contains three rocker-type switches controlling pneumatic lumbar adjustment. The top switch (A) adjusts the upper lumbar pneumatic support, the middle switch (B) adjusts the mid lumbar pneumatic support, and the bottom switch (C) adjusts the lower lumbar pneumatic support. Pushing a switch forward inflates and pushing a switch rearward deflates a lumbar pneumatic support.

Backrest Inclination

Recline adjusting knobs are located at the RH and LH rear base of the seat back (Figure 9). Rotate the knobs forward or rearward to adjust the recline angle of the seat back.

Auto Actuator Button

A forward and rearward adjusting button is located on the control panel (Figure 10). Adjust the seat forward or rearward by pushing the button (D). Use body momentum to slide the seat either forward or rearward to the desired position. Release the button to lock the seat in position.

Pneumatic Air Suspension Switch

The pneumatic air suspension switch is located on the control panel (Figure 10). The switch (E) controls the amount of air in the air spring suspension chamber.

Pushing the pneumatic air suspension switch up inflates the air spring suspension chamber, raising the seat. Pushing the pneumatic air suspension switch down lowers the seat.

Seat Cushion Rake Adjustment

The seat cushion rake (tilt) adjusting handle (F) is located on the RH front of the seat (Figure 10). The front part of the seat cushion can be adjusted 0 degrees to 15 degrees, by pulling the handle up and positioning the thigh extension up or down to the desired angle.

Thigh Extension / Cushion Length Adjustment

The front part of the seat cushion can be extended up to two inches, by pulling the front of the thigh extension forwards or backwards to the desired length (Figure 9).

Adjustable Shock

To adjust shock, turn clockwise to soften ride, counter-clockwise to stiffen ride (Figure 9).

Headrest Support

Adjust the headrest height by pulling up or pushing down on the top of the headrest (Figure 9). Position the headrest to the desired height. Make certain the headrest locks into place after adjusting.

Adjust the headrest tilt by pulling forward or pushing back on the top of the headrest. Position headrest as required.

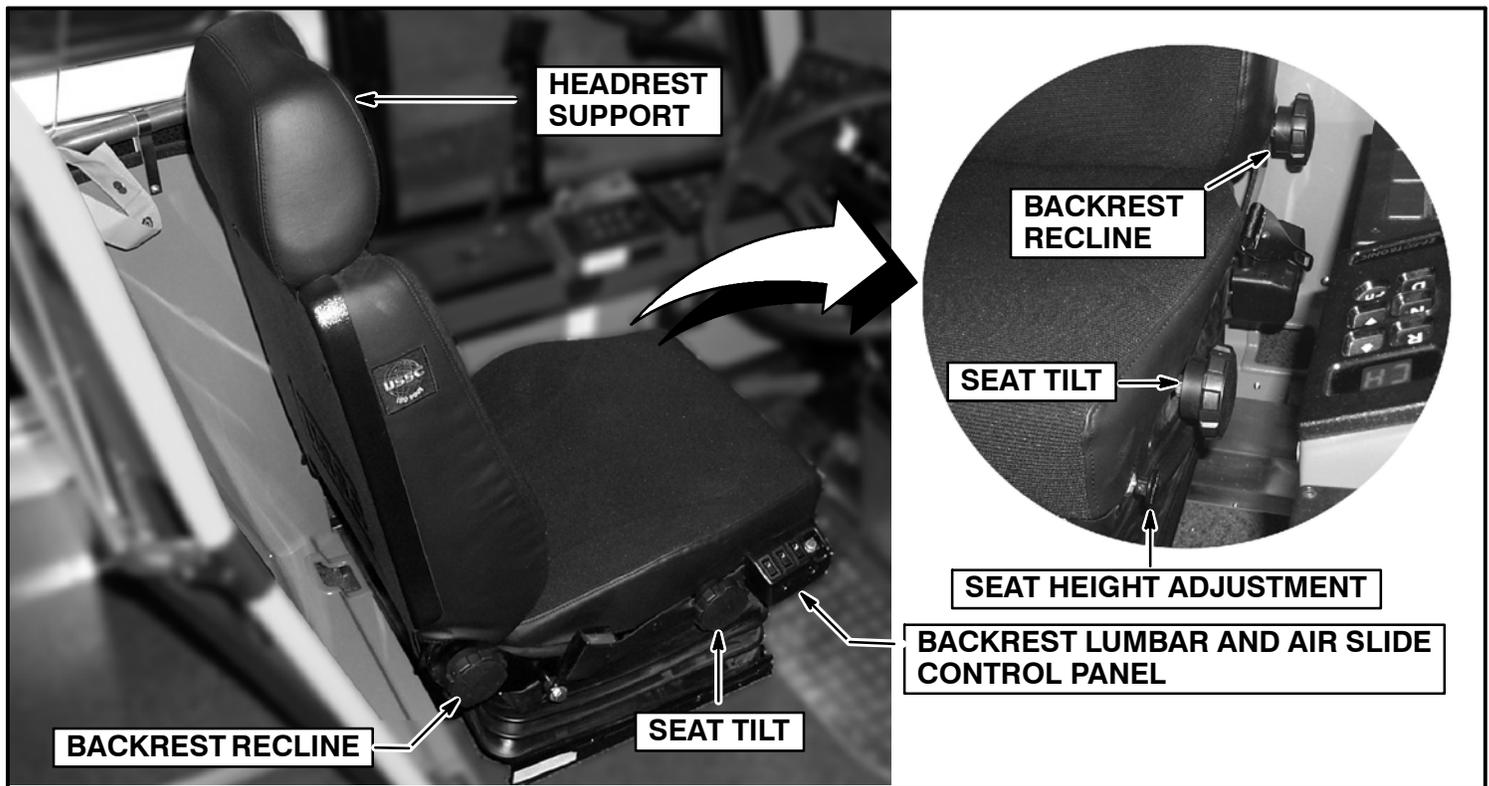


FIGURE 11. USSC DRIVER SEAT.

USSC DRIVER'S SEAT ADJUSTMENTS (IF APPLICABLE)

Seat adjustments are pneumatically operated and manually operated.

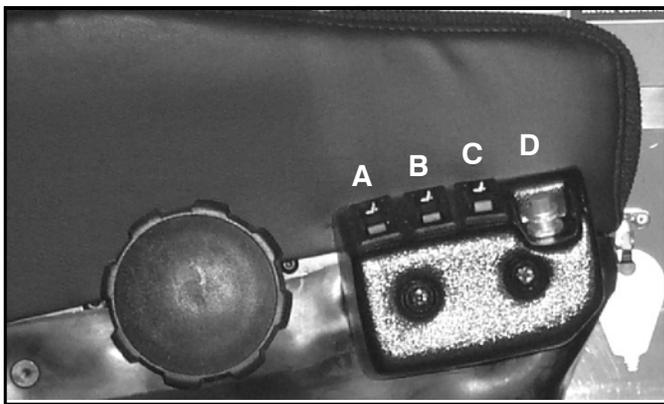


FIGURE 12

A control panel, located on the RH front edge of the seat cushion, contains three air lumbar switches. Pushing the switches increases or decreases the amount of lumbar support. The first switch (A) adjusts the side bolsters, the second switch (B) adjusts the upper lumbar pneumatic support, and the third switch (C) adjusts the lower lumbar pneumatic support.

Adjust the seat forward or rearward by pushing the air slide release button (D). Use body momentum to slide the seat either forward or rearward to the desired position. Release the button to lock the seat in position.

Backrest Recline

Recline adjusting knobs are located at the RH and LH rear base of the seat cushion (Figure 11). Rotate the knobs forward or rearward to adjust the recline angle of the seat back.

Seat Tilt

Seat tilt adjusting knobs are located at the RH and LH side of the seat cushion (Figure 11). Rotate the knobs forward or rearward to adjust the tilt of the seat. Seat tilt is independent of seat height adjustment.

Seat Height Adjustment

The height adjusting knob is located on the LH front edge of the seat cushion (Figure 11). Rotation increases or decreases the amount of air in the air bag, raising or lowering the seat accordingly. All air can be quickly released by pulling the knob out. Pushing it back in restores air to the system.

Headrest Support

Adjust the headrest height by pulling up or pushing down on the top of the headrest (Figure 11). Position the headrest to the desired height.

Driver's Seat Belt Adjustment

Adjust the belt as needed while seated, sitting straight and well back into the seat. In a single motion, pull the lap belt across your lap far enough to push the latch plate into the buckle until it clicks. This unlocks the retractor so the belt can be pulled out to the proper length.

IMPORTANT: Using the restraint system provided can lessen the chance and/or severity of injury in an accident or sudden maneuver. Carefully follow the instructions in this section on using the restraint system.

Position the belt across your lap as low on the hips as possible. This is necessary to spread the force of the lap belt over the stronger hip area instead of across the abdomen. Then adjust to a snug fit by pulling the belt firmly across your lap toward the lap belt retractor so it can take up the slack. This reduces the risk of sliding under the belt during an accident.

To unfasten the belt, push in the button in the center of the buckle. The retractor is designed to rewind the belt automatically when the buckle is unlatched. Do not let the belt twist while it is rewinding into the retractor. The bulk of the twisted belt may cause the retractor to jam so it will not rewind further. At the same time, the retractor may keep the belt from being pulled out.

If a belt should get jammed, you may be able to release it by working the belt in and out until the belt rewinds far enough to unlock. If the belt remains jammed or other parts of the restraint system do not work properly, report the condition to service personnel promptly.

Seat Belt Inspection

Every 30 days, check the belt, buckle, latch plate, retractor and guide loops for proper operation. Also check for loose or damaged parts that could keep the restraint system from operating properly. Keep sharp edges and sharp objects away from the belts and other parts of the restraint system.

Keep the belts clean and dry, and replace belts if the webbing appears frayed, cut, or otherwise damaged. Belts should be replaced if they have been involved in an accident. Have parts replaced if there are any questions as to their condition. Clean seat belts with mild soap and lukewarm water only, and avoid bleaching or dyeing belts as this may weaken them.

MIRRORS

Inside Rearview Mirrors

The inside rearview mirrors can be adjusted up, down or sideways. Adjust to provide a clear view of the interior rear of coach.

Exterior Mirrors

The coach is equipped with large exterior rearview mirrors with convex upper mirror heads for wide angle viewing, and larger full face lower flat mirror heads.

Adjust the mirrors so that the sidewall of the coach can just be seen in the inner portion of the mirror. This will help determine the relationship of the coach to objects seen in the mirror.

Ensure that some portion of the mirrors can also be seen through the wiper sweep when they are in use.

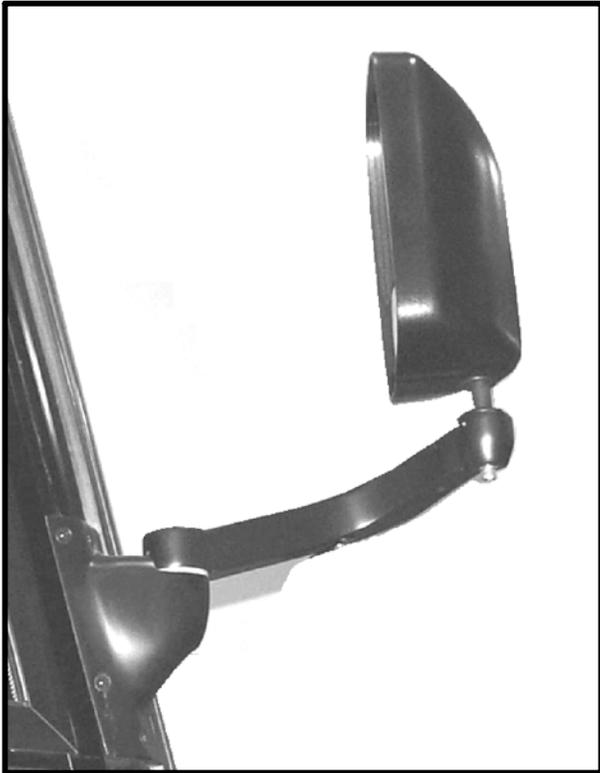


FIGURE 13.

PRE-TRIP INSPECTION

Commuter Coach

The exterior lights and dash tell-tales automatically activate for two (2) minutes, when both foot-operated signal switches are pressed simultaneously.

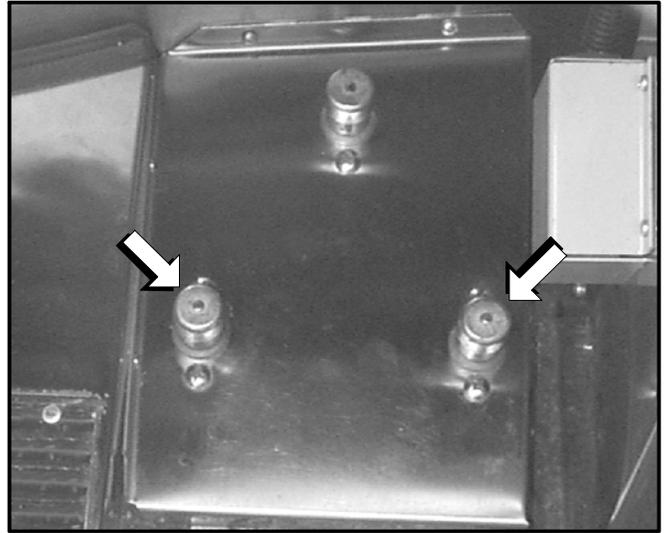


FIGURE 14.

Tour Coach

Before the Pre-Trip Inspection function is enabled, these functions must be met:

- Position the Master Power switch to the "ON" position,
- Select NEUTRAL on the transmission pushbutton shift selector (PBSS),
- Set the Park Brake,
- Position the DOME light switch (located on the lower, LH console) to the "ON" position,
- Position the FRONT light switch (located on the instrument panel) to the "ON" position,
- Orient the turn signal switch to the Left or Right position,
- Apply and hold a service brake application of 60 psi.

Only after these conditions are met, the Pre-Trip Inspection function is enabled, automatically activating the exterior lights and dash tell-tales for two (2) minutes.

3-SWITCHES, WARNING LIGHTS AND GAUGES

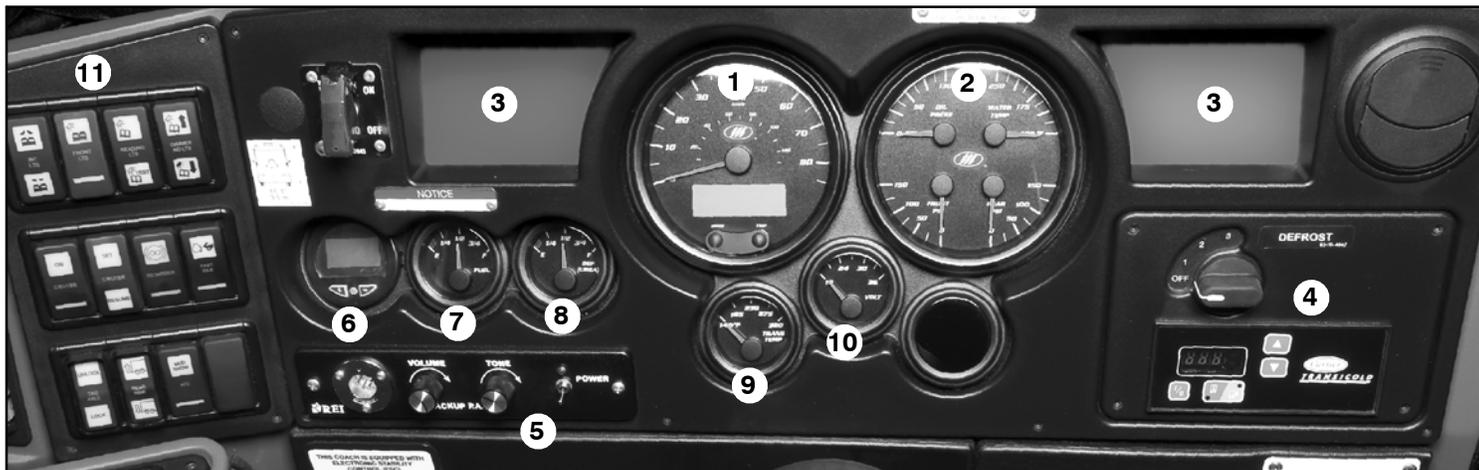


FIGURE 15. Instrument Panel.

INSTRUMENT PANEL COMPONENTS (Figure 15)

1. SPEEDOMETER w/ ALPHA-NUMERIC DISPLAY
2. 4-IN-1 GAUGE with TELLTALES
3. TELLTALE CLUSTERS
4. HVAC DASH CONTROLLER
5. P.A SYSTEM
6. SMARTWAVE FULL FUNCTION DISPLAY
7. FUEL GAUGE
8. DEF (UREA) GAUGE
9. TRANSMISSION TEMPERATURE GAUGE
10. VOLTMETER GAUGE
11. ACTIA MUX SWITCHES

INSTRUMENT DASH PANEL

4-IN-1 Gauge



FIGURE 16

4-IN-1 GAUGE

The 4 in 1 gauge, located beside the speedometer, features a front and rear air pressure gauge as well as an oil pressure gauge which all read pressure in pounds per square inch. A water temperature gauge which reads engine coolant temperature in degrees Fahrenheit is also featured.

4 IN 1 GAUGE TELL-TALE WARNING LAMPS

1. Front Air PSI

The low air warning tell-tale illuminates when the air pressure drops below the pre-determined level.

In the event of a low air warning, stop the coach and determine the cause of air loss before proceeding.

2. Rear Air PSI

The low air warning tell-tale illuminates when the air pressure drops below the pre-determined level.

In the event of a low air warning, stop the coach and determine the cause of air loss before proceeding.

3. Water Temperature

The tell-tale illuminates when the coolant temperature is above normal. Obtain service as soon as possible.

4. Oil Pressure

The tell-tale illuminates when the oil pressure is too low.

NOTICE

Low air pressure will illuminate the LOW AIR lamp and a buzzer will sound, indicating that the air pressure is too low. Stop coach and determine reason for pressure loss.

DO NOT operate the coach under 100 psi air pressure.

Tell-tale Indicator Lamp Clusters

Tell-tale indicator lamp clusters are located on the left and right sides of the center dash module. The tell-tale lamps illuminate to indicate various operating or functioning conditions or to warn of various system malfunctions or potential system hazard conditions. Some lamps are accompanied by a buzzer or bell.

NOTICE

Tell-tale indicator lamps for optional systems or components not installed or used on D4000 / D4005 / D4500 / D4505 Series coach are disabled and do not illuminate.

LH Tell-tale Cluster / ACTIA (Figure 17)

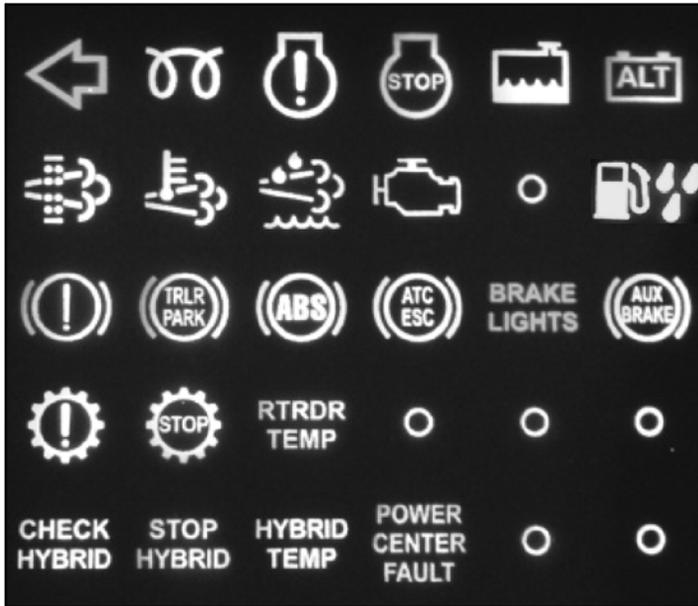


FIGURE 17

Arrow - LH Turn Signal (Green)

Wait to Start (Amber) – Illuminates when the grid heater is ON (pre–heat function).

Check Engine (Amber) – If a fault is detected, the Electronic Control Module (ECM) illuminates the CHECK ENGINE light and stores a malfunction code.

Stop Engine (Red) – Tell-tale indicates that a serious engine condition has been detected. Tell-tale glows steadily, along with a warning buzzer sounding, and the engine begins a power-down sequence.

Low Coolant (Amber) – A low engine coolant level is indicated by this tell-tale. Do not run engine until the condition is corrected.

Not Gen (Red) – This tell-tale indicates that the alternator is not charging. Stop the engine, determine cause of malfunction and correct.

Regeneration Lamp (DPF) (Amber) – Tell-tale illuminates when a regeneration is required. Tell-tale is OFF during regeneration.

High Exhaust Temperature Lamp (HET) (Amber) – This tell-tale will illuminate when the coach is moving at a low speed and the exhaust outlet temperature exceeds the predetermined level.

Diesel Exhaust Fluid (DEF) (Amber) – Tell-tale illuminates that the DEF level is low.

Malfunction Indicator Lamp (MIL) (DDC engine only) (Amber) – Tell-tale is disabled on 2010 EPA engine configuration.

Water in Fuel (Amber) – Water in the fuel filter.

Park Brakes (Red) – Park Brake is applied.

Trailer Park Brakes (Red) – Tell-tale is disabled.

ABS (Anti-lock Brake System) (Amber) – Tell-tale indicates the condition of the anti-lock brake system. When the coach is initially started, the indicator comes on. At approx. 5-7 mph, the light goes off and stays off if the system is functioning properly. If the light comes on when the coach is in motion, the ABS is not working properly.

Electronic Stability Control / Automatic Traction Control (Yellow) - Tell-tale indicates an Electronic Stability Control (ESC) or an Automatic Traction Control (ATC) event.

Brake Lights (Green) – Tell-tale illuminates when the service brake is applied using the foot pedal.

Aux. Brake (Amber) – Tell-tale illuminates when the Jacobs Engine Brake is activated.

Check Trans (Amber) – Tell-tale light illuminates indicating a transmission failure.

Stop Trans (Amber) – Tell-tale is disabled on 2010 EPA engine configuration.

Retarder Temperature (Amber) – Tell-tale light illuminates when retarder oil temperature is above 168 degrees Celsius for more than ten (10) seconds.

Check Hybrid (Amber) – Hybrid coach configuration.

Stop Hybrid (Amber) – Hybrid coach configuration.

Hybrid Temp (Amber) – Hybrid coach configuration.

Hybrid Power Center Fault (Amber) – Hybrid coach configuration.

Tell-tale Indicator Lamp Clusters

Tell-tale indicator lamp clusters are located on the left and right sides of the center dash module. The tell-tale lamps illuminate to indicate various operating or functioning conditions or to warn of various system malfunctions or potential system hazard conditions. Some lamps are accompanied by a buzzer or bell.

NOTICE

Tell-tale indicator lamps for optional systems or components not installed or used on D4000 / D4005 / D4500 / D4505 Series coach are disabled and do not illuminate.

RH Cluster / ACTIA (Figure 18)

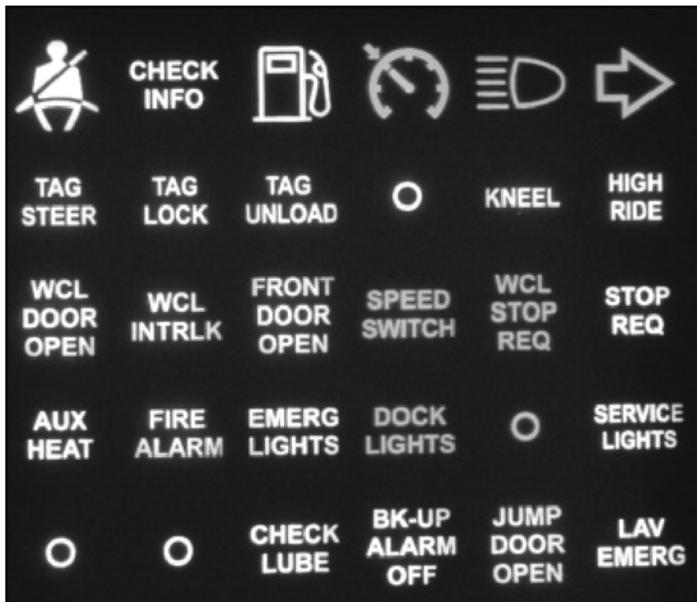


FIGURE 18

Seat Belt (Amber)

The **Check Info (Amber)** tell-tale illumination indicates that a message regarding additional tell-tale information is displayed on the alphanumeric display of speedometer. Depending on the message displayed, a buzzer may accompany the message.

Low Fuel (Amber) – Illuminates when fuel level is low.

Cruise Enabled (Green)

Hi-beam (Blue) – Illuminates when bright lights are ON

Arrow - RH Turn Signal (Green)

Tag Steer (Red) – Illuminates when the latching system malfunctions and axle is not castered correctly for travel direction.

Tag Lock (Red) – If tell-tale light illuminates and remains illuminated, the axle is either unlocked above 20 mph, locked below 15 mph or the manual override is engaged.

NOTE: The TAG LOCK tell-tale may illuminate intermittently when the coach is turning at or above 25 mph. There is nothing wrong with the system, as long as the tell-tale extinguishes when the coach comes out of the turn and onto straight-away.

Tag Unload (Red) – Illuminates when the tag axle is unloaded.

Kneel (Red) – Illuminates in kneeling mode.

High Ride (Red) – Tell-tale will illuminate and a buzzer sounds when the coach is in transition and is maintained in HIGH RIDE.

WCL Door Open (Red) – Tell-tale will illuminate indicating door ajar or unlocked condition.

WCL Interlocks (Red) – Tell-tale light illuminates when the wheelchair lift interlock is activated.

The wheelchair interlock system, when activated, disables the transmission shift and throttle, sets the park brake solenoid, and begins engine fast idle.

Front Door Open (Red) – Tell-tale light illuminates when the entrance door is open.

Speed Switch (Red) – Tell-tale light illuminates when coach speed is less than 2 mph on certain coach configurations.

WCL Request Stop (Blue) – Illuminates when a passenger in the wheelchair area presses the stop button.

Request Stop (Amber) – Illuminates when a passenger presses the stop button in the parcel rack mounted service module above the seats.

Auxiliary Heat (Amber) – Illuminates when the auxiliary heater has been activated.

Fire Alarm (Red) – When emergency fire alarm sensor is tripped, tell-tale lamp illuminates and buzzer or bell sounds.

Emerg Lights (Amber) – Tell-tale light illuminates when the ISTV coach emergency lights are ON.

Dock Lights (Blue) – Tell-tale is disabled.

Service Lights (Amber) – Tell-tale light illuminates when the engine compartment light is ON.

Check Lube (Amber) – Tell-tale light illuminates when Vogel timer is set.

Back-up Alarm Off (Amber) – Tell-tale is disabled.

Jump Door Open (Red) – Tell-tale light illuminates when the ISTV jump door is open.

Lav Emerg (Amber) – Illuminates when a passenger presses the emergency button in the lavatory.

The **CHECK INFO** tell-tale illumination indicates that a message regarding additional tell-tale information is displayed on the alphanumeric display of speedometer. Dependant of the message displayed, a buzzer may accompany the message.

The tell-tale information displayed on the alphanumeric display of the speedometer are Baggage Door Open, Fast Idle and Back Up Alarm.



FIGURE 19 – LH Tell-tale Cluster

Move the coach to a safe parking area to view the message displayed on the alphanumeric display of speedometer. After the message has been recorded, the operator can press the SET button (RH side of the speedometer) to dismiss the message. The CHECK INFO tell-tale will remain illuminated, but the message will not appear until the system re-broadcasts the signal.

ACTIA MUX SWITCH PANEL



FIGURE 20.

1. Interior Lights

The Interior Lights switch operates both the overhead parcel rack, window and aisle lights. Repositioning this switch to the lower portion operates only the overhead aisle lights. The lights can be illuminated only when the keyed ignition or master control switch is in the “ON” position.

2. Front Entrance Lights

The Front Entrance Lights switch illuminates the first two rows of lights when the entrance door opens.

3. Reading Lights

The Reading Lights switch tests all reading lamps in the service modules at one time. Positioning the switch to “ON” enables the parcel rack service module’s reading light switches for passenger actuation. Positioning the switch to “OFF” eliminates the service module’s reading light feature.

4. Reading Lights Dimmer

The Reading Lights Dimmer switch controls the intensity of the passenger reading lamps in the first two rows, enabling the operator to reduce glare on the windshield.

At next coach start-up, the passenger reading lamps in the first two rows will return to the last manual setting.

5. Cruise Control

This switch energizes the Set/Resume switch for Cruise Control Operation.

6. Cruise Control (Set/Resume)

The Set/Resume switch is used to set and/or resume speed. At the desired cruise speed position the switch to “SET/ACCEL” and release switch. Remove pressure from the accelerator and system will maintain desired speed until either the brakes are applied or the Cruise Control Enable switch is turned off. In the event that brakes are applied and a return to set speed is desired, position the switch to “RESUME/ACCEL” and release.

7. Engine Brake

The engine brake switch controls the engine brake feature. In the upper HI position, all engine compression is used as a braking force when going down steep inclines. In the middle LOW position, partial engine compression is used as a braking force.

8. Fast Idle Switch

Positioning the Fast Idle switch to “ON” will run the engine at 950 rpm, building up the air pressure.

9. Tag Axle

Positioning the TAG AXLE switch to LOCK manually locks the trailing axle’s self-steer function in a straight ahead mode and illuminates the TAG LOCK tell-tale.

10. Rear Rise

When the coach is traveling under 17 mph and the switch is set to RAISE, the rear of the coach rises, the REAR LIFT tell-tale lights and the buzzer sounds. LOWER returns the coach to normal height.

11. ATC

On extra soft surfaces such as snow, mud or gravel, press the MUD/SNOW switch to increase traction by slightly increasing permissible wheel spin. Press the switch again to turn OFF MUD/SNOW feature.



FIGURE 21. Lower, LH Console Switch Panel.

LOWER, LH SWITCH PANELS (Figure 21)

1. Master Run Control

This four-position dial when positioned to “RUN” will initiate the engine start sequence. When positioned to “ENGINE STOP” the engine will shut down.

The headlamps can be activated by turning the dial to the “LIGHTS” position. The last position “CLEARANCE LAMPS” will also energize the clearance and identification lights.

2. Engine Override Switch

This toggle switch allows the operator to override an emergency shutdown due to an engine malfunction. Pressing the switch allows the operator to run the engine for an additional 30 seconds so that the operator can move the coach to a safe parking area.

A red self-cancelling cover protects the switch from inadvertent driver activation.

CAUTION

This switch allows the operator to override an emergency shutdown due to an engine malfunction. Pressing the switch allows the operator to run the engine for an additional 30 seconds so that the operator can move the coach to a safe parking area.

In a driving situation, this switch should be utilized only to safely move the coach to a safe parking area.

The engine overrule feature is not intended to provide a “limp home” capability. This feature should not be utilized to extend coach driving to a garage or other destination, as engine damage may result from over-extension of the safety feature limitations.

3. Entrance Door Switch

This switch controls door opening and closing. Push the switch forward or back to operate the entrance door.

4. Kneel Switch

This switch controls the kneeling function. Push the switch “DOWN” to kneel or “UP” to raise the coach from the “kneeling” position.

5. Engine Start Switch

The Engine Start switch is a momentary-on type switch. The top switch section must be pushed and held in the “START” or “ON” position to engage the starter. When released, the switch will return to the normal non-power (“OFF”) position.

6. Hazard/Warning Lights

Pressing the Hazard/Warning lights switch to the upper section “ON” position , flashes all front, rear and side mounted turn signal lights and both cluster indicators simultaneously. Pushing the switch to the lower section “OFF” position deactivates the Hazard/Warning lights.

The Hazard/Warning lights automatically activate when the passenger door opens, the Wheelchair Lift Master Keyswitch is in the “WCL ON” position or when reverse gear is selected. The lights extinguish when the passenger door closes, the Wheelchair Lift Master Keyswitch is in the “WCL OFF” position and the transmission is not in reverse.

7. Mirror Control

Exterior front mirror adjustments are made using the touch pad controls. “L” (left) and “R” (right) select the specific mirror. “HTR” (heater) controls the defog/defrost mirror heater element.

8. Auxiliary Power

9. Chimes Switch

The Step/Chimes switch enables the stepwell light and passenger chime switches. Passengers may signal the driver by chime stop request buttons or touch-tape switches.

10. 110 Volt Switch

11. Fog Light

12. Front Dome Switch

The Front Dome switch provides light in the stepwell area.

13. Driver’s Light Switch

The Driver’s Light switch provides light in the driver’s area.

14. Panel Illumination Switch

Push and hold the switch to brighten panel illumination. Release switch when desired brightness is reached.

Push and hold switch to dim panel illumination. Release switch when desired brightness is reached. At next coach start-up, panel illumination will return to the last manual setting.

15. Auxiliary Heat Switch

The Auxiliary Heat switch is a momentary-on type switch. The top switch section must be pushed and held in the “START” or “ON” position to engage the heater. To cancel the pre-heat mode, push the switch down to the “STOP” or “OFF” position.

16. Parcel Rack Ventilation Switch

The Parcel Rack switch activates the parcel rack blowers .

17. RH Blind Switch

18. LH Blind Switch

19. PushButton Shift Selector (Transmission)

The PBSS features six (6) green lights located on the side face of the cover plate which illuminates the console panel during night driving (Figure 22). This feature aids the operator in locating switches in low light environments.

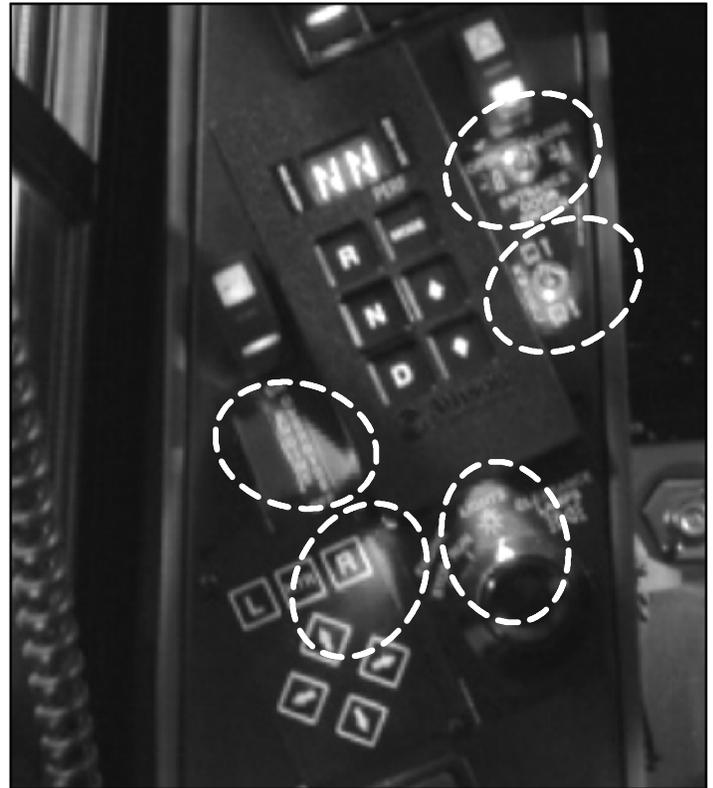


FIGURE 22. PBSS side lights.

20. Cup Holder

SEVEN (7) INCH DIAGONAL COLOR LCD DIAGNOSTIC INTERFACE (OPTIONAL)

Using the diagnostic interface, the operator can select coach electrical or drive train diagnostics to notify garage.

The diagnostic interface can be mounted in the front junction box, or shipped loose in a protective case.

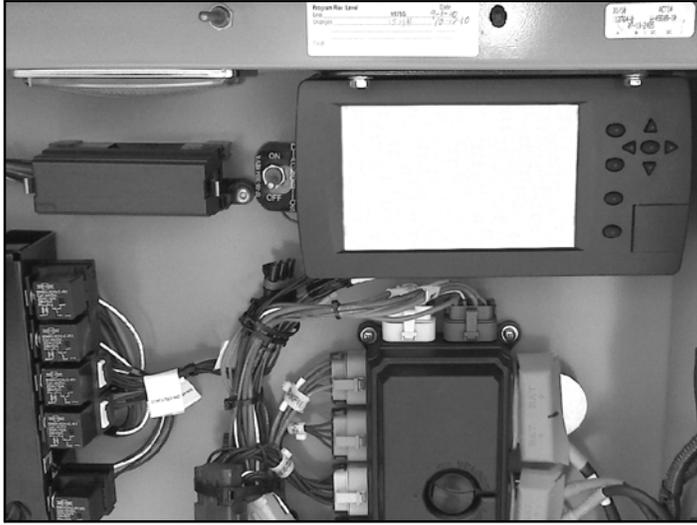


FIGURE 23. Front junction box compartment.



FIGURE 24. LCD diagnostic interface.

NOTICE

The "ship loose" LCD diagnostic interface can be connected to one of three (3) interface port connections: underneath the instrument panel, in the rear junction box, or in the bottom face of the engine compartment remote control box.

To retrieve engine codes using the diagnostic interface:

1. Position the Diagnostic toggle switch to ON,
2. Press the Power Train screen bar on the home screen,
3. Press the Engine Fault Codes screen bar,
4. Navigate through the screen to view active and non-active engine fault codes.

SmartWave Full Function Display

The SmartWave tire monitor system provides real-time tire status data such as pressure and high temperature alerts for all tire positions. It features:

1. ALARM warning light to alert driver,
2. Display screen shows alert icons, tire location and numerical unit of pressure or temperature,
3. Control buttons to scroll through display.

The SmartWave FFD displays the following alerts:

- Pressure Deviation Alert. If a tire deviates from its proper inflation pressure, the operator is alerted to the condition via the warning light.
- Critical Low Pressure Alert. If a tire falls below the programmed cold inflation pressure value, the operator is alerted to the condition via the warning light.
- High Temperature Alert. If a tire's temperature exceeds the pre-determined value, the operator is alerted.



FIGURE 25. SmartWave Full Function Display.

SpeakEasy™ MICROPHONE/RECORDING SYSTEM

The SpeakEasy™ “hands free” digital Microphone/Recording system enables the coach operator to record and playback route or P/R announcements over the inside and outside speaker systems.

The microphone is designed to function efficiently from a normal seating distance. Record messages with a normal volume, clear speaking voice. Sit in a normal position in the driver’s seat to make the recording. It is not necessary to try and lean closer to the microphone in the SpeakEasy™ unit.

The footswitch provides foot control for recording and playing back of inside messages without having to hold a hand-held microphone for PA announcements. During recording/playback of all messages, the driver’s AC/Defroster blower temporarily stops to prevent background noise.

Record Playback Procedures

The following procedures provide information on how to record and play back “Outside” and “Inside” messages.

INSIDE MESSAGES

Inside messages are recorded and played back using the SpeakEasy™ Footswitch (Figure 26). The green Indicator Light monitors Inside Message functions.

The Interior/Exterior Speaker toggle switch located on the left hand console panel must be set to “INT” (Internal Speaker).

Interior Speaker volume is controlled by the Volume Control knob located on the top of the Paging amplifier.

1. Press and hold down the SpeakEasy™ footswitch. The green indicator light will illuminate, indicating Inside Recording is enabled.
2. Begin speaking into the unit-installed microphone to generate the message. Fifteen (15) seconds maximum recording time is available for the message.
3. Release the SpeakEasy™ footswitch. The message will play back over the inside speakers.

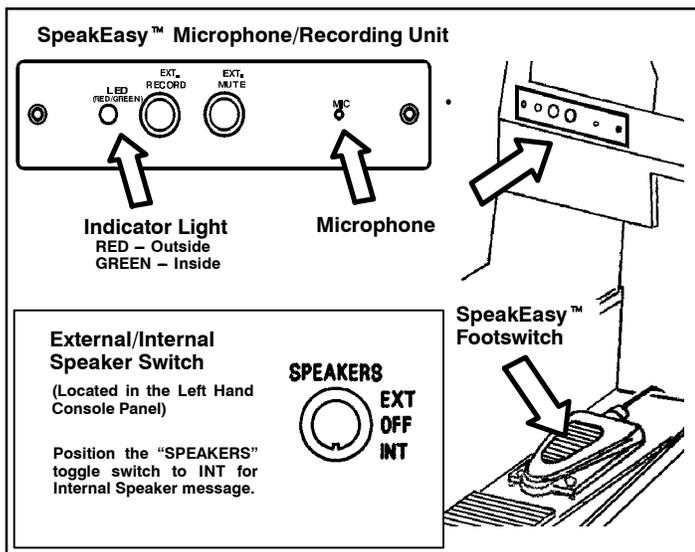


FIGURE 26 – Inside Message Recording

OUTSIDE MESSAGES

The “EXT. RECORD” and “EXT. MUTE” push buttons on the face of the dash-mounted SpeakEasy™ unit control Recording, Muting and Clearing of outside messages. Recorded outside messages play back to the outside PA speaker mounted above the entrance door.

Exterior Speaker volume is controlled by the Exterior Speaker Volume knob located on the LH console panel.

Recording Outside Messages

Close the ent. door before beginning the outside message recording process. This is necessary, because the system is designed to play back messages when the door opens.

1. Press and hold the “EXT. RECORD” button located on the SpeakEasy™ dash-mounted unit. The red indicator light will illuminate.
2. Begin speaking into the unit-installed microphone to generate the message. Fifteen (15) seconds maximum recording time is available for the message.
3. Release the “EXT. RECORD” button when finished recording the message. The “Outside” message will play once, each time the bi-part door opens.

Muting Outside Messages

1. Press and release the “EXT. MUTE” button located on the SpeakEasy™ dash-mounted unit. The red indicator light will illuminate and flash every five (5) seconds.
2. Resume the outside message by pressing and releasing the “EXT. MUTE” button. The red indicator light will stop flashing and extinguish.

Clearing Outside Messages

Two methods can be used to clear outside recorded messages from the program:

1. Record a new message over the existing message by following the procedure under the previous heading: “Recording Outside Messages”.
2. Press and release the “EXT. RECORD” button which also erases the existing message.

Redirecting messages To Outside Speaker

The SpeakEasy™ Footswitch can be used to record and play back “on-the-fly” messages for the outside speaker with the door open or closed. The same procedure for “inside” Footswitch record/playback is used, except the Interior/Exterior Speaker toggle switch located on the left hand console panel must be set to “EXT” (Exterior Speaker). The following steps specifically define the procedure:

1. Press and hold down the SpeakEasy™ footswitch and speak into the unit-installed microphone to generate the message. Speak in a normal volume, clear voice. It is not necessary to lean closer to the microphone. Fifteen (15) seconds maximum recording time is available for the message.
2. Before releasing the footswitch to activate replay of the recorded message, position the External/Internal speaker toggle switch to the “EXT” position.
3. While continuing to hold the “SPEAKER EXT” switch, release the SpeakEasy™ footswitch. The message will play back over the outside speaker.

SpeakEasy 2™ HANDS-FREE SYSTEM

The SpeakEasy 2 system allows the operator to record and playback route or public address announcements over the inside and/or outside speaker systems.

A footswitch allows messages to be recorded without having to hold a microphone. During recording and playback, the driver's defroster blower temporarily stops.

Recording and Playback of a Message

1. Select the appropriate playback speaker(s), using the INSIDE, OUTSIDE or BOTH switch on the control head.
2. Press and hold the footswitch, then in a normal voice begin speaking. The indicator light will illuminate as long as the footswitch is held.
3. At the end of the message release the footswitch. The same message will play back over the speaker(s).
4. The message can be cancelled by quickly pressing and releasing the footswitch.

Recording an Automated Outside Messages

Close the bi-part door before recording, because the system is designed to play messages when the door opens.

1. Press and hold the RECORD button located on the control head, then in a normal voice begin speaking. The indicator light will illuminate as long as the button is held.
2. At the end of the message release RECORD button. The same message will play back over the outside speaker each time the door is opened.
3. Repeat Steps 1 and 2 if necessary until a satisfactory message has been recorded.

Muting Outside Messages

1. Press the MUTE button located on the control head to mute the outside message at a particular stop. The indicator light will illuminate.
2. Resume the outside message by pressing the MUTE button prior to reaching the next stop. The indicator light will be OFF.

Clearing Outside Messages

The outside message can be cancelled by quickly pressing and releasing the footswitch, or by shutting down the coach.

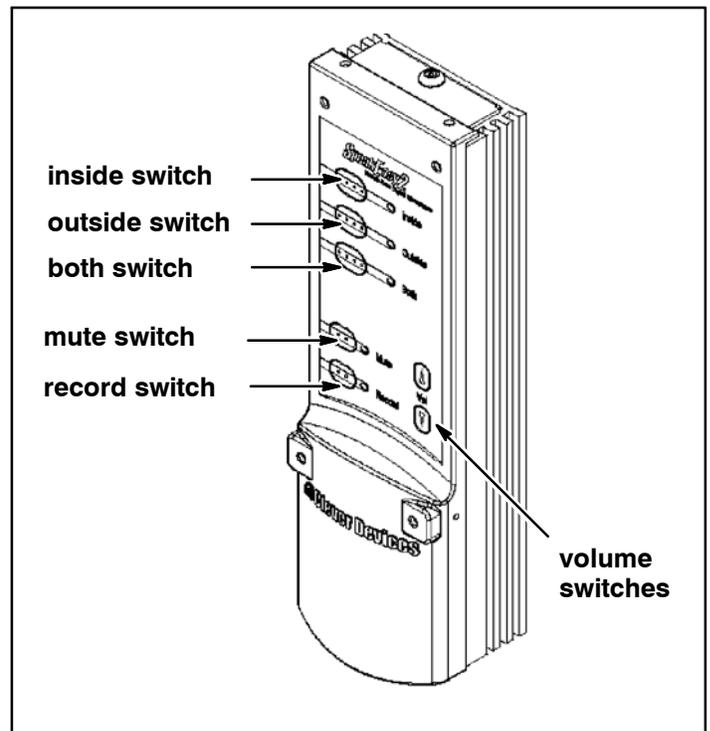


FIGURE 27 – SpeakEasy 2 Control Head

4-STEERING COLUMN & FLOOR MOUNTED CONTROLS

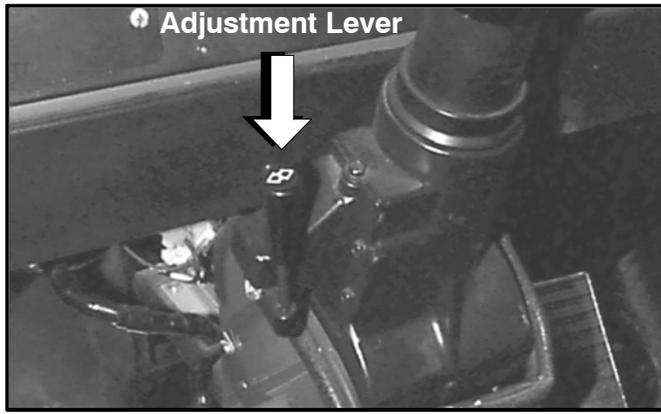


FIGURE 28

Steering Column

The adjustable tilt and telescoping steering column control lever is located on the left side of column (Figure 28). Tilt angle can be adjusted to four positions, in addition to being adjusted up (OUT) and down (IN) as required. Before making any adjustment, position seat properly.

Push the tilt lock lever located on the left side of the steering column outward from the column. Hold the steering wheel and pull or push to the desired tilt position.

To lower or raise the steering wheel, push the lock lever toward the steering column using your left hand. Grasp the center of the steering wheel with your right hand and raise or lower to the desired position.

NOTICE

Ensure that the direction of force is applied to the center of the steering wheel.

In each case, release lock lever to lock column in desired position.

! WARNING

After adjusting steering column, apply force to the steering wheel to ensure that column is firmly locked before driving. Do not attempt adjustment of the steering column while coach is in motion. The steering column could suddenly move, causing driver to loose control.

NOTE: The coach can still be safely steered if a power assist steering system malfunction occurs, however, a much greater force is required when turning.

Directional Signal - Foot (IF APPLICABLE)

The optional directional signal switches are mounted on a separate foot console located next to the driver's foot rest. RH/LH signals are selected by pressing the momentary-on foot-operated switches. (Figure 29)

Pre-Trip Inspection (IF APPLICABLE)

The exterior lights and dash tell-tales automatically activate for two minutes, when both foot-operated signal switches are pressed simultaneously.

Headlamp Dimmer - Foot

The hi/low headlight beam is selected by pressing the foot-operated dimmer switch on the driver's foot rest. Each time the switch is pressed, the headlight beam changes from one setting to another. (Figure 29)

Headlamp Dimmer - Hand

The steering column mounted turn signal switch incorporates the headlamp high and low beam switch. Lift switch lever UP and release to change from one setting to another. The blue HI-BEAM telltale illuminates on high beam.

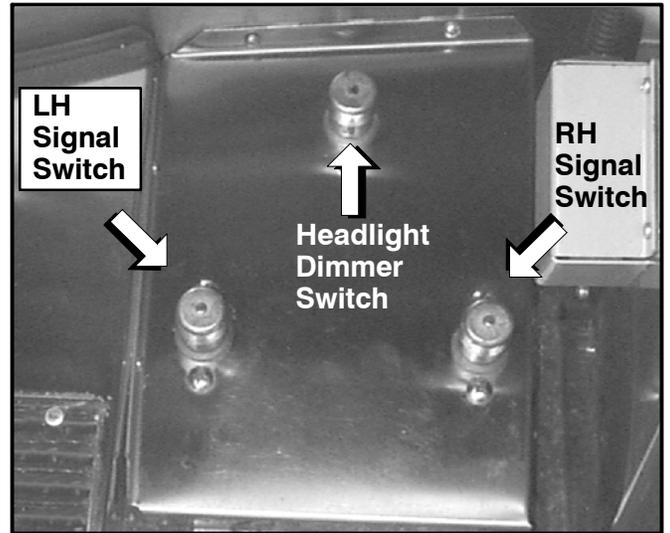


FIGURE 29. Drivers Foot Switches.

Horn Control - Foot (IF APPLICABLE)

The foot operated horn is located on the driver's foot rest.



FIGURE 30. Foot Operated Horn Switch.

Horn Control - Hand

The horn is actuated by pressing the MCI button in the center of the steering wheel.

Service Brakes

The coach is equipped with air-operated service brakes which are applied using the foot pedal to the left of the accelerator pedal. The amount of pressure applied to the pedal determines the extent and force of the brake application.

NOTICE

Air system pressure must be at least 100 psi (689 kPa) before brakes can develop their full effectiveness. Observe the air pressures indicated on the dual air gauge at frequent intervals during coach operation.

CAUTION

“Fanning” or “pumping” the brake pedal is not recommended. This practice does not increase the effectiveness of the brake system. It wastes air and causes unnecessary wear on brake parts.

Stop lights on the rear of the coach automatically illuminate when the brake pedal is depressed. A tell-tale light on the dash illuminates when stop lights are activated.

ANTI-LOCK BRAKE SYSTEM (ABS)

The ABS (Anti-lock Brake System) minimizes the potential of “brake lock-up” in low-traction road conditions or in “panic stop” braking situations. The coach retains a greater degree of stability and steerability.

During braking, the Anti-lock Brake System automatically senses any impending wheel lockup due to loss of traction. The system monitors deceleration rates during braking and automatically adjusts brake application pressures at each wheel.

High-Traction Road Conditions

The Anti-lock Brake system is de-energized during normal brake applications on high-traction, dry road surfaces. During braking, apply a firm, positive brake pedal pressure.

Low-Traction Road Conditions

Do not “pump” or “fan” the brakes in low-traction road conditions. Applying firm, positive pedal pressure “energizes” or activates the ABS. The sensors and modulator valves cause the brakes to “pulse” or “modulate” at a very rapid rate, sensing which wheel is near lockup because of less traction and which wheel has enough traction. Brake pressure automatically adjusts at each wheel.

“Panic Stop” Braking Conditions

Do not “pump” or “fan” the brakes in “panic stop” braking conditions. Applying firm, continuous, heavy pedal pressure “energizes” or activates the ABS. The brakes then “pulse” or “modulate” at a very rapid rate, sensing which wheel is near lockup because of less traction and which wheel has enough traction. Brake pressure automatically adjusts at each wheel. In this way, traction is maintained between the road surface and tires, increasing the potential for stable, non-skid stops.

An “ABS” indicator light in the RH telltale cluster tells the condition of the Anti-lock Brake System. Upon coach starting, the indicator first flashes, then steadily illuminates. At approximately 5–7 mph, the indicator shuts off and stays off, indicating the system is working properly. If the indicator illuminates when the coach is moving at road speed (above 5–7 mph), the Anti-lock Brake System is malfunctioning. An ABS malfunction automatically reverts the brake system to standard non-ABS operation.

ELECTRONIC STABILITY CONTROL (ESC)

D series coaches are now equipped with a MeritorWABCO stability control system that features Electronic Stability Control (ESC) combined with Roll Stability Control (RSC). ESC is a computerized technology that can improve a vehicle’s handling by detecting and potentially preventing skids by automatically applying brakes to help steer the vehicle where the driver wants to go.

ESC is automatic in that these systems become active when the system Electronic Control Unit (ECU) senses conditions that could produce imminent roll or directional instabilities. Rapid lane changes or cornering at excessive speed on dry or slippery surfaces can create the potential for spinout or driftout, often before the operator is aware. The ESC system uses a lateral accelerometer, a steer angle sensor in the steering column and a yaw rate sensor to enhance the operator’s control in these conditions.

NOTICE

The stability control system is designed to assist the operator, not to replace the operator. The operator will notice a difference in the coach when the ESC system becomes active, but should continue to drive as normal and provide any additional needed corrections. In an ESC event, the operator may first sense a decrease in engine power as the system ECU overrides the accelerator pedal, and may then sense additional deceleration from an engine brake application and service brake applications on the steer axle brakes or all axle brakes, depending on whether the conditions suggest the possibility of a directional control or a rollover event.

Releasing Service Brakes

In the event a normal service brake application fails to release, reduce air pressure to below 75 ± 5 psi (517 ± 34.5 kPa) by pumping brake pedal. Operate engine until dual air gauge reads above 100 psi. Make a normal service brake application and then release it, or make a normal park brake application, release it, and then make a service brake application and release it. One of these procedures should free the brakes.

CAUTION

Use the following release procedure to free service brakes. Do not attempt to break coach free with engine power if brakes fail to release.

Parking and Emergency Brakes

The coach is equipped with an air-operated parking brake control valve for parking the bus and for emergency braking function. Operation of the system is as follows:

Normal Operation

1. Stop the coach by firmly applying the Service Brake pedal. Pull up on the park brake valve knob to set the park brakes. Brakes will remain applied and locked, even if coach air pressure is lost. Always apply parking brakes by pulling up on the park brake valve knob before leaving coach.
2. Put the transmission in neutral by firmly pushing on the "N" button on the Transmission Touchpad.
3. Before moving the coach, the air pressure gauge must read 100 psi (689.5 kPa) or more.

Park Brake Release

With coach air pressure at 100 psi (689.5 kPa) or more, push the parking brake control knob down, followed by a full service brake application. Parking brake release should allow normal service brake operation.

Emergency Parking Brake Release

The emergency parking brake release valve is a manually operated on-off control. It is used to manually release the emergency park brake. The valve is spring loaded and remains in the exhaust (button out) position constant manual force is applied.

CAUTION

Fully apply the service brakes to ensure complete release of the park brake. If the park brake fails to release, refer to the park and service brake release procedure on the preceding page.

The Wheelchair Lift Sidewall Access Door and the Wheelchair Lift Access Door must be closed before the park brake will release.

The parking brake is interlocked with, and affects the operation of several other coach components. The relationship between these components and the park brake interlock is shown in the following:

KNEELING FEATURE - APPLYING the Park Brake energizes the kneeling relay when the kneeling switch is activated. RELEASING the Park Brake de-energizes the kneeling relay; the coach returns to ride height if in the kneeling mode.

WHEELCHAIR LIFT - Manually applied push/pull valve can be in any position. Opening either the wheelchair access door or lift door also electrically sets the park brake.

NOTICE

The Park Brake is required to be manually set whenever the driver leaves the driver seat.

NOTICE

At coach speeds less than 2 mph, the wheelchair lift park brake interlock is set.

THIS PAGE INTENTIONALLY LEFT BLANK

5 – MISCELLANEOUS COMPONENTS AND CONTROLS



**FIGURE 31. Driver's Area Window Blinds.
Windshield and Driver's Window Blinds**

Blinds are provided for the windshield and for the driver's window (Figure 31). The blinds easily adjust to the desired position by pulling down on the blind handle tab to lower or by pulling the release cord to raise to the desired position. Optional motorized front windshield blinds are available with control switches located on the lower LH switch panel.



FIGURE 32. Driver's Modesty Panel.

Driver's Modesty Panel

A driver's modesty panel and black acrylic shield is located at the back of the driver's seat. The panel provides driver protection and closes off the driver's area during night time operation. The panel extends from the driver's guard rail to slightly above the top of the passenger windows (Figure 32).

LUMINATOR® Destination Sign System (IF APPLICABLE)



FIGURE 33. Operators Display Keyboard II.

The Luminator Information Display System is a series of signs and a computerized Operators Display Keyboard II (ODK II).

The Luminator sign system displays destination, public relations, and route number information to waiting passengers. A Front Destination, Side Destination, Side Route, or Dash (Route) Run sign can be operated and controlled through the Operators Display Keyboard II (Figure 33).

Each of the destination signs have their own unique address, so that each sign receives only pertinent information. All display messages are programmed through the ODK II.

The ODK II uses a flash memory card as the standard method of updating programming. A connector for the flash memory cards is located behind the rubber cover on the front of the ODK II (Figure 33).

ODK II keyboard II & Functions

This list identifies all the keys and briefly explains the operation and purpose of each control key.

MENU – Accesses advanced programming options.

SELECT – Pressing selects additional characters **G–Z** on message entry.

MESSAGE TEXT – Not Used.

ROUTE – Pressing enables setting Run number entry.

P/R – Press to enable Public Relations message code entry. (This key is enabled only if Public Relations messages are programmed.)

DEST A & DEST B – enable destination message code entry or message display change. These keys are permanently enable.

0 through 9 – These numbered keys enter message codes and are permanently enabled, but are sequence dependent. A Destination or enabled Public Relations key must be pressed first for these number keys to function.

A through F – These alphabetical keys enter messages codes in conjunction with **0 through 9** numerical keys and are sequence dependent. Normally these keys are enabled for code entry only if the message codes contain these alpha characters.

ENTER – This key activates the selected message code, is permanently enabled and is sequence dependent. The key functions only if the code entry field (shown on the message display after pressing a destination or enabled public relations key) contains a code.

ARROW KEYS – These keys provide directional scrolling for the various functions.

ODK II startup & normal operation

When the sign system is powered up, the ODK II indicates “SYSTEM INITIALIZE...PLEASE WAIT”. This message is then followed by a scrolling dot indicating the ODK II communication has not been established. One communication is established, the last message entered before power shutdown is displayed in the ODK II message display.

All messages such as: Destination, Public Relations (P/R) and Emergency are selected at the ODK II.

“Silent Alarm” Initiated Emergency Message

As a safety feature, The Luminator IDS can be linked to a silent alarm. The silent alarm is activated by pressing your left foot upwards on the button of the alarm switch box. When the driver activates the alarm, the Operators Display on the ODK II will display “ Public Service “, while the exterior Front and Side Destination signs will display “ Call Police “. The ODK II systems message “ Public Service “ will verify to the operator that the alarm has been activated.

NOTE: The ODK II emergency message can be erased by entering a new destination code.

Basic function & Operation

Any programmed message can be displayed any time during normal operation by entering a new message code. A valid destination must be entered before a P/R (Public Relations) message entry.

The Destination Sign system begins operation as soon as it is powered up, however some basic “keying in” functions are required.

Destination “A” or “B” may be used.

Example – To enter and display message No. 15: push DEST. A Key, then Number Keys 1 and 5, then the “ENTER” Key. Wait 5 seconds.

Example – Display Public Relations (P/R) (add on) Message No. 12: Push P/R Key, then Number Keys 1 and 2, then the “ENTER” Key. Wait 5 seconds.

Example – Recall Destination “A” and display: Push DEST A Key, then the “ENTER” Key. Wait 5 seconds.

NOTICE

The Public Relations message can be erased by pushing “P/R Key”, then Number Key 0 (or 000), then the “ENTER” Key.

Sedan Entrance Door (IF APPLICABLE)

An air-operated sedan entrance door is installed on the D4000 / D4005 / D4500 / D4505 series coaches (Figure 34). The door may be opened or closed from the driver's area or from the exterior door switch located in the curbside exterior pocket. Operation of the coach door is explained as follows:

1. Position the switch to the OPEN or CLOSED direction to maintain door motion.
2. The door operation can be interrupted in mid-cycle by releasing the switch.
3. The door lock will engage when door reaches full closed position.
4. The door will operate normally when coach air pressure is maintained between 90 and 120 psi. The door will begin to move slowly and lose power with air pressure below 90 psi.
5. The door will operate normally when coach air pressure is maintained between 90 and 120 psi. The door will begin to move slowly and lose power with air pressure below 90 psi.



FIGURE 34

Bi-Parting Entrance Door (IF APPLICABLE)

An air-operated Bi-Parting entrance door is installed on the D4000 / D4005 / D4500 / D4505 series coach (Figure 35). The door may be opened or closed from the driver's area or from the exterior door switch located in the curbside exterior pocket. Operation of the coach door is explained as follows:

1. Position the switch forward or rearward to open or close the door.
2. The door operation can be interrupted in mid-cycle by moving the switch in the opposite direction.
3. The door lock will engage when door reaches full closed position.
4. When the main battery disconnect is switched to "OFF" position, the door will close automatically.
5. The door will operate normally when coach air pressure is maintained between 90 and 120 psi. The door will begin to move slowly and lose power with air pressure below 90 psi.



FIGURE 35

Exterior Entrance Door Switch

An exterior door switch is enclosed in a pocket located directly to the left of the entrance door. A spring-loaded snap cover encloses the switch.

Entrance Door Overrule Valve

The manually-actuated entrance door overrule valve provides for the emergency dumping of air from the entrance door actuating air cylinder, door claw and header locking devices. After dumping air the entrance door can be pushed open. The valve is located on the RH corner panel.



FIGURE 36

The overrule valve can also be operated from the front junction box cable knob (Figure 37).

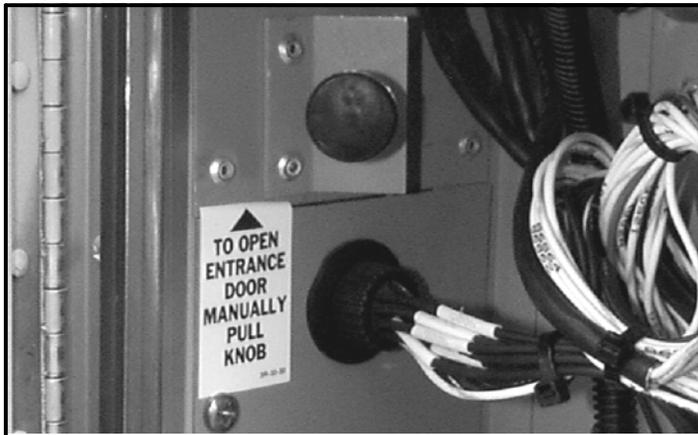


FIGURE 37

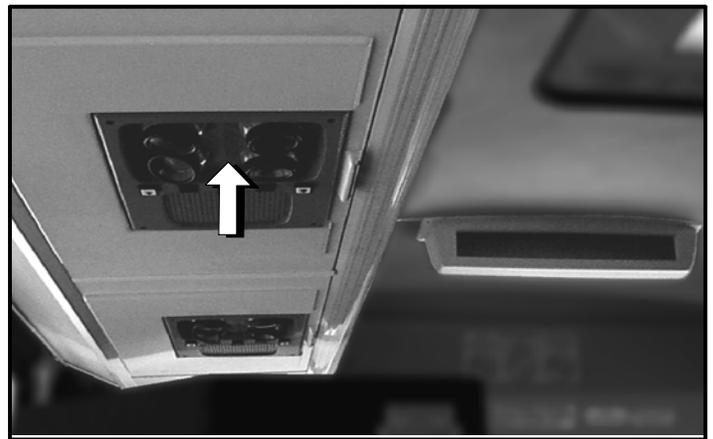


FIGURE 38

Passenger Stop Request

A stop request button is accessible to each passenger in the parcel rack service module (Figure 38). When a button is pressed, an amber telltale in the RH Telltale Cluster illuminates and the Spotter's Display in the ceiling cap panel shows a "Stop Requested" message.

Wheelchair Stop Request Tape Switch (IF APPLICABLE)

The Wheelchair Stop Request Tape switches are mounted in the LH/RH wheelchair parking areas, on the wheelchair lift door and on the opposite roadside wall below the window. Pressing the Tape Switch illuminates a blue telltale in the RH Telltale cluster.

NOTE: After making the requested stop and closing the entrance or wcl door, the tell-tale automatically cancels.



FIGURE 39

Driver's Compartment - Locking (Optional)

The roadside and curbside #1 Parcel Rack compartment includes a door with a keyed-alike lock. This lock can be set for either unlocked or locked mode. This provides privacy and security for the driver's items and audio/video components.



FIGURE 40

Parcel Rack Capacity

The maximum capacity for a single section of parcel rack is 75 lbs. For coaches not having the optional parcel rack doors, a daily inspection of the load restraining cords is required to ensure they are in good condition.

Kneeling System

The driver activated kneeling feature allows the front of the coach to be lowered 3 to 6 inches for passenger entry. After boarding is complete, return the coach to normal travel height by moving the "KNEEL" Switch to the "UP" position. The system components are installed in a control box located in the No. 1 baggage bay. Manual override valves are mounted in the control box to bypass the kneeling feature.

System Operation

The kneeling system can be activated only when the door closed, the Park Brake applied, the Wheelchair Lift is OFF and air pressure is at 95 PSI (655 kPa). The audible and visual indicators are activated when the kneeling switch, located in the left hand console forward switch panel, is positioned to "DOWN" to activate the kneeling system. The sonalert sounds and the amber light flashes through the complete kneeling cycle. A red "KNEEL" telltale in the right hand telltale cluster also illuminates during the kneeling cycle.

Positioning the kneeling switch to "UP" raises the coach to normal ride height, cancelling the audible and visual kneeling indicators, completing the kneeling cycle.

Back-Up Alarm

An audible back-up alarm is connected to the back-up light circuit. The single pitch alarm is mounted in the engine compartment and is activated automatically when Reverse gear is selected.

Back-Up Lights

Back-up lamps are located in the rear LH/RH satellite doors. Placing the transmission in Reverse gear automatically illuminates the back-up lamps.

Hazard/Warning Lights

A relay automatically activates the hazard warning lights when the passenger door opens, during wheelchair operations or when the transmission is in reverse gear. The hazard/warning lights extinguish when the entrance or wheelchair door closes or the transmission reverse gear range is not selected.

Stop Request Sign (IF APPLICABLE)

The Stop Request Sign is located in the front ceiling cap above the entrance way. This unit displays programmed messages, "Stop Requested" and other information programmed from the fare box.(Figure 41).

This sign is energized when either the service module signal chime buttons or the wheelchair tape switches are actuated. A latching relay keeps the sign illuminated until the driver's entrance door control switch is activated to open the door.

"REQUEST STOP" telltales illuminate in the RH Tell-tale cluster when a passenger requests a stop. A blue tell-tale illuminates when the wheelchair area tape switch is pressed. An amber tell-tale illuminates when the stop request button in a parcel rack mounted overhead seat module is pressed.

Push the CHIME switch to the "ON" position to enable the chime service module switches. Once the switch is activated, the stepwell light will illuminate when the entrance doors open, and passengers may signal the driver by chime stop request buttons or touch-tape switches.



FIGURE 41

Hubodometer (Optional)

A hubodometer is mounted on the curbside rear wheel to record the total miles the coach has travelled. This is in addition to the coach dash mounted odometer.



FIGURE 42

Auxiliary Heater (Optional)

The auxiliary heater is located in the left rear of the engine compartment. The auxiliary heater turns on automatically to augment the temperature of engine coolant for coach heating.

To preheat the coolant or test the heater, turn the auxiliary heater on with the AUXILIARY HEATER switch.

Auxiliary Heater Diagnostics

The operator can identify function and component diagnostics by checking either the light bars or the new LED display located on the front of the control module (Figure 43).



FIGURE 43. Proheat Control Module LED Display

AMEREX Fire Suppression System

The AMEREX fire suppression system is an automatic system that continuously monitors the engine compartment for fires. The system uses thermo-sensors connected to an electronic circuit monitor/control panel to electrically trigger the release of the dry chemical (ABC) extinguisher.



FIGURE 44 – Fire Suppression Control Panel

NOTICE

The Relay Reset button located on the Amerex control panel is disabled.

Control Panel

The control panel is responsible for driver alerts and for the automatic activation of the system during fire hazards. The control panel has both audible and visual alarms.

Normal Operation

During normal operation, a green System OK LED is illuminated on the front of the control panel. This indicates that all circuits are intact and functioning.

Fire Hazard Conditions

As a safety provision, the operator can extend engine shutdown time for an additional 15 seconds by engaging the ENGINE OVERRULE switch, to allow moving the coach to a safe location. This may be done as many times as necessary to safely bring the coach to a controlled stop.

In the event of fire, the green System OK LED will go out and the red FIRE LED will come on. The system will force chemical fire suppressant through four spray nozzles located in the engine compartment.

An audible buzzer will sound continuously during fires. This alarm will operate until the Push to Silence button is pushed. When the Silence button has been pushed, the Silence Engaged LED will be illuminated.

NOTICE

As a safety provision, the silence feature cannot be operated in advance of a fire or fault condition.

When the fire is extinguished and the thermo-sensor cools, the red FIRE LED will illuminate. The red FIRE LED will remain illuminated until the system is serviced and the monitor is reset.

Fault Condition

If a fault occurs in the system, the Service System LED will be illuminated and will remain so until the condition is repaired.

Manual Operation

The manual function is used when a fault exists that could inhibit auto/electrical actuation via the control panel. During a fire emergency, the driver must manually pull the disarming pin that retains the actuator switch and push the button (Figure 45). The manual fire button is located behind the drivers seat, on the LH side.

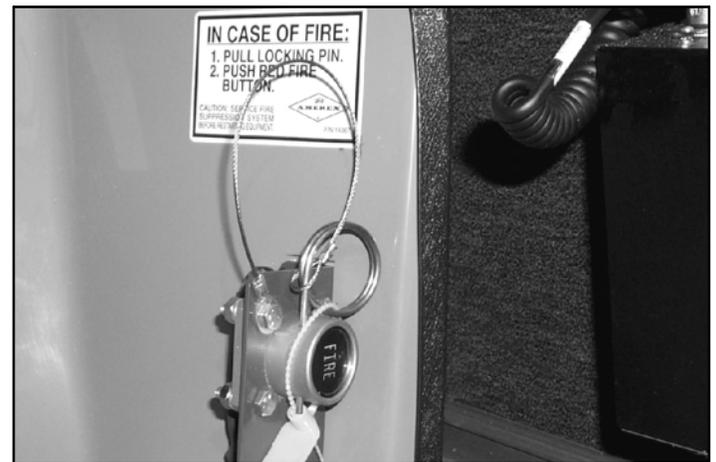


FIGURE 45.

THIS PAGE INTENTIONALLY LEFT BLANK

6–ENGINE OPERATION, DPF REGENERATION, FUEL AND EXHAUST

Starting The Engine / Master Run Control Dial

The controls necessary to start and stop the engine from the operator's compartment are mounted on the instrument panel in front of the driver. These controls and a description of their operation and function follow:

1. Ensure that the main battery disconnect switch is in the "ON" position.
2. Ensure that the Park Brake control knob is pulled "UP", in the parking brakes "APPLIED" position.
3. Turn the MASTER RUN CONTROL to the "RUN" position.
4. Select NEUTRAL on the transmission shift pad selector on the LH control console.
5. Wait for the "CHECK ENGINE" and the "STOP ENGINE" lights to extinguish. If the system is failure free, the lights will go out within 5 seconds.

CAUTION

Do not start the engine when the engine warning lights stay on or do not come on momentarily after turning on the ignition. Operating the engine under these circumstances may cause engine damage.

6. Push the momentary–on "START" switch (located beside the transmission shift pad selector) to start engine. Release the switch when the engine starts.

CAUTION

Do not engage starter for longer than 15 seconds at a time. Allow starter motor to cool before a second attempt. Continuous use of the starter without allowing a cooling period may damage the starter motor.

CAUTION

At coach start-up, operators must not apply the accelerator pedal until the coach air pressure is above 90 psi on the instrument panel gauges. Failure to wait for the coach air pressure reach 90 psi will result in initiating the CHECK ENGINE LIGHT (CEL) and logging fault code 39 into the ECU memory (for low vehicle air supply pressure).

Engine Warm-Up

After the initial starting and low idle engine operation, it is necessary to activate the fast idle for three minutes to bring engine up to temperature, or to quickly fill the air system.

Parking brakes should be kept applied during initial warm-up, and must be on before the fast idle will operate. Observe gauges and telltale lamps frequently during warm-up and subsequent operation. If abnormal conditions develop, stop engine immediately and determine cause.

NOTICE

Fast idle function is interlocked to the park brake.

Stopping The Engine

1. Bring coach to complete stop.
2. Apply the parking brake and place transmission in Neutral.
3. Idle engine at low rpm for 30 seconds, then shut down the engine.

CAUTION

Shutting down a turbo-charged engine directly from a high rpm condition may cause damage to the turbocharger. Idling at low rpm before shutting down the engine assures that the turbine speed has dropped.

Remote Engine Operation

NOTE: This feature is primarily for maintenance purposes. Before attempting to start engine from rear of coach, make sure transmission is in neutral and parking brake applied.



FIGURE 46

Switches for starting and stopping the engine at the rear are mounted on the remote electrical control panel. This panel is located at the left side in the engine compartment. To gain access to the panel, open rear engine compartment doors (Figure 46).

Starting Engine - Remote

In operator's compartment, place Master switch in the "ON" position.

In the engine compartment, put engine switch in the upper position (**ENG RUN**).

Move remote switch to bottom position (**REAR START**) and hold until engine starts. Use the same precautions regarding use of starter as explained under starting engine.

Stopping Engine - Remote

To stop engine at rear, place **ENG RUN** switch to **ENG OFF** position.

! WARNING

If it is necessary to work on engine without engine running, place remote control and run switches in "off" positions. This breaks the circuit to starter and prevents starting the engine.

Electronic Engine Control System

This system controls the combustion process of the engine through timing and fuel metering relative to internal/external sensor readings. The system continually monitors information from the electronic transmission control system to achieve more fuel efficient shifting.

Various gauges are provided to show engine oil pressure and coolant temperatures, however, the electronic control systems generally monitor conditions that could result in damage to the engine or that are dangerous to coach operation. If during operation the system detects a serious condition, (such as loss of water or oil), it should alert the driver via the telltale warning lights. Audible alarms may also be installed to alert driver of serious engine problems.

The DDEC VI system can be programmed to sequentially reduce power and shut engine down in case of serious engine problems. An **EMERGENCY OVERRIDE** switch is provided to override the (DDEC) automatic engine shutdown system and will allow engine to run for an additional 30 seconds so that coach may be moved to safe parking area. Use the switch as often as necessary.

SEVEN (7) INCH DIAGONAL COLOR LCD DIAGNOSTIC INTERFACE (OPTIONAL)

Using the diagnostic interface, the operator can select coach electrical or drive train diagnostics to notify garage.

The diagnostic interface can be mounted in the front junction box, or shipped loose in a protective case.



FIGURE 47. Front junction box compartment.



FIGURE 48. LCD diagnostic interface.

NOTICE

The “ship loose” LCD diagnostic interface can be connected to one of three (3) interface port connections: underneath the instrument panel, in the rear junction box, or in the bottom face of the engine compartment remote control box.

To retrieve engine codes using the diagnostic interface:

1. Position the Diagnostic toggle switch to ON,
2. Press the Power Train screen bar on the home screen,
3. Press the Engine Fault Codes screen bar,
4. Navigate through the screen to view active and non–active engine fault codes.

DIESEL PARTICULATE FILTER (DPF) REGENERATION

MCI coaches with an EPA 2010 engine are equipped with a diesel particulate filter (DPF) and a regeneration system which work together to reduce particulate emissions.

On MCI coaches there are three regeneration modes:

Passive Regen – Normal engine operation provides sufficient exhaust temperature for regen to occur with no noticeable effects to the driver.

Active Regen – Normal engine operation does not provide sufficient exhaust temperature for passive regen to occur. Regeneration system raises the exhaust temp for regen to occur.

Stationary Regen – Normal operation of the engine will not allow for passive or active regeneration to occur. The operator must initiate a regen with the remote switch.

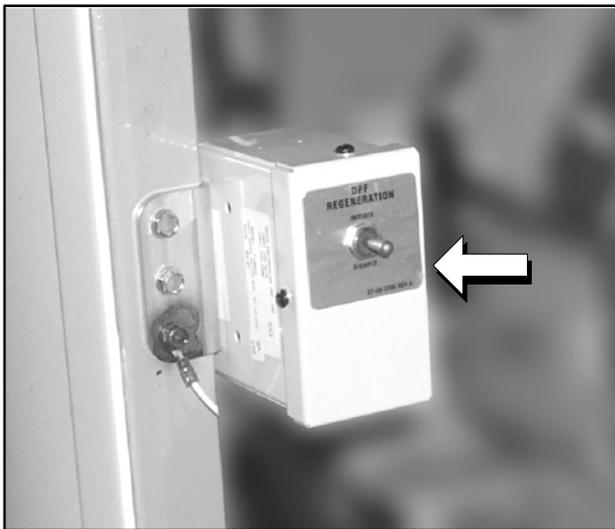


Figure 49. Regeneration switch, located in the curbside, rear service compartment

! WARNING

To avoid serious personal injury or property damage, ensure that no persons or objects are at or within two feet of the exhaust outlet at any time during a regeneration.

Ensure that exhaust and outlet are clear of any trash, grasses, or other vegetation or debris.

Use extreme caution during a stationary regeneration, as exhaust gas tail pipe outlet temperatures can exceed 900 degrees F (482 degrees C).

Stationary regenerations are to be performed outdoors only.

DO NOT leave the coach unattended during a stationary regeneration.

DO NOT perform inside a garage or maintenance facility.

DO NOT attach an exhaust extraction hose to the exhaust outlet.

MCI coaches with an EPA 2010 engine are equipped with two (2) specific tell-tales for the regeneration system:

Regeneration Tell-tale Lamp (DPF)– Tell-tale illuminates when a regeneration is required. Tell-tale is OFF during regeneration.

High Exhaust Temperature Tell tale Lamp (HET)– This tell-tale will illuminate when the coach is moving at a low speed and the exhaust outlet temperature exceeds the predetermined level.



Figure 50. ACTIA LH tell-tale.

ENGINE SPECIFIC REGEN STRATEGY / CUMMINS (2010 EPA)

Before a parked or stationary regen can occur, these requirements must be met:

- The DPF tell-tale lamp illuminated (solid or flashing),
- Vehicle speed is 0 MPH.,
- Locate the transmission push–button shift selector. While making a service brake application, cycle the push–button shift selector by pressing Neutral,
- Locate the Park brake. While making a service brake application, cycle the Park brake ON–OFF–ON. Park brake is applied,
- The HVAC system is OFF,
- Engine running at idle speed (Not fast idle),
- Park brake is applied,
- Service brake released,
- the exhaust and outlet are clear of any trash, grasses or debris.

Hold up the regen switch to the "Initiate position" for 5 seconds and release. Do not move the switch to the "Regen Inhibit" position.

A Stationary Regen can be disabled by:

Disabling one or more of the Stationary Regen requirements, or,

Toggle the Regen switch to "Inhibit position" for 5 seconds, or,

Turning OFF the ignition switch.

An Active Regen can be disabled by:

The Park Brake is applied, or transmission is in Neutral or Reverse gear.

Stationary Regen Operation

DPF tell-tale lamp will illuminate for 1 sec and turn OFF for the duration of regen,

Engine RPM will rise to 950 RPM,

HET tell-tale lamp will illuminate after approximately 3 minutes indicating high exhaust temperature during the regen and remain on until after the exhaust is below the predetermined temp,

Duration of the regen is 20–60 minutes depending on the level of soot in the DPF,

When the regen is completed, all telltales will be OFF, engine RPM will return to idle.

Fuel System

When servicing any of the diesel engine installations, refer to the applicable manufacturer's Diesel Engine Service Manual. Fuel system components which require periodic maintenance include the engine air cleaner and fuel filters. Care must be taken when filling the fuel tank to prevent entry of dirt and water.

! WARNING

Do not smoke while handling fuel.

Should gasoline be put into the main or auxiliary fuel tank(s) by mistake, the tank(s) must be completely drained and refilled with diesel fuel. Gasoline will damage the engine. If the engine has been run with gasoline in the tank(s), then the entire fuel system must be drained since the fuel pump will have pulled the gasoline into the lines and filters and into the pump and engine.

Fuel Specification

Engines must comply with EPA mandated low emission guidelines by using ULSD (ultra low sulfur diesel) fuel.

Failure to use ULSD fuel in 2010 EPA engines will result in component damage.

Diesel Exhaust Fluid (DEF)

The DEF fuel tank is separate from the diesel tank, located at the curbside, rear corner of the #3 baggage bay compartment (Figure 51). Open the DEF fuel door to access the blue cap on the tank.

Diesel Exhaust Fluid (DEF) Specification

DEF must meet ISO standard 22241-1.



FIGURE 51

Diesel Fuel Contamination

The most common form of diesel fuel contamination is water. Water can be introduced to the fuel supply through poor maintenance (loose or open fuel tank cap), a contaminated fuel supply, or condensation.

NOTE: Use care in the storage and handling of diesel fuel to prevent contamination by dirt and water.

Condensation is particularly prevalent on units which stand idle for long periods of time. Ambient temperature changes cause condensation in partially filled fuel tanks.

FUEL PRO FUEL FILTER (Optional)

The Fuel Pro extends filter change intervals and features a clear cover that provides visual identification of the fuel level (Figure 52). When the fuel level reaches the change filter line on the filter cartridge, the element should be replaced at the next scheduled maintenance interval. Fuel filters should be replaced as a set.

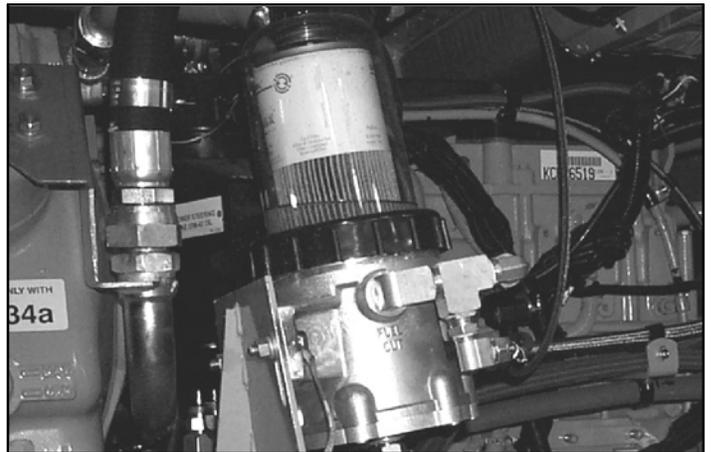


FIGURE 52

CAUTION

2010 EPA engines must only use CJ-4 engine oil. If the ambient temperature is above 15 °F (-9.5 °C), 15W40 oil must be used. If the ambient temp. is below 15 °F (-9.5 °C), 5W40 must be used.

Failure to use CJ-4 engine oil in 2007 EPA engines will reduce component life.

All diesel engines require heavy-duty lubricating oils. Basic requirements of such oils are lubricating quality, high heat resistance, and control of contaminants. The reduction of friction and wear by maintaining an oil film between moving parts is the primary requisite of a lubricant. Film thickness and its ability to prevent metal-to-metal contact of moving parts is related to oil viscosity.

Oil quality is the responsibility of the oil supplier. (The term "oil supplier" is applicable to the refiners, blenders, and rebranders of petroleum products, and does not include distributors of such products.)

There are many brands of commercial crankcase oil marketed today. Obviously, engine manufacturers or users cannot completely evaluate the numerous commercial oils. The selection of a suitable lubricant in consultation with a reliable oil supplier, observance of his oil drain recommendations (based on used oil sample analysis and experience), and proper filter maintenance, will provide the best assurance of satisfactory oil performance.

Temperature is the most important factor in determining the rate at which deterioration or oxidation of the lubricating oil will occur. The oil should have adequate thermal stability at elevated temperatures, thereby precluding formation of harmful carbonaceous and/or ash deposits.

The piston and compression rings must ride on a film of oil to minimize wear and prevent ring seizure. At normal rates of consumption, oil reaches a temperature zone at the upper part of the piston where rapid oxidation and carbonization can occur. In addition, as oil circulates through the engine it is continuously contaminated by soot, acids, and water originating from combustion. Until they are exhausted, detergent and dispersant additives aid in keeping sludge and varnish from depositing on engine parts, but such additives in excessive quantities can result in detrimental ash deposits. If abnormal amounts of insolubles form, particularly on the piston in the compression ring area, early engine failure may result.

Oil that is carried up the cylinder liner wall is normally consumed during engine operation. Oil and additives leave carbonaceous and/or ash deposits when subjected to the elevated temperatures of the combustion chamber. Deposit amounts are influenced by the oil composition, additive content, engine temp., and oil consumption rate.

Policy On Lubricant Additives

MCI does not recommend or support the use of any supplementary lubricant additives. These include all products are marketed as top oils, break-in oils, graphitizers, and friction-reducing compounds.

NOTICE

Refer to the Capacity Chart in the Specifications portion of this manual for the correct oil capacity of your engine.

! WARNING

Do not breathe or inhale the exhaust fumes. Exhaust gases contain carbon monoxide, a colorless and odorless gas, which can cause unconsciousness and in some instances may be lethal.

If at any time you think exhaust fumes are entering the coach, have the cause determined and corrected as soon as possible. If you must drive under these conditions, discharge passengers if possible and drive with all air vents fully open.

Keep the engine exhaust system, coach body, and coach ventilation system properly maintained to protect against carbon monoxide entry into the coach. Always keep the exhaust tailpipe area clear of snow and other material to help reduce the build-up of exhaust gases under the vehicle. It is recommended that the exhaust system and coach body be inspected by a competent technician anytime the exhaust system or coach has been damaged, whenever a change is noticed in the sound of the exhaust system, and each time the coach has routine maintenance performed.

Keep the air inlet grill clear of snow, leaves, dirt or other obstructions at all times to allow for proper air flow through the coach ventilation system.

Do not operate the engine inside confined areas such as garages without the use of proper exhaust removal systems. Do not operate the engine while parked inside narrow alley ways. If the vehicle must be parked with the engine running for an extended period and is in an unconfined area, turn the HVAC system on to help force outside air into the coach.

7 – TRANSMISSION OPERATION

GEN IV AUTOMATIC TRANSMISSION

The B500 series GEN IV is an electronically-controlled hydraulic auto-shifting six-speed transmission. This transmission controls all aspects of the shift function once placed into the desired drive range. Shift range selections are made with the touch-pad module located on the side console.

A two-character digital display is located at the top of automatic transmission shift selector. The left character of the display, SELECT, designates N, R, or the highest gear available of the selected forward range. The right character of the display, MONITOR, designates the actual gear which is being commanded by the transmission control module (TCM).

Two-character diagnostic codes can be accessed using the touch-pad on the pushbutton shift selector.

The MODE button, can be utilized to invoke a special function that has been programmed into the TCM. A small red light is illuminated on the MODE button when the function is activated.

NOTE: The gear selector should always be in the NEUTRAL position when the coach is parked.



FIGURE 53. GEN IV pushbutton shift selector

Shift Inhibit Logic

This system prevents the transmission from selecting a gear unless there is a full brake application (60 psi), the wheelchair lift is deactivated, and the kneeling feature is deactivated.

Shift Selection

The following is a brief description of the symbols used for gear range selection on the automatic transmission shift selector:

R – REVERSE

N – NEUTRAL

D – DRIVE; the highest forward gear will appear on the SELECT display. The transmission will shift to the starting gear.

During normal operation with **D – DRIVE** selected, the SELECT display shows the highest attainable forward range. The MONITOR display shows the gear which has been commanded by the TCM (actual gear in which the transmission is currently operating).

The UPSHIFT and DOWNSHIFT arrow buttons (▲ and ▼) are used to select a higher, (if not in **D – DRIVE**, or lower, if not in **1**), forward range. One press of the pushbutton changes the range selected by one range. If the pushbutton is held down continuously, the selected range will continue to change up or down until the button is released or until the highest or lowest possible range of gears is selected.

NOTE: Even though a lower range is selected, the transmission may not downshift until coach speed is reduced, thus preventing excessive engine speed in the lower range.

The UPSHIFT and DOWNSHIFT arrow buttons are not functional in **R – REVERSE** or **N – NEUTRAL**.

CAUTION

There is no “PARK” position on the pushbutton shift selector.

ALWAYS apply the Parking Brake to hold the coach while unattended and place the Shift Control Selector in the “N” (NEUTRAL) position.

Refer to “SERVICE BRAKES”, “Park Brake Release” headings for the proper Parking Brake application and release procedure.

When shifting from Neutral to a Drive or Reverse range, the engine should be at normal idle speed. When the coach is parked, the transmission should always be in the “N” (NEUTRAL) position.

Telltale Warning Light

The electronic control system is programmed to alert the driver when something is wrong by illuminating the “CHECK TRANS” in the LH tell-tale cluster.

Illumination of the “CHECK TRANS” at any time after engine start (system check) indicates that a problem has been detected. When a problem condition has been detected, the TCM / ECU will:

- illuminate the “CHECK TRANS” tell-tale lamp,
- flash the display on the pushbutton shift selector,
- restrict shifting, and
- register a diagnostic code.

Generally, while the “CHECK TRANS” lamp is illuminated, upshifts and downshifts will be restricted and direction changes will not occur. The pushbutton shift selector should not respond to any operator shift requests while the “CHECK TRANS” tell-tale lamp is ON.

When the “CHECK TRANS” lamp is illuminated, the transmission will operate in the “Limp Home” mode with reduced capabilities. The Limp Home feature will lockup the transmission in a selected gear to enable continued coach operation for a short time until it can be moved safely out of traffic. Advise service personnel immediately to minimize the potential for damage to the transmission.

CAUTION

Do not attempt shut down of engine or shift transmission until coach is safely parked. If shut down and restart is attempted, the transmission would shift into Neutral, which would discontinue the “Limp Home” feature and leave the coach stranded until fault is cleared.

Allison Diagnostic Code Retrieval

Diagnostic codes, displayed as two digit numbers, indicate a transmission malfunction. Diagnostic codes can be accessed through the pushbutton shift selector. These codes are logged in the TCM / ECU with the most severe or recent code listed first.

A maximum of five codes, identified as d1 to d5, can be listed at one time. As codes are added, the oldest non–active codes are dropped from the list. If all codes are active, the code with the lowest priority not included on the severity list is dropped.

If the displayed code is active, the red light is illuminated on the MODE button. If the displayed code is non–active, the red light will not illuminate on the MODE button.

Pressing the N key on the touch-pad, with the ignition turned ON (engine can be running), will allow the user to retrieve the transmission codes.

To access diagnostic codes, stop the coach in a safe location. Apply the park brake. Simultaneously press the ▲ and ▼ buttons to access the fluid level display mode. Press the ▲ and ▼ buttons again to access the diagnostic display mode.

Observe the two digit display for codes. Press the MODE button to view the next code.

Record all codes.

Diagnostic Code Example

Code – P0722.

Displayed as: d1, P, 07, 22.

Each item is displayed for about one second.

d1 is the diagnostic code list position.

P0722 is the diagnostic code.

Clearing a Fault Code

Record all codes prior to clearing.

With the selector in **N**, simultaneously press the ▲ and ▼ buttons twice. Press and hold the **MODE** button for ten seconds to clear both active indicators and in–active codes. Release the button to return to normal operation.

ALLISON Fluid Level Check

Fluid level diagnostic information, displayed as two digit numbers, can be accessed through the pushbutton shift selector. These checks should in no way take the place of the manually conducted dipstick level check.

The coach must be parked on a level surface with the transmission in Neutral and the park brake applied. The fluid level check may be delayed until the following conditions are met:

- the fluid temperature is above 140F (60C) and below 220F (104C),
- the transmission is in Neutral,
- the engine is at idle,
- the transmission output shaft is stopped,
- the coach has been stationary for approximately two minutes, allowing the fluid to settle.

The pushbutton shift selector will indicate a delayed fluid level check by a flashing display under SELECT and a digital countdown from 8 to 1 under MONITOR.

To access fluid level diagnostic information, simultaneously press the ▲ and ▼ buttons to access the fluid level display mode.

A correct fluid level is reported when an “OL” is displayed (“OL” indicates the Oil Level Check Mode), followed by “OK”. The “OK” display indicates that the fluid level is within the correct fluid level zone. “**OL OK**” indicates correct fluid level.

NOTE: The dipstick check may not agree exactly with sensor checks because the oil level sensor compensates for fluid temperature.

Low fluid level is reported when an “OL” is displayed, followed by “LO” and a number. “LO” indicates a low fluid level, and the number indicates quarts of fluid the transmission requires. “**OL LO 02**” indicates that two additional quarts of fluid should bring the level to the acceptable zone.

NOTE: Confirm an electronically obtained low fluid condition by making a manual fluid level check.

High fluid level is reported when an “OL” is displayed, followed by “HI” and a number. “HI” indicates a high fluid level, and the number indicates quarts overfilled. “**OL HI 01**” indicates one quart past the full level.

Invalid Display conditions are reported when an “OL” is displayed, followed by “--” and a number. The displayed number is a code, and would indicate an improper condition for electronic check or a system malfunction. “**OL -- 70**” would indicate that the oil sump temperature is too low.

NOTICE

The Invalid Display is activated when conditions do not allow the fluid level to be checked. Review the following codes and their associated conditions to assist in quickly correcting the condition.

CODES DESCRIPTIONS

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

To exit the oil level display mode with pushbutton shift selector, press any other button on selector.

THIS PAGE INTENTIONALLY LEFT BLANK

8 – EMERGENCY CONDITIONS

Alarm and Warning System

The coach is equipped with tell-tale lamps and buzzer signals which immediately warn of any abnormal operating conditions. The tell-tale lamps are located on the instrument panel. The buzzer is located in the Front J-Box.

<u>Telltale Light</u>	<u>Buzzer</u>	<u>Condition</u>
REGENERATION (PDF) . NO		Regen is required for 2007 engine
HIGH EXHAUST TEMP . NO		Exhaust outlet temp exceeds level
MIL NO		Failure of an emission component
LOW AIR YES		Air Pressure Low
HOT ENG NO		Engine Overheated
PARK BRAKES NO		Brake On
NOT GEN NO		Generator Not Charging
HI-BEAM NO		Headlight High Beam On
BACK-UP LAMPS NO		Back-up Lamps On
LOW WATER NO		Low Engine Coolant Level
FIRE ALARM YES		Indicates fire in engine compartment
STOP ENG YES		Serious Engine Condition

CAUTION

Gauges and telltale lamps are provided so the operator can observe the operation and condition of various components and equipment.

CAUTION

If abnormal conditions are indicated, take action at once to locate and correct the cause before serious damage can occur. Do not ignore warnings of abnormal operating conditions. Regularly check all gauges and telltale lamps during operation.

Engine Oil Gauge

Normal readings at operating temperatures are 50-70 psi (345-483 kPa) at 1800 RPM. If the oil pressure drops below a safe level during operation, the CHECK ENGINE or STOP ENGINE telltale lights will illuminate. This condition should cause the coach engine to automatically shutdown.

Engine Coolant Temperature (Overheat)

The engine coolant temp. range varies between the different engines. If possible, avoid going to full throttle until engine temp. reaches 140°F (60°C). The engine will come up to normal operating temperature shortly after driving.

If the engine becomes overheated during operation, the CHECK ENGINE or STOP ENGINE telltale lights will illuminate. This condition should also cause the coach engine to automatically shutdown. If overheating occurs, check water level of engine cooling system as directed under Engine Cooling System and look for other possible causes.

Engine Electronic System - Warning

Each engine installation is equipped with an alarm system to warn the operator of an abnormal oil/coolant level and/or temperature condition. Such conditions are indicated by telltale lights on the instrument panel. DDEC equipped coaches have an automatic system to powerdown and/or shutdown engine operation if any abnormal conditions arise.

NOTE: The automatic powerdown or shutdown can be temporarily over-ridden to move the coach to a safe location.

If the engine has begun the 30 second powerdown sequence, the following procedure can be used to keep the coach in motion.

1. Lift the guard and activate the ENGINE SHUTDOWN OVERRIDE switch located on the left side switch panel. Depress the switch at approximately 15 – 20 second intervals as often as required to delay shutdown and move the coach to a safe stop area.

2. Continue coach travel until a safe location is found. Operate engine at lowest RPM possible while moving coach.

If the engine has automatically shut down, the following procedure must be used to restart and move the coach.

1. Momentarily turn the Ignition switch or Master Run switch to the “OFF” position and back to “ON” again.
2. Press the Engine Shutdown Override switch, and attempt to restart engine with the Engine Start switch.
3. Move coach to a safe location. Operate the engine at lowest RPM possible while moving coach.

Alternator - Warning

A tell-tale light marked NOT GEN is located on the instrument panel. This telltale will be illuminated whenever the Master Run switch is “ON” and engine not operating, or when engine is running and alternator is not charging.

If the **NOT GEN** telltale light goes on during normal operation, it indicates that the alternator is not charging. Turn off all electrical accessories, except driving lights at night, to reduce the electrical load on the batteries and obtain service attention as soon as possible.

Power Steering System

If the power steering system goes out because the engine has stalled or due to a hydraulic failure, the coach can still be steered. However, much greater effort is required, especially in sharp turns or in low speed.

Emergency Escape - Roof Hatch

The escape hatch is located in the roof for emergency exiting. The hatch may also be used for ventilation of the passenger compartment during emergencies.

To open in case of emergency, turn then push knob to open as shown in the instructions on roof hatch (Figure 54).



FIGURE 54

Emergency Escape - Side Sash

All side passenger windows can be opened from the inside for emergency escape purposes. Sash is hinged at the top and can be opened by pulling out and up on the release bar, then pushing the sash out. Instruction plates are mounted below the sash on the release bars at each seat location (Figure 55). Inspect regularly to assure latch is secure and serviceable.



FIGURE 55

Hazard and Warning Signal System

The coach is equipped with a flashing signal system which flashes all directional signal lights simultaneously to warn traffic in an emergency. The hazard warning switch, located on the lower left switch panel, is used to energize this signal system. A HAZARD telltale light is illuminated and both turn indicator arrows ◀ ▶ flash when the system is operating.

The Hazard/Warning lights automatically activate when the passenger door opens, the Wheelchair Lift Master Keyswitch is in the "WCL ON" position or when reverse gear is selected. The lights extinguish when the bi-part passenger door closes, the Wheelchair Lift Master Keyswitch is in the "WCL OFF" position and the transmission is not in reverse.

Recommended Tire Inflation Pressures

Ride characteristics and tire wear are affected by tire inflation. MCI recommends that the inflations shown on the certification plate be followed for that size tire. Inflation pressures for tires other than those shown may be found on the chart in the "Specifications" section of this manual.

NOTICE

Only use approved 22.5 – 9 inch tires.

Remote Engine Operation

NOTE: This feature is primarily for maintenance purposes. Before attempting to start engine from rear of coach, make sure transmission is in neutral and parking brake applied.



FIGURE 56

Switches for starting and stopping the engine at the rear are mounted on the remote electrical control panel. This panel is located at the left side in the engine compartment. To gain access to the panel, open rear engine compartment doors (Figure 56).

Starting Engine - Remote

1. In operator's compartment, place Master switch in the "ON" position.
2. In the engine compartment, put engine switch in the upper position (**ENG RUN**).
3. Move remote switch to bottom position (**REAR START**) and hold until engine starts. Use the same precautions regarding use of starter as explained under starting engine.
- 4.

Stopping Engine - Remote

To stop engine at rear, place **ENG RUN** switch to **ENG OFF** position.

! WARNING

If it is necessary to work on engine without engine running, place remote control and run switches in "OFF" positions. This breaks the circuit to starter and prevents starting the engine.

Switch - Battery Disconnect

The main battery disconnect switch, located in the battery compartment, shuts off electrical supply from the batteries to most electrically controlled systems (Figure 57).

Both the 12V and 24V disconnects are combined on the rotary switch. To disconnect batteries, rotate counter-clockwise to "OFF" position.

All electrical circuits are protected by circuit breakers or fuses. The main 24-volt circuit breaker is automatically self-resetting. Smaller circuit breakers of the self-resetting type are also used in the front junction box. These circuit breakers will automatically reset as the breaker element cools.

NOTE: These circuit breakers will continue to open and close intermittently, as long as a short exists. In cases like this, turn the defective circuit off until the cause can be located and corrected.

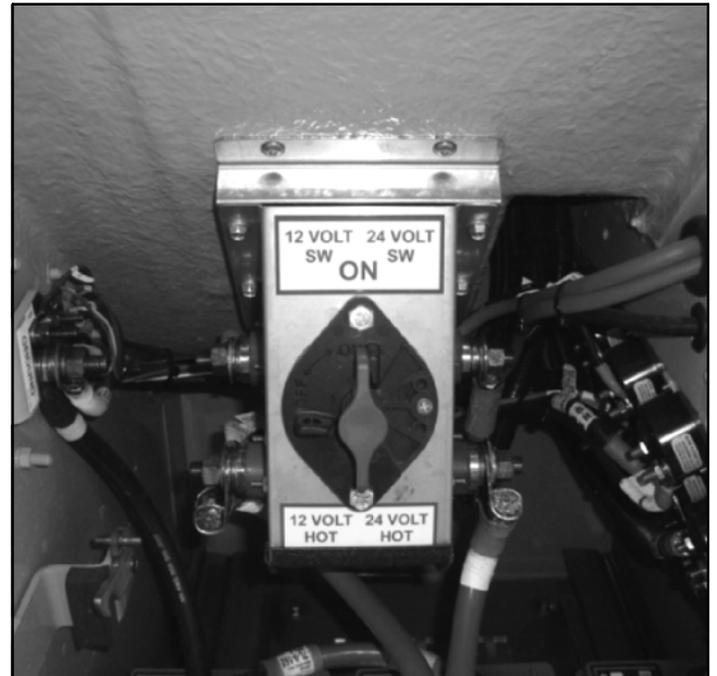


FIGURE 57

Emergency Starting

The coach may require the following emergency battery boost procedures during extreme weather conditions. The negative and positive booster battery posts and distribution cable are inside the right-hand engine compartment.

CAUTION

Do not push or tow this coach to start. This may damage the coach. If the coach has discharged batteries, it can be “jump started” by using energy from another battery. Ignoring the “Emergency Starting” procedures herein outlined could result in: Personal injury or property damage caused by the electrolyte squirting from battery vents or battery explosion.

Damage to the starting or charging system of the booster or immobilized vehicle. Do not attempt to jump start a vehicle with a frozen battery. Frozen batteries may rupture or explode. If a frozen battery is suspected, examine fill vents for ice. If ice can be seen, do not attempt to start the vehicle with jumper cables.

CAUTION

Both the booster battery and discharged battery must be handled carefully while using jumper cables. Follow the “connecting” and “disconnecting” procedures shown. Do not permit vehicles to touch each other as this could establish a ground connection and counteract the benefits of this procedure.

Connecting Booster Cables

1. Ensure that the coach is in neutral and set the park brake. Turn off lights, heater and other loads.
2. Ensure that the battery disconnect is ON.

CAUTION

Always exercise caution when the battery disconnect is ON.

3. Turn the engine run switch OFF. Wait a few seconds to allow the multiplex system to power down.
4. Switch the battery disconnect OFF.
5. Remove vent caps from both the booster and the discharged batteries. Lay a cloth over the open vent wells of each battery.
6. Attach one end of one positive (+) cable to the positive terminal of the booster battery (identified by a red color, “+” or “P” on the battery case, post or clamp). Remove the rubber boot that covers the post on the side of the channel on the front of the A/C compressor base. Attach the other end of the jumper cable to this post.

7. Taking care that clamps from one cable do not touch clamps on the cable, attach one end of the remaining negative (–) cable to the negative terminal of the booster battery (identified by a black color, “–” or “N” on the battery case, post or clamp). Attach the other end to the ground stud on the top of the A/C front mounting rail.

8. Switch the battery disconnect ON.

9. Turn the engine run switch to RUN. Wait a few seconds while the multiplex system does a power-on self-test.

10. Start the coach.

11. When the coach is running, remove the booster cables. Observe all cautions.

Disconnecting Booster Cables

1. Taking care that clamps from one jumper cable do not inadvertently touch clamps on the other jumper cable, disconnect jumper lead from ground stud of the vehicle being started. Do not lean over booster battery when disconnecting this lead.

2. Remove remaining end of negative (–) jumper cable from the booster battery.

3. Remove one end of the remaining jumper cable from post on the side of the front mounting rail of the A/C compressor, then remove the other end of the same cable from positive terminal of the booster battery. Secure the rubber boot over the post on the A/C compressor mounting rail.

4. Remove cloths from open vent wells of each battery. Discard cloths as they may have corrosive acid on them. Install vent caps on both the booster and the discharged battery.

Color Coded Cables

Color coded battery cables are provided to minimize the chance of battery and cable terminals being misconnected. Color coded battery cables identify the following: Red is (Battery +)24 volts, Blue is (Battery +)12 volts and Black is negative (–).

Electrical Towing Receptacle

The towing electrical receptacle is wired to the coach front electrical junction box to provide power from the towing vehicle to the coach lighting system. This connects the coach stop, clearance, hazard, turn signals, clearance and ID light system to the towing vehicle lighting system operation.

Lifting and Towing

If a disabled D series coach needs to be lifted from the ground in order to be towed, please refer to the MCI Maintenance Manual Section 3—LIFTING & TOWING for the proper lift equipment and procedures.

However, if the coach can be towed without lifting the front end, follow the procedure below.

CAUTION

The drive axle shafts must be removed when coach is being towed to avoid possibility of damage to transmission.

1. Remove stud nuts and washers retaining axle shafts, rap center of axle shaft flange sharply to loosen dowels and pull out axle shaft. Plug axle tube to prevent oil loss.

NOTICE

Before attempting to tow coach, parking brakes must be released. Check the service brake air pressure on the dash mounted dual air gauge.

CAUTION

The park brake circuit and at least one service brake circuit require full air pressure, preferably the primary (rear service brake) circuit. This will allow the park brake push-pull valve to be pushed down, allowing the locks to release and permit the park brakes to retract. A full service brake application will be required to ensure release.

NOTICE

If all circuits are low, and the air system is intact, the entire system may be filled through the schrader valve in the RH rear service compartment. If all circuits are low and the coach won't run or generate air pressure, fill at least one service circuit and the park brake circuit using the appropriate emergency fill valves in the front LH service compartment.

2. Operate the coach engine during the tow to maintain brake system air pressure, or attach an external air pressure line, from the tow truck, to the emergency park/service brake fill valve in the front service compartment. The air pressure must be 75 psi minimum and the line should be attached via quick-disconnect air connector.

CAUTION

Do not tow the coach without external air pressure applied to the emergency park / service brake air fill valves, unless the coach engine and its air compressor are in operation. Without system air pressure, the park brakes will apply automatically if parking air pressure falls to approximately 40 psi.

3. Position the tow truck so that the truck's tow bar contacts the front bumper of the coach.

4. Attach the tow truck chains in the coach tow eyes and take up all slack.

5. Attach safety chains as applicable.

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

a. Make sure the Park Brake is released before towing by applying the service brakes.

b. Do not allow passengers in the coach during towing.

c. Do not exceed a prudent, safe towing speed. Be aware of changing conditions.

d. Avoid "tight" turning, accelerating and decelerating.

e. After approximately two miles towing, check and retighten the safety and tow chains as necessary.

Air Pressure - Warning

The primary and secondary service brakes, and suspension/accessory air systems pressure is monitored by the main air pressure switch located in the rear junction box. When the Master Run or ignition switch is in the "ON" position, the LOW AIR warning system is initialized. If, during normal operation, a LOW AIR warning is activated, it indicates that air pressure is too low in one of these three air circuits. Warnings will remain on until air pressure rises above 100 psi (689 kPa).

! WARNING

A low air warning telltale will illuminate and a buzzer will sound when air pressure drops below 75 ± 5 psi (517 ± 34.5 kpa) in either of these air circuits. In the event of a low air warning, stop the vehicle at once and determine the cause of air loss before proceeding.

The coach should not be operated with air pressure below 100 psi in either circuit, as brake effectiveness could be reduced resulting in an increased stopping distance.

Service Brakes (Emergency Operation)

This coach is equipped with a dual circuit service brake system with separate reservoirs for primary (rear) and secondary (front) brake circuits. If a low air condition occurs in the primary service brake supply circuit, secondary service brake air is routed to the emergency stand-by valve. Fully modulated primary (rear) braking will be available through the drive axle brake chamber's emergency portion, along with the secondary (front) service brakes.

NOTICE

No provisions are made for secondary circuit air loss, because the primary brakes alone are sufficient to stop the coach.

In the unlikely event that a low pressure condition occurs in both service brake circuits at the same time (i.e., air compressor or supply hose failure), the service brake system can be used to safely stop the coach after alarm sounds. Approx. three separate service brake applications may be made before both circuits are depleted (depending on rate of air loss). If necessary, the park brake can also be used to stop the coach after service brakes are depleted.

NOTICE

The park brake may be released and reapplied approximately three more times in order to move and/or park the coach in a safe location, before the park reservoir is depleted.

Parking Brakes (Emergency Operation)

The park brake reservoir is isolated from the service brake circuits, and provides air to the park brake circuit exclusively. If park reservoir drops below 45 ± 5 (276 ± 34.5 kPa) the parking brakes will automatically apply. Once applied, brakes are mechanically locked and will remain so until air has been replenished in the park reservoir, and at least one of the service brake reservoirs.

NOTICE

After the park brake has automatically applied in the emergency mode, it can not be safely released until the park brake circuit has been filled above 75 psi \pm 5 psi (519 \pm 34.5 kPa), and at least one service brake air circuit is filled above 100 psi \pm 5 psi (690 \pm 34.5 kPa).

Emergency Parking Brake Release

The emergency parking brake release valve is a manually operated on-off control. It is used to manually release the emergency park brake. The valve is spring loaded and remains in the exhaust (button out) position constant manual force is applied.

! WARNING

The following procedure is to be used only for emergency moving of a disabled coach.

Emergency Fill - Park/Service Brake System

The park/service brake air system may be filled from an external source by applying air at two (2) of the three (3) emergency fill schrader valves located in the front LH side service compartment (Figures 58 and 59). To emergency fill the park brake system, apply air to the emergency park system's fill valve. To emergency fill the service brake system, apply air to at least one of the two emergency service brake fill valves.

Filling of the park brake circuit will permit the release and reapplication of the park brake only. Filling of the front circuit will permit a modulated primary/secondary application, while filling of the rear circuit will permit a normal primary brake application. Filling of either service brake circuits will allow for the safe release of the park brake and coach movement. If the entire park/service brake system's integrity is intact, it may be completely filled by use of the rear service fill schrader valve. The valve is located in line on the compressor discharge sump (ping tank) drain inside the RH rear side service compartment.

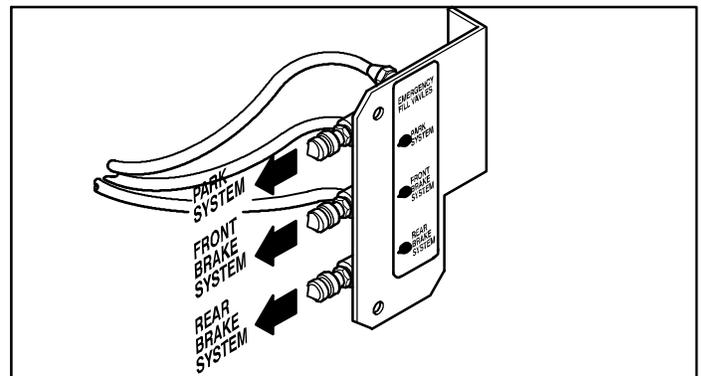


FIGURE 58



FIGURE 59

NOTICE

Always fill the park brake circuit first. Before applying air in an emergency fill procedure, ensure that the park brake valve is in the “UP” position. When filling the park/service brake system via the front or rear schrader valves as outlined above, the air does not pass through the air dryer. This may result in water entering the air system reservoirs. After repairs are completed, manually drain all reservoirs to relieve any moisture present.

Tools and Safety Equipment

Three collapsible reflective safety triangles are securely mounted in the battery compartment.

These have a folding stand for placing at intervals on the roadway toward oncoming traffic. Use these to warn traffic if the coach must be parked in an emergency situation.

Fire Extinguisher

A 5 lb. fire extinguisher is installed under the #2 curbside side passenger seat. To remove, lift and disengage catch on the mounting box. Lift fire extinguisher out (Figure 60).



FIGURE 60

The 5 lb. fire extinguisher can also be located in the #1 roadside parcel rack compartment.

THIS PAGE INTENTIONALLY LEFT BLANK

9-HEATING AND AIR CONDITIONING

Main A/C System / MICROMAX

The dash controller is located on the lower RH side of the instrument panel. Before either system will operate, the Master switch must be “ON”, NOT GEN light off, engine running and system air pressure above 95 ± 5 psi (655 ± 34.5 kPa).

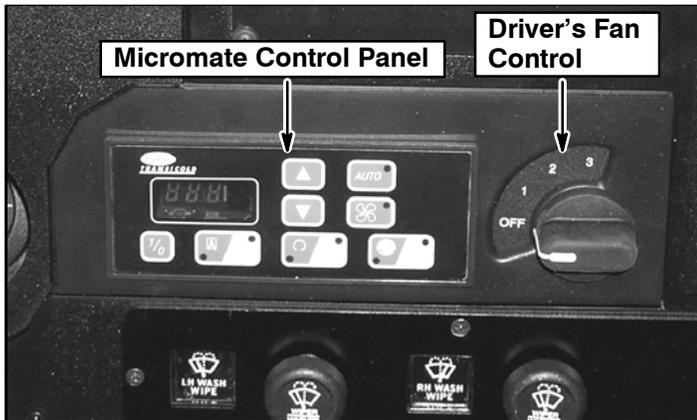


FIGURE 61

Driver's Fan (Defrost) Control

Controls driver's defroster fan speed from OFF, LO, MED, HIGH.

The flow of coolant to the driver's heater system is controlled by the "T" handled cable-operated hot water control valve. The control handle can be adjusted to vary flow through the valve by pulling up and turning to lock. The driver's heat control handle is located adjacent to the fresh air control handle mounted to the driver's foot rest assembly.

Micromate Control Panel

The Micromate Control Panel (Figure 61) displays the setpoint temperature, interior (return air) temperature and exterior temperature. To read interior or exterior temperature, press the TEMPERATURE display button to illuminate the indicator light. After a short delay, the display will return to the default setpoint temperature.

Setpoint temperature may be changed by pressing the UP or DOWN arrow button. The UP button will increase the set point temperature and the DOWN button will decrease the setpoint temperature. The setpoint temperature can be adjusted from 60°F to 80°F (15°C to 27°C).

NOTICE

Engage the engine fast idle when it is necessary to operate the air conditioning system while the coach is parked.

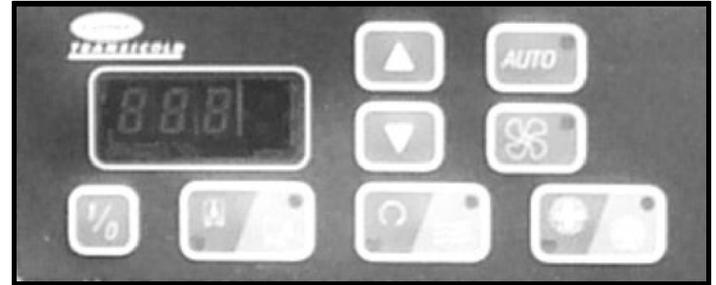


FIGURE 62

KEY FUNCTIONS

-  Turns the HVAC system ON and OFF.
-  Selects interior or exterior temperature display.
-  Selects passenger ram (fresh) air or recirculated air.
-  Sets the fan speed.

-  Raises the temperature.
-  Lowers the temperature.
-  Selects default temperature settings.
-  Sets the system to ventilation only.

Driver's Ventilation And Fresh Air

The driver's area has a separate fresh air intake system. The fresh air control handle, adjacent to the driver's heat control handle, operates a flap on the bottom of the driver's heater and defroster unit (Figure 63). The flap partially covers the opening through which fresh air from a vent above the bumper enters the driver's heater defroster system.

Placing the control handle downward opens the flap allowing more air to enter the system. Air flow can be regulated by locking the control handle in any position between fully up and fully down by rotating the handle 1/8 turn. When the flap is closed as far as possible, the system operates on mainly recirculated air.

NOTICE

The air flow to the windshields is continually open to prevent the possibility of fogging.

A gasper under the dash on the left-hand side near the driver's knees vents the fresh air into the driver's area. The right-hand gasper is used for the A/C and heating distribution. The volume of air flow from the gaspers can be regulated by rotating the knurled flange on the front of the gasper outlet. Rotating the gasper will also shut off or maximize the air flow. The direction of the air flow can be adjusted by moving the gasper outlet in its ball socket.

NOTICE

In warm, humid conditions, the driver's fresh air system can assist in defogging the windshields.

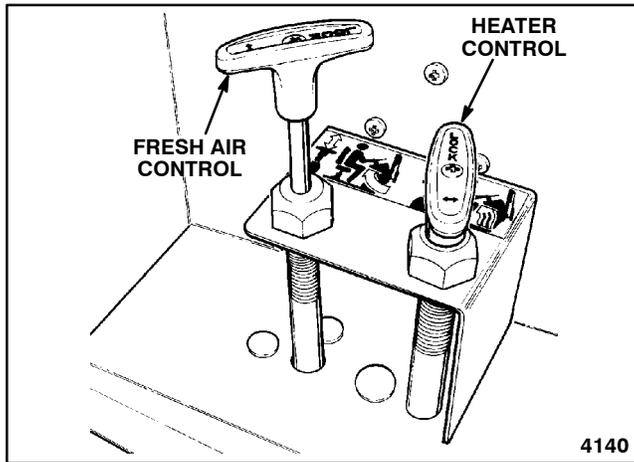


FIGURE 63

! WARNING

Avoid too high a temperature in the driver's area. This tends to induce drowsiness and may affect your ability to safely operate the coach. It may also affect the temperature in the passenger compartment.

CAUTION

When the outside temperature is very high or very low, both the driver's and passenger fresh air intakes should be closed as much as possible.

This will maximize the efficiency of the HVAC systems in very cold or hot weather conditions.

Parcel Rack Ventilation

An internal ventilation system is located in the mid-section of the left and right hand parcel rack units. The system contains individualized passenger air outlets mounted in speaker racks attached to the underside of the parcel racks. These are individually-controlled by twisting "off" or "on", and by directing the air flow directional nozzle. The blower is controlled by the Parcel Rack System Blower Speed switch mounted in the upper left switch panel. Interior air supply enters the parcel rack ventilation system through an inlet grill on the module door (Figure 64).



FIGURE 64

10–SERVICE AND MAINTENANCE

Service & Access Doors

The exterior view on the following page identifies all service compartments and exterior access doors for the D4000 / D4005 / D4500 / D4505 series coaches (Figure 65).

Their locations, components contained within, and methods of opening are as follows:

NOTICE

Some components may be optionally located and accessed through other compartment service doors.

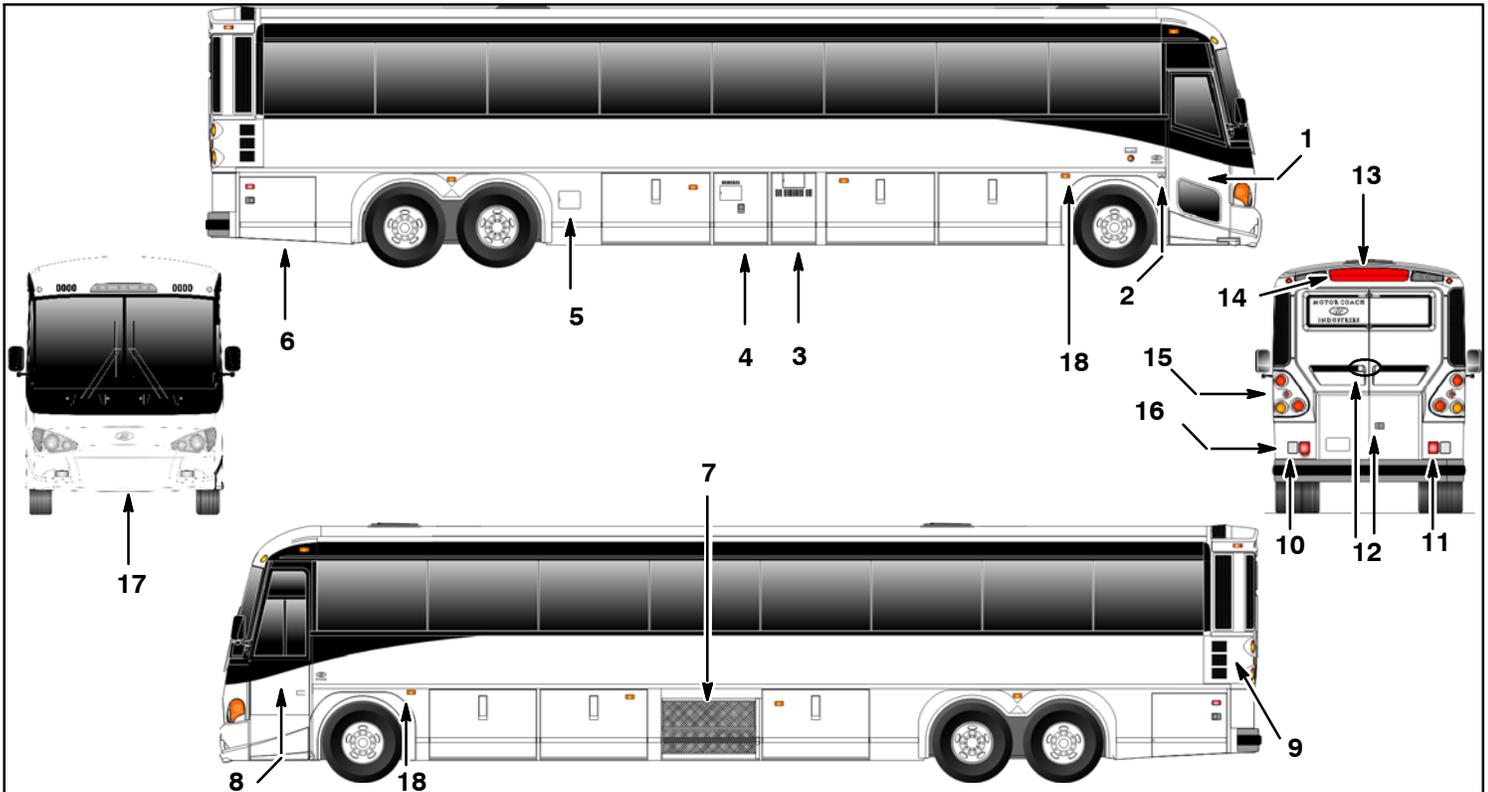


FIGURE 65 – D4505 Exterior Components

D4505 Exterior Components (Figure 65)

1. Entrance Door (Sedan)
2. Entrance Door Exterior Switch
3. Fuel Compartment Door
4. Battery Compartment
5. DEF Compartment Door
6. Rear Side Service Compartment Door
7. A/C Condenser
8. Electrical Panel / Front Junction Box
9. Radiator Compartment
10. Air Cleaner Service Door
11. A/C Compressor Service Door
12. Engine & Cooling Compartment Door Latches
13. ID Marker Light–High Mounted
14. Brake Light–High Mounted
15. Rear Tail Light Cluster
16. Back–up Lights
17. Bumper and Spare Tire Compartment
18. Directional Light

! WARNING

Use care when making checks, repairs or doing any maintenance activity on the coach to avoid being injured. Some components of this coach may be hazardous if used, serviced or handled improperly.

The improper or incomplete service of components could also lead to malfunctions, which may result in personal injury or damage to the coach.

Rear Side Service Compartment Door

The LH/RH rear side service doors are located directly behind the rear wheel housings. Access is provided to both sides of the engine through these doors. The suspension components are accessed from the right side door. The auxiliary heater, B500 transmission dipstick and rear electrical J-box is accessed by the left side door.

The doors feature upper and lower front mounted hinges, and are retained by top and bottom spring bolt latches. Pull the paddle handle out to open doors. The door is held in the open position by a prop rod retainer clip. Move door firmly off open position to release prop rod and close door.

Condenser Compartment Door

The condenser door is located at left side of coach behind the no. 2 baggage compartment. Access is provided to the door mounted condenser, condenser fans and motors, receiver tank, filter/dryer and other A/C components.

The door features a full length front mounted hinge, and is retained by four slot-type, quarter-turn, spring clip fasteners at rear edge. The door is held in the open position by a hinged metal strap. The strap must be displaced from its locked position to close the door.

Fuel Compartment Door

The fuel compartment is located on the right side of the coach behind the #2 baggage compartment. Access is provided to the fuel filler cap, fuel tank and associated lines and sensors through this door.

To access the fuel tank filler cap and neck, open the small spring return door. Complete access to the fuel tank can be obtained by unfastening and removing the service door.

DEF Compartment Door

The Diesel Exhaust Fluid (DEF) compartment is located on the curbside of the coach, at the rear of the #3 baggage compartment.

Battery Compartment Door

The battery compartment is located on the right side of the coach directly behind the fuel door. Access is provided to the main disconnect switch, batteries, tools, and HVAC filter compartment by this door.

This door features a full length top mounted hinge, and retained by two bottom spring bolt latches. The door is held in the open position by positive lock pin. To access the main disconnect switch, open the small spring return door. To access the other components, pull the paddle handle out and lift door open.

NOTICE

When securing the door in the open position during Sliding Wheelchair Access door operation, install the positive lock pin in the lower hole of the hinge (Figure 66).



FIGURE 66

Entrance Door

An air-operated entrance door is provided as access into the coach. This door is opened or closed from the interior or exterior by activating the appropriate inner or outer door control switches.

Wheelchair Access Door (IF APPLICABLE)

A manually operated wheel chair access door is located in the RH forward section of the coach above baggage bay no. 2. This door provides wheelchair access to the coach using the wheel chair lift which is stowed in the lower section of baggage bay no. 2.

Lift Cassette Access Door (IF APPLICABLE)

The lift cassette access door is located on the right side of the coach, on baggage bay no. 2. This door provides access to the lift cassette and the pendant control switch, which operates the lift.

NOTICE

To ensure the cassette door closes with the latches fully engaged, apply sufficient force to both latch points when closing door (refer to Figure 67).

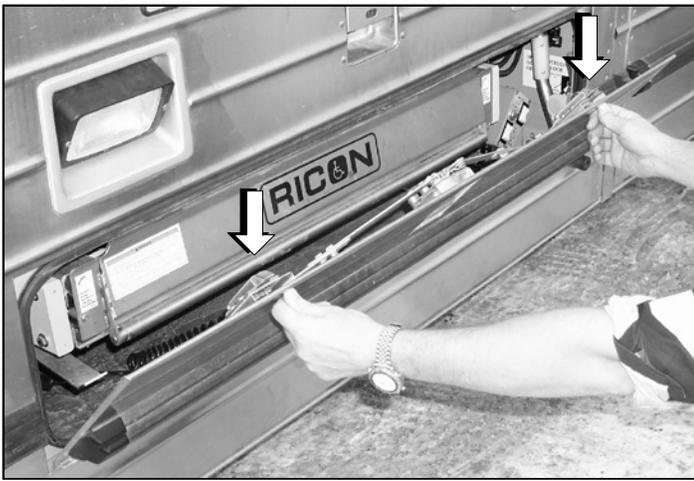


FIGURE 67

Rear Engine Access Door

The rear engine access doors are located at the rear of the coach. Engine oil level, power steering fluid, A/C compressor and drive belt, water temperature gauge and remote control panel are accessible from here.

The doors feature upper and lower side mounted hinges, and are retained by top and bottom spring bolt latches. Pull the paddle handle out on the right side door to open both doors. The door is held in the open position by a prop rod retainer clip. Move the door firmly off the open position to release the prop rod and close the door.

Engine Cooling Compartment Doors (Figure 65)

The engine cooling compartment (radiator) doors are located above the rear engine access doors.

To open the engine cooling compartment doors, open the curbside rear engine access door and pull the lever down, disengaging the lever from the curbside engine cooling compartment door. Locate the door latch and pull outward (refer to Figure 68). Pull doors outwards until the doors are fully open and secured.

NOTICE

Ensure that the lever is always engaged when the engine cooling compartment doors are closed to prevent inadvertent opening due to high internal compartment pressures.

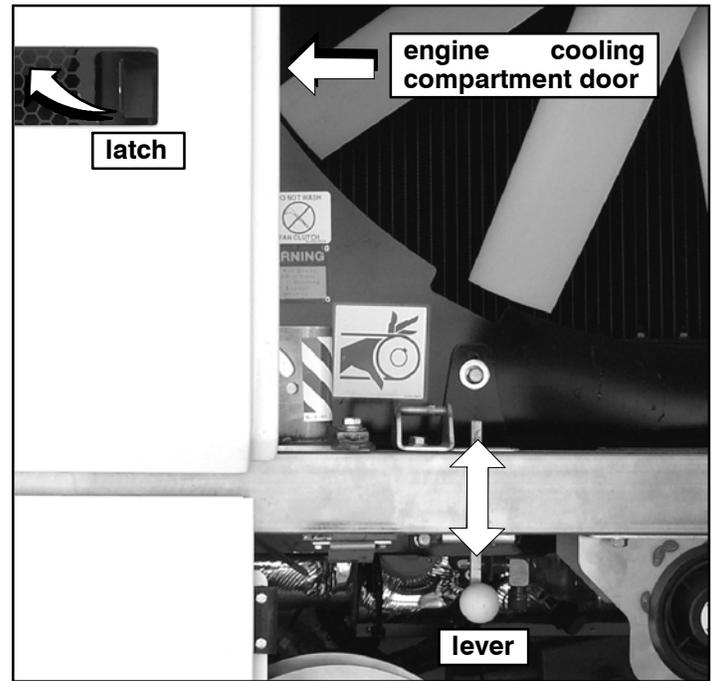


FIGURE 68

Baggage Compartment Door

The LH/RH baggage compartment doors are located along the side of the coach between the front and rear wheelhouses. Access to the DDEC/ATEC & A/C junction box, in-station lighting converter and breakers (no. 1 LH compartment), center tunnel electrical components, HVAC blower, ABS control, tire tool bar, water valve and voltage regulator is provided through these doors (Figure 69).

The door mechanism incorporates spring-assisted counter-balanced vertical opening with spring clip retention, and a four point locking arrangement. Pull up on the latch handle, then pull out and up on the door to open.

NOTICE

Always use the positive locking pins to secure the door in the open position while loading baggage.

Lift up on the door latch, push the door closed and push the latch down until it snaps into the latched position to close the door.

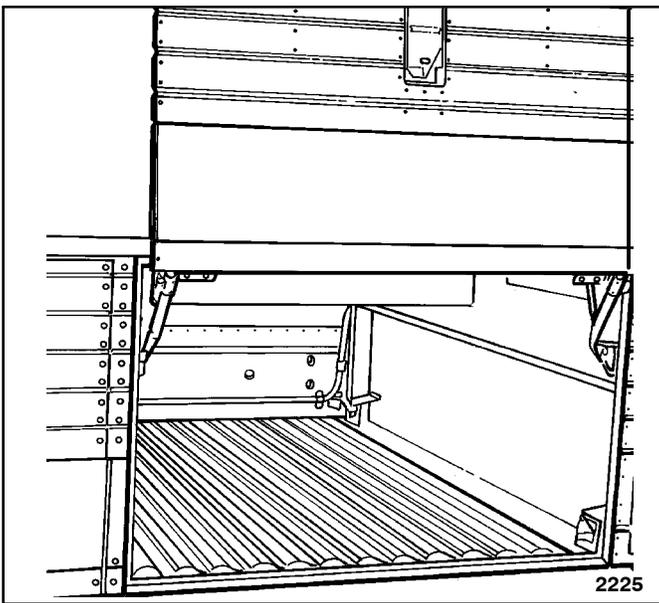


FIGURE 69

⚠ WARNING

Spring clip condition and adjustment should be inspected prior to loading and unloading baggage compartment.

Tire Compartment Door

The tire compartment door is incorporated into the front bumper. Access to the spare tire and jack is provided through this door. The door is hinged at the bottom and retained by two top spring bolt latches. The door features spring counter-balanced opening.

To open the tire door, open the front side service door and pull bumper release handle. The bumper is held in the open or (down) position by an over-center angle latch on LH counter-balance. The angle must be displaced from its locked position to close the bumper door.

Front Side Service Compartment Door

The front side service door is located below the front junction box door. The door gives access to the emergency fill valves, accessory tank, tire compartment release handle, horns, steering components, and windshield washer reservoir.

The door is front hinged and held closed by two slot-type, quarter-turn, spring clip fasteners. The door is held in the open position by a prop rod retainer clip. Move door firmly off open position to release the prop rod and close the door.

Front Junction Box Access Door

The front junction box door is located above the front side service door. This door provides access to the front electrical components, including amplifiers, emergency entrance door air release cable, and tag axle speed switch.

The door is front hinged and held closed by two quarter-turn spring clip fasteners. The door is held in the open position by a prop rod retainer clip. Move the door firmly off the open position to release the prop rod and close the door.

Back-Up Lamp Access Door

Twin rear access doors are mounted at the rear of the coach below the LH/RH main taillamp panels. The engine air filter, back-up lights and A/C compressor are accessed through these doors. The doors have top and bottom front-mounted blind hinges and are secured by two slot-type quarter-turn spring clip fasteners at rear.

Cooling System

The engine cooling system maintains the proper operating temperature of the coach engine and also provides a supply of heated water for the coach heating system. The cooling system's radiator is filled by either a manual or automatic coolant recovery system.

⚠ WARNING

At times, fans may not be engaged. However, fan clutches can, without warning, automatically cycle. When working in the vicinity of the engine, care must be exercised to keep hands, loose clothing, etc., clear of all moving objects, i.e., belts, pulleys, fans.

Injury could result if contact were to be made.

CAUTION

Never pour cold coolant into a hot engine. The sudden change in temperature may crack the cylinder head or block.

The heating and engine cooling systems cannot normally be completely drained. Therefore, when replenishing the system, a proper mixture of antifreeze and water must be installed to prevent any possible damage to the system due to freezing conditions.

Coolant Recovery System

The basic manual or optional automatic coolant recovery system is incorporated into the cooling system to fill or to replenish coolant in the event of overheating. The system includes a low coolant level warning sensor that activates a LOW WATER tell-tale light and actuates the pump when the water level in the surge tank reaches a predetermined low level. There is a sight glass on the coolant recovery tank. This system features a 6-gallon reserve coolant reservoir under A/C compressor mountings inside the RH rear side service door.

Filling

The entire cooling system is filled by the recovery system pump via the surge tank.

1. Close all drain cocks and ensure that isolation and bypass gate valves are open.

2. Turn the main battery disconnect switch "ON". The LOW WATER tell-tale light on the dash will come on. If it does not illuminate, check the lamp using the bulb test switch.

3. Fill the coolant recovery tank and continue adding coolant to the tank until the pump and telltale light shut off and the system is full.

4. Hold the pump switch, located on the remote control box, in the “ON” position. The pump will begin to operate and pump coolant into the system.

NOTICE

The pump will shut off automatically when the recovery tank empties. On automatic systems, the pump starts without actuating a switch.

5. Open the petcock on the water bypass tube. This will allow air to bleed as the system fills. Close when the coolant begins to flow out the petcock.

6. Refill the recovery tank with reserve coolant.

NOTICE

The angle of the coolant recovery tank will allow the coolant to expand as it warms up without overflowing.

Wheel Wrench and Handle

The wheel nut wrench and wrench handle are necessary to loosen the wheel nuts. The handle is stored in the left rear baggage compartment (Figure 70). The wrench is located in the storage tray in the battery compartment.

NOTICE

Run-up block must be used on fully inflated and flat tires for sufficient jack clearance.

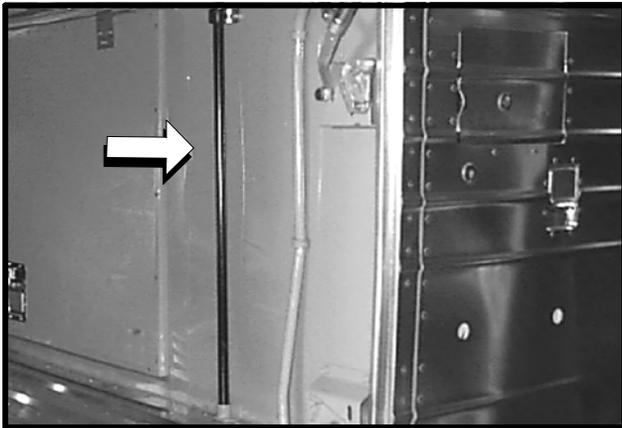


FIGURE 70

Spare Tire & Wheel Storage

The spare tire and wheel are carried in a compartment directly behind the front bumper (Figure 71). Entry is gained by releasing the bumper retaining lever inside the front side service compartment.

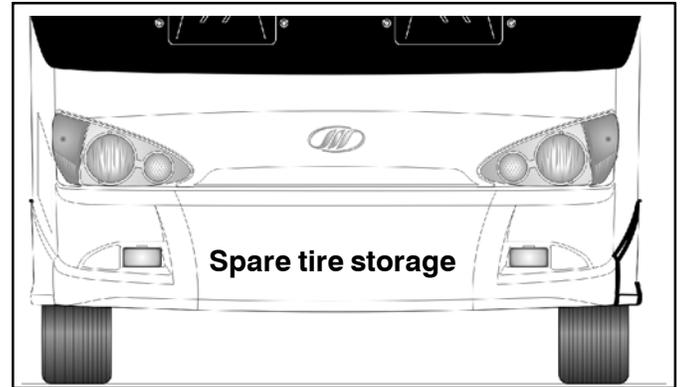


FIGURE 71

! WARNING

Wheel and tire assemblies weigh more than 100 pounds. Use caution if required to handle the wheel and tire units.

Tire & Wheel Removal – Jacking & Blocking

If a flat tire occurs and the wheel is to be changed, contact Control Center to request maintenance assistance. The following procedures are for maintenance personnel reference. Refer to Section 3 – LIFTING & TOWING in the Maintenance Manual for more detailed information.

NOTICE

Run-up block must be used on fully inflated and flat tires for sufficient jack clearance.

Stud Pilot Wheels

Front Axle

1. Turn front wheels straight in preparation for wheel and tire removal.
2. Run the flat tire up on run-up block. Stop the coach and apply parking brakes.
3. Place the jack under the front jack pad and raise the coach (Figure 72).
4. Before the tire is completely off the ground, partially loosen the wheel nuts.
5. Raise the coach completely, remove the run-up block and proceed to remove the wheel nuts.

Drive Axle

1. If the inner dual is to be changed, partially loosen the outer dual wheel nuts before running onto the run-up block.
2. Run the inflated tire up on the run-up block. Stop the coach and apply the parking brakes.
3. Place jack under the rear jack pad and raise the coach (Figure 73).
4. Before the tire is completely off the ground, completely remove the outer wheel nuts and partially loosen the fluted inner wheel nuts.

NOTICE

If the outer dual wheel is flat, position the run-up block in front of the inner dual, loosen the outer wheel nuts, roll the coach up onto the block, and change the tire.

5. Raise the coach completely, remove the run-up block, and proceed to remove inner-wheel wheel nuts.

NOTICE

Run-up block must be used on fully inflated and flat tires for sufficient jack clearance.

Trailing Axle

1. Partially loosen wheel nuts before tire is lifted off the ground.
2. Place the tag axle tire on the run-up block. Stop the coach and apply the parking brakes.
3. Place the jack under the rear pipe strut jack pad and raise coach (Figure 74).

NOTICE

The following emergency procedure applies to the D4000 series coaches only.

In case the spare is already in use or trailing wheel and tire is needed for replacement, the following procedure can be followed as an emergency measure to reach a service facility.

1. Turn the trailing axle air control valve "OFF", jack the trailing axle and remove the wheel per changing procedure.
2. Install the holdup chain on the trailing wheel axle. The chain is carried in the storage tray in the battery compartment.
3. Place the air release valve "ON" to reinflate the air springs bellows (Figure 75).

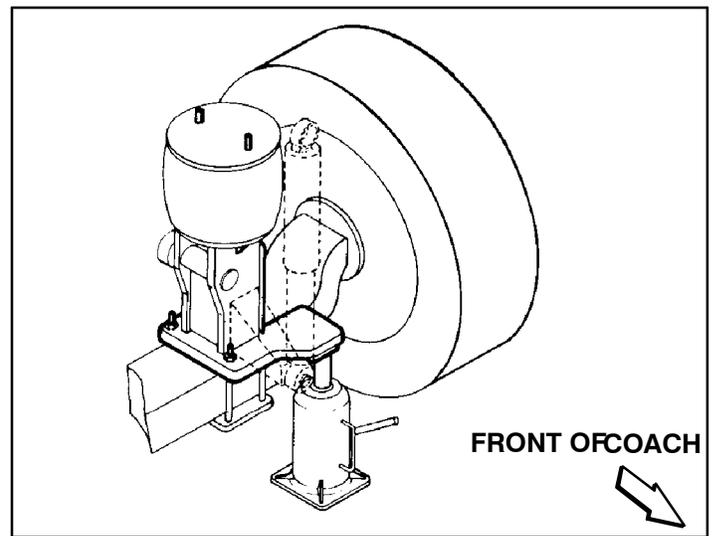


FIGURE 72. Front axle jacking points

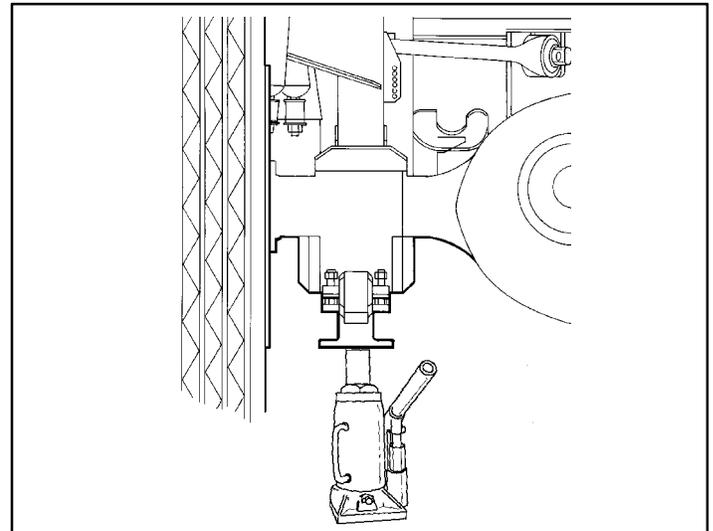


FIGURE 73. Drive axle jacking points

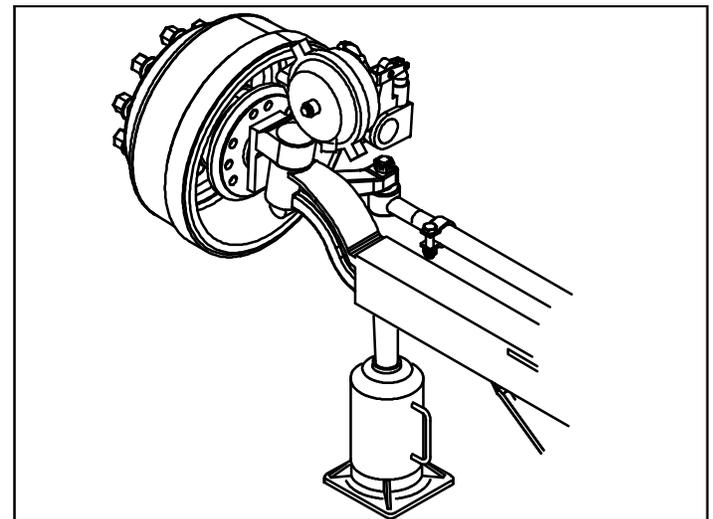


FIGURE 74. Tag axle jacking points

Hub Pilot Wheels

Front Axle

1. Turn front wheels straight in preparation for wheel and tire removal.
2. Run the flat tire up on run-up block. Stop the coach and apply parking brakes.
3. Place the jack under the front jack pad and raise the coach (Figure 72).
4. Before the tire is completely off the ground, partially loosen the wheel nuts.
5. Raise the coach completely, remove the run-up block and proceed to remove the wheel nuts.

Drive Axle

1. If the inner dual is to be changed, partially loosen the wheel nuts before running onto the run-up block.
2. Run the inflated tire up on the run-up block. Stop the coach and apply the parking brakes.
3. Place jack under the rear jack pad and raise the coach (Figure 73).
4. Before the tire is completely off the ground, completely remove wheel nuts.
5. Raise the coach completely and remove the run-up block.

NOTICE

Run-up block must be used on fully inflated and flat tires for sufficient jack clearance.

Trailing Axle

1. Partially loosen wheel nuts before tire is lifted off the ground.
2. Place the tag axle tire on the run-up block. Stop the coach and apply the parking brakes.
3. Place the jack under the rear pipe strut jack pad and raise coach (Figure 74).

NOTICE

The following emergency procedure applies to the D4000 series coaches only.

In case the spare is already in use or trailing wheel and tire is needed for replacement, the following procedure can be followed as an emergency measure to reach a service facility.

1. Turn the trailing axle air control valve “OFF”, jack the trailing axle and remove the wheel per changing procedure.
2. Install the holdup chain on the trailing wheel axle. The chain is carried in the storage tray in the battery compartment.
3. Place the air release valve “ON” to reinflate the air springs bellows (Figure 75).

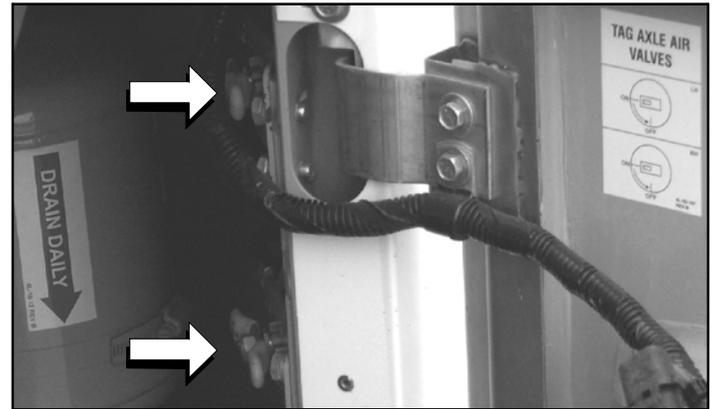


FIGURE 75

CAUTION

Reduce speed when operating the coach without a trailing wheel. The trailing wheel tire should be repaired and installed as soon as possible. Trailing wheel with a flat tire must be removed if travel distance to a service center is more than 5 miles.

Fueling

The engine fuel tank is accessible through a small access panel on the fuel door, on the curbside of the coach (Figure 76). Use only clean diesel fuel of the correct grade. Close fuel tank filler and tighten securely after filling.

Refer to Fuel and DEF Specifications in Section 6.

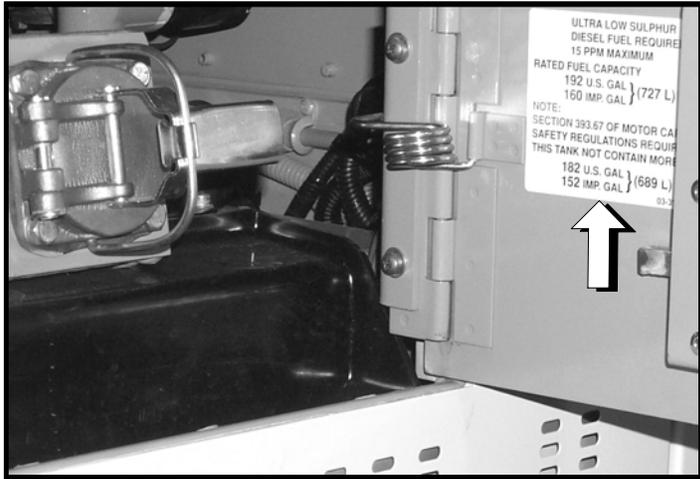


FIGURE 76

The DEF fuel tank is separate from the diesel tank, located at the curbside, rear corner of the #3 baggage bay compartment (Figure 77). Open the DEF fuel door to access the blue cap on the tank. Tighten cap securely after filling.



FIGURE 77

Lubricating Oil - Engine

The engine oil dipstick is accessible through the rear engine access doors.

! WARNING

When working in the vicinity of the engine, care must be exercised to keep hands, loose clothing, etc., clear of all moving objects; i.e., belts, pulleys, fans.

! WARNING

It is important to note that the fan clutches may allow the fans to be stationary, but fans may cycle on without any prior warning. Injury could result if contact were to be made.

Lubricating Oil - Automatic Transmission

The transmission fluid used to apply the clutches and lubricate and cool the components must be maintained at the proper level. If the fluid level is too low, the clutches will not receive adequate fluid supply and performance will be affected. If the fluid level is too high, overheating may result from the fluid being churned and aerated.

Lubricating Oil – Power Steering Reservoir & Pump

A vented filler cap is installed on the reservoir cover. A sight glass is installed on the housing side to visually check oil level. Correct level is seen at the center of the viewing glass. This level corresponds to the “FULL” level reading on the dipstick. Check levels periodically and add fluid as required.

The filter element is changed by loosening and removing the cover retaining nut and washer. Remove the filter element retaining spring and lift the element out of the reservoir housing. Reverse this procedure to install the new filter element. Do not overtighten the cover retaining nut.

Power Steering Pump

The Power Steering Pump connects to the reservoir and steering box through hose lines and fittings.

Windshield Washer Reservoir

A windshield washer reservoir with a five-gallon capacity is mounted in a bracket on the inside of the front left side service compartment door (Figure 78).

NOTICE

The washer fluid level should be checked frequently during inclement weather. Use a fluid formulated for cold weather to help prevent freezing damage. Warm windshields with the defroster before using the washers in cold weather to help prevent icing.

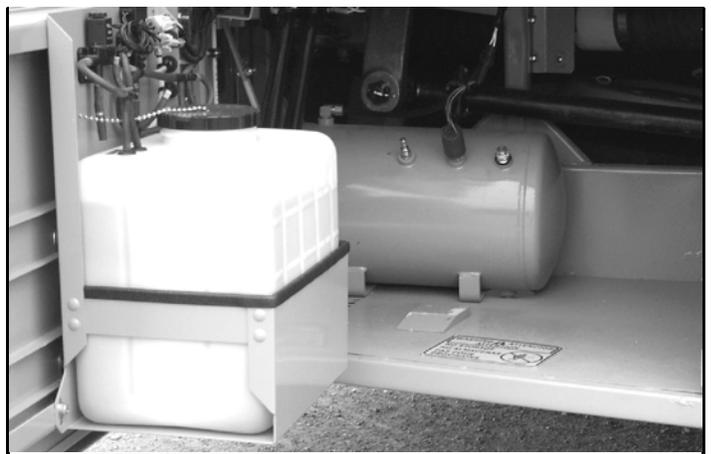


FIGURE 78

11 - WHEELCHAIR LIFT

RICON WHEELCHAIR LIFT ASSEMBLY (IF APPLICABLE)

The Ricon® wheelchair lift provides safe on-loading and off-loading of wheelchair passengers with easy ground level access. A pendant control switch, located on the inside of the lift cassette access door, operates the lift. An electro-hydraulic power system with emergency manual back-up powers the lift system.

The wheelchair lift access door has keyed access, incorporating a safety interlock switch along with a keyed power switch to prevent accidental deployment. The electric pump, emergency hand pump and fluid reservoir are located inside the control box mounted to the rear of the No.1 RH (curb-side) baggage compartment.



FIGURE 79 - Lift Cassette Access Door

The lift is housed in a cassette type module, mounted in the No.2 RH (curbside) baggage bay.

Wheelchair parking space is available next to and across from the lift platform. Special folding seats on tracks slide away providing wheelchair parking area.

RICON F9TF LIFT OPERATING CONTROLS

Control Pendant Switch Assembly

The Control Pendant Switch Unit is located in the lift cassette access door (when the door is opened) (Figure 79). The WCL Control Pendant contains a POWER ENABLE switch and four buttons (Figure 80).

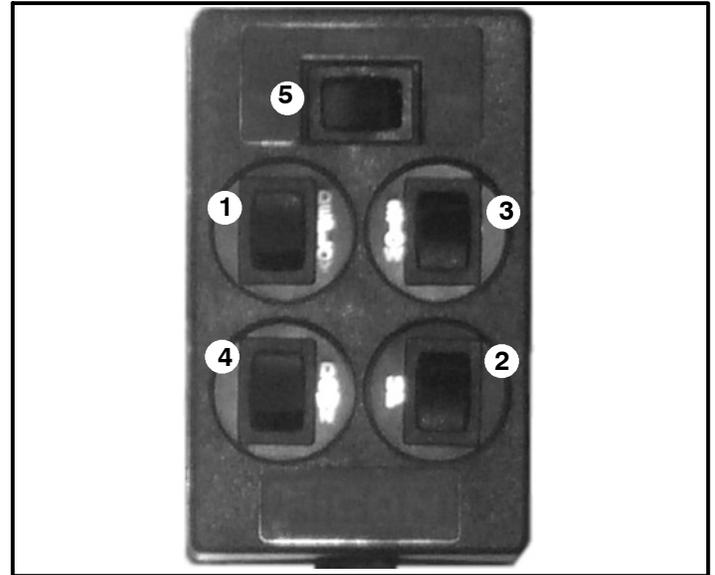


FIGURE 80 - Ricon F9TF Control Pendant Switches

1. Deploy Button
2. Up Button
3. Stow Button
4. Down Button
5. Power Enable Switch

Turning ON the POWER ENABLE switch provides power to the pendant and illuminates the DEPLOY, STOW, UP and DOWN buttons. To operate a button, press and hold until the function completes.

Movement of the platform can be halted at any time by releasing the button.

NOTICE

The Power Indicator should illuminate only when the lift is operational. If the indicator does not illuminate DURING lift operation, or remains illuminated when the lift is NOT operating, servicing is required.

At this point, DO NOT ATTEMPT TO OPERATE THE LIFT. An authorized RICON dealer must be contacted.

Wheelchair Lift Master Switch

A master ON/OFF switch (keyswitch or toggle switch) located on the upper LH instrument panel (Figure 81) energizes coach safety interlock circuits and enables the wheelchair lift compartment toggle switch when in the "ON" position.



FIGURE 81. Master Lift Switch.

Wheelchair Lift Toggle Switch

A self cancelling toggle switch, located on the wheelchair lift frame, must be switched "ON" to energize the push button pendant switch assembly (Figure 82).

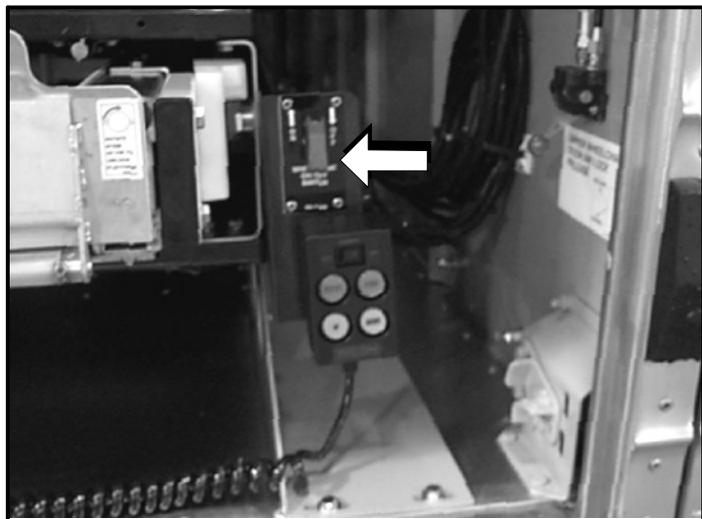


FIGURE 82. Reference photo.

The Wheelchair Lift toggle switch is automatically moved to the "OFF" position when the operator closes the flip cover.

RICON F9TF LIFT OPERATION

The wheelchair lift can be operated in either the normal mode (electrically) or in emergency situations by the manual mode (hand-operated pump).

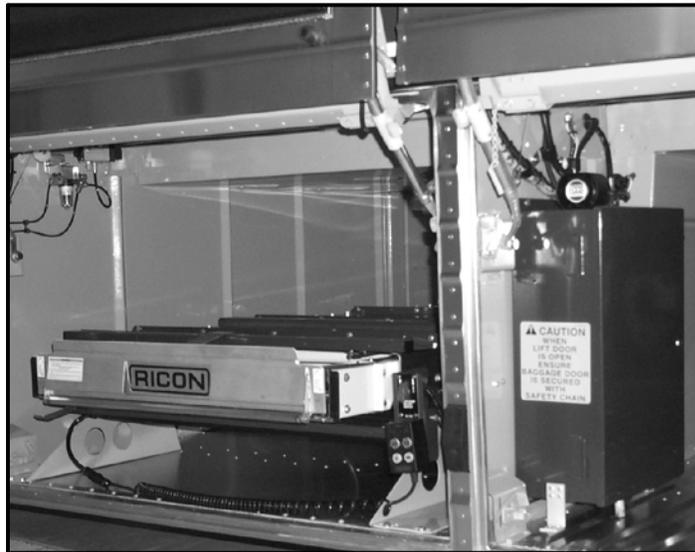


FIGURE 83

! WARNING

A minimum of 60 inches of clear area in front of the lift is required during operation.

This lift is designed for use by wheelchair and standee occupants only. Improper use of the lift can result in personal injury.

Do not exceed rated load capacity of 660 pounds (300 Kg).

Prior to use, inspect wheelchair lift for proper function, required maintenance or damage. If a problem exists, do not use lift.

Do not deploy lift if coach is not on level surface. A sloping condition could cause wheelchair to roll off platform.

All personnel charged with wheelchair lift operations must be trained, and know all the procedures for the wheelchair lift's normal and emergency operation before opening the lift with passengers aboard.

Deploying The Lift

Before the lift control pendant switch is enabled, these functions must occur:

- The engine must be running,
- Select “NEUTRAL” on the transmission Shift Pad,
- Set the Park Brake,
- Turn the Wheelchair Lift Master Key Switch (located on the dash) to the “ON” position,
- Ensure the WCL Interlocks dash telltale illuminates,
- Fold and position passenger sliding seats to provide wheelchair parking area (Refer to Passenger Seats section for details),
- Open the Lift Cassette Access Door,
- Push the self cancelling toggle switch (located on the wheelchair lift frame) to the “ON” position.

Only after these conditions are met, the wheelchair lift system is energized and can be operated using the Lift Control Pendant Switch.

- Press and hold the DEPLOY button, on the Control Pendant switch (Figure 80), until the lift unit extends completely out of the cassette enclosure.

NOTE: The lift must completely extend out of the cassette before the lift can be raised or lowered. When the lift extends, the bridgeplate assembly automatically flips up, acting as a rear barrier.

- Unfasten the safety restraint belt. Raise the handrails until the slam lock engages. Fasten the safety restraint belt.

NOTE: The electronically interlocked safety restraint belt must be buckled to raise or lower the lift. Power is interrupted to the Lift Control Pendant Switch if the belt is unbuckled.

Raising The Lift

- Position wheelchair, facing outward if possible, in the center of the platform and lock wheelchair brakes,
- Pull occupant restraint belt from retractor on handrail and fasten to other handrail,
- Press and hold the UP button, on the Control Pendant switch,
- Raise the wheelchair lift to the **closed** wheelchair lift sliding door, until the lift automatically stops prior to the sliding door (limit switches from the wheelchair lift will stop the lifting operation),

NOTE: The lift will stop approximately 12 inches below coach floor level.

- Grab the wheelchair door handle and pull door open,
- Press and hold the UP button until the lift stops at coach floor level,

NOTE: When the lift is raised, the rollstop automatically flips up as a barrier. At coach floor level, the bridgeplate assembly automatically deploys across coach threshold gap as a ramp.

- Release occupant restraint belt, and carefully unload and secure passenger (Refer to the Wheelchair Restraints section for details),

Lowering The Lift

- Position wheelchair, facing outward if possible, in the center of the platform and lock wheelchair brakes,
- Pull occupant restraint belt from retractor on handrail and fasten to other handrail,
- Press and hold the DOWN button, on the Control Pendant switch,

NOTE: The bridgeplate assembly automatically flips up when the lift is lowered from coach floor level.

- Lower the wheelchair lift until the lift automatically stops (limit switches from the wheel chair lift will stop the lowering operation),

NOTE: The lift will stop approximately 12 inches below coach floor level.

- Grab the wheelchair door handle and manually close the door,
- Power will be sent back to the wheelchair lift to allow the lift to be lowered,
- Press and hold the DOWN button, until the platform reaches ground level and the rollstop opens completely,
- Release occupant restraint belt, and carefully unload passenger.

Stowing The Lift

- Lower the handrails to platform,
- Position the platform anywhere above the stow level,
- Press and hold the STOW button. The lift will align to the stowing level and retract into the lift enclosure cassette,

The limit switches will only allow the wheelchair lift to be stowed when the door has been pulled back manually the last 3.0” – 5.0”, or latched closed.

NOTE: When retracted, the bridgeplate assembly will automatically fold over onto the platform.

- Turn OFF the POWER ENABLE switch on the Control Pendant switch and stow pendant on provided clip,
- Push the self cancelling toggle switch (located on the wheelchair lift frame) to the “OFF” position. Close the Lift Cassette Access Door,

NOTE: To ensure the cassette door closes with the latches fully engaged, apply sufficient force to both latch points when closing door.

- Turn the Wheelchair Lift Master Switch (located on the dash) to the “OFF” position.

NOTICE

For more detailed operating information, refer to the RICON Service/Owner Manual.

Threshold Warning System

The threshold warning system is located above the wheelchair parking (threshold) area (Figure 84). The module status indicator light illuminates when the wheelchair lift is powered, indicating that the module is activated. Two acoustic sensors monitor the doorway threshold area.

If the acoustic sensors detect a passenger in the threshold area; when the lift is below coach floor height and the sliding wheelchair access door is open, an audible buzzer and flashing light are actuated.

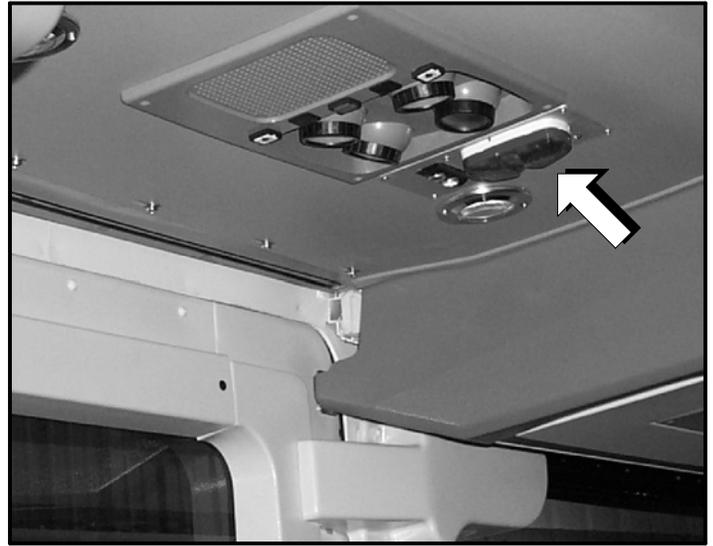


FIGURE 84

BRAUN NUVL WHEELCHAIR LIFT ASSEMBLY (IF APPLICABLE)

The BRAUN wheelchair lift provides safe on-loading and off-loading of wheelchair passengers with easy ground level access. A pendant control switch, located on the inside of the lift cassette access door, operates the lift.

The electric pump, emergency hand pump and fluid reservoir are located inside the control box mounted to the rear of the No.1 RH (curbside) baggage compartment.



FIGURE 85 - Lift Cassette Access Door

The lift is housed in a cassette type module, mounted in the No.2 RH (curbside) baggage bay.

Wheelchair parking space is available next to and across from the lift platform. Special folding seats on tracks slide away providing wheelchair parking area.

BRAUN NUVL LIFT OPERATING CONTROLS

Control Pendant Switch Assembly

The Pendant Control Switch Unit is located in the lift cassette access door (Figure 79). The Pendant Control contains three buttons (Figure 80).

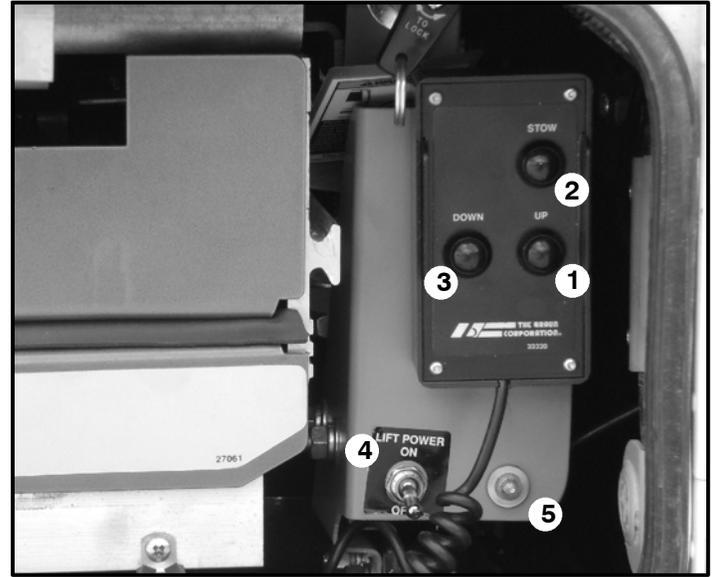


FIGURE 86 - Pendant Control Switches

1. Up Button
2. Stow Button
3. Down Button
4. Power Enable Switch
5. Power Indicator Light

Turning ON the POWER ENABLE switch provides power to the pendant and illuminates the STOW, UP and DOWN buttons. To operate a button, press and hold until the function completes.

Movement of the platform can be halted at any time by releasing the button.

The Power Indicator should illuminate only when the lift is operational. If the indicator does not illuminate DURING lift operation, or remains illuminated when the lift is NOT operating, servicing is required.

At this point, DO NOT ATTEMPT TO OPERATE THE LIFT.

Wheelchair Lift Master Switch

A master ON/OFF switch (keyswitch or toggle switch) located on the upper LH instrument panel (Figure 87) energizes coach safety interlock circuits and enables the wheelchair lift compartment toggle switch when in the "ON" position.



FIGURE 87. Master Lift Switch.

Wheelchair Lift Toggle Switch

A toggle switch, located on the wheelchair lift frame, must be switched "ON" to energize the push button pendant control switch assembly (Figure 82). The green power light indicator illuminates to signal power to the lift, when toggle switch is positioned to the ON position.

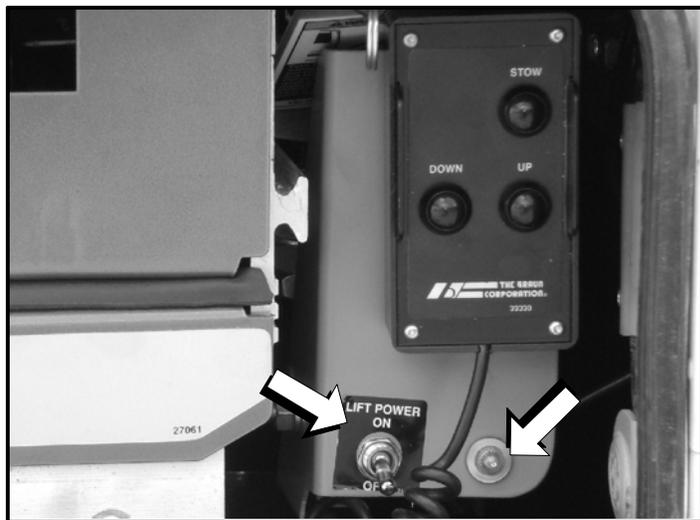


FIGURE 88.

BRAUN NUVL LIFT OPERATION

The wheelchair lift can be operated in either the normal mode (electrically) or in emergency situations by the manual mode (hand-operated pump) (Figure 89).

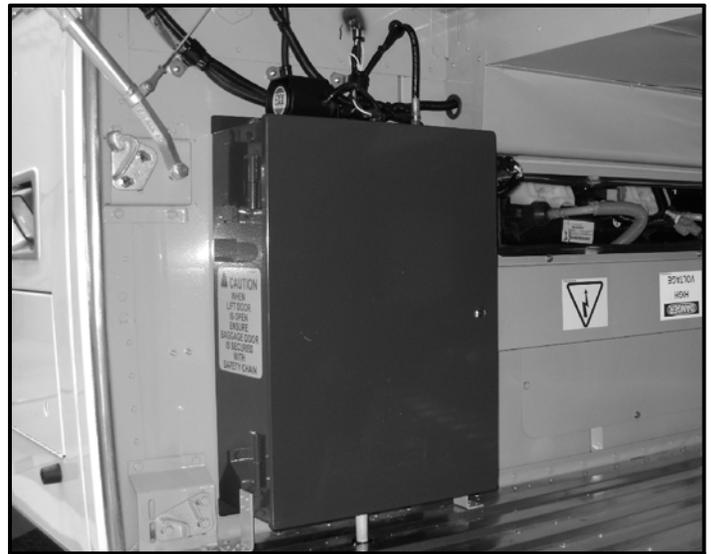


FIGURE 89



WARNING



A minimum of 60 inches of clear area in front of the lift is required during operation.

This lift is designed for use by wheelchair and standee occupants only. Improper use of the lift can result in personal injury.

Do not exceed rated load capacity of 660 pounds (300 Kg).

Prior to use, inspect wheelchair lift for proper function, required maintenance or damage. If a problem exists, do not use lift.

Do not deploy lift if coach is not on level surface. A sloping condition could cause wheelchair to roll off platform.

All personnel charged with wheelchair lift operations must be trained, and know all the procedures for the wheelchair lift's normal and emergency operation before opening the lift with passengers aboard.

Deploying The Lift

Before the lift control pendant switch is enabled, these functions must occur:

- The engine must be running,
- Select “NEUTRAL” on the transmission Shift Pad,
- Set the Park Brake,
- Turn the Wheelchair Lift Master Key Switch (located on the dash) to the “ON” position,
- Ensure the WCL Interlocks dash telltale illuminates,
- Fold and position passenger sliding seats to provide wheelchair parking area (Refer to Passenger Seats section for details),
- Open the Lift Cassette Access Door,
- Push the toggle switch (located on the wheelchair lift frame) to the “ON” position.

Only after these conditions are met, the wheelchair lift system is energized and can be operated using the Lift Control Pendant Switch.

- Stand clear. Press the UP or DOWN switch until the platform extends fully. Release switch.
- Lift handrail latch handles, deploy (lift) handrails: up to vertical position and lower handrail latch handles fully.
- Lift outer barrier to vertical position.
- Latch handrail belt.

The electronically interlocked safety restraint belt must be buckled to raise or lower the lift. Power is interrupted to the Lift Pendant Control Switch if the belt is unbuckled.

- Press the UP switch until the platform stops (raises to floor level) and inner roll stop unfolds to floor level. Release switch.

Raising The Lift

- Load passenger onto platform. Lock wheelchair brakes and latch handrail belt.

Outer barrier must be fully unfolded (ramp position) until the entire wheelchair has crossed the outer barrier.

Passenger must be positioned fully inside yellow boundaries.

- Press UP switch to fold outer barrier UP fully (vertical), raise the platform.
- Raise the platform to the **closed** wheelchair lift sliding door, until the lift automatically stops prior to the sliding door (intermediate position achieved) (limit switches from the wheelchair lift will stop the lifting operation),

The lift will stop approximately 12 inches below coach floor level.

- Grab the wheelchair door handle and pull door open,
- Press UP switch until the lift stops at coach floor level and unfold inner roll stop to floor level. Release switch.
- Unlock wheelchair brakes and carefully unload passenger. Secure passenger (Refer to the Wheelchair Restraints section for details).

Lowering The Lift

- Position wheelchair in the center of the platform and lock wheelchair brakes,

Passenger must be positioned fully inside yellow boundaries.

The outer barrier must be UP and handrail belt must be latched.

- Press DOWN switch.
- Lower the platform until the lift automatically stops (intermediate position achieved) (limit switches from the wheelchair lift will stop the lowering operation),

The lift will stop approximately 12 inches below coach floor level.

- Grab the wheelchair door handle and manually close the door,
- Power will be sent back to the wheelchair lift to allow the lift to be lowered,
- Press DOWN switch until the entire platform reaches ground level and the outer barrier unfolds fully (ramp position). Release switch.
- Unlock wheelchair brakes and carefully unload passenger.

Stowing The Lift

- Latch handrail belt.
- Press STOW switch until platform identifies stow level (platform performs a pair of movements indicating stow level). Release switch, to avoid handrails contacting coach.
- Unlatch handrail belt.
- Fold outer barrier down to platform (horizontal) position.
- Lift handrail latch handles, stow (fold) handrails down to platform (horizontal) position and lower handrail latch handles fully (Figures 90 and 91).



FIGURE 90

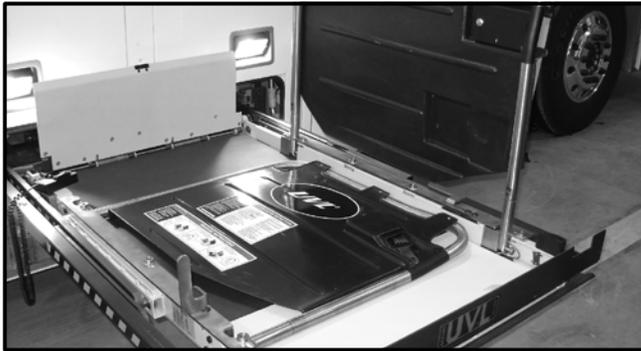


FIGURE 91

- Latch handrail belt.
- Press STOW switch until platform stops (retracts fully). Release switch.
- Push the toggle switch (located on the wheelchair lift frame) to the “OFF” position. Close the Lift Cassette Access Door.

To ensure the cassette door closes with the latches fully engaged, apply sufficient force to both latch points when closing door.

- Turn the Wheelchair Lift Master Switch (located on the dash) to the “OFF” position.

For more detailed operating information, refer to the BRAUN Service/Owner Manual.

Threshold Warning System

The threshold warning system is located above the wheelchair parking (threshold) area (Figure 92). The module status indicator light illuminates when the wheelchair lift is powered, indicating that the module is activated.

The wheelchair lift step sensor pad, located at the base of the sliding wheelchair access door, monitors the doorway threshold area (Figure 93).

If the wheelchair lift step sensor pad detects a passenger in the threshold area; when the lift is below coach floor height and the sliding wheelchair access door is open, an audible buzzer, mounted in the light bar, and flashing light are actuated.



FIGURE 92

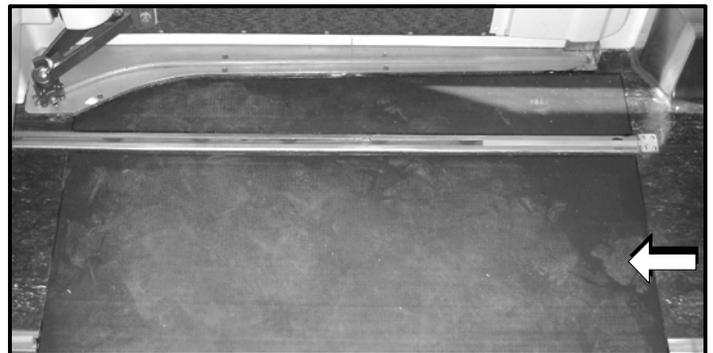


FIGURE 93

Passenger Seats

The passenger seats in the wheelchair parking area have seat bottoms that fold upward, and dual pedestal bases that slide in dual mounting tracks.

This design provides wheelchair parking space in the designated RH curbside and LH roadside areas. One area is immediately inside the wheelchair passenger area access door, and the second area is directly across the aisle on the LH roadside of the coach.

Pedestal mounted belts, with retractors, are provided front and rear of tie-down positions, on both the curb and road sides, with integral end retaining buckles for each. A wheelchair occupant shoulder restraint, with retractor, is provided on the coach sidewall outboard of each wheelchair tie-down position. End retaining buckles are provided on pedestals of the fixed folding seats, rearward of each wheelchair tiedown position.

Refer to Figures 94 to 98 to identify the adjustable seat components that fold and slide to move the sliding seat, to provide wheelchair parking area.

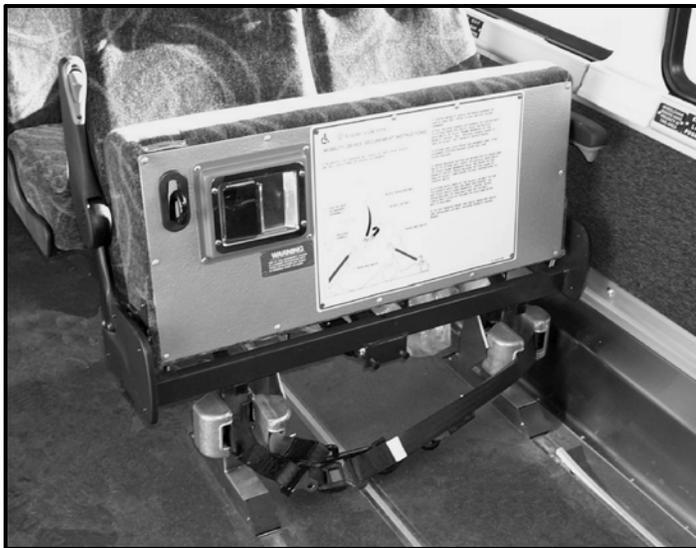


FIGURE 94

- Pull the release lever, located underneath the fixed seat, and fold up (Figure 94),
- On the sliding seat(s) located directly in front of the fixed seat, depress the button on the end of the armrest, to raise and lock the seat back in the upright position. Lift the armrest to the upright position (Figure 95),

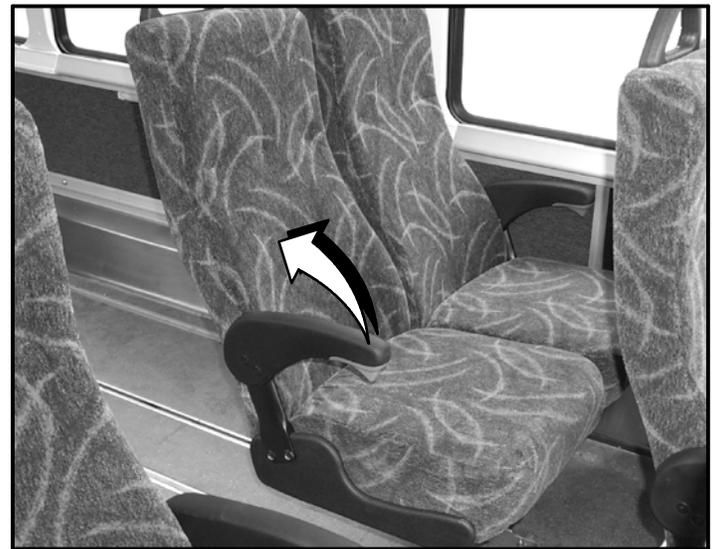


FIGURE 95

- Pull the release lever, located underneath the seat, and fold up (Figure 96),



FIGURE 96

- Remove track inserts from floor,
- Simultaneously, push the “press to release” button and the pedestal bar rearward (Figure 97),

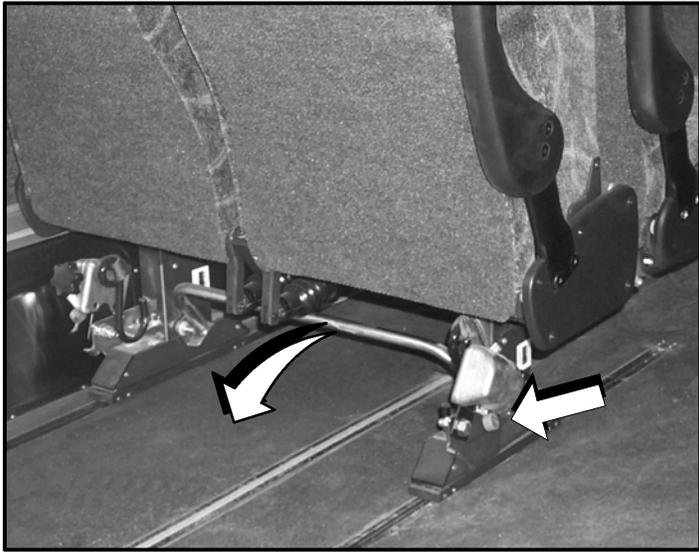


FIGURE 97

- Slide the seat from lock – down position a few inches and engage foot pedal lock – down on pedestal,
- Slide seat, using the handles on back of seat, until floor pedal automatically engages stowed lock down point in floor track (Figure 98),

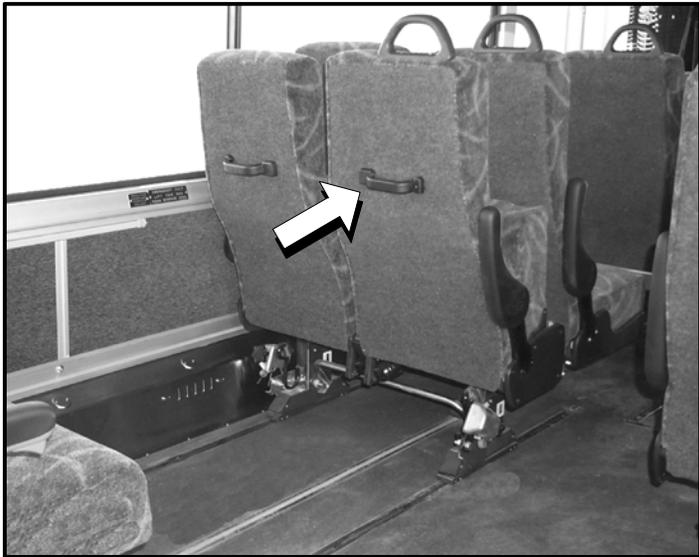


FIGURE 98

- Check to ensure that lock – down engagement is made, and seat does not continue to slide in floor track.



FIGURE 99

NOTICE

The curb side of the coach is equipped with two sliding seats and one fixed (flip-up) seat. The road side of the coach is equipped with one sliding seat and one fixed (flip-up) seat.

Wheelchair Restraints

- Center mobility device between barrier or flip-up seat and front floor anchor facing forward,
- Pull release handle on barrier or flip-up seat to extend rear red belts. Hook (or buckle) both belts on solid frame members of the mobility device. Pull release handle again to take up slack. Set mobility device brake,
- Extend and lock front securement arm, for alternative system engage loose belt into floor anchors
- Press release button on retractor of front red belts to extend belt. Hook (or buckle) both belts on solid frame members near the front of the mobility device. Press release button again to take up slack. Turn knobs on belt retractors to tighten belts.,
- Extend both ends of the black lap belt to the occupant's aisle side hip area and fasten. Do not place belts over armrests. Fasten black shoulder belt to available end on lap belt. Check belt locks by pulling on each end after belt is secured,
- To exit, remove front red belts, rear red belts, and shoulder/lap belt. Release mobility device brake.

NOTICE

Mobility Device Securement Instructions are listed on the placard (Figures 100 and 101), located underneath the fixed (flip-up) seat on the curbside and roadside of the coach.

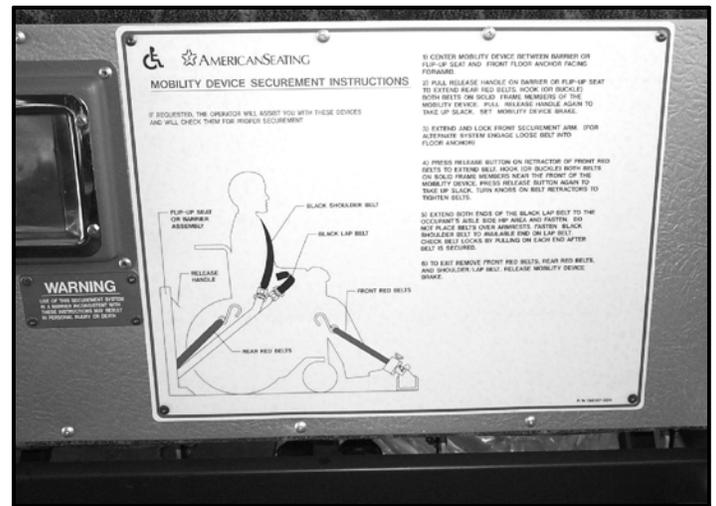


FIGURE 100

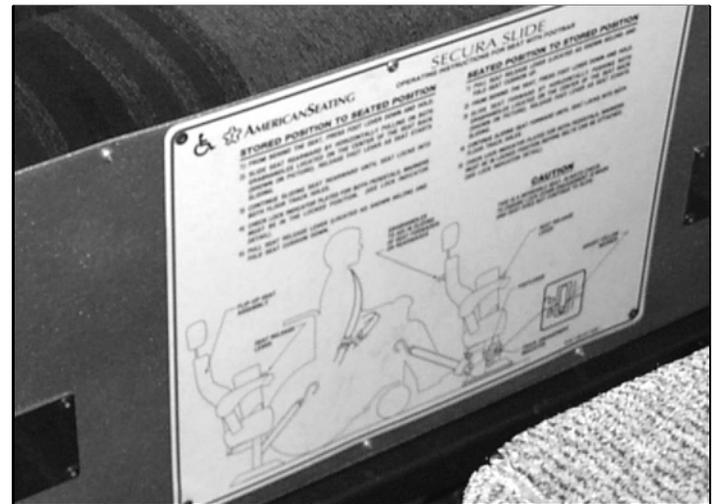


FIGURE 101

Emergency Hydraulic Hand Pump

In emergency situations a manual mode is used for lowering passengers and stowing operation. When the wheelchair lift is manually operated, the hand pump provides hydraulic pressure to the lift cylinder. A manual pressure release lowers the lift. The lift must be stowed or deployed manually by pushing back into or pulling out of the cassette.

! WARNING

The manual mode should never be used for boarding of passenger, only for the emergency lowering of passengers and stowing of lift.

The electrically controlled power unit pump and valves, and the manually operated hydraulic hand pump and release valve are contained within the Ricon wheelchair lift control box located in the front right-hand (curbside) baggage compartment (Figure 102). All hydraulic hoses and electrical control harnesses are routed through the baggage compartment wall and into the lift cassette.

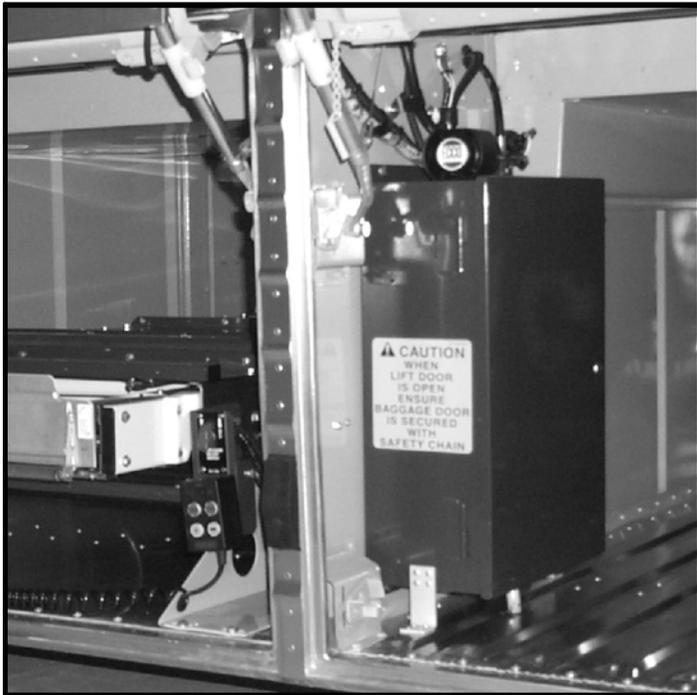


FIGURE 102

Wheelchair Door Overage Valve

The manually-actuated wheelchair door overrule valve (Figure 103) provides for the emergency dumping of air from the wheelchair door.

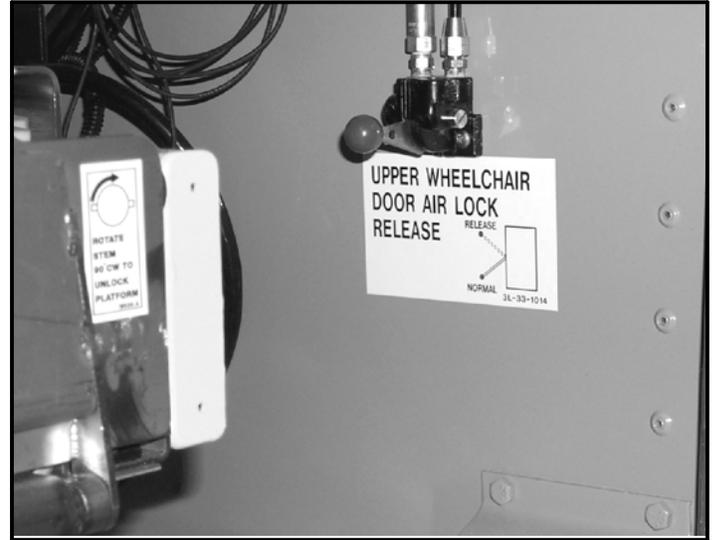


FIGURE 103

12–BASIC SPECIFICATIONS

D SERIES VEHICLE HEIGHT (MAX) 137 Inches (3479.8 mm)
(From Top Of Roof Hatches)

D SERIES VEHICLE WIDTH (MAX) 102 Inches (2590 mm)
(Excludes Fenders, Mirrors And Side Turn Lights)

FUEL TYPE: ULSD only

DEF TYPE: ISO standard 22241–1

ENGINE OIL: CJ–4

TIRE INFLATION CHART (9.00” RIM WIDTH)

NOTICE

Only use approved 22.5 – 9 inch tires.

Minimum load range is J.

**Load range H can be used on the drive axle
for winter tires.**

AXLE	GAWR	LOAD/TIRE	PRESSURE (PSI)
Front	16,000 lbs.	8,000 lbs.	120
Drive	22,500 lbs.	5,625 lbs.	100
Tag (D4000 at 46,000 GVW)	10,000 lbs.	5,000 lbs.	85
Tag (D4500 at 48,000 GVW)	12,000 lbs.	6,000 lbs.	85
Tag (D4500 at 50,000 GVW)	14,000 lbs.	7,000 lbs.	100

TIRE CHART (9.00” RIM WIDTH)

Make and type	Size	Axle	Load Range
Goodyear G409MBA	315/80R22.5	All Axles	J
Goodyear Intercity Cruiser	315/80R22.5	All Axles	J
Michelin XZA2	315/80R22.5	All Axles	L
Firestone HP3000 / FS400	315/80R22.5	All Axles	J
Bridgestone R294	315/80R22.5	All Axles	J
Goodyear G124 (Snow tire)	12R22.5	Drive Axle Only *	H
Michelin XDN2 (Snow tire)	315/80R22.5	Drive Axle Only *	L
Michelin XDN2 (Snow tire)	12R22.5	Drive Axle Only *	H
Matador DH1	315/80R22.5	Drive Axle Only *	J
Matador FH1	315/80R22.5	Front & Tag Axle Only *	J

THIS PAGE INTENTIONALLY LEFT BLANK

13–DIAGNOSTIC CODES / 2010 EPA ENGINE

CUMMINS ENGINE DIAGNOSTIC CODES

J1939 SPN (FMI)	DIAGNOSTIC CODE DESCRIPTION	EFFECT
27 (4)	EGR Valve Position Circuit - Voltage Below Normal or Shorted to Low Source.	EGR valve actuation will be disabled.
27 (2)	Engine Exhaust Gas Recirculation 1 Valve Position -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
31 (0)	Exhaust Gas Circulation (EGR) System-Cond. Exists.	EGR valve operation will be disabled.
81 (16)	Engine Particulate Trap Inlet Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	None on performance.
84 (2)	Wheel Based Vehicle Speed - Data Erratic, Intermittent or Incorrect.	Engine speed limited Maximum Engine Speed without VSS parameter value. Cruise control, Geardown Protection, and Road Speed Governor will not work.
84 (9)	Wheel-Based Vehicle Speed -Abnormal Update Rate	Refer to vendor manual.
84 (10)	Wheel Based Vehicle Speed Sensor Circuit Tampering has been Detected.	Engine speed limited Maximum Engine Speed without VSS parameter value. Cruise control, Geardown Protection, and Road Speed Governor will not work.
84 (19)	Wheel-Based Vehicle Speed -Received Network Data In Error	Refer to vendor manual.
91 (2)	Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect.	The engine will only idle.
91 (3)	Accelerator Pedal or Lever Position Sensor1 Circuit - Voltage Below Normal or Shorted to High Source.	Severe derate in power output of the engine. Limp home power only.
91 (4)	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage Above Normal or Shorted to Low Source.	Severe derate in power output of the engine. Limp home power only.
91 (9)	Accelerator Pedal Position 1 Abnormal Update Rate	Refer to vendor manual.
91 (19)	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Received Network Data in Error.	Engine may only idle or engine will not accelerate to full speed.
95 (16)	Engine Fuel Filter Differential Pressure -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
97 (16)	Water In Fuel Indicator -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
97 (15)	Water In Fuel Indicator - Data Valid but Below Normal Operational Range - Least Severe Level.	Possible white smoke, loss of power, or hard starting.
97 (3)	Water in Fuel Indicator Sensor Circuit - Voltage Above Normal or Shorted to High Source.	None on performance. No water in fuel warning available.
97 (4)	Water in Fuel Indicator Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	None on performance. No water in fuel warning available.
100 (3)	Engine Oil Riffle Pressure 1 Sensor Circuit - Voltage Above Normal or Shorted to High Source.	None on performance. No engine protection for oil pressure.
100 (4)	Engine Oil Riffle Pressure 1 Sensor Circuit - Voltage Below Normal or Shorted to Low Source	None on performance. No engine protection for oil pressure.

CUMMINS Diagnostic Codes - Continued

100 (18)	Engine Oil Riffle Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Level.	Progressive power derate increasing in severity from time of alert.
100 (1)	Engine Oil Riffle Pressure - Data Valid but Below Normal Operational Range - Most Severe Level.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.
100 (2)	Engine Oil Riffle Pressure - Data Erratic, Intermittent, or Incorrect.	None on performance. No engine protection for oil pressure.
101 (16)	Crankcase Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	None on performance.
101 (0)	Crankcase Pressure - Data Valid but Above Normal Operation Range - Most Severe Level.	Engine power derate.
101 (3)	Crankcase Pressure Circuit - Voltage Above Normal or Shorted to High Source.	No engine protection for high crankcase pressure.
101 (4)	Crankcase Pressure Circuit - Voltage Below Normal or Shorted to Low Source.	No engine protection for high crankcase pressure.
101 (2)	Crankcase Pressure - Data Erratic, Intermittent or Incorrect.	None on performance.
101 (15)	Crankcase Pressure - Data Valid but Above Normal Operational Range - Least Severe Level.	None on performance.
102 (2)	Intake Manifold 1 Pressure - Data Erratic, intermittent, or Incorrect.	Engine power derate.
102 (3)	Intake Manifold 1 Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source.	Derate in power output of the engine.
102 (4)	Intake Manifold 1 Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	Derate in power output of the engine.
102 (10)	Engine Intake Manifold #1 Pressure -Abnormal Rate Of Change	Refer to vendor manual.
102 (16)	Intake Manifold 1 Pressure - Above Normal Operating Range. Moderately Severe Level.	Refer to vendor manual.
102 (18)	Intake Manifold 1 Pressure - Below Normal Operating Range. Moderately Severe Level.	Refer to vendor manual.
103 (15)	Turbocharger 1 Speed - Data Valid but Above Normal Operational Range - Least Severe Level.	Engine power derate to lower the turbocharger speed.
103 (10)	Turbocharger 1 Speed - Abnormal Rate of Change.	None on performance. The ECM uses an estimated turbocharger speed.
103 (2)	Turbocharger 1 Speed - Data Erratic, Intermittent, or Incorrect.	None on performance. The ECM uses an estimated turbocharger speed.
103 (18)	Turbocharger 1 Speed - Data Valid but Below Normal Operational Range - Moderately Severe Level.	Engine power derate. The ECM uses an estimated turbocharger speed.
103 (16)	Engine Turbocharger 1 Speed -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
105 (0)	Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Most Severe Level.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.
105 (2)	Engine Intake Manifold 1 Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

105 (3)	Intake Manifold 1 Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
105 (4)	Intake Manifold 1 Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
105 (15)	Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Least Severe Level.	Progressive power derate increasing in severity from time of alert.
105 (18)	Engine Intake Manifold 1 Temperature -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
108 (3)	Barometric Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source.	Engine power derate.
108 (4)	Barometric Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	Engine power derate
108 (2)	Barometric Pressure - Data Erratic, Intermittent, or Incorrect.	Engine power derate.
110 (2)	Engine Coolant Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
110 (3)	Engine Coolant Temperature 1 Sensor Circuit - Voltage Above Normal or Shorted to High Source.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
110 (4)	Engine Coolant Temperature 1 Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
110 (15)	Engine Coolant Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
110 (16)	Engine Oil Riffle Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Power derate and possible engine shutdown. If Engine Protection Shutdown feature is enabled.
110 (18)	Engine Coolant Temperature -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
110 (0)	Engine Coolant Temperature - Data Valid but Above Normal Operational Range - Most Severe Level.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.
110 (31)	Engine Coolant Temperature - Conditions Exists.	EGR valve actuation will be disabled.
110 (31)	Engine Coolant Temperature - Condition Exists.	EGR valve actuation will be disabled.
110 (15)	Engine Coolant Temperature - Data Valid but Above Normal Operational Range - Least Severe Level.	Power derate and possible engine shutdown if engine protection shutdown feature is enabled.
111 (1)	Engine Coolant Level -Data Valid But Below Normal Operational Range -Most Severe Level.	Refer to vendor manual.
111 (3)	Coolant Level Sensor 1 Circuit - Voltage Above Normal or Shorted to High Source.	None on performance.
111 (4)	Coolant Level Sensor 1 Circuit - Voltage Below Normal or Shorted to Low Source.	None on performance.
111 (18)	Coolant Level - Data Valid but Below Normal Operational Range - Moderately Sever Level.	None on performance.

CUMMINS Diagnostic Codes - Continued

111 (17)	Coolant Level - Data Valid but Below Normal Operational Range - Least Severe Level.	None on performance.
157 (0)	Engine Injector Metering Rail 1 Pressure -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
157 (3)	Engine Injector Metering Rail 1 Pressure -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
157 (4)	Engine Injector Metering Rail 1 Pressure -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
157 (16)	Engine Injector Metering Rail 1 Pressure -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
157 (18)	Engine Injector Metering Rail 1 Pressure -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
167 (16)	Electrical Charging System Voltage - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Amber warning lamp illuminated until high battery voltage condition is corrected.
167 (18)	Electrical Charging System Voltage - Data Valid but Below Normal Operational Range - Moderately Severe Level.	Amber lamp will light until low battery voltage condition is corrected.
167 (1)	Electrical Charging System Voltage - Data Valid but Below Normal Operational Range - Most Severe Level.	Red lamp illuminated until very low battery voltage condition is corrected.
168 (18)	Battery 1 Voltage - Data Valid but Below Normal Operational Range - Moderately Severe Range.	Engine may stop running or be difficult to start.
168 (16)	Battery 1 Voltage - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Possible electrical damage to all electrical components.
168 (17)	Battery Potential / Power Input 1 -Data Valid But Below Normal Operating Range -Least Severe Level	Refer to vendor manual.
171 (2)	Ambient Air Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
171 (3)	Ambient Air Temperature Sensor 1 Circuit - Voltage Above Normal or Shorted to High Source.	None on performance.
171 (4)	Ambient Air Temperature Sensor 1 Circuit - Voltage Below Normal or Shorted to Low Source.	None on Performance.
171 (9)	Ambient Air Temperature -Abnormal Update Rate	Refer to vendor manual.
171 (19)	Ambient Air Temperature -Received Network Data In Error	Refer to vendor manual.
175 (0)	Engine Oil Temperature High - Data Valid but Above Normal Operational Range - Most Severe Level.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.
175 (2)	Engine Oil Temperature 1 -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
175 (3)	Engine Oil Temperature Sensor 1 Circuit Voltage Above Normal or Shorted to High Source.	No engine protection for engine oil temperature.
175 (4)	Engine Oil Temperature Sensor 1 Circuit Voltage Below Normal or Shorted to Low Source.	No engine protection for engine oil temperature.

CUMMINS Diagnostic Codes - Continued

175 (16)	Engine Oil Temperature 1 -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
188 (16)	Engine Speed At Idle, Point 1 (Engine Configuration) -Data Valid But Above Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
188 (18)	Engine Speed At Idle, Point 1 (Engine Configuration) -Data Valid But Below Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
190 (0)	Engine Crankshaft Speed/Position - Data Valid but Above Normal Operational Range - Most Severe Level.	Fuel injection disabled until engine speed falls below the overspeed limit.
190 (2)	Engine Crankshaft Speed/Position - Data Erratic, Intermittent, or Incorrect.	Engine can run rough. Possibly poor starting capability. engine runs using backup speed sensor. engine power is reduced.
190 (16)	Engine Crankshaft Speed/Position - Data Erratic, Intermittent, or Incorrect.	Refer to vendor manual.
191 (9)	Transmission Output Shaft Speed -Abnormal Update Rate	Refer to vendor manual.
191 (19)	Transmission Output Shaft Speed Received Network Data In Error	Refer to vendor manual.
251 (2)	Real-Time Clock Power Interrupt - Data Erratic, Intermittent, or Incorrect.	None on performance. Data in the ECM will not have accurate time and date information.
251 (10)	Time Abnormal Rate Of Change	Refer to vendor manual.
411 (2)	Exhaust Gas Recirculation Valve Delta Pressure - Data erratic, Intermittent or Incorrect.	EGR valve actuation will be disabled.
411 (3)	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source	EGR valve actuation will be disabled.
411 (4)	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source	EGR valve actuation will be disabled.
411 (16)	Exhaust Gas Recirculation Valve Delta Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	EGR valve actuation will be disabled.
411 (18)	Exhaust Gas Recirculation Valve Delta Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	EGR valve operation will be disabled.
412 (2)	Engine Exhaust Gas Recirculation 1 Temperature - Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
412 (3)	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source.	EGR valve actuation will be disabled.
412 (4)	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	EGR valve actuation will be disabled.
412 (15)	Exhaust Gas Recirculation Temperature - Data Valid but Above Normal Operational Range - Least Severe Level.	Slight fueling derate to bring EGR temperature under the maximum limit.
412 (16)	Exhaust Gas Recirculation Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Severe fueling derate to bring EGR temperature under the maximum limit.

CUMMINS Diagnostic Codes - Continued

444 (18)	Battery Potential / Power Input 2 -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
444 (16)	Battery Potential / Power Input 2 -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
558 (9)	Accelerator Pedal 1 Low Idle Switch -Abnormal Update Rate	Refer to vendor manual.
558 (19)	Accelerator Pedal 1 Low Idle Switch -Received Network Data In Error	Refer to vendor manual.
563 (9)	Anti-Lock Braking (ABS) Active -Abnormal Update Rate	Refer to vendor manual.
612 (2)	Engine Magnetic Speed/Position Lost Both of Two - Data Erratic, Intermittent, or Incorrect.	None on performance.
626 (3)	Start Enable Device 1 Circuit (Ether Injection) - Voltage Above Normal or Shorted to High Source.	Ether start functionality will be disabled.
626 (4)	Start Enable Device 1 Circuit (Ether Injection) - Voltage Below Normal or Shorted to Low Source.	Ether start functionality will be disabled.
627 (12)	Injector Power Supply - Bad Intelligent Device or Component.	Possible low power, engine misfire, and/or engine will not start.
627 (2)	Power Supply Lost With Ignition On - Data Erratic, Intermittent, or Incorrect.	Possible no noticeable performance effects or engine dying or hard starting. Fault information, trip information, and maintenance monitor data can be inaccurate.
629 (12)	Electronic Control Module Critical Internal Failure-Bad Intelligent Device or Component.	Engine may not start.
630 (12)	Calibration Memory -Bad Intelligent Device Or Component	Refer to vendor manual.
632 (4)	Engine Fuel Shutoff Valve Driver Circuit- Voltage Below Normal or Shorted to Low Source.	Fuel shutoff valve will close. Engine will shutdown.
632 (3)	Engine Fuel Shutoff Valve Driver Circuit- Voltage Above Normal or Shorted to High Source.	Fuel shutoff valve may not open when keyswitch is in ON position, or may not close when keyswitch is in OFF position.
633 (31)	Engine Fuel Actuator 1 Control Command -Condition Exists	Refer to vendor manual.
639 (9)	SAE J1939 Multiplexing PGN Timeout Error Abnormal Update Rate.	One or more multiplexed devices will not operate properly. One or more symptoms will occur.
639 (13)	SAE J1939 Multiplexing Configuration Error - Out of Calibration.	At least one multiplexed device will not operate properly.
639 (9)	J1939 Datalink - Abnormal Update Rate.	Engine speed will ramp down and remain at idle.
641 (15)	VGT Actuator Driver Over Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level.	None on performance.
641 (11)	VGT Actuator Driver Circuit - Root Cause Not Known	VGT actuation will be disabled.
641 (7)	VGT Actuator Driver Circuit (Motor) - Mechanical System Not Responding Properly or Out of Adjustment.	VGT travel may be limited.
641 (13)	Engine Variable Geometry Turbocharger Actuator #1 Out Of Calibration	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

641 (12)	VGT Actuator Controller - Bad Intelligent Device or Component.	VGT actuation will be disabled.
641 (31)	VGT Actuator Driver Circuit - Condition Exists.	VGT actuation will be disabled.
641 (9)	VGT Actuator Driver Circuit - Abnormal Update Rate.	Active aftertreatment diesel particulate filter regeneration will be disabled.
641 (13)	VGT Actuator Controller - Out of Calibration.	Low intake manifold pressure.
647 (4)	Fan Control Circuit - Voltage Below Normal or Shorted to Low Source.	The fan can possibly stay on continuously or not run at all.
647 (3)	Fan Control Circuit - Voltage Above Normal or Shorted to High Source.	The fan may stay on continuously or not run at all.
651 (7)	Engine Injector Cylinder #01 -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
651 (6)	Injector Solenoid Driver Cylinder 1 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possible misfire or run rough.
651 (5)	Injector Solenoid Driver Cylinder 1 Circuit - Current Below Normal or Open Circuit.	Current to injector is shut off. Engine can possibly misfire or run rough.
652 (5)	Engine Injector Cylinder #02 -Current Below Normal Or Open Circuit	Refer to vendor manual.
652 (7)	Engine Injector Cylinder #02 -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
653 (7)	Engine Injector Cylinder #03 -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
653 (6)	Injector Solenoid Driver Cylinder 3 Circuit - Current Above Normal or Ground Circuit.	Current to injector is shut off. Engine can possible misfire or run rough.
653 (5)	Injector Solenoid Driver Cylinder 3 Circuit - Current Below Normal or Open Circuit.	Current to injector is shut off. Engine can possibly misfire or run rough.
654 (7)	Engine Injector Cylinder #04 -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
654 (6)	Injector Solenoid Cylinder Number 4 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possibly misfire or run rough.
654 (5)	Injector Solenoid Driver Cylinder 4 Circuit - Current Below Normal or Open Circuit.	Current to injector is shut off. Engine can possibly misfire or run rough.
655 (7)	Engine Injector Cylinder #05 -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
655 (6)	Injector Solenoid Driver Cylinder 5 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possible misfire or run rough.
655 (5)	Injector Solenoid Drive Cylinder 5 Circuit - Current Below Normal or Open Circuit.	Current to injector is shut off. Engine can possibly misfire or run rough.
656 (5)	Injector Solenoid Driver Cylinder 6 Circuit - Current Below Normal or Open Circuit	Current to injector is shut off. Engine can possibly misfire or run rough.
656 (6)	Injector Solenoid Driver Cylinder 6 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possible misfire or run rough.
656 (7)	Engine Injector Cylinder #06 -Mechanical System Not Responding Or Out Of Adjustment	

CUMMINS Diagnostic Codes - Continued

662 (6)	Injector Solenoid Driver Cylinder 2 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possible misfire or run rough.
677 (3)	Starter Relay Driver Circuit - Voltage Above Normal or Shorted to High Source.	Either the engine will not start or the engine will not have starter lockout protection.
677 (4)	Starter Relay Driver Circuit - Voltage Below Normal or Shorted to Low Source.	The engine will not have starter lockout protection.
703 (11)	Auxiliary I/O #03 -Root Cause Not Known	Refer to vendor manual.
723 (2)	Engine Camshaft Speed/Position Sensor - Data Erratic, Intermittent, or Incorrect.	Engine can run rough. Possible poor starting capability. Engine runs using primary engine position sensor.
723 (7)	Engine Speed 2 Mechanical System Not Responding Or Out Of Adjustment	
729 (3)	Engine Intake Air Heater Driver #1 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
729 (4)	Engine Intake Air Heater Driver #1 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
748 (9)	Transmission Output Retarder Abnormal Update Rate	Refer to vendor manual.
862 (3)	Heater Circuit #09 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
862 (4)	Heater Circuit #09 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
974 (3)	Remote Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage Above Normal or Shorted to High Source.	Remote accelerator will not operate. Remote accelerator position will be set to zero percent.
974 (4)	Remote Accelerator Pedal or Lever Position Sensor1 Circuit - Voltage Below Normal or Shorted to Low Source.	Remote accelerator will not operate. Remote accelerator position will be set at zero percent.
974 (19)	SAE J 1939 Multiplexing Remote Accelerator Pedal or Lever Position Sensor System - Received Network Data in Error.	The engine will not respond to the remote throttle. Engine may only idle. The primary or cab accelerator may be able to be used.
1072 (3)	Engine Brakes Actuator Driver 1 Circuit - Voltage Above Normal or Shorted to High Source.	Engine brake on cylinders 1, 2, and 3 can be on all the time or can not be activated.
1072 (4)	Engine Brakes Actuator Driver 1 Circuit - Voltage Above Below or Shorted to Low Source.	Engine brake on cylinders 1, 2, and 3 can not be activated.
1073 (4)	Engine Brake Actuator Driver Output 2 Circuit - Voltage Below Normal or Shorted to Low Source.	Engine brakes on cylinders Number 4, 5, and 6 can not be activated.
1073 (3)	Engine Brake Actuator Driver Output 2 Circuit - Voltage Above Normal or Shorted to High Source.	Engine brakes on cylinders Number 4, 5, and 6 can not be deactivated, or can not be activated.
1075 (3)	Engine Electric Lift Pump for Engine Fuel Supply - Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
1075 (4)	Engine Electric Lift Pump for Engine Fuel Supply - Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
1136 (2)	Engine ECU Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
1136 (3)	ECM Internal Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source.	None on performance.
1136 (4)	ECM Internal Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	None on performance.

CUMMINS Diagnostic Codes - Continued

1172 (2)	Engine Turbocharger 1 Compressor Intake Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
1172 (3)	Turbocharger 1 Compressor Inlet Temperature Sensor Circuit - Voltage Above Normal.	Engine power derate.
1172 (4)	Turbocharger 1 Compressor Inlet Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source.	Engine power derate.
1176 (1)	Engine Turbocharger 1 Compressor Intake Pressure Data Valid But Below Normal Operational Range - Most Severe Level	Refer to vendor manual.
1176 (18)	Engine Turbocharger 1 Compressor Intake Pressure Data Valid But Below Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
1209 (3)	Exhaust Gas Pressure Sensor Circuit - Voltage Above Normal or Shorted to Low Source.	None on performance.
1209 (4)	Exhaust Gas Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source.	None on performance.
1209 (2)	Exhaust Gas Pressure - Data Erratic, Intermittent, or Incorrect.	The ECM will estimate the exhaust gas pressure.
1209 (16)	Exhaust Gas Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Fueling derate to bring exhaust gas pressure below the maximum operating limits.
1213 (9)	Malfunction Indicator Lamp Abnormal Update Rate	Refer to vendor manual.
1267 (4)	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage Below Normal or Shorted to Low Source.	Vehicle accessories or ignition bus loads controlled by the idle shutdown relay will not power up.
1323 (31)	Engine Misfire Cylinder #1 -Condition Exists	Refer to vendor manual.
1324 (31)	Engine Misfire Cylinder #2 -Condition Exists	Refer to vendor manual.
1325 (31)	Engine Misfire Cylinder #3 -Condition Exists	Refer to vendor manual.
1326 (31)	Engine Misfire Cylinder #4 -Condition Exists	Refer to vendor manual.
1327 (31)	Engine Misfire Cylinder #5 -Condition Exists	Refer to vendor manual.
1328 (31)	Engine Misfire Cylinder #6 -Condition Exists	Refer to vendor manual.
1347 (3)	Engine Fuel Pump Pressurizing Assembly #1 - Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
1347 (4)	Engine Fuel Pump Pressurizing Assembly #1 - Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
1347 (7)	Engine Fuel Pump Pressurizing Assembly #1 - Mech. System Not Responding Or Out Of Adjustment	Refer to vendor manual.
1378 (31)	Engine Oil Change Interval - Condition Exists.	Maintenance reminder only.
1569 (31)	Engine Protection Torque Derate -Condition Exists	Adaptive cruise control will not operate. Standard cruise control may not operate
1590 (2)	Adaptive Cruise Control Mode - Data Erratic, Intermittent, or Incorrect.	Adaptive cruise control will not operate. Standard cruise control may not operate

CUMMINS Diagnostic Codes - Continued

1623 (9)	Tachograph output shaft speed -Abnormal Update Rate	Refer to vendor manual.
1623 (19)	Tachograph output shaft speed -Received Network Data In Error	Refer to vendor manual.
1639 (2)	Fan Speed - Data Erratic, Intermittent, or Incorrect.	The fan will only be in the ON or OFF position.
1675 (31)	Engine Starter Mode -Condition Exists	Refer to vendor manual.
1761 (18)	Aftertreatment 1 SCR Catalyst Tank Level -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
1761 (17)	Aftertreatment 1 SCR Catalyst Tank Level -Data Valid But Below Normal Operating Range -Least Severe Level	Refer to vendor manual.
1761 (4)	Aftertreatment 1 SCR Catalyst Tank Level -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
1761 (3)	Aftertreatment 1 SCR Catalyst Tank Level -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
1761 (1)	Aftertreatment 1 SCR Catalyst Tank Level -Data Valid But Below Normal Operational Range -Most Severe Level	Refer to vendor manual.
1818 (31)	ROP Brake Control active -Condition Exists	Refer to vendor manual.
2623 (3)	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Above Normal or Shorted to High Source.	Severe derate in power output of the engine. Limp home power only.
2623 (4)	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Below Normal or Shorted to Low Source.	Severe derate in power output of the engine. Limp home power only.
2629 (15)	Engine Turbocharger 1 Compressor Outlet Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
1267 (3)	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage Above Normal or Shorted to High Source.	Vehicle accessories or ignition bus loads controlled by the idle shutdown relay will not power up.
2633 (7)	Engine Variable Geometry Turbocharger (VGT) 1 Nozzle Position -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
2789 (16)	Engine Turbocharger 1 Calculated Turbine Intake Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
2789 (15)	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level.	Fuel is limited in an attempt to decrease the exhaust gas temperature entering the turbocharger.
2790 (15)	Turbocharger Compressor Outlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level.	Fuel is limited in an attempt to decrease the exhaust gas temperature entering the turbocharger.
2791 (15)	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
2791 (12)	EGR Valve Controller - Bad Intelligent Device or Component.	EGR valve operation will be disabled.

CUMMINS Diagnostic Codes - Continued

2791 (13)	EGR Valve Controller - Out of Calibration.	EGR valve operation will be disabled.
2791 (11)	EGR Actuator Driver Circuit - Root Cause Not Known.	The EGR valve will hold the position of the last valid J1939 message.
2791 (6)	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control -Current Above Normal Or Grounded Circuit	Refer to vendor manual.
2791 (5)	EGR Valve Control Circuit - Current Below Normal or Open Circuit.	EGR valve actuation will be disabled.
2791 (4)	EGR Valve Control Circuit - Voltage Below Normal or Shorted to Low Source.	EGR valve actuation will be disabled.
2791 (7)	EGR Valve Control Circuit - Mechanical System Not Responding Property or Out of Adjustment.	EGR valve actuation will be disabled.
2789 (16)	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Moderately Severe Level.	Fuel is limited in an attempt to decrease the calculated exhaust gas temperature entering the turbocharger.
2797 (13)	Engine Injector Group 1 -Out Of Calibration	Refer to vendor manual.
3031 (4)	Aftertreatment 1 SCR Catalyst Tank Temperature - Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3031 (3)	Aftertreatment 1 SCR Catalyst Tank Temperature - Voltage Above Normal, Or Shorted To High Source . .	Refer to vendor manual.
3031 (2)	Aftertreatment 1 SCR Catalyst Tank Temperature - Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3031 (18)	Aftertreatment 1 SCR Catalyst Tank Temperature - Data Valid But Below Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
3050 (31)	Catalyst Missing - Condition Exists.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3050 (13)	Catalyst Efficiency - Out of Calibration.	None on performance.
3050 (11)	Catalyst Face Plugged - Root Cause Not Known.	None on performance.
3050 (13)	Catalyst Efficiency - Out of Calibration.	None on performance.
3058 (10)	EGR System Monitor -Abnormal Rate Of Change	Refer to vendor manual.
3058 (16)	EGR System Monitor -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3058 (18)	EGR System Monitor -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3060 (18)	Engine Cooling System Monitor Data Valid But Below Normal Operating Range -Moderately Severe Level	None on performance.
3216 (2)	Aftertreatment 1 Intake NOx -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3216 (4)	Aftertreatment 1 Intake NOx -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3216 (9)	Aftertreatment 1 Intake NOx -Abnormal Update Rate	Refer to vendor manual.
3216 (16)	Aftertreatment 1 Intake NOx -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

3216 (20)	Aftertreatment 1 Intake NOx -Data Drifted High	Refer to vendor manual.
3218 (2)	Aftertreatment 1 Intake Gas Sensor Power Status - Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3226 (2)	Aftertreatment 1 Outlet NOx -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3226 (4)	Aftertreatment 1 Outlet NOx -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3226 (9)	Aftertreatment 1 Outlet NOx -Abnormal Update Rate	Refer to vendor manual.
3226 (20)	Aftertreatment 1 Outlet NOx -Data Drifted High	Refer to vendor manual.
3228 (2)	Aftertreatment 1 Outlet Gas Sensor Power Status - Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3241 (3)	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Above Normal or Shorted to High Source.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 (2)	Aftertreatment Exhaust Gas Temperature 1 - Data Erratic, Intermittent or Incorrect.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 (4)	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Below Normal or Shorted to Low Source.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 (2)	Aftertreatment Exhaust Gas Temperature 1 - Data Erratic, Intermittent or Incorrect.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 (31)	Catalyst Inlet Temperature Sensor Swapped with Outlet - Condition Exists.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3242 (0)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
3242 (2)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3242 (3)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3242 (4)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3242 (15)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
3242 (16)	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3245 (3)	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Above Normal or Shorted to High Source.	None on performance.
3245 (4)	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Below Normal or Shorted to Low Source.	None on performance.
3246 (0)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Data Valid But Above Normal Operational Range -Most Severe Level	None on performance.
3246 (2)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Data Erratic, Intermittent Or Incorrect	None on performance.

CUMMINS Diagnostic Codes - Continued

3246 (3)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Voltage Above Normal, Or Shorted To High Source	None on performance.
3246 (4)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Voltage Below Normal, Or Shorted To Low Source	None on performance.
3246 (15)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	None on performance.
3246 (16)	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	None on performance.
3251 (0)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
3251 (2)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3251 (3)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3251 (4)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3251 (15)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
3251 (16)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3360 (2)	Aftertreatment 1 Diesel Exhaust Fluid Controller Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3360 (9)	Aftertreatment Diesel Exhaust Fluid Controller - Abnormal update rate.	Refer to vendor manual.
3360 (11)	Aftertreatment 1 Diesel Exhaust Fluid Controller Root Cause Not Known	Refer to vendor manual.
3360 (19)	Aftertreatment 1 Diesel Exhaust Fluid Controller - Received Network Data In Error	Refer to vendor manual.
3360 (12)	Aftertreatment 1 Diesel Exhaust Fluid Controller Bad Intelligent Device Or Component	Refer to vendor manual.
3361 (2)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3361 (3)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3361 (4)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3361 (5)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Current Below Normal Or Open Circuit	Refer to vendor manual.
3361 (7)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
3361 (11)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Root Cause Not Known	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

3361 (12)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Bad Intelligent Device Or Component	Refer to vendor manual.
3362 (31)	Aftertreatment 1 SCR Catalyst Dosing Unit Input Lines -Condition Exists	Refer to vendor manual.
3362 (7)	Aftertreatment 1 SCR Catalyst Dosing Unit Input Lines -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
3363 (3)	Aftertreatment 1 SCR Catalyst Tank Heater -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3363 (4)	Aftertreatment 1 SCR Catalyst Tank Heater -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3363 (5)	Aftertreatment 1 SCR Catalyst Tank Heater -Current Below Normal Or Open Circuit	Refer to vendor manual.
3363 (7)	Aftertreatment 1 SCR Catalyst Tank Heater Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
3363 (16)	Aftertreatment 1 SCR Catalyst Tank Heater -Data Valid But Above Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
3363 (18)	Aftertreatment 1 SCR Catalyst Tank Heater -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3480 (2)	Aftertreatment 1 Fuel Pressure 1 Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3480 (3)	Aftertreatment 1 Fuel Pressure 1 Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3480 (4)	Aftertreatment 1 Fuel Pressure 1 Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3480 (17)	Aftertreatment 1 Fuel Pressure 1 Data Valid But Below Normal Operating Range -Least Severe Level	Refer to vendor manual.
3482 (2)	Aftertreatment 1 Fuel Enable Actuator -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3482 (3)	Aftertreatment 1 Fuel Enable Actuator -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3482 (4)	Aftertreatment 1 Fuel Enable Actuator -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3490 (3)	Aftertreatment 1 Purge Air Actuator -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3490 (4)	Aftertreatment 1 Purge Air Actuator -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3490 (7)	Aftertreatment 1 Purge Air Actuator -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
3509 (3)	Sensor supply voltage 1 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3509 (4)	Sensor supply voltage 1 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3510 (3)	Sensor supply Voltage 2 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3510 (4)	Sensor supply Voltage 2 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

3511 (3)	Sensor supply Voltage 3 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3511 (4)	Sensor supply Voltage 3 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3512 (3)	Sensor supply voltage 4 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3512 (4)	Sensor supply voltage 4 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3513 (3)	Sensor supply voltage 5 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3513 (4)	Sensor supply voltage 5 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3514 (3)	Sensor supply voltage 6 -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3514 (4)	Sensor supply voltage 6 -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3555 (17)	Ambient Air Density -Data Valid But Below Normal Operating Range -Least Severe Level	Refer to vendor manual.
3556 (2)	Aftertreatment 1 Hydrocarbon Doser -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3556 (5)	Aftertreatment 1 Hydrocarbon Doser -Current Below Normal Or Open Circuit	Refer to vendor manual.
3556 (18)	Aftertreatment 1 Hydrocarbon Doser -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3597 (18)	ECU Power Output Supply Voltage #1 Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
3610 (2)	Diesel Particulate Filter Outlet Pressure 1 Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
3610 (3)	Diesel Particulate Filter Outlet Pressure 1 Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3610 (4)	Diesel Particulate Filter Outlet Pressure 1 Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3667 (3)	Engine Air Shutoff Status -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
3667 (4)	Engine Air Shutoff Status -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
3703 (31)	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch -Condition Exists	Refer to vendor manual.
3711 (31)	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature -Condition Exists	Refer to vendor manual.
3713 (31)	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout -Condition Exists	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

3936 (7)	Aftertreatment Diesel Particulate Filter System - Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
3936 (15)	Aftertreatment Diesel Particulate Filter System Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
3936 (16)	Aftertreatment Diesel Particulate Filter System Data Valid But Above Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
4094 (31)	NOx limits exceeded due to Insufficient Reagent Quality -Condition Exists	Refer to vendor manual.
4096 (31)	NOx limits exceeded due to Empty Reagent Tank Condition Exists	Refer to vendor manual.
4334 (2)	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
4334 (3)	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4334 (4)	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
4334 (16)	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
4334 (18)	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure -Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
4340 (3)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 1 state -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4340 (5)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 1 state -Current Below Normal Or Open Circuit	Refer to vendor manual.
4342 (3)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 2 state -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4342 (5)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 2 state -Current Below Normal Or Open Circuit	Refer to vendor manual.
4344 (3)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 3 state -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4344 (5)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 3 state -Current Below Normal Or Open Circuit	Refer to vendor manual.
4346 (3)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 4 state -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4346 (5)	Aftertreatment 1 SCR Catalyst Reagent Line Heater 4 state -Current Below Normal Or Open Circuit	Refer to vendor manual.
4360 (0)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
4360 (2)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

4360 (3)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4360 (4)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
4360 (10)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Abnormal Rate Of Change	Refer to vendor manual.
4360 (15)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
4360 (16)	Aftertreatment 1 SCR Catalyst Intake Gas Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Lev	Refer to vendor manual.
4363 (0)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
4363 (2)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
4363 (3)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4363 (4)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
4363 (10)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Abnormal Rate Of Change	Refer to vendor manual.
4363 (15)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Data Valid But Above Normal Operating Range -Least Severe Level	Refer to vendor manual.
4363 (16)	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
4364 (18)	Aftertreatment 1 SCR Catalyst Conversion Efficiency Data Valid But Below Normal Operating Range - Moderately Severe Level	Refer to vendor manual.
4376 (3)	Aftertreatment 1 SCR Catalyst Reagent Return Valve -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4376 (4)	Aftertreatment 1 SCR Catalyst Reagent Return Valve -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
4376 (5)	Aftertreatment 1 SCR Catalyst Reagent Return Valve -Current Below Normal Or Open Circuit	Refer to vendor manual.
4752 (18)	Engine Exhaust Gas Recirculation 1 (EGR1) Cooler Efficiency Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
4765 (2)	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

4765 (3)	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
4765 (4)	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
4765 (16)	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
4792 (7)	Aftertreatment 1 SCR Catalyst System -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
4794 (31)	Aftertreatment 1 SCR Catalyst System Missing Condition Exists	Refer to vendor manual.
4795 (31)	Aftertreatment 1 Diesel Particulate Filter Missing -Condition Exists	Refer to vendor manual.
4796 (31)	Aftertreatment 1 Diesel Oxidation Catalyst Missing -Condition Exists	Refer to vendor manual.
5019 (2)	Engine Exhaust Gas Recirculation 1 Outlet Pressure Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
5019 (3)	Engine Exhaust Gas Recirculation 1 Outlet Pressure Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
5019 (4)	Engine Exhaust Gas Recirculation 1 Outlet Pressure Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
5024 (10)	Aftertreatment 1 Intake Gas NOx Sensor Heater Ratio -Abnormal Rate Of Change	Refer to vendor manual.
5031 (10)	Aftertreatment 1 Outlet Gas NOx Sensor Heater Ratio -Abnormal Rate Of Change	Refer to vendor manual.
5246 (0)	Aftertreatment SCR Operator Inducement Severity -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
5285 (18)	Engine Charge Air Cooler 1 Efficiency Data Valid But Below Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
5298 (17)	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency Data Valid But Below Normal Operating Range -Least Severe Level	Refer to vendor manual.
5298 (18)	Aftertreatment 1 Diesel Oxidation Catalyst Missing -Condition Exists	Refer to vendor manual.
5319 (31)	Aftertreatment 1 Diesel Particulate Filter Incomplete Regeneration -Condition Exists	Refer to vendor manual.
5394 (2)	Aftertreatment Diesel Exhaust Fluid Dosing Valve -Data Erratic, Intermittent Or Incorrect	Refer to vendor manual.
5394 (3)	Aftertreatment Diesel Exhaust Fluid Dosing Valve -Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
5394 (4)	Aftertreatment Diesel Exhaust Fluid Dosing Valve -Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
5394 (5)	Aftertreatment Diesel Exhaust Fluid Dosing Valve -Current Below Normal Or Open Circuit	Refer to vendor manual.
5394 (7)	Aftertreatment Diesel Exhaust Fluid Dosing Valve -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.

CUMMINS Diagnostic Codes - Continued

5397 (31)	Aftertreatment 1 Diesel Particulate Filter Regeneration too Frequent -Condition Exists	Refer to vendor manual.
5491 (3)	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
5480 (16)	Aftertreatment 1 Diesel Exhaust Fluid Controller Temperature -Data Valid But Above Normal Operating Range -Moderately Severe Level	Refer to vendor manual.
5491 (4)	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
5491 (5)	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay Current Below Normal Or Open Circuit	Refer to vendor manual.
5491 (7)	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.
5571 (7)	High Pressure Common Rail Fuel Pressure Relief Valve -Mechanical System Not Responding Or Out Of Adjustment	Refer to vendor manual.

DIAGNOSTIC CODES/TRANSMISSION

ALLISON B500 GEN IV DIAGNOSTIC CODES

ALLISON CODE RETRIEVAL

Pressing the N key on the touch-pad, with the ignition turned ON (engine can be running), will allow the user to retrieve the transmission codes.

Simultaneously press the ▲ and ▼ buttons to retrieve oil level data. Press the ▲ and ▼ buttons again to display d1. Press the MODE button to view the next code. Record all codes.

C1312	Retarder Request Sensor Failed Low
C1313	Retarder Request Sensor Failed High
P0122	Pedal Position Sensor Circuit Low Voltage
P0123	Pedal Position Sensor Circuit High Voltage
P0218	Transmission Fluid Overtemperature
P0561	System Voltage Performance
P0562	System Voltage Low
P0563	System Voltage High
P0602	TCM Not Programmed
P0610	TCM Vehicle Options Error (Trans ID)
P0613	TCM Processor
P0614	P0614 Torque Control Mismatch (ECM/TCM)
P0634	TCM Internal Temperature Too High
P063E	Auto Configuration Throttle Input Not Present
P063F	Auto Configuration Engine Coolant Temp Input Not Present
P0658	Actuator Supply Voltage 1 Low (HSD 1 gnd)
P0659	Actuator Supply Voltage 1 High (HSD 1 open/batt)
P0667	TCM Internal Temperature Sensor Circuit Range / Perform.
P0668	TCM Internal Temperature Sensor Circuit Low
P0669	TCM Internal Temperature Sensor Circuit High
P0701	Transmission Control System Performance
P0702	Transmission Control System Electrical
P0703	Brake Switch Circuit
P0708	Transmission Range Sensor Circuit – High Input
P070C	Transmission Fluid Level Sensor Circuit – Low Input
P070D	Transmission Fluid Level Sensor Circuit – High Input
P0711	Transm. Fluid Temperature Sensor Circuit Performance
P0712	Transmission Fluid Temperature Sensor Circuit Low Input
P0713	Transmission Fluid Temperature Sensor Circuit High Input
P0716	Turbine Speed Sensor Circuit Performance
P0717	Turbine Speed Sensor Circuit No Signal
P071A	RELS Input Failed On
P071D	General Purpose Input Fault
P0720	Output Speed Sensor Circuit
P0721	Output Speed Sensor Circuit Performance
P0722	Output Speed Sensor Circuit No Signal
P0726	Engine Speed Input Circuit Performance

ALLISON Diagnostic Codes - Continued

P0727	Engine Speed Input Circuit No Signal
P0729	Incorrect 6th Gear Ratio
P0730	Incorrect Neutral Gear Ratio
P0731	Incorrect 1st Gear Ratio
P0732	Incorrect 2nd Gear Ratio
P0733	Incorrect 3rd Gear Ratio
P0734	Incorrect 4th Gear Ratio
P0735	Incorrect 5th Gear Ratio
P0736	Incorrect Reverse Ratio
P0741	Torque Converter Clutch System Stuck Off
P0776	PCS 2 Controlled Clutch Stuck Off
P0777	PCS 2 Controlled Clutch Stuck On
P0796	PCS 3 Controlled Clutch Stuck Off
P0797	PCS 3 Controlled Clutch Stuck On
P0842	Transmission Pressure Switch Solenoid 1 Circuit Low
P0843	Transmission Pressure Switch Solenoid 1 Circuit High
P0880	TCM Power Input Signal
P0881	TCM Power Input Signal Performance (Battery Voltage)
P0882	TCM Power Input Signal Low (Battery Voltage)
P0883	TCM Power Input Signal High (Battery Voltage)
P0894	Transmission Component Slipping
P0960	Pressure Control Solenoid (PCS) MM Control Circuit Open
P0961	Pressure Control Solenoid (PCS) MM System Performance
P0962	Pressure Control Solenoid (PCS) MM Control Circuit Low
P0963	Pressure Control Solenoid (PCS) MM Control Circuit High
P0964	Pressure Control Solenoid (PCS) 2 System Open
P0965	Pressure Control Solenoid (PCS) 2 System Performance
P0966	Pressure Control Solenoid (PCS) 2 Control Circuit Low
P0967	Pressure Control Solenoid (PCS) 2 Control Circuit High
P0968	Pressure Control Solenoid (PCS) 3 System Open
P0969	Pressure Control Solenoid (PCS) 3 System Performance
P0970	Pressure Control Solenoid (PCS) 3 Control Circuit Low
P0971	Pressure Control Solenoid (PCS) 3 Control Circuit High
P0973	Shift Solenoid (SS) 1 Control Circuit Low
P0974	Shift Solenoid (SS) 1 Control Circuit High
P0975	Shift Solenoid (SS) 2 Control Circuit Open
P0976	Shift Solenoid (SS) 2 Control Circuit Low
P0977	Shift Solenoid (SS) 2 Control Circuit High
P0989	Retarder Pressure Sensor Failed Low
P0990	Retarder Pressure Sensor Failed High
P1739	Incorrect Low Gear Ratio
P1891	Throttle Position Sensor PWM Signal Low Input

ALLISON Diagnostic Codes - Continued

P1892	Throttle Position Sensor PWM Signal High Input
P2184	Engine Coolant Temperature Sensor 2 Circuit Low
P2185	Engine Coolant Temperature Sensor 2 Circuit High
P2637	Torque Management Feedback Signal (SEM)
P2641	Torque Management Feedback Signal (LRTP)
P2670	Actuator Supply Voltage 2 Low (HSD 2 gnd)
P2671	Actuator Supply Voltage 2 High (HSD 2 batt/open)
P2685	Actuator Supply Voltage 3 Low (HSD 3 gnd)
P2686	Actuator Supply Voltage 3 High (HSD 3 batt/open)
P2714	PCS 4 Controlled Clutch Stuck Off
P2715	PCS 4 Controlled Clutch Stuck On
P2718	Pressure Control Solenoid (PCS) 4 System Open
P2719	Pressure Control Solenoid (PCS) 4 System Performance
P2720	Pressure Control Solenoid (PCS) 4 Control Circuit Low
P2721	Pressure Control Solenoid (PCS) 4 Control Circuit High
P2723	PCS 1 Controlled Clutch Stuck Off
P2724	PCS 1 Controlled Clutch Stuck On
P2727	Pressure Control Solenoid (PCS) 1 System Open
P2728	Pressure Control Solenoid (PCS) 1 System Performance
P2729	Pressure Control Solenoid (PCS) 1 Control Circuit Low
P2730	Pressure Control Solenoid (PCS) 1 Control Circuit High
P2736	Pressure Control Solenoid (PCS) 5 System Open
P2737	Pressure Control Solenoid (PCS) 5 System Performance
P2738	Pressure Control Solenoid (PCS) 5 Control Circuit Low
P2739	Pressure Control Solenoid (PCS) 5 Control Circuit High
P2740	Retarder Oil Temperature Hot
P2742	Retarder Oil Temperature Sensor Circuit - Low Input
P2743	Retarder Oil Temperature Sensor Circuit - High Input
P2761	TCC PCS Control Circuit Open
P2762	TCC PCS Control Circuit Range / Performance
P2763	TCC PCS Control Circuit High
P2764	TCC PCS Control Circuit Low
P2772	Four Wheel Drive Low Switch Circuit Performance
P278A	Kickdown Input Switch Circuit
P2793	Gear Shift Direction Circuit
P2808	PCS 6 Controlled Clutch Stuck Off
P2809	PCS 6 Controlled Clutch Stuck On
P2812	Pressure Control Solenoid (PCS) 6 System Open
P2813	Pressure Control Solenoid (PCS) 6 System Performance
P2814	Pressure Control Solenoid (PCS) 6 Control Circuit Low
P2815	Pressure Control Solenoid (PCS) 6 Control Circuit High
U0001	High Speed CAN Bus Reset Counter Overrun

ALLISON Diagnostic Codes - Continued

U0010	CAN Bus Reset Counter Overrun
U0100	Lost Communication with ECM / PCM "A"
U0103	Lost Communication with Shift Module 1
U0115	Lost Communication with ECM / PCM "B"
U0291	Lost Communication with Shift Module 2
U0304	Software Incompatibility with Gear Shift Control Module 1
U0333	Software Incompatibility with Gear Shift Control Module 2
U0404	Invalid Data Received from Gear Shift Module 1
U0592	Invalid Data Received from Gear Shift Module 2

DIAGNOSTIC CODES/TRANSMISSION

ZF AS-TRONICS DIAGNOSTIC CODES / PUSH BUTTON SHIFT SELECTOR (PBSS)

Calling Up Current Codes / PBSS

1. Turn the ignition ON.
2. Push the **N** key on the Push Button Shift Selector (PBSS).
3. Hold down the UP arrow key until codes repeat.
4. Record all codes (Failure #).

When calling up codes, ZF lists 3–digit failure #'s on a two character shift selector display by illuminating the horizontal arrows graphic as the third digit (refer to example below).



Failure # on shift selector display is **181** – CAN EEC2 timeout.

When calling up codes, if the horizontal arrows graphic is not illuminated the shift selector is displaying a 2–digit failure #.

ZF Failure Code	Fault Description
2	Short Circuit to ground at output stage to Y2 (Valve Splitter; DD: high, OD: low)
3	Short circuit to ground at output stage to Y3 (Valve Splitter; DD: low, OD: high)
4	Short circuit to ground at output stage to Y4 (valve Select)
5	Short circuit to ground at output stage to Y5 (Valve Select)
6	Short circuit to ground at output stage to Y6 (Valve Shift)
7	Short circuit to ground at output stage to Y7 (Valve Shift)
8	Short circuit to ground at output stage to Y8 (Valve Range)
9	Short circuit to ground at output stage to Y9 (Valve Range)
10	Short circuit to ground at output stage to Y10 (Main Valve)
12	Short circuit to ground at output stage to reverse light relay (E-Module)
16	Short circuit to ground at output stage to brake solenoid
17	Short circuit to ground at output stage to Y1 (inertia brake valve)
18	Short circuit to ground at outstage to Y17 (valve clutch disengage slow)
19	Short circuit to ground at output stage to Y15 (valve clutch engage slow)
20	Short circuit to ground at output stage to Y16 (valve clutch disengage fast)
21	Short circuit to ground at output stage to Y14 (valve clutch engage fast)
22	Short circuit to ground at output ADVP (wakeup control signal for E-module, voltage supply to display, warning lamp, warning buzzer, output speed sensor 1)
23	Short circuit to ground at output stage to warning lamp (E-Module)
25	Short circuit to ground at output SD to display
26	CAN engine configuration timeout
27	Error on “engine configuration message” (engine configuration)
28	Error on “Actual driveline retarder-percent torque” signal (ERC1_DR)
29	Error on “Engine coolant load increase” signal (ERC1_DR)
30	Error on “Driveline retarder configuration message” (Driveline retarder configuration)
31	Error on “Actual engine retarder-percent torque” signal (ERC1_ER)
32	Error on “Engine retarder configuration message” (Engine retarder configuration)
33	CAN “Engine retarder configuration” timeout

34	Interruption at output stage to Y2 (Valve Splitter)
35	Interruption at output stage to Y3 (Valve Splitter)
36	Interruption at output stage to Y4 (Valve Select)
37	Interruption at output stage to Y5 (Valve Select)
38	Interruption at output stage to Y6 (Valve Shift)
39	Interruption at outpost stage to Y7 (Valve Shift)
40	Interruption at output stage to Y8 (Valve Range)
41	Interruption at output stage to Y9 (Valve Range)
42	Interruption at output stage to Y9 (Valve Range)
44	Interruption at output stage to reverse light relay (E-Module)
48	Interruption at output stage to brake solenoid
49	Interruption at output stage to Y1 (inertia brake valve)
50	Interruption at output stage valve Y17 (clutch disengage slow)
51	Interruption at output stage valve Y15 (clutch engage slow)
52	Interruption at output stage valve Y16 (clutch disengage fast)
53	Interruption at output stage to large Y14 (clutch engage fast)
54	Interruption at output ADVP (wakeup control signal for E-Module, voltage supply to display, warning buzzer, output speed sensor 1)
55	Interruption at outpost stage to warning lamp (E-Module)
66	Short circuit to positive at output stage to Y2 (Valve Splitter)
67	Short circuit to positive at output stage Y3 (Valve Splitter)
68	Short circuit to positive at output stage to Y4 (Valve Select)
69	Short circuit to positive at output stage to Y5 (Valve Shift)
70	Short circuit to positive at output stage to Y6 (Valve Shift)
71	Short circuit to positive at output stage to Y7 (Valve Shift)
72	Short circuit to positive at output stage to Y8 (Valve range low)
73	Short circuit to positive at output stage to Y9 (Valve range high)
74	Short circuit to positive at output stage to Y10 (Main valve)
75	Short circuit to positive at output stage to warning buzzer (E-Module)
76	Short circuit to positive at output stage to reverse light relay (E-Module)
80	WSK: Short circuit to positive at output stage to torque converter lock-up
81	Short circuit to positive at output stage to Y1 (inertia brake valve)
82	Short circuit to positive at output stage to valve Y17 (clutch disengage slow)
83	Short circuit to positive at output stage to valve Y15 (clutch engage slow)
84	Short circuit to positive at output stage to valve Y16 (clutch disengage fast)
85	Short circuit to positive at output stage to valve Y14 (clutch engage fast)
86	Short circuit to positive at output ADVP (wakeup control signal for E-Module, voltage supply to display, warning lamp, warning buzzer, output speed sensor 1)
87	Short circuit to positive at output stage to warning lamp (E-Module)
89	Short circuit to positive at output SD to display
90	Communication error between controller 1 and controller 2 (ECU failure)
91	CAN EBC1 timeout

92	Error on "ABS active" signal (EBC1)
93	Error on "ASR engine control active" signal (EBC1)
94	Error on "ASR brake control active" signal (EBC1)
95	Error on "Cruise control active" signal (CCVS)
96	Error on "Cruise control set speed" (CCVS)
97	Error on "Engine speed" signal (EEC1)
98	Error on transmission input speed signal
99	Error on output speed signal 1
100	Error on output speed signal 2
101	Error on both output speed signal
102	Plausibility error between transmission input speed and out-put speed
103	CAN CCVS Error on wheel based vehicle speed
104	High voltage (Vehicle electrical system voltage too high)
105	Low voltage (Vehicle electrical system voltage too low)
107	Stabilized voltage supply at output AU (clutch sensor supply) out of valid range.
108	Error in selector lever or tip lever
110	ZF CAN timeout
113	Error on "Driveline retarder configuration" timeout
114	Clutch engaged unintentionally in standstill, gear engaged
117	Error in clutch self-adjustment process
118	Clutch does not disengage
119	Clutch does not engage/does not transmit engine torque
120	Mechanical failure of small disengagement clutch valve
121	Mechanical failure of large disengagement clutch valve
122	Mechanical failure of small engagement clutch valve
123	Mechanical failure of large engagement clutch valve
124	Error on dutch travel signal
126	Error on pressure sensor signal
127	Error on ECU temperature sensor signal
128	Error on oil temperature sensor signal
129	No shift sensor signal (Short circuit to positive)
130	No shift sensor signal (Short circuit to ground)
131	No shift sensor signal (interruption)
132	Self adjustment error of shift sensor
133	No gate select sensor signal (short circuit to positive)
134	No gate select sensor signal (short circuit to ground)
135	No gate select sensor signal (interruption)
136	Gate select sensor self adjustment error
137	No range change group (GP) sensor signal (Short circuit to positive)
138	No range change group (GP) sensor signal (Short circuit to ground)
139	No range change group (GP) sensor signal (Interruption)
140	Self adjustment error of range change group sensor in position fast

141	No splitter group (GV) sensor signal (Short circuit to positive)
142	No splitter group (GV) sensor signal (Short circuit to ground)
143	No splitter group (GV) sensor signal (Interruption)
144	Splitter group (GV) sensor self adjustment error
145	Range change group (GP) disengagement error
146	Changeover error during range change group (GP) shifting
147	Range change group (GP) does not engage
148	Splitter (GV) does not disengage
149	Change over error during splitter shifting
150	Splitter (GV) does not engage
151	Selector cylinder does not disengage
152	Change over error during gate selection procedure
153	Selector cylinder does not engage
154	Main transmission gear does not disengage
155	main transmission gear does not engage
156	Wrong gear shifting
157	Selector sensor signal leaves engaged position
158	Shift sensor signal leaves engaged position during driving
159	Range-change group sensor signal leaves engaged position during driving
160	Splitter sensor signal leaves engaged position during driving
161	Easy Start feed back signal permanently active pr brake not completely open
162	Easy Start not available
163	Engine does not react on torque intervention
164	Error on "Drivers demand engine percent torque" (EEC1)
165	Error on "Accelerator pedal position" (EEC2)
166	Permanent idle signal
168	No idle signal or error on "idle signal switch" signal (EEC2) or never active "idle signal"
169	Cut-off relay in ECU does not switch off
170	No voltage supply at pin 30 or cut-off relay in ECU does not switch on
171	Error on "Actual engine percent torque" signal (EEC1)
173	Error on "Brake switch" signal (CCVS)
174	Error on "Kickdown switch" signal (EEC2)
175	Error on "Ignition lock" signal (Key 15)
177	System-CAN Busoff error
178	CAN Error warning
179	CAN queue overrun
180	CAN EEC1 timeout
181	CAN EEC2 timeout
182	CAN CCVS timeout
183	CAN ERC1_ER timeout
184	CAN ERC1_DR timeout
188	ECU fault - wrong interrupt
189	ECU fault - stack watch

190	EOL EEPROM parameter out of valid range
191	EOL EEPROM parameter checksum error
192	ECU fault - EEPROM access failure
193	ECU temperature too high
194	Both sources for front axle speed not available
197	Error on "Front axle speed" (WSI)
198	Error on "Relative wheel speed" (WSI)
199	CAN WSI timeout
227	Application-Error database for CAN-communication
251	E-Modul internal failure
252	Check system

DIAGNOSTIC CODES/HVAC

HVAC PARAMETERS CODES

PARAMETERS and ALARM CODE RETRIEVAL

Pressing the UP and DOWN arrow buttons for 3 – 5 seconds will allow the user to scroll up or down through the parameters and alarms.

When scrolling through the parameters, the current parameter will be displayed for 2 seconds. When the last parameter is reached, the list will wrap back. Pressing the ON/OFF key at any time, or if no key is pressed for 30 seconds the mode will exit and will revert back to the default display.

Lights indicate alarm codes. Each alarm code is a 2 digit number. The first display is the first digit, and after a slight pause the second display is the second digit. When the end of the alarm is reached the display will show “— —”. If the AUTO key is held down for 5 seconds while “— —” is displayed, all inactive codes are cleared.

Record all codes prior to clearing.

Code	Code Name	Description
P1	Return Air Temperature	This value is the temperature measured by the return air sensor. If the sensor is shorted it will display <i>CL</i> . If it is open circuited it will display <i>OP</i> .
P2	Coil Temperature	Not Used.
P3	Ambient Temperature	This value is the outside temperature measured by the ambient temperature sensor. If the sensor is shorted it will display <i>CL</i> . If it is open circuited it will display <i>OP</i> .
P4	Suction Line Temperature	This value is the temperature of the refrigerant gas leaving the evaporator coil. If the sensor is shorted it will display <i>CL</i> . If it is open circuited it will display <i>OP</i> .
P5	Suction Pressure	This value is the suction pressure measured by the suction pressure transducer. If the sensor is shorted it will display <i>CL</i> . If it is open circuited it will display <i>OP</i> .
P6	Discharge Pressure	This value is the discharge pressure measured by the discharge pressure transducer. If the sensor is shorted it will display <i>CL</i> . If it is open circuited it will display <i>OP</i> .
P7	Superheat	This value is calculated by the Mirco Max using values P4 and P5.
P8	Analog Set Point Temp.	Not Used
P9	A/C Control Window #1	This is the number of degrees F above setpoint at which the unloaders will be both energized. This value can be modified between 0 and 10°F. The default value is 1°F.
P10	A/C Control Window #2	This is the number of degrees F above AC control window one at which the first unloader will be energized. This value can be modified between 0 and 10°F. The default value is 1°F.
P11	A/C Control Window #3	This is the number of degrees F above AC control window two at which the evaporator fan speed will be set to low. This value can be modified between 0 and 10°F. The default value is 1°F.
P12	Heat Control Window	This is the number of degrees F below setpoint before the reheat coolant valve is energized. This value can be modified between 0 and 10°F. The default value is 2°F for heat and 4°F for reheat.
P13	Compressor Safety Off Delay	This number is the minimum time in minutes that the compressor must be off after a high or low pressure alarm before it can be restarted. This value can be modified between one and five minutes. The default value is 1.
P14	Fan Delay	This is the minimum time (in seconds) that the fans must run at a particular speed before changing to another speed. This value can be modified between one and 60 seconds. The default value is two seconds.
P15	Reheat Valve Delay	This is the minimum time (in seconds) that the reheat valve must be in a particular state (open/closed) before changing to another state. This value can be modified between 1 and 60 seconds. The default value is 2 seconds.
P16	Compressor High Pressure Switch	This is the current state of the compressor high pressure switch input. <i>CL</i> will be displayed if it is closed and <i>OP</i> will be displayed if it is open.

P17	Cond. Fan Speed Switch	Not used.
P18	Maximum Setpoint	This is the maximum value that the operator will be allowed to set the set-point temperature. The value can be modified in degrees with the up and down keys to a value between 60°F and 80°F.
P19	Minimum Setpoint	This is the minimum value that the operator will be allowed to set the set-point temperature. The value can be modified in degrees with the up and down keys to a value between 60°F and 80°F.
P20	Compressor Hours High	This is the number of hours of operation that the compressor has run with the clutch energized in thousands.
P21	Compressor Hours Low	This is the number of hours of operation that the compressor has run with the clutch energized in hundreds, tens and ones.
P22	Evaporator Hours High	This is the number (in thousands) of hours of operation with the evaporator fans energized.
P23	Evaporator Hours Low	This is the number (in hundreds, tens and ones) of hours of operation with the evaporator fans energized.
P24	Maintenance 1 Hour High	This is the value of compressor hours high (P20) at which maintenance alarm #1 will be activated. This value can be modified by the up and down arrow keys. If both high and low values are zero the alarm is disabled.
P25	Maintenance 1 Hour Low	This is the value of compressor hours low (P21) at which maintenance alarm #1 will be activated. This value can be modified by the up and down arrow keys. If both high and low are zero the alarm is disabled.
P26	Maintenance 2 Hours High	This is the value of evaporator fan hours high (P22) at which maintenance alarm #2 will be activated. This value can be modified by the up and down arrow keys. If both high and low values are zero the alarm is disabled.
P27	Maintenance 2 Hours Low	This is the value of evaporator fan hours low (P23) at which maintenance alarm #2 will be activated. This value can be modified by the up and down arrow keys. If both high and low values are zero the alarm is disabled.
P28	Freeze Alarm Setting	This is the value at which the freeze alarm will be activated. The default value is 32°F. This value can be modified between 20°F and 40°F in one degree increments by using the arrow keys.
P29	Relay Module Voltage	This is the voltage being supplied to the relay module.
P30	Main Board Software Version	This is the software version of the logic board.
P31	Display Software Version	This is the software version of the display module.
P32	Ki	Not used.
P33	Kp	Not used.
P34	Default Display	This is the value displayed on the Micromate™ control panel. It is set to OFF to display set point temperature or set to ON to display return air temperature. This feature is available in software revision 1.9 and later.

DIAGNOSTIC CODES/HVAC

HVAC ALARM CODES

PARAMETERS and ALARM CODE RETRIEVAL

Pressing the UP and DOWN arrow buttons for 3 – 5 seconds will allow the user to scroll up or down through the parameters and alarms.

When scrolling through the parameters, the current parameter will be displayed for 2 seconds. When the last parameter is reached, the list will wrap back. Pressing the ON/OFF key at any time, or if no key is pressed for 30 seconds the mode will exit and will revert back to the default display.

Lights indicate alarm codes. Each alarm code is a 2 digit number. The first display is the first digit, and after a slight pause the second display is the second digit. When the end of the alarm is reached the display will show “---”. If the AUTO key is held down for 5 seconds while “---” is displayed, all inactive codes are cleared.

Record all codes prior to clearing.

ALARM NO.	TITLE	CAUSE	REMEDY	CONTROLLER RESPONSE
A11	Coil Freeze	Coil temperature is less than 32°F and the compressor is operating.	Check causes of coil freezing.	An alarm will be generated and the system will shut-down. The evaporator fans will remain running while the compressor is off.
A12	High Voltage	The battery voltage is greater than 32 volts.	Refer to Section 7 of the Maintenance Manual	The system is shut down until the voltage returns to normal levels.
A13	Low Voltage	The battery voltage is less than 17 volts.	Refer to Section 7 of the Maintenance Manual	The system is shut down until the voltage returns to normal levels.
A14	Return Air Probe Failure	Return air temperature sensor failure or wiring defective.	Ensure all connectors are plugged in. check sensor resistance or wiring. Replace sensor or repair wiring.	All outputs except the evaporator fans will be de-energized.
A15	Suction Pressure Transducer Failure	Suction pressure transducer failure or wiring defective.	Ensure all connectors are plugged in. Check sensor voltage or wiring. Replace sensor or repair wiring.	Both unloaders are energized.
A16	Discharge Pressure Transducer Failure	Discharge pressure transducer failure or wiring defective.	Ensure all connectors are plugged in. check sensor voltage or wiring. Replace sensor or repair wiring.	One unloader is energized.
A17	Low Pressure Shutdown	Low suction pressure switch.	Check cause of low suction pressure.	The clutch is de-energized for the minimum off time. The evaporator fans will remain running during this period. After the compressor cycles off three times in 30 minutes all outputs will be de-energized and the system is locked out until the power is cycled or the alarm is reset.

A21	High Discharge Pressure	High discharge pressure switch open or wiring defective.	Check discharge pressure transducer reading, wiring or cause of high discharge pressure.	The clutch is de-energized for the minimum off time. The condenser and evaporator fans will remain running during this period. After the compressor cycles off three times in 30 minutes all outputs will be de-energized and the system is locked out until the power is cycled or the alarm is reset.
A22	Breaker Trip Alarm	A breaker on the relay board has tripped or a fan relay has failed.	check breakers for tripped device. Repair short and reset breaker.	Alarm will be generated.
A23	Evaporator Fan Overload	Evaporator fan overload jumper is open.	Ensure connector is plugged in or repair wiring.	Alarm will be generated.
A24	Condenser Fan Overload	Condenser fan overload jumper is open.	Ensure connector is plugged in or repair wiring.	alarm will be generated.
A25	Motor Failure	A brushless motor has not reached full operating speed or a motor failure.	Replace motor.	Alarm displayed and the motor fail output is energized.
A26	Not used.			
A31	Maintenance Alarm 1	The compressor hour meter is greater than the value in Maintenance Hour Meter 1.	Reset the maintenance hour meter.	Alarm will be generated.
A32	Maintenance Alarm 2	The evaporator hour meter is greater than the value in Maintenance Hour Meter 2.	Reset the maintenance hour meter.	Alarm will be generated.
A99	Alarm Queue Full	All locations of the alarm queue are currently full and no more alarms can be saved.	Record and clear alarm queue.	Alarm will be generated.

DIAGNOSTIC CODES/ABS

WABCO ABS DIAGNOSTIC CODES

ABS Code - The ABS DIAGNOSTIC switch located on the side of the rear junction box (ceiling, baggage bay compartment #1), will allow the user to access ABS fault codes. The flashing red light indicates diagnostic codes. Each ABS code is a 2 digit number. The first set of flashes is the first digit, and after a slight pause the second set of flashes is the second digit. Record all codes



FIGURE 104. ABS diagnostic switch.

Wheel Sensor Roadside Front

CODE	FAULT	CAUSE	ACTION
3 + 2	air gap	air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 2	slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 2	speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact.
4 + 2	shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 2	shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 2	open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 2	short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 2	incorrect tire	such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 2	wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 2	abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 2	frequency too high	non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 2	incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Wheel Sensor Curbside Front

CODE	FAULT	CAUSE	ACTION
3 + 1	air gap	air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 1	slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 1	speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact. Turn the wheel and read out amplitudes of sensor signals and compare with required values.
4 + 1	shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 1	shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 1	open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 1	short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 1	incorrect tire	such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 1	wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 1	abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 1	frequency too high	non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 1	incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Wheel Sensor Roadside Drive

CODE	FAULT	CAUSE	ACTION
3 + 4	air gap	air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 4	slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 4	speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact. Turn the wheel and read out amplitudes of sensor signals and compare with required values.
4 + 4	shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 4	shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 4	open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 4	short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 4	incorrect tire	such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 4	wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 4	abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 4	frequency too high	non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 4	incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Wheel Sensor Curbside Drive

CODE	FAULT	CAUSE	ACTION
3 + 3	Air gap	Air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 3	Slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 3	Speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact. Turn the wheel and read out amplitudes of sensor signals and compare with required values.
4 + 3	Shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 3	Shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 3	Open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 3	Short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 3	Incorrect tire	Such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 3	Wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 3	Abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 3	Frequency too high	Non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 3	Incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Wheel Sensor Roadside Tag

CODE	FAULT	CAUSE	ACTION
3 + 6	Air gap	Air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 6	Slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 6	Speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact. Turn the wheel and read out amplitudes of sensor signals and compare with required values.
4 + 6	Shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 6	Shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 6	Open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 6	Short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 6	Incorrect tire	Such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 6	Wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 6	Abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 6	Frequency too high	Non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 6	Incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Wheel Sensor Curbside Tag

CODE	FAULT	CAUSE	ACTION
3 + 5	Air gap	Air gap too large, sensor output voltage too low but just exceeds trigger level	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out.
3 + 5	Slip	16 sec. slip duration detected.	Adjust airgap. Other possible reasons: gear engaged at slippery conditions or modulator valve does not work correctly.
3 + 5	Speed drop-out	Temporary loss of wheel speed signal. Air gap too large, sensor voltage exceeds trigger level too late.	Adjust air gap, push sensor back to polewheel. Check bearing play and polewheel run out. Check sensor wiring and connectors for intermittent contact. Turn the wheel and read out amplitudes of sensor signals and compare with required values.
4 + 5	Shorted to UBATT	DC voltage detected. Short circuit or impedance to battery voltage.	Check sensor wiring and connectors.
4 + 5	Shorted to ground	Short circuit to ground is detected.	Check sensor wiring, connectors and sensor.
4 + 5	Open circuit	Open circuit is detected	Check sensor wiring, connectors and sensor.
4 + 5	Short circuit	Short circuit between sensorwires IG/IGM is detected	Check sensor wiring, connectors and sensor.
5 + 5	Incorrect tire	Such proportion of tire diameter / pole wheel teeth number that wheel speed difference within front axle > 10 % or difference within wheels of different axles > 19 % . Pneus or number of polewheel teeth are different.	Check wheel circumference and number of polewheel teeth
5 + 5	Wires mismatched	Wire IG or IGM of another sensor is detected.	Check for mismatch – fault of another sensor. Correct harness.
5 + 5	Abnormal speed	Brake squeezes or chatters.	NO repair instruction. Check sensor wiring and connectors for intermittent contact. Check polewheel for damages. Read out amplitudes of sensor signals and compare with required values.
5 + 5	Frequency too high	Non plausible sensor frequency measured.	Check sensor wiring and connectors for intermittent contact. Check whether brake squeezes. Change ELECTRONIC if fault occurrence repeats without brake squeezing.
6 + 5	Incorrect pole wheel	Cyclic drop out detected at speed higher than 10 km/h. Several wheel revolution necessary.	Check polewheel for damages / missing teeth. Use WABCO sensor probe. Replace polewheel if not checked o.k. If additional airgap faults are stored, adjust airgap.

Modulator Roadside Front

CODE	FAULT	CAUSE	ACTION
2 + 2	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 2	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 + 2	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

Modulator Curbside Front

CODE	FAULT	CAUSE	ACTION
2 + 1	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 1	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 + 1	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

Modulator Roadside Drive

CODE	FAULT	CAUSE	ACTION
2 + 4	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 4	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 + 4	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

Modulator Curbside Drive

CODE	FAULT	CAUSE	ACTION
2 + 3	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 3	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 + 3	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

Modulator Roadside Tag

CODE	FAULT	CAUSE	ACTION
2 + 6	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 6	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 + 6	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

Modulator Curbside Tag

CODE	FAULT	CAUSE	ACTION
2 + 5	Shorted to UBATT	Inlet (EV) or outlet (AV) are short–circuited to battery supply or to another modulator wire.	Check modulator wires, connectors and modulator.
2 + 5	Open circuit	Inlet (EV) or outlet (AV) wire is broken.	Check modulator wires, connectors and modulator.
2 +5	Shorted to ground	Inlet (EV) or outlet (AV) is shorted to ground.	Check modulator wires, connectors and modulator.

DBR, Retarder

CODE	FAULT	CAUSE	ACTION
7 + 3	Shorted to UBATT	Output is shorted to battery supply.	Check wire, connectors and relay.
7 + 3	Open circuit	DBR–output is not connected to a load.	Direct connection to another ECU with an internal high–impedance pull up resistor. Check parameter setting.
7 + 3	Shorted to ground	Output is shorted to ground.	Check wire and connectors.

Other

CODE	FAULT	CAUSE	ACTION
8 + 1	Voltage supply axles 1+2+Dif, low voltage/open circuit	Supply voltage is temporarily too low. WL on as long as voltage is too low.	Check supply wire, connectors and fuse.
8 + 5	GND 2 open circuit	Connection to central Ground interrupted or with too high resistance.	Check wire and connectors.
8 + 3	Voltage supply axles 1+2+Dif, internal relay does not open	Internal relay does not open power line.	Change ELECTRONIC if fault detection repeats.
8 + 5	Dif–OV (LD) shorted to Ubatt	Output is shorted to battery supply.	Check wire and connectors.
8 + 1	ECU Voltage supply, axle 3 + Aux. Low voltage/open circuit	Supply voltage is temporarily too low. WL on, as long as voltage is too low.	Check supply wire, connectors and fuse.
8 + 5	Dif–OV (LD) high impedance	lowside driver does not work	Change ELECTRONIC if fault detection repeats.
8 + 5	Dif–OV (LD) shorted to ground	output is shorted to ground.	Check wire and connectors.
8 + 3	Voltage supply 3rd axle+Aux. internal relay does not open	Internal relay does not open power line.	Change ELECTRONIC if fault detection repeats.

7 + 7	BLS / Pres.Sens. shorted to UBATT	Brake permanent activated or input shorted to plus	Check wire, connectors and sensor / switch
7 + 7	open or shorted to ground	Brake input grounded or open circuit	Check wire, connectors and sensor / switch
7 + 2	Diff. Brake Valve, shorted to UBATT	Output is shorted to battery supply.	Check wire and connectors.
7 + 2	Diff. Brake Valve, open circuit	Output wire is interrupted.	Check wire, connectors and valve.
7 + 2	Diff. Brake Valve, shorted to ground	Output is shorted to ground.	Check wire, connectors and valve.
7 + 6	FA Brake Valve, shorted to UBATT	Output is shorted to battery supply.	Check wire and connectors.
7 + 6	FA Brake Valve, open circuit	Output wire is interrupted.	Check wire, connectors and valve.
7 + 6	RSC valve, shorted to UBATT	Output is shorted to battery supply.	Check wire and connectors.
7 + 6	RSC Valve, open circuit	Output wire is interrupted.	Check wire, connectors and valve.
7 + 6	RSC Valve, shorted to ground	Output is shorted to ground.	Check wire, connectors and valve.
8 + 6	Supply shorted to ground	Output is shorted to ground.	Check wire and connectors.
7 + 4	Warning Light WL–Relay	Output detects no load to plus or is grounded.	Check wire and bulb
7 + 8	TPM	Change of wheelcircumference detected	Check and correct tire presssure
8 + 6	ESC datalink data erratic	Data communication faults with ESC module	Check harness between ABS ECU and ESC module and connectors
7 + 1	ESC CAN datalink fault	Data communication faults with ESC module	Check harness between ABS ECU and ESC module and connectors
8 + 6	ESC module failure	Internal	Replace ESC–Module if fault repeats
8 + 6	ESC initialisa-tion required	ABS or ECS module was exchanged	Follow ECU initialisation process
8 + 6	Mounting ESC module faulty	Mounting not in accordance with specification	Check mounting of ESC module
8 + 6	SAS–Offset-fault	Offset out of tolerance	Check installation of Steering Angle Sensor
8 + 6	SAS failure	Steering Angle Sensor defect	Replace Steering Angle Sensor and start new initialisation

7 + 1	SAE J1939 open or short circuit	SAE J1939 communication impossible. SAE J1939 high open or short circuit to plus or ground or SAE J1939 low or low/high are mismatched.	Check wire and connectors.
7 + 1	SAE J1939 no access	SAE J1939 communication impossible. SAE J1939 high open or short circuit to plus or ground or SAE J1939 low or low/high are mismatched.	Check wire and connectors.
7 + 1	SAE J1939 time-out EEC1	Engine electronic sends torque message incorrectly. Time out supervision detects fault.	Check engine ECU or it's wires

DIAGNOSTIC CODES/AMEREX

AMEREX FIRE SUPPRESSION SYSTEM DIAGNOSTIC CODES

AMEREX Code - Blinking LED's on the Amerex control panel indicates diagnostic codes. Record all codes.

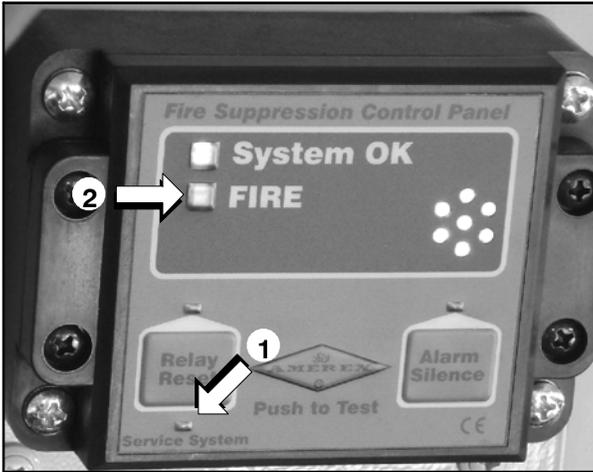


FIGURE 105.

1. The blinking Service System LED indicates Service System Blink Codes.
2. The blinking FIRE LED indicates Alarm Blink Codes.

SERVICE SYSTEM BLINK CODES	ALARM BLINK CODES
1 Blink - Main Power Fault	1 Blink - Heat Zone 1
2 Blinks - Heat Zone 1 Fault	2 Blinks - Heat Zone 2
3 Blinks - Heat Zone 2 Fault	3 Blinks - Both Zones
4 Blinks - Actuator Fault	
5 Blinks - Backup Battery Fault	
7 Blinks - Pressure Switch Fault	

4-IN-1 Gauge, 15

A

A/C, Display Key Functions, 57

A/C System – Main, 57

ABS – Anti-Lock Brake System, 26

ABS – Low Traction Road Conditions, 26

ABS – Panic Stop Braking Conditions, 26

Air Pressure (Warning), 53

Alarm & Warning Systems, 49

Alarm – Back-Up, 33

Alarms & Warnings –

Alternator (Telltale – NOT GEN), 49

Engine Oil Gauge, 49

Engine Overheat, 49

Power Steering System, 49

Telltale/Buzzer/Condition, 49

Alternator (Warning), 49

Amerex Fire Suppression System, 35

Anti-Theft Precautions, 4

Auto-Leveling, 4

Auxiliary Heater, 34

Diagnostics, 34

B

Battery Boost –

Connecting Booster Cables, 52

Disconnecting Booster Cables, 52

Emergency Starting, 52

Bi-Parting Entrance Door, 32

Brake Release – Park, 8

Brakes –

ABS, Anti-lock Brake System, 26

Parking & Emergency, 27

Service, 26

C

Certification Plate, 1

Circuit Breakers – Main, 51

Code Retrieval

ABS, 113

Allison Transmission, 46, 100

Amerex Fire Suppression, 123

Engine, 22

HVAC Parameters and Alarm, 109, 111

ZF Transmission, 104

Connector – Color Coded Cables, 52

Cooling System, 62

Coolant Filling, 62

Coolant Recovery System, 62

D

Dash, Instrument Panel, 15

Destination Sign – Luminator, 29

Diagnostic Codes

ABS, 113

Allison Transmission, 100

Amerex, 123

Engine, 81

HVAC, Parameters Codes, 109

HVAC, Alarm Codes, 111

ZF Transmission, 104

Directional Signal-Foot Operated, 25

Door – Baggage Compartment, 61

Door – Battery Compartment, 60

Door – Condenser Compartment, 60

Door – DEF Compartment, 60

Door – Engine Cooling Compartment, 61

Door – Entrance, 60

Door – Front Junction Box Access, 62

Door – Front Side Service Compartment, 62

Door – Fuel Compartment, 60

Door – Lift Cassette Access, 60

Door – Rear Engine Access, 61

Door – Rear Side Service Compartment, 60

Door – Taillight/Filter Access, 62

Door – Tire Compartment, 62

Door – Wheelchair Access, 60

D cont'd

DPF Regeneration, 40
Engine Operation Fuel & Exhaust, 37
Driver Controls—Commuter, 3
Driver's Compartment (Locking), 33
Driver's Heater & Defroster, 57
Driver's Modesty Panel, 29
Driver's Seat (Adjustments), 8
Driver's Seat – Seat Belt Adjustment, 13
Driver's Seat – Seat Belt Inspection, 13
Driver's Seat—Isringhausen , Adjustments, 10
Driver's Seat—National , Adjustments, 9
Driver's Seat—RECARO, Adjustments, 11
Driver's Seat—USSC, Adjustments, 12

E

Electrical – Towing Receptacle, 52
Electronic Engine Control System, 38
Emergency Conditions, 49
Emergency Escape (Roof Hatch), 50
Emergency Escape (Sash), 50
Emergency Fill – Park/Service Brake Systems, 54
Emergency Parking Brake Release, 27 , 54
Emergency Starting – Battery Boost, 52
Emergency Starting – Connecting Booster Cables, 52
Emergency Starting – Disconnecting Booster Cables, 52
Engine, Auxiliary Heater, 34
Engine – Electronic Control System, 38
Engine – Starting, 37
Engine – Stopping, 37
Engine Electronic System (Warning), 49
Entrance Door – Exterior Door Switch, 32
Entrance Door – Overrule Valve, 32
ESC, 5 , 26
Exterior Components, 59
Exterior Inspection – (Walk—Around), 7

F

Fire Extinguisher, 55
Fuel & Exhaust – Engine Operation, 37
Fuel Pro Fuel Filter, 42
Fuel System, 42
Fueling, 66

H

Hazard & Warning Signal Lights, 50
Hazard/Warning Lights, 33
Headlamp Dimmer— Foot Operated, 25
Heating & Air Conditioning (HVAC), 57
Horn—Foot Operated, 25
Horn—Hand Operated, 25
Hubodometer, 34
HVAC, Display Key Functions, 57

I

Initial Start—Up, 7
Instrument Panel, 15
Instrument Panel Components, 15
Interior Components Checklist, 7
International Symbols, 4
Introduction – To The Driver, 1

J

Jacking & Blocking – Tire & Wheel Removal, 63
Jacking – Drive Axle, 64 , 65
Jacking – Front Axle, 64 , 65
Jacking – Trailing (tag) Axle, 64 , 65

K

Kneeling – Throttle Interlock, 33
Kneeling Feature, 5
Kneeling System (Toggle Switch), 33

L

Lifting & Towing, 53
Lights – Back–Up, 33
Lower LH Switch Panel, 20
Luminator Destination Sign, 29

M

Main A/C System, 57
Main Circuit Breakers, 51
Main Switch – Battery Disconnect, 51
Micromax HVAC Display, Micromate Control Panel, 57
Mirrors, 14
Mirrors, Exterior, 14

N

Nameplate, 1
Neutral Interlock – Brake & Transmission, 27

O

Operational Checklist, 7

P

Parcel Rack Capacity, 33
Park Brake Release, 8 , 27
Parking & Emergency Brakes, 27
Parking Brakes (Emergency Operation), 54
Passenger – Stop Request, 32
Passenger Seats, 75
Power Steering Pump, 66
Power Steering Reservoir & Pump (Lubricating Oil), 66
Power Steering System, 49
Pre–Service Preparations & Procedures, 7
Pre–Trip Inspection, 14
Pump – Power Steering, 66

R

Rear Rise, Feature, 5
Recommended Tire Inflation Pressures, 50
Remote – Starting Engine, 38 , 51
Remote – Stopping Engine, 38 , 51
Remote Engine Operation, 38 , 51

S

Seat Belt Adjustment – Driver's, 13
Seat Belt Inspection, 13
Service & Access Doors, 59
Service Brakes (Emergency Operation), 54
Service Brakes (Operation), 26
Shift Inhibit Logic, 45
Shift Selection – Transmission, 45
Sleep Mode, 7
SmartWave Full Function Display: 22
Spare Tire & Wheel Storage, 63
SpeakEasy Microphone/Recording System, 23
 Clearing, 24
 Muting, 24
 Recording, 24
Steering Column – Floor Mounted Controls, 25
Steering Column – Tilt/Telescoping, 25
Stop Request – Passenger, 32
Stop Request – Wheelchair Tape Switch, 32
Stop Request Sign, 33
Switch – Main Battery Disconnect, 51

T

Telltale Cluster – Left Hand, 16
Telltale Cluster – Right Hand, 17
Threshold Warning System, 70 , 74
Tire & Wheel Removal – Jacking & Blocking, 63
Tire Inflation Chart, 79
Tools & Safety Equipment, 55
Towing Receptacle – Electrical, 52
Trailing Axle Unloading, 4

V

- Ventilation System (Driver's), 58
- Ventilation System (Parcel Rack), 58

W

- Warning Lights, Gauges, Switches, 15
- Wheel Wrench, 63
- Wheelchair – Stop Request Tape Switch, 32
- Wheelchair Door – Overrule Valve, 78
- Wheelchair Lift – BRAUN, 71
- Wheelchair Lift – RICON, 67
- Wheelchair Restraints, 77
- Window Blinds – Driver's & Windshield, 29
- Windshield Washer Reservoir (Filling), 66

United States Operators please notice:

The National Highway Traffic Safety Administration has requested that the following statement be provided for your information.

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Motor Coach Industries, Inc.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Motor Coach Industries, Inc.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 366-0123 in Washington, DC, area) or write to: NHTSA, U.S. Department of Transportation, Washington, DC, 20590. You may also obtain other information about motor vehicle safety from the Hotline.

Canadian Operators please notice:

To report or obtain information on motor vehicle safety-related defects, or manufacturers' recalls, call Transport Canada's Information Centre at 1-800-333-0371, or call (613) 998-8616 if you are in the Ottawa area.

You can email comments or questions to roadsafetywebmail@tc.gc.ca or write to:

Road Safety and Motor Vehicle Regulation Directorate, Transport Canada, Tower C, Place de Ville, 330 Sparks Street, Ottawa, Ontario, K1A 0N5