

JULY 2015  
MODEL YEAR 2016

# J4500



Reliability Driven™



# OPERATORS MANUAL

# J4500 OPERATORS MANUAL

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# INTRODUCTION

## NOTICE

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

### COACH APPLICABILITY

This manual supports the MCI J4500 Coach.

### TO THE DRIVER

This manual has been prepared to provide you with the information you need to operate the MCI J4500 Series Coach.

The specifications and information throughout this manual are subject to change without notice.

## NOTICE

**Report immediately any problem or malfunction that interferes with the operation of the coach, particularly if safety may be affected.**

The term "Optional" in this manual pertains to all equipment and features other than basic.

### MCI SERVICE NUMBER: 1-800-241-2947

This manual is a permanent part of this vehicle. It must stay with the coach if the coach is sold.

### PUBLICATION DATE: July 2015

### EFFECTIVE WITH UNIT NUMBER 67310

### MCI PUBLICATION PART #: 03-26-1035B



Figure 1.

### CERTIFICATION PLATE

The certification plate (Figure 1.) is mounted beside the driver's seat, and certifies compliance with all applicable Federal Motor Vehicle Safety Standards in effect on the date of manufacture. It also lists the date the coach was built, the GVWR, GAWR's, rim size, tire pressures, coach model and coach serial number.

### EMISSION CONTROL DECAL

The emission control decal (Figure 2.) is affixed to the lower panel next to the driver's seat, beside the certification plate shown in



Figure 2.

### COACH NAMEPLATE

The nameplate (Figure 3.) is mounted in the engine compartment at the rear of the coach. The vehicle identification number (VIN), model year and date of manufacture are shown on this plate.

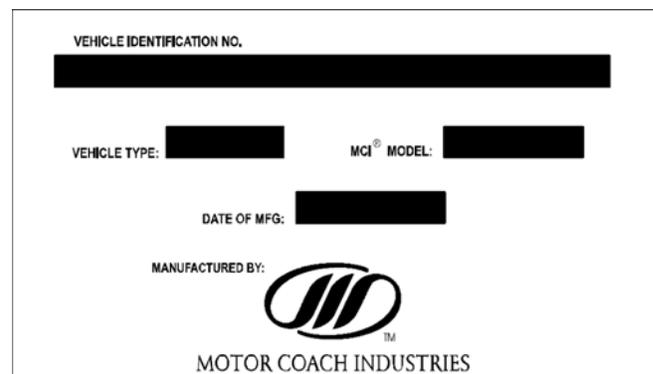
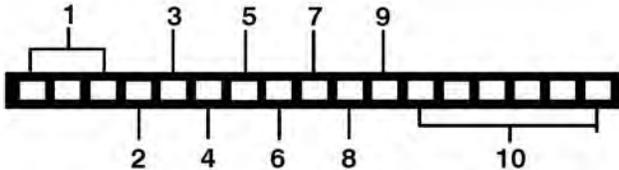


Figure 3.

## VEHICLE IDENTIFICATION NUMBER (VIN)

The nameplate and the certification plate both contain the seventeen-character vehicle identification number (VIN). The numbers correspond to the items in the following list.



1. The first three characters identify the manufacturing company:  
1M8 = MCI Inc. (U.S.)  
2MG = MCI Ltd. (Canada)
2. The fourth character identifies the coach model:  
3 = J4500 Intercity
3. The fifth character identifies the series:  
J = J-Series
4. The sixth character identifies the type of coach:  
M = Intercity (MCI)  
P = Incomplete Vehicle
5. The seventh character identifies the type of engine:  
B = Cummins ISX  
8 = Detroit Diesel DD13
6. The eighth character identifies the type of brakes:  
A = Air Brake Intercity
7. The ninth character is the check number.
8. The tenth character identifies the year:  
G = 2016
9. The eleventh character identifies the manufacturing location:  
W = Winnipeg, Manitoba
10. The twelfth through seventeenth characters is the coach's unit number.

## INTERNATIONAL SYMBOLS

Some of the following international symbols may be on controls and components of this coach (Figure 4.).



Figure 4.

- |                              |                                 |
|------------------------------|---------------------------------|
| 1. Parking Brake             | 26. Baggage Doors Lock          |
| 2. Anti-Lock Brakes          | 27. Kneel                       |
| 3. Stop Engine               | 28. Spark Could Explode Battery |
| 4. Check Engine              | 29. Avoid Sparks Or Flames      |
| 5. Do Not Shift              | 30. Drivers Area HVAC           |
| 6. Retarder Hot              | 31. Lights Or High Beam         |
| 7. Protect Eyes By Shielding | 32. Clearance Lamps             |
| 8. ECAS Stop                 | 33. Turn Signals                |
| 9. Suspension Recover        | 34. Hazard Warning              |
| 10. Entrance Door Open       | 35. Engine Oil Pressure         |
| 11. Entrance Door Close      | 36. Engine Oil Temp             |
| 12. Fog Lights               | 37. Engine Coolant Temp         |
| 13. Window & Aisle Lights    | 38. Windshield Wipers           |
| 14. Aisle Lights             | 39. Acid Cause Burn             |
| 15. Drivers Light            | 40. Caution Possible Injury     |
| 16. Step Lights              | 41. Lighter                     |
| 17. Reading Lights           | 42. Battery Charging System     |
| 18. Blinds Up                | 43. Horn                        |
| 19. Blinds Down              | 44. Air Pressure                |
| 20. Master Power             | 45. Fasten Seat Belt            |
| 21. Engine Start             | 46. Ventilating Fan             |
| 22. Fast idle                | 47. Windshield Defrost          |
| 23. Engine Brake             | 48. Windshield Washer           |
| 24. Retarder                 | 49. Passenger Area HVAC         |
| 25. Baggage Doors Unlock     |                                 |

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# DAILY INSPECTIONS

The following checks are in addition to the Federal Motor Carrier Safety Administration requirements, not instead of them.

## EXTERIOR INSPECTION

1. Ensure that all windows, mirrors and lights are clean and unobstructed.
2. Ensure that all side windows are closed. A protrusion of 1/4" (6mm) or more indicates that a window is not properly latched.
3. Check that the coach exterior is clear of debris, and that all service doors are secure.
4. Check the tire pressure and inspect the tires for damage. Check that the wheel nuts are tight and inspect the wheels for damage.
5. Look under the coach for fluid leaks, animals or obstructions. Check behind the coach.
6. Check the engine oil level, coolant level, condition of belts and power steering fluid level.
7. Check the engine compartment to ensure that there are no loose or unsecured objects.
8. Check the windshield washer reservoir and fill if required.
9. Ensure that the engine compartment remote control box ENGINE ENABLE switch is ON and the STARTER CONTROL switch is set to FRONT.
10. Turn ON the main electrical switch.

## INTERIOR COMPONENTS CHECKLIST

1. Ensure that the door(s), hatches and emergency exit windows open, close, seal and latch properly.
2. Ensure that the parcel rack doors are latched.
3. Inspect the seats and floor for debris. Clean if necessary.
4. Ensure that the interior and step-well lights work.
5. Ensure that the lavatory door, windows and wheelchair access door (if equipped) are closed and latched.
6. Ensure that emergency equipment and contents are in place and properly stowed.
7. Activate the entertainment control module and verify the operation of the driver's and cordless microphones (if equipped). Adjust output volume if necessary.



***Before starting ensure that the fast idle is OFF and the parking brake is applied. Ensure that there is ample distance ahead of and behind the coach in case it moves unexpectedly during starting.***

***DO NOT rev the engine while starting.***

The following checks are in addition to the Federal Motor Carrier Safety Administration requirements, not instead of them.

## OPERATIONAL CHECKLIST

1. While the engine is running, look for oil or coolant leaks and listen for air leaks.
2. While the engine is running, check the alternator lights on the remote control box in the engine compartment. The lights should be OFF.



**Be very careful when the engine is running and the engine door is open.**

**If it is necessary to have the engine running for certain inspections or checks, keep a safe distance from moving belts, pulleys, shafts or fans.**

**Keep hands and limbs away from moving belts and pulleys and also hot areas such as exhaust and turbocharger components and coolant lines.**

**Do not wear loose, baggy or frayed clothing when working near any moving parts such as pulleys, belts, shafts or fans.**

3. Close and secure all baggage and service doors.
4. Ensure that all exterior lights are working.
5. If the coach is equipped with a wheelchair lift, check the lift operation. For more information refer to the vendor manual.
6. After the HVAC system has stabilized (10 to 15 minutes), listen for abnormal noises in the compressor and fan motors; check the compressor oil level and check the refrigerant level. Ensure that the self-test has been performed successfully and that there are no errors or alarms indicated.

7. Position the inside and outside mirrors, adjust the driver's seat and fasten the seat belt.
8. Ensure that the tilt steering column is locked.
9. Ensure that the defroster, heater, horn, windshield wipers and washers all function.



**Do not move the coach until the front and rear air gauges both read at least 100 psi.**

10. Apply the service brakes, release the park brake, then release the service brakes.
11. Apply and hold the brakes and observe the pressure drop. It should not drop by more than 3 psi in 1 minute.
12. Move the coach slowly and bring it to a stop to ensure that the brakes stop and hold the coach.
13. Ensure that brake pedal operation feels normal.
14. Ensure that all gauges stay in normal range.
15. Move the coach a short distance at low speed and check the steering. Ensure that the coach is under full control and handling properly. The steering wheel must turn smoothly without any unusual noises.

## DRIVER'S SEAT BELT

### Driver's Seat Belt Adjustment



**Using the restraint system can lessen the severity of injury in an accident or sudden maneuver.**

While seated straight and well back into the seat, adjust the belt as necessary.

To unfasten the belt, push the release button.

If a belt jams, 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 restraint system parts 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. Check for loose or damaged parts. Keep sharp edges and sharp objects away from belts and other parts of the restraint system.

Keep the belts clean and dry. Replace belts if the webbing appears frayed, cut or damaged. Replace belts that 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; do not bleach or dye.

## MIRRORS

### Inside Rear-view Mirrors (Optional)

The inside rear-view mirrors can be manually adjusted up, down or sideways.

### Exterior Rear-view Mirrors

Exterior mirrors have separate upper and lower segments. The convex upper portion is for wide-angle view.

Adjust the exterior mirrors so that you can see the side of the coach in part of the mirror. This helps determine the relationship of the coach to objects seen in the mirror.

The roadside and curbside mirror controls are on the lower LH console switch panel. Use the switch in the center of each mirror control to select the upper or lower mirror. Move the switch to the left to adjust the lower mirror and to the right to adjust the upper mirror.

Defrost the mirrors using the mirror heat switch located below the mirror controls.

## PRE-TRIP INSPECTION, INTERIOR / EXTERIOR LIGHTING

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 Shift Pad selector,
- Set the Park Brake,
- Position the Reading Light test switch to the “ON” 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 all interior / exterior coach lighting and dash tell-tale lights and buzzer will activate for two (2) minutes.

## NOTICE

***The back-up lights do not illuminate during the Pre-Trip Inspection.***

***The Pre-Trip Inspection function can be canceled by positioning the Reading Light test switch to “OFF”, or positioning the Hazard switch to “ON”.***

## ANTI-THEFT PRECAUTIONS

1. Do not leave the coach unattended with the engine running.
2. Park in a lighted spot when possible.
3. Fully close all windows and doors.
4. Keep valuable items out of sight.
5. Lock out the battery disconnect switch

# SWITCHES, WARNING LIGHTS AND GAUGES



**Figure 5. Driver Area**

1. Instrument Panel, refer to Page 20
2. LH / RH Tell-Tale Cluster, refer to Pages 10-13
3. LH Switch Panel, refer to Pages 15
4. RH Switch Panel, refer to Pages 16
5. Lower, LH Console Switch Panel, Page 17
6. HVAC Display, refer to Page 15

## TELL-TALE LAMPS

Tell-tales indicate various conditions by lighting. In general, yellow indicates system status and red indicates a fault or warning. Tell-tales are located in RH and LH clusters, in the instrument cluster. Some tell-tales are accompanied by a buzzer or bell. At system start-up, tell-tales light briefly to show that the LEDs work.

### LEFT-HAND TELL-TALE CLUSTER (Figure 6.)

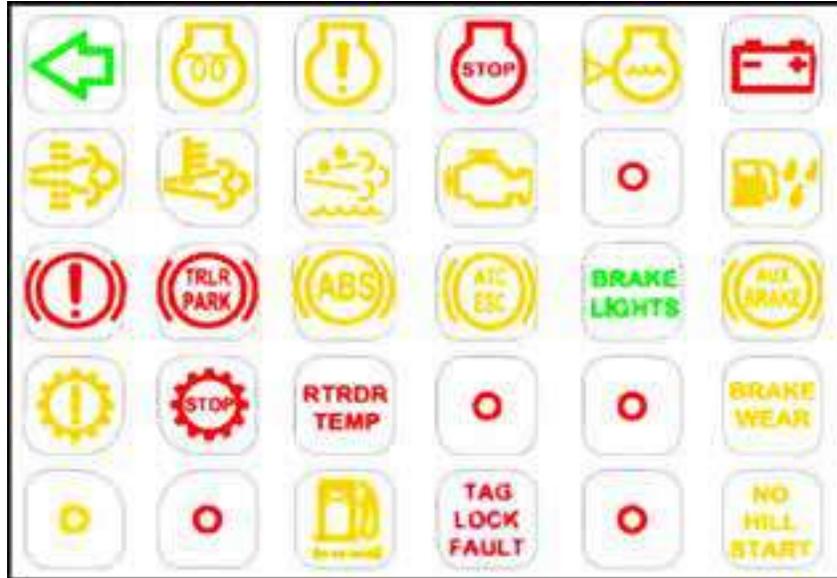


Figure 6. ACTIA LH Tell-tale Cluster



**Left Turn Indicator (Green)**



**Wait to Start (Yellow)** - This tell-tale will illuminate when the grid heater is ON (pre-heat function).



**Check Engine (Yellow)** - Engine fault. Refer to vendor manual.



**Stop Engine (Red)** - Engine is powering down or stopped.



**Low Coolant (Yellow)** - Tell-tale indicates a low engine coolant level. Do not run engine until condition is corrected.



**Not Generating (Red)** - Tell-tale indicates that one or both alternators are not functioning.



**Regeneration (DPF) (Yellow)** - Tell-tale illuminates when a regeneration is required. Tell-tale is OFF during Regen.



**High Exhaust Temperatures (HET) (Yellow)** - Tell-tale will illuminate when the coach is moving less than 5 mph (approx.) and the exhaust outlet temperature exceeds the predetermined level.



**Diesel Exhaust Fluid (DEF) (Yellow)** - Tell-tale illuminates indicating the DEF level is low. Correct by refilling the DEF tank.

DEF tell-tale flashes indicating the DEF level has fallen below a critical level. Correct by refilling the DEF tank.

DEF tell-tale flashes and Check Engine illuminates indicating the DEF level is critically low and power loss will occur. Normal engine power will be restored by refilling the DEF tank.

DEF tell-tale flashes and Check Engine and Stop Engine illuminates indicating the DEF tank has been run dry. Engine will De-rate and limit speed to 5 MPH. Normal engine power and coach speed will be restored by refilling the DEF tank.



**MIL (Yellow)** - Malfunction Indicator Tell tale Lamp (on DD13 engines ONLY). Tell-tale indicates a failure of an emission system component.



**Blank**



**Water in Fuel (Yellow)** - Tell-tale indicates water in the fuel filter.



**Park Brake Applied (Red)**



**Trailer Park (Red)** - Tell-tale is disabled.



**ABS (Yellow)** - Tell-tale indicates anti-lock braking system malfunction.



**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 throughout the service brake application.



**Engine Brake (Yellow)** - Tell-tale indicates the engine brake is activated.



**Check Transmission (Yellow)** - Move the coach to a safe location and turn OFF ignition. DO NOT change gear.



**Stop Transmission (Red)** - Tell-tale is disabled.



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



**Brake Wear (Yellow)** - Tell-tale is disabled.



**Fuel Filter Restriction (Yellow)** - Indicates the fuel filter has been clogged.

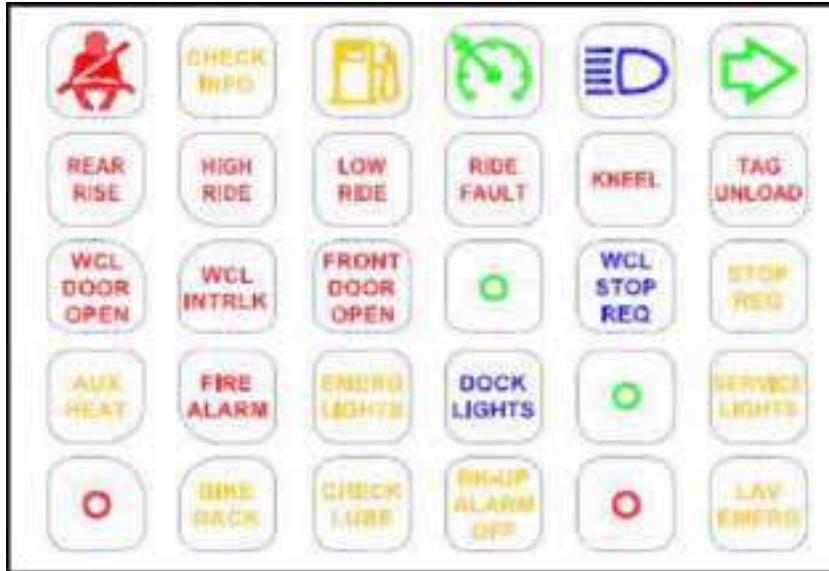


**Tag Lock Fault (Red)** - Tell-tale illuminates when coach speed reaches 15 mph and the tag cylinder does not lock. Tell tale is OFF when coach speed returns to 10 mph.



**No Hill Start (Yellow)** - Tell-tale is disabled.

**RIGHT-HAND TELL-TALE CLUSTER (Figure 7.)**



**Figure 7. ACTIA RH Tell-tale Cluster**



**Driver Seat Belt (Red)** - Tell-tale lights when park brake is released and the driver's seat belt is not buckled.



**Check Info (Yellow)** - Tell-tale indicates message on alphanumeric display of speedometer. Refer to next page for further information.



**Low Fuel (Yellow)**



**Cruise Enabled (Green)** - Tell-tale indicates that the cruise control is activated.



**High Beams (Blue)** - Hi-beam tell-tale will illuminate when the main headlamps are on HIGH intensity.



**Right Turn Indicator (Green)**



**Rear Rise (Red)** - Tell-tale illuminates and a buzzer sounds when the Rear Rise switched is pressed.



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



**Low Ride (Red)** - Tell-tale flashes when the coach is in transition to and is maintained in LOW RIDE.



**Ride Fault (Red)** - Tell-tale illuminates when a fault has occurred in the MDSS. Report problem to maintenance personnel.



**Kneel (Red)** - Tell-tale flashes and a buzzer sounds when the coach is kneeling or recovering. When kneel is reached, the lamp stays on and the buzzer stops.



**Tag Unload (Red)** - Tell-tale Illuminates when the tag axle is unloaded.



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



**WCL Interlock (Red)** - Tell-tale 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.



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



**Stop Request (Yellow)** - Tell-tale lights when a passenger presses the stop request button.



**Aux. Heat (Yellow)** - Illuminates when the auxiliary heater has been activated.



**Fire Alarm (Red)** - Illuminates when the temperature sensors sense heat from a fire in the engine compartment.



**Emergency Lights (Yellow)** - Tell-tale is disabled.



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



**Service Lights (Yellow)** - Tell-tale indicates engine compartment. light is ON.



**Bike Rack (Yellow)** - Tell-tale is disabled.



**Check Lube (Yellow)** - Tell-tale is disabled.



**Back-up Alarm Off (Yellow)**- Tell-tale is disabled.



**Lavatory Emergency (Yellow)**- Tell-tale illuminates when a passenger presses the emergency button in the lavatory.

### CHECK INFO TELL-TALE

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.

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 TRIP button (RH side of the speedometer, refer to Figure 8.) to dismiss the message. The CHECK INFO tell-tale will remain illuminated, but the message will not appear in the alphanumeric display of speedometer until the system re-broadcasts the signal.

The tell-tale information displayed on the alphanumeric display of speedometer are Lavatory Emergency (displayed as LAVTORY), Baggage Lights (BAG LTS), Low Ride (LOWRIDE), Digital Wheel End Sensor (WHL END) and Fire Alarm.



**Figure 8. Speedometer Alphanumeric display**



Figure 9. 4 in 1 Gauge

#### 4 IN 1 GAUGE TELL-TALES (Figure 9.)

##### 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.***



**Figure 10. - LH Switch Panel**

**LEFT-HAND SWITCH PANEL (Figure 10.)**

1. **Fog Lights Switch**
2. **Mirror Heat Switch** - Press this switch to clear the mirrors of fog and frost.
3. **Parcel Rack Blower Switch** - The PARCEL RACK switch turns the parcel rack blowers ON and OFF
4. **Auxiliary Heater Switch** - When the engine is OFF, the engine can be preheated by pushing the AUXILIARY HEATER switch forward, which activates a 90 minute timer in the Proheat unit. When the Proheat burner is ON, the HEATER ON telltale lights.

To turn the Proheat OFF, push the switch back. It will purge for 2 to 3 minutes. If the coach is started during preheating, the temperature-Dependant control overrides the timer.

5. **Override** - Press to override an emergency engine shutdown for 30 seconds. Press as often as necessary to move coach to safe parking.

**⚠ 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.*

**⚠ CAUTION**

*In a driving situation, the override 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.*

6. **Master Power Switch** - Pressing this switch to the ON (upper) position will enable all of the multiplex modules and turn on the coach's electrical system.
7. **Engine Start Switch** - Used to start the coach using the rocker switch ignition.

To START the coach using the rocker switch ignition, place the master power switch in the ON (upper) position. Press the upper portion of the engine start momentary-on spring return switch to engage the starter. Release the switch once the coach has started.

Allow the coach to idle for 30 seconds.

To STOP the engine, place the master power switch in the OFF (lower) position.



**Figure 11. RH Switch Panel**

**RIGHT-HAND SWITCH PANEL (Figure 11.)**

1. **Interior Light**
2. **Reading Lights** - Turns reading lights ON and OFF.
3. **Blank Switch**
4. **Baggage Bay Lights** - Turns the baggage bay lights ON and OFF. The baggage bay lights have a timer feature that automatically shuts OFF the lights after 30 minutes, if the switch is left in the ON position.
5. **LH Baggage Lock** - Locks and unlocks the left-hand baggage doors.
6. **RH Baggage Lock** - Locks and unlocks the right-hand baggage doors.
7. **Kneeling** - With the park brake applied, the transmission in Neutral and the entrance door closed, press and hold the KNEEL half of the switch to lower the front of the coach 5" (127 mm).
8. **Entrance Door Open/Close** - Press and hold the upper half of the switch to open the door. Press and hold the lower half of the switch to close the door. Door movement stops if the switch is released.
9. **Panel Lights**
10. **Driver's Light** - Turns lights on in the driver's compartment.
11. **Step-well Lights** - When this switch is ON, the step-well lights turn ON whenever the entrance door opens.
12. **Blue LED Light**
13. **Blank Switch**
14. **Hazard/Warning Lights** - Flashes all front, rear and side-mounted turn signal lights and both telltales simultaneously.



**Figure 12. Lower LH Console Switch Panel**

**LOWER LH CONSOLE SWITCH PANEL (Figure 12.)**

- 1. **Cup Holder**
- 2. **Headlight Switch**
- 3. **Mirror Controls** - Adjust the RH and LH exterior mirror heads (upper and lower).
- 4. **110 Volt**
- 5. **Tag Lock / Auto Switch**

Press the upper half, LOCK, of the momentary switch to lock the tag cylinder. The CHECK INFO tell tale flashes and the alphanumeric display on the speedometer will display TAG LOCK.



When coach speed reaches 15 mph, the alphanumeric display on the speedometer will stop displaying the TAG LOCK message.

When coach speed reaches 10 mph and lower, the tag cylinder will remain locked and the alphanumeric display on the speedometer will display the TAG LOCK message.

The tag cylinder can only be unlocked by pressing the lower half, AUTO, of the momentary switch or by cycling the ignition.

- 6. **Mud/Snow** - On extra soft surfaces (snow, mud or gravel), press the MUD/SNOW switch to increase traction by slightly increasing permissible wheel spin. The LOW TRACTION or ESC / ATC telltale will blink continuously when MUD/SNOW is active. Press the switch again to turn off MUD/SNOW. (Turning off the ignition also resets the MUD/SNOW feature.)
- 7. **Fast Idle** - Place the transmission in Neutral, apply the parking brakes and turn FAST IDLE on to increase engine idle speed for engine warm-up, air pressure build-up or A/C operation when the coach is parked. Return the switch to normal when fast idle is not required.
- 8. **Tag Axle Unload** - Press to unload the tag axle to improve traction on the drive axle. Press again to transfer the load back to the tag axle.



**Only unload the tag axle in low traction situations.**

## LOWER LH CONSOLE SWITCH PANEL Cont'd

### 9. Rear Rise

**10. Level Control Switch** - Press the UPPER half of the switch to raise the front and rear suspension to the High Ride parameter height. Press the LOWER half to lower the front and rear suspension to Low Ride parameter height.

**11. Normal Ride / Recover** - Press switch to change front and rear suspension to Normal Ride height.

### 12. LH Blind Switch

### 13. RH Blind Switch

### 14. 12-Volt Power Source

### 15. Automatic Transmission Control

### 16. Wheelchair Master Switch (Optional)

### 17. Emergency Park Brake Release

### 18. Front Service Compartment Door Release



Figure 13.

## Regeneration Switch

The regeneration toggle switch is located in the rear, side service compartment (Figure 14.).

### **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.



Figure 14. Regen Switch

## Park Brake Interlocks

The parking brake is interlocked with and affects the operation of kneeling and cl as follows:

- **Kneeling** - The park brake must be applied to kneel. Releasing the park brake cancels kneeling and returns the coach to normal ride height.
- **Wheelchair Lift** - The park brake is interlocked by the wheelchair lift key switch. The park brake must be set before turning the wheelchair lift master key switch on. Opening the wheelchair lift doors also sets the parking brake.

## PARKING BRAKES

The coach has air-operated spring parking brakes. The PARKING BRAKE control is a black, button located under the LH switch panel (Figure 15.).

### **CAUTION**

*Do not leave the coach without applying the parking brake.*



Figure 15. Parking Brake Knob

### Normal Park Brake Operation

1. Stop the coach, put the transmission in neutral.
2. Pull the park brake knob out (Figure 15.) to set the park brake. The valve will latch in this position.
3. Ensure that the air pressure gauge shows 100 psi (689 Pa) or more.
4. Push the park brake knob fully in to release the brakes. The valve will latch in this position.

### Emergency Park Brake Release

In an emergency, where there is no pressure or low pressure in the air system, the parking brake can be released by pushing and holding down the Emergency Park Brake Release.

### **NOTICE**

*The park brake emergency release air tank has only enough air to release the parking brake three times.*

The Emergency Park Brake Release is a green, circular button located on the lower LH console switch panel (Figure 16.).



Figure 16. Emerg. Park Brake Release



**Figure 17. J4500 Instrument Panel**

**INSTRUMENT PANEL/GAUGES(Figure 17.)**

**1. Speedometer** - The speedometer, which features an alphanumeric message display, reads the forward speed of the coach in miles per hour or kilometers per hour. The speedometer features a MODE and TRIP button allow the driver to select, set/reset displays and scroll through active system warning messages, when the coach is at a complete stop.

The MODE button is utilized to select the mode of operation for the message display and to clear priority messages.

The TRIP button is utilized to change what is displayed on the lower line of the alphanumeric message display.

The following settings can be selected on the main screen by utilizing the MODE and/or TRIP buttons (Figure 18.):

- Imperial / Metric Units,
- Contrast Adjust,
- Display Language (English, Spanish or French)
- Diagnostics Menu.



**Figure 18.**

**2. 4-in-1 Gauge:**

**Front Air Pressure** - The secondary air pressure gauge reads front brake air reservoir pressure in pounds per square inch or kilo-pascals. If the pressure is low during start-up, the LED lights and a buzzer sounds. The alarms stop when the pressure builds up to operating level. Do not operate the coach under 100 psi (690 kPa).

**Rear Air Pressure** - The primary air pressure gauge reads rear brake air reservoir pressure in pounds per square inch or kilo-pascals. If the pressure is low during start-up, the LED lights and a buzzer sounds. The alarms stop when the pressure builds up to operating level. Do not operate the coach under 100 psi (690 kPa).

**⚠ CAUTION**

*If a low air warning activates during driving, stop the coach immediately and find the cause of the air loss. If brake reservoir pressure drops significantly, the parking brakes apply automatically.*

### 4-in-1 Gauge: (cont'd)

**Oil Pressure** - The oil pressure gauge reads engine oil pressure in pounds per square inch or kilo Pascals. Oil pressure should be between 50 - 70 psi (345 - 483 kPa). The LED lights when the oil pressure is too low.

**Coolant Temperature** - The coolant temperature gauge reads engine coolant temperature in degrees Fahrenheit or Celsius. The normal operating range is 160-226F (71-108C). The LED lights when the temperature is above normal. Obtain service as soon as possible.

### 3. 3-in-1 Gauge:

**Fuel** - The fuel gauge reads the fuel level in the tank.

**Diesel Exhaust Fluid (DEF)** - The DEF gauge reads the fluid level in the tank.

**Engine Tachometer** - The engine tachometer reads engine revolutions per minute.

**4. Voltmeter** - The voltmeter reads the condition of the 24-volt electrical system. The gauge is calibrated in volts. The needle should be from 27 to 29 volts. If below 27 volts, the batteries are undercharging. If above 29 volts, the batteries are overcharging. Have the system checked if over- or undercharging. The LED lights when voltage is too low.

### 5. Transmission Temperature

### 6. Plug

### 7. Vent

**8. SmarTire SmartWave Full Function Display** - The SmartWave tire monitor system provides tire pressure deviation alert, low pressure warning and high temperature alert for all tire positions.

#### SmartWave display functions:

1. ALARM tell-tale 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.

## Bendix Wingman System (Optional)



Figure 19.

### **WARNING**

The Driver is always responsible for the control and the safe operation of the vehicle at all times. The Bendix Wingman Advanced (or ACB) system does not replace the need for a skilled, alert professional driver, reacting appropriately and in a timely manner, and using safe driving practices.

Any audible and/or visual alert by the system means that your vehicle is too close to the vehicle ahead, immediately act to potentially avoid, or lessen the severity of, a collision.

Improper use of the Bendix Wingman Advanced (or ACB) system can result in a collision causing property damage, serious injuries, or death.

#### **Active Cruise with Braking (ACB)**

The Wingman system (Figure 19.) is engaged by turning cruise control ON and setting the vehicle speed. The system helps maintain a set distance between the operated vehicle and a detected vehicle ahead. To disengage the system, turn the cruise control OFF or press the brake pedal.

### **WARNING**

The Wingman Advanced (or ACB) system is automatically ready when the cruise control is set. However, cruise control must be used only in the same conditions that are normally recommended for ordinary cruise control. As noted below, there are certain situations when cruise control should NOT be used. Do not use cruise control in the following conditions or situations:

- *Inclement weather (rain, snow, fog, ice or other severe weather conditions)*
- *Dense Traffic*
- *Sharp curves and winding roads*
- *Entrance or exit ramps*
- *Downhill grades*
- *Construction zones*
- *Smaller forward vehicles - Smaller vehicles, such as motorcycles, may be difficult for the radar to identify. It is the driver's responsibility to be aware of these types of vehicles and to slow down if necessary.*

### **NOTICE**

***Any vehicle trouble code that disables vehicle cruise control will also cause a diagnostic trouble code in Wingman Advanced (or ACB). The Wingman system will not operate until the DTC is cleared.***

#### **Collision Mitigation (Advanced)**

Audible and visual alerts are provided to the operator through a Driver Interface Unit (DIU). All the alerts are always active regardless whether cruise control is engaged or not. Any alert means your vehicle is too close to another vehicle or object. These alerts will change as the distance between the two vehicles decreases alerting the operator of the impending hazard. As the distance closes, the system will automatically intervene and slow the vehicle.

## **⚠️ WARNING**

The radar system only senses metallic objects. Non-metallic or limited metallic objects such as people, animals, RVs, motorcycles, horse drawn buggies, logging vehicles, or cross- traffic will not trigger the system.

## **⚠️ CAUTION**

Due to inherent limitations of radar technology, the collision mitigation technology on rare occasions may not detect moving vehicles or stationary objects in your vehicle's lane of travel.

Road curvature may impact the radar's ability to track vehicles ahead in the same lane.

Operator alerts, warnings, or brake interventions may not occur. In addition, the system may react to moving vehicles not in your vehicle's lane of travel. Operator alerts, warnings, or brake interventions may occur.

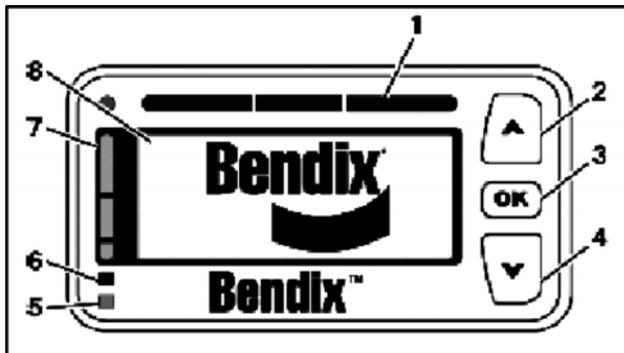


Figure 20.

### **Bendix Wingman Driver Interface Unit (DIU)**

1. Three Red LEDs
2. UP Button
3. OK Button
4. Down Button
5. Orange LED
6. Blue LED
7. Three Yellow LEDs
8. LCD Display

### **Following Distance Alert (FDA)**

A FDA is generated through the DIU using vehicle speed, forward vehicle speed, distance and driving scenarios.

## **⚠️ CAUTION**

*These alerts indicate that the time between your vehicle and the detected forward vehicle ahead is less than one and a half (1.5) seconds and decreasing. Once the audible alert is heard, the driver should increase the distance between their vehicle and the vehicle ahead until the audible alert stops.*

### **Single, Yellow Illuminated LED**

The forward vehicle is within a 1.5 seconds range and traveling at the same speed or slower.

The screen will visually show the distance between the vehicles, closing.

### **Two, Yellow Illuminated LEDs**

The forward vehicle is much too close and traveling at the same speed or slower. The screen will visually show the vehicles slightly closer to each other.

### **All Three, Yellow Illuminated LEDs**

This is the closest and most urgent Following Distance Alert. The forward vehicle is in this zone and traveling at the same speed or slower. The screen will visually show the distance between the vehicles as very close.

### **All Three, Red Illuminated LEDs**

This alert is the most severe warning. A loud solid tone is generated, and the screen will flash. The system will automatically slow down the vehicle. The operator must apply additional braking to maintain a safe distance from the vehicle ahead. If a collision is likely to occur, and the collision mitigation feature activates the brakes, the tone of the alert will change and the screen will flash between two displays.

## **⚠️ CAUTION**

*This alert indicates that a collision with the detected forward vehicle is likely and the driver must immediately act to potentially avoid, or lessen the severity of a collision.*

## Stationary Object Alert (SOA)



***This alert does not provide any automatic intervention at all, active braking or vehicle deceleration. Operator must take appropriate braking and/or avoidance measures. This alert indicates that a collision with a stationary object is likely and the operator must immediately act to potentially avoid, or lessen the severity of, a collision. System will provide up to a three (3) second alert when approaching a detected, sizable, metallic stationary object in vehicle's current lane of travel.***

### Two Yellow Illuminated LEDs

The radar detects a sizable, non-moving, metallic object in the vehicle's path of travel.

### Brake Overuse Alert



***This alert is provided when the system is intervening and using the brakes excessively. Brake overuse can lead to overheating and a potential loss of braking performance (brake fade).***

***Using cruise control on downhill runs will cause this alert. Do not use cruise control on downhill grades.***

### Blinking Blue LEDs

When brake overuse is detected, a text message and audible alert/alarm is generated and the DIU blue LED will illuminate. The operator has 15 seconds to take action (turn cruise control OFF or apply the brakes).

## Solid Blue LEDs

If the operator doesn't take action within 15 seconds, the system will shut off and a DTC (Diagnostic Trouble Code) will be generated. All intervention features of the system will remain off until the next ignition cycle. If the operator does intervene within the 15 seconds, the system will remain unavailable for 20 minutes. After 20 minutes the displayed ACB Braking Overuse message will disappear and the blue LED will turn off.

## NOTICE

***All three types of alerts (FDA, IA, and SOA) will continue to be provided during the brake overuse alert.***

### False Alerts

In certain unusual traffic or roadway conditions, Wingman Advanced (or ACB) may issue a false alert. While eliminating all false alerts is not possible, if false alerts occur too frequently (more than twice a day), this may indicate sensor misalignment. Service the system at the earliest opportunity.

### Front Bumper Radar Sensor

The sensor relaying information to the DIU is located on the front bumper of the coach (Figure 21.).



Figure 21.

## NOTICE

***Radar sensor inspection for obstruction/damage must be monitored routinely.***

# STEERING COLUMN & FLOOR-MOUNTED CONTROLS



Figure 22. Steering Wheel

## STEERING COLUMN

### **⚠ WARNING**

Ensure that the column is firmly locked before driving. Do not adjust the steering column while driving; steering control could be lost.

The tilt and telescoping steering column is basic. It has a molded polyurethane steering wheel with fingertip cruise control and Jake brake.

The tilt/telescoping control lever is on the LH side of the steering column (Figure 23.). Pull on the adjustment lever and tilt the steering wheel to the desired position. Push on the adjustment lever and raise or lower the assembly as necessary. Release the lever to lock. Ensure that the column is securely latched.



Figure 23.

## “SMART STICK” CONTROLS

The “Smart Stick” (Figure 24.), on the LH side of the steering column, controls the turn signals, air horn, headlamp dimmer, windshield washer and windshield wipers.

### Turn Signals

Move the lever up for right turns, and down for left turns. The corresponding telltale will flash.

### Air Horn

Press the button on the end of the turn signal lever to activate the air horn.

### Headlamp Dimmer

Pull the turn signal lever forward and release it to change from one setting to another. The HIGH BEAM telltale lights when the headlights are on high beam.

### Windshield Washers

Push the sleeve towards the steering column. Activating the washer turns the wipers ON for four seconds on low speed.

### Windshield Wipers

There are four rotary positions that operate the wipers: OFF, intermittent, low speed and high speed.



Figure 24.

1. Windshield Washer
2. Windshield Washer
3. Turn Signals
4. Air Horn

## CRUISE CONTROL



**Do not use cruise control in heavy traffic, on icy roads or in any other driving condition that does not permit a constant speed.**

### Setting Vehicle Speed

Press the ON switch to turn on the cruise control. Accelerate to the desired speed, press the Set switch, then release the accelerator pedal. The CRUISE ENABLED telltale on the RH cluster stays on until the cruise control is turned off.

**Note: Cruise control will not operate under 20 mph (32 km/h).**

### Increasing Set Speed

1. Press and hold the RES switch until the desired speed is reached,  
OR
2. Press the accelerator pedal until the desired speed is reached, then press and release the SET switch.

**NOTE: When driving with cruise control, speed may be increased (for passing, etc.) by pressing the accelerator in the usual way. Releasing the accelerator returns the coach to the set speed.**

### Decreasing Set Speed

1. Press and hold the Set switch until the desired speed is reached,  
OR
2. Lightly press the brake to disengage the system. Allow the vehicle to coast to the desired speed, then press and release the Set switch.

**NOTE: The transmission may be shifted in the normal way without disengaging the cruise control.**

### Canceling the Set Speed

1. Press the OFF switch or the CANCEL button,  
OR
2. Make a slight brake application.

**NOTE: When automatic operation is canceled, Res may be used to return to cruise control.**



Figure 25.

## JACOBS (JAKE) ENGINE BRAKE

The Jake brake controls are mounted on the RH side of the steering wheel.

The four controls are: OFF, LOW, MEDIUM and HIGH.



Figure 26.

The button located at the top of the RH control features a “courtesy light” that momentarily flashes the coach marker lights to acknowledge passing vehicles.

## ELECTRIC HORN

Press the horn bar on the steering wheel center hub to activate the electric horn.

## ACCELERATOR PEDAL

The accelerator pedal is to the right of the service brake pedal.

## SERVICE BRAKES



***Do not apply the parking brakes until the coach has come to a complete stop.***

The coach has air-operated service brakes that are applied with the foot pedal to the left of the accelerator pedal.

Stop lamps on the rear of the coach light when the brake pedal is pressed. The STOP LAMPS telltale on the RH telltale cluster lights.

## ANTI-LOCK BRAKES (ABS)

The anti-lock brake system (ABS) minimizes brake lock-up at each wheel.



***DO NOT pump the brake pedal. This defeats the purpose of the ABS.***

The ABS telltale on the LH telltale cluster is used for blink code diagnostics and lets the driver know the status of the system. The telltale lights briefly at ignition. If it lights at any other time, the system requires service. Full regular braking remains, and partial ABS may be present (refer to Figure 27.).



**If an ABS malfunction is indicated by the ABS telltale lamp, the driver must safely stop the coach and safely check all six (6) wheel ends for an overheat condition.**

**If an overheat condition exists, the coach must NOT be driven until inspected by a qualified technician.**

## NOTICE

***In the event of an ABS malfunction, the braking system will default to a normal braking system. Exercise caution to avoid potential wheel-lock conditions.***

## ABS Telltale

Ignition ON	Normal Operations	ABS telltale comes on briefly at ignition for a bulb check, then goes out.	System is O.K.
	After Servicing ABS	ABS telltale lights and stays lit at ignition.	Telltale goes out when coach is driven at above 4 mph (6 km/h). System is OK.
	Existing Fault	ABS telltale lights and stays lit at ignition.	Telltale stays lit when coach is driven above 4 mph (6 km/h). A fault exists in the ABS.

Figure 27.

# OPERATING FEATURES

## ENTRANCE DOOR

The entrance door is controlled by a switch on the RH switch panel on the instrument panel, or by an exterior switch located rearward of the door (Figure 28.).



**Figure 28. Exterior Entrance Door Switch**

The DOOR OPEN telltale turns ON when the door is open.

To operate, hold the switch until the door is fully opened or closed. The door may be stopped anywhere in its travel by releasing the switch. The door catch will engage when the door is in the fully closed position only, with the ignition ON.

## KNEELING

The coach has a kneeling feature that allows the operator to lower the front of the coach five (5) inches (127 mm) for ease of boarding.

To activate the kneeling feature, the park brake must be set, the transmission must be in Neutral and the entrance door must be closed.



**To avoid personal injury and property damage, ensure that nothing is under the coach when kneeling.**

To lower the coach, press and hold the KNEEL half of the switch in the RH switch panel. While the coach is lowering, the KNEEL telltale and exterior kneel lamps flash, and interior and exterior (optional) buzzers

sound. When the coach reaches kneel height, the telltale remains lit, but the exterior lamp and buzzer(s) go off (Figure 28.).

To return to normal ride height, press and release the RECOVER half of the switch.

If the KNEEL switch is released before the coach is fully knelled, the coach stops lowering. To resume kneeling, press and hold RECOVER to return to normal ride height, then press and hold KNEEL to reactivate kneeling.

## NOTICE

***The coach automatically returns to normal height if the park brake is released or the transmission is shifted out of Neutral.***

## REAR RISE

The coach may be equipped with the rear rise option, which prevents rear bumper scuffing in off-highway situations by raising the rear bumper approximately three (3) inches (76 mm) above normal ride height.

The Rear Rise switch is located on the RH switch panel. When the coach is traveling under 20 mph (30 kph) and the RAISE half of the switch is pressed, the rear of the coach rises, the HIGH RIDE telltale lights and a buzzer sounds.

Pressing LOWER or traveling above 20 mph (30 kph) returns the coach to normal ride height.



***Do not operate the coach in the high position for extended periods. Lower the rear rise system before any suspension maintenance or inspection.***

## TAG AXLE UNLOAD, ELECTRICAL (OPTIONAL)

The electrical tag axle unloading feature allows the operator to partially unload the tag axle using a dash-mounted switch. When the coach cannot get traction, this transfers weight to the drive axle. The operator should refill the tag as soon as the coach has regained traction. It is unsafe to drive the coach with the tag axle air springs unloaded.



**Only the tag axle unloading feature in low traction situations.**

**Do not use it for normal driving. Reduce coach speed when the tag axle air springs are unloaded.**

To unload, press the TAG AXLE switch located on the LH switch panel. The TAG UNLOAD telltale will light and a buzzer will sound.

To re-load, press the TAG AXLE switch again or drive above 17 mph.

Applying the service brake prevents MDSS from self-leveling the coach when the tag axle is unloaded.

## IN-STATION LIGHTING/BATTERY CHARGER (J4500) (OPTIONAL)

An optional 110V AC receptacle in the battery compartment provides for in-station lighting and battery charging.

## AUTOMATIC TRACTION CONTROL (ATC)

This system improves traction when the coach is on slippery surfaces by reducing drive wheel spin. If one drive wheel starts to spin, ATC applies the brake to transfer engine torque to the wheel with better traction. If all drive wheels spin, ATC reduces engine torque to improve traction.

The telltale comes on when the drive wheels spin during acceleration. It goes out when the drive wheels stop spinning. ATC is always active; the operator does not have to select it.

The MUD/SNOW switch is included with ATC. On extra soft surfaces, such as mud, deep snow or gravel, this feature increases traction by slightly increasing wheel spin. When MUD/SNOW is active, the LOW TRACTION telltale blinks continuously.

## ELECTRONIC STABILITY CONTROL

Coaches are equipped with a stability control system that features Electronic Stability Control (ESC) combined with Roll Stability Control (RSC). ESC is a computerized technology that improves the safety of 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 spin-out or drift out, 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.**



# WHEELCHAIR LIFT (OPTIONAL)

## GENERAL DESCRIPTION

A wheelchair lift is installed in the storage compartment on the curbside rear of the coach, between the wheel housing and the rear service door. The lift provides safe on-loading and off-loading of wheelchair passengers with easy ground level access. The platform raises to coach floor level where the passenger enters the coach through the cabin access door.

The lift is powered by an electrically operated hydraulic pump, with emergency manual back-up, and operated with a hand held WCL controller. Keyed operation and a safety interlock prevents unsafe deployment.

The wheelchair lift platform features:

- folding handrails,
- a manually operated front barrier,
- a powered rear barrier that acts as a bridge between the platform and the coach floor.

A cabin access door is located directly above the wheelchair lift storage compartment. The door has a forward hinge and a positive lock mechanism to prevent accidental closing. The cabin access door is operated manually.

Two wheelchair parking spaces are available next to and across from the lift platform. Special sliding and folding seats can be repositioned to provide wheelchair parking area.

A seven point wheelchair and passenger restraint system is included at both wheelchair locations.

The electric pump, emergency hand pump (Figure 29.) and reservoir assembly are located in the rear service compartment.



Figure 29.

## WHEELCHAIR INTERLOCK SYSTEM

This system prevents the WCL controller to be enabled until the following functions occur:

- the main battery disconnect switch is in the ON position,
- the engine is running,
- Neutral is selected on the transmission shift pad,
- the Park Brake is set,
- the master wheelchair lift key switch (located on the lower, LH switch panel) is turned to the ON position.

**Only after these conditions are met, the following functions occur:**

- the vehicle assumes normal ride height,
- the throttle is disabled,
- the WCL INTRLK dash telltale illuminates,
- the engine is running at fast idle,
- the Hazard/Warning lights automatically activate,
- the audible back up alarm automatically activates,
- the transmission shift inhibit and MDSS inhibit are energized,
- the park brake lock valve is energized,
- the wcl interior light illuminates,
- the wcl controller is enabled,
- the key will release from the master wheelchair lift key switch, eliminating the possibility of theft or engaging the coach during wheelchair operation.

## THRESHOLD WARNING SYSTEM

The threshold warning system is located above the wheelchair parking (threshold) area (Figure 30.). 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 cabin access door is open, an audible buzzer and flashing light are actuated.



Figure 30.

## BRAUN WHEELCHAIR LIFT OPERATION

1. Stop the coach, ensuring that there is adequate clearance to deploy the lift and to allow the passenger to maneuver onto the platform.
2. Place the transmission in Neutral and set the Park Brake.
3. Turn ON the wheelchair lift master switch key on the lower, LH switch panel (Figure 31.). The alarm will sound and the WCL INTRLK dash telltale in the RH telltale cluster will illuminate.



**Figure 31. WCL Master Switch**

4. Fold and position passenger sliding seats to provide wheelchair parking area.
5. Remove the key and exit the coach.
6. Open the wheelchair lift compartment door. Place the steel pin through the two holes, securing the door in the open position

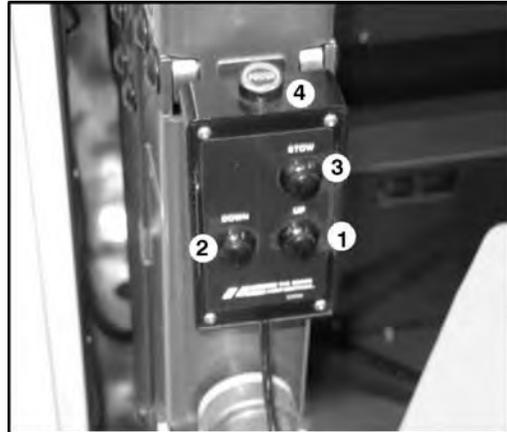


**Figure 32.**

1. WCL control pendant
2. Pin location

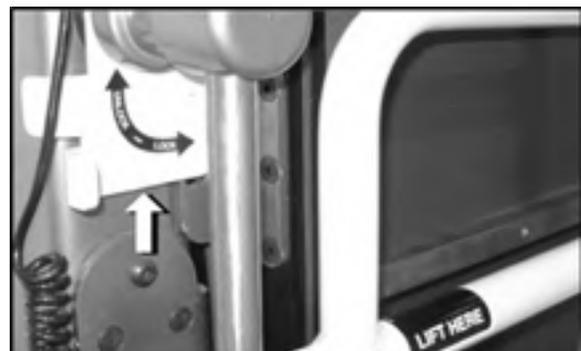
## Deploying The Lift From Compartment

7. Lift to remove control pendant from lift storage clip.
8. Press POWER switch on the pendant to ON (POWER button illuminates only when the lift is operating and receiving power).



**Figure 33. Braun WCL Pendant**

1. Up Button
2. Down Button
3. Stow Button
4. Power Enable Switch
9. Stand clear. Press and hold the UP switch until lift stops (extends fully).
10. Lift the RH handrail and swing out. Lower the handrail to the locked position.
11. Lift the LH handrail and swing out. Lower the handrail to the locked position
12. Securely support platform with right hand and rotate yellow platform latch (Figure 34.) up to Unlock platform.

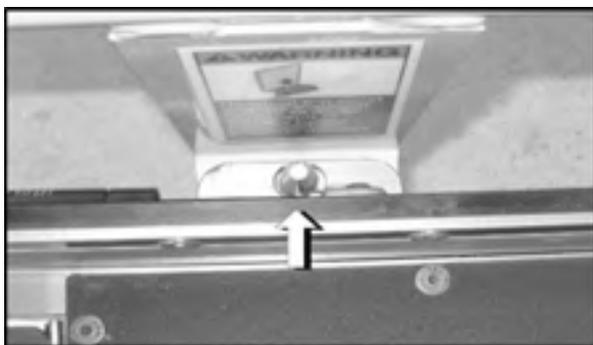


**Figure 34.**

- Grab the top of the platform and apply enough force to pull down platform to horizontal position, ensuring that it engages on the pin of the handrail assembly.  
(Figure 35. and Figure 36.)



**Figure 35.**



**Figure 36.**

- Grip outer barrier and pull outer platform out fully, ensuring the center transition plate engages (locks) outer platform.



**Figure 37.**

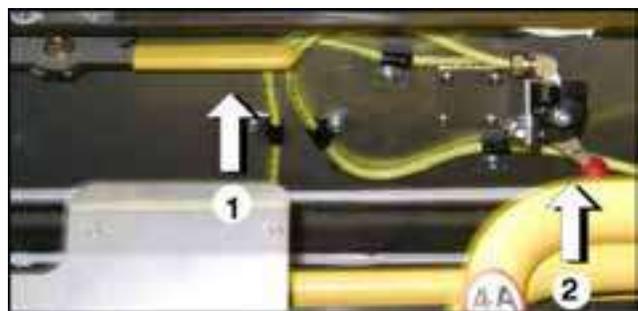
## NOTICE

*The platform will not raise or lower unless the outer barrier is in the vertical and locked position.*



**Figure 38.**

- Exhaust the door locks and actuating cylinder on the cabin door by placing the air dump valve to the release position (Figure 39.).
- Reach into the compartment and push the manual latch handle upwards to release the cabin door (Figure 39.).



**Figure 39.**

- Latch handle location
  - Air dump valve
- When the passenger is ready to board, grasp the edge of the cabin door to open it fully, and secure in full open position. using rocker switch on door (Figure 40.).



**Figure 40.**

### TO LOAD PASSENGER:

1. Load passenger onto platform, lock wheelchair brakes.
2. Latch handrail belt.
3. Press UP switch on the pendant to fold outer barrier up. Raise platform to floor level. At coach floor level, the inner roll stop will automatically unfold as a ramp.
4. Carefully unlock wheelchair brakes and unload passenger from platform.
5. Position and securely restrain wheelchair in the wheelchair parking area using the proper restraints.

### TO UNLOAD PASSENGER:

1. Latch handrail belt.
2. Press UP button on the pendant until lift stops (raises to floor level), and inner roll stop unfolds to floor level.
3. Carefully load passenger onto platform and lock wheelchair brakes.
4. Latch handrail belt.
5. Press DOWN button on the pendant until entire platform reaches ground level and outer barrier unfolds fully.
6. Unlatch handrail belt, unlock wheelchair brakes and unload passenger from platform.

### TO STOW PLATFORM:

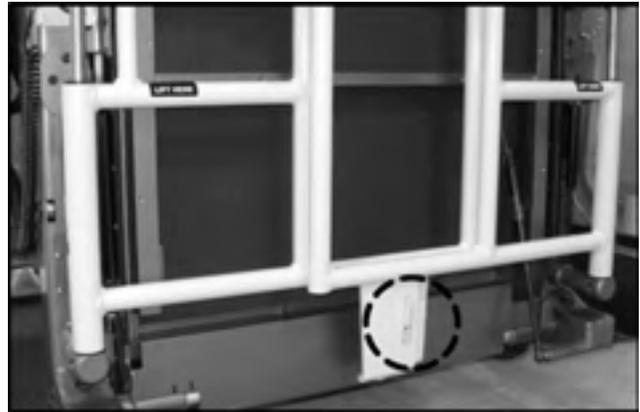
1. Press STOW button on the pendant until platform reaches stow level (stops).
2. Using strap, lift center transition plate and push outer barrier in fully.
3. Manually stow (fold) platform to vertical position.
4. Support platform with right hand and rotate yellow platform latch to Unlock position (up).
5. Push platform in and rotate yellow platform latch to Lock position.

### TO STOW HANDRAILS:

1. Lift the LH handrail and swing in.
2. Lower handrail to locked position.
3. Lift the RH handrail and swing in.
4. Lower handrail to locked position.

## NOTICE

**Ensure handrails are locked together (Figure 41.).**



**Figure 41.**

### TO STOW LIFT (IN):

1. Press STOW button until lift stops (retracts fully).
2. Release the cabin door by placing the LOCK/UNLOCK switch at the end of the heat duct to UNLOCK.

## NOTICE

**The cabin door must be closed before the lift key is switched OFF. This action controls both the pneumatic door locks as well as providing power to the lift.**

3. Press POWER switch to OFF.
4. Store hand-held pendant in lift storage clip.
5. Remove pin from lower door hinge. Insert pin in storage clip.
6. Close door.
7. Turn wheelchair lift key switch on the lower, LH switch pane to OFF.

## MANUAL WHEELCHAIR LIFT OPERATION

In case of an electrical or other malfunction, passengers may be unloaded by manually operating the lift. The manual bypass valves and hand pump are located in the side service compartment directly to the rear of the w/c compartment.

### CAUTION

**Manual operation should only be used for unloading passengers during a malfunction. DO NOT use the manual operation feature to load passengers.**

Refer to the BRAUN manual provided with your coach and the decal on wheelchair lift door (Figure 42.) for information on manual wheelchair lift operation.



**Figure 42.**

## WHEELCHAIR PASSENGER SEATING

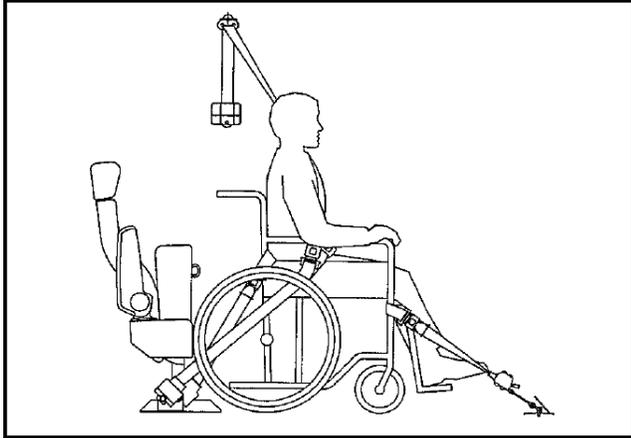


Figure 43.

### Positioning The Wheelchair

Since the QRT Retractable System consists of self-locking and self-tensioning retractors which retract and lock automatically, the driver can position the wheelchair anywhere within the clear floor space which will allow for convenient access to securement points on the wheelchair.

### Securing The Passenger

The self-locking and self-tensioning features of the QRT enables the driver to secure the wheelchair beginning with either the front or rear retractors or if standing on the lift with the wall side front and rear retractors if this is more convenient.

## NOTICE

***Explain to the passenger what you are doing to make them feel comfortable with the process.***

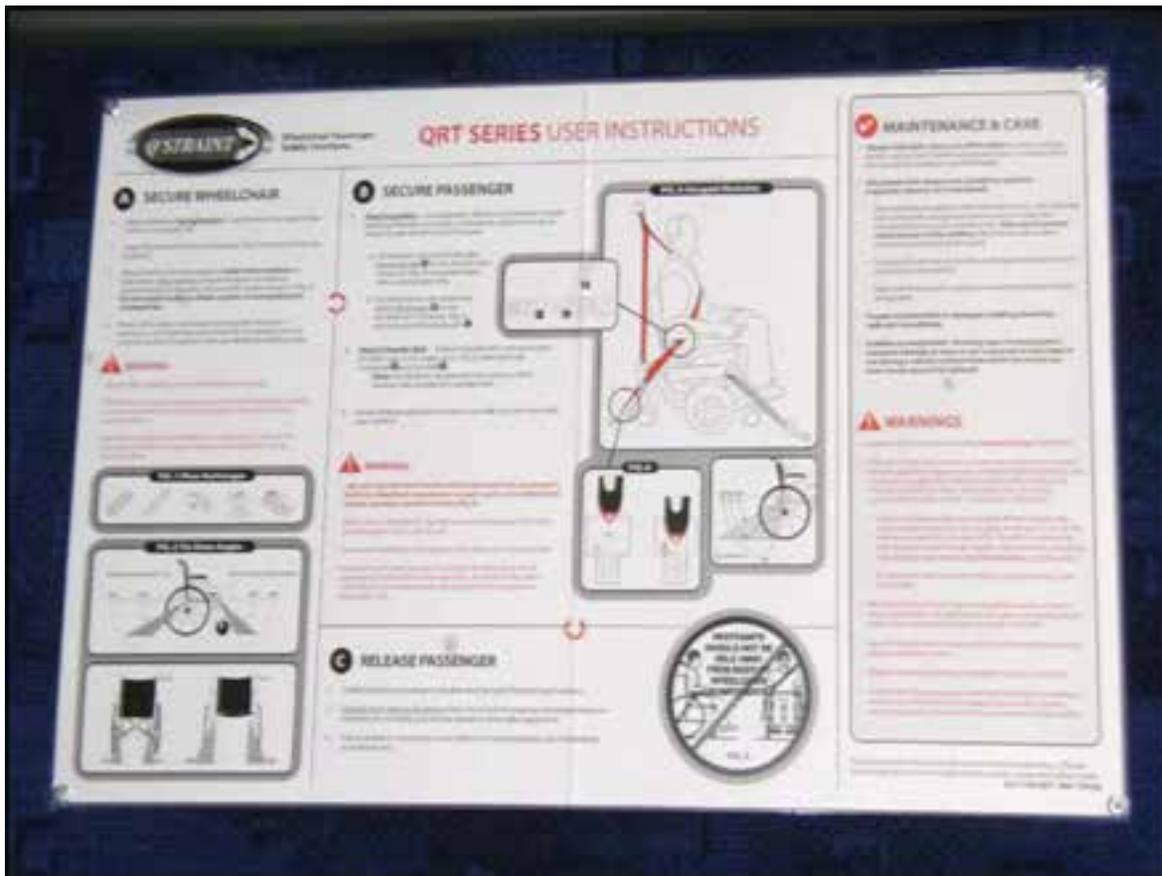


Figure 44. QRT Instruction placard mounted on cabin access door

## Securing The Passenger (cont'd)

1. Ensure a straight line from anchorage to wheelchair attachment.
2. Select the appropriate attachment points on the wheelchair. Look for frame members that are welded or securely bolted to each other.

**NOTE: DO NOT use removable armrests, footrests, wheels of the crisscross supports on folding wheelchairs.**

3. The rear attachment points should be a solid frame member as near as possible to where the seat and the back meet. The front attachment points should be a solid frame member, which will create an angle between 30 and 45 degrees to the retractor.
4. Attach the "J" hooks on all four retractor belts to solid frame members.
5. Ensure that the belts are properly tensioned.

**NOTE: DO NOT allow the webbing to be twisted inside the retractor.**

6. Extend the shoulder belt from the retractor and attach the female pin connector end to the male pin connector on the lap belt. The belt will remain comfortable on the passenger and lock only in an emergency when an inertial force is applied.

**NOTE: When positioned properly, the shoulder belt should lay across the torso and angle up from the mid-point of the shoulder to the wall.**

**NOTE: Adjust the belt as firmly as possible consistent with user comfort.**

**DO NOT twist the belt.**

7. Engage the wheel locks on the wheelchair.

## **WARNING**

**Ensure all passengers and wheelchair equipment is secured correctly. Failure to do so can result in property damage, personal injury or death.**

## Care and Maintenance

1. Clean the webbing periodically with mild soap and water. After cleaning, fully extend the belts and position them to prevent water from entering the retractor until completely dry. Take care to prevent contamination of the webbing with polishes, oils and chemicals, particularly battery acid.
2. Webbing and components should be inspected, cleaned and maintained regularly.
3. Frayed, contaminated and damaged webbing should be replaced.
4. Broken and worn parts should be replaced.
5. Components, including anchorages, that are suspected to have been in use during an impact from which the vehicle must be towed, should be replaced.
6. Clean bolt threads and re-apply permanent thread locker if bolts are adjusted.

## **CAUTION**

***Do not use the wheelchair life for lifting freight. The warranty will be void. Do not use the wheelchair life for lifting***

# ENGINE OPERATION, FUEL AND EXHAUST

## Starting the Engine

The controls necessary to starting and stopping the engine from the driver's area or engine compartment are mounted on the instrument panel in front of the driver and on the remote box in the engine compartment. These controls and a description of their operation and function follow:

### CAUTION

**Do not engage the started for longer than 15 seconds at a time. Wait 30 seconds before cranking again. Continuous use can damage the starter motor.**

#### Front Start Procedure



Figure 45.

1. Master Power / Ignition Switch - Pressing this switch to the ON (upper) position will enable all of the multiplex modules and turn on the coach's electrical system (Figure 45.).

2. Engine Start Switch - Used to start the coach using the rocker switch ignition (Figure 45.). To START the coach, place the master power / ignition switch in the ON (upper) position. Press the upper portion of the engine start momentary-on spring return switch to engage the starter. Release the switch once the coach has started. Allow the coach to idle for 30 seconds. To STOP the engine, place the master power switch / ignition in the OFF (lower) position.

## Rear Start/Remote Engine Operation

### NOTICE

**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 is applied.**

The remote electrical control panel is located at the LH side in the engine compartment. To gain access to the panel, open rear engine compartment doors.

1. Ensure the ENGINE ENABLE switch on the remote engine control box (located in the engine compartment) is set to ON.

### WARNING

**Be very careful when the engine is running and the engine door is open. If it is necessary to have the engine running for certain inspections or checks, keep a safe distance from moving belts, pulleys, shafts or fans. Keep hands and limbs away from moving belts and pulleys and also hot areas such as exhaust and turbocharger components and coolant lines. DO NOT wear loose, baggy or frayed clothing when working near any moving parts such as pulleys, belts, shafts or fans.**

2. Actuate the "REAR START" switch to start engine. The start switch is a momentary-on spring return type and must be held in the depressed position to engage the starter.

### CAUTION

**Do Not engage the starter for longer than 15 seconds at a time. Wait 30 seconds before cranking again. Continuous use can damage the starter motor.**

#### Engine Warm-Up

Activate the FAST IDLE switch to warm up the engine, fill the air system quickly, and to increase electrical and HVAC output. Parking brake must be applied. Watch gauges and telltales. If abnormalities arise, stop engine and find cause.

## Stopping the Engine

1. Bring coach to a complete stop.
2. Place the transmission in Neutral.
3. Apply the parking brake.
4. Idle the engine at low rpm for 30 seconds, then turn the ignition OFF.

### Regeneration Switch

The regeneration toggle switch is located in the rear, side service compartment (Figure 14.).

## 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 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 perform inside a garage or maintenance facility. DO NOT attach an exhaust extraction hose to the exhaust outlet.



Figure 46.

## CAUTION

**Shutting down the engine from high idle can damage the turbine bearings.**

### Multiplex Bypass Circuit

If the engine cranks but does not start because the ignition module fails, the engine ignition bypass switch, located in the rear junction box, provides emergency power to start the engine.

**NOTE: In this mode, the coach should be driven straight to a service facility.**

1. Open the rear junction box compartment door (baggage bay compartment #3) (Figure 47.). Locate the emergency engine switch on the upper section of the junction box (Figure 48.).



Figure 47.



Figure 48.

2. Lift the red self-canceling cover and position the toggle switch ON.
3. Get service assistance as soon as possible.

## ENGINE CODE RETRIEVAL

Using the touch screen diagnostic interface (Optional), the operator can retrieve coach electrical or drive train diagnostics to notify the garage. (Figure 49.).

There are three (3) interface port connections on the coach:

1. underneath the instrument panel,
2. in the rear junction box located in baggage bay compartment #3, and,
3. the bottom face of the engine compartment remote control box.



**Figure 49. LCD diagnostic interface connected underneath the instrument panel.**

## IMMERSION HEATER - Engine Block (Optional)

Use the engine block heater when the coach is parked for an extended period in cold weather. The plug is in the curb-side rear service door (Figure 50.)



Figure 50.

## FUELING

Two (2) diesel (ULSD) fuel fillers are installed on the coach. One is located behind a filler door in the fuel tank compartment door on the curbside (Figure 51.). The second location is on the roadside behind a filler door in the A/C condenser door.



Figure 51. Diesel (ULSD) Fuel Door

The fuel tank is equipped with a whistle that stops when the tank is full. Close filler and latch it securely after filling.

## CAUTION

**Do not fill the tank from both necks at once or have both fill caps open; the tank will over-fill and overflow.**

## CAUTION

**DO NOT put anything but DEF in the DEF tank (blue cap).**

One (1) diesel exhaust fuel (DEF) filler door is provided next to the curbside diesel (ULSD) filler door (Figure 52.).



Figure 52. DEF Tank Door

## Diesel Fuel Specification

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

## CAUTION

**Failure to use ULSD fuel in 2015 EPA engines will result in component damage.**

## Diesel Exhaust Fuel (DEF) Specification

DEF must meet ISO standard 22241-1.

## Diesel Fuel System Maintenance

The fuel filter(s) require(s) periodic maintenance, and fuel lines and connections must be inspected regularly for evidence of leaks. When filling the tank, take care to prevent the entry of dirt and water. See the MCI Maintenance Manual and the Service and Maintenance section of this operator's manual for further information.

## WARNING

**Do not smoke while handling fuel.**

### Diesel Fuel Contamination

Water is the most common contaminant. It can be introduced through poor maintenance (loose or open fuel tank cap), a contaminated fuel supply or condensation.

A fuel filter with water separator is located on the curb side of the engine. Inspect the bowl for water accumulation and drain as required. The auxiliary heater also has a fuel filter. Inspect and drain regularly.

### Lubricant Additives

Do not use any lubricant additives.



**Failure to use CJ-4 engine oil in 2015 EPA engines will reduce component life.**

### FUEL PRO FUEL FILTER

The Fuel Pro extends filter change intervals and features a clear cover that provides visual identification of the fuel level (Figure 53.). 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 53.

## EXHAUST



**Exhaust gases contain carbon monoxide, which can cause unconsciousness and death. Strictly follow safety guidelines:**

- 1. Do not inhale exhaust fumes.**
- 2. If you suspect that exhaust fumes are entering the coach, discharge passengers and do not drive the coach. Have the cause determined and corrected immediately.**
- 3. The exhaust system, body and ventilation system must be inspected and maintained regularly.**
- 4. Keep the tailpipe area clear of snow and other material.**
- 5. The exhaust system and coach body must be inspected any time the exhaust system or coach are damaged, or when the exhaust system sounds different.**
- 6. Keep the engine air inlet grille clear of snow, dirt and other obstructions.**
- 7. Do not run the engine inside confined areas without using an exhaust removal system.**
- 8. Do not run the engine while parked in narrow alleys.**
- 9. If the coach must be parked with the engine running for an extended period and is in an unconfined area, turn the HVAC system on.**

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# TRANSMISSION OPERATION

## GEN V AUTOMATIC TRANSMISSION

The B500 series GEN V 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 54. GEN V pushbutton shift selector

1. Two Character Digital Display
2. Mode ID
3. Mode ON Indicator
4. Mode Button
5. Manual Shift Up / Down

## Shift Selection Controls

D - DRIVE is used for normal driving. All shifting is automatic.

N - NEUTRAL

R - REVERSE

▲▼ - Used to select gear ranges manually. The display will show the highest gear in the selected range. Lower gears can be selected to provide engine braking on steep grades.

## CAUTION

*The transmission may select a gear range higher than the selected range if damage due to engine over-speed is possible.*

## CAUTION

*There is no PARK position on the transmission touch-pad. Select N (Neutral) and apply the parking brake. When shifting from Drive to Reverse or Reverse to Drive, select Neutral first. The engine must be at normal idle before shifting. If the coach is at fast idle, turn fast idle off and wait for the idle speed to slow before shifting.*

## GEN V 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.

The display will show two dashes (--) if diagnostic cycle was performed and no problems were found.

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. Select Neutral and apply the park brake. Simultaneously press the ▲ and ▼ buttons to access the fluid level display mode. Continue to press the ▲ and ▼ buttons 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.

d1 is the diagnostic code list position.

P is the main diagnostic code.

07, 22 are the sub codes.

Each item is displayed for about one second.

### 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.

LED flashes when the code clears.

## ALLISON GEN V

### TRANSMISSION FLUID LEVEL CHECKS

#### Automatic Transmission Fluid

Access the transmission dipstick and fill tube from the rear engine door.

#### Electronic Fluid Check

1. After reaching normal operating temperature [140F - 220F (60C - 104C)], park the vehicle on a level surface, select Neutral and allow the engine to idle (500-800 rpm).

**NOTE: Coach should be stationary for approx. two minutes to allow the fluid to settle. NO fast idle during electronic fluid check.**

2. Simultaneously press the   buttons once. There may be a short delay while the fluid and temperature stabilizes.

3. The fluid level will display:

**If correct**, OL-OK.

**If low**, OL-LO-# (number of quarts of transmission fluid required).

**If high**, OL-HI-# (number of quarts overfilled).

4. Confirm with a manual fluid level check.

### Manual Cold Fluid Level Check

Do a cold check to ensure that the transmission has enough fluid for safe operation until a hot check can be done. Check the reading at least twice.

1. Park the coach on a level surface and apply the parking brake.
2. Run the engine for at least 1 minute.
3. Apply the service brakes, shift the transmission to drive (D) and operate the engine at 1000 to 1500 rpm for 30 seconds. Shift to reverse (R) to clear air from the hydraulic system. Shift to neutral (N) and idle the engine at 500-800 rpm.
4. With the engine running, remove the dipstick from the tube and wipe it clean.
5. Insert the dipstick into the tube and remove it. Check the level reading.
6. Repeat to verify the reading.
7. If the fluid level is within the COLD RUN band, the transmission may be operated until the fluid is hot enough to perform a hot check. As required, add fluid to bring the level to the middle of the band.
8. Perform a hot check as soon as the coach reaches normal operating temperature [140F - 220F (60C - 104C)].

### CAUTION

**Low and High fluid levels cause overheating and irregular shift patterns. If not corrected, transmission damage can occur.**

### NOTICE

**Dipstick checks may not agree exactly with sensor checks, because the oil level sensor compensates for fluid temperatures.**

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# EMERGENCY CONDITIONS

## CAUTION

**Check gauges and telltales at start-up and regularly during operation. If abnormalities arise, take action at once.**



If the following telltales light, action is required		
Regeneration (DPF)	Telltale	Regeneration required for 2015 engines
High Exhaust Temperature (HET)	Telltale	Exhaust outlet temp exceeds predetermined level
Malfunction Indicator (MIL)	Telltale	Failure of an emission component on DD13 engine
Not Generating	Telltale	Alternator(s) not functioning, Alternator belt broken
Tag Unloaded (Optional)	Telltale	Tag axle is unloaded
ABS	Telltale	Anti-lock braking system malfunction
Check Transmission	Telltale	Transmission problem, Do not change gear.
Check Engine	Telltale	Engine fault
Stop Engine	Telltale	Engine is powering down or stopped
Low Coolant	Telltale	Add coolant. Check for leaks in the engine compartment
Supply Air Low	Telltale	System air pressure is low
Fire Alarm	Telltale	Fire in the engine compartment
Lavatory Emergency	Telltale	Passenger has pressed buzzer in lavatory
Digital Wheel End Sensor	Speedometer	High temperature warning in rear wheel
Voltmeter Gauge LED	Instrument	Voltage too low
Oil Pressure Gauge LED	Instrument	Oil pressure is too low
Temperature Gauge LED	Instrument	Engine coolant temperature too high
Tachometer Gauge LED	Instrument	Engine RPM too high
Air Pressure Gauge LED	Instrument	Front or rear brake pressure too low
Fuel Gauge LED	Instrument	Low Fuel

## EMERGENCY ESCAPE

### Roof Hatch

Two escape hatches are located in the roof for emergency exiting (Figure 55.). To open in case of an emergency, follow the instructions on the applicable roof hatch.



Figure 55.

A prop rod is located in the hatch opening.



Figure 56.

### WARNING

The roof hatch may be partially propped open by the operator for ventilation purposes when it is safe to do so.

Before doing so, the operator should ensure that the coach will have adequate roof clearance with the partially opened hatch throughout the operator's intended route of travel. The partial opening should not be performed while the coach is in motion.

In no event should the roof hatch be fully opened for ventilation or any other purpose while the coach is being operated.

### Side Windows

Select side passenger windows can be opened from inside for emergency escape purposes. These non-bonded side windows are top hinged, and open from the inside.

To open, lift the release bar at the lower edge, disengaging the safety latches. Push the window out.

Emergency instructions decals are attached to the release bars (Figure 58.). Inspect regularly to assure the decals are legible.



Figure 57.



Figure 58.

### WARNING

Do not open the side windows while the coach is moving.

Windows close with enough force to cause injury. Ensure that hands are clear.

## EMERGENCY STARTING

### NOTICE

***If the coach has dead batteries, it can be jump started.***

Negative and positive boosting posts are in the curb-side rear service compartment.

### WARNING

**Follow procedures exactly or personal injury or property damage may result, and the starting or charging system of the booster or immobilized vehicle may be damaged.**

**Do not jump start a vehicle with a frozen battery. Frozen batteries can rupture or explode. Examine the fill vents for ice. If ice is visible, do not jump start.**

**Connect and disconnect jumper cables as described.**

#### Connecting Booster Cables (Figure 59.)

1. Set the parking brake, turn off lights, heater and all electrical accessories.

### WARNING

**To reduce the chance of an explosion, take steps to prevent hydrogen buildup. Remove the vent caps from the booster and the dead batteries. Ensure the battery compartment is well ventilated.**

### CAUTION

***Do not permit vehicles to touch each other. Take care that clamps from one cable do not touch clamps on the other cable.***

2. Remove the vent caps from the booster and the discharged batteries.
3. Remove the rubber boot that covers the positive booster post located on the upper frame rail below the lavatory tank.
4. Attach one end of one jumper cable to the positive terminal of the booster battery.

5. Attach the other end of the same cable to the positive booster post on the upper frame rail below the lavatory tank.



**Figure 59.**

6. Attach one end of the remaining negative cable to the negative terminal of the booster battery.
7. Attach the other end to the negative booster post on the lower coach frame rail.
  1. Positive Boost Post
  2. Negative Boost Post

#### Disconnecting Booster Cables (Figure 59.)

### CAUTION

***Do not lean over the booster battery when disconnecting the ground lead. Take care that clamps from one cable do not touch clamps on the other cable.***

1. Disconnect the jumper cable from the ground stud.
2. Remove the remaining end of the negative jumper cable from the booster battery.
3. Remove one end of the remaining jumper cable from the positive booster post on the upper frame rail.
4. Remove the other end of the same cable from the positive terminal of the booster battery.
5. Install the rubber boot over the positive booster post.
6. Install the vent caps on the batteries.

#### POWER STEERING SYSTEM

If the power steering system fails, the coach can be steered, but much greater effort is required.

## BRAKES (EMERGENCY OPERATION)

### Parking Brake (Emergency Operation)

If the front and rear brake system air pressure falls below approximately  $50 \pm 5$  psi ( $345 \pm 35$  kPa), the parking brake will automatically apply.

An isolated emergency release reservoir has enough air to release the parking brake three times. Press and hold the emergency parking brake release button (lower LH console switch panel). The parking brake springs will reapply as soon as the knob is released.

### WARNING

The parking brake emergency release button allows the coach to be moved to safety when both brake reservoirs are depleted and the parking brake has applied automatically. Do not use this feature other than to move the coach to a safe parking location.

Do not drive the coach until the air loss problem is fixed and the brake reservoirs are fully charged.

### Service Brakes (Emergency Operation)

This coach has a dual-circuit service brake system with separate reservoirs for rear and front brakes to ensure that brakes are available if one circuit fails.

If low air pressure occurs in both brake circuits at the same time, an alarm sounds. The brakes will remain operable until air pressure falls to  $50 \pm 5$  psi ( $345 \pm 35$  kPa) and the parking brakes apply automatically to stop the coach.

### Brake System Emergency Fill

Emergency fill provisions allow the primary or secondary service reservoirs to be filled independently. The fill provisions are in the front roadside service compartment (Figure 60.).



Figure 60.

### Coach Air Service Fill

A service fill provision is located behind the curb-side rear service door (Figure 61.) allows filling the coach air system from an external source, provided the air system is intact.



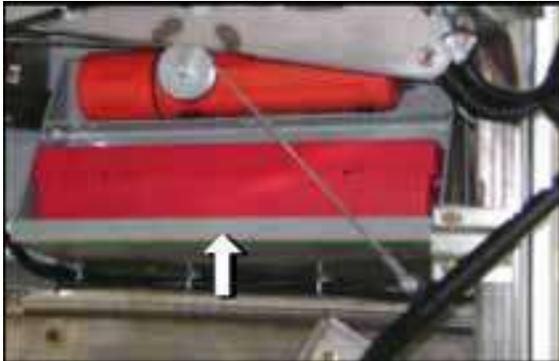
Figure 61.



## EMERGENCY STOPS

If you must stop the coach because of a breakdown or unsafe condition, ensure that it is safely parked.

1. Pull the coach as far out of traffic as possible.
2. Turn on the hazard lights.
3. Place reflector triangles in front of and behind the coach (refer to Figure 63. for storage location).



**Figure 63.**

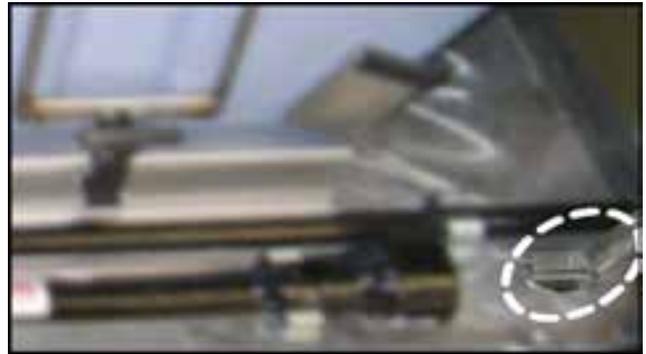
### ENTRANCE DOOR OVERRIDE VALVE

The entrance door override valve (Figure 64.) allows air to be dumped from the entrance door actuating air cylinder, door claw and header locking devices. After dumping air, the entrance door can be manually pushed open.



**Figure 64.**

In addition to the valve, there is a provision for release of the front service compartment door, beside the windshield washer reservoir. This allows the compartment door release to be operated from outside the coach. Push upwards on mechanism, throw hole opening, to release compartment door latch (Figure 56.)



**Figure 65.**

Pull the entrance door knob to dump the air, allowing the entrance door to be manually pushed opened (Figure 66.).



**Figure 66.**

### TOOLS AND SAFETY EQUIPMENT

- A fire extinguisher is installed under the #2 curbside passenger seat.
- Three reflector triangles are provided in a container mounted in the upper corner of the #1 curbside baggage bay compartment. A container of fuses are mounted in the battery compartment.
- A lug wrench, hydraulic jack with handle and wooden run-up block (used for raising the axle when changing tires) are located in the front side service compartment (Figure 67.).



**Figure 67.**

## ENGINE DOOR RELEASE LEVER

The engine compartment door release lever is in the rear curbside service door (Figure 68.).



**Figure 68.**

## MAIN BATTERY DISCONNECT SWITCH

Activate the disconnect feature of the main battery disconnect (MDS) system by turning the rotary switch 45 degrees counter-clockwise to OFF (located in the battery compartment) (Figure 69.).



**Figure 69.**

The multiplex modules installed on MCI coaches have been programmed with a system sleep mode. After thirty (30) minutes of no coach system activity, the power management supply module will remove electrical power from all the components connected to the main disconnect switch (now a rotary switch, located in the battery compartment). When the coach goes into sleep mode after thirty (30) minutes, coach power is turned OFF which allows the coach systems to conserve coach power, (providing that the hazard lights and master power switch are in the OFF position).

To turn ON (wake up) power from the exterior of the coach, press the exterior entrance door open switch. To turn ON (wake up) coach power from the interior of the coach when the coach is in sleep mode, press the entrance door open rocker switch or position the ignition rocker switch to the RUN position.

## CIRCUIT BREAKERS AND FUSES

Self-resetting circuit breakers, located in the battery compartment on the curb side of the coach, provide overload and short circuit protection for the main HVAC blowers, condenser fans, driver's evaporator blowers and 12 and 24 volt relay modules. Three self-resetting circuit breakers for the driver's blowers are in the control box for the driver's evaporator, and two self-resetting circuit breakers for the parcel rack blowers are located in the fuse box.

Fuses, provided for the auxiliary heater, engine ECM, transmission ECU, interlock modules, door sensors and HVAC controllers, are located in the battery compartment fuse box.

## LAVATORY EMERGENCY

A momentary ON lavatory emergency button is located in the lavatory compartment (Figure 70.). Pressing this button will illuminate the LAV EMERG tell-tale and activate a buzzer. Releasing the button cancels the tell-tale and buzzer.



**Figure 70.**

## 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 71.

### 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

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.

## NOTICE

*The Relay Reset button on the Amerex control panel is disabled (Figure 71.).*

In the event of a fire, the engine will shutdown 15 seconds after the fire system is activated. If more than 15 seconds are required to move the coach to a safe parking area, the operator can push the ENGINE OVERRULE switch, located on the second row of the LH Switch Panel. Push the button at approximately 10-12 second intervals to delay shutdown for another 15 seconds.

An audible buzzer will sound continuously during fires. This alarm will operate until the Alarm Silence button is pushed. When the Alarm Silence button has been pushed, the 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 remain illuminated until the system is serviced and the monitor is reset.

### Fault Condition

If a fault occurs in the actuator circuit, 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 72.). The manual fire button is located behind the drivers seat, on the LH side.



Figure 72.

# HEATING AND AIR CONDITIONING

## MICROMAX HVAC DISPLAY



Figure 73.

## MICROMAX HVAC SWITCHES

- 1. Driver's Fan (Defrost) Control** - Controls driver's defroster fan speed from OFF, LO, MED, HIGH.
- 2. Driver's Heat Control** - Controls driver's heat and cooling.
- 3. Parcel Rack Ventilation Switch** - The PARCEL RACK switch turns the parcel rack blowers ON and OFF.
- 4. Auxiliary Heater Switch** - When the engine is OFF, the engine can be preheated by pushing the AUXILIARY HEATER switch forward, which activates a 90 minute timer in the Proheat unit. When the Proheat burner is ON, the HEATER ON telltale lights. To turn the Proheat OFF, push the switch back. It will purge for 2 to 3 minutes. If the coach is started during preheating, the temperature-dependent control overrides the timer.

- 5. Micromate Control Panel** - The Micromate Control Panel displays the set point 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 set point temperature.

Set point 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 set point temperature. The set point temperature can be adjusted from 60F to 80F (15C to 27C).

## KEY FUNCTIONS



Turns the HVAC system ON and OFF.



Selects interior or exterior temperature display.



Selects 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.

## START-UP AND SETTINGS

The HVAC system self tests and starts automatically after the engine speed reaches idle. If the coach ignition key is ON, but the engine does not start by the end of the self test, the display will indicate “No Data” and the system will wait for the engine to start.

The main HVAC system will start at the same setting as when it was turned OFF.

When heating, the main fans will not start until the engine coolant temperature exceeds 120F (49C).

The fans start immediately when cooling.

The fans operate automatically at high, medium or low, depending on the heating or cooling requirements.

**NOTE: Turn fast idle ON if running the air conditioning while stopped.**

### 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.**

### PASSENGER ZONE

#### Default Settings

The default setting for the passenger zone is 70F (21C). The fans operate at high until the interior temperature reaches the set point.

#### Manual Settings

To change the temperature settings, press ▲ to increase or ▼ to decrease.

#### Temperature Settings

The temperature setting will be visible on the display. Pressing the AUTO key returns settings to auto control.

#### Fan Settings

The fans can be set at LOW or HIGH.

## Alarms

The display will toggle between an alarm and the temperature setting when there is a system malfunction. The system may shut down if the malfunction is serious.

**NOTE: To turn the heat OFF in an emergency, use the valves located in the engine compartment or the valve located under the driver's area. Refer to Section 6 of the Maintenance Manual.**

## HVAC PRE-TRIP INSPECTION

After starting system operation, allow the system to stabilize for ten to fifteen minutes, then check the following:

1. Listen for abnormal noises in the compressor or fan motors.
2. Check compressor oil level.
3. Check refrigerant level.
4. Ensure that the self-test has been performed successfully and that there are no errors or alarms indicated.
5. View compressor drive belt for excessive belt flap. (Refer to Section 16 of the Maintenance Manual.)

### Back-lit Function

The back-lit function of the Micromate control panel is actuated when the headlight or clearance lights are turned ON (Figure 74.).



Figure 74.

# AUDIO AND VIDEO SYSTEMS

The REI Dual Zone system has the following features:

- DVD/CD/MP3/MP4/Radio/MIC Player with USB Input,
- Aux / iPod/ USB Playback
- Bluetooth Hands Free Calling and Wireless Audio Streaming
- The CD/AM/FM radio has built-in amplifier for powering driver's speakers
- Six station pre-sets.
- Separate tone control (Dual Zone) for driver and passengers,



Figure 76.



Figure 75.

1. REI EC-750 Dual Zone Player
2. REI ECD-5500 Dual Zone Player
3. REI DVD Player
4. Wireless Microphone (Optional)
5. Media Hub (Optional)



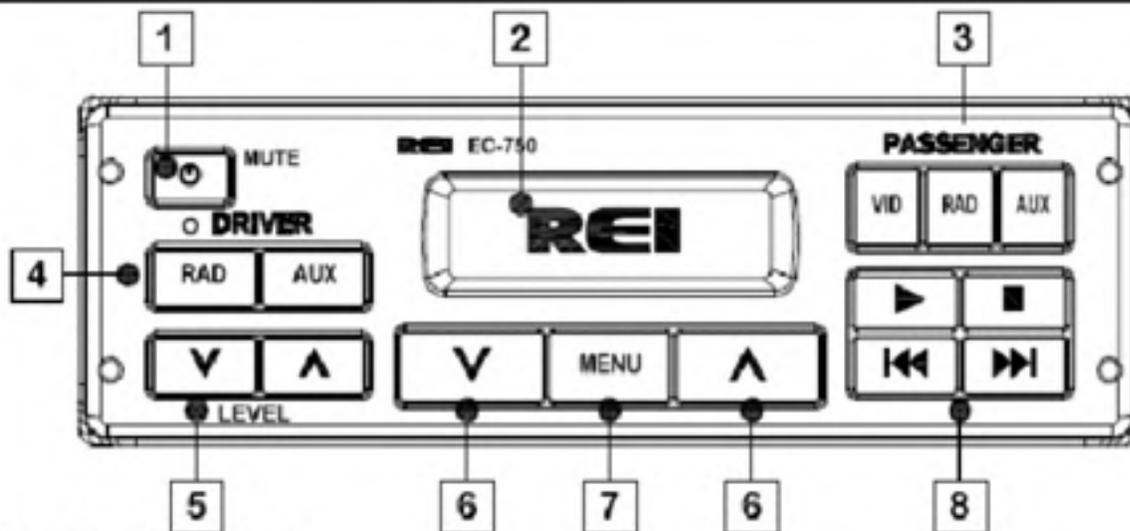
Figure 77.



Figure 78.

**MP-1000 Media Player (Optional)**

- Passenger Safety Announcements
- Custom Video Playback
- Rolling Text



### Section Overview

- 1 **POWER/MUTE:** Press and release button to turn the unit on.  
When unit is on, press and release button to Mute audio. Repeat key press to Un-mute.  
Hold button for 3 seconds to turn unit off.
- 2 **DISPLAY:** Displays the current function of the Control Module.
- 3 **PASSENGER Section:** Controls the Passenger's A/V Sources. Selections include VIDEO, RADIO, and AUX Input
- 4 **DRIVER Section:** Controls the Driver's audio. Selections include RAD (Radio) and AUX Audio Input.
- 5 **LEVEL:** Volume Controls (DOWN and UP) for Driver's audio.
- 6 **DOWN arrow and UP arrow:** Volume Controls (DOWN and UP) for passenger audio.
- 7 **MENU:** Determines which function or Menu item is being adjusted.  
Press and release cycles between Volume, Bass, Treble. Press and hold to access the Menu items.
- 8 **FUNCTION CONTROLS:** Allows control over the various functions of the system components, including PLAY, STOP, Track Back, and Track Advance.

Figure 79. REI EC-750 Dual Zone controls.

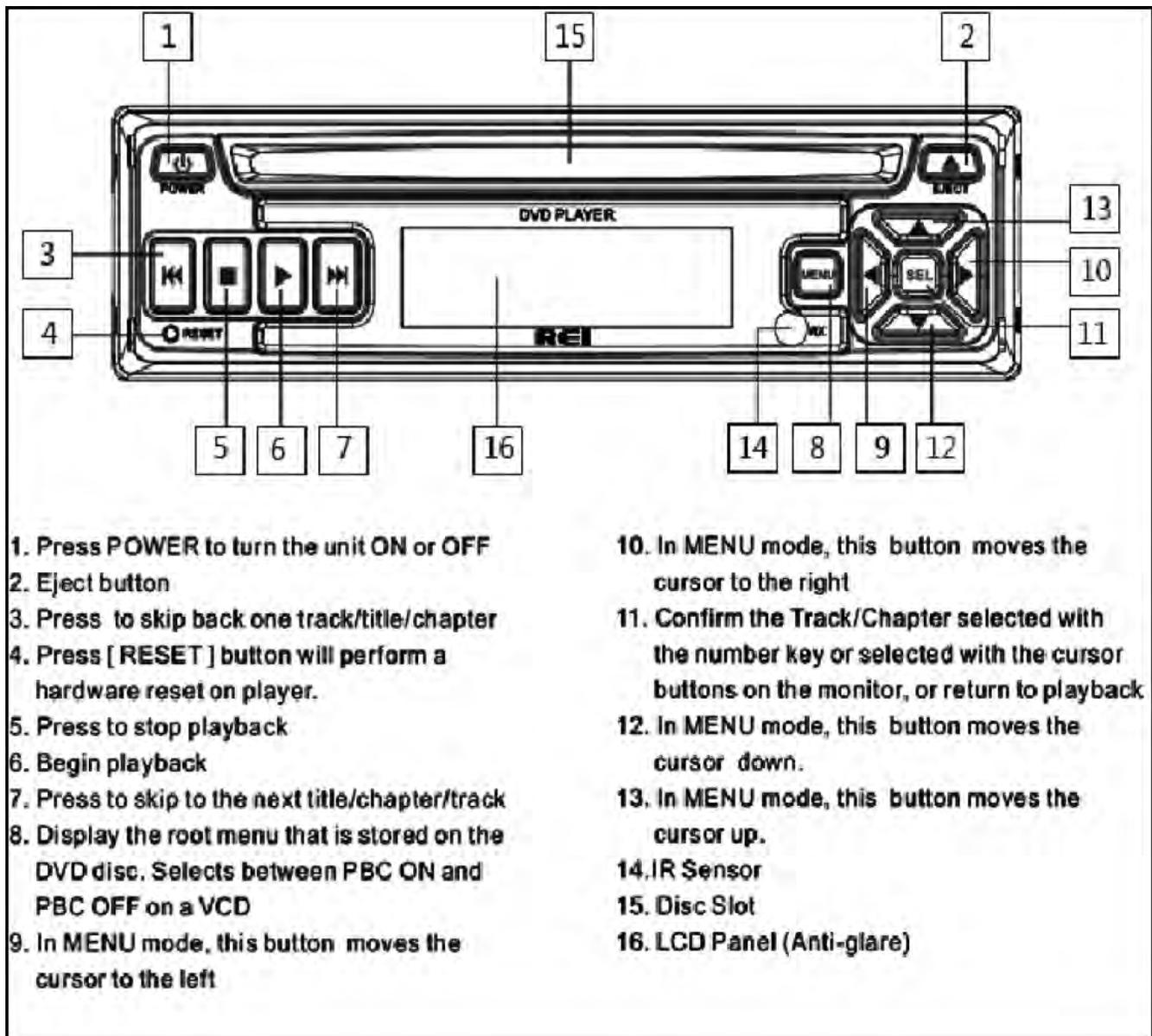
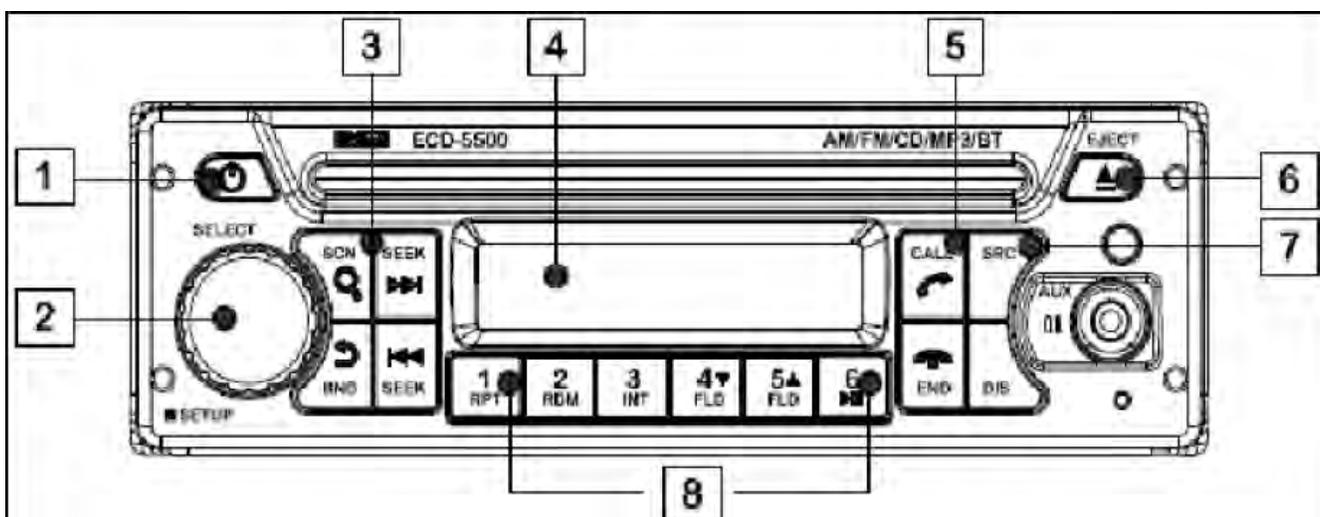


Figure 80. REI DVD Player Dual Zone controls.



- 1** POWER: Turns the Radio ON/OFF.
- 2** SELECT KNOB: Used for setup viewing and selection and iPod control.
- 3** LEFT CONTROL Section: Includes SCAN, SEEK, BAND, and iPod controls.
- 4** DISPLAY: Shows radio status.
- 5** RIGHT CONTROL Section: Includes CALL, END, DISP (display), Bluetooth controls, and MODE.
- 6** EJECT: Ejects the CD from the radio, if present.
- 7** MODE: Cycles between TUNER, WB (Weatherband), CD, USB/iPOD, BT Phone (Bluetooth Phone), BT Audio (Bluetooth Audio), AUX1, and AUX2 modes on the radio.
- 8** PRE-SETS and Playback Options: Allows User defined station pre-sets 1 through 6 and playback options such as RPT (Repeat), RDM (Random), INT (Intro), FLDR Dwn (Folder Down), FLDR Up (Folder Up), and Play/Pause.

Figure 81. REI ECD-5500 Dual Zone controls.

### REI Video Monitors

Six (6) 15.4 inch LCD monitors are installed throughout the coach cabin.

The LCD monitors have a self protection feature against extreme climate temperatures.



Figure 82.



Figure 83.

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## EXTERIOR LIGHTING (Figure 84.)

- a. Headlights
- b. Multi-function LED (sweep style), Directional Light / Hazard Light / Daytime Running Light
- c. Reflectors
- d. Identification Light
- e. Marker Light
- f. Supplemental Stop Light
- g. LED Directional Light
- h. LED Backup Light
- i. LED Stop Light
- j. License Plate Light
- k. LED Cornering Light
- l. I. Directional Light

## COMPARTMENT ACCESS (Figure 84.)

### Engine Compartment

The engine service compartment door release is in the rear, curbside, side service compartment.



**Stand clear when opening the rear engine door. It swings up.**

**Turn OFF the engine enable switch any time the engine compartment is opened.**

### Condenser Compartment

The latch is located in the roadside fuel fill door. Radiator Compartment

Open with a handle located on the road side of the rear engine compartment.

### Spare Tire Compartment

The bumper release handle is in the roadside front service compartment. Ensure sufficient clearance prior to releasing the compartment door (Figure 85.).



Figure 85.

## Front Service Compartment

The T-handle, located at the rear of the drivers lower, LH console, is utilized to release the front service compartment door.

In addition to the T handle, there is a provision for release of the front service compartment door, beside the windshield washer reservoir. This allows the compartment door release to be operated from outside the coach. Push upwards on mechanism, thru hole opening, to release compartment door latch (Figure 86. and Figure 87.).



Figure 86.

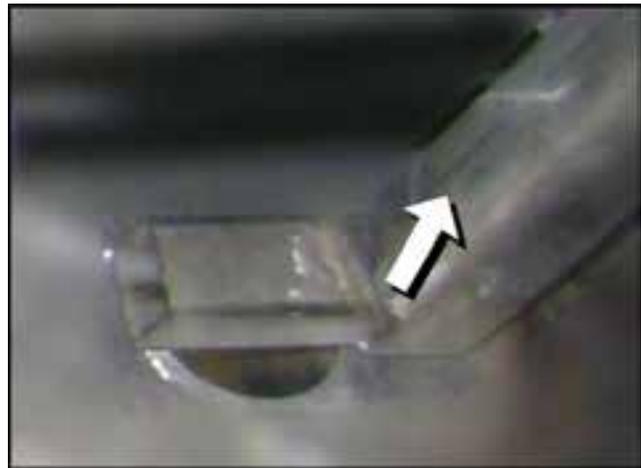


Figure 87.

## Fuel Tank

Access the fuel tank assembly through the fuel tank door on the curb side.

### Fuel Tank Filler Doors

Two diesel (ULSD) filler doors are provided: one through the condenser door on the roadside and one through the fuel tank door on the curbside.

One diesel exhaust fuel (DEF) filler door is provided next to the curbside diesel (ULSD) filler door (Figure 88.).

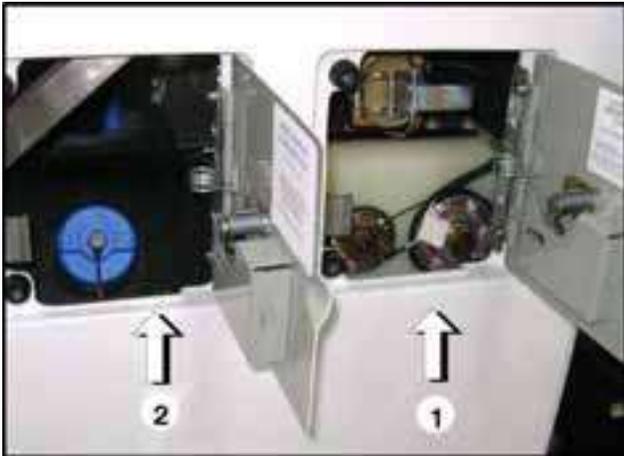


Figure 88.

1. Diesel (ULSD) Fuel Tank Filler Door
2. Diesel Exhaust Fuel (DEF) Tank Filler Door

### Auxiliary Storage / Wheelchair Lift

Located at the rear curb-side of the coach, immediately behind the trailing axle.

### Baggage Compartments

Baggage compartments are located between the front and rear axle.



**To avoid pinching fingers, do not hold the edge of the door when closing it.**

Baggage doors are locked by driver-controlled switches on the switch panel.

## COOLING SYSTEM

The engine cooling system controls the engine temperature and supplies water for the heating system. The cooling system is filled through the surge tank filler neck.

### Coolant Surge Tank

There is no coolant recovery system. Check the coolant level through the sight glass.

## TIRE CHANGE



**Do not access suspension components from the wheel wells. Unintentional actuation could cause serious injury or death.**

**NEVER go under the coach while it is raised and supported on a jack only (Figure 87.).**

**Wheel and tire assemblies weight more than 200 lbs. (90 kg). Use caution when loosening the wheel nuts, and when lifting the wheel off the hub.**



**DO NOT attempt to fit stud mount rims. DO NOT attempt to fit 8.25" rims. Only use tires that are sufficiently rated. Fit similar tires in similar condition on both sides of the axle. Only use correctly-profiled valve stems in hub-mounted 9" x 22.5" rims.**

### Front or Trailing Axle

1. Turn the front wheels straight ahead.
2. Run the flat tire up on the run-up block. Stop the coach and apply the parking brake.
3. Place the bottle jack under the axle beam so that the jack ram pad fits into the round recess at the bottom of the axle beam. Partially raise the wheel (Figure 89.).

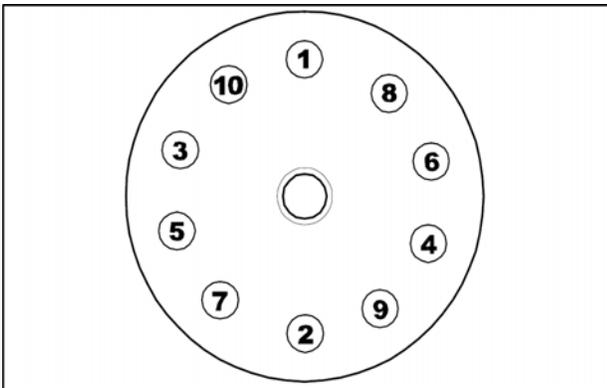


**Figure 89.**

4. Before the tire is completely off the ground, loosen the wheel nuts.
5. Raise the wheel completely, remove the run-up block, and remove the wheel nuts and the wheel and tire assembly.
6. Mount the wheel on the hub pilot.
7. Torque the wheel nuts to 450-500 ft.-lbs using the criss-cross sequence shown (Figure 90.).

**⚠ WARNING**

Re-torque wheel nuts after 100 miles.

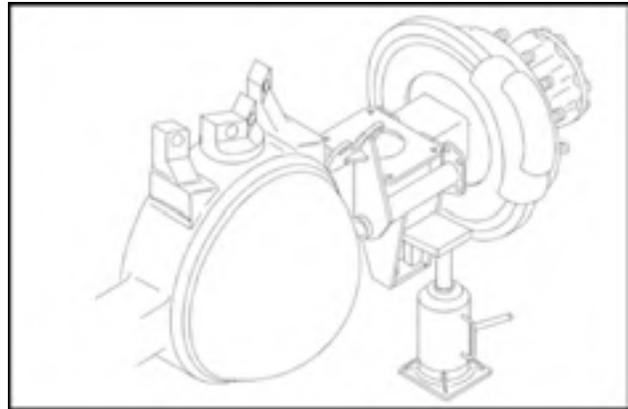


**Figure 90.**

**Drive Axle**

1. Run the inflated tire up onto the run-up block. Stop the coach and apply the parking brake.

2. Place the bottle jack under the drive axle (Figure 91.) so that the jack ram pad fits the recess at the bottom of the jacking pad. The jack pad is on the rear face of the drive axle beam below the suspension support structure attachment. Partially raise the wheel.



**Figure 91.**

3. Before the tire is completely off the ground, loosen the wheel nuts.

**⚠ WARNING**

The wheel and tire assemblies weigh more than 200 lbs. (90 Kg). Use caution when loosening the wheel nuts, and when lifting the wheel off the hub.

4. Raise the wheel completely, remove the run-up block, and remove the wheel nuts and the wheel and tire assemblies as required.

**⚠ WARNING**

The drive axle wheel nuts are hub mounted: the wheel nuts hold both the outer and inner wheels. Take care when removing the nuts and tire assemblies.

5. Ensure that both wheels are properly seated on the hub pilot before tightening the nuts fully. Torque wheel nuts to 450-500 ft.-lbs using the criss-cross sequence shown in Figure 90.

**⚠ WARNING**

Re-torque wheel nuts after 100 miles.

## FUELING

Two diesel (ULSD) fuel fillers are installed on the coach. One is located behind a filler door in the fuel tank compartment door on the curbside and the second location is on the roadside behind a filler door in the A/C condenser door (Figures 92 and 93).



Figure 92. Diesel (ULSD) Fuel Door

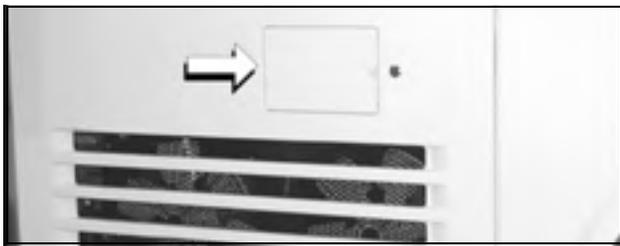


Figure 93. A/C Condenser Door

The fuel tank is equipped with a whistle that stops when the tank is full. Close filler and latch it securely.



**Do not fill the tank from both necks at once or have both fill caps open; the tank will over-fill and overflow.**

**DO NOT put anything but DEF in the DEF tank ( blue cap ).**

One diesel exhaust fuel (DEF) filler door is next to the curbside diesel (ULSD) filler door ( ).

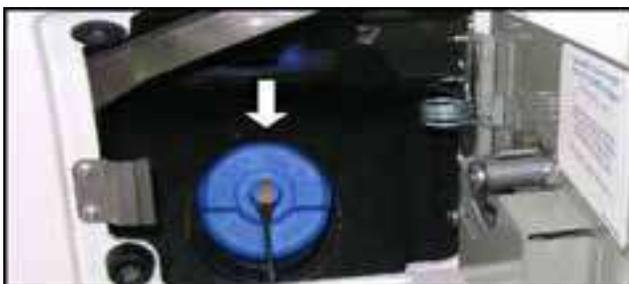


Figure 94. DEF Tank Door

## Diesel 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 2015 EPA engines will result in component damage.**

**NOTICE**

**Biodiesel not to exceed B20.**

## Diesel Exhaust Fuel (DEF) Specification

DEF must meet ISO standard 22241-1.

## AUXILIARY HEATER

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 AUX HEAT switch.

## Auxiliary Heater Diagnostics

The operator can identify function and component diagnostics by checking the light bars or number display located on the front of the control module.



Figure 95.

## FLUID REPLACEMENT

### Engine Lubricating Oil

The engine oil dipstick is accessible through the rear engine access door (Figure 100.). Always check the engine oil level with:

- the engine at normal operating temperature
- the coach on level ground
- the engine OFF.

**NOTE: Leave the engine stopped for at least 5 minutes. Do not overfill.**

Withdraw the dipstick and wipe it clean. Insert the dipstick fully, then withdraw it and read the oil level. If it is down to LOW mark, add sufficient oil to bring the level up to FULL mark.

### Power Steering Fluid

The coach has a power steering fluid reservoir in the engine compartment (Figure 100.). The reservoir has a filler nozzle, sight glass and vent tube. The correct cold level is at the center of the sight glass. (Use the dipstick in the fill cap for hot level checks.) Check levels periodically and add if necessary.



***Do not spill oil on the fan belts. The oil will cause the belt material to degrade rapidly and break.***

### Automatic Transmission Fluid - Allison

Refer to the heading "Transmission Operation" - Allison Automatic Transmission - Transmission Fluid Level Checks, for the dipstick location and transmission fluid specifications.

### Windshield Washer Reservoir

The windshield washer reservoir is in the front service compartment (Figure 96.).



Figure 96.

## NOTICE

***All fluids must be handled, stored and maintained according to the instructions on the "Waste Fluid Removal" decal. The decal is located in the rear engine compartment (Figure 97.).***

**All waste fluids and other materials, including:**

- antifreeze,
- engine, alternator, or air compressor oil,
- transmission fluid,
- diesel fuel,
- grease,
- air conditioning coolant products, and
- other environmentally hazardous products

**must be stored and maintained during and after removal in accordance with all applicable statutes, laws, and regulations.**

**Please consult with your local environmental enforcement authority for further information.**

**Failure to comply with applicable law may result in serious criminal and/or civil fines, penalties, and/or incarceration.**

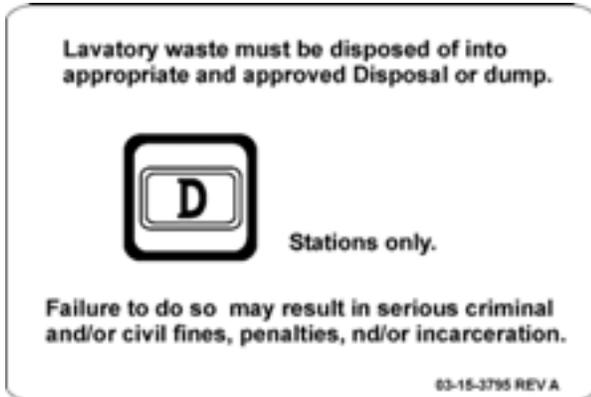
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Figure 97.

## LAVATORY TANK SERVICE PROCEDURES

### NOTICE

**Refer to local health regulations for proper disposal procedures and equipment. Lavatory waste must be disposed of according to the instructions on the “Lavatory Waste” decal. The decal is located on the inside of the curbside rear service door (Figure 98.).**



**Figure 98.**

### Draining the Lavatory Tank

1. Position the coach over a suitable sanitary sewage drain.
2. Open the dump valves (2.) and drain the tanks completely.
3. Connect a water hose to the rinse connection.
4. Close the upper dump valve and fill the upper tank.
5. Press the flush button for 30 seconds (if the coach has a flush toilet).
6. Open the dump valve and drain the tank.
7. Repeat Steps 1 to 5 until the discharged water appears clean.



**Figure 99.**

### Charging the Lavatory Tank

1. Close both dump valves and fill the primary tank with water to one-third sight glass level.



**Do not allow the lavatory chemicals to contact your skin.**

2. Add approved chemical charge to the tank.
3. If the coach has a flush toilet, test.



**J4500 ENGINE BAY & COMPONENTS**  
**Cummins ISX 2015 Engine**

**Figure 100.**

- |                                  |                                     |
|----------------------------------|-------------------------------------|
| 1. Coolant Fill, 15 psi Rad Cap  | 10. Alternator Belt                 |
| 2. Remote Electrical Control Box | 11. Fan Belt                        |
| 3. Back-up Alarm                 | 12. Aux Heater                      |
| 4. Air Filter                    | 13. Engine Oil Fill Tube / Dipstick |
| 5. Power Steering Reservoir      | 14. Filter Minder                   |
| 6. Lavatory Service Valves       | 15. Gear Box Filler Tube            |
| 7. Dual Denso Alternator, Top    | 16. Radiator Door Handle location   |
| 8. Dual Denso Alternator, Bottom | 17. Fuel Pro Fuel Filter            |
| 9. A/C Belt                      | 18. Transmission Oil Tube           |



**Figure 101.**

- |                                  |  |
|----------------------------------|--|
| 1. Coolant Fill, 15 psi Rad Cap  | 9. A/C Belt                            |
| 2. Remote Electrical Control Box | 10. Alternator Belt                    |
| 3. Back-up Alarm                 | 11. Fan Belt                           |
| 4. Air Filter                    | 12. Aux Heater                         |
| 5. Power Steering Reservoir      | 13. Engine Oil Fill Tube (2 locations) |
| 6. Lavatory Service Valves       | 14. Filter Minder                      |
| 7. Dual Denso Alternator, Top    | 15. Gear Box Filler Tube               |
| 8. Dual Denso Alternator, Bottom | 16. Radiator Door Handle location      |

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# SPECIFICATIONS

VEHICLE HEIGHT (MAXIMUM NORMAL RIDE HEIGHT).....141.25 Inches (3587 mm)  
(From Top Of Roof Hatches)

VEHICLE WIDTH (MAXIMUM) .....102 Inches (2590 mm)  
(Excludes Mirrors And Side Turn Lights)

GROSS VEHICLE WEIGHT RATING.....54,000 Lbs. (24,500 Kg)  
CAPACITIES

## CAPACITIES

DIESEL FUEL TYPE.....ULSD (ultra low sulfur diesel)

DEF (DIESEL EXHAUST FUEL) TYPE.....ISO Standard 22241-1

ENGINE CRANKCASE..... (SAE 15W-40) API Classification CJ-4

POWER STEERING SYSTEM.....7.5 Qts.(7.1 L)  
(TES-389)

AUTOMATIC TRANSMISSION.....25 Qts.(23 L)  
(TES-389)

COOLING SYSTEM.....25 Gals.(100 L)  
(Glycol-based coolant)

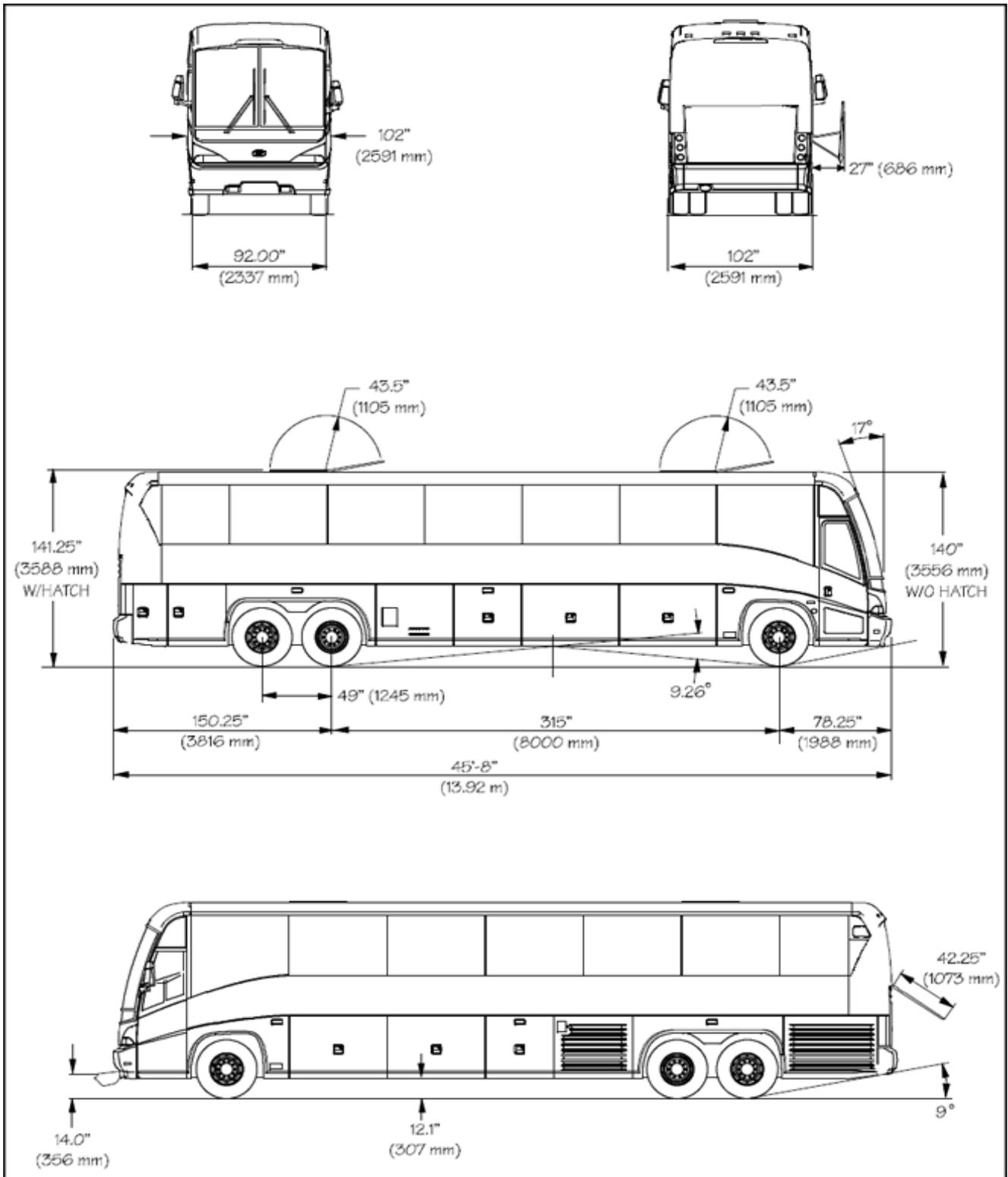
AIR CONDITIONING.....23 Lbs.(10.4 Kg)  
(R134 Refrigerant)

LAVATORY FRESH WATER TANK.....10 Gals.(37.8 L)  
LAVATORY WASTE RETENTION TANK:  
PRIMARY.....16 Gals.  
SECONDARY.....24 Gals.

PARCEL RACK (Right Side).....1184 Lbs (537 kg)  
PARCEL RACK (Left Side).....1332 Lbs (604 kg)  
BATTERIES.....8D, 1350 CCA Post type

TIRE SIZE (Basic).....315/80R22.5 on a 9.00 inch rim  
TIRE SIZE (Minimum)....."J" Rated





**Figure 102. J4500 MODEL BODY AND DOOR CLEARANCE DIAGRAM**



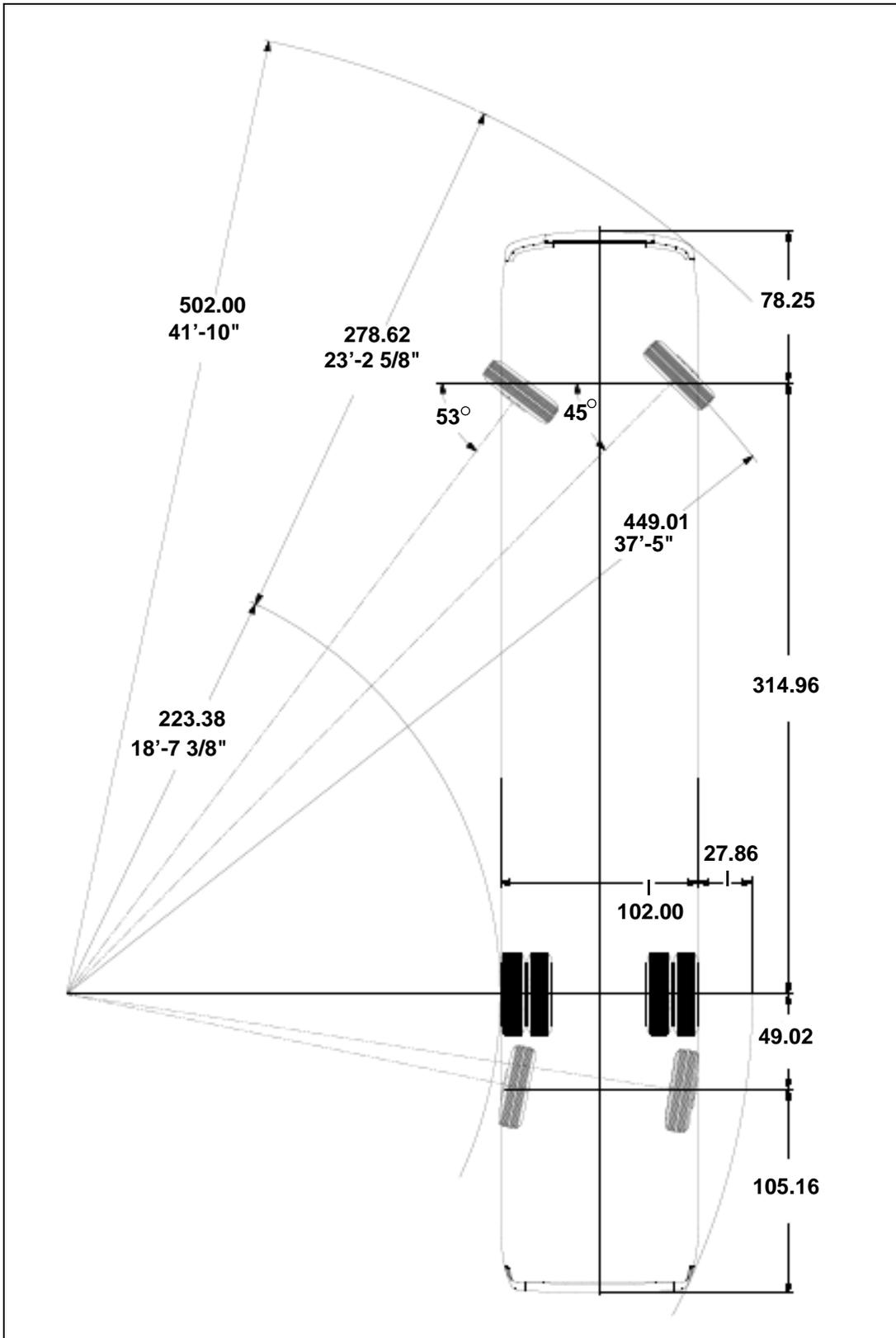


Figure 103. J4500 TURNING RADIUS

## TIRE SPECIFICATIONS

# NOTICE

**The tires listed below meet GHG regulations as LRR tires.**

**It is the owner's responsibility for tire maintenance.**

### Replacement Tires

Always replace the tires with the same rating, size and the same or better rolling resistance coefficient (CRR). Contact the tire manufacturer for tires' CRR rating.

### TIRE CHART

Make and Type	Size	Load Range	Axle	Front Pressure	Drive Pressure	Tag Pressure
Goodyear G409 MBA	B315/80R22.5	J	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Michelin XZY-2	315/80R22.5	L	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Michelin XZA2	315/80R22.5	L	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Michelin XDN2	315/80R22.5	L	Drive Axle	Not approved	100 psi (690 kPa)	Not approved
Firestone FS400	315/80R22.5	L	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Bridgestone R249	315/80R22.5	J	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Firestone HP 3000	315/80R22.5	J	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Goodyear G124 (Grip Style)	12R22.5	H	Drive Axle	Not approved	100 psi (690 kPa)	Not approved
BF Goodrich 2T234	315/80R22.5	L	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)
Matador DH1	315/80R22.5	J	Drive Axle	Not approved	100 psi (690 kPa)	Not approved
Matador FH1	315/80R22.5	J	Front/Tag Axle	120 psi (827 kPa)	Not approved	120 psi (827 kPa)
Continental HSL ECO plus	315/80R22.5	J	All Axles	120 psi (827 kPa)	100 psi (690 kPa)	120 psi (827 kPa)

TIRE SIZE (Basic).....315/80R22.5 on a 9.00 inch rim  
 TIRE SIZE (Minimum)....."J" Rated



# DIAGNOSTIC CODES / ENGINE

## DD13 DIAGNOSTIC CODES

SPN	FMI	CODE DESCRIPTION
51	2	Intake Throttle Position Deviation Error
51	3	Intake Air Throttle Circuit Failed High
51	4	Intake Air Throttle Circuit Failed Low
70	13	J1939 Park Brake Switch Signal from Source #1 is missing
70	19	J1939 Park Brake Switch Signal from Source #1 is erratic
84	0	Vehicle Speed Above Programmable Threshold1 While Driving
84	2	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is erratic
84	2	VSS Anti Tamper Detection via Virtual Gear Ratio
84	3	Vehicle Speed Sensor Circuit Failed High
84	3	Vehicle Speed Sensor Circuit Failed High
84	4	Vehicle Speed Sensor Circuit Failed Low
84	4	Vehicle Speed Sensor Circuit Failed Low
84	6	VSS Anti-Tamper Detection via ABS Vehicle Speed Comparison
84	8	VSS Anti Tamper Detection via Fixed Frequency Device
84	9	J1939 Wheel-Based Vehicle Speed Signal from Source#2 is missing
84	10	J1939 Wheel-Based Vehicle Speed Signal from Source#3 is erratic
84	11	Vehicle Speed Above Programmable Threshold2 While Driving
84	13	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is missing
84	13	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is missing
84	14	J1939 Wheel-Based Vehicle Speed Signal from Source#3 is missing
84	19	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is erratic
84	19	J1939 Wheel-Based Vehicle Speed Signal from Source#2 is erratic
84	20	Vehicle Speed Sensor Drifted High Error (VSS signal not plausible)
84	21	Vehicle Speed Sensor Erratic
84	21	Vehicle Speed Failure
91	0	Accelerator Pedal Circuit Failed High
91	3	Accelerator Pedal Signal Circuit Failed High
91	4	Accelerator Pedal Circuit Failed Low
91	13	J1939 EEC2 Message is missing
97	15	Water in Fuel
98	0	Oil Level High
98	1	Oil Level Very Low
98	18	Oil Level Low
100	1	Engine Oil Pressure Low
100	1	Oil Pressure Very Low
100	3	Engine Oil Pressure Circuit Failed High
100	4	Engine Oil Pressure Circuit Failed Low
100	17	Oil Pressure Plausibility
100	18	Oil Pressure Low
107	0	Air Filter Restriction High
108	3	Barometric Pressure Circuit Failed High
108	4	Barometric Pressure Circuit Failed Low
108	13	Ambient Air Pressure Signal Not Available via CAN
110	0	Coolant Temperature Very High
110	0	Coolant Temperature High
110	2	Coolant Outlet Temperature Not Plausible
110	3	Engine Coolant Outlet Temperature Circuit Failed High



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
110	4	Engine Coolant Outlet Temperature Circuit Failed Low
110	9	Coolant Temperature Signal Not Available via CAN
110	14	Coolant Temperature / Engine Oil Temperature Plausibility Fault
110	16	Coolant Temperature High
111	1	Coolant Level Very Low
111	3	Coolant Level Circuit Failed High
111	4	Coolant Level Circuit Failed Low
111	18	Coolant Level Low
111	19	Coolant Level Low (CAN)
120	13	J1939 Retarder Fluid Message is missing
157	7	No Description
157	16	Fuel Rail Pressure Low
157	18	Fuel Rail Pressure High
158	2	Ignition Switch Not Plausible
158	2	KI15 ignition switch status of CPC2 and MCM do not match
158	7	Keys witch battery potential SA61
164	0	Quantity Control Valve (Low Side) Error
164	1	Quantity Control Valve (High Side) Error
164	3	Rail Pressure Sensor Circuit Failed High
164	4	Rail Pressure Sensor Circuit Failed Low
164	5	Rail Pressure Sensor Circuit Failed Open
164	20	Rail Pressure Sensor - Drift High
164	21	Rail Pressure Sensor - Drift Low
168	0	Battery Voltage High
168	0	Battery Voltage High
168	0	Battery Voltage High
168	1	Battery Voltage Low
168	1	Battery Voltage Very Low
168	1	Battery Voltage Low
168	7	Opt Idle Detected Charging System or Battery Failure
168	14	ECU power-down not completed (Main Battery Terminal Possibly Floating)
168	18	Battery Voltage Low
171	2	Ambient Temperature Sensor Data Erratic
171	9	J1587 Ambient Air Temp Sensor Data Message Stopped Arriving
171	13	Ambient Air Temperature Signal Not Available via CAN
171	14	J1587 Ambient Air Temp Sensor Data Not Received This Ignition Cycle
174	0	Fuel Temperature Too High
174	2	Fuel Temperature Sensor, General Temp. Plausibility
174	3	Fuel Temperature Circuit Failed High
174	4	Fuel Temperature Circuit Failed Low
175	0	Oil Temperature High Warning
175	3	Engine Oil Temperature Circuit Failed High
175	4	Engine Oil Temperature Circuit Failed Low
175	14	Engine Oil Temperature Sensor Plausibility Fault
175	15	Oil Temperature High Pre-Warning
188	31	Idle Speed Out of range
190	0	Engine Speed High
190	9	Engine Speed Signal Not Available via CAN
191	9	J1939 ETC1 Message is missing
191	13	J1939 Transmission Output Shaft Speed Signal is missing



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
191	13	J1939 Transmission Output Shaft Speed Signal is missing
191	19	J1939 Transmission Output Shaft Speed Signal is erratic
191	19	J1939 Transmission Output Shaft Speed Signal is erratic
247	0	MCM Engine Hours Data higher than expected
247	1	MCM Engine Hours Data lower than expected
247	9	MCM Engine Hours Data not received or stopped arriving
247	10	MCM Engine Hours Data increasing at an implausible rate
247	14	MCM Reported Ash Mileage is Lower then the CPC Stored Value
411	0	EGR Differential Pressure Too High (Low Box)
411	1	EGR Differential Pressure Too Low (High Box)
411	2	EGR Delta Pressure Sensor Out Of Calibration
411	3	EGR Delta Pressure Sensor Circuit High
411	4	EGR Delta Pressure Sensor Circuit Low
411	13	EGR Delta Pressure Sensor Out Of Calibration
513	9	Actual Torque Signal Not Available via CAN
523	13	J1939 Transmission Current Gear Signal is missing
523	19	J1939 Transmission Current Gear Signal is erratic
523	19	J1939 Transmission Current Gear Signal is erratic
524	9	J1939 ETC2 Message is missing
527	9	J1939 CCVS Message is missing
558	2	Idle Validation Switch Inputs Reversed
558	3	Idle Validation Switch 1 Circuit Failed High
558	4	Idle Validation Switch 1 Circuit Failed Low
558		Idle Validation Switch 2 Circuit Failed Low
558	6	Idle Validation Switch 2 Circuit Failed High
596	13	J1939 Cruise Control Enable Switch Signal from Source #1 is missing
596	19	J1939 Cruise Control Enable Switch Signal from Source #1 is erratic
597	2	Service Brake Status Not Plausible
597	13	J1939 Service Brake Switch Signal from Source #1 is missing
597	19	J1939 Service Brake Switch Signal from Source #1 is erratic
599	4	Cruise Control SET and RESUME Circuits Failed Low
600	13	J1939 Cruise Control Coast Switch Signal from Source #1 is missing
600	19	J1939 Cruise Control Coast Switch Signal from Source #1 is erratic
602	13	J1939 Cruise Control Accelerate Switch Signal from Source #1 is missing
602	19	J1939 Cruise Control Accelerate Switch Signal from Source #1 is erratic
608	14	J1708 Data Link Failure
609	12	CPC2 Hardware Failure
625	2	Invalid Data on Engine CAN Link
625	2	Incorrect MCM System ID Received
625	4	ECAN Link Circuit Failure
625	8	MCM PT-CAN DM1 Message Not Received or has Stopped Arriving
625	8	MCM UDS DM1 Message Not Received or has Stopped Arriving
625	9	ACM PT-CAN DM1 Message Not Received or has Stopped Arriving
625	9	No Data Received from Engine CAN Link
625	14	ACM UDS DM1 Message Not Received or has Stopped Arriving
625	14	MCM System ID Not Received or Stopped Arriving
625	17	No ACM Communication - Pre Warning
625	18	No ACM Communication - Warning
628	2	EEPROM Checksum Failure
628	12	EEPROM Checksum Failure for the SCR Block



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
628	14	XFLASH Static Fault Code Memory Page Read Write Failure
628	17	1000ms ECU OS Task Timed out Prior to Completion
629	2	CPC Hardware/Software Mismatch
629	12	DDEC Data X flash Write Error. Replace CPC2.
630	13	SCR Number Out of Range
636	1	Crankshaft Position Sensor Signal Voltage Too Low
636	2	No Match of Camshaft and Crankshaft Signals
636	3	Crankshaft Position Sensor Open Circuit
636	8	Crankshaft Position Sensor Time Out
636	10	Crankshaft Position Sensor Signal Erratic
636	11	Crankshaft Position Sensor Failure
639	9	J1939 PROP11 message is missing
639	13	HDMS Fan is configured and the J1939 message was not received.
639	14	J1939 Data Link Failure
639	14	J1939 Data Link Failure
647	3	Fan Stage 1 Circuit Failed High
647	4	Fan Stage 1 Circuit Failed Low
647	5	Fan Stage 1 Circuit Failed Open
651	3	Injector Cylinder #1 Needle Control Valve Abnormal Operation (MAX)
651	4	Injector Cylinder #1 Needle Control Valve Abnormal Operation (MIN)
651	6	Injector Cylinder #1 Needle Control Valve, Valve Shorted Circuit
652	3	Injector Cylinder #2 Needle Control Valve Abnormal Operation (MAX)
652	4	Injector Cylinder #2 Needle Control Valve Abnormal Operation (MIN)
652	6	Injector Cylinder #2 Needle Control Valve, Valve Shorted Circuit
653	3	Injector Cylinder #3 Needle Control Valve Abnormal Operation (MAX)
653	4	Injector Cylinder #3 Needle Control Valve Abnormal Operation (MIN)
653	6	Injector Cylinder #3 Needle Control Valve, Valve Shorted Circuit
654	3	Injector Cylinder #4 Needle Control Valve Abnormal Operation (MAX)
654	4	Injector Cylinder #4 Needle Control Valve Abnormal Operation (MIN)
654	6	Injector Cylinder #4 Needle Control Valve, Valve Shorted Circuit
655	3	Injector Cylinder #5 Needle Control Valve Abnormal Operation (MAX)
655	4	Injector Cylinder #5 Needle Control Valve Abnormal Operation (MIN)
655	6	Injector Cylinder #5 Needle Control Valve, Valve Shorted Circuit
656	3	Injector Cylinder #6 Needle Control Valve Abnormal Operation (MAX)
656	4	Injector Cylinder #6 Needle Control Valve Abnormal Operation (MIN)
656	6	Injector Cylinder #6 Needle Control Valve, Valve Shorted Circuit
677	2	Starter Switch Inconsistent
677	3	Engine Starter Relay Shorted to High Source
677	4	Engine Starter Relay Circuit Failed Low
677	5	Engine Starter Relay Open Circuit
677	7	Engine Starter Relay - Starter Does Not Engage
679	7	Pressure Limiting Valve, Failed to Close
701	3	Digital Output 4 09 Circuit Failed High
701	4	Digital Output 4 09 Circuit Failed Low
702	3	Digital Output 3 17 Circuit Failed High
702	4	Digital Output 3 17 Circuit Failed Low
703	3	Digital Output 3 09 Circuit Failed High
703	4	Digital Output 3 09 Circuit Failed Low
704	3	Digital Output 4 07 Circuit Failed High
704	4	Digital Output 4 07 Circuit Failed Low



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
705	3	Digital Output 1 13 Circuit Failed High
705	3	Digital Output 1 13 Circuit Failed High
705	4	Digital Output 1 13 Circuit Failed Low
705	4	Digital Output 1 13 Circuit Failed Low
706	3	Digital Output 3 10 Circuit Failed High
706	4	Digital Output 3 10 Circuit Failed Low
707	3	Digital Output 2 10 Circuit Failed High (CEL / AWL Lamp)
707	4	Digital Output 2 10 Circuit Failed Low (CEL / AWL Lamp)
708	3	Digital Output 3 12 Circuit Failed High
708	4	Digital Output 3 12 Circuit Failed Low
709	3	Digital Output 3 16 Circuit Failed High
709	4	Digital Output 3 16 Circuit Failed Low
710	3	Digital Output 4 06 Circuit Failed High
710	3	Digital Output 4 06 Circuit Failed High
710	4	Digital Output 4 06 Circuit Failed Low
710	4	Digital Output 4 06 Circuit Failed Low
711	3	Digital Output 1 05 Circuit Failed High
711	4	Digital Output 1 05 Circuit Failed Low
712	3	Digital Output 1 04 Circuit Failed High
712	4	Digital Output 1 04 Circuit Failed Low
713	3	Digital Output 3 07 Circuit Failed High
713	4	Digital Output 3 07 Circuit Failed Low
713	5	Digital Output 3 07 Open Circuit
713	7	TOP2 Shift Failure
714	3	Digital Output 3 08 Circuit Failed High
714	4	Digital Output 3 08 Circuit Failed Low
714	5	Digital Output 3 08 Open Circuit
715	3	Digital Output 4 10 Circuit Failed High
723	8	Camshaft Position Sensor Time Out
723	10	Camshaft Position Sensor Signal Erratic
723	11	Camshaft Position Sensor Failure
904	9	J1939 EBC2 Message from ABS is missing
904	13	J1939 Front Axle Speed Signal is missing
904	19	J1939 Front Axle Speed Signal is erratic
972	2	Throttle inhibit switch signal not plausible due to excess vehicle speed
973	2	Evo bus 5stage retarder level position not plausible
973	9	J1939 EBC1 Message is missing
973	13	Evobus 5stage retarder level calibration not plausible
973	13	J1939 Engine Retarder Selection Signal Missing
973	19	J1939 Engine Retarder Selection Signal Erratic
974	2	Remote Accelerator Pedal Supply Voltage Out of Range
974	3	Remote Accelerator Pedal Circuit Failed High
974	4	Remote Accelerator Pedal Circuit Failed Low
979	9	J1939 PTO Message Not Received This Ignition Cycle
986	9	J1939 CM1 Message is missing
1037	0	DPF HC Absorption Very High
1037	15	DPF HC Absorption Warning
1037	16	DPF HC Absorption High
1071	3	Fan Stage 2 Circuit Failed High
1071	4	Fan Stage 2 Circuit Failed Low



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
1071	5	Fan Stage 2 Circuit Failed Open
1072	3	Jake Brake Stage 1 Circuit Failed High
1072	4	Jake Brake Stage 1 Circuit Failed Low
1072	5	Jake Brake Stage 1 Circuit Failed Open
1073	3	Jake Brake Stage 2 Circuit Failed High
1073	4	Jake Brake Stage 2 Circuit Failed Low
1073	5	Jake Brake Stage 2 Circuit Failed Open
1077	5	Quantity Control Valve Error, Current Too Low
1077	6	Quantity Control Valve, Current Too High
1077	14	Leakage in High Pressure Fuel System Too High (Leak Down Test)
1077	31	Rail Pressure Governor Error, Open Loop Error
1231	9	ACM Message Not Received or has Stopped Arriving
1267	3	Digital Output 4 10 Circuit Failed Open
1267	4	Digital Output 4 10 Circuit Failed Low
1590	9	Adaptive Cruise Control Device Reporting Error
1590	19	Adaptive Cruise Control Message Not Received
1624	9	J1939 TCO1 Message is missing
1624	13	J1939 Tachograph Vehicle Speed Signal is missing
1624	19	J1939 Tachograph Vehicle Speed Signal is erratic
1636	0	Charge Air Cooler Low Efficiency
1636	2	Engine Air Temperature - Plausibility Fault Out of Range (Low Box)
1636	3	Intake Manifold Temperature Circuit Failed High
1636	4	Intake Manifold Temperature Circuit Failed Low
1639	2	Fan Speed Fault
1659	18	Thermostat Error Detected
1663	7	Optimized Idle Safety Loop Faulted
1716	9	J1939 ERC1 Message is missing
1761	1	DEF Tank Level 0 - Empty (Speed Limited)
1761	3	DEF Tank Level Sensor Circuit Failed High
1761	4	DEF Tank Level Sensor Circuit Failed Low
1761	17	DEF Tank Level 2 - Very Low
1761	18	DEF Tank Level 1 - Empty
1761	31	DEF Tank Level 3 - Low
1814	9	VDC1 Message was not received or has stopped arriving.
1845	9	J1939 TCFG2 Message is missing
2630	2	Engine Air Temperature - Plausibility Fault Out of Range (High Box)
2630	3	Charge Air Cooler Outlet Temperature Circuit Failed High
2630	4	Charge Air Cooler Outlet Temperature Circuit Failed Low
2630	16	Charge Air Cooler Performance Monitor
2631	1	Low Air Flow
2659	0	EGR Flow Target Error Diagnostic - High Flow
2659	18	EGR Flow Target Error Diagnostic - Low Flow
2791	7	EGR Valve Actuator, Failsafe Mode, Motor On
2791	9	EGR Valve Actuator, Failsafe Mode, Motor Off
2791	10	EGR Actuator Slow Response
2791	14	EGR Valve Actuator, No Failsafe Mode, Motor Off
2791	16	EGR Valve Actuator, Temperature Fault
2797	3	Injector Needle Control Valve Cylinder 1,2,3 Shorted to Battery
2797	4	Injector Needle Control Valve Cylinder 1, 2, 3 Shorted to Ground
2798	3	Injector Needle Control Valve Cylinder 4,5,6, Shorted to Battery



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
2798	4	Injector Needle Control Valve Cylinder 4, 5, 6 Shorted to Ground
2900	9	J1939 ETC7 Message is missing
3031	2	DEF Tank Temperature - Drift
3031	3	DEF Tank Temperature Sensor Circuit Failed High
3031	4	DEF Tank Temperature Sensor Circuit Failed Low
3056	2	SCR Inlet Nox Sensor - Error
3057	2	SCR Outlet Nox Sensor - Error
3216	2	SCR Inlet Nox Sensor - Drift
3216	3	SCR Inlet Nox Sensor Circuit Failed High
3216	4	SCR Inlet Nox Sensor Circuit Failed Low
3216	13	SCR Inlet Nox Sensor Signal Not Available
3216	21	SCR Inlet Nox Sensor - Drift (Low Box)
3226	2	SCR Outlet Nox Sensor - Drift
3226	3	SCR Outlet Nox Sensor Circuit Failed High
3226	4	SCR Outlet Nox Sensor Circuit Failed Low
3226	13	SCR Outlet Nox Sensor Signal Not Available
3226	21	Nox Outlet Sensor Drift High
3236	9	Exhaust Mass Signal Not Available via CAN
3242	3	DOC Inlet Temperature Circuit Failed High
3242	4	DOC Inlet Temperature Circuit Failed Low
3242	8	DOC Inlet Temperature - Signal Spike
3242	20	DOC Temperature Drift - Inlet High or Outlet Low
3246	0	DPF Outlet Temperature - Very High
3246	3	DPF Outlet Temperature Circuit Failed High
3246	4	DPF Outlet Temperature Circuit Failed Low
3246	8	DPF Outlet Temperature - Signal Spike
3246	15	DPF Outlet Temperature - High
3246	20	DPF Outlet/SCR Inlet Temperature - Abnormal
3246	21	DPF Outlet Temperature Sensor - Not Plausible
3250	0	DOC Outlet Temperature - Very High
3250	3	DOC Outlet Temperature Circuit Failed High
3250	4	DOC Outlet Temperature Circuit Failed Low
3250	8	DOC Outlet Temperature - Signal Spike
3250	14	Abnormal DOC Temperature Rise 2
3250	15	DOC Outlet Temperature - High
3250	20	DOC Temperature Drift - Inlet Low or Outlet High
3250	31	Abnormal DOC Temperature Rise
3251	0	DPF Pressure - Out of Range Very High
3251	2	DOC Inlet Pressure Sensor - Not Plausible
3251	16	DPF Pressure - Out of Range High
3361	0	DEF Pressure Duty Cycle High
3361	1	DEF Pressure Duty Cycle Low
3361	3	DEF Dosing Valve Circuit Failed High
3361	4	DEF Dosing Valve Circuit Failed Low
3361	5	DEF Dosing Valve Circuit Failed Open
3361	7	DEF Unit - Unable to clear Restriction
3363	0	DEF Tank Temperature - High
3363	1	DEF Tank Temperature - Low
3363	3	DEF Coolant Valve Circuit Failed High
3363	4	DEF Coolant Valve Circuit Failed Low



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
3363	5	DEF Coolant Valve Circuit Failed Open
3364	1	Improper DEF Quality Final Warning
3364	2	Improper DEF Quality
3364	17	Improper DEF Quality Warning
3464	3	H Bridge 1 Circuit Shorted to Battery
3464	4	H Bridge 1 Circuit Shorted to Ground
3464	5	H Bridge 1 Circuit Open Load
3464	31	Intake Air Throttle Control Electrical Fault
3471	3	HC Doser Circuit Failed High
3471	4	HC Doser Circuit Failed Low
3471	5	HC Doser Circuit Failed Open
3480	0	Fuel Compensation Pressure High
3480	1	Doser Fuel Supply Pressure Abnormal
3480	2	Doser Fuel Line Pressure Low
3480	3	Fuel Compensation Pressure Sensor Circuit Failed High
3480	4	Fuel Compensation Pressure Sensor Circuit Failed Low
3480	14	Doser FLP Sensors Failed Self Test
3480	31	Fuel Cut Off Valve Pressure Not Plausible
3482	3	Fuel Cut Off Valve Circuit Failed High
3482	4	Fuel Cut Off Valve Circuit Failed Low
3482	5	Cut Off Valve Circuit Failed Open
3509	3	ACM Sensor Supply 1 Short to Battery
3509	3	5V Sensor Supply Bank 1 Circuit Failed High
3509	4	ACM Sensor Supply 1 Short to Ground
3509	4	5V Sensor Supply Bank 1 Circuit Failed Low
3510	3	5V Sensor Supply Bank 2 Circuit Failed High
3510	3	ACM Sensor Supply 2 Short to Battery
3510	3	Accelerator Pedal Supply Voltage Circuit Failed High
3510	4	Accelerator Pedal Supply Voltage Circuit Failed Low
3510	4	ACM Sensor Supply 2 Short to Ground
3510	4	5V Sensor Supply Bank 2 Circuit Failed Low
3510	7	Accelerator Pedal Supply Voltage Circuit Failed High
3512	3	3V Sensor Supply Bank 2 Circuit Failed High
3512	4	3V Sensor Supply Bank 2 Circuit Failed Low
3556	0	Regen Temperature - Out of Range High
3556	1	Regen Temperature - Out of Range Low
3556	18	DOC Outlet Temp Low, (Low Temp Regen)
3563	3	Intake Manifold Pressure Circuit Failed High
3511	3	3V Sensor Supply Bank 1 Circuit Failed High
3511	4	3V Sensor Supply Bank 1 Circuit Failed Low
3563	4	Intake Manifold Pressure Circuit Failed Low
3563	18	Inlet Manifold Pressure Failed Low
3563	20	Ambient and Inlet Manifold Pressure Difference (Low Box)
3597	3	High Side Digital Output 1 Circuit Failed High
3597	3	Proportional Valve Bank 1 Circuit Failed High
3597	4	Proportional Valve Bank 1 Circuit Failed Low
3597	4	High Side Digital Output 1 Circuit Failed Low
3598	3	Proportional Valve Bank 2 Circuit Failed High
3598	4	Proportional Valve Bank 2 Circuit Failed Low
3599	3	High Side Digital Output 3 Circuit Failed High



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
3599	3	MCM Internal Injector Power Supply Failed High
3599	4	High Side Digital Output 3 Circuit Failed Low
3599	4	MCM Internal Injector Power Supply Failed Low
3606	9	J1939 ESS Message is missing
3609	3	DOC Inlet Pressure Circuit Failed High
3609	4	DOC Inlet Pressure Circuit Failed Low
3610	2	DPF Outlet Pressure Sensor - Not Plausible
3610	3	DPF Outlet Pressure Circuit Failed High
3610	4	DPF Outlet Pressure Circuit Failed Low
3659	3	Injector Cylinder #1 Amplifier Control Valve Abnormal Operation (MAX)
3659	4	Injector Cylinder #1 Amplifier Control Valve Abnormal Operation (MIN)
3659	6	Injector Cylinder #1 Amplifier Control Valve, Valve Shorted Circuit
3660	3	Injector Cylinder #2 Amplifier Control Valve Abnormal Operation (MAX)
3660	4	Injector Cylinder #2 Amplifier Control Valve Abnormal Operation (MIN)
3660	6	Injector Cylinder #2 Amplifier Control Valve, Valve Shorted Circuit
3661	3	Injector Cylinder #3 Amplifier Control Valve Abnormal Operation (MAX)
3661	4	Injector Cylinder #3 Amplifier Control Valve Abnormal Operation (MIN)
3661	6	Injector Cylinder #3 Amplifier Control Valve, Valve Shorted Circuit
3662	3	Injector Cylinder #4 Amplifier Control Valve Abnormal Operation (MAX)
3662	4	Injector Cylinder #4 Amplifier Control Valve Abnormal Operation (MIN)
3662	6	Injector Cylinder #4 Amplifier Control Valve, Valve Shorted Circuit
3663	3	Injector Cylinder #5 Amplifier Control Valve Abnormal Operation (MAX)
3663	4	Injector Cylinder #5 Amplifier Control Valve Abnormal Operation (MIN)
3663	6	Injector Cylinder #5 Amplifier Control Valve, Valve Shorted Circuit
3664	3	Injector Cylinder #6 Amplifier Control Valve Abnormal Operation (MAX)
3664	4	Injector Cylinder #6 Amplifier Control Valve Abnormal Operation (MIN)
3664	6	Injector Cylinder #6 Amplifier Control Valve, Valve Shorted Circuit
3695	9	DPF Regen Inhibit MUX Switch Message Stopped Arriving
3695	13	DPF Regen Inhibit MUX Switch Message Contains SNV Indicator
3695	14	DPF Regen Inhibit MUX Switch Message Not Received this Ignition Cycle
3695	19	DPF Regen Inhibit MUX Switch Message Contains Data Error Indicator
3696	9	DPF Regen Force MUX Switch Message Stopped Arriving
3696	13	DPF Regen Force MUX Switch Message Contains SNV Indicator
3696	14	DPF Regen Force MUX Switch Message Not Received this ignition Cycle
3696	19	DPF Regen Force MUX Switch Message Contains Data Error Indicator
3711	31	Parked Regen Failed - DOC Temp In Low Preventing Dosing
3713	31	Parked Regen Failed - DOC Temp Out, Not Reaching Target Temp
3716	31	High Idle Regen - Low Temperature
3719	0	Soot Level Very High
3719	15	DPF Zone 3 Condition
3719	16	Soot Level High
3719	31	DPF Zone 2 Condition
3720	15	DPF Ash Clean Request
3936	18	DPF Pressure - Out of Range Low
4041	0	20ms ECU OS Task Locked in an Endless Loop
4041	9	20ms ECU OS Task Timed out Prior to Completion
4041	16	1000ms ECU OS Task Locked in an Endless Loop
4077	0	Doser Fuel Line Pressure High
4077	3	Doser Fuel Line Pressure Sensor Circuit Failed High
4077	4	Doser Fuel Line Pressure Sensor Circuit Failed Low



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
4077	14	Doser Fuel Line Pressure Failed Self Test
4193	2	Coolant Inlet Temperature Not Plausible
4193	3	Engine Coolant Inlet Temperature Circuit Failed High
4193	4	Engine Coolant Inlet Temperature Circuit Failed Low
4193	10	Coolant Temperature Sensors not Plausible
4257	3	Injector Amplifier Control Valve Cylinder 1, 2, 3 Shorted to Battery
4257	4	Injector Amplifier Control Valve Cylinder 1, 2, 3 Shorted to Ground
4258	3	Injector Amplifier Control Valve Cylinder 4, 5, 6 Shorted to Battery
4258	4	Injector Amplifier Control Valve Cylinder 4, 5, 6 Shorted to Ground
4334	2	DEF Pressure Sensor - Drift
4334	3	DEF Pressure Sensor Circuit Failed High
4334	4	DEF Pressure Sensor Circuit Failed Low
4334	7	DEF Pressure Low
4334	17	DEF Purge Pressure High
4335	1	DEF Air Pressure Not Detected (from vehicle supply)
4335	2	DEF Air Pressure Sensor - Drift
4335	3	DEF Air Pressure Sensor Circuit Failed High
4335	4	DEF Air Pressure Sensor Circuit Failed Low
4335	7	DEF Air Pressure Low
4335	14	DEF - Information Only
4335	31	DEF - Information Only
4336	3	DEF Air Valve Circuit Failed High
4336	4	DEF Air Valve Circuit Failed Low
4336	5	DEF Air Valve Circuit Failed Open
4337	2	DEF Dosing Unit Temperature - Drift
4337	3	DEF Temperature Sensor Circuit Failed High
4337	4	DEF Temperature Sensor Circuit Failed Low
4353	3	Diffuser Heater Circuit Failed High
4353	4	Diffuser Heater Circuit Failed Low
4353	5	Diffuser Heater Open Circuit
4354	3	SCR Line Heater #1 Circuit Failed High
4354	4	SCR Line Heater #1 Circuit Failed Low
4354	5	SCR Line Heater #1 Open Circuit
4355	3	SCR Line Heater #2 Circuit Failed High
4355	4	SCR Line Heater #2 Circuit Failed Low
4355	5	SCR Line Heater #2 Circuit Failed Open
4356	3	SCR Line Heater #3 Circuit Failed High
4356	4	SCR Line Heater #3 Circuit Failed Low
4356	5	SCR Line Heater #3 Circuit Failed Open
4357	3	SCR Line Heater #4 Circuit Failed High
4357	4	SCR Line Heater #4 Circuit Failed Low
4357	5	SCR Line Heater #4 Circuit Failed Open
4358	3	DEF General Heater Circuit Failed High
4358	4	DEF General Heater Circuit Failed Low
4358	5	DEF General Heater Circuit Failed Open
4360	3	SCR Inlet Temperature Sensor Circuit Failed High
4360	4	SCR Inlet Temperature Sensor Circuit Failed Low
4360	8	SCR Inlet Temperature - Signal Spike
4360	20	SCR Inlet Temperature Sensor Drift High in Range
4363	0	SCR Outlet Temperature High



## DD13 DIAGNOSTIC CODES

<u>SPN</u>	<u>FMI</u>	<u>CODE DESCRIPTION</u>
4363	3	SCR Outlet Temperature Sensor Circuit Failed High
4363	4	SCR Outlet Temperature Sensor Circuit Failed Low
4363	8	SCR Outlet Temperature - Signal Spike
4363	20	SCR Outlet Temperature Sensor Drift High in Range
4364	1	SCR NOX Conversion Efficiency Very Low
4364	18	SCR NOX Conversion Efficiency Low
4375	3	DEF Pump Circuit Failed High
4375	4	DEF Pump Circuit Failed Low
4375	5	DEF Pump Circuit Failed Open
4375	6	DEF Pump Supply Current High
4752	0	EGR Cooler Low Efficiency
4752	31	EGR Cooler Performance Monitor
5016	3	Coolant Valve Supply Voltage Failed High
5016	4	Coolant Valve Supply Voltage Failed Low
5017	3	High Side Digital Output 5 Circuit Failed High
5017	4	High Side Digital Output 5 Circuit Failed Low
5246	0	Regulatory Fault Ignored - Final Action (Speed Limit)
5246	15	Regulatory Fault Ignored - De-rate On
5246	16	Regulatory Fault Ignored - Final Action Pending
5298	14	SCR Abnormal Temperature Rise
5357	16	Fuel Quantity High Detected
5357	18	Fuel Quantity Low Detected
5397	31	DPF Regen Too Often
520231	13	Fuel Mass Signal Not Available via CAN
520232	9	NOx Mass Signal Not Available via CAN
520249	4	SCR Inlet Temperature High



## CUMMINS 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 (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.
91 (3)	Accelerator Pedal or Lever Position Sensor 1 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 (2)	Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect.	The engine will only idle.
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.
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.
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.

## CUMMINS Diagnostic Codes - Continued

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 (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 (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.
102 (2)	Intake Manifold 1 Pressure - Data Erratic, intermittent, or Incorrect.	Engine power derate.
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 and 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 (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 (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.
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 (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 (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 Severe 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.
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.
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.
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.
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.
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.
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.
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.



## CUMMINS Diagnostic Codes - Continued

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 shut-down.
632 (3)	Engine Fuel Shutoff Valve Driver Circuit- Voltage Above Normal or Shorted to High Source.	Fuel shutoff valve may not open when key-switch is in ON position, or may not close when keyswitch is in OFF position.
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 (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.

## CUMMINS Diagnostic Codes - Continued

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 possibly 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 possibly 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 possibly misfire or run rough.
658 (7)	Engine Injector Cylinder #06 - Mechanical System Not Responding Or Out Of Adjustment	
662 (6)	Injector Solenoid Driver Cylinder 2 Circuit - Current Above Normal or Grounded Circuit.	Current to injector is shut off. Engine can possibly 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	
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.



## CUMMINS Diagnostic Codes - Continued

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.
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 (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.

## CUMMINS Diagnostic Codes - Continued

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.
1590 (2)	Adaptive Cruise Control Mode - Data Erratic, Intermittent, or Incorrect.	Adaptive cruise control will not operate. Standard cruise control may not operate
1639 (2)	Fan Speed - Data Erratic, Intermittent, or Incorrect.	The fan will only be in the ON or OFF position.
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.
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.
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.



## CUMMINS Diagnostic Codes - Continued

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.
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 (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.
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.
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.
3216 (4)	Aftertreatment 1 Intake NOx -Voltage Below Normal, Or Shorted To Low Source	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.
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.

## CUMMINS Diagnostic Codes - Continued

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 Temp 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.
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.
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 (16)	Aftertreatment 1 Diesel Particulate Filter Differential Pressure -Data Valid But Above Normal Operating Range-Moderate Severe Level	Refer to vendor manual.
3360 (12)	Aftertreatment 1 Diesel Exhaust Fluid Controller Bad Intelligent Device Or Component	Refer to vendor manual.
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.
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 -Volt Below Normal, Or Shorted To Low Source	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.



## CUMMINS Diagnostic Codes - Continued

3480 (4)	Aftertreatment 1 Fuel Pressure 1 Voltage Below Normal, Or Shorted To Low Source	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.
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.
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.
3597 (18)	ECU Power Output Supply Voltage #1 Data Valid But Below Normal Operating Range - Moderately Severe Level	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.
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.

## CUMMINS Diagnostic Codes - Continued

5246 (0)	Aftertreatment SCR Operator Inducement Severity -Data Valid But Above Normal Operational Range -Most Severe Level	Refer to vendor manual.
5285 (18)	Engine CAC 1 Efficiency Data Valid But Below Normal Operating Range -Mod. 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 DEF Dosing Valve -Mechanical System Not Respond Or Out Of Adjustmnt	Refer to vendor manual.
5397 (31)	Aftertreatment 1 Diesel Particulate Filter Regeneration too Frequent -Condition Exists	Refer to vendor manual.
5491 (3)	Aftertreatment 1 DEF Line Heater Relay Voltage Above Normal, Or Shorted To High Source	Refer to vendor manual.
5480 (16)	Aftertreatment 1 DEF Controller Temp.-Data Valid But Above Normal Op. Range -Moderately Severe Level	Refer to vendor manual.
5491 (4)	Aftertreatment 1 DEF Line Heater Relay Voltage Below Normal, Or Shorted To Low Source	Refer to vendor manual.
5491 (5)	Aftertreatment 1 DEF Line Heater Relay Current Below Normal Or Open Circuit	Refer to vendor manual.
5491 (7)	Aftertreatment 1 DEF Line Heater Relay - Mech. System Not Responding Or Out Of Adjustment	Refer to vendor manual.
5571 (7)	High Pressure Commn Rail Fuel PRV -Mech. System Not Responding Or Out Of Adjustmnt	Refer to vendor manual.
5571 (0)	High Pressure Common Rail Fuel PRV -Data valid but above normal operational range, Most Severe Level	Refer to vendor manual.
5585 (18)	Engine Injector Metering Rail 1 Cranking Pressure Data valid, but below normal operational range - Moderately Severe Level	Refer to vendor manual.
5603 (9)	Cruise Control Disable Command Abnormal Update Rate	Refer to vendor manual.
5603 (31)	Cruise Control Disable Command Condition Exists	Refer to vendor manual.



## CUMMINS Diagnostic Codes - Continued

5605 (31)	Cruise Control Pause Command Condition Exists	Refer to vendor manual.
5742 (3)	Aftertreatment DPF Temperature Sensor Module Voltage Above Normal or Shorted to High Source	Refer to vendor manual.
5742 (4)	Aftertreatment DPF Temperature Sensor Module Voltage Below Normal or Shorted to Low Source	Refer to vendor manual.
5742 (9)	Aftertreatment Diesel Particulate Filter Temperature Sensor Module Abnormal Update Rate	Refer to vendor manual.
5742 (11)	Aftertreatment Diesel Particulate Filter Temperature Sensor Module Root Cause Not Known	Refer to vendor manual.
5742 (12)	Aftertreatment Diesel Particulate Filter Temperature Sensor Module Bad Intelligent Component	Refer to vendor manual.
5742 (16)	Aftertreatment DPF Temp. Sensor Module Data valid, Above Normal Operational range-Mod. Severe Level	Refer to vendor manual.
5743 (3)	Aftertreatment SCR Temperature Sensor Module Voltage Above Normal, or Shorted to High Source	Refer to vendor manual.
5743 (4)	Aftertreatment SCR Temperature Sensor Module Voltage Below Normal, or Shorted to Low Source	Refer to vendor manual.
5743 (9)	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module Abnormal Update Rate	Refer to vendor manual.
5743 (11)	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module Root Cause Not Known	Refer to vendor manual.
5743 (12)	Aftertreatment SCR Temperature Sensor Module Bad Intelligent Component	Refer to vendor manual.
5743 (16)	Aftertreatment SCR Temp. Sensor Module Data valid, Above Normal Operational Range-Mod. Severe Level	Refer to vendor manual.
5745 (3)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Heater Voltage Above Normal, or Shorted to High Source	Refer to vendor manual.
5745 (4)	Aftertreatment 1 DEF Dosing Unit Heater Voltage Below Normal, or Shorted to Low Source	Refer to vendor manual.
5745 (18)	Aftertreatment 1 DEF Dosing Unit Heater Voltage Below Normal Operating Range - Mod. Severe Level	Refer to vendor manual.
5746 (3)	Aftertreatment 1 DEF dosing Unit Heater Relay Voltage Above Normal, or Shorted to High Source	Refer to vendor manual.
5746 (4)	Aftertreatment 1 DEF dosing Unit Heater Relay Voltage Below Normal, or Shorted to Low Source	Refer to vendor manual.

## CUMMINS Diagnostic Codes - Continued

5798 (2)	Aftertreatment 1 DEF Dosing Unit Heater Temperature Data Erratic, Intermittent or Incorrect	Refer to vendor manual.
5798 (10)	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature Abnormal rate of Change	Refer to vendor manual.
5848 (4)	Aftertreatment 1 Outlet NH3 Voltage Below Normal, or Shorted To Low Source	Refer to vendor manual.
5848 (10)	Aftertreatment 1 Outlet NH3 Abnormal Rate of Change	Refer to vendor manual.
5848 (12)	Aftertreatment 1 Outlet NH3 Bad Intelligent Device or Calibration	Refer to vendor manual.
5848 (13)	Aftertreatment 1 Outlet NH3 Out of Calibration	Refer to vendor manual.
6303 (3)	Voltage Above Normal, or Shorted To High Source	Refer to vendor manual.
6303 (4)	Voltage Below Normal, or Shorted To Low Source	Refer to vendor manual.



# DIAGNOSTIC CODES/TRANSMISSION

## ALLISON GEN V B500 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.

CODE	CAUSE
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	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	Transmission 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
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
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
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 Incompatability with Gear Shift Control Module 1
U0333	Software Incompatability 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/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 Temperature	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	Condenser 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/AMEREX

## AMEREX FIRE SUPPRESSION SYSTEM DIAGNOSTIC CODES

### AMEREX Code

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



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	

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Road Safety and Motor Vehicle Regulation Directorate, Transport Canada, Tower C, Place de Ville, 330 Sparks Street, Ottawa, Ontario, K1A 0N5