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# **IC Bus® Propane Autogas CE Series**

## **Operation and Maintenance Manual**

**IC Bus, LLC**

2701 Navistar Drive, Lisle, IL 60532 USA

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## IMPORTANT

The information, specifications, and illustrations contained in this manual are based on data that was current at the time of publication. IC Bus, LLC reserves the right to make changes and/or improvements at any time without notification, liability, or without applying those changes or improvements to vehicles previously manufactured and/or sold.

### NOTICE

Be advised that this motor vehicle may be equipped with computer / recording devices. Their function is to allow an authorized individual to download data or information relating to the operation or performance of this vehicle.

The stored data or information may be neither downloaded nor retrieved except by the vehicle's registered owner, or, in the alternative, by another individual or entity authorized by the registered owner (e.g., IC Bus® dealer) who may need this data or information to properly service or diagnose this vehicle for repair or following an accident.

Any access to this information without the owner's consent may be in violation of law and may subject that person or entity to criminal penalties.

### CALIFORNIA

#### Proposition 65 Warning



**WARNING** Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel)

Battery posts, terminals and other related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Wash hands after handling.

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## IMPORTANT

It is important that the applicable vehicle identification number (VIN), engine serial number and or component feature codes are recorded. These numbers are required to obtain pertinent information for this vehicle or engine.

### VEHICLE IDENTIFICATION NUMBER (VIN)

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### CUSTOMER ASSISTANCE CENTER

1-800-44-TRUCK (1-800-448-7825)

### ENGINE

Feature Code:

Serial Number:

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### Navistar, Inc.

2701 Navistar Drive  
Lisle, IL 60532 USA  
[www.navistar.com](http://www.navistar.com)

### FRONT AXLE

Feature Code:

Serial Number:

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### IC Bus, LLC

2701 Navistar Drive  
Lisle, IL 60532 USA  
[www.navistar.com](http://www.navistar.com)

### REAR AXLE

Feature Code:

Serial Number:

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### TRANSMISSION

Feature Code:

Serial Number:

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## SECTION 1 — INTRODUCTION

### Preface

All IC Bus® buses are engineered and manufactured to provide economical and trouble-free service. It is the owner's responsibility to make sure the bus receives proper care and maintenance.

Making modifications to various parts, components and systems of your bus can adversely affect the quality and reliability of your vehicle. IC Bus does not recommend making modifications to this bus.

This manual provides information needed to understand the operation of your bus and its safety features. It also contains information necessary for the proper operation and maintenance of various bus body and chassis systems.

Do not operate this bus until you are completely familiar with the contents of this manual. Keep this manual in your bus for reference. If you sell the bus, make sure this manual stays with it.

**Optional Features.** This manual describes many optional features that may not be installed in this vehicle.

### Cautions / Warnings / Notes

Cautions, Warnings and Notes are included throughout this manual.



#### CAUTION

**Cautions advise you of the proper care to be taken to prevent damage to your vehicle or property.**



#### WARNING

**Warnings advise you of hazards, the consequences, and what to do to prevent them, not only to prevent damage to your vehicle or property, but to help prevent situations and occurrences that could result in personal injury or death.**

**NOTE:** Notes indicate an operation, procedure or instruction that is important for correct service.

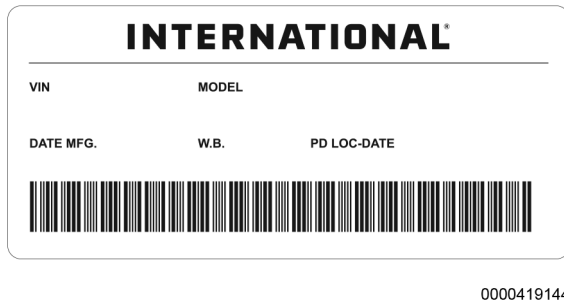
## Introduction

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### Vehicle Identification

It is important that you record the Vehicle Identification Number (VIN), Component Code Numbers, and Serial Numbers. Use these numbers to obtain parts and information for your bus.

**NOTE:** The following illustration represents a typical VIN tag. The actual VIN tag may vary.



### Assistance Guide

IC Bus believes that every customer is entitled to the best service, both from the product itself and from the firm who sells and services that product.

If for any reason, you do not feel you are receiving these services for the operation of your vehicle or the sales transaction, return

to your selling dealer to correct these matters. If the matter is not resolved at that time:

- Contact a member of management at the Dealership to discuss the details of the difficulty. In most cases a problem can be resolved to your satisfaction by the owner or manager.

When parts are required, always provide the Component Code Number, vehicle model and Vehicle Identification Number. Ask your salesperson to assist you in obtaining this information.

For more information not given in this manual, or if you require services of trained service personnel, we urge you to contact a nearby IC Bus® or International® dealer or phone 1-800-44-TRUCK (87825) for assistance.

### Component Code Numbers

Code numbers are the basis for identifying the components used on your IC Bus® bus. They are used by sales personnel to order the bus, by manufacturing to build it, and by parts to service the bus. Many items in this manual are identified by codes.

Code numbers are a combination of numbers and / or letters. These codes are listed on the Vehicle Line Set Ticket which is sometimes called the Vehicle Specification Card or Code Sheet.

### Line Set Ticket

Each vehicle has a Line Set Ticket (Code Sheet) which lists the identification code numbers of components used to build the vehicle.



A copy of the Line Set Ticket is included in the literature provided with the vehicle. When replacement parts are required, use this copy to positively identify vehicle components to make sure you get the correct parts.

## **Vehicle Storage Instructions**

When a vehicle is not used for an extended period of time, precautions must be taken to prevent deterioration of vehicle components. Vehicles that are out of service for extended periods of time can experience corrosion and other undesirable effects. Drive vehicle monthly to exercise the brakes, driveline and steering. Run the vehicle long enough for the engine to reach operating temperature.

**NOTE: For propane autogas related storage and handling information, refer to the following National Fire Protection Association (NFPA) document:**

- **NFPA 58: Liquefied Petroleum Gas Code**

**NOTE: Losses occurring to a unit while it is in storage will not be considered for warranty reimbursement.**

### **Storage Duration – One Month or Less**

1. Wash vehicles as necessary. Always wash vehicles that have been exposed to road salt.

**NOTE: Washing Instructions - Wash the vehicle with warm water and mild soap, then wipe wet surfaces with a chamois or soft cloth. DO NOT use hot water or strong soaps or detergents. DO NOT wash the vehicle in direct sun, or when the sheet metal is hot to the touch. This will streak the finish. DO NOT wipe dirt off dry surfaces, as this will scratch the finish.**

**NOTE: When vehicles are stored outside, particularly in coastal areas (salt water and high humidity atmosphere) or other areas of corrosive environment, paint and bright metal may require frequent washing and waxing to prevent deterioration. Determining washing frequency is the customer's responsibility.**

**NOTE: For vehicles exposed to ultraviolet rays of the sun, apply a coating of Bon-Ami® soap, or similar product, to the inside surfaces of the windshield and windows, to shade the interior and prevent fading of the interior trim.**

2. Inspect painted surfaces; touch up all exposed primed or raw metal areas to prevent rust.
3. Apply a thick coat of wax to prevent discoloration from the elements; wax all chrome and stainless steel metal parts.
4. Check the radiator coolant for proper level and adequate freeze protection (-20°F [-29°C] is standard for medium duty models and bus chassis; -40°F [-40°C] is standard for heavy duty models.)
5. Drain air brake reservoirs and close the drain cocks.
6. Lubricate all exposed transmission and auxiliary transmission shift rails.

## Introduction

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7. Check state-of-charge eye in batteries and re-charge if open circuit voltage is below 12.6 volts. Disconnect battery ground cables to prevent accidental starting, or parasitic electrical loads from discharging the battery.

### Storage Duration—Over One Month

Units in storage longer than one month should be driven until the engine reaches operating temperature:

1. Make sure all tires are inflated properly, and reconnect batteries.
2. Check all vehicle fluid levels and fill as required.
3. Start and run the vehicle at fast idle, until it reaches operating temperature. To remove surface charge from the battery, built up from previous start-ups and short idle periods, operate the heater and / or air conditioner, headlights, and other accessories for several minutes.
4. Turn OFF heater and / or air conditioner and any other accessories; shut off the headlights. Park the vehicle and shut off the engine.
5. Perform the procedure for **Storage Duration - One Month or Less**, if returning the vehicle to storage.

**NOTE: After every 30 additional days of storage, perform Items 1 through 5.**

### Storage Facilities

1. Whenever possible, store vehicles indoors, protected from sunlight, in a dry, well ventilated

area. If indoor storage is not available, select storage lots to eliminate conditions that cause deterioration.

2. Park away from transformers and / or electrical motors, because when the protective wax in tire compound cracks, ozone in the air attacks the exposed areas.
3. Park away from trees, high weeds and / or grass to prevent damage from tree or weed sap, and to minimize bird and insect stains.
4. Park away from railroad tracks, paint shops, smoky industrial areas, and locations of possible road splash contact.
5. If a vehicle is parked on an incline, install wheel chocks.

## Reporting Safety Defects

### U.S. Registered Vehicles

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying IC Bus.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or IC Bus.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to <http://www.safercar.gov>; or write to: Administrator, NHTSA, 400 Seventh Street, SW. Washington, DC 20590. You can also obtain other information about your motor vehicle safety from [www.safercar.gov](http://www.safercar.gov).

### **Canadian Registered Vehicles**

If you believe that your vehicle has a defect which could cause injury or death, to the operator, passengers or persons outside the vehicle, immediately inform Transport Canada in addition to notifying IC Bus.

To contact Transport Canada, Defect Investigations and Recalls you may call 800-333-0510 or write to: Transport Canada, ASFAD, Place de Ville Tower C, 330 Sparks Street, Ottawa Ontario, K1A 0N5.

### **Safety Recalls and Authorized Field Changes**

Safety Recalls and Authorized Field Changes are two campaigns that are used to notify owners of modifications that may involve their vehicle. If you receive such notification, PLEASE FOLLOW ALL INSTRUCTIONS PROVIDED IN THE CUSTOMER LETTER. If your vehicle is part of a Safety Recall campaign, the recall service procedure must be completed to ensure safe operation of your vehicle. As a vehicle owner, you must provide IC Bus dealers with address corrections and changes to ensure that you receive all notifications. Please verify that your IC Bus® dealer has your correct address. Dealers also have a record of any outstanding campaigns that affect your vehicle.

## **Emission Control Systems**

**NOTE: Federal and California Emission system warranties are found in your Engine Operation and Maintenance Manual.**

### **HD-OBD Foreword**

Heavy Duty On-Board Diagnostics (HD-OBD) is a U.S. Government mandated standard for all 2013 and later Class 4 and above vehicles with a Gross Vehicle Weight Rating (GVWR) of 14,001 pounds or more. The HD-OBD system monitors the engine and aftertreatment systems to verify they are operating within emissions limits. If an emissions fault is logged, the Malfunction Indicator Lamp (MIL) will illuminate and one or more fault codes will be set.

The HD-OBD system operates similarly to previous power train control systems by storing fault codes and turning ON the MIL. If the problem that caused the fault goes away, the code will clear and the MIL will go out after certain operating conditions have been met. This may take several times operating the vehicle.

### **Supplemental Federal Emission Control System Warranty**

The United States Environmental Protection Agency adopted new heavy-duty Greenhouse Gas (GHG) vehicle regulations on 15 September 2011. This vehicle may be certified to the GHG regulations. For certified vehicles, additional GHG emissions control system warranty covers certain vehicle components.

## Introduction

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This Supplemental GHG Federal Emission Control System Warranty coverage for these vehicle components will be managed according to current Federal Emission Control System Warranty process. The GHG emission control system warranty applies to the below listed vehicle components such that they meet the following two conditions:

1. The vehicle and / or GHG emission control system component is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of the GHG regulations and such component is an emission control and appears on the GHG vehicle emission certification label.
2. The vehicle and / or GHG emission control system component is free from defects in materials and workmanship that cause the vehicle to fail to conform to the GHG requirements during the applicable supplemental warranty period.

### **GHG Emission Control System Warranty Period**

The GHG emission control system warranty period begins on the date the new GHG certified vehicle is delivered to you. The period of coverage is the greater of the base mechanical warranty or:

- Five (5) years or 50,000 miles, whichever comes first, for spark-ignition and light heavy-duty diesel vehicles with GVWR below 19,500 pounds.

- Five (5) years or 100,000 miles, whichever comes first, for medium and heavy heavy-duty vehicles with GVWR equal to or greater than 19,500 pounds.
- Two (2) years or 24,000 miles, whichever comes first, for tires.

### **Additional Components Covered**

#### **Applies to all certified models:**

The GHG emission-related warranty covers the following components such that they meet the two conditions listed above:

1. Hybrid system components (where applicable)
2. Components whose failure would increase a vehicle's evaporative emissions (for vehicles subject to evaporative emission standards)
3. Tires

#### **Applies only to certified vehicles equipped with innovative technologies**

The GHG emission-related warranty covers components certified as innovative technologies which are part of the certified emission controls. Please contact your authorized IC Bus or International Dealer for further information.

### **Supplemental Federal Emission Control System Maintenance, Repair, And Replacement**

Your vehicle may comply with the Greenhouse Gas (GHG) regulations adopted by the Environmental Protection Agency on 15 September 2011. As owner or operator of a GHG compliant vehicle, your vehicle and GHG emissions control system components should be properly maintained in good working order.

Repair and replacement of GHG emission control system components should be done to original vehicle manufacturers'

specifications to ensure proper function of the vehicle. Tire replacement should be to tires with GHG emission performance as good, or better, than tires originally equipped on the vehicle. Consult with the tire manufacturer for tire specifications.

The United States Environmental Protection Agency allows limited modification of your vehicle and its GHG emission control system components. Please refer to applicable regulations for allowable and prohibited modifications.



## SECTION 2 — VEHICLE INSPECTION GUIDE

### Introduction

A pre-trip inspection, in accordance with Commercial Driver's License (CDL) regulations, the Department of Transportation (DOT) and state regulations, is absolutely necessary before you can begin the first route of the day. The routine can vary from bus to bus, but it is essential to have a routine and follow it. The following inspections may include checks that are in addition to the CDL requirements. If the pre-trip inspection reveals a problem, report it to the service department or a qualified technician so that it can be repaired before operating the vehicle.

After returning from your daily routes, you must complete a written inspection report in accordance with CDL regulations. Report any faults that you find, or any problems that occurred during your trip, to the service department so that they can be repaired before the next trip.

**NOTE:** Make sure your bus is in proper operating condition to keep the passengers safe.

**NOTE:** The driver's window cannot be unlocked from the outside.

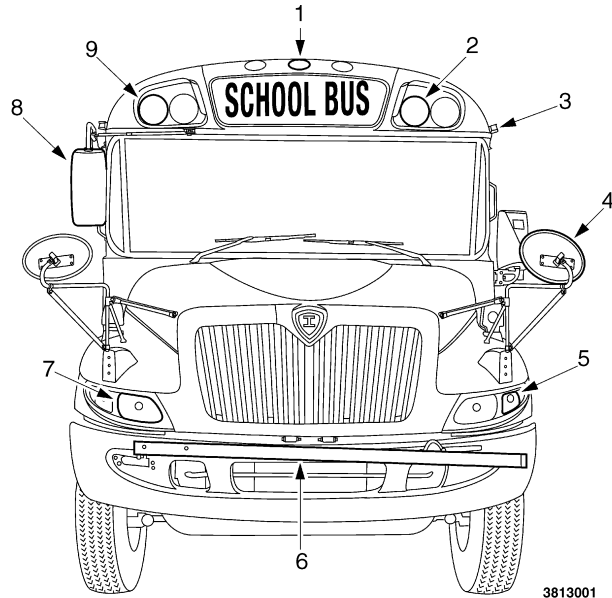
**NOTE:** If the buzzers do not activate with the ignition turned ON and the emergency exits open, have the vehicle repaired before placing the vehicle in service.

**NOTE:** Make sure that every emergency exit door and release bar is not blocked.

**NOTE:** The following illustrations are for reference only and may slightly differ from the actual vehicle.

# Vehicle Inspection Guide

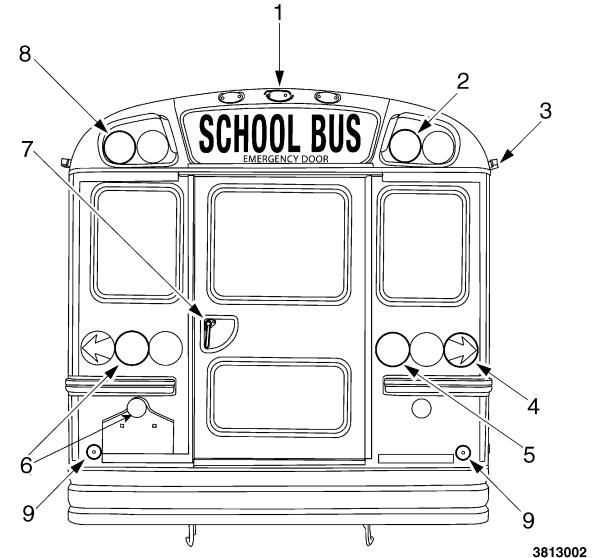
## CE Bus Front View



3813001

1. Identification lamp
2. AMBER warning light
3. Clearance lamp
4. Cross view mirror
5. Turn signal
6. Crossing gate
7. Headlight
8. Rearview mirror
9. RED warning light

## CE Bus Rear View

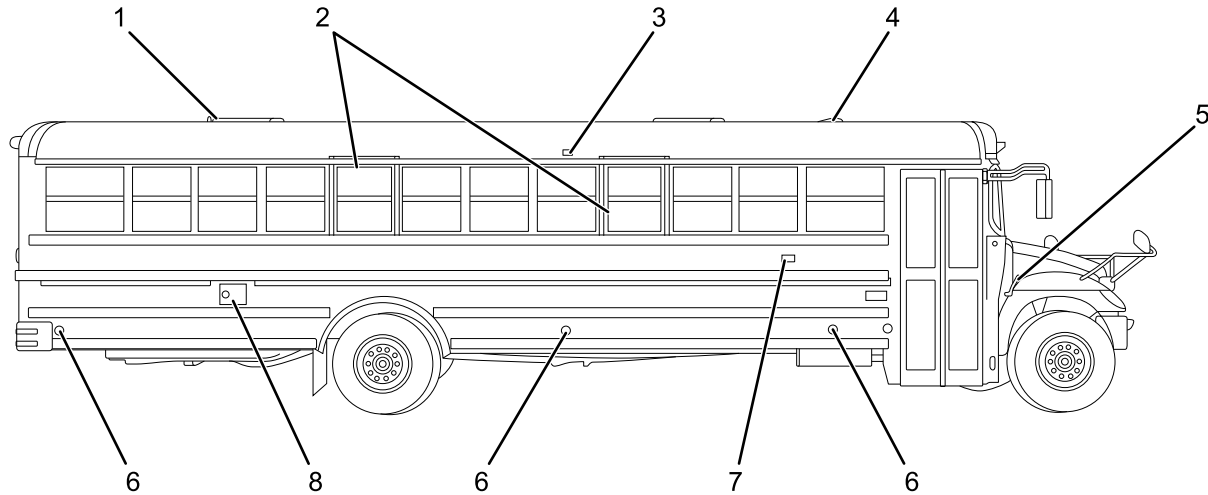


3813002

1. Identification lamp
2. AMBER warning light
3. Clearance lamp
4. Turn signal(with or without arrows)
5. Backup light
6. Stop lights / tail light
7. Emergency door handle
8. RED warning light
9. Reflex reflector



### CE Bus Right-Side View



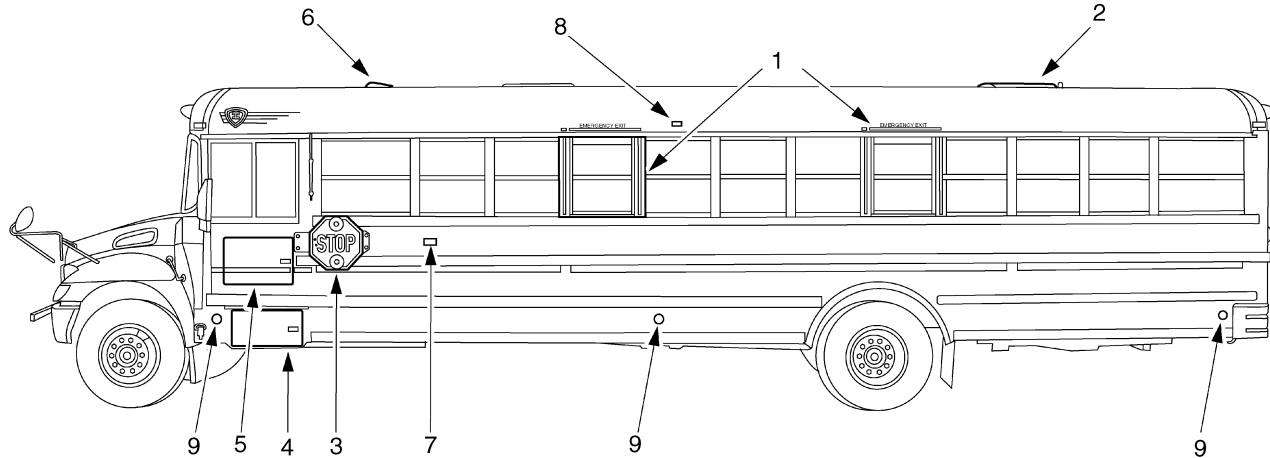
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- |                                  |                     |                                  |
|----------------------------------|---------------------|----------------------------------|
| 1. Emergency roof vent / hatch   | 4. Static vent      | 7. Side mounted turn signal lamp |
| 2. Emergency exit window         | 5. Hood latch       | 8. Fuel door                     |
| 3. Intermediate side marker lamp | 6. Reflex reflector |                                  |

## Vehicle Inspection Guide

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### CE Bus Left-Side View

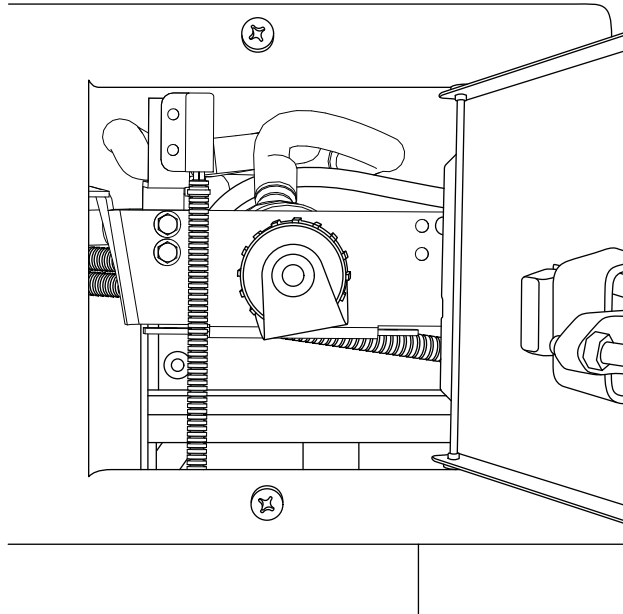


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- |                                |                                        |                                  |
|--------------------------------|----------------------------------------|----------------------------------|
| 1. Emergency exit window       | 4. Battery compartment                 | 7. Side mounted turn signal lamp |
| 2. Emergency roof vent / hatch | 5. Electrical compartment access panel | 8. Intermediate side marker lamp |
| 3. Stop arm                    | 6. Static vent                         | 9. Reflex reflector              |

### Propane Autogas Fuel Cap

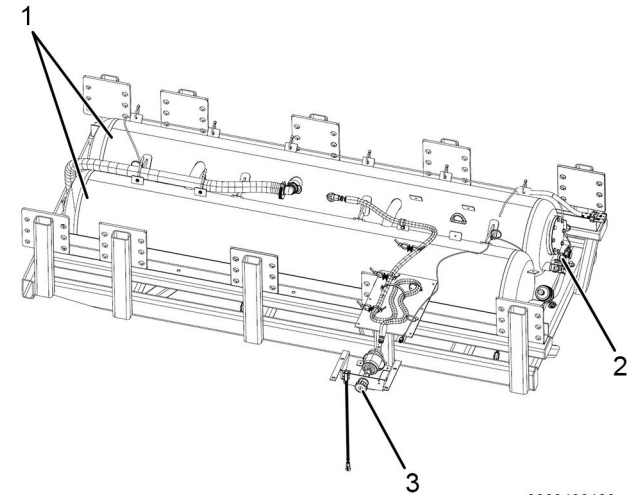
The propane autogas fuel cap is on the right-side or left-side side of the bus, located behind the rear tire.



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### Typical Propane Autogas Fuel Tank Configuration

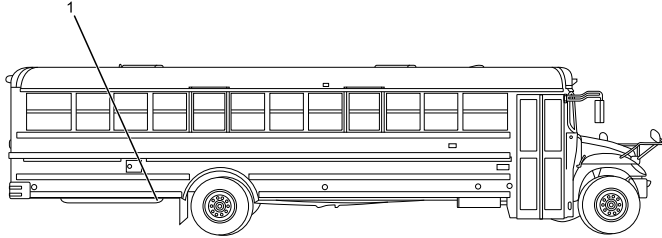
The propane autogas fuel tanks are located on the underside of the bus, behind the rear axle. The propane autogas bus may be equipped with a 47-gallon, 68-gallon, or a 89-gallon fuel tank. The fuel tank system consists of the fuel tanks, shutoff valves and fuel cap.



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1. Tanks
2. Shut off valve
3. Fuel cap

### 1/4 Turn Fuel Safety Shutoff Valve Location

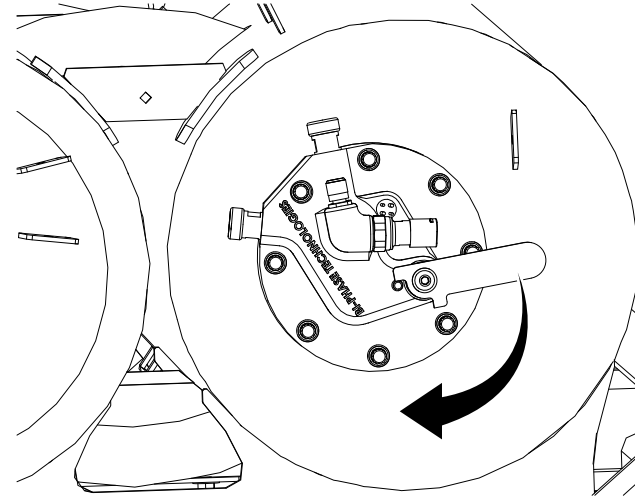


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1. 1/4 turn fuel safety shutoff valve

### Lever Style Fuel Safety Shutoff Valve (If Equipped)

The fuel system utilizes a manual lever style shutoff valve to be used in the case of an emergency. The valve is located underneath the bus on the front side of the propane autogas tank.

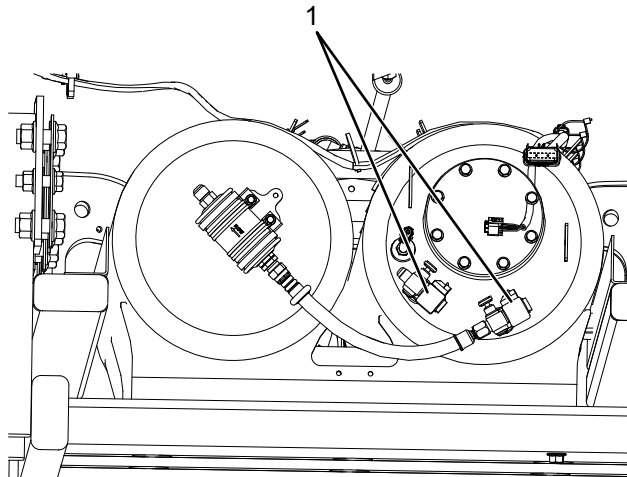


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To operate the valve, grab firmly and pull the valve down a 1/4 turn (90°) until the tab on the lever contacts the dowel on the tank. This will manually stop fuel flow from the autogas tanks.

### Knob Style Fuel Safety Shutoff Valve (If Equipped)

The fuel system may be equipped with a knob style fuel shutoff valve in case of an emergency. This style of shutoff system is equipped with 2 valves. The valves are located underneath the bus on the front side of the propane autogas tank. Both valves must be turned to the closed position in order to shut off the fuel system.



0000431522

1. Shutoff valve

To operate the knob valves, grab the knob firmly and turn clockwise to tighten the valve into the closed position. This will manually stop fuel flow from the autogas tanks.

### Propane Autogas Vehicle Identification Decal

Propane identification decals are mounted on the lower right-side rear of the vehicle.



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## Vehicle Inspection Guide

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### Inspection Check Lists


#### Exterior Checks



#### **WARNING**

To prevent personal injury and / or death, or damage to property, turn off engine and set the parking brake anytime you leave the vehicle.

Location	Description
Walk-Around Inspection	Look and listen for leaks and puddles as you walk up to the bus. Check for vandalism and loose items under the vehicle. Check the fuel door and the fuel tank cap. Review the results of the previous post-trip inspection with your supervisor or previous driver. Check all previously noted items to make sure that all requested repairs have been made.
Leaks	Check for signs of fluid leaks in the engine compartment. Also check for signs of drips on the ground under the engine.
Outside Mirrors	Make sure the outside view is not obstructed. Check the cross-view and rear-view mirrors for cleanliness. Also make sure the mirrors are intact and properly adjusted.
Battery	<div> <b>WARNING</b></div> <p>To prevent personal injury and / or death, or damage to property, keep lighted tobacco, flames, sparks or other ignition sources away from the batteries. Gas from the battery cells is flammable and can ignite and / or explode. This is particularly true when jumper cables are being used.</p> <p>Check the batteries for loose wires or corrosion at the terminals to prevent possible battery or starting failure.</p>

Location	Description
Lights and Reflectors	<p>Turn ON the exterior lamp check system to make sure all exterior lights are working. For operation of the system see <b>Lights</b> section. Check the operation of the AMBER warning lights, RED warning lights, and hazard warning lights. If your BE 200 bus has an exterior strobe light, test it as well. Inspect all reflectors, headlights, turn signals, and emergency flashers. Make certain they are clean, firmly attached, and without cracks or breaks.</p>
Wheels and Tires	<div style="text-align: center;">  <b>WARNING</b> </div> <p><b>To prevent personal injury and / or death, or damage to property, if wheels or tires must be changed, obtain expert tire service help. Mounting and dismounting of tires should only be performed by qualified personnel using necessary safety procedures and equipment.</b></p> <p>Inspect all wheels and tires for any obvious defects, damage, or excessive tread wear. Check tires for the proper inflation. Check wheel or rim nuts for tightness and condition. If equipped with front oil type wheel bearings, check for proper oil level.</p>
Rear Axle and Wheel Bearings	<p>Check for obvious leaking on outside or inside of wheel. Inspect axle flanges and wheel seals for leaks and loose mounting hardware, or broken items. Check lube level, if equipped with sight glass.</p>

## Vehicle Inspection Guide

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### Front / Rear Suspension



#### WARNING

To prevent personal injury and / or death, or damage to property, do not operate vehicle if there is a loss of steering or suspension, which could result in a loss of vehicle control.

Location	Description
Springs	Look for missing, broken or shifted leaves, or leaves that are in contact or nearly in contact with the tire, wheel, brake drum, brake chamber, frame or body.
Spring Mounts	Check the spring hangers, bolts, bushings, axle mounting U-bolts and nuts for cracks, breaks, wear, damage, tightness, and missing hardware. For proper torque, refer to the torque charts in the <b>Maintenance Intervals and Specifications</b> section.
Shock Absorbers	Check for cracks, leaks, and missing or broken mounting bolts or bushings.

### Brakes

Location	Description
Drum or Rotor and Brake Linings	Check to see that there are no cracks, dents or holes and no loose or missing bolts. Check to see that the brake linings, where visible, are not worn thin or contaminated by lubricant.
Hoses	Check for secure couplings and for cracked, worn or frayed hoses.
Chamber (Air Brakes Only)	Check to see that the brake chambers are not cracked or dented and that they are securely mounted.
Slack Adjuster (Air Brakes Only)	Check for broken, loose or missing parts: angle between push rod and adjuster arm should be approximately 90 degrees when the brakes are applied.
Air Wet Tank (Air Brakes Only)	Drain water daily.



### Underhood and Fluid Checks



#### WARNING

To prevent personal injury and / or death, or damage to property, maintain adequate clearance between all parts of the exhaust system and all hoses, wires, and lines for engine cooling, brake system, fuel system, power steering system, and electrical system. Heat damage to hoses and wires may cause vehicle malfunction.



#### WARNING

To prevent personal injury and / or death, or damage to property, if vehicle is equipped with an automatic transmission, have a qualified technician regularly check operation of transmission neutral start switch. If unit starts in gear, the vehicle may inadvertently move.



#### WARNING

To prevent personal injury and / or death, or damage to property, exercise care when working on vehicles with running engines that are equipped with an automatic fan clutch. The fan engages when engine coolant reaches a predetermined temperature or the refrigerant pressure (if equipped with air conditioning) reaches a predetermined setting. The fan will start with no advance warning.



#### WARNING

To prevent personal injury and / or death from hot coolant or steam scalding, use the following procedure to remove the pressure cap from the de-aeration tank:

- A. Allow the engine to cool.
- B. Wrap a thick cloth around pressure cap.
- C. Partially unscrew pressure cap slowly while firmly holding cap down, then pause to allow pressure to release.
- D. When system pressure is released, fully unscrew pressure cap while continuing to hold cap down. Slowly release downward pressure from pressure cap.
- E. Remove cap.

## Vehicle Inspection Guide

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Location	Description
Belts	Open the hood and check that the water pump, alternator, and A/C compressor belts are not frayed and have no excessive cracking, loose fibers, or other signs of wear. Make sure they are snug and secure.
Fan Cooling Ring and Shroud	Check for security of engine-mounted fan cooling ring and fan shroud.
Engine Oil	Use the engine oil dipstick to verify that the engine oil level is correct. Refer to the <b>Engine Operation and Maintenance Manual</b> for the correct fluid and lubricant specifications.
Automatic Transmission Fluid	With the engine running, use the dipstick to make sure the correct transmission fluid level is present. Refer to the Allison Transmission Manual for correct fluid and lubricant specifications.
Engine Coolant	Make sure the fluid is between the ADD and MAX fluid level range as marked on the reservoir. Do not remove the pressure cap until the coolant has cooled; failure to do so may result in personal injury. If additional fluid is necessary, see the <b>Maintenance Intervals and Specifications</b> section of this manual to find the correct fluid type before filling.
Windshield Washer System Fluid	Inspect the fluid level through the plastic reservoir. If additional fluid is necessary, see the <b>Maintenance Intervals and Specifications</b> section of this manual to find the correct fluid type before filling.
Power Steering Fluid	Check that the fluid is between the MIN (COLD) and MAX (HOT) marks. If additional fluid is necessary, see the <b>Maintenance Intervals and Specifications</b> section of this manual to find the correct fluid type before filling.
Brake Fluid Check	Check to make sure the brake fluid is between the MIN and MAX lines. If additional fluid is necessary, see the <b>Maintenance Intervals and Specifications</b> section of this manual for the correct fluid type before filling.
Radiator and Charge Air Cooler	Inspect the radiator and charge air cooler for damage and / or blockage. Inspect all radiator and heater hoses.
Hood and Hood Latches	Close and latch the hood. Check that the hood is securely latched in place with the hood latches.

### Interior Visual and Operational Checks

Location	Description
Interior Mirror	Make sure the interior mirror is clean and adjusted to provide a clear view of the entire rear of the bus including the rear windows. To adjust the mirror, loosen the bolts and nuts in the slotted holes. After moving the mirror to the desired position, tighten the bolts and nuts.
Window Operation	Make sure windows are free of dirt, fog, condensation and snow. Make sure the driver and passenger windows can open and close completely.
Engine Starting	For engine starting procedures, reference (Starting Procedures, page 113).
	<b>NOTE: All remaining checks are to be performed with the engine running.</b>
Instrumentation	With engine running, check gauges for oil pressure, temperature, alternator, and fuel levels.
Wiper Blades	Look through the windshield to inspect both wipers for signs of wear, damage, or signs of aging on the rubber blades. Check wiper operation.
Passenger Entry	Make sure the door opens and closes completely. Make sure the entry steps are clear, and the treads are secure and are in good condition.
Heater Leaks / Fans	Inspect for interior heater fluid leaks and check fan operation at all heater locations.
Emergency Devices	Sound the horn. Turn on the heater and defroster. Check the windshield wipers and washers for proper operation. Using cross-view mirrors and another person, or the lamp check system, verify that the front and rear exterior directional signal lights are working. Make sure that all interior lights are working properly.

## Vehicle Inspection Guide

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Location	Description
Air Brake Check	<p>Check the air brakes accordingly:</p> <ul style="list-style-type: none"><li>• Install wheel chocks if necessary. Push in parking brake and start engine.</li><li>• Check the air compressor or governor cut-out pressure (approximately 120 psi (827 kPa)).</li><li>• Shut off engine and turn key to ON position.</li><li>• Without brake pedal applied, note air pressure drop for 1 minute (It should be less than 2 psi (14 kPa)).</li><li>• Depress and hold brake pedal making sure there is no more than a 3 psi (21 kPa) per minute pressure drop.</li><li>• Step on and off brake pedal and check for warning indicator and buzzer to come on at about 60 or 70 <math>\pm</math> 6 psi (414 or 483 kPa).</li><li>• Step on and off brake and check to make sure the parking brake knobs pop out between 20 to 40 or 45 psi (138 to 310 kPa ).</li><li>• Restart engine, shift into a low gear, and gently pull against service and parking brakes separately to make sure they will hold.</li></ul>
Hydraulic Brake Check	<p>Pump the brake pedal three times. Then apply firm pressure to the pedal and hold for 5 seconds. The pedal should not move, and the brake pressure indicator should not illuminate.</p>
Accelerator Pedal	<p>Check for smooth, non-binding pedal action.</p>
Shift Selector	<p><b>NOTE: Foot brake pedal must be pressed to shift out of the (P) Park position.</b> Check for proper functioning of the shift selector and linkage.</p>
Parking Brake Check	<p><b>NOTE: Foot brake pedal must be pressed to release the parking brake and to shift out of the Park (P) position.</b> With foot on brake pedal, shift the transmission into a forward gear. Take your foot off the service brake pedal, and allow the bus to idle forward. If the bus moves forward, the parking brake has malfunctioned. Stop the bus with the service brake and have the vehicle serviced immediately.</p>

Location	Description
Backup Alarm Check (If Equipped)	<p>Check for proper operation of the Backup alarm. See Driver Section for Backup alarm operation.</p> <p><b>NOTE: Foot brake pedal must be pressed to release the parking brake and to shift out of the (P) Park position.</b></p>
Wheelchair Lift System Operational Check (If Equipped)	Inspect the optional wheelchair lift system for proper operation every day. Refer to the lift manufacturer's Operators Manual for items that should be checked before operation.

### Integrated Air Conditioning System (IC Air)

Location	Description
Compressor Belts	<p>Check for tension and wear.</p> <p>Inspect for properly tensioned belt. This ensures maximum compressor performance and belt life.</p>
Evaporator Filters	<p>Check for cleanliness.</p> <p>A properly maintained filter maximizes air flow and system performance.</p>
Hoses	<p>Check that hoses are secured and protected.</p> <p>Prevents the possibility of refrigerant leaks.</p>
Wiring Harnesses	<p>Check that harnesses are secured and protected.</p> <p>Prevents the possibility of electrical shorts.</p>
Condenser Coil	<p>Check for cleanliness.</p> <p>A properly maintained condenser coil will ensure maximum heat transfer and system performance.</p>
Sight Glass Moisture Indicator	<p>Check color of sight glass:</p> <ul style="list-style-type: none"> <li>• Deep GREEN = Absence of moisture</li> <li>• YELLOW = Moisture is present <b>IMMEDIATE SYSTEM SERVICE REQUIRED</b></li> </ul>

## Vehicle Inspection Guide

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### Emergency Exits and Equipment

Location	Description
Roof Hatch	Inspect the roof hatch daily for proper opening, buzzer warning, if supplied, and operating instruction decal attachment. Make sure the emergency hatch is completely closed and secure.
Emergency Exits	Check all emergency exits every day for proper opening, buzzer warning, and operating instruction decal attachment. Check to see that all emergency exit doors can be opened, and that they are firmly closed. Make sure all emergency door release bars are properly secured, and the kickout window handle is properly latched.
Warning Lights, Stop Arm, Crossing Gate, and Entrance Door Check	<ul style="list-style-type: none"><li>• Check to see that the AMBER and RED warning lights are operating properly. To check these lights use the Exterior Lamp Check procedure in the <b>Lights</b> section of this manual.</li><li>• Verify the Stop Arm and Crossing Gate are working properly and extend completely</li><li>• Verify the entrance door is opening and closing properly.</li><li>• Verify the flasher warning lights and stop arm are working properly with the flasher switches and entrance door operations. Check to see that the AMBER Warning Lights are flashing. When the entrance door is opened, check to see that the AMBER Warning Lights stop flashing and the RED warning lights begin flashing, and Crossing Gate and Stop Arm are extended. Close the entrance door and observe that flasher warning lights go OFF. There is an optional feature that will automatically turn OFF the pupil warning lights after the bus has started to move.</li><li>•</li></ul>
Emergency Equipment	If equipped / required by state law, check to make sure that the fire extinguisher, reflective triangles, first aid kit and body fluid clean up kit are in place and secure.

## Propane Autogas System Inspection



### WARNING

To prevent personal injury and / or death, or damage to property, exercise care when inspecting the propane autogas system. Wear Personal Protective Equipment (PPE) when interacting with the propane autogas system, as escaping propane can cause severe frostbite and freeze burn.

Location	Description
Fuel Tank(s)	Inspect fuel tanks for dents, scratches, gouges, abrasions, and other signs of damage. Check that fuel tanks are secured to mounting brackets and hardware is secured to frame.
Fuel Lines	Inspect fuel lines and connections for any leaks, crimping, or other signs of damage.
Decals and Labeling	Verify that all required propane decals are present on tanks and vehicle.
Fuel Safety Shutoff Valve	Check for signs of damage or leaks.
Fuel Door / Fueling Port	Verify that fuel door is securely closed and the fueling port and cap are free of damage. The vehicle will not start if the fuel door is open.



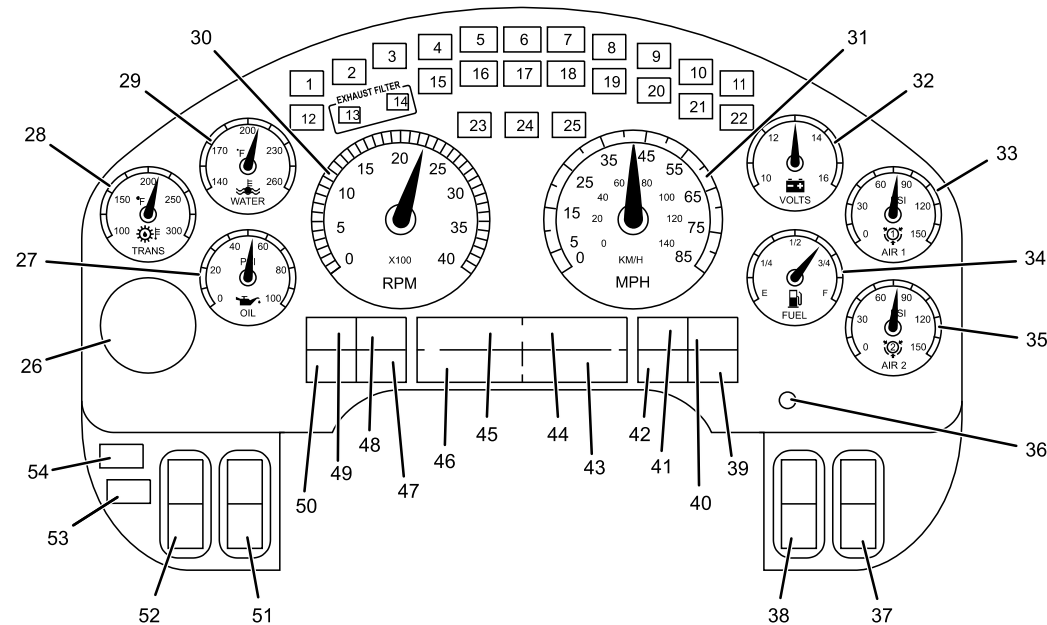


## SECTION 3 — INSTRUMENTATION

### Instrument Panel Gauge Cluster

The instrument panel gauge cluster includes the instrument gauges, warning indicators, and an integral digital display, that provide odometer, transmission gear indication, and compass

heading and outside temperature displays. This instrument panel gauge cluster displays the crucial operational functions of the vehicle. The following are descriptions and illustrations of the gauges, warning indicators, and integral digital display options.










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## Instrumentation





### Warning Indicators





The instrument panel gauge cluster may contain as many as 25 individual LED warning indicators. These indicators are used to alert the driver of vehicle conditions and functions and may indicate a WARNING or STOP condition. They are turned on by the software in the instrument panel gauge cluster. At ignition, the warning indicators will illuminate for 8 to 10 seconds, as part of the vehicle power-up sequence.

Item No.	Item	Description
1	 3813045	Wait to Start Lamp Illuminates YELLOW when the fuel system purge cycle is taking place. Do not attempt to start engine until Wait to Start Lamp has been extinguished.
2		Not Used
3	 8487080	Illuminates YELLOW. Used in conjunction with other Warning indicators or General Text and Warning Messages and may be accompanied by an audible alarm to indicate an Alert condition to the operator.
4	 8487084	AWL-The AMBER Warning Lamp (AWL) illuminates when the vehicle needs to be serviced at the first available opportunity.

5	 8487086	RSL-The RED Stop Lamp illuminates RED when a serious problem has occurred. This lamp is accompanied by a message on the odometer display and an AUDIBLE ALARM. If the RED Stop Lamp illuminates, immediately pull the vehicle safely off the roadway, turn on the flashers, set the parking brake, place warning devices, and stop the engine. The engine should not be restarted prior to being serviced.
6	 3813046	Illuminates RED when a failure in the service brake system has occurred. If the Brake Pressure warning indicator illuminates, safely stop the vehicle as soon as possible and seek service immediately.
7	 8487075	Illuminates RED when the parking brake is applied. If the brake warning indicator does not illuminate, or if it stays on with the parking brake not engaged, seek service immediately.
8	 8487079	Illuminates when the emergency exit is not securely closed when the key switch is in the ACC (Accessory) or ON position.

9	<b>RANGE INHIBITED</b> 8487070	Illuminates YELLOW when the transmission is not engaged in the selected gear. The warning indicator goes out when the gearshift lever is adjusted to the appropriate gear. Refer to the Transmission Operator Manual for more information.
10	<b>LIFT DOOR</b> 8487083	Illuminates YELLOW when the optional lift door is not securely closed when the key switch is in the ON position.
11	 3813047	Illuminates YELLOW when the traction control system is turned OFF. It also illuminates momentarily when the traction control system is on and is limiting wheel spin. Blinks on if slippery road conditions may exist. If this happens, adjust your driving accordingly. Refer to the <b>Driving</b> section for more information.
12	 8487092	Flashes GREEN when the left-side turn signal or the hazard lights are turned ON.
13		Not Used
14		Not Used

15	 3813053	MIL-The Malfunction Indicator Lamp (MIL) illuminates when the On-Board Diagnostics (OBD) detects a malfunction related to the emissions control system. The illuminated MIL indicates that the vehicle needs to be serviced at the first convenient opportunity. Lamp may remain active after repair until system operation confirms repair.
16	<b>SERVICE</b>  8487088	Illuminates RED when a parking brake system malfunction has been detected. If the Service Parking Brake indicator stays illuminated, have the system serviced immediately.
17	 8487073	Optional indicator illuminates RED immediately after ignition is turned on to remind operator to fasten seat belt. This applies to only the driver's seat. Optional Seat Belt Reminder with Seat Belt Monitoring causes initial visual indication, then flashes with audible alarm when ignition is on, parking brake is released, and seat belt is not fastened.
18	<b>BRAKE FLUID</b>  3813054	Illuminates RED when the brake fluid falls below the safe operating level.
19	<b>RED FLSHR</b> 3813049	Illuminates when the RED flasher warning lights are activated.

20	<b>AMBER FLSHR</b> 3813048	Illuminates when the AMBER warning flasher lights are activated.
21	 8487089	Illuminates YELLOW when an antilock brake system malfunction has been detected. If the ABS indicator stays illuminated or continues to flash, have the system serviced immediately.
22	<b>ECON</b> 8487091	Illuminates YELLOW when transmission Economy Mode is selected. Refer to the Transmission Operator Manual for more information (If Equipped).
23	 8487092	Flashes GREEN when the left-side turn signal or the hazard lights are turned ON.
24	 8487094	Illuminates BLUE when the high beam head lamps are turned ON.
25	 8487093	Flashes GREEN when the right-side turn signal or the hazard lights are turned ON.

**NOTE:** If the MIL is illuminated, it is the vehicle owner's responsibility to have the engine repaired or face fines.

### Instrument Panel Gauge Cluster


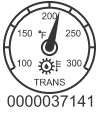









#### **WARNING**

**To prevent personal injury and / or death, or damage to property, never operate the vehicle when insufficient air pressure (less than 70 psi [483 kPa]) is indicated for either the primary or secondary air system. The volume of air required to stop the vehicle may be greater than that available. Have the brake system checked and repaired before returning the vehicle to service.**

There are 10 gauges in the instrument panel gauge cluster to help monitor the vehicle while in service. Most gauges have in-gauge warning indicators that turn on if the gauge pointer moves into an out-of-acceptable-range condition. When the ignition switch is turned ON, the gauge indicators will be on. Metric versions of the gauges and speedometer are available as an option.

**NOTE:** If any indicator fails to go out after starting engine, stop engine and determine cause of the gauge indication that is out of acceptable range.



26		Not used
27		Indicates engine oil pressure in pounds per square inch (psi).
28		Indicates the transmission lubricant temperature in degrees Fahrenheit (°F).
29		Indicates engine coolant temperature in degrees Fahrenheit (°F).
30		The tachometer indicates engine speed (rpm). The engine can be operated between idle speed and high idle speed without damage but should not be allowed to over-speed (such as when going downhill).
31		The speedometer indicates the vehicle speed in miles per hour (mph) and kilometers per hour (km/h).
32		Indicates the battery voltage (volts) when the ignition switch is in the ON position.

33		Provides indication of air pressure available for the primary air brakes in pounds per square inch (psi).
34		Indicates the approximate fuel level in the fuel tanks.
35		Provides indication of air pressure available for the secondary air brakes in pounds per square inch (psi).

### Direct Drive Warning Indicators

The instrument panel gauge cluster also houses eight (8) direct drive warning indicators that alert the operator of various conditions of the vehicle. They are in two groups of four each, located on both sides of the LED quadrant displays. The warning indicators that are not used in this particular model will be **substituted with** a blank cover plate.

**NOTE: There are several variation of Direct Drive Warning Indicators. Actual indicator configuration may vary.**

Item No.	Item	Description
39		Optional transmission fluid / filter change indicator illuminates YELLOW. Refer to Transmission Operation Manual for additional information
40		Not Used
41		Not used
42		Not used
47		Electronic Stability Control (if equipped) - Illuminates YELLOW with a flashing indicator which represents that the electronic stability control is engaged, while a solid indicator represents a fault in the system.
48		Not used.
49		Not used.
50		Not used.

### Integral Digital Display

The integral digital display is located below the speedometer and the tachometer. It is arranged in four quadrants that display vehicle information. The four quadrants can be individually selected by using the display control button.

**Display Control.** The display control is used to scroll to a quadrant and to select the various modes within a quadrant. To navigate between quadrants, turn and release the control either clockwise or counterclockwise. To select the screens within a quadrant, press and release the control. Press and hold the control for more than 3 seconds to reset the value of the selected quadrant parameter (if the parameter can be reset). The selected quadrant is identified by a vertical bar located in the far right-side of quadrant. In quadrant 1, the odometer screen can be toggled between English and metric by pressing and holding the control.

Item No.	Quadrant Number and Message Function	Message Description
36	Display Control	Toggles the information display from one screen to the next when pressed and released.
43	Quadrant 2: General Text and Warning Messages	Displays a variety of messages ranging in priority necessary for vehicle monitoring and operation, and vehicle malfunction warnings. Some messages are used in conjunction with instrument panel gauge cluster warning indicators (see list of messages in the <b>Instrument Panel Gauge Cluster &gt; Integral Digital Display Detailed Information</b> section in <b>Controls / Features</b> ).
44	Quadrant 1: Informational Messages	Informational Display Screens: <ul style="list-style-type: none"> <li>• Odometer</li> <li>• Trip Odometer</li> <li>• Total Engine Hours</li> <li>• Trip Hours</li> <li>• Instantaneous Fuel Economy</li> <li>• Trip Average Fuel Economy</li> <li>• Trip Idle Fuel Used</li> </ul>
45	Quadrant 4: Transmission Gear Indication	Transmission gears for the Allison P-R-N-D-L gear selection display.
46	Quadrant 3: Compass Heading / Outside Temperature	<b>(Optional)</b> Displays compass heading when vehicle is equipped with a compass module. Displays outside temperature (reading is obtained from the temperature sensor).

## Instrumentation

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### Integral Digital Display Detailed Information

#### Quadrant 1: Informational Displays

**NOTE:** The available display screens are dependent on the configuration of the vehicle.

Quadrant 1 – Display Messages	Description
Odometer	<p>The odometer displays the total distance traveled.</p> <p><b>Display Format:</b> 100,000.0 TRIP MILES TRIP KM</p>
Trip Odometer	<p>The trip odometer displays a record of the elapsed distance traveled since the last reset.</p> <p><b>NOTE:</b> The trip hours and trip miles are independently reset.</p> <p><b>Display Format:</b> 100,000.0 TRIP MILES TRIP KM</p>
Total Engine Hours	<p>The Engine Hour display provides a record of accumulated engine hours, and will not show any increase unless the engine is running.</p> <p><b>NOTE:</b> This display function cannot be reset.</p> <p><b>Display Format:</b> 100,000.0 HOURS</p>



Quadrant 1 – Display Messages	Description
Trip Hours	<p>The Trip Hour display provides a record of elapsed engine hours since the last reset.</p> <p><b>NOTE: The trip hours and trip miles are independently reset.</b></p> <p><b>Display Format:</b> 100,000.0 TRIP HOURS</p>
Instantaneous Fuel Economy	<p>This display provides a record of the instantaneous fuel economy sent from the engine. The display indicates in miles per gallon or liters per 100 kilometers, corresponding to the units selected while in the odometer mode.</p> <p><b>Display Format:</b> 30.0 INST MPG INST L/100KM</p>
Trip Average Fuel Economy	<p>The display value will indicate the average fuel economy value since the last reset of the trip odometer. The display indicates in miles per gallon or liters per 100 kilometers, corresponding to the units selected while in the odometer mode.</p> <p><b>Display Format:</b> 30.0 TRIP MPG TRIP L/100KM</p>

## Instrumentation

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Quadrant 1 – Display Messages	Description
Trip Idle Fuel Used	<p>The display value indicates the calculated Trip Idle Fuel Used.</p> <p><b>Display Format:</b> 100,000.0 TRP IDL GAL TRP IDL L</p>
Axle Load Indication	<p>The instrument panel gauge cluster displays an approximate value of Axle Load for the front and / or rear axles.</p> <p><b>NOTE: Axle load readings are most accurate on a level surface with parking brake released.</b></p> <p><b>Display Format:</b> approx. 45.0 FT LBSX1000 FT KGX1000 RR LBSX1000 RR KGX1000</p>

### Quadrant 2 Text and Warning Messages

These messages inform the driver of vehicle conditions. If the message flashes, it will flash for 3 - 5 seconds, and then will be displayed for an additional 3 - 5 seconds. If more than one message is viewable, the displayed message will be followed by an asterisk (\*), indicating multiple messages. To view additional

messages, press and release the display control button to proceed to the next message.

The following is a list of the **routine** Text and Warning messages that can be displayed and is dependent upon the configuration of your vehicle:

Quadrant 2 – Display Messages	Description	Flash (Yes / No)	Warning Indicator Association
Washer Fluid Low	Indicates low washer fluid level.	Yes	No
Electrical Fault	When instrument panel gauge cluster's ability to display diagnostic codes is enabled, this message is displayed when there are active diagnostic codes.	Yes	No
Check A/C	Indicates a fault in the HVAC System.	Yes	No
Air Filter Restriction	Message displayed indicates restricted air flow to the engine.	Yes	No
Exterior Lamp Check Active	Message displayed indicates Exterior Lamp Check is in progress.	Yes	No
HVAC Temp Setting	Bar graph displayed show temperature setting in low to high increments.	No	No
Activate HVAC Front Blower	Bar graph displayed show blower speed setting in OFF and low to high increments.	No	No
Cruise	Indicates that the Cruise Control System is turned ON.	No	No
Check Brake Switch	Check brake switch operation.	Yes	No
Check Pupil Warning Indicator	Check pupil warning lights around the bus to ensure all are operational.	Yes	No
Check Stop Arm / Crossing Gate	Check the Stop Arm / Crossing Gate operation.	Yes	No
Check Exterior Lamps	Inspect all exterior lamps to ensure proper operation.	Yes	No

## Instrumentation

Quadrant 2 – Display Messages	Description	Flash (Yes / No)	Warning Indicator Association
Engine Control System Error	Message is displayed when there is an error in the engine control system.	Yes	No
Low Coolant Level	Message is displayed when coolant level is less than or equal to 80%.	Yes	No
Change Engine Oil	Message is displayed when engine oil change is detected as necessary.	Yes	No
Fuel Door / Refueling Port Door Ajar	Indicates that Fuel Door / Refueling Port Door is ajar and must be closed for system to be functional.	Yes	No
Electrical Fault (Priority 1 or 2)	(1) Message is displayed when when EGC requests the RED Stop Lamp. (2) Message is displayed when when EGC requests the AMBER Warning Lamp.	Yes	(1) RED Stop Lamp (2) AMBER Warning Lamp
Check Trans	Message is displayed when transmission needs to be serviced.	Yes	AMBER Warning Lamp
Trans Temp	Message is displayed when transmission turns on the AMBER Warning Lamp. Not available with all transmissions.	Yes	AMBER Warning Lamp
Gen Trns Flt	Message is displayed when transmission turns on RED Stop, MIL, or PROTECT, or the YELLOW Warning indicator without the conditions to display Check Trans, Trans Temp, Trans Oil Life, Trans Oil Filter, or Trans Service. Not available with all transmissions.	Yes	Yes (see description)
Trans Oil Life	Message is displayed when transmission oil needs changed. Not available with all transmissions.	Yes	No
Trans Oil Filter	Message is displayed when transmission oil filter needs changed. Not available with all transmissions.	Yes	No

<b>Quadrant 2 – Display Messages</b>	<b>Description</b>	<b>Flash (Yes / No)</b>	<b>Warning Indicator Association</b>
Trans Service	Message is displayed when transmission needs service. Not available with all transmissions.	Yes	No
ECM, TCM, Shift Selector, ABS, Retarder – Driveline, EGC, Compass Module, ESC, VSM, SD, AGSP, TPMS, Exhaust Module, Telematics, AGSP 2, SIC 2, AGSP 3, SIC 1, PAM, Service Tool, Global	Message is displayed when a module other than the engine requests the RED stop warning indicator.	Yes	RED Stop Lamp
ECM, TCM, Shift Selector, ABS, Retarder – Driveline, EGC, Compass Module, ESC, VSM, SD, AGSP, TPMS, Exhaust Module, Telematics, AGSP 2, SIC 2, AGSP 3, SIC 1, PAM, Service Tool, Global	Message is displayed when a module other than the engine requests the AMBER Warning Lamp.	Yes	AMBER Warning Lamp
VSL Ovrđ Active	Vehicle speed limit override active.	No	No
VSL Ovrđ Expiring	Vehicle speed limit override expiring.	No	No
	Blank screen, available only when engine rpm less than or equal to 325 rpm, or vehicle speed less than 3 km/h.	No	No
Calibrate Compass	Message is displayed when vehicle speed is less than 3 km/h and the operator has not requested Calibrate Compass in the current ignition cycle.	No	No
End Calibration	Message is displayed when vehicle speed is less than 3 km/h and the operator has requested Calibrate Compass in the current ignition cycle.	No	No

## Instrumentation

Quadrant 2 – Display Messages	Description	Flash (Yes / No)	Warning Indicator Association
Calibration Ended	Message is displayed when vehicle speed is less than 3 km/h and the operator has requested Calibrate Compass in the current ignition cycle.	No	No
Declination Zone	Message is displayed only when vehicle speed is less than 3 km/h.	No	No

### Warning Messages

In addition to the Diagnostic Trouble Codes (DTC), the digital display will display a warning message whenever an engine indicator is illuminated. This warning message will be toggled with the normal DTC as follows:

**AMBER Warning Lamp** indicator: WARN ENGINE message

**RED Stop Lamp** indicator: STOP ENGINE message

The following chart provides the warning messages that are displayed along with corresponding Instrument panel gauge cluster indicators.

Warning indicator	Warning Message
RED Stop Lamp	STOP ENGINE
AMBER Warning Lamp	WARN ENGINE

### Outside Temperature and Compass Displays (If Equipped)

The optional Outside Temperature and Compass Heading is displayed in Quadrant 3. Typical displays for Temperature and

Compass Heading are listed in the following table. The display provides both the outside ambient temperature and the relative direction of the vehicle within a particular geographical zone. See below for details of calibration and use.

Vehicle must be moving to acquire an accurate temperature.

Quadrant 3 – Display Messages	Description
Outside Temperature and Compass Heading	<b>Display Format:</b> <div>32°F SE</div>
	<div>0°C SE</div>
	<div>32°F NO CAL</div>

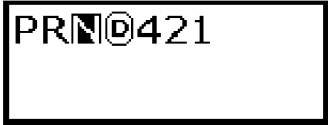
8590030

## Outside Temperature Reading

The Outside Temperature is displayed on the first line of Quadrant 3 above the Compass Heading. The temperature sensor is located near the front bumper. Due to its location, the sensor readings can be affected by road or engine heat during idling or prevailing driving conditions (extended slow movement).

The display will be in °F or °C, depending on the units selected while in the odometer mode.

## Quadrant 4: Transmission Gear Displays

Quadrant 4 – Transmission Gear Indications	
Allison P-R-N-D-L gear display	 8487430

## Optional Instrument Panel Gauge Cluster Compass Calibration Procedure

All new vehicles with an optional compass must have an initial compass calibration performed. A compass calibration may or may not have been completed at the vehicle assembly plant. If the compass headings are noticeably incorrect, or become noticeably incorrect, or the NO CAL message is displayed, the Declination Zone may need to be reset to agree with the current geographic location, or the Compass Directional Calibration will need to be recalibrated.

The compass direction is displayed in the lower left-side quadrant of the instrument panel gauge cluster display just below the outdoor temperature reading. Text messages necessary to calibrate the compass can be found in the instrument panel gauge cluster display in the lower right-side quadrant (quadrant 2) of the display. Twist the instrument panel gauge cluster display knob until the cursor is flashing in the lower right-side quadrant. Press the instrument panel gauge cluster display knob until the desired text message is displayed. Compass Calibration related text messages include Calibrate Compass, Compass Declination, Declination Zone #, and End Calibration.

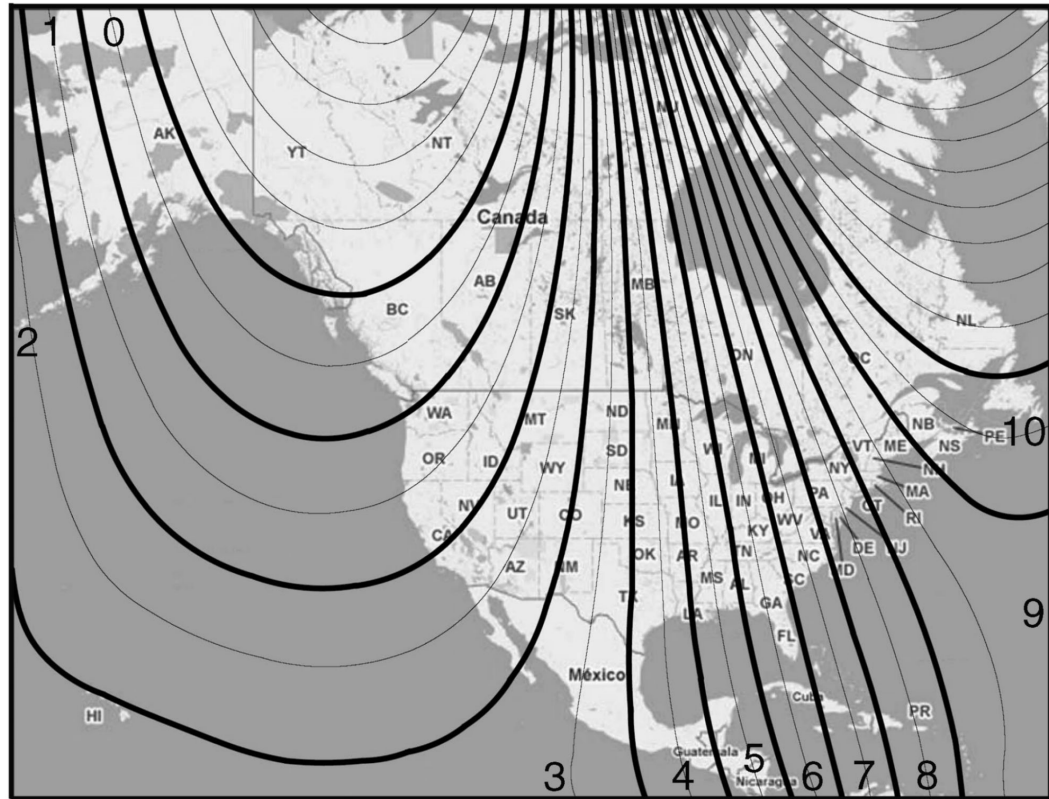
**NOTE: The Declination Zone for the location where the Compass Calibration procedure is being performed must be set first and thereafter the Compass Directional Calibration Procedure can be performed. Both procedures are listed on the following pages and must be followed exactly to ensure proper calibration of the compass.**

### *Compass Declination Zone Set Procedure*

The Declination Zone number is used to account for the errors between magnetic North and true North in the vehicle's geographic operating area, and must be set correctly for the compass to display accurate headings.

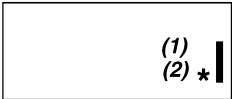




**NOTE: When calibrating / recalibrating the compass, you must select the Declination Zone which corresponds to the geographic location where the compass calibration is being performed. It can be reset later to match the Declination zone where the vehicle will be operating.**

## References



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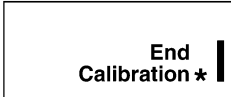





Step	Procedure	Displayed Message
1	Select Quadrant 2 (lower right-side) on the display by turning the display control knob either clockwise or counterclockwise.	 3817049
2	Select the Compass Declination message by pressing and releasing the display control knob until this message appears.	 3817053
3	Press and hold the display control knob until any Declination Zone number (0 – 10) is displayed.	 3817054
4	<p>Turn the display control knob clockwise or counterclockwise until the desired Declination Zone number is displayed. Refer to Declination Zone Map to determine the proper number for the current geographic location.</p> <p><b>NOTE: If no Declination Zone number is selected within 15 seconds, the display will return to the Compass Declination message.</b></p> <p><b>NOTE: If the compass is being calibrated / recalibrated, the Declination Zone must be set to the Zone number for the location where the compass calibration / recalibration is being performed regardless of the location where the vehicle will eventually operate.</b></p>	 3817055
5	Press and <b>HOLD</b> the display control knob until the Compass Declination message appears (this indicates that the new Declination Zone number has been programmed into the compass).	 3817053

## Instrumentation

### Compass Directional Calibration Procedure

To begin the Compass Directional Calibration Procedure, stop the vehicle in an area large enough to permit driving in complete circles and perform the following steps:

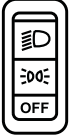
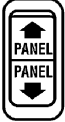
Step	Procedure	Displayed Message
1	Select Quadrant 2 (lower right-side) on the instrument panel gauge cluster display by turning the display control knob either clockwise or counterclockwise.	 3817049
2	Select the Calibrate Compass message by pressing and releasing the display control knob until this message appears.	 3817050
3	Press and hold the display control knob until the End Calibration command is displayed.  <b>NOTE: IF the End Calibration command will not show up, turn OFF the vehicle, restart it, and return to Step 1.</b>  <b>NOTE: The following steps (4 through 6) must be completed within 3 minutes to lock in the new calibration. Do not press the display control knob or turn the key OFF until these steps are completed or the calibration process will be cancelled.</b>	 3817051
4	Immediately following the End Calibration command being displayed, drive the vehicle in three complete circles (during this time the compass display will go blank or have dashed lines present).	 3817052

Step	Procedure	Displayed Message
5	Stop the vehicle and wait shortly. The End Calibration message should reappear on the display.	 <p>End Calibration *</p> <p>3817051</p>
6	<p>Push and <b>HOLD</b> the display control knob until the End Calibration command disappears. The calibration should now be complete.</p> <p><b>IMPORTANT!: Just pressing and failing to hold the display control knob inward until the End Calibration command disappears will cancel the calibration procedure and you must start over at Step 1.</b></p>	
7	<p>Test the compass calibration. Turn the vehicle ignition key OFF and then restart the vehicle. Wait 10 seconds for the compass to complete its self test. Drive the vehicle in a circle and note the compass readings:</p> <ul style="list-style-type: none"> <li>• If the lower left-side quadrant of the instrument panel gauge cluster display shows the correct compass / vehicle heading, the compass calibration is now complete.</li> <li>• If the compass readings are incorrect, inspect for correct Declination Zone number, turn OFF the vehicle, restart the vehicle, wait 10 seconds, and perform another circle while periodically noting the compass readings.</li> <li>• If readings are still incorrect, restart the compass calibration procedure.</li> </ul>	 <p>N/S/E/W *</p> <p>3817056</p>

## Instrumentation

### User Switches

The instrument panel gauge cluster provides locations for six user-defined switches. The following table describes the functional details of the standard switch configurations.

Item No.	Item	Description	Switch Indicator Status
<b>Left-Side Optional Push Button Switches</b>			
49	Configured by customer request		
50	Configured by customer request		
51	 0000058012	<b>Headlight / Park Lamp Switch</b>	Go to <b>Lights</b> section
52	 8487054	<b>Instrument Panel Gauge Cluster Dimmer Switch.</b>	Go to <b>Lights</b> section
<b>Right-Side Optional Switches / Indicators</b>			
53	Configured by customer request		
54	Configured by customer request		

## Instrument Panel Gauge Audible Alarms

**WARNING**

**To prevent personal injury and / or death, or damage to property, when an alarm sounds, stop normal vehicle operation and determine the source of the alarm condition.**

Audible alarms are used in addition to warning indicators and gauges. An audible alarm sounds when a problem exists with one of the vehicle functions. Audible alarms sound when one of the gauges indicates an abnormal condition, or when there is a problem with one of the vehicle systems. When an audible alarm is heard, have the system inspected immediately, and do not operate the bus until the bus is serviced.

**Audible Alarms**

<b>Alarm Condition</b>	<b>Audible Alarm Pattern</b>	<b>Additional Comments</b>
<b>Fuel Level Gauge</b> low (only alarms on each key switch turn-on)	5 beeps	Gauge warning indicator illuminates.
<b>Voltmeter Gauge</b> out of range reading	5 beeps	Gauge warning indicator illuminates.
<b>Engine Oil Pressure Gauge</b> out of range reading	5 beeps	Gauge warning indicator illuminates.
<b>Engine Coolant Temperature Gauge</b> out of range reading	5 beeps	Gauge warning indicator illuminates.
<b>Transmission Oil Temperature Gauge</b> out of range reading	5 beeps	Gauge warning indicator illuminates.
<b>Auxiliary Air Pressure Gauge</b> out of range reading	5 beeps	Gauge warning indicator illuminates.
<b>Gauge sensor faults</b>	5 beeps	Gauge pointer goes to 6 o'clock position and gauge warning indicator illuminates.
<b>RED Stop Lamp</b> illuminates	Repeating single beep	Gauge warning indicator illuminates.
<b>Brake Pressure Indicator</b> illuminates	Repeating single beep	Gauge warning indicator illuminates.

## Instrumentation

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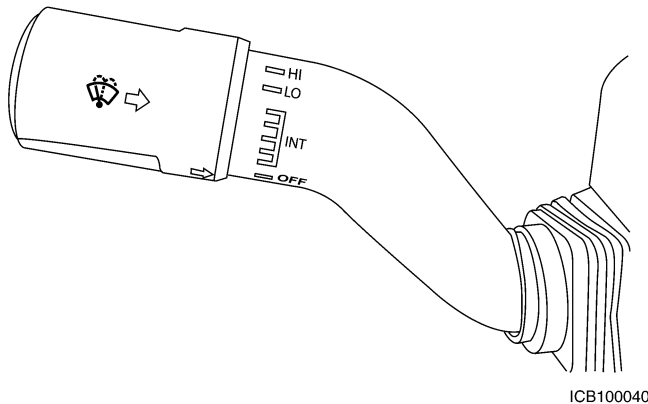
### Audible Alarms (cont.)

Alarm Condition	Audible Alarm Pattern	Additional Comments
Electrical System Controller fault	10 beeps	CHECK ELEC SYS warning indicator illuminates.
Emergency Exit Alarm	Continuous buzzer	Check for an unlatched emergency exit.
Post-Trip Inspection	Repeated single beep, lights flashing then horn honking	Complete the Post-Trip Inspection.
Turn Signal Alarm	Continuous tone	Alarm sounds if either turn signal is on for more than one mile. Will not activate when hazard flashers are on.
Low Coolant Alarm	Repeating single beep	Gauge warning indicator illuminates.
Seat Belt Reminder With Seat Belt Monitoring	Repeating single beep	Gauge warning indicator illuminates.

## SECTION 4 — DRIVER CONTROLS

### Windshield Wiper / Washer System

#### Wiper Blade Speed



The windshield wiper / washer switch is located on the left-side of the steering column.

Rotate the windshield wiper control to the desired interval, low or high speed position.

The bars are for intermittent wipers. When the wiper control is in the intermittent position, rotate the control upward for faster intervals, and downward for slower intervals.

#### Windshield Wiper Speed Control

This optional feature forces wipers to slowest intermittent speed when parking brake is set and wipers are left ON for a predetermined time.

#### Windshield Washer



#### WARNING

To prevent personal injury and / or death, or damage to property, do not use the washers in freezing weather without first warming the windshield with the defrosters; otherwise, the washer solution may freeze on the windshield and obscure your vision, which could cause an accident.



#### WARNING

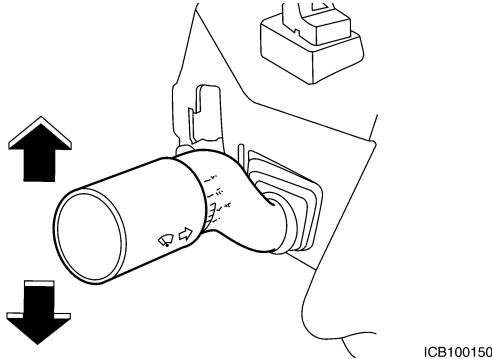
To prevent personal injury and / or death, or damage to property, do not use radiator coolant or antifreeze in the windshield washer reservoir. Radiator coolant in the washer reservoir can severely reduce visibility when sprayed on the windshield.

## Driver Controls

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Push the control on the end of the stalk inward to activate the washer function. Push and hold for a longer wash cycle. Using the windshield washer function activates the wipers. The wipers automatically cycle to clear the windshield, and also stop automatically after a 5-second cycle.

### Turn Signal



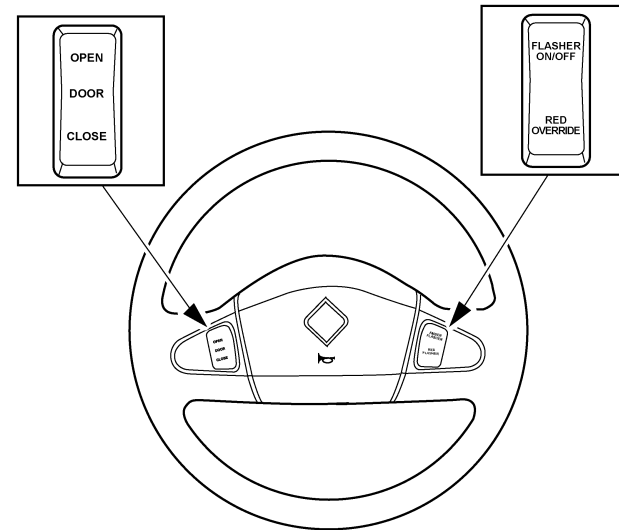
The turn signal switch is located on the left-side of the steering column and is part of the multi-function switch. Move the lever up or down to signal the turning direction. After the turn has been completed, the turn signal automatically cancels.

For additional information about the Turn Signal Multi-Function Switch refer to the **Lights** section.

## Steering Wheel and Column

### Steering Wheel Controls

**NOTE:** The location for the entry door and warning flasher switches is the steering wheel, and the left-side / right-side console switch panel.



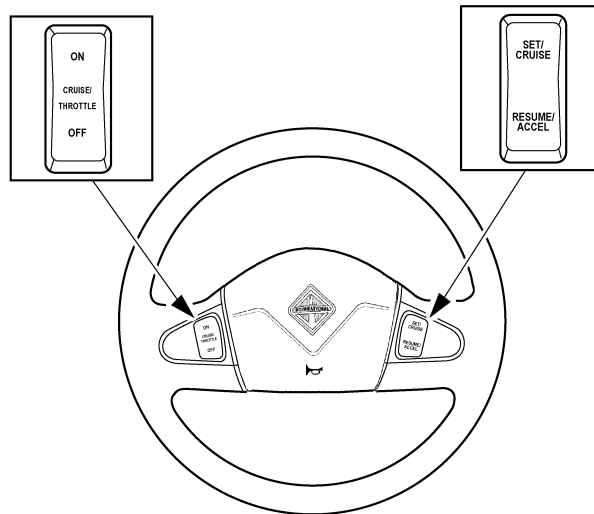
OPEN / CLOSE DOOR button is located on the steering wheel in the left-side button position.



FLASHERS ON / OFF and RED OVERRIDE button is located on the steering wheel in the right-side button position.

For the uses of these buttons see the **Passenger Control** section.

### Steering Wheel Controls



For the correct use of the cruise control switches in this location, refer to the cruise control procedure later in this section.

### Horn

The horn is a standard electric automotive type and is located in the center of the steering wheel. Push down the horn button to operate it.

### Adjustable Tilt or Tilt / Telescoping Steering Column



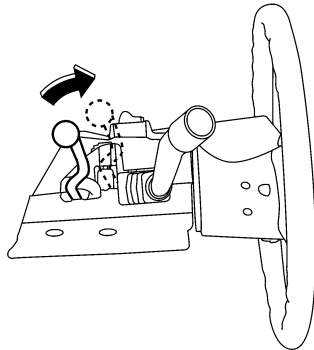
#### **WARNING**

To prevent personal injury and / or death, or damage to property, do not adjust the steering column while the vehicle is moving. It could suddenly or unexpectedly move, causing the driver to lose control of vehicle.



#### **CAUTION**

To prevent property / vehicle and / or engine component damage, do not lubricate the Tilting mechanism.



ICB100042

The optional adjustable tilt steering column allows you to pull the tilt steering control toward you and move the steering wheel up or down. Hold the control while adjusting the wheel to the desired position. Release the tilt steering control to lock the column in position.

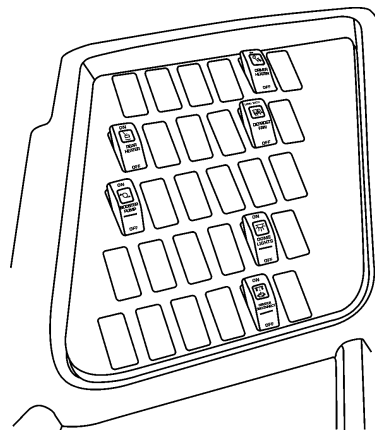
### Left-Side Console Switch Panel

#### Rocker Switches and Their Functions

**NOTE:** Due to differences in state and local requirements and customer preferences, the location and arrangements of the controls and switches on the console switch panels may be different than those illustrated. Some switch positions may be empty, while other rows may have only one switch. Switches are installed in the same location unless precluded by state regulations. Before reading this section of the manual, sit in driver's seat and become familiar with the location of the controls and switches in this bus.

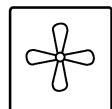
**NOTE:** Your bus may not be equipped with all switches listed.

The left-side console switch panel contains the controls for bus heaters and defrosters, destination sign, and other standard and optional bus body controls.



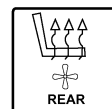
ICB100043

**DRIVER HEATER / DEFROST:**  
Turns heater / defrost blower motor to HI / LO / OFF.



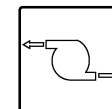
**DRIVER  
HEATER  
DEFROST**  
3813093

**REAR HEATER:** Turns heater blower HI / LO / OFF.



**REAR  
HEATER**  
ICB900002

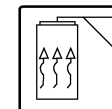
**BOOSTER PUMP:** Turns ON / OFF coolant pump in heating system.



**BOOSTER  
PUMP**

ICB100163

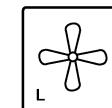
**HEATED MIRROR:** Turns heating element behind outside mirror glass ON / OFF.



**HEATED  
MIRROR**

ICB100165

**LEFT FAN:** Turns HI / LO / OFF driver's defog fan above windshield.



**LEFT  
FAN**

ICB900007

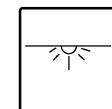
**DRIVER DOME:** Turns ON / OFF driver side lights.



**DRIVER  
DOME**

ICB100172

**DOME LIGHTS:** Turns ON / OFF interior side lights.



**DOME  
LIGHTS**

ICB100173

## Driver Controls

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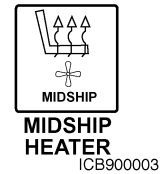
NOISE SUPP: Disconnects power to all noise generating devices.



LIFT SWITCH: Turns Wheelchair lift power ON or OFF.



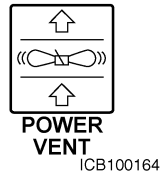
MIDSHIP HEATER: Turns heater blower motor to HI / LO / OFF.



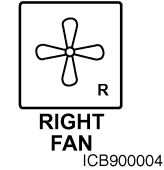
STEPWELL HEATER: Turns the Stepwell Heater ON / OFF.



POWER VENT: Turns ON / OFF power to exhaust vent.



RIGHT FAN: Turns right-side front windshield defog fan HI / LO / OFF.



DESTINATION: Turns ON / OFF illumination for destination window.



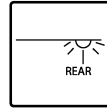
STROBE LIGHT: Turns ON / OFF top strobe light.



LAST DOME: Turns ON / OFF last dome light.



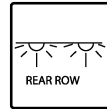
REAR DOME: Turns ON / OFF rear half dome lights.



**REAR DOME**

ICB100174

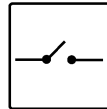
REAR ROW DOME: Turns ON / OFF rear row lights.



**REAR ROW DOME**

ICB100171

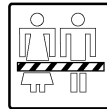
MASTER FLASHER: Turns ON / OFF system power for the warning indicator system.



**MASTER FLASHER**

ICB100176

CROSSING GATE (CANCEL): Switch that blocks extension of crossing gate.



**CROSSING GATE**

ICB100177

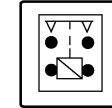
STOP ARM CANCEL: Momentary switch retracts Stop Arm / Crossing Gate turns on Chime, while RED warning flashers are on.



**STOP ARM CANCEL**

ICB100179

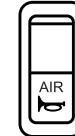
MASTER DISCONNECT: Controls power to designated body circuits, ignition switch, or rocker switch operations.



**MASTER DISCONNECT**

ICB100180

AIR HORN: Controls solenoid that turns optional Air Horn ON or OFF.



0000058013

### Power Outlet

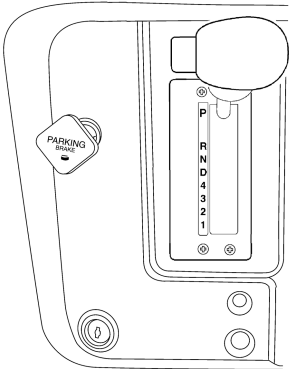
The optional power outlet is located inside the storage compartment. The power outlet supplies a 12-volt power supply for driver accessories, such as cellular phones and two-way radios.

### Transmission, Parking Brake, and Ignition Switch Panel

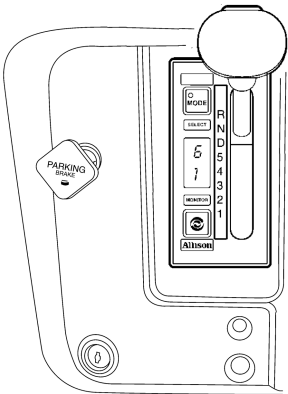
Before reading this section of the manual, sit in driver's seat and become familiar with the location of these controls.

The Transmission / Parking Brake / Ignition Switch Panel provides the mounting for the automatic transmission shifter, the knob to engage / disengage the parking brake and the ignition switch.

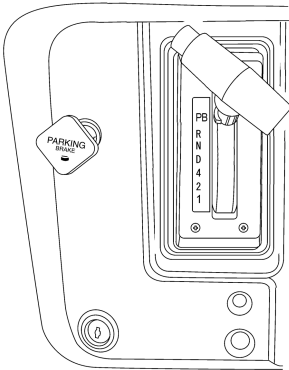
For instruction on the operation of the components on this panel, refer to the **Operation** section.



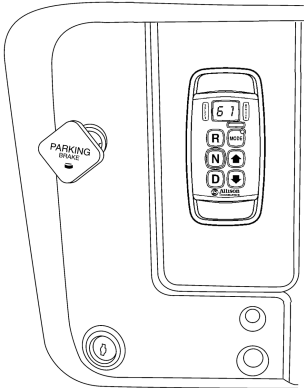
**Allison 1000 PTS Shift Lever**



**Allison Generation IV T-Bar Gearshift**



**Allison Mechanical Shift Lever**



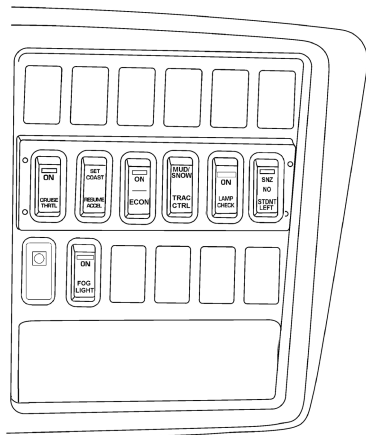
**Allison Generation IV Push-Button Shift Selector**

## Right-Side Console Switch Panel

### Rocker Switches and Their Functions

**NOTE:** Due to differences in state and local requirements, the location and arrangements of the controls and switches on the console switch panels may be different. Some switch positions may be empty, while other rows may have only one switch. Switches are installed in the same location unless precluded by state regulations. Before reading this section of the manual, sit in driver's seat and become familiar with the location of the controls and switches in this bus.

**NOTE:** Your bus may not be equipped with all the switches listed.



3813096

**CRUISE SWITCH:** Turns the cruise control system ON and OFF.



**CRUISE**

ICB100186

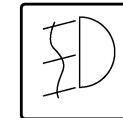
**SET / RESUME SWITCH:** sets and controls the engine speed.



**THROTTLE**

ICB100185

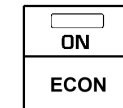
**FOG LAMP SWITCH:** Turns the fog lamps ON and OFF.



**FOG  
LAMP**

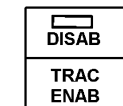
ICB100187

**ECON / ON SWITCH:** Turns transmission Economy mode ON and OFF.



**ECON  
MODE**

(If Equipped) **DISAB / TRAC ENAB SWITCH:** Turns Traction Control system ON or OFF (Air Brake chassis).



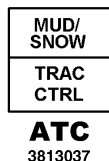
**ATC**

3813036

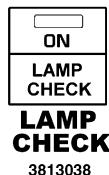
## Driver Controls

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(If Equipped) MUD / SNOW) / TRAC CTRL SWITCH: Controls amount of ATC action of the Traction Control system (Hydraulic Brake chassis).



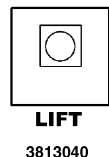
ON / LAMP CHECK: Initiates exterior lamp test during Pre Trip inspection.



SNZ / NO STDNT LEFT: Initiates delay of Post-Trip inspection system activation.



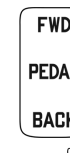
(If Equipped) Lift Door Indicator: GREEN indicator flashes to indicate that Lift door is opened.



ENG BRAKE – ON / OFF:  
Turns engine compression brake ON / OFF.



PEDAL ADJ – FWD / BACK (If Equipped):  
Allows forward / upward and back / downward repositioning of power-adjustable pedals when key is in the ON position, the park brake is set, and the transmission is in neutral or park.



## Cruise Control

### Operation



To prevent personal injury and / or death, or damage to property, do not use the cruise control system when unpredictable driving conditions are present. Such conditions include heavy traffic and / or roads that are winding, icy, snow covered, slippery, wet, or with a loose surface. These conditions may cause wheel slippage and loss of vehicle control.



**NOTE:** The right-side console switch panel is the standard location for the cruise control switches. These switches may be located on the steering wheel as an available option, moving the entry door controls and pupil warning indicator to the right-side console switch panel.

The electronic engine vehicle speed controls are activated by the switches located on the console switch panel.

The left-side ON / OFF switch turns the control feature ON or OFF. The right-side switch (SET / COAST — RESUME / ACCEL) sets and controls the engine speed.

1. Press the ON position on the ON / OFF rocker switch to activate the cruise control feature.
2. Press the SET position on the rocker switch after reaching a speed of at least 56 km/h (35 mph) to set the cruise speed.
3. Push and hold the RESUME / ACCEL to increase your set speed, or the SET / COAST to decrease your set speed.
4. A slight tap on the brake pedal deactivates the cruise. To return to this speed, press the RESUME / ACCEL position switch.
5. Push the OFF position on the switch to cancel the previous speed setting. The previous speed setting is also cancelled when the vehicle is turned OFF.

## **Mirror Adjustment**

### **WARNING**

To prevent personal injury and / or death, or damage to property, use patience and always check the overall field of vision when unloading, as some children could be outside the field of vision. Do not move your bus until you have confirmed the location of every child and confirmed that they are clear.

### **WARNING**

To prevent personal injury and / or death, or damage to property, mirrors are not a substitute for exercising care in operating the vehicle. Mirrors must be properly adjusted for each driver and the driver must be aware of the limitations on the viewing area that exists even when the mirrors are properly used.

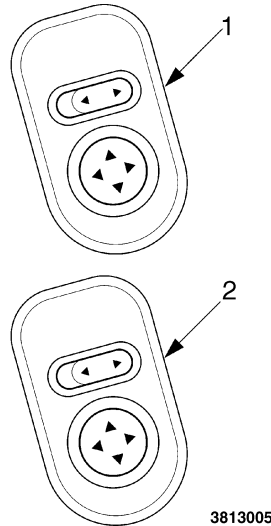
### **WARNING**

To prevent personal injury and / or death, or damage to property, only use the crossview mirrors to view pedestrians while the bus is stopped. Images in such mirrors do not accurately show other vehicle locations.



### WARNING

**To prevent personal injury and / or death, or damage to property, make sure your path is clear in all directions before moving your vehicle. All vehicles have blind spots. If necessary, ask for assistance when moving vehicle. Backup alarms are available through your IC Bus® dealer. However, they are never a substitute for the above procedures.**



1. Left- / Right-side flat mirror adjustment switch
2. Left- / Right-side convex mirror adjustment switch

The optional mirror adjustment controls are located on the left-side console control panel. The switches with the left and right directional arrows control which side will be adjusted. For left-side adjustment make sure the switch is in the left position. For right-side mirror adjustment make sure the switch is in the right position.

Before driving the bus, check the mirror adjustment. The mirrors enhance visibility and assist safe vehicle operation. Make sure you can see the entire front of the bus using the cross view mirrors. Use the rear view mirrors to see both sides of the bus, and at least four bus lengths behind the bus. Use the following steps to adjust the mirrors before you operate the bus.

1. Adjust the driver's seat to the desired position, and observe the view through all outside mirrors to enhance visibility in all directions
2. Look through the right-side flat driving mirror and make sure that the top of the side windows are visible in the upper edge of the mirror, and that the right-side of the bus body is visible in the inside edge of the right-side flat mirror.
3. Look through the right-side convex driving mirror and make sure that the view in the top of the convex mirror overlaps the view covered by the right-side flat driving mirror, and that the right-side of the bus body is visible in the inside edge of the right-side convex mirror.

4. Look through the left-side flat driving mirror and the left-side convex driving mirror and observe that the views are the same as described for the right-side mirrors. Refer to Steps 2 and 3.
5. Look through and adjust the cross view mirrors to make sure that there is complete visibility around both sides and the front of the bus



## SECTION 5 — LIGHTS

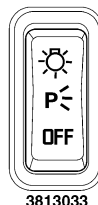
### Headlight Switch and Panel Lighting Control

#### Headlight Switch

These switches are part of the instrument panel gauge cluster and located below the Instrument Gauges.

The headlights, parking, marker and tail lights are controlled by the three-position PARK / HEADLIGHT rocker switch. This switch functions even when ignition key is turned OFF.

- Place the switch in the top position to turn ON the headlights, parking, marker and tail lights. The instrument panel gauge cluster illuminates when the park or headlights are turned ON.
- Place the switch in the middle position to turn ON the parking lights, marker lights, and taillights.
- Place the switch in the lower position to turn OFF the lights.



**Headlight Warning Buzzer Feature** This optional buzzer sounds when headlight switch is ON and ignition switch is in the OFF position.

**Daytime Running Lights Feature** This feature provides for vehicle headlights to be turned on when engine is running and headlight switch is in OFF position.

**Optional Headlight Feature (08WPY)** Provides for headlights, tail lights, park / marker lights, and instrument panel gauge cluster lights to function with ignition switch ON and headlight switch OFF.

**Optional Headlight Feature (08WRU)** Provides for headlights, tail lights, park / marker lights, and instrument panel gauge cluster lights to function when the engine is running and headlight switch OFF.

#### Automatic Headlights

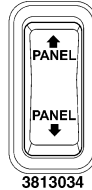
The optional automatic headlights feature automatically turns on headlights at low ambient light levels. This feature can be overridden, however, by pressing the push button switch in the lower left-side switch pack in the instrument panel gauge cluster.



# Lights

## Panel Lighting Control

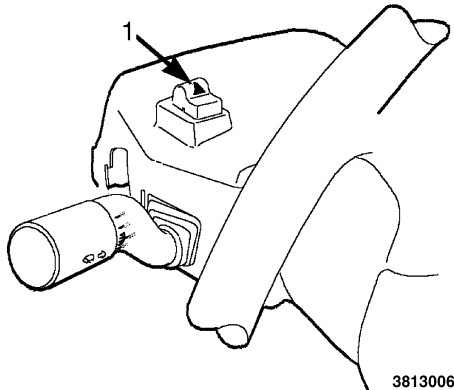
The Panel rocker switch controls the panel lighting brightness. Press the upper portion of the rocker switch to increase the brightness. Press the lower portion of the rocker switch to dim the brightness.



## Interior (Dome) Lights

For control of inside lights, see the **Driver Controls** section.

## Hazard Warning Light Switch



1. Hazard warning light switch

Use the hazard warning light switch in an emergency to warn traffic of vehicle breakdown, approaching danger, the vehicle is in tow, or is operating at a reduced speed. The hazard warning lights can be operated with the ignition in any key switch position.

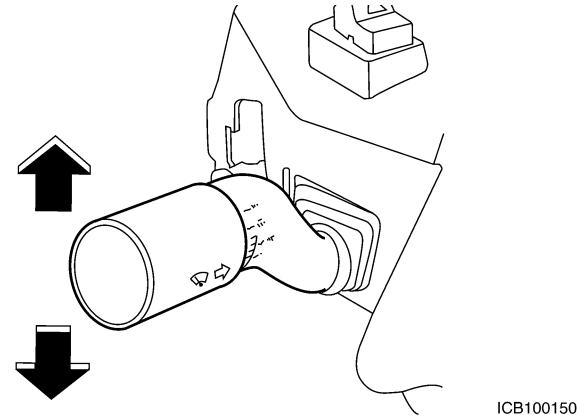
Press the button to activate all hazard flashers simultaneously.

Press the button again to turn the flashers OFF.

## Turn Signal Switch

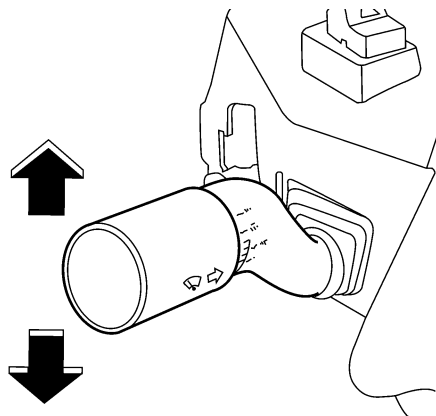
The turn signal switch is mounted on the left-side of the steering column below the steering wheel. The GREEN directional indicator lights, which are activated by the turn signal switch, are located on the instrument panel.

## Signaling for a Turn



Move the turn signal lever up or down to the full turn position which is past the point of resistance. The turn signal automatically cancels if the steering wheel is turned through a large enough degree.

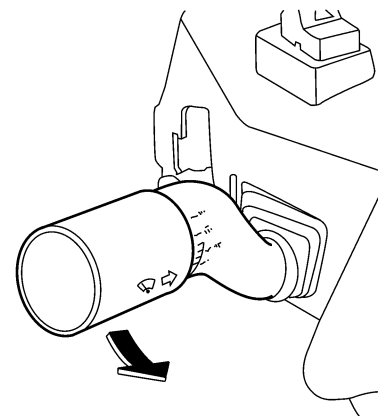
## Lane Change



ICB100150

Some switches include a lane change feature, which allows you to signal your intention to change lanes without locking the switch into the full turn position. Move the turn signal lever, up or down, to the point where resistance to movement is felt. The turn signal lever returns to the OFF position when released.

## HI / LO Beam



ICB100154

Pull the turn signal lever past the click position, the lights switch to high-beam position. Pull again to return to low-beam.

## Strobe Light

The optional strobe light comes on automatically unless operated by a separate switch. Check your state regulations on strobe light use.

## Exterior Lamp Check

### Switch Location

The switch to activate and deactivate the exterior lamp check system is one of the right-side user switches located below the instrument panel gauge cluster.

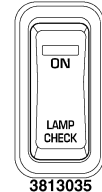
### Function

The exterior lamp check is a feature that allows the driver to conduct the exterior lamp check by themselves. The exterior lamp check is included in the **Vehicle Inspection Guide** section of this manual. While the system is active, the driver can exit the bus and visually inspect all lights on the exterior of the vehicle for proper operation.

### Activation

To activate the exterior lamp check:

- Turn the key to the ON or Accessory (ACC) ignition position.
- All lights that will be checked must be turned OFF.
- The parking brake must be applied.
- Place the exterior lamp check switch in the ON (up) position. The exterior lamp switch ON indicator will then illuminate GREEN.



### Deactivation

To deactivate the system, do any one of the following:

- Press the exterior lamp switch to the OFF (down) position.
- Move the ignition switch to the OFF or ACC position.
- Manually turn on lamps being checked with this feature.
- Release the parking brake.

When the exterior lamp check system is deactivated the GREEN indicator on the switch will turn OFF.



## SECTION 6 — PASSENGER CONTROL

### Door Opening / Closing

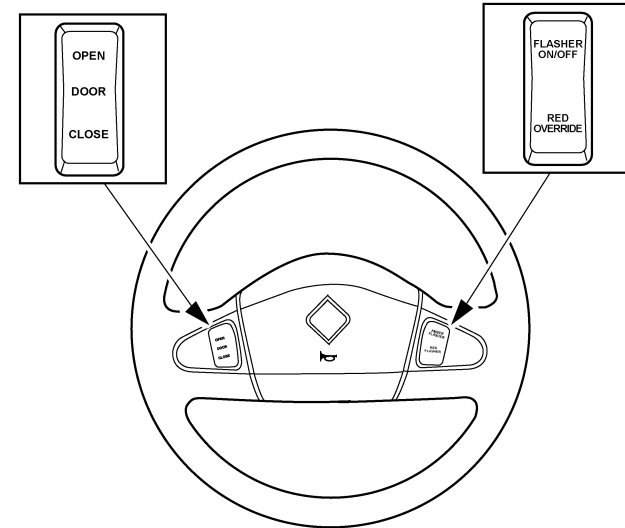
#### Opening / Closing



#### WARNING

To prevent personal injury and / or death, or damage to property, make sure that each child, and all of their clothing, backpacks, bookbags and other belongings are clear of the vehicle before the door is closed and the bus operated. Consult with local and state authorities for specific procedures that may apply for children entering or exiting buses.

**NOTE:** Due to various state and local requirements, the location of the entrance door OPEN / CLOSE switches shown may be different from your vehicle.



ICB100056

The entrance door OPEN / CLOSE button is located on the steering wheel in the left-side button position.

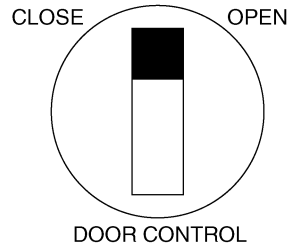
Press the top of the button to open the entrance door.

Press the bottom of the button to close the entrance door.

## Passenger Control

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### Two-Position Door Switch



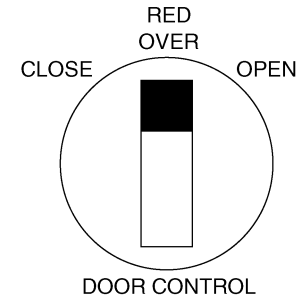
ICB900012

The optional two-position door switch is located on the left-side or right-side console switch panel.

With the ignition ON, the entrance door can be opened by moving the switch to the OPEN position.

With the ignition ON, the entrance door can be closed by moving the switch to the CLOSE position.

### Three-Position Door Switch



ICB900013

The optional three-position door switch is located on the left-side or right-side console switch panel.

With the ignition ON, the entrance door can be opened by moving the switch to the OPEN position.

With the ignition ON, the entrance door can be closed by moving the switch to the CLOSE position.

Moving the switch to the RED OVER position will start the RED flashers (assuming the master flasher switch is ON) but will not open or close the entrance door.

### Opening the Entrance Door

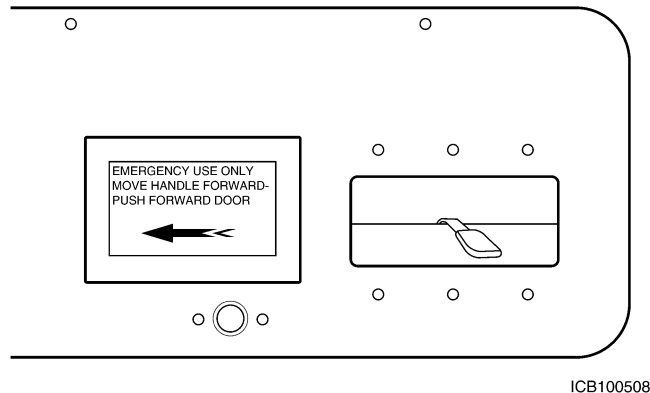
#### Opening the Entrance Door Manually



#### WARNING

To prevent personal injury and / or death, or damage to property, for outward opening doors, when the door Manual / Automatic switch is in the manual position, do not allow anyone to lean against the entrance doors, as they will open allowing a person to fall out of the bus. The manual position is only to be used in Emergency or Service Conditions.

#### Electric-Actuated Door



The emergency release for the electrically actuated door is located behind the access panel over the entrance door. To release the electrically actuated door, grasp the handle and move forward (left).

#### Air-Actuated Door

The emergency release for the air actuated door is located on the right-side of the instrument panel. To release the air actuated door, move the toggle switch from NORMAL to EMERGENCY.



### Traffic Warning System

The Traffic Warning system alerts both oncoming and following drivers when the bus is preparing for safety stops, such as railroad crossing stops, or when loading and unloading passengers. The system consists of an eight-lamp RED and AMBER warning indicator system and an optional electronic safety messages sign. Both of these systems will be described below.

## Passenger Control

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### Electronic Safety Messages

The electronic messaging system is an electronic rear facing LED sign that provides two distinct safety messages to alert drivers when the bus is stopping or stopped. When the AMBER warning lights are activated, the alternating **Caution - Stopping** LED message flashes.



3813007

When the RED warning lights are activated and the stop arm is deployed, the alternating **Stop – Do Not Pass** LED message flashes. See the description of the eight-lamp AMBER and RED warning lights below.



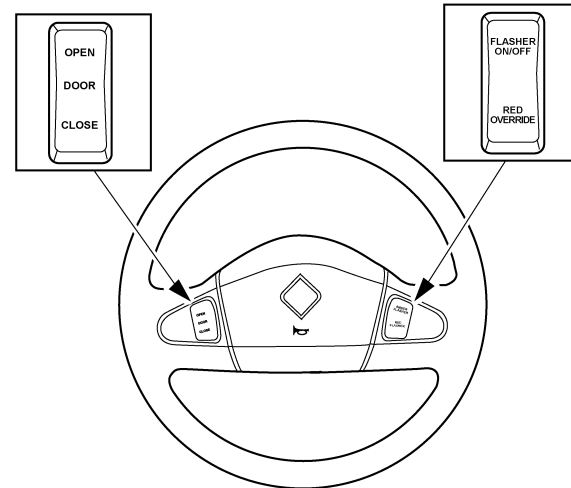
3813008

### Eight-Lamp AMBER and RED Warning Lights

The eight-lamp AMBER and RED warning system is made up of four AMBER (two front and two rear), and four RED (two front and two rear) flashing lights, and is part of the warning flasher system.

The AMBER warning lights alert the public of the intent to stop and load / unload students onto / from the bus. The RED warning lights and the stop arm are intended to warn the public that students are boarding or leaving the bus.

The warning indicator control is located on the right-side of the steering wheel.



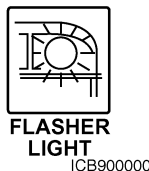
ICB100056

### Optional Rocker Switches

**NOTE:** These switches can be located on the left-side or right-side console switch panel.

**NOTE:** These rocker switches are an optional alternative to the steering wheel controls. When this option is chosen, the cruise / throttle switches move to the steering wheel location.

### Sequential System



Press the FLASHER LIGHT ON / OFF button to engage the AMBER warning lights.

The AMBER warning lights change automatically to the RED warning lights when the entrance door is opened.

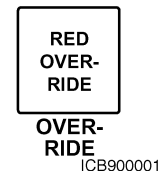
The RED warning lights will deactivate when the door is closed and the vehicle travels faster than a preset road speed parameter.

The optional RED warning lights will deactivate when the door is closed when the bus is not moving.

**NOTE:** If the entrance door is reopened without pressing the FLASHER ON / OFF or the RED OVERRIDE buttons, the RED warning lights will not activate.

Press the RED OVERRIDE button twice to turn OFF the RED warning lights while the door is open and the bus is not moving or traveling at a speed lower than the preset road speed parameter with the door closed.

### Non-Sequential System



With the master flasher switch in the ON position, press the FLASHER ON / OFF button to engage the AMBER warning lights. (If the master switch is not turned ON, there will be no activation of the lights or stop arm.)

## Passenger Control

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The AMBER warning lights change automatically to the RED warning lights when the entrance door is opened.

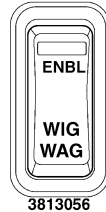
The RED warning lights will deactivate when the doors are closed.

**NOTE: If the door is reopened, the RED lights will reactivate without pressing the FLASHER LIGHT ON / OFF or the RED OVERRIDE buttons.**

To turn OFF the RED warning lights while the door is open and the bus is not moving, press the RED OVERRIDE switch twice, or turn OFF the master flasher switch.

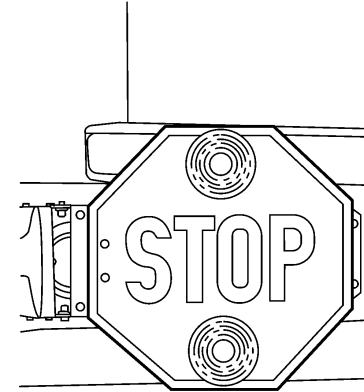
### WIG WAG Warning System (If Equipped)

The optional Wig Wag is a device for flashing the right-side and left-side headlights alternately at a preset rate of about 75 times per minute. If the low beams are on, the high beams will alternate and vice versa. If the driving lights are on, the low beams will alternate.



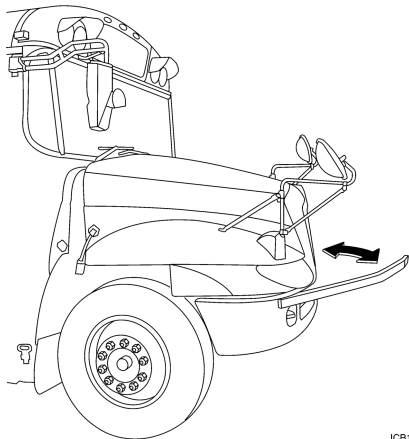
### Flashing Stop Arm

Used to warn the public that students are boarding or leaving the bus



ICB100155

### Crossing Gate



The crossing gate extends when the RED warning lights are on to make sure that students do not cross too close to the front of the bus and out of the view of the driver.

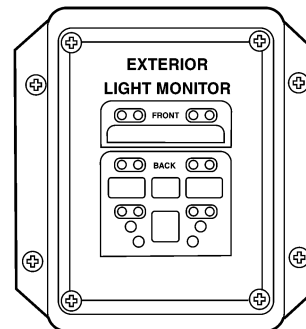
**NOTE: The illustration is for reference only and may differ from the actual vehicle.**

### Driver Visual Warning Lights and Indicators

The driver's visual warning lights, located in the instrument panel gauge cluster, indicate the operation of the eight lamp warning system (either AMBER or RED), the wheelchair lift door indicator, and other optional equipment.

Each indicator only comes on when the respective light or switch is activated.

**EXTERIOR LIGHT MONITOR (OPTIONAL):** The light monitor is mounted in the overhead console panel.



### Audible Warning Buzzer

The audible warning device buzzer is activated when the rear emergency door, roof hatch (if equipped with a buzzer), kickout windows, or side emergency doors are open with the ignition switch in the ON or Accessory (ACC) position.

### Post-Trip Inspection Systems

It is the driver's responsibility to check for children who may be left on the bus at the end of every trip. The post-trip inspection system is intended to be an aid to the driver in order to ensure that the responsibility is not accidentally overlooked.

## Passenger Control

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### Post-Trip Inspection Activation (No Student Left Behind® System)

Normal student pickup and drop off operation of the bus will automatically activate the system. The system can be simulated by performing the following procedure:

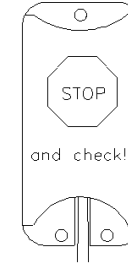
1. Start the bus or turn the ignition to the ON position.
2. Activate the RED flashers.

### Post-Trip Inspection Deactivation (No Student Left Behind® System)

To deactivate the Post-Trip (Leave No Student Left Behind® System) perform the following steps to avoid horn honking and headlights flashing:

**NOTE: If the disarm procedure is not followed and the ignition is in the OFF position, turn the ignition to the ON position to stop the horn from honking and start the procedure again.**

1. Turn the ignition to the OFF position and then back to the ON position, the system will give a reminder beep every 30 seconds for up to 4 minutes.
2. Proceed to the rear of the bus checking for children that may still be on the bus. Once the rear of the bus is reached, press and release the post-trip inspection button. The system is now deactivated.
3. Return to the front of the bus and turn the ignition to the OFF position. Remove the key if exiting the bus.



### Inspection Activation (Child Check-Mate System)

Normal student pickup and drop off operation of the bus will automatically activate the system. The system can be simulated by performing the following procedure:

1. Turn the ignition to the Key ON position.
2. Activate RED flashers or the system will self arm after 10 minutes of the bus ignition being in the Key ON position with the door closed.

### Post-Trip Inspection Deactivation (Child Check-Mate System)

To deactivate the Post-Trip (Child Check-Mate) perform the following steps to avoid horn honking and headlights flashing:

**NOTE: If the disarm procedure is not followed, turn the ignition to the ON position and close the entrance door to stop the horn from honking and start the procedure again.**

1. Turn the ignition to the Key OFF position and close the entrance door.



- The dome lights will turn ON for added view of the bus. Proceed to the rear of the bus checking for children that may still be on the bus.

### NOTE: Post-Trip

**The operator will have 60 seconds to press the post-trip inspection button at the rear of the bus.**

- Press and release the post-trip inspection button at the rear of the bus.
- The system is now deactivated, the dome lights will flash to confirm the system is disarmed. The dome lights will remain ON for the next 60 seconds.
- Proceed to the front of the bus and remove the key if exiting the bus.

## Emergency Exits

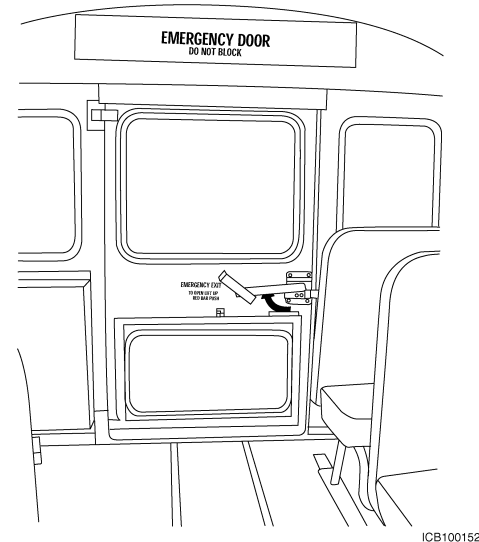
**NOTE: Make sure the printed operating instructions are present and visible at all times. Inspect every emergency exit every day for proper operation.**

Opening any emergency exit will trigger an alarm to alert the driver when the key is in the on or accessory position.

**NOTE: A label stating Do Not Block is required by each emergency door and side emergency exit window. This label is a warning to the user of the bus not to block the emergency exits with wheelchair, child restraint systems or other items; for example, trash containers.**

Pull up the RED lever to unlatch the emergency door. After the door is unlatched, push outward to open. Make sure the printed operating instructions are present and visible at all times. Inspect every emergency exit every day for proper operation.

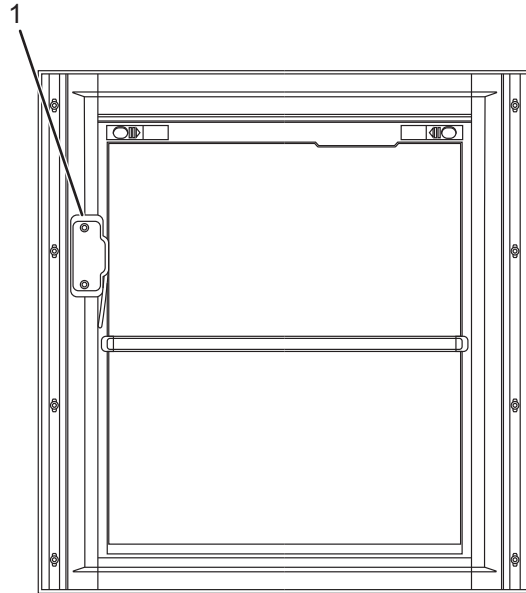
### Emergency Door



ICB100152

### Emergency Exit Windows

#### *Emergency Exit Window*

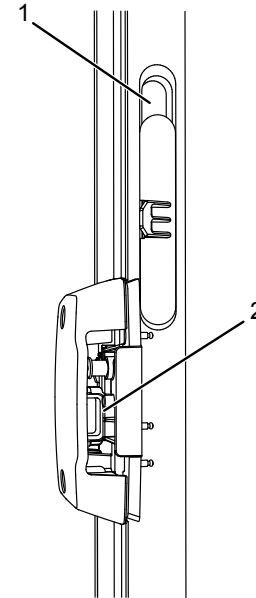


0000428403

1. Release handle

**NOTE: Ensure the printed operating instructions are present and visible at all times. Inspect every emergency exit every day for proper operation.**

Pull up on the release handle to unlatch the Emergency Exit Window, and push the window outward to open.



0000433122

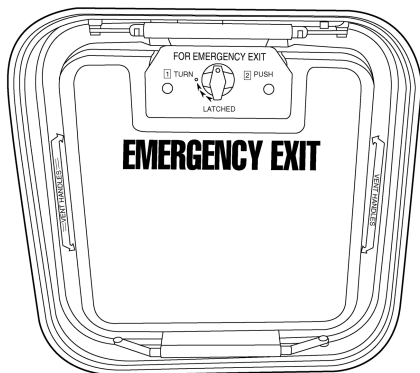
1. Slide lubrication point
2. Release handle lubrication point

Make sure windows are free of dirt, fog, condensation, and snow. Make sure the windows can open and close completely. Once a year, pull up on the release handle to open the emergency windows and lubricate the window slides (2) and release handle. Only specific lubricants should be used on the emergency exit window lubrication points. For emergency exit window lubrication specification, refer to the **Maintenance Intervals and Specifications** section of this manual.

### **Roof Vent / Hatch**

When using the vent, push upward at the locations marked on the hatch.

Open the hatch by turning the RED knob to the 2 position, then push upward on the knob. Make sure the printed operating instructions are present and visible at all times. Inspect every emergency exit for proper operation every day. The emergency hatch type may be different in your bus. If your emergency hatch is different, become completely familiar with its operation before driving the bus.



ICB100151

### **Vandal Locks**

The optional vandal lock mechanism is used to lock access doors, rear emergency window, and roof hatches to prevent unauthorized access to the bus while not in use. Vandal locks can be provided on front entrance doors, side emergency door, rear emergency window, roof hatches, and lift doors.

On the side emergency door, the vandal lock is a dead bolt lock that the driver slides in place to secure the bus from unwanted vehicle access.

On the rear emergency window, the driver uses the vandal lock handle to slide the lock in place.

The vandal lock, for the front entrance door, is engaged with a standard-looking door key, which is rotated clockwise to lock the door and counterclockwise to unlock the door.

Vandal locks for all emergency exits include ignition starter interlocks. The front entrance door vandal lock may include an ignition starter interlock.

#### **Vandal Locks with Starter Interlock (If Equipped)**

**NOTE:** Once the bus engine is running, the vandal lock / starter interlock will not stop the bus, but it will prevent it from restarting when the lock is engaged. The alarm will be activated to alert the driver.

As an extra measure of security, the bus may be equipped with the optional vandal lock feature with starter interlock.

## Passenger Control

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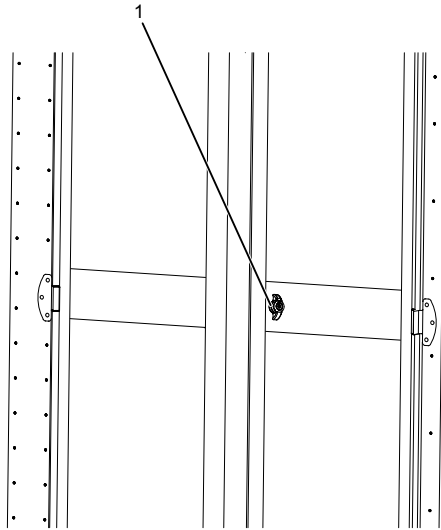
The ignition starter interlock prevents the bus from being started while the exit door is locked. If the ignition switch is turned to the START position while vandal locks are in place, an alarm will be activated as long as the door is locked.

### Entrance Door Lock (If Equipped)

As an extra measure of security, the bus may be equipped with a entrance door lock. This lock mechanism is used to lock the entrance door to the bus in order to prevent unauthorized access to the bus while not in use or attended.

To lock the entrance door lock feature, rotate the latch clockwise.

To unlock, rotate the latch counterclockwise.



0000431525

1. Latch

## SECTION 7 — SEATING AND SAFETY RESTRAINTS

### Driver Seat Adjustment



#### WARNING

To prevent personal injury and / or death, or damage to property, always use driver restraint system when vehicle is moving.



#### WARNING

To prevent personal injury and / or death, or damage to property, do not adjust driver's seat while vehicle is moving. The seat could suddenly or unexpectedly move, causing the driver to lose control of vehicle.



#### WARNING

To prevent personal injury and / or death, or damage to property, use caution and reduce speed when operating this vehicle over rough roads or surfaces as this can cause loss of vehicle control. Use caution and reduce speed. Properly adjusted seats and seating systems may not compensate completely for severe road conditions. Ensure that head clearance will be maintained during all road conditions, as the seat may move up and decrease the available space.

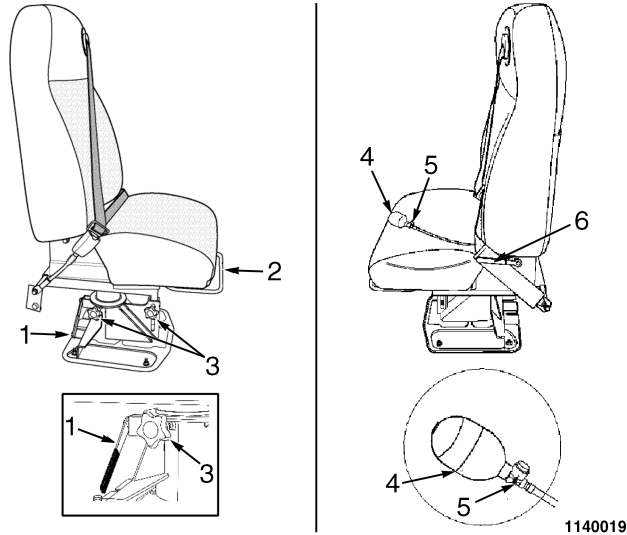


#### WARNING

To prevent personal injury and / or death, or damage to property, apply parking brake and place transmission in Park, if available, or Neutral prior to exiting the driver seat.

**NOTE:** This bus may be equipped with an optional driver seat that may be different from the one described in this manual. If so, refer to the seat manufacturer's manual for proper operation and maintenance.

### Seat Height Adjustment



1. Seat height lever
2. Forward / aft adjustment bar
3. Seat height adjustment lock knob
4. Lumbar support squeeze bulb
5. Release valve
6. Seatback adjustment lever

There are three possible seat heights available: Top, Middle, and Low. At the top position three adjustment holes are visible, and at the low position none of the holes are visible.

### **WARNING**

**To prevent personal injury and / or death, or damage to property, do not adjust driver's seat while vehicle is moving. The seat could suddenly or unexpectedly move, causing the driver to lose control of vehicle.**

**NOTE: All seat height adjustments must be made WHILE NOT SITTING IN THE SEAT.**

Adjust the seat height as follows:

1. Loosen the seat height adjustment lock knob just enough to allow seat height adjustment.
2. While standing to the side of the seat, lift and hold the seat height lever while raising or lowering the seat to the desired height, then release the lever. While adjusting the seat height, the seat height lever may remain in the up position. The location and orientation of the height adjustment lever may vary.
3. When at the desired position, move the seat slightly up or down until the seat height lever snaps to its height engaged (down) position.
4. After the desired seat position is satisfied, tighten the seat height adjustment lock knob.

### Forward / Aft Adjustment

Lift and hold the forward / aft adjustment bar to move the seat forward or backward, and release the lever at the desired position.

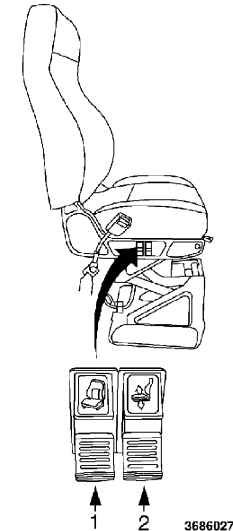
### Seatback Adjustment

The seatback adjustment lever is located on the left-side of the seat. Lift and hold the seatback lever while moving the seatback forward, or rearward, and release the lever at the desired position.

### Lumbar Support Adjustment

Squeeze the lumbar support squeeze bulb to move the support upward. To move the lumbar support downward, release the air from the lumbar support squeeze bulb, by turning the release valve counterclockwise.

### Optional Air Suspension Seat



1. Lumbar adjustment
2. Height adjustment

### Forward / Aft Adjustment Lever

Move and hold the forward / aft adjustment lever to the left to move the seat forward or backward.

### Seatback Adjustment Knob

The seatback adjustment knob is located on the left-side of the seat at the intersection of the seatback and the lower seat cushion. Turn the seatback adjustment knob clockwise to tilt the seatback forward and rotate the knob counterclockwise to tilt the seatback rearward.

### Lumbar Support

Pull the left-side switch (lumbar support switch) upward or push downward to adjust the lumbar support to your preference.

### Height Adjustment Switch

Lift the height adjustment switch upward to adjust the seat height. While seated, pull the lever up and release when an acceptable height has been achieved. To lower the seat, depress the switch and stop when an acceptable height has been reached.

### Driver Seat Belts



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, any seat belt in use during an accident must be replaced. When replacement of any part of the seat belt is required, the entire belt must be replaced, both retractor and buckle sides.**



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, properly inspect and maintain seat belts every 10,000 miles or sooner during heavy usage.**



Wear your seat belt at all times the vehicle is in motion to avoid personal injury. Before fastening the seat belt, adjust the seat to the desirable driving position. Driver's lap and shoulder (three-point) seat belt with retractor is standard.

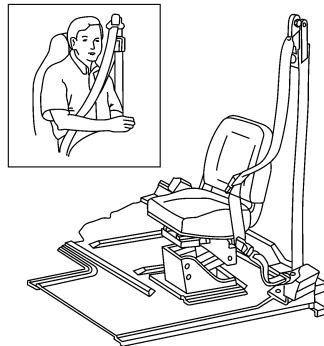
### Driver's Adjustable Lap and Shoulder (Three-Point) Belt



#### WARNING

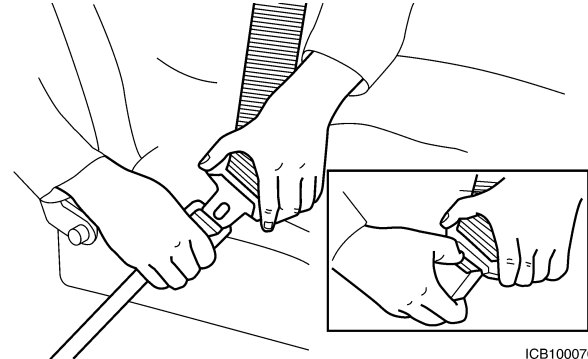
To prevent personal injury and / or death, or damage to property, position the safety belt height adjusters so that the belt rests across the middle of your shoulder. Failure to adjust the safety belt properly could reduce the effectiveness of the seat belt.

Inspect the entire seat belt assembly for corrosion, wear, fraying or weak spots. Check the retractor, latch, and buckle for proper function, and all seat belt mounting bolts for tightness.



ICB100069

Bring the belt across your hips and chest and insert the latch plate into the buckle until secure to fasten the seat belt. The web is free to slide through the latch plate, allowing the belt tension to equalize across your hips and chest. The retractor is a locking type that allows the webbing to adjust for body movement.



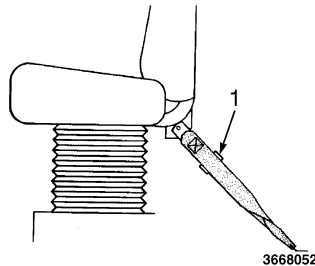
ICB100070

Press the release button to disconnect the seat belt.

### Seat Belt Tether

**NOTE:** The majority of the driver seats have nonadjustable tethers. Driver seats with adjustable tethers must follow the Tether Adjuster Procedure.

#### Tether Adjuster Procedure

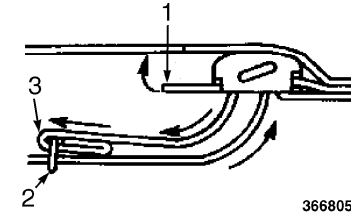


1. Tether adjuster

**NOTE:** The seat belt tether must be checked for proper adjustment prior to vehicle operation.

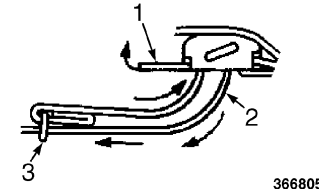
1. Adjust the driver seat fore and aft to accommodate driver comfort.
2. After the seat is adjusted, take weight off the seat to allow the seat to rise to its highest point.
3. Pull the webbing through the tether adjuster until there is no slack.

#### Adjusting the Length of the Tether



1. Tether adjuster
2. Wire loop
3. Nub

To shorten the tether, squeeze the tether adjuster and pull the nub and wire loop to move the webbing away from the tether adjuster (as shown by the arrows).



1. Tether adjuster
2. Strap
3. Wire loop

To lengthen the tether, squeeze the tether adjuster and, while firmly holding the strap, use the nub and wire loop to move the webbing toward the adjuster (as shown by the arrows).

### Care of Seat Belts



#### WARNING

To prevent personal injury and / or death, or damage to property, do not bleach or re-dye seat belt webbing. Bleaching or re-dyeing may cause a weakening / premature deterioration of the webbing.



#### WARNING

To prevent personal injury and / or death, or damage to property, use caution when cleaning seat belts. Disinfectant products can contain solvent based chemicals that can adversely affect seat belt components.

#### NOTE:

- Do not use a 70% isopropyl solution as a wash solution.
- Do not use a 70% isopropyl solution wipe on seats that are hot from day time heat.
- Vapors can accumulate quickly when using a 70% isopropyl solution wipe. Maintain adequate ventilation by opening windows and doors.
- The effectiveness of the 70% isopropyl solution can be diminished when used in high heat conditions due to evaporation.

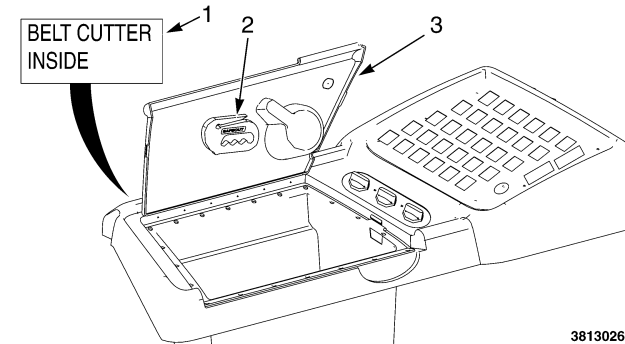
Clean the belts occasionally with mild soap. Do not use cleaning solvents or abrasives.

A 70% solution of isopropyl alcohol can be used as a disinfectant wipe. A 70% isopropyl solution is readily available from local sources.

### Inspection of Seat Belts

Inspect the buckle and latch plate for positive engagement and effective release. Inspect the webbing and assembly for damage or wear. Replace the entire belt if any deficiencies are found.

### Seat Belt Cutter



1. Belt cutter label
2. Seat belt cutter
3. Lid

If it becomes necessary to cut through a seat belt, the seat belt cutter is located inside of the driver's compartment lid.

## Seating and Safety Restraints

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**NOTE:** Location of seat belt cutter may vary according to state regulations.

### Passenger Seat Belts

Buses may be equipped with optional passenger seat belts.



#### **WARNING**

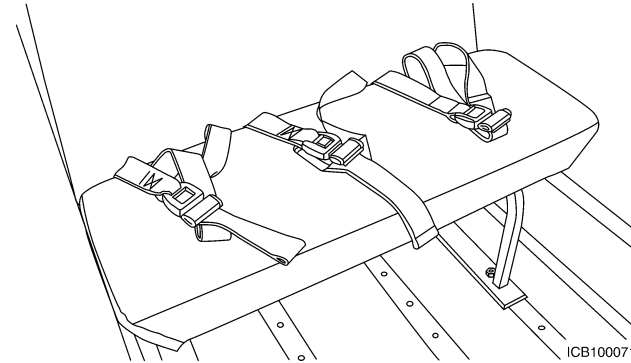
To prevent personal injury and / or death, or damage to property, properly inspect and maintain seat belts every 10,000 miles or sooner during heavy usage.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, any seat belt in use during an accident must be replaced. When replacement of any part of the seat belt is required, the entire belt must be replaced, both retractor and buckle sides.

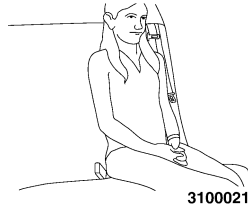
### Passenger Two-Point Seat Belt (Lap Belts)



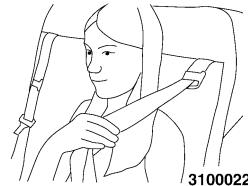
To loosen the belt, slide the latch up the webbing as far as necessary to make the belt go around the passenger's lap. Insert the latch plate into the buckle until secure. To loosen, pull up on the lap belt. Tighten the belt until it is snug by pulling on the loose end of the belt. Push the release button on the buckle to release the seat belt. Position the lap portion of the belt so that the webbing is below the passenger's waist, not over the stomach or abdomen area. The lap portion of the belt must be low and snug over the bony structure of the passenger's hips.

### Passenger Three-Point Seat Belts (Optional)

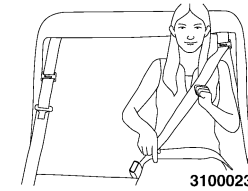
#### *Buckling Up*



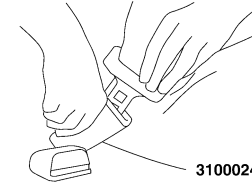
1. The passenger should sit as flat against the seat back as possible to achieve the best possible fit of the lap-shoulder belt on the passenger's upper and lower torso.



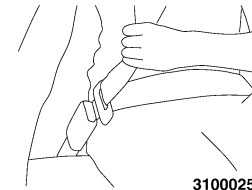
2. Pull out the shoulder belt webbing from the upper seat back. Do not let the belt get twisted. (The shoulder belt may lock if pulled across the body too quickly. If this happens, let the belt retract slightly to unlock it. Then pull the belt across you more slowly).



3. Place the lap-shoulder belt over the shoulder and around the passenger's upper body.



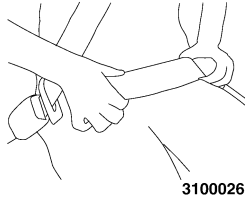
4. Insert the latch plate into the matching seat belt buckle on the lower seat cushion.



5. Listen for an audible click when the latch plate is fastened. Check that the buckle connection is secure by pulling on the shoulder portion of the lap-shoulder belt.

## Seating and Safety Restraints

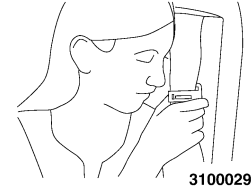
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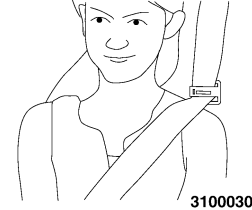
6. Position the lap portion of the belt so that the webbing is below the passenger's waist, not over the stomach or abdomen area. The lap portion of the belt must be low and snug over the bony structure of the passenger's hips.



7. Pull up on the shoulder portion of the lap-shoulder belt to tighten the lap portion. **This step is important and must be done to ensure proper fit of lap-shoulder belt to passenger.** The shoulder portion of the belt must be snug across the chest and in the center of the passenger's shoulder.

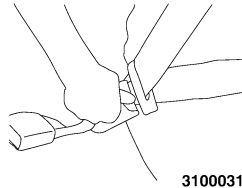


8. Position the shoulder height adjuster at or just above the passenger's shoulder. The shoulder belt should not cross the passenger's face or neck.

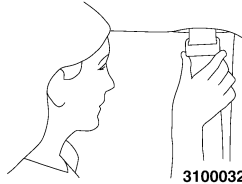


9. Make sure the lap-shoulder belt is snug and lies flat against the passenger. There should be no twisting of the webbing.

### Unbuckling

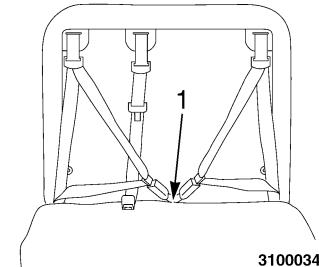


1. Push the RED buckle release button and remove the latch plate from the buckle. The buckle has a release mechanism that separates the latch plate from the buckle.
2. Allow the shoulder belt to retract and stow in the upper seat back.



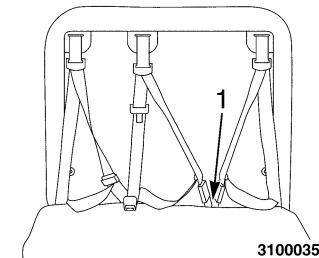
3. As a courtesy to the next passenger, move the shoulder height adjuster up to the highest position.

### 39 Inch Flex Seat



1. Sliding dual buckles (two seating position)

**Use for two children:** Slide the sliding dual buckles on right-side all the way left to create two seating positions.



1. Sliding dual buckles (three seating position)

**Use for three children:** Slide the sliding dual buckles on right-side all the way right to create three seating positions.

## Seating and Safety Restraints

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### Integrated Child Restraint Seats (Optional)



#### **WARNING**

To prevent personal injury and / or death, or damage to property, observe the following:

- Follow all instructions on the child restraint and in this manual.
- It is important to use an approved rearward facing infant restraint for a full year to allow the neck and spine to develop enough to support the weight of the child's head in the event of a collision.
- Adjust the belts provided with this child restraint snugly around the child.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, observe the following:

- A frayed or torn child restraint belt could rip apart in a collision and leave your child with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately.
- Do not disassemble or modify the system.
- Child restraint belt systems must be replaced after a collision if they have been damaged (such as a bent buckle or 5-point connector, or torn webbing). Similarly, the child restraint-equipped bench or bucket seat must be replaced after a collision if it is damaged (such as a bent or broken seat frame).

Indiana Mills and Manufacturing Inc. (IMMI®) Integrated Child Restraint Seats (Optional)

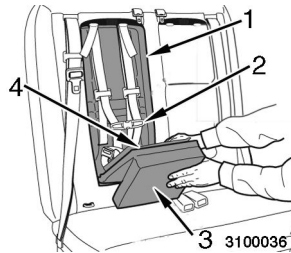
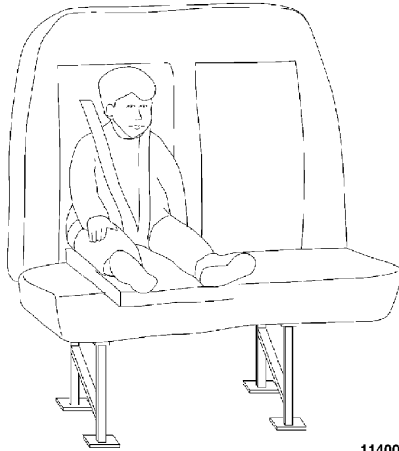


#### **WARNING**

To prevent personal injury and / or death, or damage to property, observe the following:

- Use only with children who weigh between 22 and 85 lb (10 and 39 kg), children whose height is 49 in (124 cm) or less, or with children who are over one year of age.
- Top portion of the seat cushion must be folded under lower portion of seat cushion to form seating surface for child.





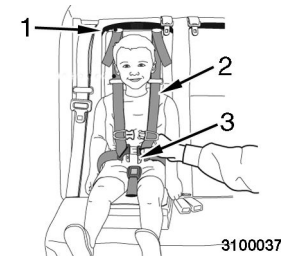
1. Removable seat pad
2. Chest clip
3. Two-piece seat cushion
4. Harness buckle

Activate the restraint system by lowering the two-piece seat cushion. Fold the top portion of the cushion under the bottom portion to form a seating surface for the child. Be sure seat belt buckles (if equipped) are NOT beneath the two-piece seat cushion. Failure to fold the seat cushion under can result in damage to the restraint and thus improper restraint of the child.

Open chest clip by squeezing middle tabs and pulling chest clip apart.

Unbuckle harness buckle by pressing down on RED release button.

To loosen harness, lift metal at top of seat and pull down on shoulder strap to loosen strap. Repeat with second shoulder strap.



1. Metal tabs
2. Shoulder straps
3. Harness buckle

Place the child in the restraint with the child's back flat against the back of the bus seat cushion. Position shoulder straps over the child's shoulders.

## Seating and Safety Restraints

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Buckle harness by inserting buckle tongues into harness buckle.

Listen for an audible click when each buckle tongue is fastened.

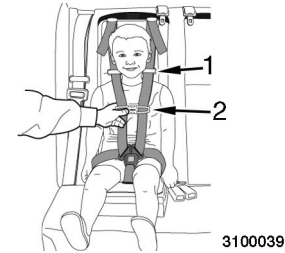
Check that the buckle connection is secure by pulling on the shoulder straps.



1. Top straps

To tighten harness, pull down equally on top straps on both sides until the harness is snug around the child.

A snug strap should not allow any slack. It lies in a relatively straight line without sagging. It does not press on the child's flesh or push the child's body into an unnatural position.



1. Shoulder height adjuster
2. Chest clip

Fasten chest clip by pushing both sides together, then position chest clip at middle of the child's chest, at armpit level.

Position each shoulder height adjuster at or just above the child's shoulder. Be sure harness is snug and tight on child's thighs and chest.

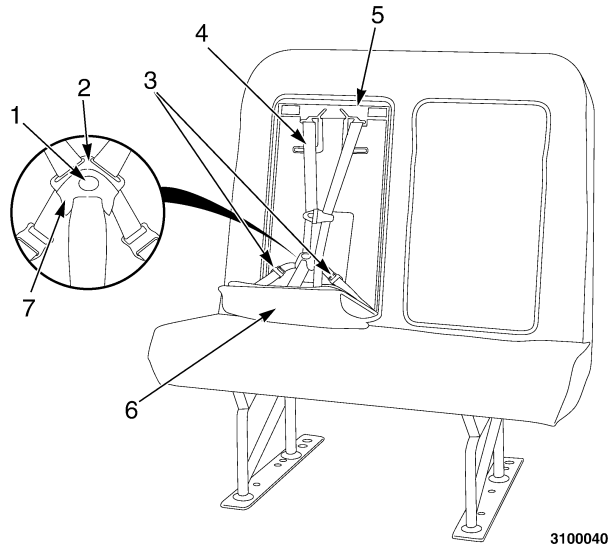
### CE White Integrated Child Restraint Seats (Optional)



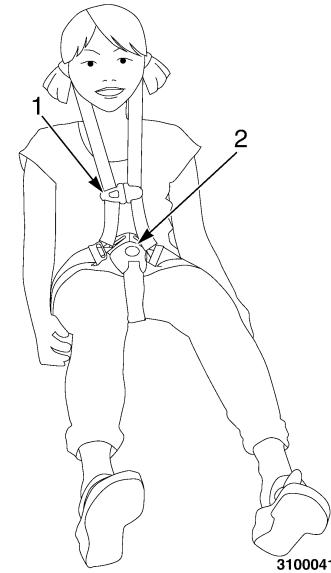
To prevent personal injury and / or death, or damage to property, observe the following:

**This integrated child seat is designed for use only by children who weigh between 20 and 85 lb (9 and 39 kg).**

Refer to the following illustration to become familiar with the parts of the child seat and five-point seat belts. This child restraint system conforms to U.S. Federal Motor Vehicle Safety Standard 213 and Canada Motor Vehicle Safety Standard No. 213.4



1. Buckle release button
2. Seat belt latch plates
3. Adjustment
4. Shoulder belt strap
5. Removable pad
6. Folded down leg rest pad
7. Buckle



1. Shoulder belt clip
2. Seat belt latch plates

To open the child restraint, grasp the upper portion (leg rest pad) and lower the child seat cushion.

## Seating and Safety Restraints

---

To secure the child:

1. Before placing the child in the seat, add slack to the shoulder belts. Release the seat belts by pulling up on the belt adjustment strap, then pull up on the seat belts.
2. Place the child into the child seat, pull the shoulder belts through the appropriate shoulder slot for the height of the child and put a shoulder belt over each shoulder. Insert both seat belts latch plates into the buckle and pull up on them to make sure they are firmly latched.

**NOTE: Be sure that the seat belt buckle is free of foreign objects that may prevent you from properly latching latch plates. If an object is in the opening, and cannot be removed, see your dealer for service immediately.**

3. Fasten the two halves of the shoulder belt clip together and put it 2 - 3 in (5 - 7.6 cm) below the child's chin. The purpose of the clip is to keep the shoulder belts positioned correctly on the shoulders.

To remove the child, reverse steps 1 - 3.

### Child Restraint Anchorage Systems (Optional)

The following provides information pertaining to attaching add-on child seats to passenger seats with child restraint anchorage systems including tether anchors.

When installing an add-on child seat, follow the instructions located on the add-on child seat for the forward facing position.

Ensure that the seat chosen is able to be installed in the forward facing position and is designed to be used with the child restraint anchorage system.

Passenger seats with optional child restraint anchorage systems for attaching add-on child seats are usually located in the first few rows of passenger seats behind the operator and / or entrance door. To determine the location of the passenger seats in the vehicle that are equipped with child restraint anchorage systems, look for the pockets in the seat back just above the seat cushion with a bar inside, or bars protruding up, between the seat back and the seat cushion. Lower Anchors and Tethers for Children (LATCH) anchor locations may be identified with the anchorage symbol just above the anchor.

Canadian school buses and all commercial buses must attach the tether of the add-on child seat to the tether anchor located on the passenger seat per the following instructions. To locate the tether anchor (see Location of the Tether Anchor).

**NOTE: Tethers are not required in U.S. school buses in combination with child restraint anchorage system (UCRA) when installing add on child restraint seats.**

Passenger seats may have one or two child restraint anchorage systems. If two anchor systems are present in the same passenger seat, and only one add-on child seat is going to be installed, it is recommended to use the system closest to the wall to improve the mobility of the passenger in the open seat in case of an emergency.



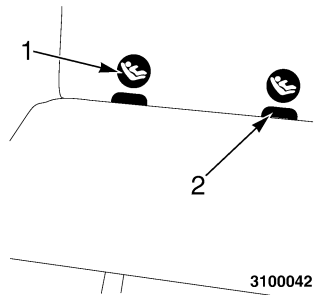
### WARNING

To prevent personal injury and / or death, or damage to property, observe the following:

Follow all instructions on the child restraint and in this manual. Follow the manufacturer's warnings for proper use of the child restraint system and LATCH attachments.

Follow the manufacturer's warnings for proper use of the child restraint system and LATCH attachments.

#### *Location and Use of Lower LATCH Anchors*

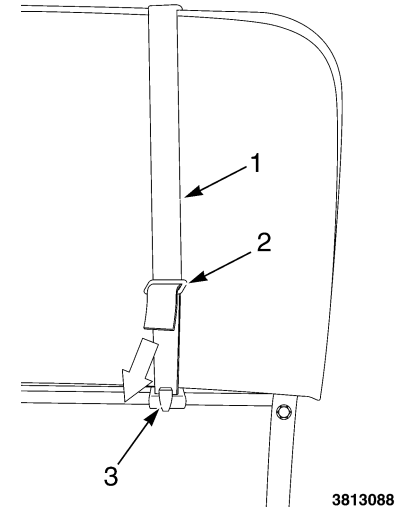


1. Anchorage symbols
2. Lower latch anchors

#### **Location of the Tether Anchor (Optional)**

The tether anchor style and location may vary between seat manufactures.

IC and CE white seats tether installation is as follows:



1. Child strap
2. Adjuster
3. Tether anchor

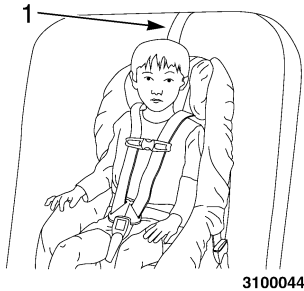
**NOTE: IC and CE white tether anchors are mounted to the seat belt bar and are visible under the rear of the seat back.**

For the attachment of an add-on child seat tether, wrap the tether over the seat as shown then connect the snap hook to the tether anchor. Adjust the tether to a snug and tight fit by pulling on the free end of the strap at the adjuster.

## Seating and Safety Restraints

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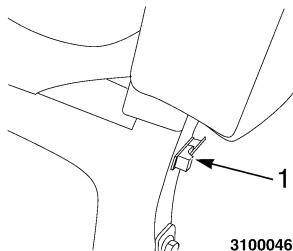
### IMMI® Seats Tether Installation



1. Child seat tether

All base, three-point, and integrated child restraint (BTI) bus seats equipped with LATCH are also equipped with tether anchors for add-on child seats.

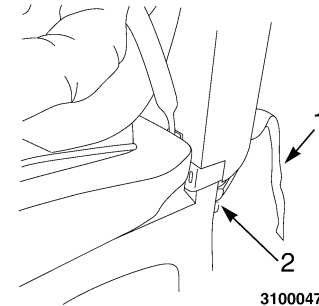
### *Location and Use of Tether Anchors (BTI Bus Seats)*



1. Tether anchor

Tether anchors are located on the aisle side rear pedestal and on the seat wall mount bracket rear edge.

### *Installing Tether*

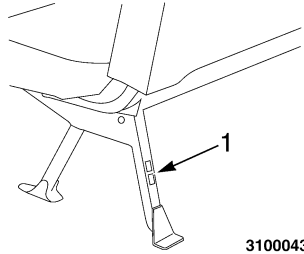


1. Strap (free end)
2. Tether anchor

To attach an add-on child seat tether, route the tether on the child seat over the top of the belted BTI bus seat. Extend the tether and connect the snap hook to the nearest tether anchor provision at the lower rear of the seat. Adjust the tether to a snug and tight fit by pulling on the free end of the strap at the adjuster.

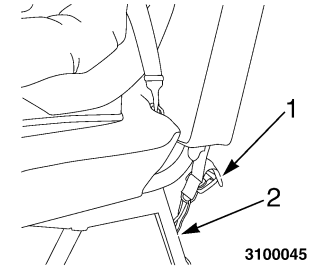
### *Location and Use of Tether Anchors (SafeGuard® XChange Bus Seats)*

SafeGuard® XChange bus seats are equipped with tether anchors for add-on child seats.



1. Tether anchor

Tether anchors are located on the aisle side rear pedestal and on the seat wall mount bracket rear edge.



1. Strap (Free End)
2. Tether anchor

To attach an add-on child seat tether, route the tether on the child seat over the top of the SafeGuard® XChange bus seat. Extend the tether and connect the snap hook to the nearest tether anchor provision at the lower rear of the seat. Adjust the tether to a snug and tight fit by pulling on the free end of the strap at the adjuster.

## Seating and Safety Restraints

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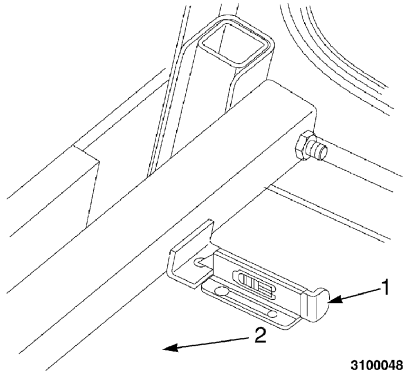
### Cushion Release Latch



#### WARNING

To prevent personal injury and / or death, or damage to property, make sure seat belts and equipment are held out of the way when lowering the cushion to seated position. Keep hands and feet clear while lowering the seat cushion.

### Rear Latching

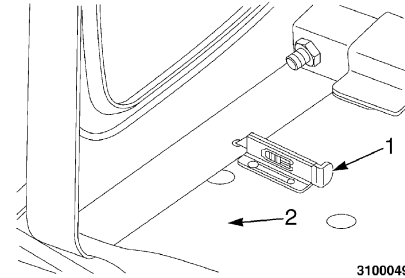


1. Latch
2. Seat bottom

Optional release latches may vary based on seat style. Seats automatically latch when sat upon. Pull up on seat cushion to confirm cushion is latched.

For both rear and side latching designs, pull the latch to release.

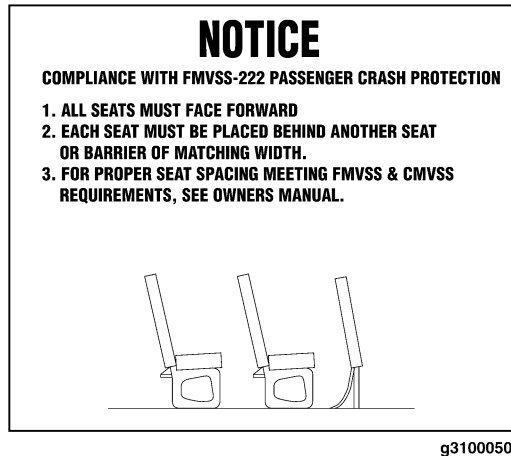
### Side Latching



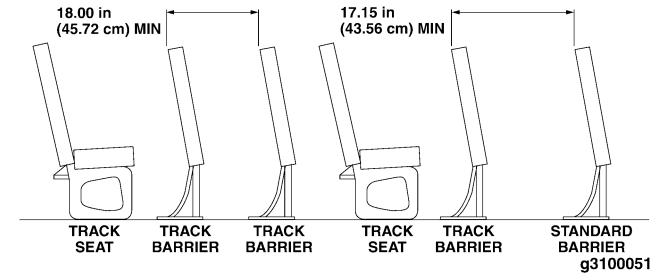
1. Latch
2. Seat bottom



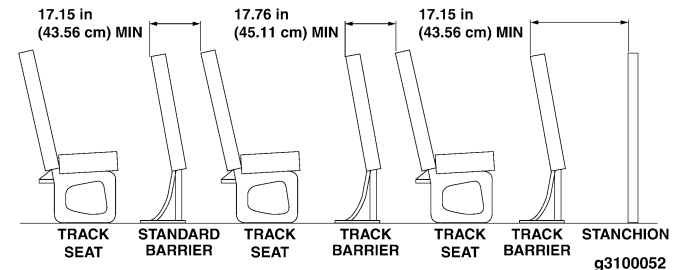
The following diagrams outline the maximum seat spacing for specific seat and barrier types to ensure FMVSS / CMVSS 222 c school bus compliance requirement are met. Original seat layout for a specific unit can be obtained by contacting your IC Bus® dealer.



The standard track seat label is found on the front bulkhead of all buses with track seating.

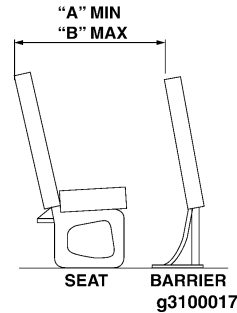


Minimum spacing with standard barrier to track barrier, and track barrier to track barrier.

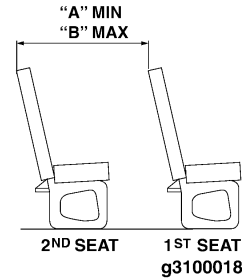


Minimum spacing with stanchion to track barrier, track seat to track barrier, and track seat to standard barrier.

## Seating and Safety Restraints



Barrier Type	Seat	A - Minimum	B - Maximum
Standard	IC Track	28.75 in (73.03 cm)	34.35 in (87.25 cm)
Track	IC Track	29.24 in (74.27cm)	34.24 in (86.97 cm)
Standard	CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	28.51 in (72.41 cm)	32.54 in (82.65 cm)
Track	CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	29.10 in (73.91 cm)	32.10 in (81.53 cm)
Standard	CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	28.49 in (72.36 cm)	32.52 in (82.60 cm)
Track	CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	29.35 in (74.55 cm)	32.35 in (82.17 cm)
Standard	CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	28.53 in (72.47 cm)	32.56 in (82.70 cm)
Track	CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	29.36 in (74.57 cm)	32.36 in (82.19 cm)
Standard	IMMI® Track Seat (without Integrated Child Seat)	30.54 in (77.57 cm)	36.44 in (92.56 cm)
Track	IMMI® Track Seat (without Integrated Child Seat)	30.92 in (78.54 cm)	34.92 in (88.70 cm)
Standard	IMMI® ICS Track Seat (with Integrated Child Seat)	30.54 in (77.57 cm)	36.44 in (92.56 cm)
Track	IMMI® ICS Track Seat (with Integrated Child Seat)	30.92 in (78.54 cm)	35.92 in (91.24 cm)



Seat to Seat			Spacing
First Seat	Second Seat	A - Minimum	B - Maximum
IC Track	IC Track	26.00 in (66.04 cm)	31.00 in (78.74 cm)
IC Track	CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	25.87 in (65.71 cm)	28.87 in (73.32 cm)
IC Track	IMMI® ICS Track Seat (with Integrated Child Seat)	27.68 in (70.31 cm)	32.68 in (83.01 cm)
CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	IC Track	29.13 in (73.99 cm)	34.13 in (86.69 cm)
IMMI® ICS Track Seat (with Integrated Child Seat)	IC Track	26.32 in (66.85 cm)	30.32 in (77.01 cm)
CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	CEW-CR11 Track Seat (with or without lap belts, with Integrated Child Seat)	28.00 in (71.12 cm)	31.00 in (78.74 cm)
CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	28.00 in (71.12 cm)	31.00 in (78.74 cm)
CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	27.00 in (68.58 cm)	30.00 in (76.20 cm)

## Seating and Safety Restraints

Seat to Seat			Spacing
First Seat	Second Seat	A - Minimum	B - Maximum
CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	27.00 in (68.58 cm)	30.00 in (76.20 cm)
CEW-QS11 Track Seat (with 3–point belts, without Integrated Child Seat)	CEW-QSCR11 Track Seat (with 3–point belts, with Integrated Child Seat)	28.00 in (71.12 cm)	31.00 in (78.74 cm)
IMMI® Track Seat (without Integrated Child Seat)	IMMI® Track Seat (without Integrated Child Seat)	27.00 in (68.58 cm)	31.00 in (78.74 cm)
IMMI® ICS Track Seat (with Integrated Child Seat)	IMMI® ICS Track Seat (with Integrated Child Seat)	27.00 in (68.58 cm)	32.00 in (81.28 cm)
IMMI® Track Seat (without Integrated Child Seat)	IMMI® ICS Track Seat (with Integrated Child Seat)	27.00 in (68.58 cm)	31.00 in (78.74 cm)
IMMI® ICS Track Seat (with Integrated Child Seat)	IMMI® Track Seat (without Integrated Child Seat)	27.00 in (68.58 cm)	32.00 in (81.28 cm)

## SECTION 8 — WHEELCHAIR INSTRUCTIONS AND INFORMATION

### Introduction

This section will cover information pertaining to wheelchair lift (if equipped) operation, instructions and information. It is important to understand and follow the warnings, cautions, and instructions in this section to ensure the safety of any passengers or operators that may utilize the wheelchair lift or restraints.

### Wheelchair Lift Operation

For operation of the optional wheelchair lift (including the lift door), refer to the Manufacturer Operation Manual.



#### **WARNING**

**To prevent personal injury and / or death, or damage to property / vehicle components, always set the parking brake when operating the wheelchair lift, or unexpected and sudden vehicle movement may occur.**

### Wheelchair Lift Interlocks – Extending

Read the following before operating the wheelchair lift.

The wheelchair lift system for these buses are designed with interlocks that require the vehicle to be completely stopped with the transmission out of gear and the parking brake applied, before the wheelchair lift system can be fully utilized.

Power will not be supplied to the wheelchair lift mechanism unless all of the following steps have been performed **(this is true even with the optional lift switch in the ON position — See Driver Controls section for the switch description)**.

Also, refer to the **Brake** and **Transmission** sections for wheelchair lift interlocks.

1. Ensure that the ignition switch is in the OFF, ON or ACC (Accessory) position.
2. Place transmission shift lever in Park (P) or Neutral (N) position.
3. Apply parking brake. The instrument panel gauge cluster PARK indicator will turn ON.

An **(Optional)** feature provides for the parking brake to automatically be applied (Auto-Apply) when the transmission shift lever is moved to the Park (P) position.

4. Open the wheelchair lift door. The optional GREEN indicator (in left-side control panel) will flash as long as lift door is opened.

**NOTE: An optional exterior light is provided, which is mounted below the lift door and activated by opening lift door. It is used to light up the area while the wheelchair lift is in operation.**

The wheelchair lift can now be operated (according to the manufacturer's Operation Manual instructions). The LIFT DOOR instrument panel gauge cluster indicator will turn ON and will remain ON as long as the wheelchair lift door is opened.

### Wheelchair Lift Interlocks – Retracting and Stowing

The vehicle cannot be moved (the transmission cannot be released from Park (P) position, or the parking brake cannot be released), until the following procedures are completed. Also, refer to the **Transmission and Parking Brake** sections for their wheelchair interlocks.

Follow the steps below in the order listed when retracting and stowing the wheelchair lift:

1. First stow the wheelchair lift (according to the manufacturer's Operation Manual instructions).
2. Then close the wheelchair lift door (according to the manufacturer's Operation Manual instructions). The LIFT DOOR instrument panel gauge cluster indicator will then turn OFF.

### Wheelchair Lift Alarm

The instrument panel gauge cluster alarm (a continuous beeping) will be triggered if:

1. The wheelchair lift door is extended **and**:
2. The parking brake is not applied (knob is not pulled and released) **or**:
3. The transmission is not in Neutral (N) or Park (P).

**NOTE: The alarm will continue to beep until the above conditions are corrected.**

### Parking Brake / Wheelchair Lift Interlock and Alarm

**Parking Brake / Wheelchair Lift Interlock (If Equipped).** On vehicles equipped with an optional wheelchair lift, power will not be supplied to the wheelchair lift mechanism unless the parking brake is applied.

**NOTE: On vehicles equipped with optional wheelchair lift, the parking brake cannot be released until the wheelchair lift is completely stowed.**

**NOTE: For a complete description of these interlocks, see the Parking Brake / Wheelchair Lift (If Equipped) Interlock procedures in the Hydraulic Brake section.**

On vehicles equipped with an optional wheelchair lift, the following will describe the optional parking brake / wheelchair lift interlock and parking brake / wheelchair lift alarm. Read

and understand these paragraphs and the wheelchair lift manufacturer's Operation Manual before operating the wheelchair lift.

Power will not be supplied to the wheelchair lift mechanism unless all of the following steps have been performed.

### WHEELCHAIR LIFT EXTENSION OPERATION

**NOTE: Some vehicles with wheelchair lift extensions are configured to operate with the ignition switch OFF. This optional configuration requires the lift door to be open, the transmission to be placed in Neutral and the parking brake to be applied.**

1. Ensure that the ignition switch is in the ON or ACC (Accessory) position.
2. Place transmission shift lever in Parking Brake (PB), Park (P), or Neutral (N) position.
3. **For Air Brakes**, pull parking brake knob. (Park indicator on instrument panel gauge cluster will turn ON.)
4. **For Hydraulic Brakes** set the foot operated parking brake. (Park indicator on instrument panel gauge cluster will turn ON.)
5. Open the wheelchair lift door.

The wheelchair lift can now be operated (according to the manufacturer's Operation Manual instructions). The LIFT

DOOR instrument panel gauge cluster indicator will turn ON and will remain ON as long as the wheelchair lift door is opened.

### PARKING BRAKE / WHEELCHAIR LIFT INTERLOCK – RETRACTING AND STOWING OPERATION

The vehicle cannot be moved (the parking brake cannot be released), until the following operations are performed:

1. Turn ignition ON.
2. Retract and stow the wheelchair lift. The LIFT DOOR instrument panel gauge cluster indicator will be turned OFF.
3. Close the lift door.
4. Depress the service brake and press and hold the button on the gearshift lever handle and select Reverse (R) or Drive (D) position.
5. **For Air Brakes**, push in on the parking brake knob. (Park indicator on instrument panel gauge cluster will turn OFF).
6. **For Hydraulic Brakes** depress and hold the parking brake pedal, with the brake pedal held, pull the brake release lever until the park brake indicator goes out, then release the foot pedal.
7. Lift foot from the brake pedal, and then slowly press the accelerator pedal.

### **PARKING BRAKE / WHEELCHAIR LIFT ALARM (IF EQUIPPED)**

- The instrument panel gauge cluster alarm will beep continuously if the wheelchair lift door is extended
- The parking brake is released.

**NOTE: When either the powered parking brake is set, or the wheelchair lift door is closed, the instrument panel gauge cluster alarm will immediately stop beeping.**

### **Parking the Bus With Transmission Shift / Wheelchair Lift Interlocks**



#### **WARNING**

**To prevent property damage, personal injury, and / or death, always set the parking brake when operating the wheelchair lift, or unexpected and sudden vehicle movement may occur.**

Read and understand these paragraphs, along with the wheelchair lift manufacturer's Operation Manual before operating the wheelchair lift. On vehicles equipped with an optional wheelchair lift, the optional transmission shift / wheelchair lift Interlock provides that power will not be supplied to the wheelchair lift mechanism, and therefore, the wheelchair lift cannot be operated until the previous steps have been completed.

### **WHEELCHAIR LIFT EXTENSION OPERATION**

After the bus has been safely parked (see previous steps):

1. Open the wheelchair lift door. (LIFT DOOR instrument panel gauge cluster indicator should be turned ON.)
2. Extend the wheelchair lift (according to the manufacturer's Operation Manual instructions). The LIFT DOOR instrument panel gauge cluster indicator turned ON and will remain ON as long as the wheelchair lift door is opened.

### **Starting Bus in Motion With Transmission Shift / Wheelchair Lift Interlocks**

Read and understand the wheelchair lift manufacturer's Operation Manual before operating the wheelchair lift.

On vehicles equipped with an optional wheelchair lift, the optional transmission shift / wheelchair lift interlock will prevent shifting out of the PB Parking Brake, or Park (P) position, until the wheelchair lift door is closed. This will prevent the vehicle from being moved while the wheelchair lift is still extended. For a description of the wheelchair lift retraction and stowing operation, go to the **Passenger Control** section.



### Retracting and Stowing Operation

After using the wheelchair lift, to load passengers, before you can start the bus in motion, (shifting the gearshift lever out of the Park [P] position), retract and stow the wheelchair lift and then close the lift door (LIFT DOOR gauge luster indicator should be turned OFF).

When the wheelchair lift has been safely stowed (according to the wheelchair lift manufacturer's Operation Manual instructions), the bus can be safely moved as follows:

1. Depress the service brake pedal.
2. Press and hold the button on the gearshift lever handle.
3. Move the gearshift lever from Park (P) to Reverse (R) or Drive (D) position.
4. Release the button.
5. Release the parking brake (push and release the parking brake knob).
6. Lift foot from service brake pedal.
7. Slowly press the accelerator pedal (the instrument panel gauge cluster PARK indicator should be OFF).



## SECTION 9 — CLIMATE CONTROLS

### Heater System

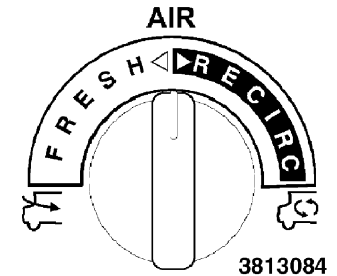


#### WARNING

To prevent personal injury and / or death, or damage to property, observe the following:

Never drive the vehicle unless the windshield and all other windows are clear. A fogged, ice / snow covered, or dirty windshield or window limits vision, which could cause an accident. To improve defroster efficiency, remove ice and / or snow by hand from the windshield and windows with a non-metallic scraper.

Adjust the air knob to provide outside air into the driver area.

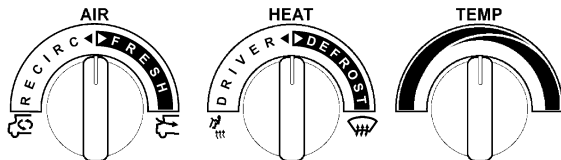
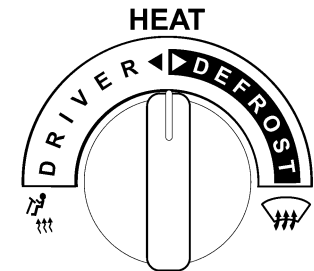


### Driver Heater

The driver heater console is located below the left-side switch panel.

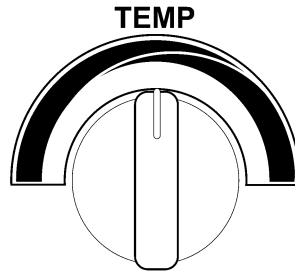
Three heater control knobs provide air flow direction, fresh air or recirculation control, and temperature selection.

Adjust the heat knob to direct the air flow either into the driver area or the defrost area.



3813095

Adjust the temperature (TEMP) knob to control the temperature of the air through the heater vents.



ICB100503

The heater fan speed is controlled by the DRIVER HEATER DEFROST fan switch on the left-side console switch panel.



### Auxiliary Heaters

The Midship / Rear heater switches provide blower speed control for the passenger compartment heaters and are located on the left-side switch panel. The control switch is labeled OFF / LO / HI.

### Defrost Operating Instructions

The defroster blower is controlled by the three-position (OFF / LO / HI) DRIVER HEATER / DEFROST fan switch, located on the left-side switch panel. Press the switch to the desired position to control blower speed.

Air is directed through the defrost duct to the windshield and side window outlets utilizing the Defrost Climate Control Heat selector. Use this mode at maximum fan speed and temperature setting for best windshield and side window defrosting.

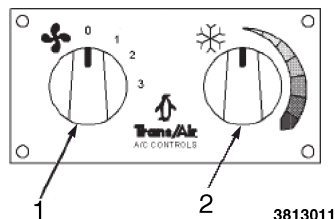
If equipped, the optional step well heater may be turned on for added air flow to the defroster vents.

### Integrated Air Conditioning System (IC Air)

This vehicle may be equipped with an optional skirt - or roof-mounted, factory-installed Integrated air conditioning (IC Air) system. Before operating the system, become familiar with the climate control system operating controls.

Becoming familiar with your IC Air climate control system operating controls will enable you to realize maximum system performance and maintain a comfortable environment for you and your passengers.

The system controls consists of two rotary switches, one controlling the evaporator fans and the other controlling the thermostat. The following illustration will identify both switches of the control system.



3813011

Item #	Name	Functional Description
1	System OFF / Fan Speed control: This control has four (4) positions: 0 thru 3	<ul style="list-style-type: none"> <li>The 0 position is the system OFF position.</li> <li>Position 1 = Low evaporator fan speed.</li> <li>Position 2 = Medium evaporator fan speed.</li> <li>Position 3 = High evaporator fan speed.</li> </ul>
2	Air Conditioning Temperature Control	Clockwise = Cooler Counterclockwise = Warmer.

## Circulation Fans



### WARNING

To prevent personal injury and / or death, or damage to property, wait until the motor cools off before repositioning the fan motor. It can become extremely hot when operated in normal ambient temperatures for long periods of time.

Some buses are equipped with circulation fans. The controls are labeled RIGHT FAN and LEFT FAN and are located on the left-side switch panel driver console. Each fan has OFF / LO / HI speed control.

Each fan can be positioned in several directions. First turn its fan control switch to the OFF position and then grasp the cage and pivot fan to the desired position to reposition the fan.

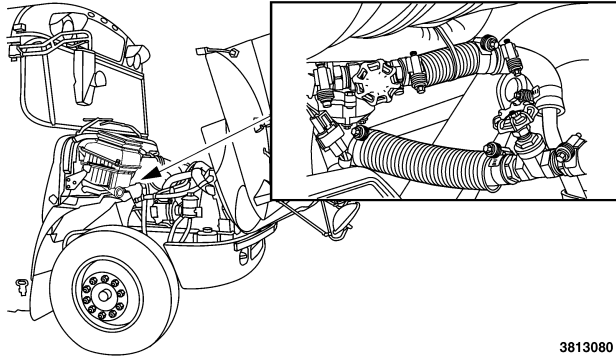
### Heater Booster Pump

The heater booster pump assists coolant flow from the engine and increases heater performance. Turn the heater booster pump ON to provide the vehicle with additional interior heat.

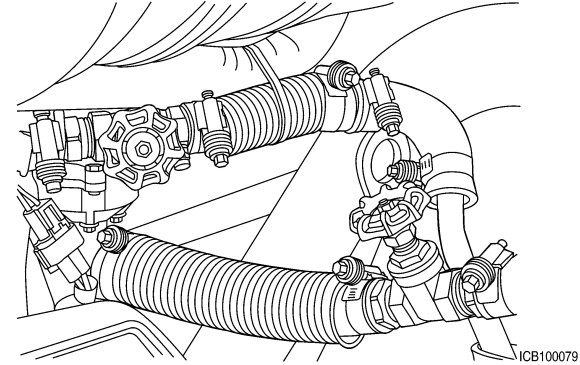
**NOTE:** Do not use the heater booster pump unless the heater cutoff valve is manually opened.

### Heater Cutoff Valve

**NOTE:** The illustration is for reference only and may differ from the actual vehicle.



3813080



### Typical Heater Cutoff Valve

The heater cutoff valve for the coolant supply is under the hood.

Turn the heater cutoff valves ON (counterclockwise) whenever the heater is used.

Turn the heater cutoff valves OFF (clockwise) to stop hot coolant from being routed into the bus on hot days.

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## SECTION 10 — OPERATION

### Starting Procedures

#### Preparing the Fuel System



#### WARNING

To prevent personal injury and / or death, or damage to property, observe the following:

Do not operate the bus in the possible presence of flammable vapors unless both a complete hazard analysis is performed and necessary additional safety processes and / or equipment such as vapor testing, air intake shutoff devices, ventilation, are utilized. The operator is responsible for using those processes and / or equipment to ensure that all components on the bus can be operated safely under the specific conditions and hazards that may be encountered.



#### WARNING

To prevent personal injury and / or death, or damage to property, do not use volatile starting aids such as ether, propane, or gasoline in the engine air intake system.



#### WARNING

To prevent personal injury and / or death, or damage to property, do not mix any other fuel forms with propane autogas. This can cause an unexpected reaction that may damage the engine and those around it.



#### WARNING

To prevent personal injury and / or death, or damage to property, never start the engine unless you're sure the transmission selector is in Neutral and the brake is applied; otherwise, accidental movement of the vehicle can occur.



#### WARNING

To prevent personal injury and / or death, or damage to property / engine, do not operate an engine beyond the maximum governed speed.



### WARNING

To prevent personal injury and / or death, or damage to property, since exhaust gases from engines contain hazardous compounds, do not operate engines in enclosed areas without abundant forced ventilation (with garage doors and windows wide open). Maintain exhaust system in good operating condition.



### WARNING

To prevent personal injury and / or death, or damage to property, pay strict attention to the following:

Care should be taken to prevent sudden accelerations when both drive wheels are on a slippery surface. This could cause both drive wheels to spin and allow the vehicle to slide sideways, resulting in loss of vehicle control.

**NOTE:** Refer to the Engine Operation and Maintenance Manual supplied with your vehicle for special starting procedures.



### WARNING

To prevent personal injury and / or death, or damage to property, do not smoke while in or around the vehicle. Keep fuel away from flames and sparks.



**GOVERNMENT REGULATION:** Engine fluid (oil, fuel, and coolant) may be a hazard to human health and the environment. Handle all fluid and other contaminated materials (such as filters and rags) in accordance with applicable regulations. Recycle or dispose of engine fluids, filters, and other contaminated materials according to applicable regulations.

The following steps should be completed prior to starting the vehicle:

1. Turn the ignition switch to the ON position as you would to start the vehicle normally.
2. The WAIT TO START lamp will illuminate while the fuel system performs the purging procedure (this may take 5 - 30 seconds depending on engine heat and engine off time).
3. Once the fuel system purge is complete, the WAIT TO START lamp will extinguish. The engine is ready to be started at this time.



### CAUTION

To prevent engine damage, if engine fails to start after 20 seconds of cranking, stop cranking engine and wait 2 minutes to allow the starter motor to cool.



### *Automatic Transmission Starter Interlock*

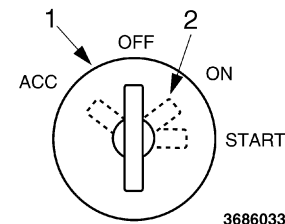
Automatic transmissions must be in Neutral or Park before the starter will engage.

### **Starting the Engine**

**NOTE:** Use of the cupholder during operation of the vehicle should be in accordance with state regulations, school district guidelines, and bus provider's operating policies.

**NOTE:** Before starting a propane autogas powered vehicle, reference (Propane Autogas System Inspection, page 25) for a pre-trip inspection list.

**NOTE:** If fuel door is opened while vehicle is stationary with the parking brake set, and the engine is running, the engine will shut down. If the fuel door is open while trying to start the engine, the engine will not start.



1. Key switch
2. Key position

**NOTE:** When the ignition switch is in the ON position, the brake system motor / pumps may be heard as they run briefly to maintain pressure in the system see the brake section for a complete description.

1. Apply the parking brake. Place the transmission in the Neutral position. Turn OFF the headlights and all accessories.
2. Turn ignition switch to ON. The WAIT TO START lamp will illuminate. Do not crank engine while lamp is illuminated.
3. Once the WAIT TO START lamp is no longer illuminated, turn the key to the START position.
4. Do not press the accelerator when starting the engine.
5. When the engine starts, release the key.
6. Monitor idle speed. Low idle speed is 750 - 850 rpm. Check all gauges during warm-up.
7. For minimum oil pressure at idle, refer to the **Engine Operation and Maintenance Manual**. If oil pressure is too low, the low oil pressure warning lamp may illuminate along with an AMBER lamp.
8. During normal engine operation the low oil pressure lamp will illuminate if minimum oil pressures are not met. If the lamp remains illuminated for an extended period of time, a derate may occur.

**NOTE: If the engine starts and then stops, repeat engine starting procedure. If more than three attempts are required, contact your nearest service center to schedule service.**

## Engine Features

### HD-OBD Overview

The HD-OBD system uses many individual pre-programmed monitors to ensure the vehicle is meeting emissions standards. An HD-OBD monitor is a strategy to evaluate the performance of an emissions related system or component. All monitors are designed for execution in a prescribed frequency; some monitors run continuously, while some run a specific ratio against the number of drive cycles.

The operator will be alerted to emissions or other system problems when the Malfunction Indicator Lamp (MIL) illuminates. When the MIL illuminates, bring the vehicle in for service at the next available opportunity. The HD-OBD system does not change the way the vehicle should be driven, the recommended driving style, or the way you use the vehicle.

### Self Diagnostics

All warning lamps are located on the instrument panel gauge cluster. When the ignition switch is turned ON, the Warning Lamps are illuminated and remain on while the ECM runs normal start-up tests, then goes OFF. If a warning lamp stays on or comes on while operating the vehicle, it is an indication that the vehicle needs service. When the warning lamp is illuminated, a Diagnostic Trouble Code (DTC) will be generated. Take the vehicle to a service center as soon as possible as some optional features and / or engine power may be lost while the indicator is lit.

## **Fuel**

**NOTE:** For specific fuel system information, refer to the vehicle **Engine Operation and Maintenance Manual**.

**NOTE:** Dependent on vehicle build date, your vehicle may be equipped with either an ACME (threaded) fill valve or a K-15 (quick-connect) fill valve style fitting. Dependent on fueling station equipment, an adapter may be required for fueling procedures.

This vehicle is equipped with a PSI 8.8L LPG engine which is fitted with a BiPhase Liquid Propane Electronic Fuel Injection (LPEFI®) fuel system. This system utilizes liquid propane fuel injection to improve power, efficiency, and operating characteristics.

The LPEFI® system works the same as a gasoline fuel injected system, with the only difference being that it injects liquid propane into each intake port. The propane fuel system operates similar to a gasoline fuel system. A typical gasoline fuel system requires a rich mixture that is very dense and dependent on ambient temperature. With the liquid propane injection the engine is capable of normal start-up with a fuel mixture that is much leaner, thus allowing a reduction in start-up emissions.

The LPEFI® system utilizes three main components: a fuel tank, the fuel lines, and the fuel injectors. The tank is located near the back of the vehicle, and the lines run from the tank to the fuel rails that are mounted on each side of the PSI 8.8L LPG engine.

## **Fuel and Blends**

HD5 Consumer Grade Propane is required for the PSI 8.8L LPG engine. The propane should meet all requirements of the ASTM D1835 standard (current year version), and should also be odorized.

### **Acceptable Fuel And Blends**

- HD - 5 Commercial Propane
- More than 90% Propane
- Less than 5% Propylene
- Odorized Propane

### **Unacceptable Fuel And Blends**

- HD -10 Commercial Propane
- Standard Commercial Propane
- Contaminated Propane
- Less than 90% Propane
- More than 5% Propylene
- Odorless Propane

### Fueling Precautions



#### **WARNING**

To prevent personal injury and / or death, or damage to property, keep propane autogas and containers away from heat, sparks, and open flames.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, do not mix any other fuel forms with propane autogas. This can cause an unexpected reaction that may damage the engine and those around it.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, avoid contact with eyes, skin, and clothing.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, pay strict attention to all propane autogas fueling site instructions and cautions when refueling your vehicle.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, do not vent or release propane indoors or near sewers, pits or low lying areas. Propane can accumulate in low spots, creating a fire hazard. Propane can also displace oxygen, creating a suffocation hazard. Propane autogas systems should be serviced in a properly ventilated area.



#### **WARNING**

To prevent personal injury and / or death, or damage to property, never loosen fittings or vent any propane. Escaping propane can cause frostbite and severe freeze burns. Wear insulated PVC rubber gloves resistant to propane, goggles for protection against accidental release of pressurized products, and thermal protective clothing when handling refrigerated liquids.



#### **CAUTION**

To prevent vehicle and / or engine damage, do not mix diesel fuel with propane.

Before fueling, be sure to read and verify the following information:

1. Do not fuel a motor vehicle with the engine running, except when it is necessary to run the engine to fuel the vehicle.

2. Do not smoke or expose any open flame in the vicinity of a vehicle being fueled.
3. Avoid sources of static electricity.
4. Report any propane leaks immediately.
5. Wear personal protective equipment (PPE) to avoid skin contact with propane.

### Fueling Procedures



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, be sure that fill nozzle is tightly secured on the vehicle's fill valve. Improperly threading the nozzle on the fill valve may lead to a dangerous leak.**

**NOTE:** Dependent on vehicle build date, your vehicle may be equipped with either an ACME (threaded) fill valve or a K-15 (quick-connect) fill valve style fitting. Dependent on fueling station equipment, an adapter may be required for fueling procedures.

**NOTE:** If the fuel door is left open after fueling, the engine will not start.

1. Turn OFF the vehicle and follow all fueling site personal protective equipment (PPE) requirements.
2. Open the fuel door.
3. Unscrew the dust cap from the vehicle fill valve.
4. Check the seal, gasket, or O-ring for tears, breaks, or cuts. If damaged / missing, do not dispense fuel until replaced.
5. Install fill valve adapter if necessary.
6. Remove the nozzle from the dispenser.
7. Screw the nozzle tightly on the vehicle fill valve, ensuring a proper fit. An improper fit could cause a leak.
8. Activate the dispenser. When the fuel level in the tank reaches 80% storage capacity, the fuel flow will automatically stop.
9. When you first release the handle and / or when you unscrew the nozzle, a short, small release of autogas vapor may occur. If more than a small release of autogas occurs, follow fueling site instructions to resolve.
10. After unscrewing the nozzle:
  - a. Return the nozzle to the dispenser.
  - b. Remove fill valve adapter if necessary.
  - c. Replace the cap on the vehicle fill valve.
  - d. Shut the fuel fill door.

### Emergencies While Filling With Propane Autogas

In the event of emergency while filling, perform the following:

1. Shut down the dispenser.
  - a. Use emergency shutoff(s). If you do not know how to do this, immediately contact site staff to shut off system.
2. Immediately evacuate the area.
  - a. Everyone in the affected area should move to a safe distance from the spill or leak. Do not re-enter area.
3. Call for help.
  - a. After you are at a safe distance from the affected area, call 911 or the local fire department.

### Restarting After Running Out of Fuel

If the vehicle runs out of fuel during operation, refer to the **Engine Operation and Maintenance Manual** supplied with your vehicle.

### Cold Weather Operation



#### WARNING

**To prevent personal injury and / or death, or damage to property, do not use the washers in freezing weather without first warming the windshield with the defrosters; otherwise, the washer solution may freeze on the windshield and obscure your vision, which could cause an accident.**



#### WARNING

**To prevent personal injury and / or death, or damage to property, do not use radiator coolant or antifreeze in the windshield washer reservoir. Radiator coolant in the washer reservoir can severely reduce visibility when sprayed on the windshield.**

Follow these instructions when operating the engine in temperatures of 32°F (0°C) or lower:

- Make sure that the batteries are of sufficient size and are fully charged. Check other electrical components to make sure they are in optimum condition.
- Use a permanent-type engine coolant solution to protect the engine against damage from freezing.
- If your vehicle is equipped with a water-fuel separator, drain it daily.

- Make sure you use proper cold weather engine oil and that it is at its proper level.
- At temperatures of 4°F (-20°C) or below, it is recommended that you use a crankcase-mounted coolant heater to improve cold engine starting.
- Consult your IC Bus® dealer for information about special cold weather equipment and precautions if operating in arctic temperatures of -20°F (-29°C) or lower.

### Hot Weather Operation

- Keep the engine cooling system filled with clean, permanent coolant solution to protect against damage from overheating.
- Keep external surface of the engine, radiator, charge air cooler, and accessories clean to avoid dirt buildup.
- Fill fuel tank at end of daily operation to prevent condensation in tank.

Above normal coolant temperature could be temporarily decreased by downshifting into the next lower gear. This increases engine rpm, which increases coolant flow and air flow through the radiator.

**NOTE:** If above normal operating temperatures persist, have vehicle serviced at first available opportunity.

### Turning OFF the Engine

Allow the engine to idle for 3-5 minutes before shutting it down. This allows the lubricating oil and coolant to carry heat away from

the large components, preventing engine damage from rising heat.

### Driver Assist Systems

There are various driver assist systems that could be configured on your truck. The driver assist systems are safety features that assist the driver in various driving conditions.

### Bendix® Wingman® Advanced™ Collision Warning System



**To prevent personal injury and / or death, or damage to property, the Bendix® Wingman® Advanced™ Collision Warning System is not to be used or relied upon to operate a vehicle. The system should be used in conjunction with rear view mirrors and other instrumentation to maintain safe operation. A vehicle equipped with the Bendix® Wingman® Advanced™ Collision Warning System should be operated in the same safe manner as if the system were not installed. The system is not a substitute for normal safe driving procedures. It will not compensate for any driver impairment, such as drugs, alcohol, or fatigue. The Bendix® Wingman® Advanced™ Collision Warning System is intended solely as an aid for an alert and conscientious professional driver.**



### WARNING

To prevent personal injury and / or death, or damage to property, before using this feature, read and thoroughly understand the Bendix® Wingman® Advanced™ Collision Warning System's Driver Instruction Manual, and obtain proper training on the system.



### WARNING

To prevent personal injury and / or death, or damage to property, be aware that the Bendix® Wingman® Advanced™ Collision Warning System may provide little or no warning for some hazards, such as pedestrians, animals, oncoming vehicles, and cross traffic.

The optional Bendix® Wingman® Advanced™ Collision Warning System combines adaptive cruise control with braking feature along with collision mitigation technology to assist the driver in various conditions. The system includes the following features:

- **Alerts**
- **Following Distance** – Provides audible and visual alerts that let the driver know when getting too close to forward vehicle
- **Impact** – Provides audible and visual alerts warning the driver that a collision with the forward vehicle is likely and that they should address the situation immediately
- **Stationary Object** – Provides audible and visual alerts that provide the driver up to a 3.0 second alert when a metallic object(s) may be blocking lane of travel
- **Adaptive Cruise Control with Braking** – When cruise control is on with the speed set, the adaptive cruise control helps the driver maintain a set following distance behind a forward vehicle by automatically utilizing the engine retarder and foundation brakes.
- **Collision Mitigation** – Provides audible and visual alerts to the driver and applies the foundation brakes when the system determines a collision with a forward, moving vehicle is imminent. The intervention can be up to two-thirds of the vehicle's braking capacity. Immediate driver action is required to potentially avoid or lessen the severity of a collision.



## **Bendix® Wingman® Fusion™ System**



### **WARNING**

To prevent personal injury and / or death, or damage to property, before using this feature, read and thoroughly understand the Bendix® Wingman® Fusion™ System's Driver Instruction Manual, and obtain proper training on the system.



### **WARNING**

To prevent personal injury and / or death, or damage to property, be aware that the Bendix® Wingman® Fusion™ System may provide little to no warning or stationary vehicle braking for some hazards, such as pedestrians, animals, oncoming vehicles, and cross traffic.



### **WARNING**

To prevent personal injury and / or death, or damage to property, the Bendix® Wingman® Fusion™ System is not to be used or relied upon to operate a vehicle. The system should be used in conjunction with brakes, rear view mirrors, and other instrumentation to maintain safe operation. A vehicle equipped with the Bendix® Wingman® Fusion™ System should be operated in the same safe manner as if the system were not installed. The system is not a substitute for normal safe driving procedures. It will not compensate for any driver impairment, such as drugs, alcohol, or fatigue. Please refer to the Bendix® Wingman® Fusion™ Operator Manual for additional warnings, system operation, and system limitations. The Bendix® Wingman® Fusion™ System is intended solely as an aid for an alert and conscientious professional driver.

Visual and audible alerts are provided by the Driver Interface Unit located in the instrument panel where it is easily visible and accessible. Refer to the driver instruction manual for complete operating instructions.

### Brakes

#### Downhill Operation

Always descend hills with extreme care. Heed warning signs posted for any grade. Stop and check brakes for condition and adjustment at available pull off areas before starting a descent.

Observe the following precautions:

- Never coast downhill. Service brakes alone should not be used to control speed on major downgrades. Brakes fade from overuse.
- The downhill speed is controlled by removing your foot from the accelerator pedal and putting the transmission in a reduced gear. If the gear selection does not hold the desired speed without overuse of the brakes, an improper gear selection was made.
- Make a full stop. Let the brakes cool, then continue down the grade in a lower gear range.
- The common rule to follow in using the engine and transmission to control vehicle speed is to select the same gear going down the hill that would be required to ascend the hill.
- The service brakes should be used to supplement available vehicle retardation. When descending long grades requiring use of the brakes, short applications (5 - 10 seconds duration) should be made rather than long, lighter, continuous applications. This minimizes temperature brake fade.

#### *Warning Indicators*

Instrument panel gauge cluster indicators identify brake system fault conditions. Certain faults may also result in cluster alarms. The following lists some of the common faults (See fault indicators in **Instrumentation** section):

**NOTE: Whenever a brake system warning indicator is lit, do not operate the vehicle until the faulty condition has been corrected.**

- **Brake Pressure.** ON STEADY when **either** front or rear brake system brake pressure failure is detected. This lamp will illuminate during Key ON Engine OFF to indicate that the vehicle will have reduced braking ability.
- **Brake Fluid.** ON steady when low fluid level is detected in Master Cylinder reservoir.
- **Service Parking Brake.** ON steady when a fault is detected in parking brake circuit of the SmartTrac™ brake system.

**NOTE: There may be a fault condition that results in more than one warning indicator being lit.**

*SmartTrac™ Hydraulic Brake Booster System (If Equipped)*



**WARNING**

To prevent personal injury and / or death, or damage to property, if part of the brake system fails, reduce speed and use caution as stopping distance may increase under the failed condition or if only one section of the brake system is operating. Have brake system repaired immediately. Loss of braking capability could cause an accident.



**WARNING**

To prevent personal injury and / or death, or damage to property, if the brake pressure warning indicator comes on while driving, be aware that your stopping distance may be significantly increased. Safely stop the vehicle as soon as possible and have the brake system repaired immediately as reduced braking capability could cause an accident.



**WARNING**

To prevent personal injury and / or death, or damage to property, always check and maintain brakes in proper condition and adjustment. Out-of-adjustment brakes could cause reduced braking ability.

The SmartTrac™ system receives fluid pressure from the power steering pump to provide power assist during braking.

The SmartTrac™ hydraulic booster has a backup pump which will provide hydraulic boost at a reduced rate if the normal source of fluid is interrupted. The signal for operation of the backup pump comes from the fluid flow switch or differential pressure switch. If normal flow is interrupted, the flow switch will close and activate the backup pump relay, which will turn on the backup pump.

If braking performance or pedal response becomes very poor, even when the pedal is strongly applied, this may indicate the presence of air in the hydraulic system or fluid leakage. This may be accompanied by the brake fluid or brake pressure warning lights, indicating that the brake fluid is getting low. Safely stop the vehicle as soon as possible and seek service immediately.



If the brake pressure warning light in the instrument cluster remains illuminated after engine start-up, and an audible tone is heard while the light is illuminated, this indicates a system failure in the brake system. Stop the vehicle as soon as safely possible and seek service immediately.

Instrument panel gauge cluster indicators identify brake system fault conditions. Certain faults may also result in cluster alarms. The following lists some of the common faults (See fault indicators in **Instrumentation** section):

**NOTE: Whenever a brake system warning indicator is lit, do not operate the vehicle until the faulty condition has been corrected.**

### *Split-System Feature*



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, if part of the brake system fails, reduce speed and employ safe driving practices as stopping distance may increase under the failed condition or if only one section of the brake system is operating. Have brake system repaired immediately. Loss of braking capability could cause an accident.**

The system is divided into two separate channels: the primary channel (controls front axle) and the secondary channel (controls rear axle). The brake master cylinder is connected to brake lines that are routed to the front and rear brake channels.

With the split brake system, the operator is has limited brake control should one of the two channels fails. If one of the motor / pump related systems fail, the driver may not detect any difference in the feel of the pedal, but with a failure in the master cylinder circuit, the driver may experience a longer pedal stroke to attain desired stopping. If a brake system failure occurs, one of the instrument panel gauge cluster warning indicators should illuminate.

## Manual Foot Operated Parking Brake System with Hydraulic Brakes



### WARNING

To prevent personal injury and / or death, or damage to property, when parking your vehicle, always use the parking brake. When parking on a grade, install wheel chocks and turn front wheels to keep the vehicle from rolling into the traveled portion of the roadway. Failure to follow these procedures could cause an unattended vehicle to move, resulting in personal injury and / or death, or property damage.



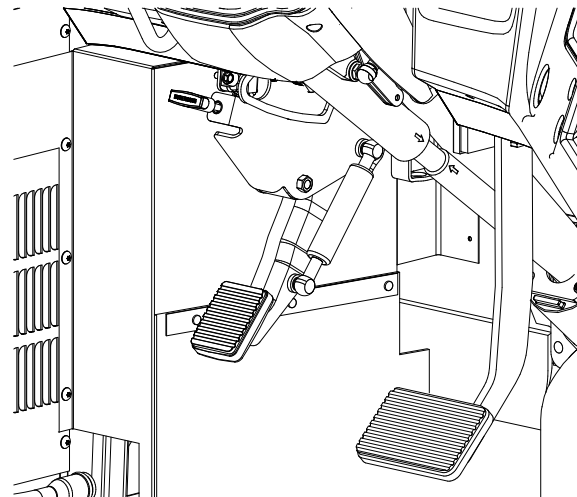
### WARNING

To prevent personal injury and / or death, or damage to property, under no circumstances should the parking brake chamber be disassembled. Disassembly will release a powerful spring that could result in personal injury and / or death, or property damage.

The purpose of the parking brake is to hold the vehicle in the parked position. It should NOT be used to brake the vehicle during normal driving. It may be used to assist in making an emergency stop in the event of service brake failure.

The manual parking brake is controlled by the parking brake pedal. Always observe the gauge instrument panel gauge cluster PARKING BRAKE indicator to determine if the parking brake is applied or released.

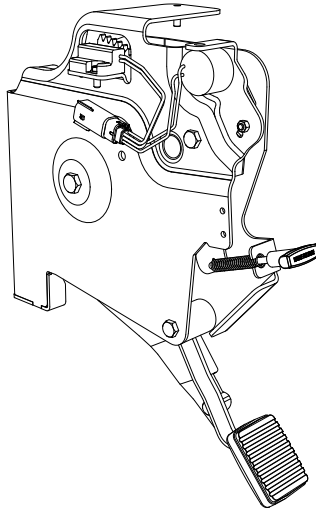
## To Manually Apply the Parking Brake



0000362061

1. Bring the vehicle to a complete stop, using your brake pedal.
2. Make sure that the engine is at low idle.
3. With your foot still firmly on brake pedal, place transmission in Park (P) or Neutral (N) position.
4. Firmly push the parking brake pedal. The PARKING BRAKE indicator will illuminate in the instrument panel gauge cluster.

### To Manually Release The Parking Brake



0000362081

1. Turn ignition switch to the ON position,
2. Depress and hold the brake pedal.
3. With the brake pedal held, pull the brake release lever until the parking brake indicator goes out, then release.

**NOTE: Wheelchair lift interlocks will prevent release of the parking brake until all conditions are satisfied (see Wheelchair Interlocks in Automatic Transmission section).**

### Air Brakes



#### WARNING

To prevent personal injury and / or death, or damage to property, never operate the vehicle when insufficient air pressure (less than 70 psi [483 kPa]) is indicated for either the primary or secondary air system, or if a low-pressure alarm is sounding and a warning indicator is illuminated. The volume of air required to stop the vehicle may be greater than that available. Have the brake system checked and repaired before returning the vehicle to service.

All air brake equipped vehicles have a split brake system. A split system provides a way to stop the vehicle if a failure occurs in either the primary or secondary brake system. If air pressure is lost in one system, the remaining system continues to provide braking action.

Even though there is braking capability for emergency stopping, do not operate the vehicle when a failure is indicated, because there may be no way of replenishing air pressure.

If vehicle has been parked for an extended period in cold weather, always check to be sure all wheels are rolling free (brakes are not frozen) when starting out. Always clean accumulated ice and snow from brake linkage.

If air pressure in either section of the split air brake system is reduced to 57 psi (393 kPa) the warning buzzer will sound and a RED indicator on the instrument panel gauge cluster glows. In addition, the air gauge(s) will indicate low air pressure in at least one of the split systems.

The warning buzzer and RED indicator automatically shut OFF when the air pressure in both systems is sufficient (approximately 70 psi [483 kPa]) to operate the vehicle.

If the RED indicator and buzzer do not shut off after start-up, check the air pressure gauge(s) and see if one or more sections of the split system has low air pressure.

If the RED indicator, buzzer, and gauge indicate a loss of pressure while driving, the vehicle will still have some braking capability. Either one-half of the split system or the spring brake system braking capability is retained. However, the distance required to stop the vehicle will be increased.

#### *Air Disc Brakes (0004JBZ, 0004JCC, 0004WEY, 0004WEZ)*

The air disc brake system encompasses a floating caliper design that is activated when air pressure is introduced into the system.

The air disc brake system works by converting air pressure into braking force. When braking is applied, air will enter the brake chamber applying pressure to the diaphragm. The pressure created activates the system causing the brake pads to contact the rotor. When braking is released, the air pressure in the brake chamber is released, exhausting the pressure on the diaphragm causing the brake pads to return to their neutral / non-braked position.

#### *Using Air Brakes*



**To prevent personal injury and / or death, or damage to property, always check and maintain brakes in proper condition and adjustment. Out-of-adjustment brakes could cause reduced braking ability.**

Do not apply and release (pump) the brakes rapidly. This is an inefficient way of slowing or stopping a vehicle and inefficient use of air pressure. This also reduces the ability of the ABS system to function properly.

#### *Using the Air Parking Brake*



**To prevent personal injury and / or death, or damage to property, before starting the engine, the parking brake control knob must be in the applied (pulled) position. Failure to do so could allow the vehicle to roll.**

The purpose of the parking brake is to hold the vehicle in the parked position. It should NOT be used to brake the vehicle during normal driving. It may be used to assist in making an emergency stop in the event of service brake failure.

**Parking Brake / Wheelchair Lift (If Equipped) Interlock.** On vehicles equipped with an optional wheelchair lift, power will not be supplied to the wheelchair lift mechanism unless the parking brake is applied.

## Operation

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**NOTE:** On vehicles equipped with optional wheelchair lift, the parking brake cannot be released until the wheelchair lift is completely stowed.

**NOTE:** For a complete description of these interlocks, see the **Parking Brake / Wheelchair Lift (Optional) Interlock** procedures in the **Hydraulic Brake** section.

### To engage Air Parking Brake

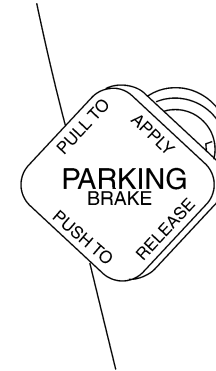
1. Bring the vehicle to a complete stop, using your brake pedal.
2. Make sure the engine is at low idle.
3. With your foot still firmly on brake pedal, place transmission in Neutral position.
4. Pull the parking brake control knob to apply the parking brake.

### To release Air Parking Brake

1. Have the engine running and your foot on the service brake pedal.
2. Push in the control knob.
3. Wait until system pressure has reached 70 psi.

**NOTE: DO NOT operate vehicle until system pressure has reached 70 psi.**

**NOTE:** To release the parking brake on vehicles with the optional wheelchair lift, the lift must be completely retracted and stowed.



ICB100155

### Air Parking Brake Control Knob

### Air Brake Gauge



The air operated parking brake has an air gauge and warning buzzer. When pressure in the parking brake air reservoir has been reduced to about 57 psi (393 kPa), the buzzer sounds.

A loss of pressure in the control circuit prevents normal operation of the parking brake.




**CAUTION**

**To prevent property / vehicle damage, if air system pressure falls below 70 psi (483 kPa), pull off the roadway, apply the parking brake, and correct the low pressure condition.**

If air pressure is reduced to approximately 40 psi (276 kPa) in both the primary and secondary systems, the parking brakes will automatically apply.

*Parking Brake Indicator Light*

**PARK**


ICB100022

The parking brake indicator is illuminated when the parking brake is applied. During engine cranking period the parking brake indicator should illuminate. This indicator goes out after the engine is started if the parking brake is not applied. If the parking brake is applied, this indicator remains on after engine has started. If the indicator does not illuminate during cranking period, the light bulb may be defective.

**Antilock Braking System (ABS)**

**WARNING**

**To prevent personal injury and / or death, or damage to property, Antilock Brake System(s) (ABS) are designed to enhance overall vehicle safety when a vehicle is driven within its safe operating limits. ABS cannot compensate for a vehicle that is being driven beyond the physical limits of control. Drivers operating an ABS-equipped vehicle should employ safe driving practices and assume no additional driving risks.**


**WARNING**

**To prevent personal injury and / or death, or damage to property, do not rely on the Antilock Brake System (ABS) to interrupt vehicle engine brake on slippery road surfaces. Turn these devices OFF during hazardous driving conditions. Failure to follow this warning may cause wheel slippage and / or loss of vehicle control.**



### **WARNING**

**To prevent personal injury and / or death, or damage to property, if the Antilock Brake System (ABS) warning indicator comes on, have the ABS repaired immediately as stopping distances may increase under certain braking conditions. Take every precaution to prevent wheel lockup, which could result in loss of vehicle control.**



### **CAUTION**

**To prevent damage to the electrical system or ABS components, when welding on an ABS-equipped vehicle disconnect the power connector from the Electronic Control Unit (ECU).**

The ABS system is a mandated system used with the Hydraulic and Air Brake systems. The antilock brake system electronically monitors vehicle wheel speed, and only engages when wheel lock is imminent. The standard brake system controls normal braking when the ABS is not engaged. ABS requires few changes in driving practices. For the best stopping performance, press, do not pump the brake pedal until the vehicle slows to desired speed or stops. The ABS system cannot provide any better braking and steering capability than the available road traction permits. If the road is slippery, it takes longer to stop than on a dry road. Steering maneuverability is similarly limited.

Vehicle speed must be reduced to compensate for the extended time and distance required to stop or slow the vehicle on slippery roads. ABS prevents lockup of controlled wheels if you over brake for existing road conditions.

The wheel hubs carry exciter rings used by the axle mounted sensors to transmit wheel speed information to the ABS electronic control unit located on the chassis frame. The control unit monitors and compares all wheel speed inputs to determine if any wheel(s) are about to lock. If wheel lockup is about to occur, the control unit commands the appropriate modulator valve to adjust pressure delivery to prevent wheel lockup.

If over-braking causes wheel lockup on the rear drive axles while retarding devices are in operation, the ABS will interrupt and disable the retarder until the lockup situation has stopped.

The ABS is equipped with a warning indicator located in the vehicle's instrument panel gauge cluster. Each time the ignition is turned on the ABS performs a self check. The ABS warning indicator will illuminate and if the ABS passes the self check, the indicator will turn OFF a few seconds after the ignition is turned on. ABS fault codes will be electronically stored in the ABS.

### **Antilock Driving Tips**

- Use controlled, even pressure to stop the vehicle, being careful not to skid. Most effective stopping will be achieved in this situation.
- If the vehicle begins to skid, maintain even pressure on the brake pedal. The ABS controller will rapidly cycle the brakes on the skidding wheel(s), while maintaining even pressure on the non-skidding wheels.
- While maintaining even pressure on the brake pedal, steer around any hazardous objects in your path.
- Attempt to steer clear of traffic, pedestrians or other obstacles while you are in an emergency braking situation. The antilock brake system will allow you to steer the vehicle during braking while it comes to a full stop. ABS is not an excuse to take unnecessary risks. Always drive carefully and stay a safe distance away from the vehicle in front of you.
- Do not pump the brake pedal during a skid unless the ABS system is not functioning.

### ABS Self-Check

**NOTE:** If an antilock fault develops, standard brake system operation is maintained. The brake system is still operational, but the antilock system does not operate to prevent wheel lockup if you over apply the brakes for existing conditions.

**NOTE:** If the ABS indicator stays illuminated or continues to flash, have the system serviced immediately.

A YELLOW warning indicator on the instrument panel indicates the status of the ABS. Each time the ignition is turned ON the indicator comes on and the system goes through an ABS self-check sequence. If the system is working normally when the ignition is turned ON, the ABS indicator comes on then flashes twice, and finally the ABS indicator remains on for several seconds before going out.

### Pedal Adjustment Switch (If Equipped)

The pedal adjustment switch (optional) allows the operator to reposition the power-adjustable pedals to enhance comfort and safety. The pedals can be repositioned closer to or further away from the operator. For more information on pedal switch operation, refer to the **Driver Controls** section of this manual.

### Manual Pedal Adjustment

Manual adjustment of brake pedal free travel should not be necessary, but if it is, it is extremely important that the work be properly performed. Allow only qualified technicians to perform this operation.

### Traction Control (If Equipped)



#### WARNING

To prevent personal injury and / or death, or damage to property, drivers operating a Traction Control equipped vehicle should employ safe driving practices and assume no additional driving risks. Traction Control systems are designed to enhance overall vehicle safety when a vehicle is driven within its safe operating limits. Traction Control cannot compensate for a vehicle which is being driven beyond the physical limits of control.

Your vehicle may be equipped with an optional traction control system which helps you maintain the stability and steerability of your vehicle, especially on snow or ice-covered roads and gravel roads. It reduces engine power and / or selectively applies the rear brakes. The system allows your vehicle to make better use of available traction in these conditions by also limiting the engine rpm when you push further on the accelerator, which limits wheel spin. The TRAC CTRL indicator in the instrument panel gauge cluster will illuminate during this Traction Control event. The TRAC CTRL indicator will also illuminate if the system is malfunctioning.



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**NOTE:** The traction control braking (ATC action) to limit wheel spin does not occur at vehicle speeds above approximately 31 mph (50 km/h). Therefore, at speeds above 31 mph (50 km/h), all ATC events are controlled only by Engine Power Limiting.

**The Traction Control switch for Hydraulic Brake equipped vehicles.** With the traction control switch in the TRAC CTRL position, the system operates as described above. The MUD / SNOW position of the traction control switch provides modified system performance for deep mud or snow conditions. If the optional traction control switch is in this position, the instrument panel gauge cluster TRAC CTRL indicator will flash.



**The Traction Control switch for Air Brake equipped vehicles.** If the system is enabled (traction control switch in the TRAC ENAB position), the TRAC CTRL indicator in the instrument panel gauge cluster will flash during a traction control event and the engine may not increase rpm when you push further on the accelerator.



## Stability Control Systems – Bendix® ESP

### **WARNING**

To prevent personal injury and / or death, or damage to property, be aware that vehicles equipped with stability control have reduced effectiveness when pulling double or triple trailers. ESP is designed and optimized for trucks and for tractors that tow single trailers. Extremely careful driving is required when towing double or triple trailers. Excessive speed and aggressive maneuvers should be avoided.

### **WARNING**

To prevent personal injury and / or death, or damage to property, Stability Control systems are designed to enhance overall vehicle stability by automatically reducing vehicle speed under certain conditions. Drivers operating a Stability Control equipped vehicle should employ safe driving practices and assume no additional driving risks.



### CAUTION

To prevent damage to property, modification to vehicles equipped with stability control systems require prior approval through IC Bus® or the stability control system manufacturer. Unapproved modifications may result in diminished stability control performance.

**NOTE:** This section gives a brief explanation of the Electronic Stability Control system, for more information refer to <http://www.bendix.com>.

The stability control system provides the core ABS function, as well as automatic traction control (ATC) and roll stability functions.

**Core ABS Functions:** The core ABS system reduces wheel lockup to help drivers maintain steering control while braking. antilock braking systems (ABS) use wheel speed sensors, ABS pressure modulator valves, and an electronic control unit (ECU) to control either four or six wheels of a vehicle. ECUs optimize slip between the tire and the road surface by monitoring individual wheel turning motion during braking.

**Yaw Control:** This function reduces the tendency of the vehicle to spin or jackknife when an under-steer or over-steer event occurs.

**Vehicle Stability Control Speed Reduction:** In the case of a potential roll event, the stability system will remove the throttle

and quickly apply brake pressure to slow the vehicle combination below the threshold.

**Steering Angle Sensor:** This sensor enables the advanced stability system to capture the driver's steering input and intervene if a yaw correction is needed. The sensor also provides the earliest indication of an increase in lateral acceleration that might cause a potential roll event. A steering angle sensor provides a greater stability margin than a vehicle that is not equipped with this sensor.

**Brake Demand Sensors:** The stability control system was designed to supplement the driver's actions. By directly measuring driver brake demand, the system can transition seamlessly between driver-intended and system-intended braking pressure. For example, if during a certain maneuver, the system calculates 40 psi (276 kPa) is needed and the driver is only applying 20 psi (138 kPa), the system compensates automatically to deliver the needed 40 psi (276 kPa). If, however, during the same maneuver, the driver steps on the brake pedal quickly to apply a higher [above 40 psi (276 kPa)] braking level, the driver's braking input overrides the temporary change made by the system.

**ABS / Stability System Interaction:** With the ABS-based stability control system, the ABS system is given priority at the wheel ends to manage wheel slip for optimal braking. The ABS system functions similarly whether the stability system or the driver applies the brakes.

## International® Ride Optimized Suspension (IROS) (If Equipped)



### CAUTION

To prevent vehicle and / or component damage, do not operate a vehicle without air in the suspension springs. Operating the vehicle without air in the air suspension springs will damage the suspension, degrade ride performance and may cause transmission damage.

The suspension system automatically adjusts to different loads to maintain a constant frame height. The system allows for ease of vehicle loading and provides improved vehicle ride and increased driver comfort. The system is completely automatic.

## Automatic Transmission Operation

### Standard Allison 1000 PTS Transmission



### WARNING

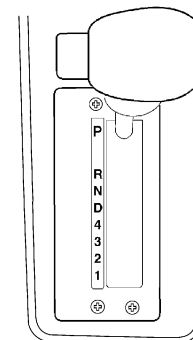
To prevent personal injury and / or death, or damage to property, check to see that area behind vehicle is clear of people, animals, and objects before backing up. Use a spotter whenever possible and always keep that person in sight. If so desired, backup alarms are available through your IC Bus® or International® dealer. However, they are never a substitute for the above procedures.



### WARNING

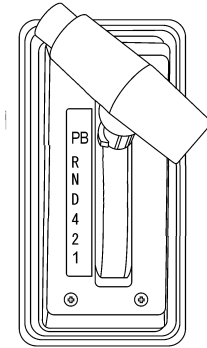
To prevent personal injury and / or death, or damage to property, hold the brake pedal down while you move the gearshift from position to position to prevent unexpected vehicle movement.

**NOTE:** For complete transmission operation, refer also to separate Allison Transmission Operator Manual.



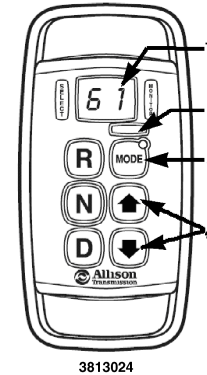
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### Allison Transmission Mechanical Lever Shifters



1. Apply the service brake and press and hold the button on the gearshift lever handle.
2. With the brake still applied, continue to hold the gearshift lever button while moving the gearshift lever to Reverse (R) or Drive (D) position, and then release the button.
- **For Air Brakes**, push in on the parking brake knob. (Park indicator on instrument panel gauge cluster will turn OFF.)
- **For Hydraulic Brakes** depress and hold the parking brake pedal, with the brake pedal held; pull the brake release lever until the Park brake indicator goes out, then release the foot pedal.
3. Lift foot from the brake pedal, and then slowly press the accelerator pedal.

### Allison Generation IV Push-Button Shift Selector



1. Digital display
  2. Mode ID
  3. Mode button
  4. Range selector buttons
- To shift the transmission into Reverse (R) or Drive (D), press the brake pedal, then press R or D, then release the brake pedal.
  - To select a lower range when in Drive (D), press the down-arrow button.
  - To select a higher range when locked in a lower range, press the up-arrow button.
  - To place the transmission in Neutral (N), press N.



**Parking the Vehicle.**

1. Use your service brake pedal to bring the vehicle to a complete stop.
2. Make sure the engine is at low idle.
3. Move the transmission shifter to the Parking Brake (PB), Park (P) or Neutral (N). With the push-button shifter, press the Neutral (N) button.
4. **For Air Brakes**, pull the parking brake knob. (Park indicator on instrument panel gauge cluster will turn ON.)
5. **For Hydraulic Brakes** apply the foot operated parking brake. (Park indicator on instrument panel gauge cluster will turn ON.)
6. Slowly remove your foot from the service brake pedal and make sure that the parking brake is properly engaged. (The instrument panel gauge cluster PARK indicator will turn ON.)

**Starting Bus in Motion**

To start the bus in motion:

1. Depress the service brake pedal and press and hold the button on the gearshift lever handle and move the gearshift lever from Park (P) to Reverse (R) or Drive (D) position, and then release the button.
2. Release the parking brake (push and release the parking brake knob), lift foot from service brake pedal, and then slowly press the accelerator pedal. The instrument panel gauge cluster PARK indicator should be turned OFF.

**Backup Alarms**

This bus may be equipped with one of two backup alarms options to warn, anyone standing behind the vehicle, that it is in the process of backing up. The backup alarm is activated by:

**Reverse gear Alarm Option.** With foot on the service brake pedal, shift the transmission into Reverse (R). **The backup alarm will sound as long as the transmission shift selector is in the Reverse (R) position.**

**Roll Back Alarm Option.** Release the parking brake and then take your foot off the service brake pedal, allowing the bus to drift backward. **The backup alarm will sound as soon as the bus begins to roll backward.**

**NOTE:** This optional backup alarm is activated every time the vehicle moves backwards, in any gear, with the ignition ON or OFF.

## Operation

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### Economy Mode

The economy mode provides a transmission shift schedule for improved fuel economy. To activate this mode, switch the ECON / ON switch, on the right-side switch panel, to the ON position. When in the ON position the switch indicator will be turned ON.

### Automatic Transmission Operating Temperatures

Your vehicle may be equipped with a warning indicator or gauge that will indicate high transmission fluid temperatures.

The sump / fluid reservoir temperatures of the Allison Transmissions should not exceed 250°F (120°C)

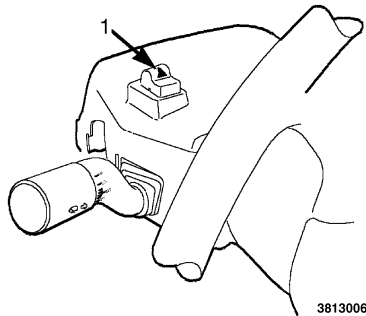
## SECTION 11 — ROADSIDE EMERGENCIES

### Hazard Warning Switch



#### WARNING

To prevent personal injury and / or death, or damage to property, in the event engine shut down occurs, make certain the vehicle is safely off the roadway, the hazard flashers are on and the warning devices are properly placed.



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#### 1. Hazard warning light switch

1. Use the hazard warning light switch in an emergency to warn traffic of vehicle breakdown, approaching danger, the vehicle is in tow, or is operating at a reduced speed.
2. Press the button to activate all hazard flashers simultaneously.
3. Press the button again to turn OFF the flashers.

### Emergency Equipment (Recommended On-Board)

#### Fire Extinguisher

Inspect the fire extinguisher monthly to make sure it has a sufficient charge. Look at the gauge located at the top of the extinguisher to verify proper charge.



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## Roadside Emergencies

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### First Aid Kit



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Make sure to keep the first aid kit completely stocked and ready for use at all times by replacing any items used.

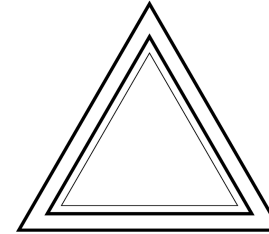
### Body Fluid Cleanup Kit



ICB100513

Use this whenever any type of body fluid comes in contact with the bus. When items are used, they should be immediately replaced.

### Reflective Triangle



ICB100514

Use the triangle whenever the bus is pulled over to the side of the road. The reflective triangle kit is usually located behind the driver's seat. After opening the kit, unfold the triangle and make sure it locks in place.

### Propane Autogas Fuel System Related Emergencies

#### First Respondent and Operator Warning

Refer to the following sections of the **Pipeline and Hazardous Material Safety Administration Emergency Guidebook** for propane autogas precautions regarding potential hazards, public safety and emergency response.

- Material ID Number: 1075
- Guide Number: 115

**NOTE: Refer to (page 14) for a reference of the 1/4 Fuel Safety Shut Off Valve.**

In the event of propane autogas fuel system emergency, perform the following:

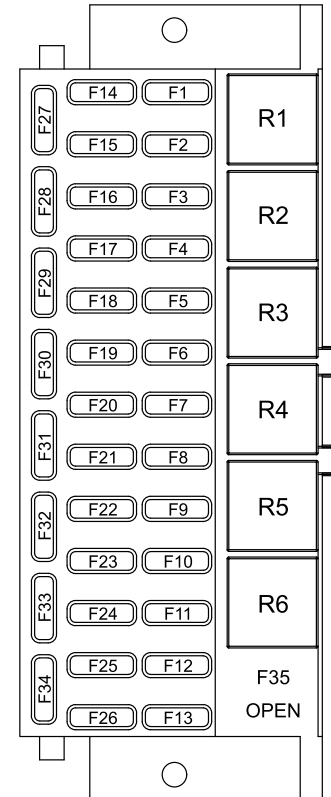
1. Stop the vehicle, place it in park and apply the parking brake.
2. Immediately evacuate the area.
  - Everyone in the affected area should move to a safe distance from the spill or leak. Do not re-enter area.
3. Call for help.
  - After you are at a safe distance from the affected area, call 911 or the local fire department.

### Fuse / Circuit Breaker Charts

**NOTE:** To gain access to the fuse and circuit breakers, reference (page 12) for the location of the Electrical Compartment Access Panel.

The following fuse illustrations represent typical fuse panel layouts. The actual vehicle fuse panels will vary depending on the vehicle options.

### Chassis Fuse / Circuit Breaker Chart



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## Roadside Emergencies

Location	Size	Description
F1	10A	Crossing Gate
F2	15A	Instrument Panel Gauge Cluster Battery Feed
F3	5A *	Hydraulic Brake Switch Battery Feed
F4	10A	Ammeter / Crossing Gate Battery Feed
F5	10A	Stop Light Relay Battery Feed
F6	30A	Air Conditioner Blower Motor
F7	10A	Key Switch Battery Feed
F8	3A	Ignition #1 Relay
F9	10A	Diagnostic Connector Battery Feed
F10	30A	Ignition #2 Relayd
F11	5A*	Body Builder / NEC GPS Prewire
F12	5A*	System Controller / Switch Pack Accessory Feed
F13	5A*	Aware
F14	5A*	Body Builder Ignition Feed
F15	10A	Compass Module / Aware
F16	10A	System Controller Ignition Feed
F17	5A*	Engine Electronics Ignition Feed
F18	5A*	Accelerator Pedal Ignition Feed

Location	Size	Description
F19	5A*	Auto Drain Valve Relay Ignition Feed
F20	10A	Backup Light Ignition Feed
F21	10A	Transmission Control Module Ignition Feed / 12V Crank Relay
F22	5A*	Transmission Shifter LCT / Eaton Hybrid HCM2
F23	10A	Fuel Heater / Air Dryer / Drain Valve / Park Regen Switch Ignition Feed
F24	5A*	Instrument Panel Gauge Cluster Ignition Feed
F25	5A*	Bendix and WABCO Hydraulic Antilock Brake System
	10A*	WABCO Air Antilock Brake System
F26	5A*	Panel Light System
F27	10A	Brake Monitor Ignition Feed
F28	5A*	Air Conditioner Clutch
F29	5A*	Change Transmission Filter Ignition Feed
F30	5A	WTEC Shift Selector / Eaton Hybrid TECU
F31	10A	Fan / Shutter
F32	20A	Coolant Heater

Location	Size	Description
F33	15A	Fog Light Battery Feed
F34	10A	Windshield Washer Pump Ignition Feed
<p><b>NOTE: Locations marked with a (*) must use fuse only.</b>  <b>NOTE: Descriptions marked with a (#) indicate fuses used with Eaton Hybrid-equipped vehicles.</b></p>		

**Fuse Description Chart**

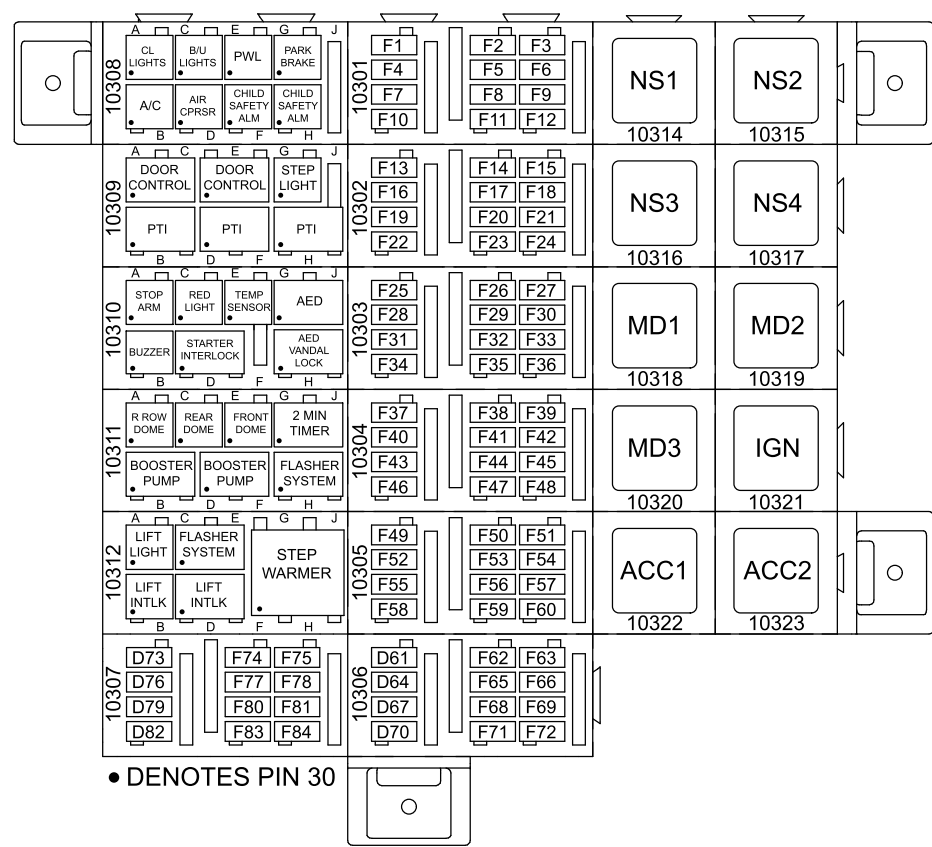
Amps	Color
5	TAN
10	RED
15	LIGHT BLUE
20	YELLOW
25	CLEAR
30	LIGHT GREEN

**Power Relays**

Location	Description
R1	Wiper Power Relay
R2	Wiper Speed Relay
R3	Stop Light Relay
R4	Back - Up Light Relay
R5	Ignition #1 Relay
R6	Ignition #2 Relay

# Roadside Emergencies

## Body Fuse / Circuit Breaker Panel



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Location	Size	Description
F1	20A	Driver-Side Heater
F2	20A	Stepwell Floor Heater
F3	7.5A	Convection Heater
	25A	Left-Side Front Passenger Heater
F4	7.5A	Defog Fan Right Switch
	15A	Defog Fan (x2) Right Switch
	20A	Center Blower Right Switch
F5	25A	Left-Side Rear Passenger Heater
F6	7.5A	Radio Power
F7	25A	Right-Side Rear Wall Heater Switch 1 / Right-Side Front Passenger Heater
F8	7.5A	Front Power Vent
F9	5A	Air Conditioning
F10	25A	Right-Side Rear Wall Heater Switch 2 / Right-Side Rear Heater
F11	7.5A	Rear Power Vent
F12	7.5A	Defog Fan Left-Side Switch
	15A	Defog Fan (x3) Left-Side Switch
	20A	Center Blower Left-Side Switch
F13	25A	Step Warmer
F14	15A	Booster Pump
F15	20A	Two-Way Radio Terminal Strip

F16	3A	Air Horn
F17	15A	Dome Lights
F18	7.5A	Direct-to-Disk Recording (DDR) / Digital Video Recording (DVR) System Camera System
	20A	Video System Terminal Strip
F19	15A	Heater Mirrors
F20	15A	Air Compressor
F21	15A	Air Compressor
F22	7.5A	Traction Chains
	20A	Traction Sanders
F23	15A	Air Seat
F24	7.5A	Heated Seat
F25	15A	Dome Lights (Battery)
F26	15A	Dome Lights Option
F27	10A	Hazard Lights
F28	15A	DC Outlet
F29	15A	Fuel Fired Heater
F30	10A	Clearance Lights
F31	7.5A	Lift Interlock
F32	15A	Electric Entrance Door
	10A	Air Door Vandal Lock
	7.5A	Manual Door Vandal Lock

## Roadside Emergencies

F33	3A	Reverse Motion Sensor
F34	7.5A	Luggage Box Lights
F35	5A	Radio Memory
F36	5A	Direct-to-Disk Recording (DDR) / Digital Video Recorder (DVR) System
F37	25A	Spare Tire Winch
F38	7.5A	Stop - Arm / Crossing Gate
F39	7.5A	Backup (B/U) Lights - Act By Rear Emergency Exit
F40	3A	PTI - Bus Scan / PTI - Checkmate
	10A	PTI - CRS
F41	3A	PTI - Checkmate - Deactivate
	15A	PTI - CRS - Headlights
F42	10A	Fire Suppression System
F43	3A	Starter Interlock
F44	7.5A	Alternate Entrance Door
F45	3A	Entrance Door Dump Valve
F46	3A	Fuel Fired Heater Timer
F47	3A	Stop - Arm / Crossing Gate Cancel
F48	5A	Dome Light Timer Relay
F49	7.5A	Emergency Exit Alarms
F50	7.5A	Front Cluster Light
F51	7.5A	Emergency Exit Lights

F52	3A	Traction Sanders
F53	20A	Pedestrian Lights
F54	3A	PTI - Bus Scan / PTI - Check Mate
	15A	PTI - CRS
F55	7.5A	Heated Wiper Blades
F56	10A	Motorized Mirrors
F57	7.5A	Light Monitor
F58	10A	Step Light
F59	–	See Circuit Diagram
F60	3A	Engine Compartment Temp Sensor
F61	–	See Circuit Diagram
F62	7.5A	Strobe Light
F63	5A	Dome Light Timer Relay
F64	–	See Circuit Diagram
F65	3A	PTI - Leave No Student Behind
F66	3A	Battery Isolator
F67	–	Rear Door Options
F68	–	See Circuit Diagram
F69	–	See Circuit Diagram
F70	–	Backup (B/U) Lights - Activated By Rear Emergency Exit
F71	3A	Locking Compartment
F72	3A	Buzzer Isolation Relay

F73	–	PTI - CRS With Enter Door Activated Dome Light / PTI - Leave No Student Behind
F74	–	See Circuit Diagram
F75	–	See Circuit Diagram
F76	–	PTI - CRS With Enter Door Activated Dome Light
F77	–	See Circuit Diagram
F78	–	See Circuit Diagram
F79	–	Dome Lights - Activated By Rear Emergency Exit
F80	–	See Circuit Diagram
F81	3A	Electrical Panel Compartment Light
F82	–	Rear Door Options
F83	7,5A	Emergency Exit Alarms (Battery)
F84	10A	AED Vandal Lock Switch

## Power Relays

Location	Description
NS1	Noise Suppression Relay 1
NS2	Noise Suppression Relay 2

## Power Relays (cont.)

NS3	Noise Suppression Relay 3
NS4	Noise Suppression Relay 4
MD1	Master Disconnect Relay 1
MD2	Master Disconnect Relay 2
MD3	Master Disconnect Relay 3
IGN	Ignition Relay
ACC1	Accessory Relay 1
ACC2	Accessory Relay 2

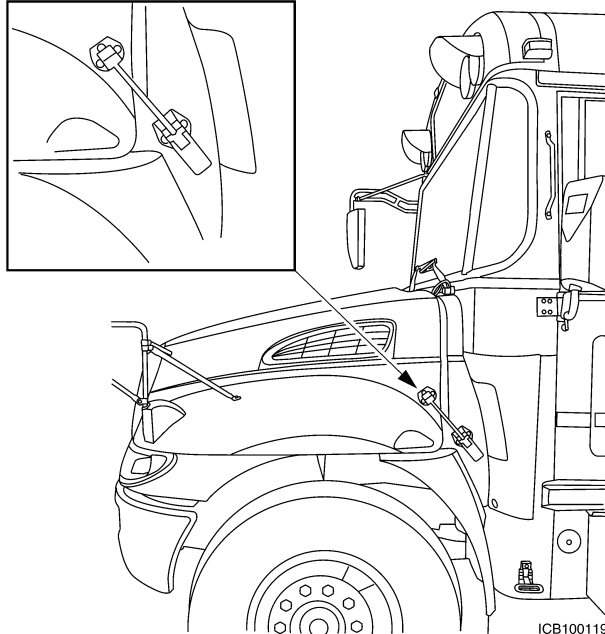
## Fuse Description Chart

Amps	Color
5	TAN
10	RED
15	LIGHT BLUE
20	YELLOW
25	CLEAR
30	LIGHT GREEN

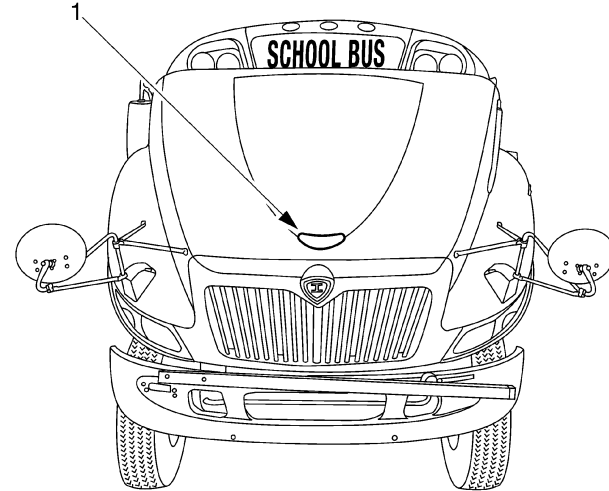
## Roadside Emergencies

### Tilt Hood

#### *Raising the Hood*



Release the latches on both sides of the cowl.



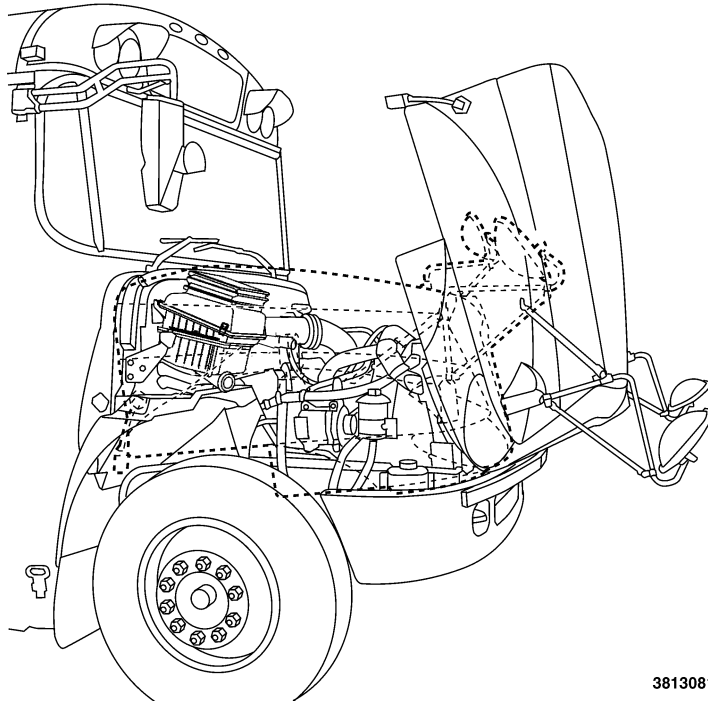
1. Hood handle



#### **CAUTION**

**To prevent damage to property, never use the crossview mirrors as a handle. Mirror damage and misadjustment can occur.**

Use the hood handle and pull the hood forward over center and allow it to settle into the raised position.



### *Lowering the Hood*

**NOTE:** Make sure that the hood has no tools / parts / people in its path of motion.

Use the hood handle and push the hood backward over center and allow it to settle into lowered position.

Engage the latches at both sides of cowl.

### Emergency Starting Using Jumper Cables

#### **WARNING**

To prevent personal injury and / or death, or damage to property, the following procedures must be performed exactly as outlined, otherwise a fire or a battery explosion could occur.

#### **CAUTION**

To prevent damage to vehicle electronic components, voltage supplied to a vehicle's electrical system must never exceed 16.0 volts. This voltage must not be exceeded when the ignition switch is in the OFF, ACC, or ON position or during engine cranking. The most reliable means for jump starting a vehicle is to use batteries connected so as to provide 12 volts. Never use an electric welder.

1. Remove metal rings or watches and do not allow metal tools to contact positive terminal of battery to prevent shorting of the electrical system.
2. Place transmission in Neutral and set parking brake in both vehicles.
3. Turn OFF lights, heater, air conditioner and any other electrical loads in both vehicles.

4. Eye protection should be worn if available. If not available, shield eyes when near either vehicle's batteries.
5. Make sure the vehicle bodies or bumpers are not touching.
6. Connect one end of the first jumper cable to positive (+) terminal of the dead battery or (+) terminal of jump start stud and then the other end to the positive (+) terminal of the booster battery.
7. Connect one end of the second jumper cable to negative (-) terminal of the booster battery and the other end to chassis frame of the vehicle with the discharged battery. Do not attach the other end to the negative (-) battery terminal of the discharged battery, because a spark could occur and cause explosion of gases normally present around the battery.
8. Reverse above procedure when removing the jumper cables.

## Towing Instructions



### WARNING

**To prevent personal injury and / or death, or damage to property, observe the following: Always install wheel chocks when manually releasing the spring brakes. For towing make sure the vehicle is securely connected to the tow vehicle and the tow vehicle parking brakes are applied before releasing the disabled vehicles parking brakes.**

- **Always install wheel chocks when manually releasing the parking brakes, or the vehicle can roll.**
- **For towing, make sure the vehicle is securely connected to tow vehicle and tow vehicle parking brakes are applied before releasing the disabled vehicle's parking brakes.**
- **To ensure release of parking brake, always cage the spring in the brake chamber.**
- **Under no circumstances should the spring brake chamber be disassembled for the purpose of releasing the parking brake.**



### WARNING

To prevent personal injury and / or death, or damage to property, always use both tow hooks to prevent possible overloading and breaking of individual hooks. This vehicle may be equipped with (optional) dual tow hooks for recovery purposes only.



### CAUTION

To prevent personal injury and / or death, or damage to property, observe the following: Due to many variables that exist in towing, positioning and lifting, towing is the sole responsibility of the towing operator.

Refer to the differential and transmission equipment manufacturer for specific instructions on towing your vehicle. Further information can be located in the component owner manual that came with this truck on delivery for original sale.

Damage caused by improper towing procedures is not a warrantable failure.

Remove tow hooks from their installed position in the front of the vehicle before operating the vehicle. Failure to do so could result in the tow hooks becoming unintentionally detached from the vehicle.



### CAUTION

To prevent transmission damage, vehicles should not be towed even short distances without suspending rear wheels or removing the axle shafts or propeller shaft.

In the event the chassis is equipped with tandem axles and the vehicle is to be towed from the front, the forward rear axle may be raised to clear the road surface and secured to the frame by chains or U-bolts, allowing only rear axle to contact road surface. Axle shafts must be removed from rear axle assembly. The wheel hub ends must be covered to prevent loss of axle lubricant and entrance of contaminants. Use extreme care in securing the chains or U-bolts to prevent possible damage of brake lines, hoses, or other components.



### CAUTION

To prevent vehicle or engine component damage, do not use the front or rear bumper as a lift point when lifting or jacking the vehicle.

Important factors to keep in mind when using tow hooks:

- Use both tow hooks when retrieving vehicle.
- Use a slow steady pull, do not jerk on hooks.
- Tow hooks are not designed for towing, but for retrieval only.

## Roadside Emergencies

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Before moving the towed vehicle, check for adequate road clearance of vehicle components. IC Bus recommends unloading the towed vehicle prior to towing to reduce any abnormal loads to the vehicle components resulting from the towing procedures. Before towing, be sure to fully release the parking brake, in either Air or Hydraulic brake system.

### Towing Preparation: Air Parking Brakes

The spring actuated type parking brake can be released by recharging the air system with at least 64 psi (441 kPa) of air. If brake system does not retain air pressure, then manually cage the spring brakes.

### Towing Preparation: Hydraulic-Powered Parking Brakes

If battery power is available:

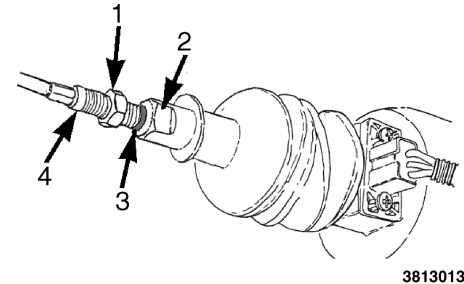
1. Key ON vehicle and press brake pedal.
2. Release parking brake and turn ignition to Key OFF position.
3. The vehicle can be towed, there may be a warning that the parking brake is not set upon key OFF.

If battery power has been lost, the parking brake cable will have to be disconnected by following the steps below (see illustration):



### CAUTION

**To prevent vehicle and / or component damage, while removing the parking brake cable, only the threaded rod should rotate. If the cable is to be reused, do not allow the cable to twist during removal.**



### Parking Brake Cable Assembly

1. 16mm jam nut
  2. SAHR canister shaft 15mm
  3. Adjustment indicator, HASH mark
  4. Threaded rod 8mm
- 
1. Install wheel chocks, place the transmission in Neutral (N), and turn the ignition switch to the OFF position.
  2. While using a 15 mm wrench to hold the SAHR canister shaft, loosen the jam nut on the threaded rod with a 16 mm wrench.
  3. While using the 15 mm wrench to hold the canister shaft, unscrew the threaded rod using an 8 mm wrench. The rod must be unscrewed approximately 2.5 in (6 cm) before the cable disconnects. The cable will exhibit some resistance while being unscrewed because it is under tension.



### **Towing Vehicle With Front Wheels Suspended**

When it is necessary to tow a vehicle with the front wheels suspended, extra precautions must be taken to avoid transmission or differential damage.

Disconnect the axle shafts at the rear axle to prevent the wheels from driving the differential and the transmission. If axle shaft is not disconnected, remove the rear axle shafts from the axle assembly. Cover the wheel hub ends to prevent loss of axle lubricant and entrance of contaminants.

### **Towing Vehicles With Rear Wheels Suspended**

Whenever possible, it is preferable to tow a disabled vehicle from the rear by raising the rear of the chassis. When towing a vehicle with the rear of the chassis suspended, the front wheels must be locked in the straight ahead position.



## SECTION 12 — CLEANING



### WARNING

To prevent personal injury and / or death, or damage to property, shift transmission to Park or Neutral, set parking brake, and install wheel chocks before performing diagnostic or service procedures.



### WARNING

To prevent personal injury and / or death, or damage to property, read and adhere to all safety instructions on the labels of all cleaners. Many cleaners contain solvents that may become concentrated in the vehicle interior breathing space. While cleaning the interior area, maintain adequate ventilation by opening windows and doors.



### WARNING

To prevent personal injury and / or death, or damage to property, read and adhere to all safety instructions on the labels of all cleaners. While most cleaning products are safe when used individually, certain cleaners can form hazardous gases if mixed with other cleaning products.

**NOTE:** Chemicals used to clean or disinfect your IC Bus® vehicle can adversely affect materials used to build the vehicle. Many common cleaning chemicals can damage or ruin the appearance of materials like ABS plastic, vinyl, rubber, aluminum, glass and painted surfaces. As with the cleaning chemicals used, the cleaning process (or the lack of a cleaning process), can also affect the life and appearance of the vehicle.

Chemicals used in premixed or aerosol disinfectant solutions can damage or affect the appearance of many interior surfaces.

The following information should be used to determine an acceptable method to clean your vehicle while maintaining the appearance and integrity of the components to be cleaned.

## Surface Cleaning

### General Cleaning, All Surface Types

Use a soft dry cloth on hard surfaces and a whisk broom or vacuum cleaner on flooring and upholstery to remove loose dirt and debris. Surfaces can then be washed with a damp cloth and a warm water and mild soap solution. Use a clear water damp cloth rinse to remove soap residue, then wipe dry.

## Cleaning

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**NOTE:** When using isopropyl alcohol as a disinfectant, the following precautions must be followed.

- **Do not use a 70% isopropyl solution as a wash solution.**
- **Do not use a 70% isopropyl solution wipe on seats that are hot from day time heat.**
- **Vapors can accumulate quickly when using a 70% isopropyl solution wipe. Maintain adequate ventilation by opening windows and doors.**
- **The effectiveness of the 70% isopropyl solution can be diminished when used in high heat conditions due to evaporation.**

A 70% solution of isopropyl alcohol can be used as a disinfectant wipe. A 70% isopropyl solution is readily available from local sources.

### ABS / Plastic

Plastic (ABS, thermal plastic, plastic) material should only be cleaned with a warm water and mild soap solution.

### Glass

**NOTE:** Use of abrasive cleaners can scratch or damage glass.

Use a soft cloth and glass cleaner only.

## Interior

The best method to preserve the appearance and extend the life of the interior components of your IC Bus® vehicle is frequent and thorough cleaning of the components. A cleaning schedule and the cleaning requirements should be determined based on the type of service conditions in which the unit is operated.

### Interior Light Bar Cleaning

All interior light bars are only to be cleaned with a mild detergent and warm water. No other cleaners are to be used, as they may damage the surface.

### Upholstery Care



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, observe the following. Disinfectant products can contain solvent based chemicals that can adversely affect seat belt components.**

Use a whiskbroom and vacuum cleaner to remove loose dust and dirt from upholstery and floor. Wash vinyl and woven plastic upholstery with warm water and mild soap. Wipe dry. If commercial cleaners are used, follow instructions supplied with cleaner.

### Flooring

**NOTE: Some buses are built with an insulating wooden sub-floor under the floor covering. Do not use a hose to clean the interior floor of the bus. Standing water may damage the wood sub-floor.**

Use a damp mop with warm water and mild soap solution. Use a clear water damp mop rinse to remove soap residue. Remove any excess water remaining on the flooring after the rinse process.

Floor mounted wheelchair track should be clean of dirt, debris and cleaning solution residue when completed. Many chemicals used to maintain roads and walkways are tracked into the bus and may react with the cleaning solution. Failure to properly clean the floor track can result in track deterioration.

### Exterior

**NOTE: Certain cleaners contain chemicals that can damage emblems and decals. If the cleaning product label states that it should not be used on plastic parts, do not use the product to clean the unit or damage may occur that would not be covered by warranty.**

The best way to preserve painted surface finish is to keep it clean by washing it often. Frequent and regular washing will lengthen the life of the vehicle's painted finish.

Wash the vehicle often with warm or cold water to remove dirt and preserve the original luster of the paint.

- Never wash the vehicle in the direct rays of the sun or when the sheet metal is hot to the touch as this may cause streaks in the finish.
- Do not use hot water, strong soaps or detergents.
- Never wipe dirt off a dry surface as the dirt will scratch the paint.

Always make certain that steps, and grab handles, or any external accessories or components attached to the body exterior, are clean and free of road grime, salt, grease, ice and other debris.

To maintain optimum vehicle preservation, wash the vehicle thoroughly immediately after operating it in the presence of road salts. Many municipalities are now using magnesium chloride and calcium chloride salts in the winter time. These salts are much more corrosive than typical sodium chloride salt and must be brushed-off in addition to spraying with high-pressure water. Merely rinsing surfaces exposed to these chemicals will not remove them fully.

In addition to the body, it is highly recommended, because of the various road chemicals used in harsh winter weather, that the under chassis and wheel ends be pressure washed during the winter and spring breaks. Adverse weather and road conditions may require more frequent washing. When exposed to heavier amounts of road chemicals, clean the vehicle as soon as possible.

## **Cleaning**

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### **Waxing or Polishing Vehicles**

Thoroughly wash the vehicle before using any wax or polish. Use a high quality paste wax and follow the wax manufacturer's instructions to help prevent bus paint from fading.

### **Crossing Arm Cleaning**

The crossing arm is only to be cleaned with a mild detergent and warm water. No other cleaners are to be used, as they may damage the surface.

## **SECTION 13 — MAINTENANCE INSTRUCTIONS**

### **Preface**



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, observe the following. If the owner / operator of the vehicle is a skilled technician and intends to perform the vehicle maintenance and servicing, they are strongly urged to purchase and follow the appropriate IC Bus® service information or Allison Transmission service information.**



#### **WARNING**

**To prevent personal injury and / or death, or damage to property, observe the following. This vehicle has many parts dimensioned in the metric system as well as the English system. Some fasteners are metric and are very close in dimension to English fasteners in the inch system. Mismatched or incorrect fasteners can loosen and reduce clamping load.**

Your bus has been engineered and manufactured to provide economical and trouble free service. However, it is the owner's responsibility to make sure the vehicle receives proper care and maintenance.

IC Bus® service parts are available through your IC Bus® dealer. If IC Bus® service parts are not used, the owner must make sure the parts used are an equivalent.

As with any machine, take care to avoid being injured when performing maintenance, repairs or inspections. Improper or incomplete service could result in the vehicle not working properly which, in turn, may result in personal injury, damage to the vehicle or its equipment, or death. If you have any questions about performing some service, contact your nearest IC Bus® bus dealer or have the service done by a skilled professional technician.

### **Maintenance Guidelines**

When servicing your bus, always:

- Turn OFF the engine unless the procedure calls for a running engine.
- Set the parking brake and install wheel chocks.
- Use support stands, not a jack, whenever you must be under a raised vehicle.
- Do not smoke.
- Wear safety glasses for eye protection.
- Operate the engine only in a well ventilated area.
- Do not work on brakes unless the proper precautions have been taken to avoid inhaling friction material dust.

## Maintenance Instructions

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- Do not wear loose clothing, hanging jewelry, watches or rings. Tie up hair when around rotating machinery.
- Avoid contact with hot metal parts; allow hot components to cool before working on them.
- Repair or replace any defects that were revealed during inspection, prior to operating the vehicle.



### **WARNING**

To prevent personal injury and / or death, or damage to property, observe the following. When operating or servicing a vehicle equipped with a propane autogas fuel system, follow all specified maintenance procedures and precautions.



### **WARNING**

To prevent personal injury and / or death, or damage to property, observe the following, do not vent or release propane indoors or near sewers, pits, or low lying areas. Propane can accumulate in low spots, creating a fire hazard. Propane can also displace oxygen, creating a suffocation hazard. Propane systems should be serviced in a properly ventilated area.



### **WARNING**

To prevent personal injury and / or death, or damage to property, do not make modifications to any part, component, or system of the vehicle, as that can adversely affect the quality and reliability of your vehicle.



### **WARNING**

To prevent personal injury and / or death, or damage to property, use only genuine IC Bus® service parts. The use of inferior parts can adversely affect the quality and reliability of your vehicle.



### **WARNING**

To prevent personal injury and / or death, or damage to property, take care when performing any maintenance or making any checks or repairs. Some of the materials in this vehicle may also be hazardous if used, serviced, or handled improperly. If you have any questions pertaining to the service, have the work done by a skilled technician.





### WARNING

To prevent personal injury and / or death, or damage to property, park vehicle on hard flat surface, turn the engine OFF, set the parking brake, and install wheel chocks to prevent the vehicle from moving in either direction.



### WARNING

To prevent personal injury and / or death, or damage to property, whenever disconnecting battery terminals, always disconnect ground terminal first. When reconnecting, always connect ground terminal last. Failure to follow this procedure could also result in a short to ground.

## Supporting Your Vehicle for Service



### WARNING

To prevent personal injury and / or death, or damage to property, always use floor stands to support the vehicle before working under it. Using only a jack could allow the vehicle to fall.



### WARNING

To prevent personal injury and / or death, or damage to property, do not use bumper as a lifting point when raising the vehicle.

When performing service repairs on a vehicle:

1. Park vehicle on level concrete floor.
2. Set parking brake and / or install wheel chocks to prevent vehicle from moving.
3. Select jack with a rated capacity sufficient to lift and hold up the vehicle.
4. Raise vehicle with jack applied to axle(s). DO NOT use bumper as a lifting point.
5. Support vehicle with floor stands under axle(s).

If axle or suspension components are to be serviced, support vehicle with floor stands under frame side members.

## Pre-Trip and Post-Trip Inspections

Pre-trip inspections should be performed each day by the operator before operating this vehicle. In many circumstances, a Post-trip inspection can be even more valuable since it may reveal problems in time for service work to be performed prior to the next trip. This can help to minimize unwelcome surprises and unscheduled downtime. A convenient checklist of items to include in a pre- / post-trip inspection are identified in the **Vehicle Inspection Guide** section as well as Commercial Driver's License (CDL) Manuals.

### Chassis Lubrication

New vehicles are lubricated at the factory. After the vehicle is placed in operation, regular lubrication and maintenance intervals, based on the type of service and road conditions, should be established. The loads carried, speed, road and weather conditions all contribute to the frequency of lubrication intervals. Thorough lubrication and maintenance at the specified intervals will insure Outstanding Life Cycle Value and will reduce overall operating expense.

In some types of operation, and where operating conditions are extremely severe (such as in deep water, mud or unusually dusty conditions), the vehicle may require relubrication after every 24 hours of operation.

Only lubricants of superior quality, such as Fleetrite® lubricants, should be used. The use of inferior products will reduce the service life of the vehicle or result in failure of its components. IC Bus recommends the use of Fleetrite® lubricants and IC Bus® original equipment parts.

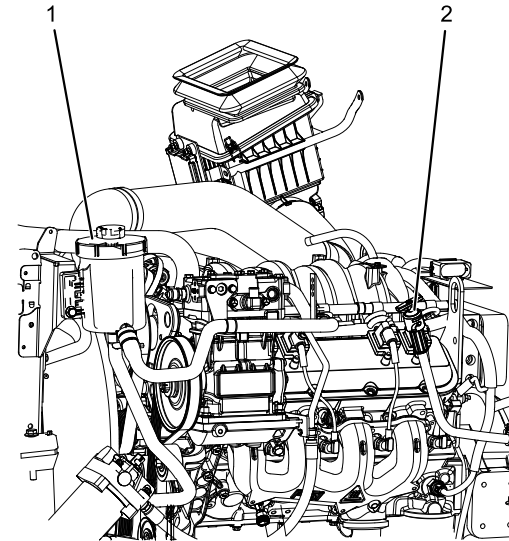
The lubrication intervals specified should be performed at whatever interval occurs first, whether it is kilometers (miles), hours, or months.

Refer to the **Lubrication and Maintenance Intervals Chart** at the end of this section for further details.

### Engine Compartment Fluid Check Points

**NOTE:** Location of deaeration tank, power steering reservoir, transmission dipstick, air cleaner, and oil dipstick may vary depending on model year and engine type.

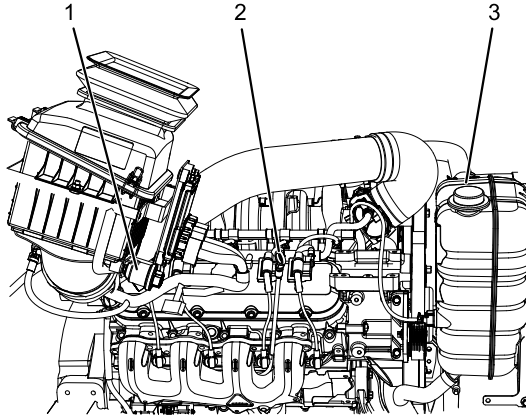
#### PSI 8.8L LPG Engine (Left-Side View)



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1. Power steering fluid level
2. Transmission fluid level

## PSI 8.8L LPG Engine (Right-Side View)



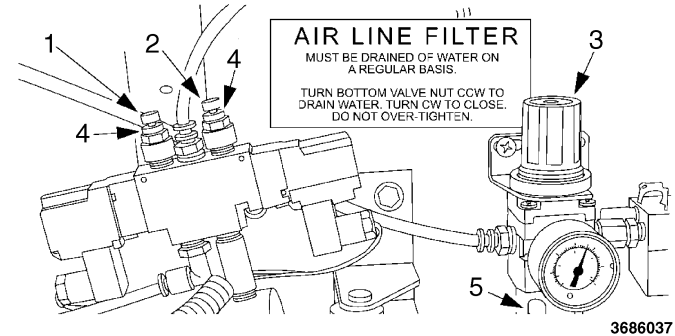
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1. Air filter restriction gauge
2. Engine oil level
3. Engine coolant level

## Air-Operated Passenger Door Adjustments

The air operated door opening and closing speeds can be adjusted by the air cylinder mounted flow control valves located behind the access panel above the entrance door. The closing force of the entrance door is determined by the adjustment of the pressure regulator. To perform these adjustments, open access panel door and use the procedures below.

## Door Opening and Closing Speed Adjustment Points



1. Opening speed screw
2. Closing speed screw
3. Pressure regulator adjustment knob
4. Lock nuts
5. Air filter

## Pressure Regulator Adjustment



**WARNING**

**To prevent personal injury and / or death, or damage to property, do not replace the air door regulator with one that allows pressure settings above 60 psi (414 kPa).**

A properly adjusted entrance door should take approximately 4 - 5 seconds to open or close depending on the pressure and speed settings.

## Maintenance Instructions

The pressure regulator should be set at approximately 60 psi (276-345 kPa). The regulator can only be set to a maximum of 60 psi (414 kPa). In cold weather, seals may stiffen and require more air pressure for proper operation. The pressure can be increased by lifting and turning the adjustment knob clockwise. Then press the cap back down.

### *Opening Speed Adjustment*

Loosen the locknut and turn the opening speed screw clockwise to slow the door opening speed, or counterclockwise, to increase the door opening speed. Tighten the locknut.

### *Closing Speed Adjustment*

Loosen the locknut and turn the closing speed screw clockwise to slow the door closing speed, or counterclockwise, to increase the door closing speed. Tighten the locknut.

### **Electrically Actuated Entrance Door Adjustment**

Electrically actuated doors are set to operate in 2 to 2 1/2 seconds. There is no adjustment for electrically actuated door opening and closing speed.

## Axles

821280

MANUFACTURED BY IC CORPORATION			
DATE OF MANUFACTURE		5	MO. 03 YR.
GVWR	12474	KGS(	27500 LBS)
GAWR FRONT	4536	KGS(	10000 LBS)
GAWR REAR	7938	KGS(	17500 LBS)
WITH	265/75R22.5G	TIRES	14 PLY
WITH	245/75R22.5G	TIRES	14 PLY
AT	759	KPa(	110 PSI) COLD
AT	759	KPa(	110 PSI) COLD
RIMS	22.5X7.50	RIMS	22.5X7.50
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.			
VEHICLE IDENTIFICATION NO.		4DRBRAAPX3A953275	
VEHICLE TYPE		SCHOOL BUS BODY# 953275MD	
452308001			

ICB100112

### **Typical Axle, Tire, and Rim Specifications-Vehicle Identification Label**

#### **Front Axle – Inspection and Lubrication**

Check to make sure that the front axle mounting U-bolts and nuts are securely tightened.

Check front axle for damaged, binding, or worn parts, and adequate lubrication.

- Kingpin wear inspection requires that no weight is on the tires.
- Kingpin and kingpin bushing lubrication requires that the vehicle weight is off tires prior to installing grease to maximize grease distribution.

- Kingpin thrust bushing lubrication requires that the vehicle weight is resting on the tires.
- Power grease guns may be used. However, a hand-pumped grease gun should be used for optimal grease distribution within each component joint.

Refer to the **Lubrication and Maintenance Intervals Chart** and the **Lubricant and Sealer Specifications Chart** at the end of this section for additional information.

- Inspect, lubricate and adjust the wheel bearings at regular intervals. Refer to **Lubrication and Maintenance Interval Chart** at the end of this section for recommended service intervals. Also refer to **Lubricant and Sealer Specifications** and **Torque Specifications** at the end of this section.

### Front Axle – Normal Maintenance

During operation the air and oil inside the hub / wheel cavity expands. It is normal for a mist of oil to be present on the outside of the hubcap around the vent slit or hole. Over time, if not wiped off, this film may collect dust and appear unsightly. If the entire face and end of the hubcap become wet with oil, investigate the cause. Refer to the Service Manual for repair procedure.

Routinely clean the hubcap to ensure that the lube level can be easily observed through the clear window as intended. In situations where the window is clean on the outside but discolored on the inside, check the lube level by removing the rubber fill / vent plug and insert a finger into the hole.

The specified lube level for clear window type hubcaps is from the minimum line to 5/16 in (8 mm) above the minimum line.

If the lube level suddenly drops dramatically below the minimum level, see the appropriate Service Manual for diagnostic procedure.

### Front Axle – Alignment

Maintaining front axle alignment is very important to achieve maximum tire life and vehicle control. Inspecting steer axle tires in the first 3,000 to 10,000 service miles will generally show if tires are wearing normally.

- Rapid outside shoulder wear on both tires indicates too much toe-in.
- Rapid inside shoulder wear on both tires indicates too much toe-out.
- Excessive wear on the inside or outside of one steer tire but not the other can indicate a toe-in or toe-out condition coupled with a misaligned front or rear axle.
- Pulling to the right or left can indicate misalignment of the front or rear axle, unequal tire pressures, or a defective / mismatched tire.

Refer to the **TIRES** subsection for additional related information.

### Rear Axle – Inspection and Lubrication

Make sure the axle mounting U-bolt nuts, and attaching or mounting bolts and nuts are securely tightened. Loose or misaligned rear axles will affect vehicle alignment, front tire wear, and handling. Refer to **Axle U-Bolt Nut Torque Chart** at the end of this section for torque specifications.

## Maintenance Instructions

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Check the rear axle oil level. Proper oil level minimizes gear wear, heat and damage to the wheel bearings and seals. The oil level should be at the lower edge of the level inspection hole when the vehicle is on level ground. Add oil as necessary.

Refer to the **Lubrication and Maintenance Interval Chart** and the **Lubricant and Sealer Specifications Chart** at the end of this section for additional information.

### Body

Inspect the undercoating of school buses annually and recoat as required.

Refer to **Section 2 – Vehicle Inspection Guide** and the **Lubrication and Maintenance Interval Chart** at the end of this section for items to be inspected / serviced and recommended service intervals.

### Brakes

#### General Information

All new IC Bus® vehicles are manufactured with non-asbestos brake linings. However, exposure to excessive amounts of brake material dust may be a health hazard.



#### WARNING

To prevent personal injury and / or death, or damage to property, pay strict attention to the following: if your vehicle is equipped with Automatic Traction Control or any type of locking or limited slip differential, power will be transmitted to the opposite wheel should one of the wheels slip. Both wheels must be raised free of the ground should it be necessary to operate one wheel with the vehicle stationary; otherwise, the wheel that is not raised will pull the vehicle off its support.



#### WARNING

To prevent personal injury and / or death, avoid breathing brake lining fiber dust. Always use a respirator while performing brake maintenance. Follow precautions listed below.



#### WARNING

To prevent personal injury and / or death, or damage to property, always check and maintain brakes in proper condition and adjustment. Out-of-adjustment brakes could cause reduced braking ability.

Follow the these precautions:

- Always wear a respirator approved by the National Institute of Occupational Safety and Health (NIOSH) or the Occupational Safety and Health Administration (OSHA) during all brake service procedures. Wear the respirator during removal of the wheels until assembly is complete.
- Never use compressed air or dry brushing to clean brake parts or assemblies.
- Clean brake parts and assemblies in the open air. During disassembly, carefully place all the parts on the floor to avoid getting dust in the air. Use an industrial vacuum cleaner with a HEPA filter system to clean dust from the brake rotors / drums, backing plates and other brake parts. After using the vacuum, remove any remaining dust with a rag soaked with water and wrung until nearly dry.
- NEVER use compressed air or dry sweeping to clean the work area. Use an industrial vacuum cleaner with a HEPA filter system and rags soaked in water and wrung until nearly dry. Carefully dispose of used rags to avoid getting dust into the air. Use an approved respirator when emptying vacuum cleaners and handling used rags.
- Wash your hands before eating, drinking or smoking. Vacuum work clothes exposed to brake dust after every use and launder them separately, without shaking them, to prevent dust from getting in the air.

### Air Brakes

#### *Brake Inspection and Adjustment*



**To prevent personal injury and / or death, or damage to property, always install wheel chocks when manually releasing the spring brakes, or the vehicle could roll.**



**To prevent personal injury and / or death, or damage to property, under no circumstances should a spring brake chamber be disassembled. Disassembly will release a powerful spring.**



### WARNING

**To prevent personal injury and / or death, or damage to property, pay strict attention to Brake Automatic Slack Adjusters (ASAs). ASAs should not need to be manually adjusted in service. ASAs should not routinely have to be adjusted to correct excessive push rod stroke. Excessive stroke indicates that a problem exists with the foundation brake, ASA, brake actuator, other brake system components or their installation or adjustment.**

**In the event that a manual adjustment must be made (although this should not be a common practice), a service appointment and full foundation brake, ASA, and other brake system component inspection must be conducted as soon as possible to ensure the integrity of the overall brake system prior to returning the vehicle to service.**

IC Bus recommends that you establish a regular schedule for periodic cleaning, lubrication, adjustment and inspection of brakes, based on the type of vehicle operation. It is difficult to predetermine an exact maintenance interval (time or mileage), since vehicles are used in a variety of applications and conditions. If you are uncertain of the proper schedule and procedures for your vehicle, contact your IC Bus® dealer.

Periodically, check the push rod travel or brake adjustment. Check the push rod travel every service interval to determine if adjustment is necessary. Brake chamber push rods on original equipment chambers have a stroke indicator (an ORANGE /

RED paint marker / rib near the base of the push rod) to aid adjustment checks. If the push rod is clean and the brakes require adjustment, the orange / RED marker can be seen protruding from the chamber when the brakes are applied.

Check the slack adjusters to ensure proper operation of the adjuster mechanism. Push rod travel should be at a minimum without brakes dragging.

This inspection or adjustment should only be performed by qualified service personnel and must be in accordance with instructions provided by the IC Bus® CE Service Manual.

At regular intervals, inspect the entire brake system. Check:

- Rubber components for deterioration. Replacement intervals vary according to environmental severity and time in service.
- Condition of rotors / drums, brake chambers, and slack adjusters.
- System for air leaks.
- Hose or pipes for corrosion, damage, deterioration.
- Operation of service and parking brakes.

Periodically, inspect the air brake chamber diaphragm, air compressor, and air cleaner, and replace if unserviceable. Refer to **Section 2 - Vehicle Inspection Guide** as well as the **Lubrication and Maintenance Intervals Chart** later in this section.

Inspect brake lining at every maintenance interval. When brake lining or blocks are worn to within 1/16 in (1.6 mm) of the rivets, replace the brake lining.



### *Air Dryer*

The function of the air dryer is to collect and remove moisture and contaminants before the compressed air reaches the air reservoirs. This protects the air system components from malfunctioning including blockage, corrosion, and freezing. For air tank draining requirements, refer to the **Maintenance Instructions** section as well as local regulations.

The air dryer is installed in the discharge line between the air compressor and the air system reservoirs. The air dryer includes a replaceable desiccant cartridge and oil blocking filter that is periodically serviced. It also may include a heater to prevent the discharge valve from freezing in cold weather.

### *Air Dryer Desiccant Replacement*

Open reservoir drain valves and check for presence of water. Small amounts of water due to condensation is normal. If the wet (air) tank and primary or secondary tanks are collecting an abnormally high amount of water between regular air tank drain intervals, replace the air dryer desiccant.

The air dryer desiccant replacement interval may vary; it is generally recommended that the desiccant be replaced every 12 months for small air dryers like the Bendix AD-IP®, or every 24 months for large air dryers like the Bendix AD-9®. If experience has shown that extended or shortened life has resulted for a particular installation, then the interval should be increased or reduced accordingly.

### *Air Dryer Purge Valve*

Check that the purge valve opens and expels moisture when the air governor shuts off the air compressor. Air should escape rapidly and then quickly stop. If the purge valve does not open, or you can hear a slight audible air leakage past the valve for longer than 30 seconds, the valve may be sticking and should be rebuilt. Purge valves may also stick if the air dryer heater has failed and ice is clogging the valve.

### *Air Dryer Heater*

Check that the air dryer heater activates at temperatures below freezing. With the vehicle in a cold environment and before the engine is started, turn on the ignition and touch the air dryer housing. It should be warmer than other metallic items on the vehicle. If some warmth cannot be felt it, may indicate that the heater element or the wiring powering it should be serviced.

### *Air Reservoir / Tanks Moisture Draining*

Moisture taken in with the air through the compressor inlet valves collects in the reservoirs. Drain the wet tank reservoir every day at the end of the trip. Drain the primary and secondary tanks periodically. Open the drain cock located either on the bottom of the tank or in the end of the tank. For ease of draining, some or all tanks may be equipped with optional pull cords. There must be some air pressure in the system to ensure proper drainage. Close the drain cocks after all moisture has been expelled. If you are unsure which tank is the wet tank, drain all tanks daily.

## Maintenance Instructions

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On vehicles equipped with automatic drain valve(s), moisture and contaminants are automatically removed from the reservoir to which it is connected. It operates automatically and requires no manual assistance or control lines from other sources. Periodically, manually drain the reservoir and make sure the drain passage is not plugged.

Some vehicles are equipped with remote air piloted drain valves. These are actuated (drained) using dedicated individual controls from the driver's control panel.

### SmartTrac™ Hydraulic Brakes (If Equipped)

#### *Brake Inspection and Adjustment*

This inspection or adjustment should only be performed by qualified service personnel and must be in accordance with instructions provided by the CE Bus Service Manual.

Establish a regular schedule for periodic cleaning, lubrication, and inspection, based on the type of vehicle operation. It is difficult to predetermine an exact maintenance interval (time or mileage) since vehicles are used in a variety of applications and conditions. Refer to the **Lubrication and Maintenance Intervals Chart** later in this section for recommendations.

On a periodic basis of at least once per year inspect the entire brake system for:

- The proper operation of the service and parking brakes.
- The condition of the discs, calipers, and ABS exciter teeth.
- Hydraulic fluid leaks.

- Hose or pipe damage.
- The condition of the ABS wheel speed sensors and wiring.
- Proper ABS wheel speed sensor-to-exciter teeth gap.

Inspect brake lining at every maintenance interval. During severe service operations or prolonged periods of stop-and-go operation, the brakes may require more frequent inspection. Establish inspection intervals that provide for lining replacement before damage to the disc occurs. Excessive lining wear may allow the metal brake shoe to damage the brake disc.

#### *Fluid Precautions*

Use only DOT 3 or DOT 4 Brake Fluid that is properly identified in a sealed container. Avoid brake fluid contact with painted surfaces. It will damage the paint.

#### *Brake Lines, Hoses, and Fittings*

- Check lines for kinks, dents, corrosion, or ruptures.
- Check hoses for abrasion, kinks, soft spots, ruptures, collapse, cracks, twists or loose frame supports. When replacing a hose, be sure there is enough clearance to prevent the new hose from rubbing against other components.
- Examine all connections for leaks.
- Repair or replace brake line tubes, hoses or fittings as required.

### *Hydraulic Brakes - Fluid Precautions*

The SmartTrac™ brake system consists of two completely separate hydraulic systems operating with two different and incompatible fluids: power steering fluid and hydraulic brake fluid. Failure to observe precautions preventing the contamination of either system with fluid from the other will result in swelling and deterioration of rubber parts leading to reduced brake performance and eventual brake failure.

**NOTE: Use only DOT 3 or DOT 4 Brake Fluid that is properly identified in a sealed container. Avoid brake fluid contact with painted surfaces. It will damage the paint.**

The following should always be observed to avoid fluid contamination. Use only properly identified and specified (or equivalent) fluids, and add fluids only to the following locations:

- Brake fluid to the brake master cylinder.
- Power steering fluid to the power steering fluid pump reservoir.

### **Hydraulic Brakes**

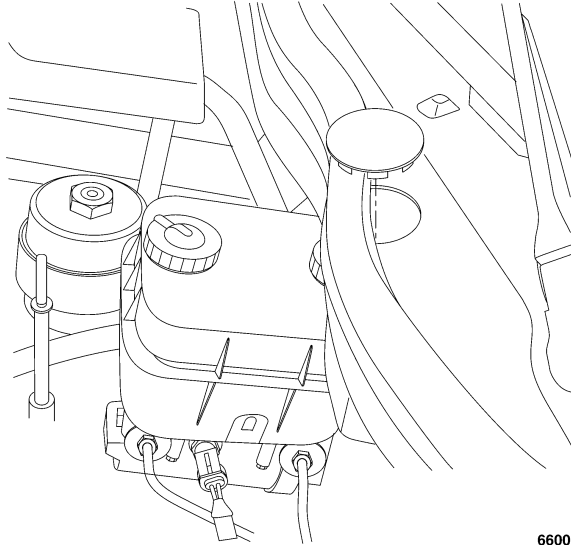
#### *Brake Fluid Level (SmartTrac™ Brake System)*

**NOTE: If brake fluid is added frequently to maintain the proper level in the master cylinder, it means that there is either rapid pad wear or a fluid system leak. A more frequent and thorough brake inspection is required.**

Do not fill the master cylinder to the top of the reservoir. Overfilling may lead to overflow. A MIN and MAX indicator are located on the reservoir; do not exceed the MAX line with brake fluid.

Check and refill the brake fluid reservoir using the following procedure:

1. Clean the reservoir caps before removal to prevent dirt or water from entering the reservoir.
2. Visually inspect the fluid level.
3. If necessary, add brake fluid from a clean unopened container.
4. Use only DOT 3 or DOT 4 brake fluid certified to meet manufacturer specifications.
5. Fill the brake fluid reservoir to the MAX line, but do not exceed the MAX fill specifications.



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During normal vehicle operation and servicing, the fluid level will vary between the MIN and MAX lines on the master cylinder mounted front reservoir. Do not fill the master cylinder to the top of the reservoir. Overfilling may lead to overflow. **DO NOT add fluid above MAX line.**

### *Driveline Parking Brake*

#### **WARNING**

To prevent personal injury and / or death, or damage to property, when servicing the vehicle, park on a flat level surface, set the parking brake, turn off the engine, and install wheel chocks.

#### **WARNING**

To prevent personal injury and / or death, or damage to property, operate vehicle in area with sufficient space to safely perform Parking Brake Burnishing Procedure.

### **Parking Brake Burnish Procedure**

1. Accelerate the vehicle to 10 mph (16 km/h).
2. Shift the transmission to Neutral (N).
3. Using the parking brake foot pedal, bring the vehicle to a gradual and complete stop using only the parking brake.
4. Repeat the above step nine times.

Parking brake adjustment should only be performed by qualified service personnel, and in accordance with instructions provided in the IC Bus® Service Manual.

### Chassis Inspection

Regular maintenance and replacement of worn, loose, or damaged parts will usually prevent more serious problems from developing later.

The lubrication and maintenance intervals present a good opportunity to inspect the vehicle. Refer to the **Lubrication and Maintenance Interval Chart** at the end of this section for detailed information on specific chassis items to inspect.

### Electrical

#### Alternator–Starter–Battery Test

An AVR (amps-volts-resistance) test should be performed periodically by a trained professional. The test checks for alternator amperage output, starter current draw, and battery amperage capacity. This type of testing detects weaknesses that may not yet be apparent during normal daily operations.

#### Terminal Inspection–Cleaning–Corrosion Protection

Periodically, inspect electrical connectors in the battery box, electrical panel box, and engine compartment for corrosion and tightness. Clean all exposed terminals and apply a lubricant sealing grease. Refer to the **Maintenance Intervals** section for appropriate sealing grease specification. The inspection / cleaning / corrosion protection should include feed-through connections, power and ground cable connections for batteries, engines, and the starter stud.

Inspect exposed cables for fraying or signs of abrasion.

Connectors that are more subject to corrosion may be disassembled and sprayed with a light coating of dielectric grease. Use grease sparingly. Too much grease will not allow air to escape from the connection and this compressed air will push the connection apart.

#### Accessory Feed Connections



**To prevent personal injury and / or death, or damage to property, do not increase size of fuse or circuit breaker or change type of breaker supplied with your truck, as this could cause wiring to overheat and possibly burn. Electrical circuits are designed with a particular wire gauge to meet the fuse and circuit breaker current rating.**

Vehicle electrical systems are complex and often include electronic components such as engine and transmission controls, instrument panels, antilock brakes, etc. While most systems still operate on battery voltage (12 volts), some systems can be as high as 90 volts or as low as 5 volts. Refer to the Electrical Circuit Diagram Manuals available from IC Bus® to ensure that any additional body lights and accessories are connected to circuits that are both appropriate and not overloaded. No modification should be made to any vehicle control system without first contacting your IC Bus® dealer.

### Engine

#### General

The vehicle (engine) owner is responsible for the performance of all scheduled maintenance. The required maintenance operations may be performed by the owner or at a service establishment of the owner's choosing. Any replacement parts used for required maintenance services or repairs should be genuine IC Bus® or engine service parts. Use of inferior replacement parts may hinder operation of engine and emission controls and can reduce engine life and / or jeopardize the warranty.

Keep the receipts covering the performance of regular maintenance in case questions arise concerning maintenance. The receipts should be transferred to each subsequent owner of the vehicle (engine).

For effective emission control and low operating cost, perform the maintenance operations listed on the following pages, at the specified periods or mileage intervals indicated (kilometers, miles, hours, or months) in the **Engine Operation and Maintenance Manual**.

Service intervals are based upon average operating conditions. In certain environments and duty cycles, more frequent servicing may be required.

#### PSI 8.8L LPG Engine

This bus is equipped with a PSI 8.8L LPG engine that has been designed to produce greener emissions while providing reliability and power through the use of a liquid propane fuel injection system.

**NOTE: For complete operation and maintenance information pertaining to your PSI 8.8L LPG engine, refer to the Engine Operation and Maintenance Manual provided with the vehicle.**

#### Scheduled Maintenance

For information regarding routine scheduled maintenance such as replacement of oil, filters, coolant, belts, belt tensioners, etc, as well as inspection and adjustment of items such as valve lash, etc. refer to the **Engine Operation and Maintenance Manual** supplied with the vehicle.

#### Air Induction System

Perform a complete inspection of the air induction system. Disassemble the joints of each aluminum component and inspect for salt build up and chlorine that can cause aluminum particles to flake off and enter the engine combustion chambers.

If corrosion is present (usually appears at the pipe connections), use a wire brush to clean the inside of the pipes and inside the rubber hoses. Clean all components thoroughly before reassembly.

If the intake pipes are pitted at the joint ends, silicone RTV may be used to seal the joints. Make sure that no excess sealant is on the inside of the pipe that can be pulled into the engine. If the service condition of the pipes, hoses, or clamps is questionable, replace them.

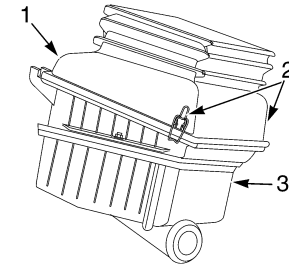
- Check for loose hoses and clamps.
- Check for ruptured or collapsed hoses.
- Check air cleaner housing for cracks.

### Air Cleaner Element Service



#### CAUTION

**To prevent damage to property, do not change the air cleaner element configuration from the factory installed configuration. If equipped with a single element or dual element, that configuration must stay with the vehicle. Failure to comply may affect engine performance.**



1. Inlet lid
2. Holddown latch
3. Air cleaner housing

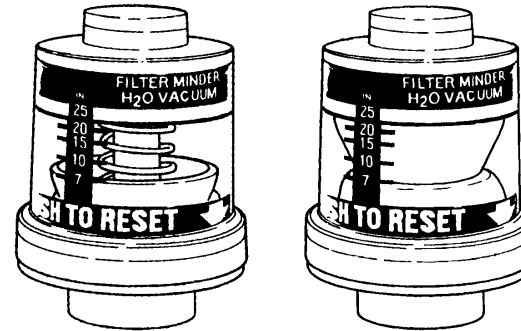
1. Unhook the holddown latches and remove the inlet lid from air cleaner housing. Remove the filter element carefully and slowly, then discard the old element.
2. Wipe the inside of the air cleaner housing with a clean, damp cloth. Be sure to clean the gasket sealing surface. **DO NOT** use compressed air for this cleaning.

## Maintenance Instructions

3. Visually inspect the air cleaner housing for damage or distortion, which could allow unfiltered air to enter the engine. Inspect to be sure that the rubber dust unloader valve at bottom of housing is in place, free of debris, and not cracked.
4. Inspect the new air filter element for a damaged or nonresilient rubber gasket. Inspect the air filter element body for dents or excessive pleat bunching. If any of the mentioned conditions exist, obtain and install an alternate new air filter element from your IC Bus or International dealer.
5. Carefully install the new air filter element into the air cleaner housing.
6. Seat and install the inlet lid squarely onto air cleaner housing; hook and latch inlet lid to air cleaner housing with holddown latches.
7. When servicing is completed, reset air restriction gauge by pushing and holding the reset button and releasing it. The YELLOW indicator will drop below the window. The air restriction gauge is now ready for the next operating cycle.

### Air Restriction Gauge Service

The initial restriction with a new air filter element will vary with air cleaner design and installation.



### Troubleshooting

#### No Restriction Reading

POSSIBLE CAUSES	HOW TO CHECK
Plugged fitting or vacuum line	Apply vacuum to gauge until locked up at RED zone. Reconnect line and hold in reset button. Indicator will fully return unless line or fitting is plugged. A slow return is normal due to safety filter in fitting.
Leak in vacuum line	Apply vacuum to gauge until locked up at RED zone. Reconnect gauge and close end of line air tight. Hold in reset button. Indicator will drop slightly and then not move unless vacuum line has a leak.



**No Restriction Reading (cont.)**

POSSIBLE CAUSES	HOW TO CHECK
Leak in gauge	Repeat above except close gauge connection airtight.
Engine air flow too low to generate a restriction reading	Turbocharged engines must be full load to pull full engine air flow (North American engines at full rpm).
Air cleaner element split open	Visually inspect element.

**High Restriction Reading**

POSSIBLE CAUSES	EXPLANATION
Plugged elements	Ultra fine particles are difficult to remove and cleaning may not sufficiently lower restriction.
Plugged inner element (if equipped)	Replace inner element.
Plugged inlet screens or ducts	Check system upstream from restriction tap for debris, damage, or improper installation.
Heavy snow or rain	Temporary high restriction can occur during a rain or snow storm and it disappears after drying out. Cold air may be so dense that high restriction may not reduce engine power before elements are damaged from high vacuum. If gauge is locked up at RED zone, check elements for damage.

**Chassis-Mounted Charge Air Cooler and Radiator Core Inspection and Cleaning**

With the engine OFF, visually inspect the charge air cooler core and radiator core assembly for debris and clogging of external fins. Prior to engine operation, remove any debris blocking the core.

### Cooling System



#### WARNING

To prevent personal injury and / or death, do the following when removing radiator or deaeration cap:

- Allow the engine to cool.
- Wrap a thick cloth around pressure cap.
- Partially unscrew pressure cap slowly while firmly holding cap down, then pause to allow pressure to release.
- When system pressure is released, fully unscrew pressure cap while continuing to hold cap down. Slowly release downward pressure from pressure cap.
- Remove cap.



#### WARNING

To prevent personal injury and / or death, or damage to property, do not exceed the pressure rating on the deaeration tank cap. Ensure that the pressure rating of the deaeration tank cap matches that listed on the side of the tank, or the tank may burst.



#### CAUTION

To prevent property damage, if the coolant should get extremely low and the engine very hot, let the engine cool for approximately 15 minutes before adding coolant. Then, add coolant slowly with the engine running. Adding cold coolant to a hot engine may crack the cylinder head or crankcase. **Never use water alone.**

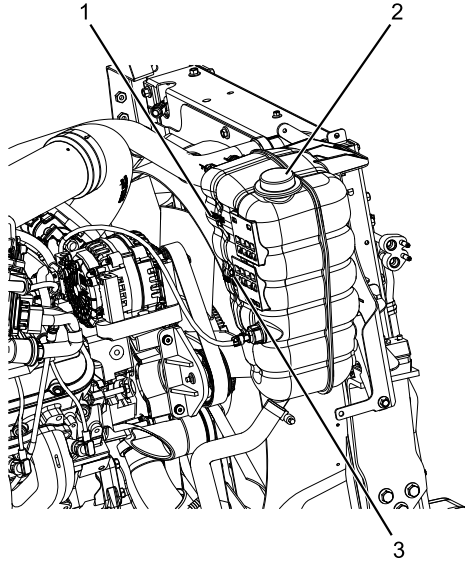
Make sure that coolant level is maintained between the COLD MIN and COLD MAX lines on the deaeration tank when engine is cold.

#### Gravity-Fill Coolant Method (PSI 8.8L LPG Engine)

##### *Filling Instructions*

**NOTE:** Using the KL5007NAV Coolant Management Tool is the recommended procedure to fill the cooling system, however, in some cases this tool may not be available, and the following gravity-fill procedure may be used instead. Contact an IC Bus® or International® dealer for special instructions on filling the coolant system.

**NOTE:** This is a traditional gravity-fill-only method that involves pouring or pumping the coolant into the deaeration tank of the cooling system and using a combination of gravity and engine operation to purge the system of air. It may be necessary to run the engine at various speeds for up to an hour after filling, followed by a 10 - 12 hour cool down and top-off, to avoid releasing a vehicle that can be approximately 1 gallon low on coolant.



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### Deaeration Tank

1. COLD MAX line
2. Vented fill cap
3. COLD MIN line

To function properly, the coolant system must be completely filled with coolant and all air must be expelled. To accomplish this, the following procedures should be carefully completed:

1. Open any shutoff valve in the heater circuit, in-transit heat circuit, or auxiliary power unit (APU) circuit (not shown).
2. Open the cooling system vent valve (where applicable) on the top radiator pipe.
3. Fill the deaeration tank with the proper coolant to the top of tank.
4. Close cooling system vent valve when air is purged and coolant is seen flowing from valve.
5. To purge air from the cooling system, start engine and run at an elevated idle (1,500 rpm) for approximately 10 minutes.
6. Verify coolant concentration and adjust coolant level to the COLD MAX level.
7. Install the deaeration tank cap once the coolant is stabilized at the COLD MAX level.
8. Verify the coolant is at the correct level and concentration.
9. Inspect and adjust the coolant level as necessary, prior to daily operation.

### *Coolant Concentration*



#### **CAUTION**

**To prevent vehicle and / or engine component damage, always use the proper coolant to top off the cooling system. Failure to do so may result in the loss of coolant life properties.**

It is required that the PSI 8.8L LPG engine uses Dex-Cool® Coolant in the cooling system. Dex-Cool® is a nitrite, nitrate, phosphate, silicate, borate and amine-free formulation that uses a patented carboxylate technology to provide maximum protection. Dex-Cool® meets ASTM D 3306 standards and is recommended for use in automotive applications.

The PSI 8.8L LPG engine requires the use of a 50/50 mixture of Dex-Cool® and water. This mixture will not vary depending on ambient temperature, the mixture will always remain 50% Dex-Cool® and 50% water.

### *Contamination of Coolant*

Coolant color can help indicate the condition of the coolant.

- Coolant color should be ORANGE (clear - not cloudy).
- Coolant must not have floating debris or visible oil.
- Over time, Dex-Cool® may begin to change to a PINK color. This is normal and should not be a concern as long as it remains clear and free of debris.

For coolant part numbers, capacities, and other antifreeze information, refer to the **Engine Operation and Maintenance Manual**.

### *Fan Clutch*

Inspect for proper operation, secure electrical connections, or air supply as appropriate. See the applicable Service Manual for details.

### **Heater and Coolant Hose Inspection and Replacement Guide**

Proper maintenance and inspection of the heater and coolant distribution system is required to maximize hose life, maintain performance of the system, and avoid potential failures.

Poorly maintained coolant is cause for hose failure. Coolant level and condition should be inspected on a regular basis.

- Check coolant level as part of the daily inspection.
- Check coolant concentration per coolant manufacturer requirements.

Heater and coolant hose inspections should be performed on an annual basis, or anytime a hose repair is made. To properly inspect engine and body heater hoses, protective metal or plastic covers and closeout panels are to be removed to allow inspection of the complete heater and coolant / hose system. Once protective covers and closeout panels are removed, the following basic steps should be followed.

- Perform a visual and touch inspection of all hoses. Hose inspection process is to include all engine compartment and body, interior and under body, hoses.
- Check heater and coolant system for signs of cold and hot leaks.

- Pay attention to the hose ends and contact points that will typically show early signs of hose failure. Observe the area around all hoses for signs of leakage.
- Synthetic rubber can oxidize and harden over time. Squeeze the hose to make sure it is pliable. Entire hose length should have a consistent feel and appearance.
- Many times hoses will fail from the inside. A hose that appears in good condition can fail due to deterioration of the inner hose and reinforcement. This type of deterioration can sometimes be detected during pressure testing.
- Cracks, blisters, or splits in the hose outer cover are the most visible signs of hose failure.
- Pressure test complete heater and cooling system annually. Test should be completed while performing hose inspection to allow all hoses to be observed for bulges and leaks.

Upon completion of the inspection process, reinstall all protective covers and closeout panels to original condition.

Many factors influence hose life such as location, years in service and service environment. Heater and coolant hose replacement is recommended after 5 years of service. In the event a hose failure is experienced prior to the recommended replacement time frame, age and condition of remaining hoses should be considered to determine if all engine and body hoses should be replaced to reduce the potential for additional failures.

### Engine Oil

**NOTE: Use only recommended viscosity engine oil. Refer to the Engine Operation and Maintenance Manual for specific engine oil specifications.**

The PSI 8.8L LPG engine requires the use of synthetic blend oil that meets Dexos1® standards. This requirement will provide a reduction in volatility and oil consumption, significant wear protection, and improved piston cleanliness. Meeting the Dexos1® standard can also enhance aeration control for improved fuel efficiency while providing better oxidation properties.

### SAE Oil Viscosity Grades

**NOTE: An optional plug in oil heater is available if the engine is being operated in conditions that may require a cold start assist.**

It is required that the Dexos1® oil meet SAE 5W-30 viscosity standards. This oil weight will be used regardless of ambient temperature.

### Fuel System



#### WARNING

To prevent personal injury and / or death, or damage to property, never loosen fittings or vent any propane. Escaping propane can cause frostbite and severe freeze burns. Wear insulated PVC rubber gloves resistant to propane, goggles for protection against accidental release of pressurized products, and thermal protective clothing when handling refrigerated liquids.



#### WARNING

To prevent personal injury and / or death, or damage to property, do not remove any valves, bulkheads, or fittings from a tank unless the tank has been drained completely. The pressure inside a propane autogas tank can push a loosened bulkhead or valve out with enough force to cause injury or death.



#### WARNING

To prevent personal injury and / or death, or damage to property, keep all sources of ignition away from propane autogas vehicles while the fuel system is being serviced. Even if the tank and fuel lines are empty, there may still be flammable vapors near the vehicle.

Frequently inspect condition of fuel tanks and mounting hardware, fuel tank cap, fuel lines, clips and routing. See the **Engine Operation and Maintenance Manual** for specific fuel system related maintenance and service intervals.

### Heater System

Check all heating / cooling fans for operation. Ensure that Heater cutoff valves are opened / closed during appropriate cold / warm months for greatest passenger comfort. Maintain heat exchanger air filters (if equipped). The driver-side heater filter is located behind the grille near the floor, to the left-side of the driver's seat. The optional step well heater filter is located behind the grille to the front of the step well. Under seat heaters may have an optional filter on the top surface of each heater box. Heater booster pumps should not be run dry for more than 30 seconds. This may cause the seals to fail.

### Integrated Air Conditioning (IC Air) System

The following conditions require the immediate attention of your nearest authorized IC Air Service Center.

- Vibration and / or noise from engine compartment
- Oil around refrigeration hose connections
- Water dripping from evaporator and / or air ducts
- Vibration and / or noise from the evaporator area
- Noticeable decrease in system performance
- Reduced air flow (this condition is normally a result of dirty or clogged evaporator filters).

### Drive Shaft

At the regular lubrication interval, check universal joints, slip joint, slip joint boot, and carrier bearings for any evidence of wear or looseness.

### Suspension (Air and Steel Springs)



#### CAUTION

**To prevent vehicle and / or engine component damage, do not adjust air suspension height to any setting other than the specified setting. Altering the height setting will change the driveline angle and may result in unwarrantable component damage, such as transmission component damage.**

Periodically verify driveline axle air suspension height and height control valve performance. Refer to the **Lubrication and Maintenance Intervals Chart** at the end of this section.

Periodically:

- Check condition of spring leaves for evidence of fatigue, bending or breakage.
- Check condition of suspension mounting brackets and bushings.
- Check that torque rod mounting fasteners are tight.

**NOTE: When retorque is required, make sure the part is in like new condition. If it can't be retorqued, then the part needs to be replaced.**

Suspension alignment must be maintained at all times.

Check the U-bolts as follows:

- After the bus has been operating under load for 1,000 miles (1,600 km), retorque the U-bolt nuts.
- Thereafter, retorque the U-bolt nuts every 36,000 miles (58,000 km).
- Clean and lubricate the U-bolt, nut threads, and seats to ensure a like new condition when retorquing.

### Frame and Optional Tow Hooks

The Bus Chassis are manufactured with frame rails of high strength low alloy (HSLA) steel and must be handled in a specific manner to ensure maximum service life. Specific instructions are published concerning proper repair of frame rails. Before attempting frame repair or modification, consult the service manager of your IC Bus® dealer.

Inspect front and rear tow hooks for damage or loose mountings.

### Steering

#### General



#### WARNING

To prevent personal injury and / or death, or damage to property, always follow recommended procedures for steering system maintenance. Failure to maintain the steering system in proper condition can cause reduced steering ability.

**NOTE:** Steering problems must be corrected at once by a qualified mechanic.

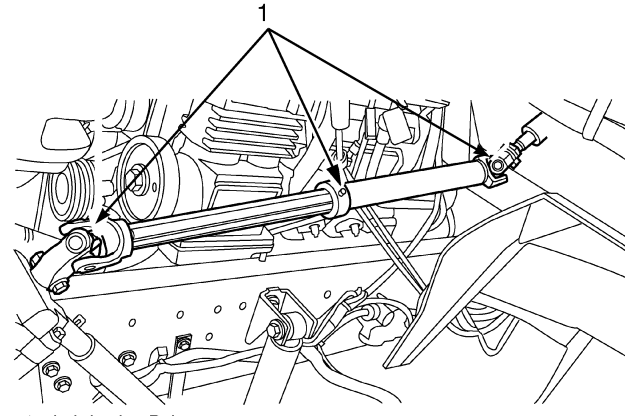
#### Inspect the steering system:

- Check tie rod ends, drag link ends, and king pins. Joints and fasteners must be tight. Articulating joints must be well lubricated.
- Check for installation and spread of cotter pins and tightness of nuts at both ends of tie rod and drag link.
- Check that pitman arm (steering arm at steering gear) mounting is tight and locked. Check the power steering system for leaks or hose chafing. Repair at once.
- Maintain proper power steering fluid level.
- Regularly inspect steering column joint bolts and steering linkage, particularly for body-to-chassis clearance.

#### Tightening Steering Intermediate Shaft Joint Bolts

Check the steering intermediate shaft joint bolts for tightness every 60,000 miles (96,000 km) or annually, whichever occurs first. Tighten bolts to torque specified in the **Torque Specification Chart** at the end of this section. Do not overtighten.

#### Lubrication Points



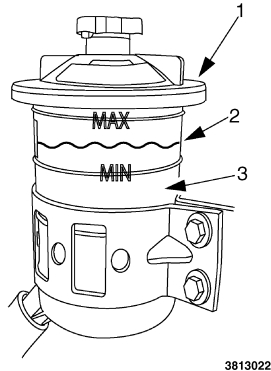
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1. Lubrication points



The steering shaft is lubricated at the three points shown above. For the correct maintenance interval, refer to the **Lubrication and Maintenance Interval Chart** at the end of this section.

### Power Steering



1. Filter access cap
2. Fluid level
3. Internal power steering fluid filter

Periodically replace the power steering fluid.

Whenever the hydraulic (power steering) system has been drained and refilled, bleed air from the system before returning the vehicle to service. Failure to properly bleed the hydraulic system can result in shimmy complaints and / or steering wheel oscillation when striking a bump.

Consult your IC Bus® dealer or IC Bus® Service Manual for the proper procedures for filling and bleeding the system.

The power steering fluid filter is located inside the power steering reservoir. To remove the filter, unscrew the large cap on the power steering reservoir and unscrew the filter. Reverse the procedure to install the new filter.

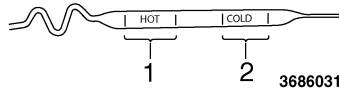
Refer to the **Lubrication and Maintenance Interval Chart** at the back of this section for the fluid and filter replacement intervals.

## Maintenance Instructions

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### Transmission

#### Transmission Fluid Level



1. HOT fluid level
  2. COLD fluid level
- Check fluid level with the parking brake applied, the engine running at idle speed, and the transmission in Neutral. Consider the transmission fluid temperature when determining the correct level.
  - When the transmission fluid is cold, the fluid level should fall within the COLD run band. When the transmission fluid is hot, the fluid level should fall within the HOT run band. Add fluid as required. Do not overfill or the transmission will overheat.
  - Check the shift linkage for proper operation.
  - Check operation of transmission neutral safety switch. Try to start the vehicle in all shift selector positions. The starter should **ONLY** operate when the shift selector is in Neutral, or Park, if supplied.
  - Refer to the **Lubrication and Maintenance Interval Chart** and the **Lubricant and Sealer Specifications chart** at the end of this section for information on automatic transmission fluids and fluid and filter change intervals.

### Tires

#### Tire Warnings



To prevent personal injury and / or death, or damage to property, for field maintenance, only inflate and load tires to the maximum of the least-rated tire on the axle. Due to tire manufacturers re-marking tires to conform to the SI (metric) system, tires marked with old and new loads or inflation pressures could be placed on the same vehicle.



To prevent personal injury and / or death, or damage to property:

- Always maintain your tires in good condition.
- Frequently check and maintain correct inflation pressures as specified by tire manufacturers.
- Inspect periodically for abnormal wear patterns and repair / replace cut or broken tire casing.
- Always use experienced, trained personnel with proper equipment and correct procedures to mount or remove tires and wheels.



### **WARNING**

To prevent personal injury and / or death, or damage to property, always follow these instructions when mounting tires on wheels:

- Only personnel who have had proper training and experience should mount or remove tires from rims or wheels.
- Use only heavy-duty rims or rims approved for radial tires. It may be necessary to contact your wheel and rim distributor to determine if your rims are approved for radial tires.
- If a tube is to be used, make sure special radial tire tubes are used because of the increased flexing of the sidewalls on radial tires.
- Never use antifreeze, silicones, or petroleum-based lubricants when mounting radial tires. Only an approved lubricant should be used as an aid for mounting tires.
- Always inflate tires in a safety cage.



### **WARNING**

To prevent personal injury and / or death, or damage to property:

- Do not mix stud-piloted wheels or fasteners with hub-piloted wheels or fasteners. Mixing wheel types may cause premature wheel failure.
- Do not change from steel wheels or a steel inner and aluminum outer wheel combination to aluminum wheels without changing the mounting hardware since the thicker aluminum wheels require longer studs. In some cases with flange nut mounting systems, changing the hub and stud assembly may be required. Improperly mixing components could cause wheel or fastener failures.
- Do not mix foreign (not made in North America) wheel mounting parts with domestic (made in North America) parts. Many foreign wheel components look similar to, but are not exactly the same as, domestic made components. Mixing components can cause wheel or fastener failures.



### **WARNING**

To prevent personal injury and / or death, or damage to property, do not mount tube-type tires on tubeless wheels or tubeless tires on tube-type wheels.

### Tire Maintenance

Preserving proper inflation pressure is a very important maintenance practice to ensure safe vehicle operation and long life for the tires.

Failure to maintain correct inflation pressure may result in sudden tire destruction, improper vehicle handling, and may cause rapid and irregular tire wear. Therefore, inflation pressures should be checked daily and always before long-distance trips.

Follow the tire manufacturer's recommended cold inflation pressure for the tire size, type, load range (ply rating), and axle loading typical for your operation. (Each steer axle tire load will equal 1/2 steer axle loading. Each drive tire load will be 1/4 the axle loading, if fitted with four tires.)

#### *Checking Inflation*

Always check inflation pressure when tires are cold. Never bleed air from hot tires to relieve normal pressure buildup. Normal increases in pressure during operation will be 10 to 15 psi (69 to 103 kPa), which is allowable in truck tires. Tires on the same axle should have the same air pressure as the corresponding other tire(s) on that axle. Steer tires should be within a 3 psi (21 kPa) pressure range of each other. All drive tires should be within a 5 psi pressure range of each other. Tag or pusher axle tires on the same axle should be within a 5 psi (34 kPa) pressure range of each other.

To minimize rim corrosion, it is particularly important to keep moisture from the inside of tires and proper selection of air compressor equipment, proper air line routing, and the use of

shop air dryers is strongly recommended to avoid moisture in the high-pressure air used for tire inflation.

#### *Underinflation*

Tires should not be permitted to become underinflated. Increased flexing due to underinflation causes heat buildup within the tire components. This leads to reduced strength, breakdown of the rubber compounds, and possible separation of the tire components (such as ply and tread separation and reduced retreadability).

Underinflation is also the primary cause of blowouts. In addition, low inflation causes an increase in rolling resistance. This results in reduced fuel mileage, a loss in tread life, and uneven wear due to increased tread movement. To determine proper inflation, refer to the tire inflation range stated on the tire sidewall and the tire manufacturer's tire load-pressure charts.

### Inspection

Check condition of tires for abnormal wear patterns and proper inflation pressures. Cut or broken tire casing must be repaired or replaced.

Tires should be inspected for the following conditions. If any are present, the tire should be removed and repaired, retreaded, or scrapped as the condition indicates.

- Any blister, bump, or raised portion anywhere on the surface of the tire tread or sidewall (other than a bump made by a repair). These indicate the start of internal separation.
- Any cut that reaches to the belt or ply cords or any cut that is large enough to grow in size and depth.

- Any nail or puncturing object.
- If any stone or object is held by a tread groove and is starting to drill into the tread base, remove the object.

Proper tire inflation, toe-in adjustment, loads, and road speeds are important factors governing tire life, steering ease, maneuverability, fuel economy, and ride quality.

### Loads



#### WARNING

**To prevent personal injury and / or death, or damage to property, do not load tires beyond their rated capacity as this decreases tire life, requiring more frequent replacement of tires. Overloading creates an unsafe condition that may result in sudden air loss from a tire failure resulting in an accident.**

**NOTE: The load rating of the tires installed on your vehicle at the time of your vehicle's production is at or in excess of the Gross Axle Weight Rating (GAWR) generally found on a label on the bulkhead above the driver. When replacing tires, be sure that the replacement tire load rating (listed separately in pounds and kilograms on the tire sidewall for single or dual applications) multiplied by the number of tires on that axle is equal to or higher than the specific listed Steer Axle or Drive Axle GAWR. Failure to do so will adversely affect maximum load-carrying capacity. Tires with the same size specification do not always have the same load specification.**

### Dual Tires Matching

Dual tires should be matched using tires of equivalent size. Tires that differ more than 1/4 in (6 mm) in diameter or 3/4 in (19 mm) in circumference should not be mounted on the same dual wheel assembly.

### Dual Tires Mixing

**NOTE: Never mix bias and radial tires on this vehicle.**

It is recommended for best overall performance that only radial tires be used on this vehicle.

Never mix different tire sizes or constructions on the same axle.

### Rotation

- Steer tires that have developed some type of irregular wear pattern can be rotated to drive axles if rib tires are being used on all wheel positions. Applying steer tires to a drive position will often wear off the irregularities, and they can be moved back to the steer axles or run out to retread stage on the rear axle.
- Another rotation possibility for fleets with rib tires in all wheel positions is to break in the new steer tires in the drive axle positions, then move them to steer axles. This will wear away tread rubber relatively quick in the early life of a tire when it is most likely to develop an unusual wear pattern.
- Drive axle tires may be placed on the other end of the same axle so that direction of rotation is reversed. This is often helpful if a heel and toe or alternate wheel nut wear pattern has developed.

## Maintenance Instructions

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### *Rotation Is Advisable*

1. If front (steering) axle tires become irregularly worn, move to rear position.
2. In a dual assembly, reverse the position of the tires if one tire wears much faster than its mate.
3. On the drive axle, if heel and toe wear or alternate wheel nut wear occurs, rotating the tires from one end of the axle to the other end of the axle may help even out this wear.

### *Tire Replacement*

**NOTE: Retread tires are not recommended for use on steering axles of trucks.**

- **Front (Steering) Axle– Tires must be removed when tread is worn to 4/32 in (3 mm) or less. Retread or rotate worn tires to drive position.**
- **Rear Axles– Tires must be removed when tread is worn to 2/32 in (2 mm).**

**If rib tire is used on front axle and lug- or off-road-type on rear axle positions:**

- **Front (Steering) Axle– Replace tires at front wheels when tread is worn to 4/32 in (3 mm) or less.**
- **Rear Axles– Tires must be removed when the tread is worn to 2/32 in (2 mm) or less. Tires identified with the word REGROOVABLE molded on the sidewall can be regrooved. A minimum of 3/32 in (2.38 mm) of undertread must be left at the bottom of the grooves.**

### **Wheel and Tire Balancing**

Out-of-round or out-of-balance wheels or tires can cause vehicle vibration and bounce, and shimmy. Replace damaged or out-of-round wheels. Out-of-round tires and wheel assemblies can be corrected by rechecking the tire relative to the wheel. The tire and wheel assembly should thereafter be dynamically balanced and reinspected while spinning for an out of round condition.

### **Wear**

Radial tires can exhibit three types of normal wear patterns: even, erosion, or chamfer.

**Even Wear** is a sign that the tire is being properly used and maintained.

**Erosion Wear** has also been called rolling wear, channel, or river wear. Erosion wear is found more often at free rolling tires. This is an indication that the tire is being used in a slow wearing operation. What happens is that the belt plies are held very rigid and the tread is not allowed to distort as it passes through the contact area. Wear will only occur at the edge of the tread. No corrective action is required. If erosion gets to be 1/16 in (2 mm) or more, the tire may be rotated to a drive axle.

**Chamfer or Shoulder Wear**, with tires inflated properly, is a normal tendency of most radial tire designs. If both inside and outside shoulders are wearing evenly around the tire, no further action is required. Overinflation is not effective in correcting this effect.

### *Irregular Wear*

If irregular wear is present, check the axle alignment, tire pressure, wheel balance, shock and suspension component condition, and wheel bearing end play.

This condition not only shortens tire life but will adversely affect the handling of your vehicle.

Rotating tires from one wheel position to another is a way often used to even out many types of irregular wear or to avoid it altogether. See **Tires – Rotation** for more information. Some of the more effective tire rotation programs are listed below:

#### **Irregular wear can be minimized by:**

- Using the correct inflation pressure for the load being carried
- Maintaining proper front wheel alignment – **especially toe-in** – to specifications
- Maintaining proper tire and wheel balance
- Maintaining shock absorbers and suspension components
- Maintaining proper wheel bearing adjustment

#### **Use of Tire Chains**

Refer to chain manufacturer's recommendation for correct tire chain usage, installation, and removal.

## **Wheels**

### **Wheel and Wheel Nut Maintenance and Installation**



To prevent personal injury and / or death, or damage to property, always follow these instructions when mounting tires on wheels:

- Only personnel who have had proper training and experience should mount or remove tires from rims or wheels.
- Use only heavy-duty rims or rims approved for radial tires. It may be necessary to contact your wheel and rim distributor to determine if your rims are approved for radial tires.
- If a tube is to be used, make sure special radial tire tubes are used because of the increased flexing of the sidewalls on radial tires.
- Never use antifreeze, silicones, or petroleum-based lubricants when mounting radial tires. Only an approved lubricant should be used as an aid for mounting tires.
- Always inflate tires in a safety cage.



### WARNING

To prevent personal injury and / or death, or damage to property:

- Do not mix stud-piloted wheels or fasteners with hub-piloted wheels or fasteners. Mixing wheel types may cause premature wheel failure.
- Do not change from steel wheels or a steel inner and aluminum outer wheel combination to aluminum wheels without changing the mounting hardware since the thicker aluminum wheels require longer studs. In some cases with flange nut mounting systems, changing the hub and stud assembly may be required. Improperly mixing components could cause wheel or fastener failures.
- Do not mix foreign (not made in North America) wheel mounting parts with domestic (made in North America) parts. Many foreign wheel components look similar to, but are not exactly the same as, domestic made components. Mixing components can cause wheel or fastener failures.



### WARNING

To prevent personal injury and / or death, or damage to property, when installing the tire and rim assembly on disc brake-equipped axles, make sure the tire valve stem clears the brake caliper. The use of either an IC Bus® or International® truck valve stem retainer or a tire manufacturer's stem forming tool is the only acceptable method of obtaining clearance when necessary. Failure to obtain proper clearance may result in rapid tire deflation.

#### *Wheel Nut Torque Maintenance*

Tighten and maintain wheel and rim mounting nuts to the proper torque. Loose nuts or overtightened nuts can lead to premature wear and possible failure of the wheel, rim, and / or mounting hardware.

#### *Hub-Piloted Wheel Installation Procedures*



### WARNING

To prevent personal injury and / or death, or damage to property, use only the same type and style wheels and mounting hardware to replace original parts. Failure to do so may result in an assembly that looks fine but does not fit together properly. This could cause wheel or fastener failures.

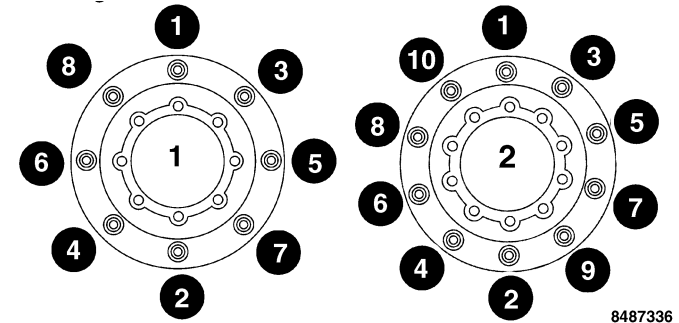


Out-of-round tires and wheel assemblies can sometimes be corrected by relocking the tire relative to the wheel.

Tightening procedure for disc wheels with flange nuts (hub-piloted):

1. Clean the mating surfaces of the hub, drum, and wheel(s) as well as the wheel studs and wheel nuts with a wire brush prior to assembly.
2. Lubricate the two-piece wheel nuts by putting two drops of oil in the slot between the nut and washer and spin the washer to spread the oil around the nut-to-washer contact surface.
3. Carefully lubricate the wheel stud threads by wiping them with a freshly oiled cloth. Do not get the oil on any other surfaces or the wheel clamping effectiveness will be reduced.
4. To prevent aluminum wheels from getting stuck on the hub due to corrosion, apply a thin coat of antiseize compound or disc brake corrosion control grease to the hub pilot pads only.
5. Slide the inner wheel (if duals) or steer wheel over the wheel studs and onto the pilot pads of the hub. Care must be taken to avoid damage to the stud threads while positioning the wheel. Ensure that the wheel is resting on the pilot pads and is against the brake drum.
6. Hand-start all wheel nuts to avoid cross-threading.
7. Starting with the nut at the 12 o'clock position and using the appropriate star or crisscross pattern (see wheel nuts

torque sequence diagram), run the wheel nuts down the wheel studs with an impact wrench until they are snug against the wheel. The purpose of this step is to snug the wheel(s) in the correct position, not to apply the final torque. The tightening of each nut should be stopped immediately when the wheel is contacted, resulting in a wheel nut torque well below the final specified torque.



1. Flange nut mount – 8 stud
  2. Flange nut mount – 10 stud
8. Use a calibrated torque wrench to apply the specified torque to each wheel nut in the sequence specified in the wheel nuts torque sequence diagram above. Refer to **Maintenance Intervals and Specifications** for proper torque values.

9. All wheels undergo a process called joint settling when placed in service after a wheel installation has been performed. This process results in a reduction in the torque on the wheel nuts. To correct this condition, operate the vehicle normally for approximately 50 miles (80 km), then use a calibrated torque wrench to retorque the wheel nuts to specification using the appropriate pattern shown in the wheel nuts torque sequence diagram.
10. As part of a daily pre-trip inspection, look for loose or missing wheel nuts. Also look for rust streaks extending outward from the wheel nuts; this can be an indicator that one or more wheel nuts are loose, even if they cannot be turned by hand. Normal periodic maintenance should also include checking the wheel nut torque with a torque wrench.

## Windshield Wiper

### Wiper Blade Assembly Replacement

1. Press the plastic lever at the wiper blade assembly to the wiper arm hinge.
2. Slide the wiper blade assembly up the wiper arm and detach it.
3. Snap the new wiper blade assembly onto the arm in the opposite direction of the removal.
4. Check to see that the rubber wiper blade rests flat against the windshield.

## SECTION 14 — MAINTENANCE INTERVALS AND SPECIFICATIONS

### Maintenance Intervals

All new vehicles are factory lubricated. Once the vehicle is in operation, regular lubrication and maintenance intervals (based on the type of service and road conditions) must be established and performed. Load weight, vehicle speed, road conditions, and weather conditions all contribute to lubrication frequency. Performing thorough lubrication and maintenance at the specified intervals will ensure an outstanding vehicle life and will reduce overall operating expense.

The Lubrication and Maintenance Intervals Chart contains an extensive list of components and systems. Listed items and systems must be regularly inspected, serviced, and / or replaced to maximize vehicle availability and minimize unexpected failures. Recommended synchronized intervals are shown for each item. This chart can serve as a convenient one-stop reference to research most maintenance needs.

Only lubricants of superior quality, such as Fleetrite® lubricants, should be used. The use of inferior products will reduce the service life of the vehicle or result in failure of its components. The use of Fleetrite® lubricants is recommended for optimum performance.

Maintenance intervals provided in this manual are for normal highway and environmental service conditions.

These intervals may be expressed in miles (kilometers), hours of operation, and / or months of operation. It is important to note that in high duty cycle types of operation and / or where operating conditions are extremely severe (such as in deep water, mud or unusually dusty conditions), the vehicle may require lubrication much more frequently than specified in this manual.

The synchronized A and B service intervals are designed to coordinate maintenance activities and to provide the appropriate levels for servicing components. Following the service intervals minimizes the number of times per year that the vehicle must be brought into the shop. In addition to the A and B service intervals, the Special Service Interval column is provided for items that need infrequent servicing. In most cases, these service intervals represent the recommended maximum intervals. For some components, however, the manufacturer's recommended maintenance intervals may have been shortened to allow synchronization with other maintenance tasks.

The maintainer may wish to synchronize engine related items with other lubrication / maintenance intervals in order to reduce downtime, even though the recommended intervals in the **Engine Operation and Maintenance Manual** may be longer. **Engine Manual maximum intervals (based on the actual operating conditions specified in that manual) must never be exceeded.**

## Maintenance Intervals and Specifications

### Lubrication and Maintenance Interval Chart Symbols Key

Symbol	Interval Definition
A	A interval: 5,000 miles (8,000 km) / 200 hours / 6 months
B	B interval: 10,000 miles (16,000 km) / 400 hours / 12 months

### Lubrication and Maintenance Interval Chart Notes

**NOTE 1:** A hand-pumped grease gun should be used for optimal grease distribution within the component joint.

**NOTE 2:** Kingpin thrust washers must be lubricated with vehicle weight on tires. Kingpins and kingpin bushings must be lubricated with weight off of the wheels and tires.

**NOTE 3:** Certain services are performed at Special Intervals or in addition to A or B Service when the interval dictates.

### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Pre-Trip Inspection	Pre-trip Inspection Items listed in Section 2 – Check All		
Axle – Front	Axle U-Bolts – Retorque		At first 1,000 miles (1,600 km) then every 36,000 miles (58,000 km) thereafter
	Drag Link – Lubricate (1)	A, B	
	Kingpins and Bushings – Lubricate (1,2)	A, B	
	Shock Absorbers – Inspect	A, B	
	Suspension Fasteners / Components – Check	A, B	
	Tie Rod Ends – Lubricate (1)	A, B	
	Wheel Bearings – Check End-play	B	
	Wheel Bearing-Grease Type – Repack		30,000 miles (48,000 km) / – / 6
	Wheel Bearing-Oil Type (including synthetic) – Change Oil		60,000 miles (96,000 km) / – / 6
	Wheel Bearing-Oil Type – Check Level	A, B	

### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Axle – Rear	<b>Stable Ride</b> Suspension Fasteners / Components – Check	A, B	
	Axle Flange Nuts – Retorque	B	
	Ride Height - Check	B	
	Axle U-Bolts – Retorque		At first 1,000 miles (1,600 km) then every 36,000 miles (58,000 km) thereafter
	Rear Axle With Petroleum Oil – Change		60,000 miles (96,000 km) / – / 12
	Rear Axle Wheel Ends – Inspect for leaks, lube level / condition, and check end play with dial indicator.	100,000 miles (160,000 km) / – / 12 Also at brake lining service If wheel end play is found to be outside the 0.001 in to 0.005 in specification, or lube condition is contaminated or low, then perform a full wheel end tear down. Inspect bearings, spindle, and spindle nuts for excessive wear and replace as necessary.	
	Rear Axle With Synthetic Oil – Change	Dana® Spicer®: 180,000 miles (288,000 km) / – / 36 months Meritor: 250,000 miles (400,000 km) / - / 36 months	
	Rear Axle Wheel Ends – Full tear down inspection of all wheel end components, regardless of condition of lube and wheel bearing end play.		500,000 miles (800,000 km) / – / 60 months

## Maintenance Intervals and Specifications

### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Body / Components	Accelerator Pedal – Check Function	A, B	
	Air Conditioner (Optional) – Check Performance	B	
	All Seat Base Bolts	B	
	Body – Check loose, damaged, missing parts	A, B	
	Body Mounting Bolts – Inspect Tightness		1 month or 1,500 miles (2,414 km) and then 3 months or 3,000 miles (4,828 km) thereafter
	Chassis – Check for loose, damaged, missing, parts	A, B	
	Emergency Windows Slides – Lubricate		Every 12 months
	Emergency Doors / Exits and Buzzers – Check	A, B	
	Entry Door – Check Operation	A, B	
	Fluid Leaks – Check	A, B	
	Headlights, Bright / Dim / Daytime – Check	A, B	
	Heater Hoses and Connections – Check Condition	12 months  <b>NOTE: See Heater and Coolant Hose Inspection and Replacement Guide in this section for additional information.</b>	

**Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)**

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Body / Components (Cont.)	Inspect and Clean Step Well and All Other Heater Cores and Blower Areas	A, B	<b>NOTE: For units without filter, more frequent cleaning may be required.</b>
	Lights Interior / Exterior – Check	A, B	
	Optional Components As Equipped – Check	A, B	
	Post-Trip Inspection Feature – Check	A, B	
	Roof Hatch(es) – Check Operation	A, B	
	Safety Equipment As Equipped – Check	A, B	
	Step Well and All Heater Core Air Filters – Inspect / Clean or Replace	A, B	
	Seat Belt(s) Bolts – Check Operation / Condition	A, B	
	Undercoating Inspection	Inspect the undercoating of school buses annually and recoat as required.	
	Warning lights, Stop Arm(s), Crossing Gate, Entrance Door / Warning lights Interaction – Check	A, B	

## Maintenance Intervals and Specifications

### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Brakes – Air	Air Compressor Discharge Line – Check blockage		50,000 miles (80,000 km) / 1,500 / 24
	Air Dryer Desiccant – Replace		AD-9 Model: 250,000 miles (400,000 km) / – / 24 Other Models: 125,000 miles (200,000 km) / - / 12
	Air Dryer Heater & Purge Valve – Check		AD-IP: 12; AD-9: 24
	Air Tanks (all) – Drain Water	A, B	
	Air Wet Tank – Drain Water	A, B	
	Brake Chamber Rod Travel – Check	A, B	
	Governor Cut-In / Cut-Out Pressure – Check	A, B	
	Low Air Pressure Warning Alarm – Check	A, B	
	Parking Brake Operation – Check	A, B	
	Rotors / Drums, Calipers, Chambers, Hoses, etc – Check for wear / damage	A, B	
	S-Cam Bushings – Lubricate	A, B	
	Service Brakes Operation – Check	A, B	
	Shoes – Check for wear and drag	A, B	



### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Brakes – Hydraulic	Brake Pedal Holds Pressure– Check	A, B	
	Discs, Calipers, Lines, etc. – Check for wear / damage	A, B	
	Hydraulic Brake Fluid - Change		Every 2 years from the date of manufacturing
	Master Cylinder – Check Fluid Level	A, B	
	Master Cylinder Cap – Check Vent for Obstruction <b>NOTE: If obstruction is observed, replace cap.</b>	A, B	
	Parking Brake Operation – Check	A, B	
	Parking Brake Cable – Check condition	A, B	
	Service Brakes Operation – Check	A, B	
Cooling System	Coolant – Check Level	A, B	
	Fan Blade / Shroud – Check Damage / Contact	A, B	
	Fan Clutch – Check	A, B	
	Radiator & CAC Fins – Check for Blockage	A, B	
Drive Shaft Non-booted Slip Joint	U-Joints and Slip Joint – Lubricate		5,000 miles (8,000 km) / – / 3
Drive Shaft SPL	U-Joints – Lubricate; Slip Joint Boot – Inspect	B	

## Maintenance Intervals and Specifications

### Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Electrical	ABS Wiring Connections & Sensors - Reseat	A, B	
	Electrical lines routing and clipping (lines are not tangled, crimped or pinched or rubbing against surfaces); not spliced or taped; insulation not cut, cracked, chafed or worn. – Inspect	B	
	Engine Electrical System Inspection		35,000 miles (56,000 km)
	Engine Start and Gauge / Warning Lights – Check	A, B	
	Instrument Readings Proper – Check	A, B	
	Power Distribution Center: Corrosion throughout case and on pins of fuses and breakers – Inspect	B	
Engine	Air Filter – Check Restriction	At restriction indication on air restriction gauge.	
	Air Filter – Replace	Refer to <b>Engine Operation and Maintenance Manual</b> .	
	Air Induction System – Check looseness / leaks		
	Engine Oil and Filter(s) – Replace		
	Engine Oil Level – Inspect		
	Fan Belt – Inspect		
	Fan Belt Auto Tensioner – Inspect		
	Fuel Filter – Replace		
Exhaust System	Pipes / Muffler – Inspect for leakage / looseness	A, B	
Fuel Tank	Fuel Tank(s) – Inspect for chips, cracks, damage, or signs of impact	12 months	

## Lubrication and Maintenance Interval: Bus — Recommended Synchronized Intervals (cont.)

System	Item	Intervals	Special Interval (3) : miles (km) / hours / months
Steering	Power Steering Fluid – Change		40,000 miles (64,000 km) / – / 12
	Power Steering Fluid – Check Level	A, B	
	Power Steering Filter – Replace		40,000 miles (64,000 km) / – / 12
	Steering System – Check Tightness	A, B	
	Steering Gear – Lubricate	A, B	ATTN: Install grease slowly at low pressure. Power grease guns may blow out seals.
	Steering Intermediate Shaft U-Joints / Slip Joint – Lubricate	A, B	
	Steering Intermediate Shaft U-Joints – Retorque		60,000 miles (96,000 km) / 1,500 / 12
Tires / Wheels	Air Pressure – Check	A, B	
	Spin Balance	At time of tire mounting	
	Wear and Condition – Check	A, B	
	Wheel Stud Nuts – Retorque	A, B	
Transmission	Automatic Trans Fluid – Check Level	A, B	
	Automatic Trans Fluid Filter(s) – Replace	Refer to appropriate Transmission Operation and Maintenance Manual.	
	Conventional or Conventional / Synthetic Mixed Automatic Trans Fluid – Replace		
	Factory-filled Synthetic Non-Mixed Automatic Trans Fluid – Replace		
	Neutral Start Switch – Check Function	A, B	
	Shift Selector / Linkage – Check Function	A, B	

## Maintenance Intervals and Specifications

### Unit Refill Capacities

#### Air Conditioner Refrigerant

See air conditioner manufacturer's Service / Operation Manual for aftermarket bus A/C system specifications.

#### Cooling System Refill Capacities

Cooling system capacities vary greatly due to variations in bus length, number of heaters and engine model. Total capacity may range from 6 - 22 gallons (23 - 83 liters).

#### Engine Crankcase

For specific engine crankcase capacities, refer to separate **Engine Operation and Maintenance Manual** provided with vehicle.

#### SmartTrac™ Brakes – Brake Fluid

Approximately 1.6 Gallons (6 Liters).

#### Rear - Axle

Axle	Axle Lube Capacities Pints (Liters)
Dana® Spicer® S11-130, S14-130, S16-130,	16 (7.5)
Dana® Spicer® 17060S, 19060S, 21060S, 23060SH	28 (13.2)

Axle	Axle Lube Capacities Pints (Liters)
Meritor MS-17-14X-3DFL, MS-19-14X-3DFL, MS-21-14X-3DFL,	33.6 (15.9)
Meritor RS-23-160	39.5 (18.7)

#### Power Steering System

Steering Gear	Power Steering Fluid Volume (pints / liters)
M-100	8.4/3.9*
TAS40	7.4/3.5*
TAS66	8.4/3.9*
THP45	7.4/3.5*
THP60	8.4/3.9*
* Approximate refill quantity; refer to power steering reservoir for proper fill marks.	

#### Transmission

Transmission Model	Transmission Fluid Volumes Pints (Liters)
Allison Automatic – 1000 PTS	38 (18)*
Allison Automatic – B-300d	29 (14)*
Allison Automatic –1000_PTS	38 (18)*

Transmission Model	Transmission Fluid Volumes Pints (Liters)
Allison 5 Speed Automatic – 2100 PTS	38 (18)*
Allison Automatic – 2200 PTS	38 (18)*
Allison Automatic – 2500 PTS	38 (18)*
Allison Automatic – 2550 PTS	38 (18)*
Allison Automatic, School and Shuttle Bus – 3000 PTS	58 (27)*
* Approximate refill quantity (less than initial fill since a portion of the used fluid remains in external circuits and transmission cavities). Check at operating temperature and top off as required.	

### Tire and Rim Combinations

#### Approved Tire and Wheel Combinations

Tire Size	Rim Width (Inches)
9R22.5	6.75, 7.50
10R22.5	6.75, 7.50
11R22.5	7.50, 8.25
12R22.5	8.25, 9.00
225/70R19.5	6.75
235/80R22.5	6.75, 7.50
245/70R19.5	6.75, 7.50
255/70R22.5	6.75, 7.50, 8.25
265/70R19.5	6.75, 7.50, 8.25
275/80R22.5	7.50, 8.25
295/75R22.5	8.25, 9.00

## Maintenance Intervals and Specifications

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### Lubricant and Sealer Specifications


Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
<b>Non-driving Front Axle</b>		
Front axle wheel bearing oil	Eaton® / Dana® axle (Generic)	75W: -40°F to - 15°F (-40°C to -26°C) 75W-80: -40°F to 80°F (-40°C to 27°C) 75W-90: -40°F to 100°F (-40°C to 38°C ) 75W-140: -40°F and above (-40°C and above ) 80W-90: (-26°C to 38°C) -15°F to 100°F 80W-140: -15°F and above (-26°C and above) 85W-140: 10°F and above (-12°C and above)
	Eaton® / Dana® axle: multipurpose EP gear lube of API GL-5 quality meeting MIL-PRF-2105E specs including *synthetic lubricants. <b>*: Do not mix conventional lube with Synthetic lube.</b>	75W: -40°F to 32°F (-40°C to 0°C) 75W-90: -40°F to 100°F (-40°C to 38°C) 75W-140: -40°C and above (-40°F and above) 80W: -15°F to 70°F (-26°C to 21°C) 80W-140: -15°F and above (-26°C and above) 90W: 10°F to 100°F (-12°C to 38°C) 85W-40: 10°F and above (-12°C and above) 140W: 40°F and above (4°C and above)

Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
Front axle wheel bearing oil – (Cont)	Meritor: Synthetic from factory with Cognis Emgard® 75W-90 will have a tag attached to fill plug that reads as follows: <b>Filled with synthetic lube. Do not mix.</b>	75W-90
	Meritor: Petroleum 0-76-A Hypoid Gear Oil 0-76-D Hypoid Gear Oil 0-76-E Hypoid Gear Oil 0-76-J Hypoid Gear Oil Petroleum oil: engine oil API-CK-4 or CJ-4	85W-140: 10°F and above (-12°C and above) 80W-90: -15°F and above (-26°C and above) 75W-90: -40°F and above (-40°C and above) 75W: (-40°C to 2°C) -40°F to 36°F  SAE 40 or 50: 10°F and above ( -12°C and above) SAE 30: -15°F and above (-26°C and above)
Front axle wheel bearing grease, tie rod ends, drag link, king pin and bushing	Eaton® / Dana® axle, Meritor axle: Fleetrite® NLGI#2 Lithium Complex Based Moly grease P/N 991044C2 or equivalent GC / LB NLGI #2 Multi-purpose Lithium Complex grease	<b>NOTE: Eaton® / Dana® and Meritor Easy Steer axles: With chassis load on axle, force grease through thrust bearings; then with axle lifted clear of floor, force grease between kingpin and bushing surfaces.</b>
<b>Body Components</b>		
Emergency Window Slides	WD-40 Specialist Dirt & Dust Resistant Dry Lube PTFE Spray or equivalent PTFE lubricant	
<b>Brakes</b>		
Brake Fluid	DOT 3 Brake fluid	

## Maintenance Intervals and Specifications

Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
<b>Engine</b>		
Engine Lubricating Oil	Refer to <b>Engine Operation and Maintenance Manual</b>	
<b>Electrical</b>		
Terminals – Lubricant Sealing Grease	Fleetrite® 472141-C1	
Connectors – Dielectric Grease	NYOGEL® 760 G	
<b>Steering System</b>		
Strg. Gear Ross TAS-Output Seal – Lubricate	Fleetrite® Lithium Complex Based Moly grease P/N 991044C2 or equivalent GC / LB NLGI #2 Multi-purpose Lithium Complex grease	
Strg. Intermediate Shaft U-Joints / Slip Joint – Lubricate	Fleetrite® NLGI #2 Lithium Complex Based Moly grease P/N 991044C2 or equivalent GC / LB NLGI #2 Multi-purpose Lithium Complex grease	



Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
<b>Approved (Power Steering Fluid)</b>		
Automatic Transmission Fluid (ATF) Fluid (Approved for use in Power Steering System)	Fleetrite® P/N FLTPSDX3Q (MPAPS B-6822 Specification) or Equivalent (Must Meet TES 389 / Dexron III Specification)	-40°F to 92°F (-33° to 32°C)
Power Steering Fluid	Fleetrite® Power Steering Fluid P/N FLTPSF32 (MPAPS B-6811 Specification)	-24°F to 92°F (-33°C to 32°C)
Engine Oil (Approved for use in Power Steering System)	Fleetrite® P/N FLTL15W40G (MPAPS B-21 Specification) or Equivalent API CK-4 15W-40 Motor Oil	18°F to 108°F (-10°C to 43°C) <b>NOTE: Must not be used with Hydraulic Brake Booster System</b>
<p><b>NOTE: The power steering system is filled with ATF fluid at the factory.</b></p> <div style="text-align: center;">  <b>CAUTION</b> </div> <p><b>To prevent component / system / property damage, ONLY use fluid types listed.</b></p> <p><b>NOTE: Certain fluid types may be better suited for use in your vehicle, dependant on geographic location and temperature. It is recommended to use the Ambient Temperatures listed above to determine what fluid best fits the application of the user's fleet or vehicle.</b></p> <p><b>NOTE: The same type of approved power steering fluid that is present in the system must be used when topping off. When switching to another approved power steering fluid type, the power steering system must be drained and flushed prior to refill.</b></p>		
<b>Drive Shaft</b>		
U-Joint - Lubricate	Fleetrite® NLGI #2 Lithium Complex Based Moly grease P/N 991044C2 or equivalent GC / LB NLGI #2 Multi-purpose Lithium Complex grease	

## Maintenance Intervals and Specifications

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Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
Clutch		
Release Bearing / Shafts / Fork - Lubricate	Fleetrite® NLGI #2 Lithium Complex Based Moly grease P/N 991044C2 or equivalent GC / LB NLGI #2 Multi-purpose Lithium Complex grease	
Cooling System		
Coolant	Refer to <b>Engine Operation and Maintenance Manual</b>	
Transmission		
	* Do not use multi-weight and GL-5 EP gear oils because they may cause transmission failure or damage.	
Allison - Synthetic Automatic Transmission Fluid (ATF) Fill / Change (optimal - recommended)	Refer to appropriate Allison Transmission Operation and Maintenance Manual.	
Allison - Conventional Automatic Transmission Fluid (ATF) Fill / Change	Refer to appropriate Allison Transmission Operation and Maintenance Manual.	

## Maintenance Intervals and Specifications

Component	Component Vendor / Lubrication Type	Viscosity / Ambient Temperature / Notes
<b>Rear Axle</b>		
Single speed	Gear oil meeting MIL-PRF-2105E, API MT-1, GL-5	75W: -40°F to - 15°F -40°C to -26°C() 75W-80: -40°F to 80°F (-40°C to 27°C) 75W-90: -40°F to 100°F (-40°C to 38°C) 75W-140: -40°F and above (-40°C and above) 80W-90: -15°F to 100°F (-26°C to 38°C) 80W-140: -15°F and above (-26°C and above) 85W-140: 10°F and above (-12°C and above)
Single speed – Continued.	International® axle: multipurpose EP gear lube of API GL-5 quality meeting MIL-PRF-2105E or SAE J2360 specs including synthetic lubricants.	75W: -40°F to 32°F (-40°C to 0°C) 75W-90: -40°F to 100°F (-40°C to 38°C) 75W-140: -40°F and above (-40°C and above) 80W: -15°F to 70°F (-26°C to 21°C) 80W-140: -15°F and above (-26°C and above) 90W: 10°F to 100°F (-12°C to 38°C) 85W-140: 10°F and above (-12°C and above) 140W: 40°F and above (4°C and above)
	Meritor:Synthetic from factory with Cognis Emgard® 75W-90 will have a tag attached to fill plug that reads as follows: <b>Filled with synthetic lube. Do Not Mix.</b>	
	Meritor petroleum: 0-76-A Hypoid Gear Oil 0-76-B Hypoid Gear Oil 0-76-D Hypoid Gear Oil 0-76-E Hypoid Gear Oil 0-76-L Hypoid Gear Oil	GL-5, SAE 85W-140: Above 10°F (-12°C) GL-5, SAE 85W-140: Above -15°F(-26°C) GL-5, SAE 80W-90: Above -15°F (-26°C) GL-5, SAE 75W Max outside temp. 35°F (2°C): Above -40°F (-40°C) GL-5, SAE 75W-140: Above -40°F (-40°C)

## Maintenance Intervals and Specifications

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### Torque Specification Charts

#### Disc Wheels Torque Chart

Stud Size	Nut Size	Specified Torque	
		lb-ft	N•m
22 mm	Flange Nut – 33 mm Across Flats	450 - 500	610 - 678
<b>NOTE: Do not use lubrication on dry threads. Where excessive corrosion exists, a light coat of lubricant on first three threads of stud bolt is permitted. Keep lubricant away from:</b> <ul style="list-style-type: none"><li>• Hex nut</li><li>• Flange nut washer surface and flat on disc wheel</li></ul>			

#### Steering Column Pinch Bolts Torque Chart

Bolt Type	Specified Torque	
	lb-ft	N•m
7/16-20	68 - 76	92 - 103

**Axle U-Bolt Nut Torque Chart**

Feature Code	Rear Suspension Capacity and Type	Torque	
		lb-ft	N•m
14SAC	13,500-lb Capacity, Single Vari-Rate	260 - 300	353 - 407
14SAE	15,500-lb Capacity, Single Vari-Rate	260 - 300	353 - 407
14SAH	18,500-lb Capacity, Single Vari-Rate	260 - 300	353 - 407
14SBK	19,800-lb Capacity, 2 Stage Vari-Rate	260 - 300	353 - 407
14SBV	21,000-lb Capacity, V-Rate, with 4,500-lb Auxiliary Spring	260 - 300	353 - 407
14TBH	15,500-lb Capacity, International Air Suspension (IROS) for axles 14ADN, 14ADP, 14AJC, 14AJE, 14ATP, and 14ATR.	260 - 300	353 - 407
	15,500-lb Capacity, International Air Suspension (IROS) for all other axles.	370 - 400	502 - 542
14TBS	21,000-lb Capacity, International Air Suspension (IROS).	260 - 300	353 - 407
14TBT	23,000-lb Capacity, International Air Suspension (IROS) for axles 14ADN, 14ADP, 14AJC, 14AJE, 14ATP, and 14ATR.	260 - 300	353 - 407
	23,000-lb Capacity, International Air Suspension (IROS) for all other axles.	260 - 300	353 - 407
<b>NOTE: For all other vendor supplied suspensions, refer to vendor's website for proper torque specifications.</b>			

## Maintenance Intervals and Specifications

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Feature Code	Front Suspension Capacity and Type	Torque	
		lb-ft	N•m
3ADA	8,000-lb Capacity, Parabolic Taper Leaf	353 - 407	260 - 300
3ADB	10,000-lb Capacity, Parabolic Taper Leaf	353 - 407	260 - 300
3ADC	12,000-lb Capacity, Parabolic Taper Leaf	353 - 407	260 - 300
3AGZ	7,000-lb Capacity, Parabolic Taper Leaf	353 - 407	260 - 300

### Wiper Arm Torque Chart

	Specified Torque	
	N•m	lb-ft
Wiper Pivot M20 Hex Nut	28	21

### Seat Base Bolts

	Specified Torque	
	N•m	lb-ft
All Seat Base Bolts	21.7 to 27	16 to 20

### Filter List

Filter part numbers and / or specifications may change during the life-cycle of this vehicle. Current information on the appropriate chassis and engine filters for your vehicle can be obtained by contacting your local IC Bus® or International® dealer parts department. If you need assistance finding a local IC Bus® or International® dealer, use the Dealer Locator icon at [www.icbus.com](http://www.icbus.com).

## SECTION 15 — CUSTOMER ASSISTANCE

### Service Information

The continued premium performance of this IC Bus® vehicle can best be ensured through proper servicing. This can be accomplished in several ways.

**IC Bus® Dealers:** Your local IC Bus® dealer provides an excellent resource – through his knowledgeable, experienced, and well equipped service staff – to handle all your maintenance, repair, and replacement work.

**Service Publications:** Those persons who are properly trained technicians with the facilities, equipment, tools, safety instructions and know-how to properly and safely service a bus can purchase the appropriate service manual sections applicable to specific vehicle components or areas of this vehicle. Engine diagnostic manuals and engine service manuals for all current engines are also available to these trained persons for purchase. Information on the purchase of available service publications for this vehicle can be found on the [www.icbus.com](http://www.icbus.com) or [www.internationaltrucks.com](http://www.internationaltrucks.com) Web site, or by contacting your local IC Bus® or International® Truck Dealer.

These resources are also available via the internet, by an annual subscription to the **Service Portal<sup>SM</sup> Website**, or via the **OnCommand® Service Information USB**. Information on the Service Portal<sup>SM</sup>. Web site's content, availability, and fee structure can be obtained by contacting your local IC Bus® or

International® Truck dealer or, in the case of a National Account, an International Fleet Service Manager.

The OnCommand® Service Information USB contains Navistar® branded truck or engine, and IC Bus® information including service and diagnostic manuals, diagnostic trouble code indices, troubleshooting guides, circuit diagram manuals, new vehicle processing manual, and a help screen.

**NOTE:** When ordering any service information, be sure to provide your vehicle's model designation, build date, engine series, and the Vehicle Identification Number (VIN).

### Navistar, Inc., Warranty Program

#### Standard Warranty • Optional Service Contracts • Custom Service Contracts • Performance PM®

The Navistar, Inc. Warranty Program provides IC Bus customers with a better choice when it comes to Standard Warranty and Service Contract Coverage. The **Standard Warranty** is the first tier of the Navistar, Inc. Warranty Program. It provides the foundation for all extended coverages.

Vehicle Coverage, Towing, Engine and Engine Electronics, Major Component, and Pre-Packaged System Component protection can be obtained under the Navistar Warranty Program through **Optional Service Contracts**.

**Custom Service Contracts**, the most flexible aspect of the Navistar Warranty Program, can provide extended protection that is specifically tailored to meet each customer's specific requirements.

Finally, through **Performance PM®**, customers can obtain a comprehensive preventative maintenance program designed to ensure consistency in pricing and the level of service received.

### **ADVANTAGES of Navistar, Inc. Warranties**

- Extends warranty protection to specified length and component coverage to suit individual needs
- Honored at all IC Bus® dealer locations in North America
- Stabilized and predictable maintenance costs
- Increased owner confidence and peace of mind
- Improved resale value on your vehicle – International Truck Warranties may be transferable for a nominal fee. Contact the Service Contract Center 1-800-336-4500 option 5 for transferability
- Most coverage is 100% parts and labor with **NO DEDUCTIBLES**
- Customized warranty programs are offered to suit your needs - your specification - your vocation
- Optional Service Contracts, Custom Service Contracts, and Performance PM, designed to ensure the lowest possible cost of ownership, are also available

- Published Service Contracts Performance PM® Service, designed to ensure the lowest possible cost of ownership, are also available.
- Optional Service Contracts have been pre-packaged to fit most common applications.

### **HOW TO OBTAIN Navistar, Inc. Warranties**

- **Standard Warranty:** Your new IC Bus® vehicle is automatically registered in the Navistar Warranty System at the time of delivery. No further action on your part is required.
- **Optional Service Contracts, Custom Service Contracts, or Performance PM®:** These programs are sold exclusively through your IC Bus® dealer. You have 365 days and up to a maximum of 160,000 km (100,000 miles), from DTU (delivery to end user), to purchase an extended warranty on your vehicle. The vehicle must also have coverage remaining under the Standard Warranty. For extended warranty purchases between 181 through 365 days from DTU and <160,000 km (100,000 miles) an additional fee will be assessed. If you would like the predictable cost of ownership and peace of mind provided by the Navistar Warranty Program, please contact your IC Bus® dealer today!



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