

BLUE BIRD **VISION**



D R I V E R S H A N D B O O K

2012





BLUE BIRD

# VISION



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Edition A

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Many of the components of Blue Bird buses are obtained from outside suppliers. Where maintenance and/or service information conflicts with the component manufacturer's documentation, the manufacturer's documentation prevails.

In the event of any conflict between the requirements of this publication and any applicable legal requirement, the legal requirement prevails. Technical requirements that exceed the legal requirements are not considered to conflict.

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## **Introduction / 7**

Blue Bird Authorized Dealers / 8  
Blue Bird School Bus Support / 8  
Blue Bird School Bus Training / 8  
Blue Bird Parts Sales / 8  
Blue Bird Technical Publications / 8  
Blue Bird Bus Warranty / 9  
Reporting Safety Defects / 9  
Driver Certification / 9  
About 2010 Emissions Standards / 10  
Regarding Modifications / 11  
About This Driver's Handbook / 12  
Safety Precautions / 12  
Scope and Content / 12

## **General Specifications / 13**

General Specification, Chassis / 13  
Alternator / 13  
Axle & Suspension, Front / 13  
Axle & Suspension, Rear / 13  
Batteries / 13  
Braking System / 13  
Bumpers / 14  
Controls / 14  
Cooling System / 14  
Drive Line / 14  
Engines / 14  
Intake / 15  
Exhaust / 15  
Frame, Chassis / 15  
Fuel System / 15  
Horn / 16  
Instruments / Gauges / 16  
Steering / 16  
Tires / 16  
Tow Hooks / 16  
Transmission / 16  
Wheels / 16  
Wiring / 16  
General Specification, Body / 17  
Panels & Compartments / 17  
Emergency Doors / 17  
Entrance Doors / 17  
Electrical / 17  
Fans (optional) / 17

Floor / 18  
Heater/Defroster / 18  
Insulation / 18  
Lettering / 18  
Lights / 18  
Mirrors / 19  
Paint / 19  
Panels, Exterior / 20  
Panels, Interior / 20  
Reflectors / 20  
Rubrails / 21  
Safety Equipment / 21  
Seats / 21  
Stepwell / 21  
Stop Arm, Crossing Arm / 21  
Sun Visor / 21  
Switch Panel / 22  
Ventilation / 22  
Windows / 22  
Windshield / 22  
Windshield Wipers / 22  
Wiring / 22  
Dimensions / 23

***Driver Orientation / 25***

Driver Orientation / 25  
Emergency Equipment Locations / 25  
First Aid Kit / 25  
Body Fluids Clean-up Kit / 25  
Fire Extinguisher / 25  
Triangular Roadside Hazard Reflector Kit / 25  
Flare Kit / 26  
Fire Axe and Crowbar / 26  
Driver's Area / 27  
Left Switch Console / 28  
Radio Switch Panel / 29  
Upper Left Switch Panel / 30  
Heater Control Panel / 31  
Lower Left Switch Panel / 32  
Right Console Switch Panel / 34  
Driver's Instrument Panel / 35  
Instrument Cluster / 36  
Message Display Center / 37  
Warning Bank Indicators / 38  
Set the Clock / 40  
Dimmer Adjustment / 40  
Contrast Adjustment / 41  
Backlight Color Adjustment / 41  
Heat and Air Controls / 42  
Heater Valve Lever / 43  
Heater Filter Panel / 43  
Steering Column / 44  
Steering Wheel Position / 44  
Left Switch Stalk / 44  
Right Switch Stalk / 44  
Cruise Control / 44  
Parking Brake, Units With Air Brakes / 46  
Parking Brake, Units With Hydraulic Brakes / 47  
Driver's Seat, Standard / 48  
Driver Lap & Shoulder Belt / 48  
Driver's Seat, Air / 50  
Driver Lap & Shoulder Belt / 50  
Interior Compartments / 52  
Passenger Seats / 54  
Passenger Area Heaters / 55  
Passenger Windows / 56  
Emergency Exits / 57  
Rear Emergency Door / 57  
Vandal Lock / 57

Emergency Pushout Windows / 58  
Emergency Roof Hatch / 59  
Entrance Door Emergency Release / 60  
Exterior Compartments / 61  
Engine Compartment / 61  
Battery Compartment / 62  
Fuel Filler / 62  
Hazard Rating (NFPA/HMIS) / 63  
Keeping Your Bus Looking New / 63  
Rating Scale / 63  
Wax / 64  
Bus Downtime Treatment / 64  
Product Identification Information / 66  
Federal Vehicle Certification Plate / 66  
Axle Record and Chassis Service Number Plate / 66  
Body Serial Number and Service Number Plate / 66  
Data Plates Reference / 67

***Pre-Trip Inspection / 69***

Before Placing the Bus in Service / 69  
Daily Pretrip Inspection / 69  
Exterior Walkaround / 69  
Entrance Area Inspection / 72  
Engine Compartment Inspection / 73  
Instrumentation & Driver's Alert Checks / 75  
Exterior Lights Check / 76  
Passenger Area Inspection / 77  
Emergency Equipment Check / 77  
Prepare For Driveaway / 78  
Mirrors and Mirrors Adjustment / 79

### ***Routine Operation / 81***

Routine Operation / 81  
Maneuvering Safety / 81  
Prior to Starting the Engine / 82  
Starting the Engine / 82  
High Idle Function / 83  
Engine Cooling System / 84  
Coolant Types / 84  
Coolant Testing and Replacement / 85  
Service Brakes / 87  
About Hydraulic Brakes / 87  
Parking Brake (With Hydraulic Brakes) / 88  
About Air Brakes / 89  
Parking Brakes (With Air Brakes) / 89  
Parking / 90  
Allison Automatic Transmissions / 91  
Allison Model 2000 Bus Series Transmission / 91  
Allison 2000 Bus Series Transmission Gear Selection / 92  
Allison Model 3000 Bus Series Transmission / 93  
Allison Model 3000 Bus Series Transmission Gear Selection / 93  
Range Inhibit Feature / 94  
Allison Automatic Transmission Driving Tips / 95  
Electric Retarder (If Equipped) / 96  
Transmission Indicator Lights / 97  
Exhaust System / 98  
DPF Regeneration In Blue Bird Buses / 99  
Aftertreatment Terms / 99  
Levels of Notification / 100  
Stationary Regeneration Precautions / 103  
SCR System in Blue Bird Buses / 104  
DEF Levels of Priority Notification / 106  
General Propane Tank Filling Procedures / 111  
Propane Powered Motor Vehicle Filling Procedures / 112

### ***Enroute Emergencies / 115***

Enroute Emergencies / 115  
Using Triangular Hazard Reflectors / 115  
Using Booster Cables / 116  
Starting Problems / 117  
Jacking and Towing / 118  
Jack Points / 118  
Towing / 118  
Air Tank Schrader Valve / 120

### ***Scheduled Maintenance / 121***

Scheduled Maintenance / 121  
Fluids & Filters / 122  
Maintenance Task Schedule / 124



# Thank You ...and Congratulations!

*We at Blue Bird Corporation wish to thank you for your investment of trust in Blue Bird quality, and congratulate you on being a Driver of one of the most innovative vehicles in pupil transportation; the Blue Bird Vision.*

## **Blue Bird Strength; Blue Bird Innovation**

The BLUE BIRD VISION is the first C-Type ("conventional") school bus built upon a chassis designed specifically for pupil transportation, rather than mounted upon a multi-purpose truck chassis. The VISION's chassis is purpose-built at Blue Bird's Fort Valley, Georgia plant, as are Blue Bird's ALL AMERICAN transit-type buses and the VISION's C-Type "little brother," the EC-72.

The BLUE BIRD VISION, with its ALL AMERICAN FE and RE siblings, comprise a complete line of built-from-the-ground-up buses, providing an ideal fit for any school route need.

Unlike most "conventional" type school buses, the VISION is anything but "ordinary." The VISION is the result of Blue Bird's steadily innovative engineering and over 85 years of school bus experience, applied to the C-Type category.

What kind of innovation? For 2008, the VISION receives a handsome new engine hood mounted to a rugged torsion pivot mount. Opening and closing the hood is a light-as-a-feather breeze. Yet this new engine hood sacrifices none of the VISION's legendary field-of-view.

The Driver's area has received multiple improvements for 2011 you are sure to enjoy. An all new dash houses the new instrument cluster and also provides a built-in glove box. The instrument cluster includes a major new feature: the Message Display Center with on-board diagnostics. This is a large LCD panel which provides you and your service technician access to a wide array of system information. The infinitely-adjustable steering column is also new, providing quick and easy adjustment.

Of course, there are myriad other technical refinements "under the hood" with which the Driver may never interact directly; but which nonetheless contribute to an overall improved operating and ownership experience.

Built to purpose. Built to last. Built to bring to your operation a new level of value, efficiency, and rugged reliability.

## **Backed By Blue Bird**

Blue Bird provides all the behind-the-scenes support you depend upon for success in your school transportation operation:

### **Blue Bird Authorized Dealers**

Blue Bird administers its full range of Customer Services through a nationwide network of local or regional Blue Bird Authorized Dealers. The Dealer through whom your bus was purchased should always be your first point of contact for information and assistance. Contact information for your dealer is located on the back cover of this manual.

### **Blue Bird School Bus Support**

Your Blue Bird Dealer is equipped and staffed to handle your service-related issues, and also has immediate and direct access to Blue Bird's own factory-based Customer Support. All Blue Bird Support Representatives are true Blue Bird technical experts with long histories at the Blue Bird plants where your buses are built.

### **Blue Bird School Bus Training**

The Training staff of Blue Bird Technical Communications conducts an ongoing program of Field Service, Factory Service, and Focussed Training classes and seminars, to ensure that service technicians of Dealers are always up-to-date on the latest service information and techniques. Some of these training classes are open to the service personnel of customers.

### **Blue Bird Parts Sales**

Blue Bird's modern Service Parts facility ships parts directly to Blue Bird Authorized Dealers and Blue Bird Bus Spec and Bus Care centers nationwide. Blue Bird Parts Sales consists of modern warehousing facilities, efficient ordering and inventory control systems, and expert technical staff who know your bus inside and out. Service Parts also publishes its own parts catalogs, available for customer purchase.

### **Blue Bird Technical Publications**

Blue Bird Driver's Handbooks and Service Manuals are produced and continually updated by a full-time in-house staff with full access to manufacturing assembly lines and Blue Bird Engineering. Additional manuals are available for purchase through your Blue Bird Authorized Dealer.



### **Blue Bird Bus Warranty**

For your convenience and efficiency, warranty claims are handled at the local Dealer level, as are all other Customer Services. Be assured that your Blue Bird is backed by one of the strongest factory warranties in the industry. Refer to the limited warranty statement supplied with your bus for the terms and limitations of the limited warranty. Contact your Blue Bird Dealer if you have questions about the limited warranty or for assistance in obtaining repairs covered by the limited warranty.

### **Reporting Safety Defects**

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 Blue Bird.

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 Blue Bird Corporation.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at:

**1-888-327-4236 (TTY: 1-800-424-9153)**

or 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 motor vehicle safety from:

***<http://www.safercar.gov>***

### **Driver Certification**

US Federal regulations require that school bus Drivers possess a Commercial Driver's License (CDL). The purpose of this manual is to acquaint the Driver with the particular Blue Bird bus model it covers. Its information must be considered supplemental to, not a replacement for, the specific requirements for Driver certification, testing, and operational procedures.

For example, the Pre-trip inspection routine described in this manual may not include all items or details of the Pre-trip inspection required by legally-mandated inspections.

Contact the Pupil Transportation Director or similar office for your particular state/district for more information.

### **About 2010 Emissions Standards**

Buses equipped with 2010 engines are designed to conform to new and stringent federal emissions standards. These standards affect both the equipment installed at the factory and the fuel at the pump.

Buses powered by 2010 emissions standards engines are equipped with special exhaust systems to reduce emissions. The technical details of the systems employed by various engine manufacturers differ, but share common general principles. The exhaust muffler is replaced by a particulate filter which traps and burns microscopic particles in a process referred to as "regeneration." When heat in the exhaust is insufficient to fully burn the particulates, the system enters an "active" regeneration mode so the necessary catalytic reaction can take place. During active regeneration events, exhaust temperatures are elevated, and an indicator light on the instrument panel illuminates to notify the Driver that regeneration is active. This regeneration mode is automatic and normal, and requires no special action on the part of the Driver.

Removing particulate matter (soot) from the exhaust stream through regeneration alone will not satisfy the more stringent 2010 emission standard. This standard requires reduced levels of Nitrogen Oxide (NOx). To achieve this a Selective Catalytic Reduction system (SCR) is added downstream to the diesel particulate filter. The SCR system uses a chemical reactant – in this case Diesel Exhaust Fluid (DEF) – which converts to ammonia in the exhaust stream and reacts with NOx to form harmless nitrogen gas and water.

As part of the 2007 emissions standards, effective October 15, 2006, the EPA has required fuel retailers to sell lower-emission fuel, designated "ultra-low-sulfur diesel". After that date, all commercially-available number 1 and number 2 highway diesel fuels are Ultra-low-sulfur diesel. This fuel must be used in all 2011 model buses powered by a diesel engine, as indicated by a decal located near the fuel filler door, reading:

*The engine in this vehicle must be operated only with low ash engine oil and ultra low sulfur diesel fuel (meeting EPA specifications for highway diesel fuel, including a 15 ppm sulfur cap).*

For detailed information on recommended fuels and other fluids, always follow your engine manufacturer's guidelines.



## Regarding Modifications

Blue Bird Corporation offers many items as standard and optional equipment to meet federal, state, and local specifications and individual customer requirements.

Those interested in modification of this vehicle should consult the Service Manual and Blue Bird Engineering Department for a more complete understanding of the vehicle.

Vehicle modifications which may cause non-conformance with the emission control and/or Federal Motor Vehicle Safety Standards ((FMVSS), are expressly not authorized by Blue Bird Corporation.

It is the responsibility of the entity undertaking the modification to ascertain compliance of the modified vehicle with any and all applicable regulations. The entity performing modification of this product must certify that all applicable regulations are met. In order to certify a modified vehicle, the upfitter or other entity performing the modification must be a licensed vehicle manufacturer or must obtain the services of a licensed vehicle manufacturer for that purpose.

Specifically, Blue Bird Corporation does not authorize any modifications to or such as the following:

- Front or rear suspension
- Wheelbase length
- Body or chassis crossmembers
- Frame rail flanges
- Welding on the engine, radiator, fuel tank(s), transmission or any component of those items
- Cooling system
- Addition of any equipment or component nearer than 2 inches (51mm) to the fuel tank(s), rotating components or "jounce" movement of driveline components

## About This Driver's Handbook

Blue Bird Technical Communications endeavors to continuously improve the value of its manuals. Your comments and suggestions are welcome, and we value the feedback we receive from our users. Send your comments to:

*Blue Bird Corporation  
Attn: Technical Communications  
P.O. Box 937  
Fort Valley, Georgia 31030*

### Safety Precautions

Throughout this manual are precautions labeled Warnings and Cautions, and set in the style shown here:

**WARNING** *The Warning designation is generally used for precautions which, if not properly observed while performing the related procedures, could result in serious personal injury or death.*

**CAUTION** *The Caution designation is generally used for precautions which, if not properly observed, could result in damage to the bus or its equipment.*

This manual is intended for use by qualified professional bus Drivers who understand and observe all appropriate safety precautions and procedures associated with safe driving in general, and pupil transportation in particular. The user of this manual must read and abide by all safety warnings noted not only in this manual, but also on any labels and documentation for vehicle equipment and devices.

### Scope and Content

This handbook is intended to acquaint the bus Driver with the Blue Bird bus model it describes. It is recommended that after being thoroughly read by the Driver, it be stored in the bus. Although not a service manual, it contains general information that may be of value in situations of roadside hazard assistance, such as the location of jacking points, or the location of fuses.

Scheduled Maintenance tables are included as a convenience. These should be regarded as the *minimum* maintenance procedures to keep the bus in proper operational condition. The service technician should refer to and become thoroughly acquainted with the separate Blue Bird Service Manual.

Please note that not all possible situations that may arise while operating the bus are addressed. The exercise of caution, common sense, and good driving practices, coupled with experience, are required for safe operation.

If questions arise that are not specifically covered in this manual, please contact your Blue Bird Dealer. Your Dealer will either answer your questions or will be able to assist in obtaining the needed information. To report a problem with your bus, contact your Blue Bird dealer (or if you deal directly with Blue Bird, contact your Service Representative). If you are unsure of the identity of your Blue Bird Service Representative, call the Blue Bird switchboard at 478.825.2021 and ask the receptionist for the Blue Bird Service Department.

*For replacement parts . . .*

*Contact your Blue Bird dealer or Parts Sales at  
Blue Bird Corporation.*

## General Specification, Chassis

### Alternator

240 Amp Leece Neville, 12 Volt, AVI-160.

### Axle & Suspension, Front

**Axle:** Hendrickson SteerTek, 12,000 lb rating. Petroleum lubed bearings. 50 degree wheel cut. Hubcaps with window seal included.

**Suspensions:** Hendrickson SofTek, 8,000 lb (standard) or 10,000 lb (optional) rating. 4" x 60", Hendrickson variable rate, tapered springs with Anti-Wear liner. Maintenance free rubber bushings.

**Shock Absorbers:** Sachs. direct acting, 1.42" diameter bore double-action piston type with long life bushings.

### Axle & Suspension, Rear

**Axle:** Meritor, RS21145, 21,000 lbs. capacity single speed with 5.29 ratio. Petroleum lubed bearings.

**Shock Absorbers:** Sachs. direct acting, 1.42" diameter bore double-action piston type with long life bushings.

**Springs:** 4" x 52" semi-elliptic, progressive, 17,000-21,000 lb. two stage leaf springs. Maintenance free, rubber bushed radius leaf permits axle adjustment for dog tracking.

### Batteries

Three Group 31 batteries with 3375 CCA @ 0° F. 4/0 gauge battery cables. Heavy duty slide out battery compartment tray.

### Braking System

**Service Brakes, Air (Optional).** Meritor air-powered, cam-operated, 4" front; 7" rear internal expanding, single leading shoe drum brakes. Meritor automatic slack adjusters. 4-channel Bendix ABS. 3-tank air system with combined capacity of 5,280 cu in. Moisture drain valve on each tank. Options available for Bendix AD-9 or AD-IP air dryer.

**Emergency/Parking (units with optional air brakes).** Captive spring actuators incorporated into rear air brake chambers. Release valve operation with control knob at driver's right.

**Service Brakes, Hydraulic (Standard).** Both front and rear systems have 15" diameter x 1.438" thick rotors. 64mm front; 70mm rear 4-piston, self adjusting Meritor Quadraulic calipers. Meritor ABS.

**Emergency/Parking ( units with standard hydraulic brakes).** Internal expanding, transmission mounted, 9" diameter x 3" wide. Mechanical cable operation with foot control lever at driver's left.

**Bumpers**

Contoured 15" steel front bumper die formed from 3/16" steel plate. Rear bumper smooth profile, 12" high with 90° flanges, die formed from 3/16" steel plate, with 14" wraparound at corners and double "A" frame bracing.

**Controls**

Electronically operated throttle, air brake treadle, valve actuated parking brake (air brakes) or cable-operated driveline shoe parking brake (hydraulic brakes) with warning light, transmission selector, dimmer switch, instrument panel rheostat-controlled lighting, key-type starter switch. Electric dual horn. Message Display Center controls on the instrument panel cluster. Cruise control on left steering column stalk. Manual outward-opening door control.

**Cooling System**

Charge air and down-flow radiator mounted in tandem at vehicle front. A 24" dia. nylon cooling fan with nine blades equipped with an electrically operated viscous fan clutch driven by polyvee fan belt with spring loaded tensioner. Fan controlled by Engine ECM.

Transynd™ TS295 Synthetic Transmission fluid cooled by heat exchanger in lower radiator tank. Premium rubber coolant hoses with constant torque clamps.

**Drive Line**

Spicer SPL series 70 shafts with protective guards and lifetime lubrication. 3 1/2" diameter shaft. SPL Series 140 is used with optional PTS 3000 transmission.

**Engines**

**Cummins ISB / 2007 Emission Standards Engines.** Some Blue Bird 2011 Visions are equipped with Cummins ISB engines which are specially designed to meet 2007 emission standards. These engines incorporate a Cummins Particulate Filter / Muffler, and use cooled Exhaust Gas Recirculation to reduce emissions. During normal use, the system automatically enters a particulate filter regeneration mode to oxidize soot collected in the particulate filter.



**Cummins ISB-10 Base** 200 HP @ 2300 RPM; 520 ft lb torque @ 1600 RPM. Governed speed 2500 RPM. Certified for NOX and NMHC for 2007 emission EPA standards. High pressure common rail fuel system. 15.2 CFM single cylinder air compressor. SAE #3 Flywheel housing. Holset turbochargers. Wastegated turbocharger. The ISB-10 monitors key engine parameters and logs diagnostic faults when an abnormal operating condition occurs. The engine de-rates available power and maximum vehicle speed when certain parameters pass a limit threshold or a maximum coolant temperature of 225 F. The engine's ECM keeps an electronic data log of time of occurrence, elapsed times, extreme pressures and extreme temperatures when the system detects an out-of-range condition. The following sensors mounted on the engine provide input to the engine protection system: oil pressure, coolant level sensor. Minimum pressure cap rating is 15 psi at sea level. Thermostats opening temperature 190 F; fully open @ 205 F. Fan full-on at engine coolant temperature of 210 F. Fuel/Water Separator supplied with engine. Blue Bird diesel fuel systems are not compatible with biodiesel. Engine manufacturer's warranty regarding performance, emissions and durability can be affected by using biodiesel.

#### **Intake**

High volume canister type air cleaner with replaceable pleated fiber cartridge. Charge Air intake circuit by exhaust-driven turbocharger. Charge Air cooler mounted in front of engine coolant radiator. Intake restriction indicator.

#### **Exhaust**

4" O.D. 16 Gauge aluminized steel tubing from engine turbo-charge to in line diesel particulate filter and selective catalytic reduction (SCR) device. Stainless steel DPF with catalytic converter and SCR. 4" O.D. 16 gauge aluminized steel tailpipe. Wide band exhaust clamps used at all joints. Left hand side exit tailpipe.

Visions equipped with 2010 emissions standards engines use engine manufacturer-specific diesel particulate filter which integrate with an active regeneration system to oxidize particulate soot and an SCR device which reduces overall NOx output.

#### **Frame, Chassis**

Dual "C" channels, 10 1/8" high with 3" flanges made of 5/16" thick, 50,000 psi steel. All permanent fixtures on frame are attached with hi-tensile strength Huck-Spin fasteners with swaged lock nuts.

#### **Fuel System**

60 gallon capacity aluminized steel safety tank mounted between frame rails. Includes a sender inspection plate and right side fill opening with spring loaded locking door.

Spin-on fuel filter (standard). Racor 490R30 fuel filter with see-thru bowl, self-venting drain, integral check valve on inlet side, and 200 watt heater (optional). Secondary fuel filter mounted on engine is supplied by engine manufacturer.

**Horn**

Electrical dual horns.

**Backing safety horn variable db.** A Variable db, backing safety horn activated whenever the bus is shifted into reverse. Sounds between 87 and 112 db automatically adjusting itself depending on the ambient noise level in the proximity of the alarm.

**Instruments / Gauges**

**Gauges:** Speedometer; Oil Pressure; Fuel Level; Coolant Temperature; Tachometer. Front Air Pressure; Rear Air Pressure on units equipped with air brakes.

**LED Warnings / Telltale Indicators:** Hest Indicator; Brake Failure, Wait To Start, ABS, Park Brake Applied, Check Transmission, Left Turn Signal, High Beam, Right Turn Signal, Coolant Level, Transmission Oil Temperature, Stop Light, Stop Engine, Engine Warning, Coolant Temperature, Low Fuel, Low Secondary Brake Pressure, Low Primary Brake Pressure.

**Message Display Center:** When configured this display will provide a continuous readout for volts, amps, transmission temperature, and applied air pressure (air brakes). Interactive LCD display, also provides system alerts such as regen needed, low DEF fluid levels, voltage error, water in fuel, engine warning, J1939 communication failure, stop engine, turn signal on; and also displays service diagnostic features.

**Steering**

Full power Ross THP-60 integral unit with 20.4 to 1 ratio; with TRW Power Steering Pump. 18" diameter, two-spoke, padded steering wheel with tilt steering column.

**Tires**

Goodyear G661 HSA, 10R22.5 LRG Steelbelt.

**Tow Hooks**

Two front frame mounted (standard). Two rear frame mounted (optional).

**Transmission**

Allison 2500 PTS Series transmission, 5 Forward speeds- 1 reverse, with Gen 4 T-handle shifter mechanism. Transynd™ TS295 Synthetic Transmission Fluid.

**Wheels**

Hub Piloted steel 10 stud disc wheels, single front, dual rear, 8.25 x 22.5 rims.

**Wiring**

Blue Bird single-zone Multiplex chassis circuit wiring system with MPX Module located in Power Distribution Unit compartment at front of bus below dash. Includes diagnostic switch in driver's switch panel for service diagnostics.

## General Specification, Body

### Panels & Compartments

**Battery Compartment.** Enclosed compartment 23.63”L x 24.00” D, has roll-out tray. Includes retaining pins with cables to secure the tray in a closed position. Hinged door with recessed locking “Paddle Handle” latch. Located on front of left side of bus.

**Exterior Electrical Compartment.** Left front side of bus, below Driver’s window.

**Power Distribution Unit.** Inside the bus, centered on the front wall against the floor. Cover removable with two thumbscrews. Houses the main Multiplex Main Bus Controller, battery power distribution connections, and other electrical connections.

**Side Electrical Channels.** Inside the bus above the side windows on both sides. Houses the trunks of all body harnesses and other optional component wiring, such as radio / PA speakers, if so equipped.

### Emergency Doors

Rear center door with 37.7” wide x 52.5” high opening. Single-point bar lock latch with inside handle and guard. 6” chrome-plated recessed exterior handle. Upper and lower clear tempered. 5” black upholstered header pad.

**Buzzers:** Two buzzers—one located in the Driver’s area and one near the rear emergency door—sound when any emergency exit is engaged.

### Entrance Doors

**Standard:** Blue Bird two-panel Outward Opening door with manual door control.

**Optional:** Bode electrically-operated two panel outward opening door. Permanently lubricated bearings and bushings. Mechanical clutching system in the gear case disengages the worm drive to allow emergency manual opening of the door. Clear (standard) or tinted (optional) glass. 5” black upholstered header pad.

### Electrical

Multiplex system incorporating chassis circuits. Power Distribution Unit under windshield near floor.

### Fans (optional)

One 6” fan mounted left of the Driver seat, with or without a second 6” fan mounted right of the Driver at body centerline. Controlled by single switch.

**Floor**

**Covering.** 3/16" thick ribbed black rubber in aisles and at entrance aisle area. Aluminum aisle trim over join in floor covering, full length of body. 1/8" smooth black rubber under seats. Molded black smooth rubber over wheelhousings.

**Subfloor.** 1/2" Fir plywood, secured to steel floor panels with screws.

**Heater/Defroster**

90,000 BTU front system on Driver's side with continuous ducted defronsting of windshield and Driver's window. Washable filter. Driver selects recirculating of fresh air into system as conditions require. Manual ball type water flow control valve on heater next to driver, for temperature control. Goodyear Hi-Miler heater hose with constant torque clamps at all joints.

**Insulation**

The roof, sides, front and rear (including corners and bow cavities) are insulated with 1 1/2" thick fiberglass providing an R-value of 5.75.

**Lettering**

SCHOOL BUS black vinyl lettering on front and rear caps. Yellow reflective background optional. Vinyl lettering on top of emergency windows and rear emergency door on both interior and exterior of vehicle, according to federal regulations. Operation instructions decal on all emergency exits. French decals options available.

**Lights**

**Backing:** Two 5" clear incandescent right and left rear.

**Clearance:** Two amber front and two amber rear single. Switch operates clearance, cluster, and side marker lights.

**Daytime Running:** Head lamps, tail, license plate, parking, clearance & marker lights activated when engine is running.

**Directional:** Two 4" plain amber fender mounted. Two 7" amber lights mounted on rear.

**Dome:** 6 Candlepower single row equally spaced at center over aisle. Single control switch.

**Headlights:** Dual element 65w high beam / 45w low beam 9004 halogen bulbs mounted in contoured lens housings.

**Stepwell:** 14 candlepower. Wired to operate with ID lights with entrance door open.

**Stop and Tail:** Two combination lights, 4" right and left rear license panel in combination with 7" stop and tail lights with clear red lens.

**Warning Lights:** Weldon 8 light sequential system with dual hoods.

## Mirrors

**Exterior Crossview:** A Rosco Mini-Hawkeye crossview mirror system allows a seated driver to view pedestrians while the bus is stopped. The crossview mirror system is comprised of a 10.8" x 12.5" elliptical mirror with tinted upper portion to reduce glare supported by a center mounting post with ball stud mounted, on both left and right sides of the bus. The mirror mounting posts are attached to the front cowls, and feature a breakaway pivot to minimize damage in the event of accidental contact. The crossview mirror system allows for viewing all areas along the front and sides of the bus which are not visible by direct view.

**Exterior Rearview:** Rosco Avia 9" x 17" non-detend rearview mirror system. Provides view of the roadway to the rear, as well as a view of the ground along both right and left sides. Rearview mirror system is comprised of a 74 square inch flat and a 38 square inch convex, 36" radius mirror on both right and left sides. Right rearview mirrors are located so as to be visible through the wiped area of the windshield. Left rearview mirrors are located so as to be viewed through the Driver's window. Both right and left rearview mirrors feature a breakaway indexed pivot and are adjustable without tools.

**Interior Rearview:** 6" x 30" with 3/16" clear safety glass laminated to steel backing plate. 1 3/4" radius rounded corners. Perimeter of mirror edged with 5/8 diameter rubber padding. Interior rearview mirror is installed above the seated Driver on the front upper inner panel, and provides a clear view of the vehicle interior and roadway to the rear, through the windows of the rear emergency door.

## Paint

**Exterior:** Heat cured polyurethane. National school bus yellow with yellow rub rails (black rubrails optional), bumpers, and around Warning Lights.

**Interior:** Astro White, hot sprayed-on baked enamel, except aluminized inner side panels. Seat frames, heaters and trim are black. Switch console and dash medium gray.

**Rust Proofing:** Body parts thoroughly rust-proofed after fabrication and before assembly.

**Undercoat:** Underside of body floor, skirt and wheelhousings thoroughly undercoated prior to body mount on chassis to ensure best coverage and maximum corrosion resistance.

**Panels, Exterior**

16 1/4" skirt. Outside side panels are constructed of 20 gauge form fluted steel. Side panels extend from below the side windows to a distance of 16 1/4" below the floor (16 1/4" skirt). Rear corner panels are constructed of 20 gauge steel and include a license plate emboss, both right and left. The left hand emboss includes nylon nuts and slot-head screws for license plate mounting. The front roof cap is formed from 18-gauge steel. The rear roof cap is formed from 20 gauge steel. Roof sheets are constructed of 20 gauge steel and span the entire width of the bus (window header to window header). Roof sheets include an embossed rain visor over side windows. Front cowl panels are constructed of 11 gauge steel. Floor panels are constructed of 14 gauge steel and are reinforced with full width "U" channel cross members. All riveted floor joints are reinforced with full width 3/16" x 1 1/2" x 2" structural steel angles and 1/8" flat bar.

**Panels, Interior**

A removable 18 gauge steel front upper inner panel is provided to allow access to the front roof cap area. A removable 20 gauge steel rear upper inner panel is provided to allow access to the rear roof cap area. Removable composite wire moldings, right and left, are provided to allow access to body wiring harnesses. Wire moldings are provided in sections. Textured aluminized fully hemmed steel inside side panels are provided, extending from the window sill down to the floor gusset seat ledge, for the entire length of the body on both left and right sides. Driver's and first section are acoustic headlining. Second section and rearward are solid headlining panels, spanning the entire width of the bus (window header to window header), constructed of 22 gauge steel, double-hemmed to provide additional joint strength.

**Reflectors**

Standard reflectors include:

- Two 3" red mounted on side of body near rear.
- Two 3" red, mounted on rear of body.
- Two 3" amber right and left intermediate side reflectors.

**Reflective Tape:** One-inch minimum width strip around each emergency exit (roof hatch/pushout window when ordered). One-inch wide strip of yellow reflective vinyl around the perimeter of the rear emergency door.

### Rubrails

Four double-ribbed low profile 16 gauge steel applied rubrails are installed along both sides of the body, as follows: One below side windows; one at seat (Passenger) level; one near the floor level; one at the bottom of the skirt. The window rail extends from the front bow on the right or the front cowl post on the left to the rear corner radius. The floor rail extends from the front bow, both right & front, to the rear corner radius. The skirt rail extends from the front bow on the right, or the front cowl post on the left, to the rear bumper (interrupted at wheelhousing cutouts). The seat rail extends from the front bow, both right and left around the rear corner radius.

Bumper rubrail installed below the rear emergency door immediately above the rear bumper. Rail spans the full width of body and wraps around the rear corner panels right and left. Yellow rubrails are standard with yellow end caps. Rubrails are secured with 1/4" screws - 20 x 5/8" with Torx drive heads. Layouts may vary on options ordered

### Safety Equipment

Three reflectorized triangular roadside warning devices enclosed in a plastic storage container, secured to the floor near Driver. 5 lb fire extinguisher in entrance door area. Two roof escape hatches mounted above aisle.

### Seats

**Driver's Seat.** National NS2000 pedestal (standard) or air adjustable (optional). Seat belt is three-point, floor mounted anti-cinch emergency locking retractor.

**Passenger Seats.** All Passenger seats and barriers are optional and are upholstered in 42 oz polyester backed vinyl, solid gray.

### Stepwell

Three-step riser, National Standard. 10" to 14" ground to lower step height. Stainless steel. Step treads with non-abrasive black rubber with white nosing. Three inch wide white ribbed rubber with metal backing wearplate is located at floor level step at the entrance door. Includes stainless steel assist rail at rear of stepwell.

### Stop Arm, Crossing Arm

One Specialty solid state electric operated high intensity reflective octagonal stop arm, red with a white border and 6" high lettering. "STOP" or "ARRETT" on both sides. Includes red incandescent lights over and under the word "STOP" visible from both sides.

### Sun Visor

Transparent dark green tint 6.5" x 30" smooth edge plastic. Located in front of driver. Adjustable vertically on two arms pivoted at ends of visor and at anchor points on windshield header.

**Switch Panel**

Mounted on left of driver with rocker-type illuminated switches for electrical equipment. Brightness of illumination is controlled by a dimmer slide switch.

**Ventilation**

**Air Intake.** Heater intake left front below windshield level provides up to 100% fresh air through heater.

**Roof Vent.** Static non-closing vent in front roof.

**Windows**

**Auxiliary Safety-View Vision Panel.** Fresnel broad vision 7 1/2" x 13 1/2 in right front cowl.

**Driver's.** Spectal double sliding aluminum sash with security fastener for locking both sash, laminated green tinted safety glass.

**Side.** Spectal 12" split sash with clear (standard) or tinted (optional) tempered glass. Four vertically hinged push-out windows.

**Rear Vision.** Fixed clear tempered.

**Windshield**

The windshield consists of four separate pieces of flat shaded safety plate glass. Black grip handles and fold-up step on right and left cowls to facilitate windshield cleaning.

**Windshield Wipers**

Electric, intermittent single switch, wet arm wipers. Electric windshield washer with hard plastic one gallon capacity reservoir located under engine hood, washer outlets mounted on wiper arms.

**Wiring**

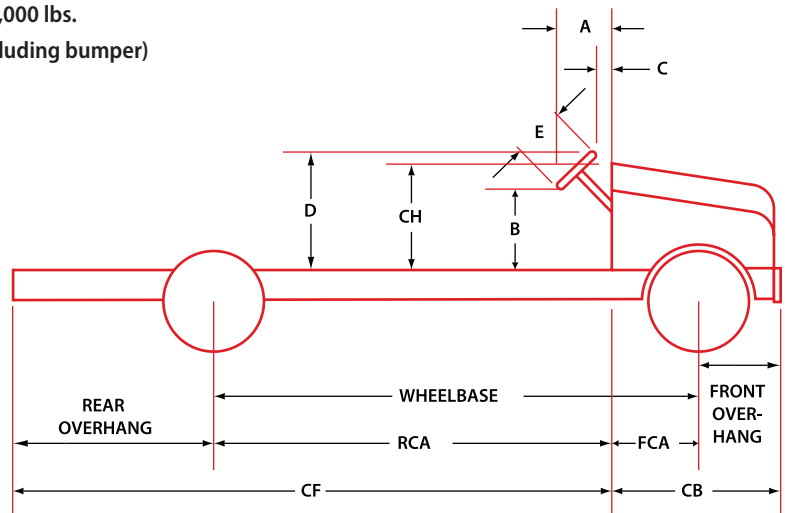
Colored and continuously number coded in molding on top of side windows for access to harnesses. Body wiring protected by automatic resetting circuit breakers.



### Dimensions

The dimensions shown exclude exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames and rub rail; and are taken under static conditions at design height. Overall maximum height varies from 120" to 124" depending upon choice of tires, suspension system, and body model. Add 3" for roof vents and 3" for 77" headroom. Rear bumper adds 1.25" to overall body length. Front bumper adds 2" to overall body length.

- Length: 289" - 471"
- Width: 96"
- Interior Width: 90 3/4"
- Height: 124" - 127"
- Skirt Length: 16 3/4"
- Wheelbase: 189" / 217" / 238" / 252" / 273"
- Interior Headroom: 74" - 77"
- Front Door: 27" wide, 78" high
- Rear Emergency Door: 52.5" x 37.7"
- Wheel Cut: 50°
- Tire Size: 10R22.5 LRG G149RSA – Goodyear
- GVWR: Up to 31,000 lbs.
- Front Overhang: 36.5 (including bumper)
- FCA (Front Cowl to Axle): 25"
- CB (Cowl to Bumper): 64.5"
- CH (Cowl Height): 33"
- A: 21.17"
- B: 26.75"
- C: 9.5"
- D: 41.97"
- E: 18"



#### Dimensions & Payload Weight (standard equipment)

WHEELBASE	BODY MODEL	CAPACITY	PAYLOAD	CURB WEIGHT	TOTAL WEIGHT	OVERALL LENGTH	REAR OVERHANG	TURN RADIUS	RCA	CF
189"	BBCV2311	48	5910	15,100	21,010	351	122.25	25.9'	164	286.25
217"	BBCV2610	54	6630	16,100	22,730	386	129.25	28.9'	192	321.25
238"	BBCV2807	60	7350	16,300	23,650	407	129.25	31.1'	213	342.25
252"	BBCV3011	66	8070	17,400	25,470	435	143.25	32.6'	227	370.25
273"	BBCV3303	72	8790	18,000	26,790	463	150.25	34.9'	248	405.25
273"	BBCV3310	78	9510	18,400	27,910	470	157.25	34.9'	248	405.25

*Pupil weight @ 120 lb each. Driver @ 150 lb.  
Approximate curb & total weights are based on standard equipment units. Optional equipment may significantly increase these estimated weights.*



## Driver Orientation

This chapter is a brief tour of the VISION's features and equipment locations.

### Emergency Equipment Locations

Some emergency equipment is optional and differs between states. Generally, all school buses have first aid kits, fire extinguishers, and triangular roadside hazard reflector kits; however, the size of first aid kits and fire extinguishers vary. The bus may also be equipped with a body fluid kit, fire axe, crowbar, or flare kit. All such devices are generally located in the Driver's area, but specific locations are also subject to optional specifications.

Upon taking delivery of the bus, the Driver must locate all the emergency equipment purchased with the bus, and become fully acquainted with its mountings; able to quickly remove the equipment in an emergency situation and replace it securely. Emergency equipment must never be left loose in the bus, but must always be securely stored in its factory-installed mountings during bus operation.

As part of a daily pre-trip inspection, the Driver must verify that all emergency equipment is in place, fully stocked (First Aid Kit), up-to-date (Fire Extinguisher), and in proper working condition.

#### First Aid Kit

The first aid kit on most VISION buses is located over the windshield toward the curbside of the bus. Each state has a specific location and contents guide that must be followed.

#### Body Fluids Clean-up Kit

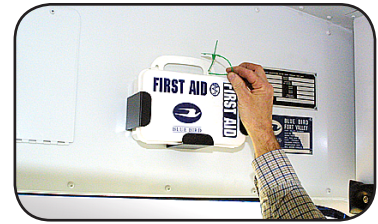
The body fluids clean-up kit is located in the general area of the first aid kit. However, each state has specific requirements for the location and labeling of this equipment. Know your state's requirements and maintain the kit accordingly.

#### Fire Extinguisher

The fire extinguisher on most VISION buses is located near the floor, forward of the entrance door stepwell or mounted to the floor near the Driver's seat. States requirements vary for the type and size of the fire extinguisher for school buses. The fire extinguisher must be monitored to ensure the charge level is within the acceptable range, and the expiration date current. It is the responsibility of the driver to ensure compliance prior to each trip.

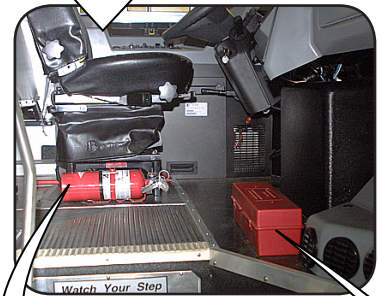
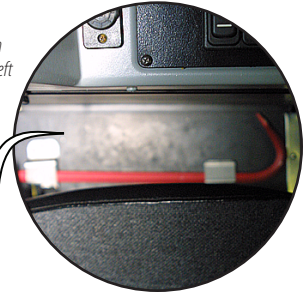
#### Triangular Roadside Hazard Reflector Kit

For those states requiring the triangular markers to be located in the driver's compartment, this container is mounted on the floor immediately behind the driver's seat. In some states, it is mounted on the floor, under the rearmost left-hand seat or under the second right hand seat. The contents of the triangular warning device kit should be checked each month or as the regulations of your state dictate. See the Enroute Emergencies chapter for instructions on deploying the reflectors.



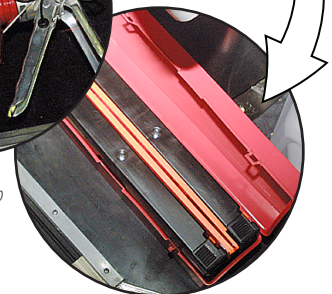
The First Aid Kit is mounted on the interior header panel above the windshield. Depending upon options or regulatory requirements the bus may also be equipped with a Body Fluid Kit in the same general location.

Fire Axe floor mounted between Driver's seat and left console



Triangular Roadside Hazard Reflector Kit

Fire Extinguisher size and location varies according to options and state specs.



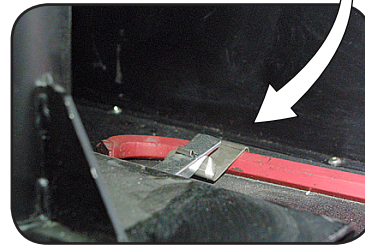
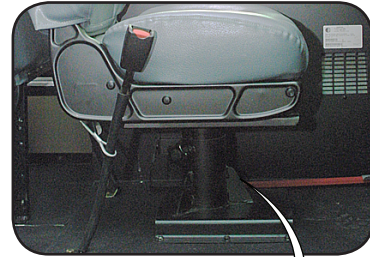
Triangular Roadside Hazard Reflector kit may also be mounted behind the Driver's seat, or at the rear of the bus just inside the Rear Emergency Door opening.

**Flare Kit**

If the bus is equipped with a flare kit, on most VISION buses it is typically mounted on the floor behind the Driver's seat and left side seat barrier. The location may differ according to state specs. The kit contents should be inventoried every 30 days, or as required by your state and local regulations. The mounting fasteners should be checked monthly to ensure security.

**Fire Axe and Crowbar**

If the bus is equipped with fire axe and/or crowbar options, on most VISION buses they are typically mounted on the floor behind the Driver's seat and left side seat barrier. The location may differ according to state specs. The Fire axe cutting edge is covered by a metal plate when mounted.

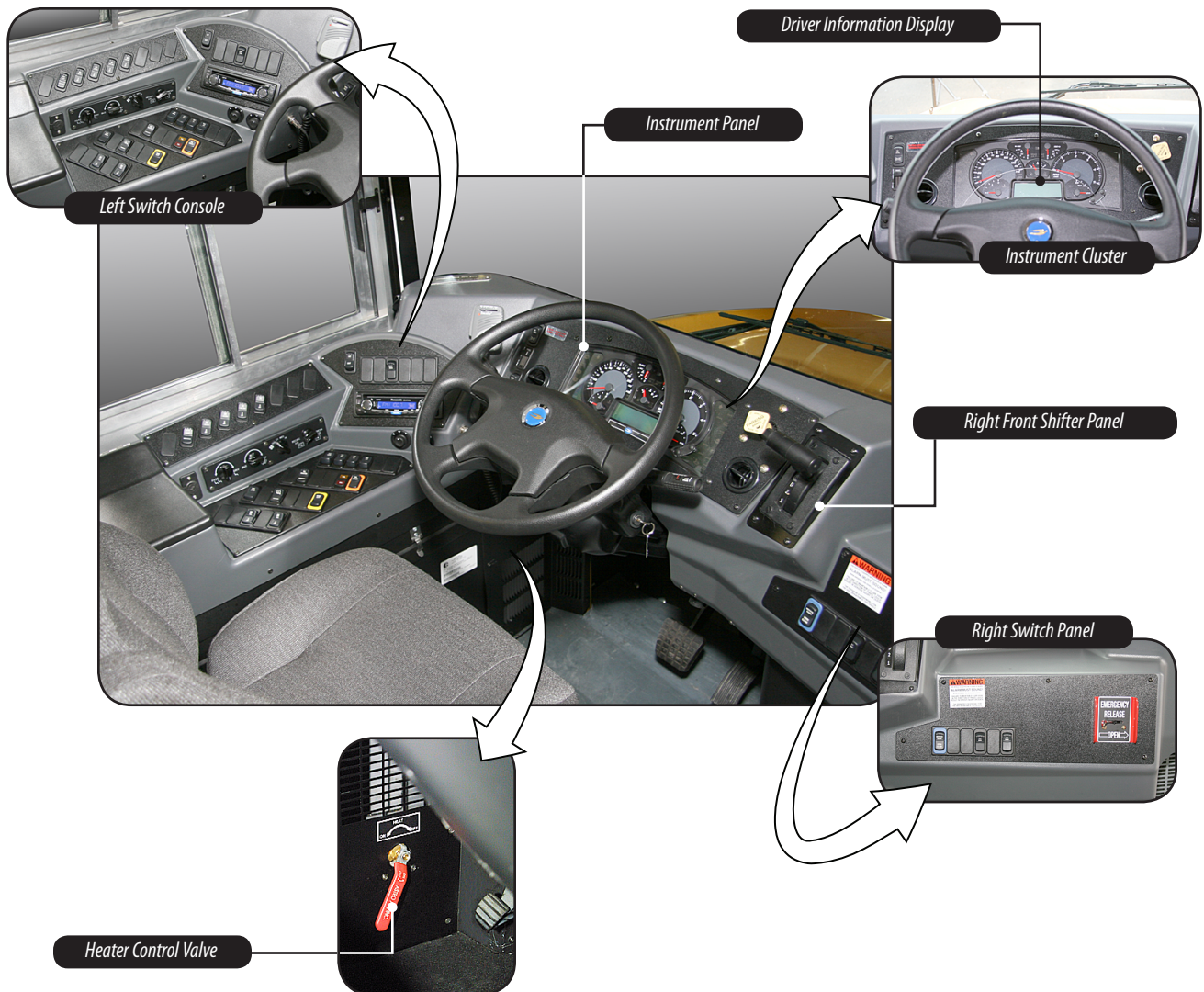


*Crowbar mounting latch*

### Driver's Area

Blue Bird has designed many new features into the Driver's area of the vision. A new one-piece molded dash housing spans the entire front of the bus. All gauges are incorporated in a single new main instrument cluster. New switch panels are located to the right and left of the instrument panel. The exact arrangement of switches in all switch panels is somewhat dependent upon specific state specifications. (For example, some states require additional switches for red and amber Warning Light pilots.) Shown are the standard and most common configurations. If your bus differs from the diagrams shown, check with your local specifications and familiarize yourself with each switch function.

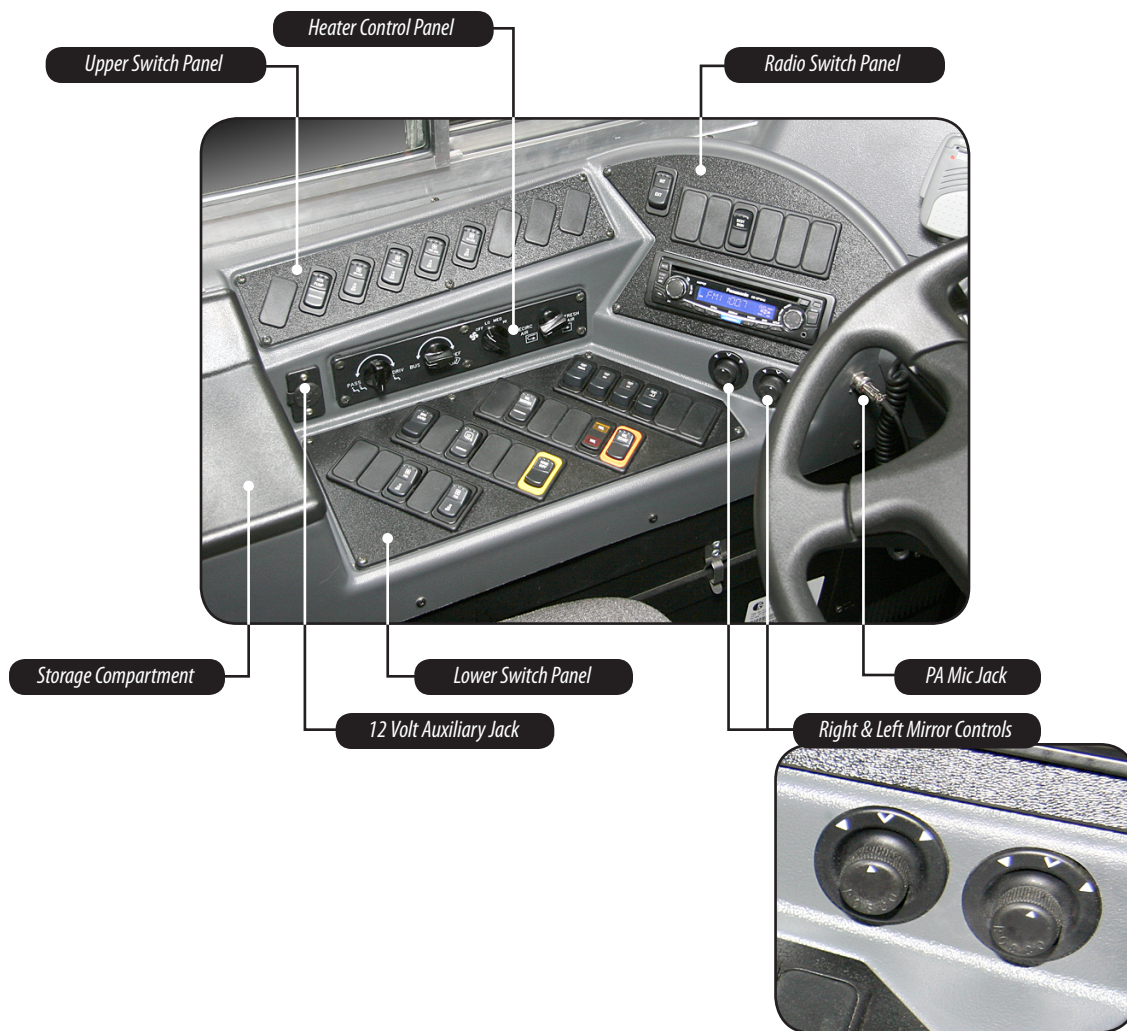
An all-new tilt / telescope steering column provides improved adjustability range, allowing the Driver to use both hands to position the wheel for maximum comfort.



### Left Switch Console

The left switch console under the driver's side window and shown here consist of, the Radio Switch Panel, the Heater Control Panel, Right and left rearview mirror controls, upper and lower switch banks, a storage compartment, the optional PA mic jack and a 12 volt auxiliary jack as well.

The left switch console contains three switch panel banks. The exact arrangement of switches in all switch panels is somewhat dependent upon specific state specifications. (For example, some states require additional switches for red and amber Warning Light pilots.) Shown are the standard and most common configurations. If your bus differs from the diagrams shown, check with your local specifications and familiarize yourself with each switch function.



**Radio Switch Panel**

The radio console switch panel located to the left of the driver and shown below includes a Panasonic AM/FM stereo cassette or CD player with PA system, depending on option ordered. The panel contains switches for standard and optional equipment and will be equipped only with switches for options that are included on your bus and therefore may differ from the panel shown here. The following is a list of switches and indicators found in this panel and their descriptive icons.



*Optional Panasonic Radio  
With CD or Cassette and  
optional PA Mic.*

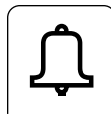


*PA Mic*

**INT**

**EXT**

**Public Address.** Interior and exterior speakers.



**Chimes.** Provides power for passenger compartment chime system.

**LIFT**

**Lift.** Provides power for lift operation.

**DEST SIGN**

**Destination Sign.**

**LIFT DOOR**

**Indicator Lights.** Lift door open and /or Emergency door open.



**Hazard Lights.** This switch turns on / off the front and rear turn signals as blinking hazard flashers.

**EMER EXIT**

**Upper Left Switch Panel**

The upper left switch panel located directly below the driver’s window and shown below includes switches that control the heater systems installed on your bus. The panel contains switches for standard and optional equipment heaters including front and rear heaters, the driver’s heater, underseat heaters, and auxiliary heater pump. The panel will be equipped only with switches for options that are included on your bus and therefore may differ from the panel shown here. The following is a list of switches and their descriptive icons found in this panel.



**Driver’s Heater Fan.** High, off and low positions.



**Heater pump.** Provides power to auxiliary heater pump, supplying heat to the passenger compartment.



**Underseat Heater Fan Switches.** 3-position (High, Off, Low) . Additional 3-position heater switches may be located in the left console lower panel if the bus is equipped with optional passenger area heaters. These switches control the fan speed of underseat heaters.



**Perimeter Convection Heater Switch.** 2-position (On / Off). If the bus is equipped with optional perimeter convection heaters in the passenger area, a switch is provided to toggle these heaters on and off. This switch operates an electric valve which controls the flow of engine-heated water.



**Heater Control Panel**

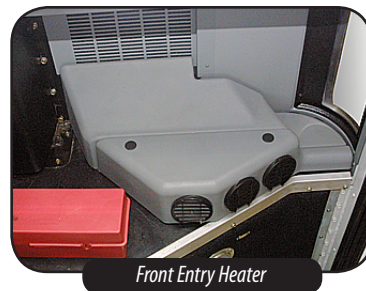
The Heater Control panel of the Side Console contains controls for the front heater unit which is housed immediately below the Side Console left of the Driver seat. Ducts from this unit also provide windshield defrosting.

**Fresh / Recirculate.** This knob controls the type air, which is circulated by the heater system and fan. By turning clockwise, air is circulated from the interior of the vehicle. This is desirable when trying to heat passenger compartment rapidly. By turning the control knob counterclockwise air from outside the bus is used in the system. This is helpful when trying to cool the vehicle.

**Heater Fan.** This knob adjusts the speed of the fan, which circulates the air in the system. In the counter clockwise position, the blower is off. By turning clockwise, 3 speeds can be achieved — low, medium and high..

**Defrost / Bus.** This knob adjusts the air flow balance between the vehicle passenger compartment and the windshield. By turning knob clockwise, a damper is moved and air is diverted toward the windshield for defrosting.

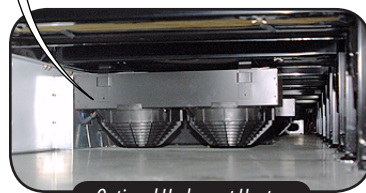
**Driver / Passenger.** This knob Adjusts air flow balance in two directions. By turning knob clockwise, a damper is moved and air is diverted toward the driver. By turning counterclockwise, the air is diverted toward passengers. The amount of air diverted is proportional to amount the knob is turned.



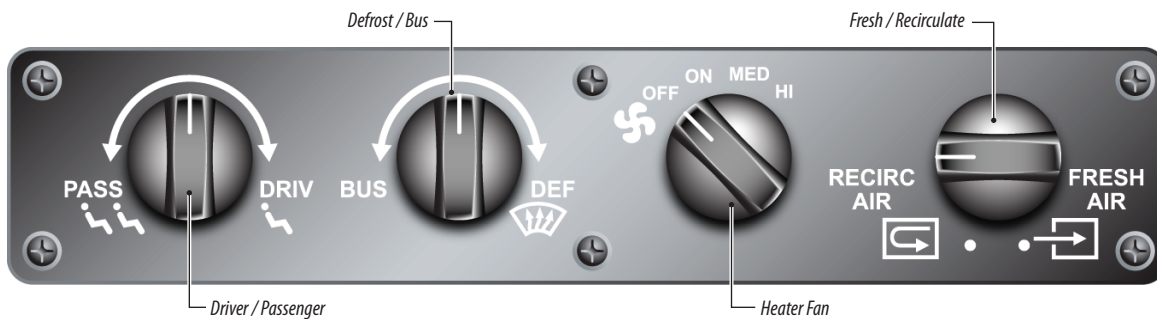
Front Entry Heater



Underseat Heater Switches



Optional Underseat Heater



**Lower Left Switch Panel**

The lower left switch panel located directly beside the driver consist of switches for standard and optional equipment. The panel will be equipped only with switches for options that are included on your bus and therefore may differ from the panel shown here. The following is a list of switches and indicators found in this panel and their descriptive icons.



**Rear Dome Lghts.** Turns on / off the overhead lights in the passenger

area. Some Vision buses have two of these switches, one each for the dome lights in the front half and rear half or the right side and left side the bus.



**Left Side Dome Lights.**



**Right Side Dome Lights.**



**Driver's Dome Light.** Turns on / off the overhead light in the Driver area.



**Door Switch.** Press and hold the top of this momentary rocker switch to

open the entrance door. The door stops automatically when it reaches the end of its travel. Press and hold the bottom of the switch to close the door.



The door stops automatically when it reaches the end of its travel. Press and



**Warning Light Start.** Switch with orange bezel. A momentary

switch which initiates the Warning Light sequence. Press this switch upon approach to each school bus stop. In most Warning Light System configurations, this activates the amber warning light flashers. When the door is then opened, the red warning lights are activated and the stop arm and crossing arm extend. This also activates the Sleeping Child check system, as indicated on the Driver Information Display.



**Warning Light Indicators.** Red and yellow.



**Warning Light Emergency.** This momentary switch activates the red warning

lights for use in the case of emergency, such as a roadside hazard.



**Warning Light Master.** Enables entire warning light system. This switch

must be on whenever the Warning Light System system is required. Specific requirements vary according to state specifications. Generally, the use of the Warning Light System is required whenever picking up and discharging students. The Master switch enables you to disable the Warning Light System when stopping for other purposes such as fueling stops.

**CAUTION** *Be sure to turn the Warning Light Master Switch off when the bus is parked overnight. Whenever the Warning Light Master switch is on, the Vision's Multiplex System will not enter its sleep mode, even if the key is removed. This will lead to battery discharge.*



**Stop Arm/Crossing Arm Cancel.** Interrupts stop arm and/or crossing arm

sequence. Pressing this momentary switch retracts the Stop Arm and Crossing Arm if they are extended. Pressing it again extends them.



**NOISE SUPP**

**Noise Suppression.**  
Includes yellow bezel.  
Momentary or on/off.

When pressed and held, certain noisy devices such as auxilliary fans, heater blowers and radio are momentarily turned off to enable the Driver to better hear ambient sounds, such as railroad signals and gate intercoms or personnel, etc.



**Strobe Light.** Controls the roof-mounted strobe light.



**Mirror Defrost.** Activates defrosting system for exterior rearview mirrors.

**STEP DE-ICE**

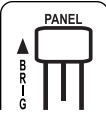
**Step De-Ice.** Activates de-icing system for entrance door steps.

**BRK OVRD**

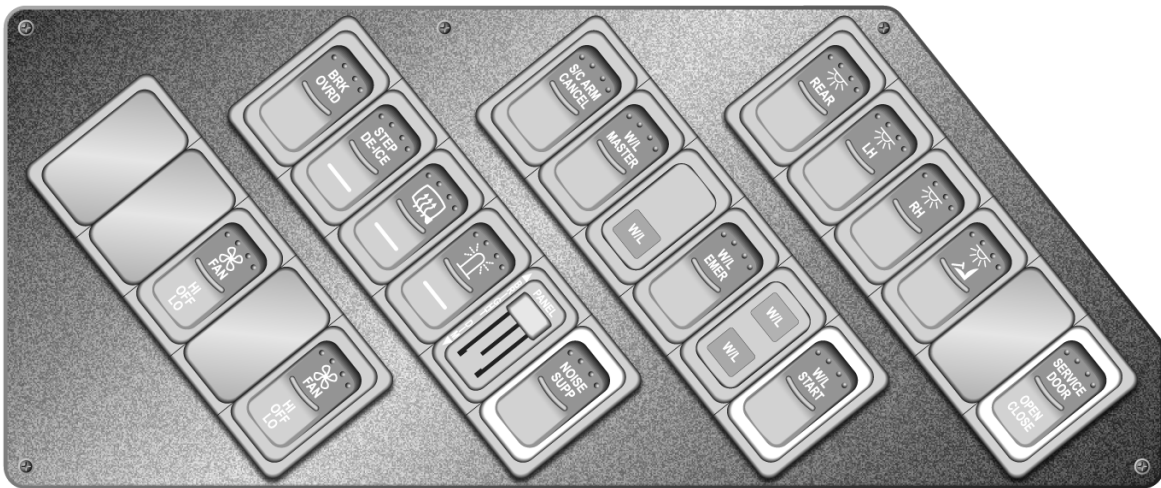
**Brake Interlock Override.**  
Momentary switch overrides Brake Interlock system.



**Fans.** Left, center and right auxiliary fans. High, low, and off positions. Fans are provided for general air circulation, Driver comfort, and/or to help accelerate windshield de-fogging under certain conditions.

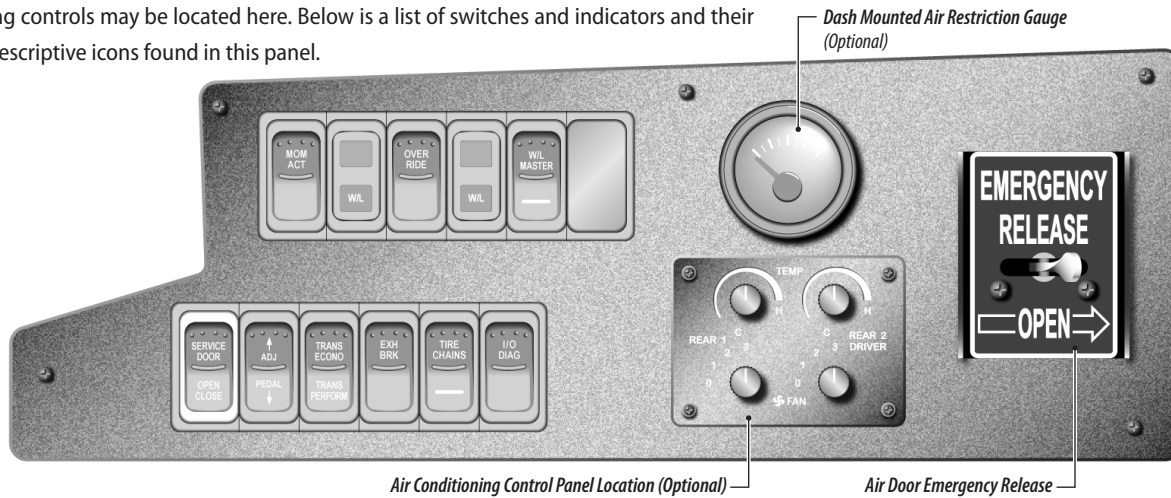


**Console Panel Dimmer.**  
Dims or brightens Console Panel switches.



### Right Console Switch Panel

The right switch panel located toward the center of the bus consist of switches for standard and optional equipment. The panel will be equipped only with switches for options that are included on your bus and therefore may differ from the panel shown here. Other options such as a dash mounted air restriction gauge, a relocated air door emergency release and a location for the standard or electronic air conditioning controls may be located here. Below is a list of switches and indicators and their descriptive icons found in this panel.



**MOM ACT**

**Warning Light Momentary.** Activates the warning light system.

**W/L**

**Warning Light Indicators.** Red and yellow.

**OVER RIDE**

**Override.** Switch enables an override of the sequential locks. (Feature Specific).

**SERVICE DOOR**

**Electric Entrance Door.** Switch with blue bezel. Press and hold the top of this momentary rocker switch to open the entrance door. The door stops automatically when

**TRANS ECONO**

**Transmission Economy.** Puts transmission into an economy shift pattern.

**TRANS PERFORM**

Can be used for long trips. **Transmission Perform** puts transmission into a performance shift mode. This is the default mode for the transmission and can be used for short stop and go trips.

**W/L MASTER**

**Warning Light Master.** Enables entire warning light system. This switch must be on whenever the Warning Light System system is required. Specific requirements vary according to state specifications. Generally, the use of the Warning Light System is required whenever picking up and discharging students. The Master switch enables you to disable the Warning Light System when stopping for other purposes such as fueling stops.

**OPEN CLOSE**

it reaches the end of its travel. Press and hold the bottom of the switch to close the door.

**EXH BRK**

**Exhaust Brake.** Activates the exhaust brake to help slow engine speed during deceleration.

**↑ ADJ**

**Pedal Adjustment.** Allows forward and rearward movement of the accelerator and brake pedal. Provides a 3 inch range of movement.

**TIRE CHAINS**

**Tire Chains.** Drops tire chains into position for icy conditions.

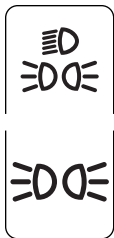
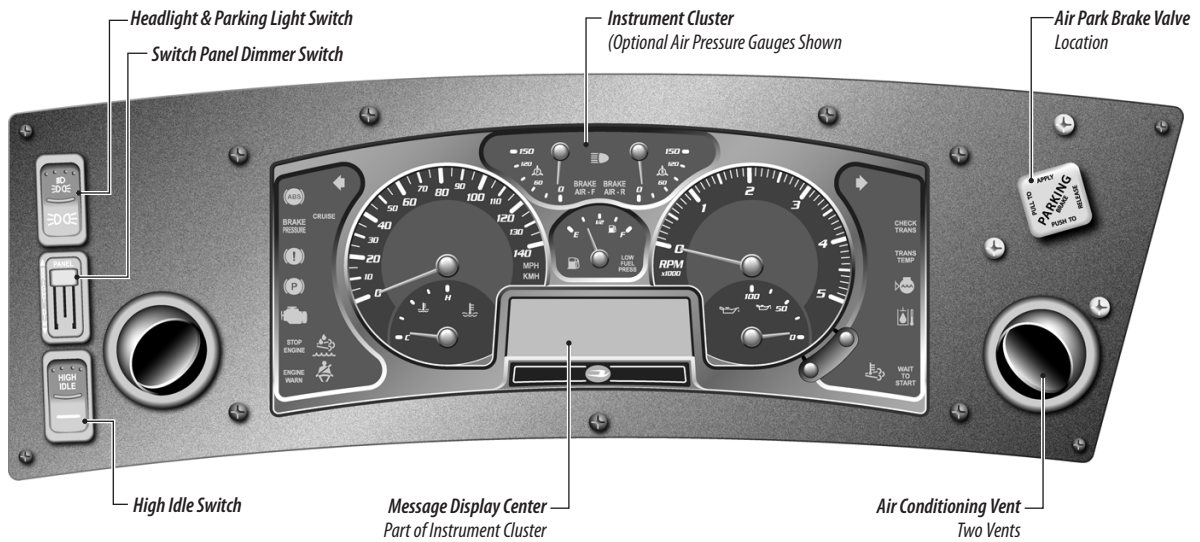
**↓ PEDAL**

**I/O DIAG**

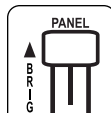
**Diagnostic Switch.** Provides diagnostic functions for the IO Control Multiplex system and the ABS system. For use by qualified personnel for diagnostic purposes only.

### Driver's Instrument Panel

The driver's instrument panel behind the steering wheel and shown here consist of the instrument panel cluster, headlight switch, panel dimmer switch, high idle switch and air conditioning vents. If your bus is equipped with air brakes the parking brake valve is also located in this panel.



**Headlights & Parking Lights.** This switch turns headlights on and off, or turns on Parking Lights. Because daytime running lights are required, the headlights shine at a lower amperage during normal bus operation after the engine is running, even when this switch is in the bottom position.



**Switch Panel Dimmer.** This slider switch is continuous, but has three detents. It adjusts the brightness of the switch panels backlighted switches. For brightening and dimming of the Instrument Cluster see the *Message Display Center Control Panel - Dimmer Adjustment*.

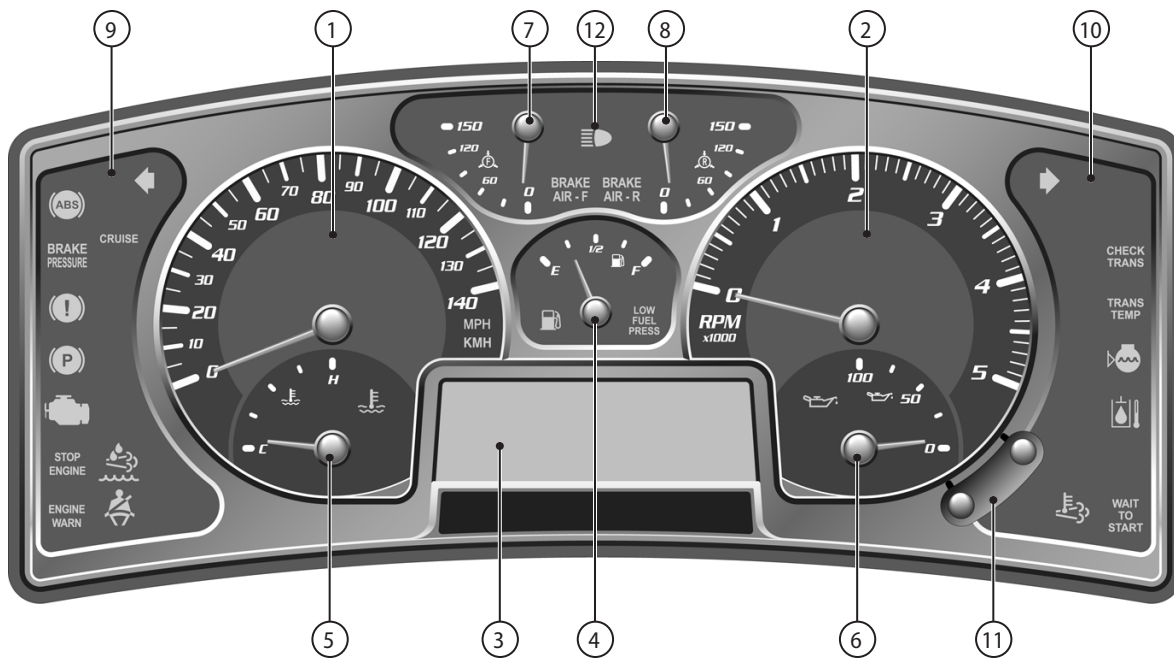


**High Idle.** This switch raises the engine idle RPM when in the on position. This may be used during engine / heater warmup and to increase alternator output in driving conditions which cause a high battery drain, such as very frequent stop / go while multiple accessories are on. This function is also useful when the bus is parked and left running for long periods of time or when electrical system demands are high such as running the AC or operating a wheelchair lift. Place the transmission in Neutral and set the Parking Brake before switching the engine to High Idle.

**Instrument Cluster**

The vision's instrument cluster is a single unit of all-electronic gauges and warning lights, which receive both analog inputs from such components as the fuel tank sender and digital signals from components such as the engine and transmission control modules. A centrally-located Message Display Center displays the odometer reading, error alerts, and service technician diagnostic information. If the vision is equipped with hydraulic brakes, the instrument cluster contains 5 gauges. Buses equipped with air brakes have two additional gauges indicating primary (front) and secondary (rear) air pressure.

1. **Speedometer.** Indicates vehicle speed in miles/hour or kilometers/hour.
2. **Tachometer.** Indicates engine speed in revolutions per minute times 1000.
3. **Message Display Center.** Displays additional information to the vehicle operator. See Message Display Center.
4. **Fuel Gauge.** Indicates fuel level in tank. Fuel gauge bank includes illuminated Low Fuel Indicator and Low Fuel Pressure Indicator.
5. **Coolant Temperature Gauge.** Indicates engine coolant temperature and includes an engine coolant temperature warning indicator.
6. **Oil Pressure Gauge.** Indicates engine oil pressure and includes an oil pressure warning indicator.
7. **Front Air Gauge.** Indicates air pressure in front brake reservoir and includes a low air warning indicator.
8. **Rear Air Gauge.** Indicates air pressure in rear brake reservoir and includes a low air warning indicator.
9. **Left Warning Bank.** Cluster of indicator lamps. See Warning Bank Indicators.
10. **Right Warning Bank.** Cluster of indicator lamps. See Warning Bank Indicators.
11. **Message Display Center Control Panel.** Two buttons which activate and toggle the menus of the Message Display Center. These buttons also serve as an Instrument Panel Dimmer, see *Dimmer Adjustment*.
12. **Headlight Highbeam Indicator.**



**Message Display Center**

The message display center provides additional information to the vehicle operator. It is located at the bottom center of the instrument panel and is divided into six zones. Each zone displays data relayed to the vehicle operator from vehicle systems. The message display center can also be used for diagnostic purposes by trained service technicians. The zones of the display are selected and toggled by the two buttons on the message display control panel on the lower right side of the tachometer.



*Message Display Control Panel*

QUAD 1	QUAD 2A
	QUAD 2B
QUAD 3	QUAD 2C
	QUAD 4

**Quad 1.** Displays the Odometer, Trip 1 Odometer and Trip 2 Odometer. The odometer registers the mileage on the vehicle and the trip odometers may be set to register mileage from destination to destination. On the message display control panel press and release the bottom button to toggle between odometer and trip odometer settings. Press the top button to reset trip odometer.

This quad also displays all general priority messages when triggered. The priority messages can be removed by pressing the bottom button or cycling the ignition.

**Quad 2A.** Displays Gear Selection. **N** - Neutral, **R** - Reverse, and **D** - Drive.

**Quad 2B.** Displays alternator output voltage (in Volts) and can display the amount of current being drawn by the vehicle electrical system (in Amps).

**Quad 2C.** Transmission temperature is normally displayed. On air brake units, when the brakes are applied, front and rear applied air pressure will be displayed. When the brakes are released, display will return to transmission temperature. This quadrant can also be programmed to display suspension air pressure in buses equipped with hydraulic brakes.

**Quad 3.** Displays the diesel exhaust fluid (DEF) gauge. This is the normal run display for busses equipped with 2010 emission standard diesel engines. The DEF gauge is displayed at all times.

**Quad 4.** Displays a clock. On the message display control panel press bottom button to activate the zone then press and release both buttons simultaneously. Use the top button to select 12 or 24 hour clock setting.

**Warning Bank Indicators**

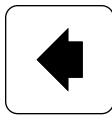
Two arrangements of LED-illuminated warning lights provide feedback to the Driver about various systems. These are located to the right and left sides of the instrument panel, indicator definitions are shown on the following page.

An audible sound speaker is incorporated into the back of the instrument cluster, and sounds to accompany the indicator light warnings. The audible alarm also serves to indicate turn signal blink and turn signal reminder.

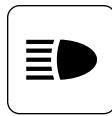
*Priority Messages*

- No Engine Communication
- No Transmission Communication
- No ABS Communication
- Data Link Warning
- Vehicle Speed Error
- Engine Door Open
- Brake Interlock Set
- Brake Interlock Fail
- Brake Interlock Requested
- Retarder Applied
- DEF Level Low
- DEF Level Critical
- DEF Level Derate
- DEF Level Empty
- DEF Speed Limit
- DEF Fluid Type
  - \* Stop Engine
- \* Engine Warning
  - \* Hi Trans Temp
- \* Low Oil Pressure
- \* High Engine Temp
- \* Low Coolant Level
  - \* Turn Signal On
  - \* Voltage Error
  - \* Water In Fuel
- \* Lift Not Stowed
- \* Regen Needed
- \* High Exhaust Temp
  - \* Alternator Fail
  - \* Headlights On
  - \* ATC Active
  - \* Range Inhibit
- \* Transmission Oil Life
  - \* Trans Oil Filter
- \* Transmission Oil Service

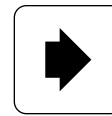
*\* (Messages Shown with Icon)*



**Left Turn.** Flashes with left turn signal.



**High Beam.** Headlights are in high beam.



**Right Turn.** Flashes with right turn signal.



**ABS.** Indicates fault in the anti-lock brakes system. Complete route then service as soon as possible.



**Cruise.** Cruise control has been activated.



**Check Trans.** The transmission needs service.



**Brake Pressure.** Indicates brake failure. Stop vehicle and call for assistance.



**Brake Air Front.** Indicates front brake air pressure outside of normal operating range.



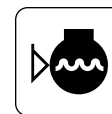
**Trans Temp.** The transmission temperature is beyond normal operating range.



**Service Brakes.** Indicates service brakes have been applied.



**Brake Air Rear.** Indicates rear brake air pressure outside of normal operating range.



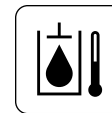
**Coolant Level.** Indicates low coolant level.



**Park.** Indicates parking brake is applied.



**Low Fuel.** Indicates fuel level at 12 percent of maximum capacity.



**Hydraulic Fluid Temperature.** The hydraulic fluid temperature is beyond normal operating range.



**Maintenance Indicator Lamp.** Indicates maintenance required.



**Low Fuel Pressure.** Indicates low fuel pressure on compressed natural gas vehicles.



**Wait to Start.** Indicates engine preheating. Wait until indicator goes off before starting engine.



**Stop Engine.** The engine ECU has detected a problem which can lead to engine damage. Stop the engine and call for assistance.



**High Coolant Temp.** Indicates coolant temperature out of normal operating range.



**HEST.** High Exhaust System Temperature. Indicates elevated exhaust temperature. See *Exhaust System* under *Routine Operation*.



**Engine Warn.** The engine needs service.



**Seat Belt.** Indicates driver seatbelt not engaged.



**Oil Pressure.** Indicates low oil pressure.



**Diesel Exhaust Fluid.** DEF low level warning light. See *SCR System in Blue Bird Buses* under *Routine Operation*.

**Set the Clock**

To set the clock, be sure the park brake is set then press and hold the bottom button on the face of the instrument cluster for approximately 5 seconds. This will display the Settings and Diagnostics screen. Press either the top or bottom button to move to the highlighted bar to menu item 6 – Set Clock. Press both buttons simultaneously to select “hours” then use the upper and lower buttons to increase or decrease the setting. Press both buttons simultaneously to set the hours. Repeat the process for the “minutes” setting. A lapse of ten seconds or more of inactivity will return the display to the previous screen automatically.

**Dimmer Adjustment**

Dimming or brightening the backlight in the instrument cluster can be accomplished two ways. The first is when the bus is stationary with park brake set. The second is in Drive Mode when the park brake is released and the headlight switch is in the “ON” position. In either case the new setting will be stored in memory.

When the bus is stationary and the park brake is set, dimming the instrument cluster is achieved through a menu in the drivers display in the cluster. Set the park brake then press and hold the bottom button on the face of the instrument cluster for approximately 5 seconds. This will display the Settings and Diagnostics screen. Press either the top or bottom button to move the highlighted bar to menu item 4 – Dimmer. Press both buttons simultaneously to select “dimmer” then use the upper and lower buttons to increase or decrease the backlight intensity. Press both buttons simultaneously to set the dimmer and exit the menu. A lapse of ten seconds or more of inactivity will return the display to the previous screen automatically.

If the bus is in drive mode by having the park brake released, the dimmer can be adjusted by pressing either the top or bottom buttons to brighten or dim the instrument cluster. The headlight switch must be in the “ON” position for this function to operate.



*Message Display Control Panel*



### **Contrast Adjustment**

Set the park brake then press and hold the bottom button on the face of the instrument cluster for approximately 5 seconds. This will display the Settings and Diagnostics screen. Press either the top or bottom button to move the highlighted bar to menu item 3 – Contrast. Press both buttons simultaneously to select “contrast” then use the upper and lower buttons to increase or decrease the contrast. Press both buttons simultaneously to set. A lapse of ten seconds or more of inactivity while in this mode will return the display to the previous screen automatically.

### **Backlight Color Adjustment**

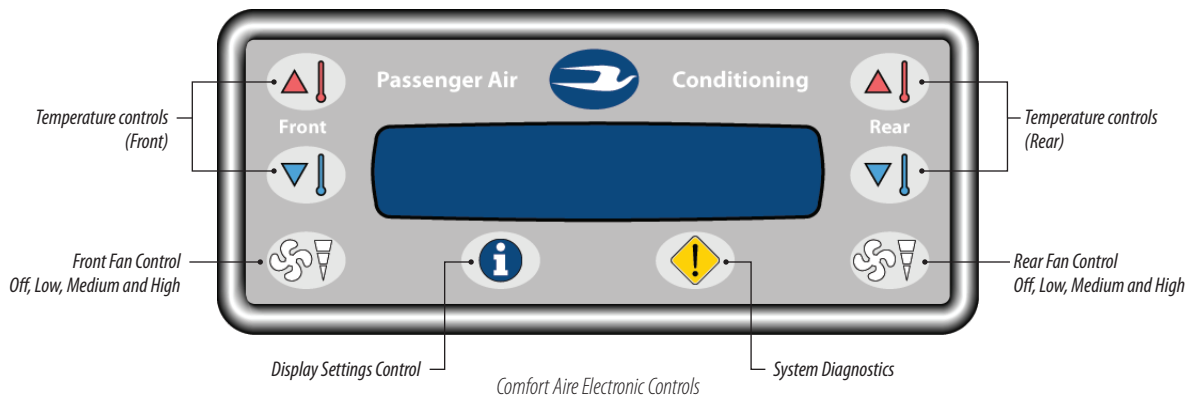
The backlight color can be adjusted to illuminate in any of five different colors (Red, Green, Blue, Lt Blue, White). To change the backlight color set the park brake then press and hold the bottom button on the face of the instrument cluster for approximately 5 seconds. This will display the Settings and Diagnostics screen. Press either the top or bottom button to move the highlighted bar to menu item 5 – BL Color. Press both buttons simultaneously to select “BL Color” then use the upper or lower buttons to toggle between a list of preset colors. Press both buttons simultaneously to set the color and exit the menu. A lapse of ten seconds or more of inactivity while in this mode will return the display to the previous screen automatically.

**Heat and Air Controls**

The optional heat and air control panels are defined below. For further explanation of heater switches and controls, see Upper Left Switch Panel and Heater Control Panel, under Left Console Switch Panel found in this manual. For additional information on optional air conditioning, see your Comfort Aire publication supplied with your air conditioned bus.



*Comfort Aire Manual Controls*



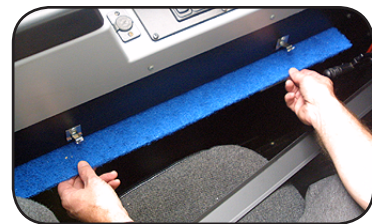
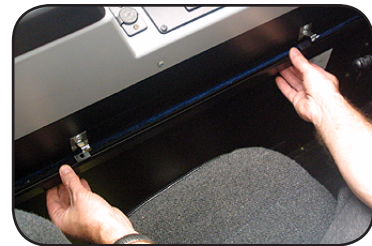
*Comfort Aire Electronic Controls*

### Heater Valve Lever

A red lever on the front heater housing to the left of the Driver's foot area controls the rate of heated fluid flowing through the heater unit, providing a "temperature control" for the heater.

### Heater Filter Panel

The filters in the heater system must be maintained and changed on a regular basis, to maintain the airflow across the heater cores. The main heater filter is located behind a small panel at the driver's left. This panel is held in place by luggage type over the center clasps. To remove the filter, pull upward and outward. To replace the filter, press it firmly into position and replace the cover panel. The cover panel must be in place to maintain the airflow through the filter.



*Heater Filter Access*

## Steering Column

The steering column of the Vision is designed for better access to the driver's area with easier adjustment and a greater range of movement.

### Steering Wheel Position

A lever at the lower side of the column sets the tilt and telescopic adjustment of the steering wheel. This is a two position lever. Pull it out to the first position to adjust tilt. Pull to the second position to adjust steering wheel height. Releasing the lever clamps the column securely at the position selected..

### Left Switch Stalk

The left stalk controls turn signals, high / low beam, intermittent windshield wipers and washers, and also contains the hazard flasher control. Turn signals operate in the normal way, push lever forward for right turn and rearward for left turn. Pull stalk up for high beam and/or low beam. Turn knob on end of stalk for intermittent windshield wiper control. Press knob on end for wash cycle. Hazard flasher is initiated by pulling the chrome lever at the base of the stalk. Cancel the flasher by using a turn signal or pressing the hazard lever in.

### Right Switch Stalk

The right stalk contains the cruise controls.

### Cruise Control

The Cruise Control is provided to improve fuel economy and lessen driver fatigue during long periods of uniform speed travel. To operate the Cruise Control:

1. Attain the desired speed in the normal manner, with the foot-operated accelerator.
2. Press the "On-Off" slider switch toward the left (On) to activate the system at the current speed.
3. Press the button on the end of the stalk to incrementally adjust speed. To make larger speed adjustments, release the cruise control by tapping the brake, and then use the throttle to reach the desired speed. Then again press the slider toward the left.
4. To momentarily deactivate the cruise feature, press the brake pedal. This will disengage the cruise control and begin to apply brakes.
5. When you wish to again use the cruise control feature, press the slider switch toward the left to Resume the previously set cruise speed.

If the ignition is switched off, or if the Cruise Control slider switch is pressed toward the right (Off), the cruise control is deactivated.

Intermittent Windshield Wipe / Wash  
Turn for Wipe. Press for wash



Left Switch Stalk

Turn Signals  
High / Low Beam  
Wipe / Wash

Hazard Flasher Control



Right Switch Stalk

Cruise Control Set  
Resume, Accelerate, On / Off



Steering Column Positioning



Tilt / Telescopic Release

### **Parking Brake, Units With Air Brakes**

On Blue Bird Vision buses equipped with air brakes, the rear wheel air chambers also enclose powerful coil springs. These springs automatically apply the rear brakes whenever air pressure is absent. These *spring brakes* also serve as the Driver-controlled parking brake.

The parking brake knob is an air valve which, when pulled outward, releases air pressure from the rear wheel chambers. This allows the springs to apply the rear brakes.

Pushing the parking brake knob inward allows air brake system air pressure to retract (cage) the coil springs. If air pressure is insufficient for safe normal air brakes operation, the air pressure is also insufficient to disengage the spring brakes. Thus, it is not possible to release the parking brake until sufficient air pressure has built up in the system.



## Parking Brake, Units With Hydraulic Brakes

Blue Bird Vision buses equipped with hydraulic brakes are also equipped with a drum/shoe-type brake mechanism mounted to the driveline at the rear of the transmission. When applied, the park brake prevents the driveshaft from turning.

A control cable leads from the parking brake mechanism to a foot pedal in the Driver's area immediately left of the brake pedal, just beside the steering column.

To apply the parking brake, press down firmly on the foot pedal. When properly adjusted, the lever is designed to require a minimum of 130 pounds of pressure to apply the parking brake. Always apply the brake fully, pressing it down to achieve a forth "click" of its detent setting.

To release the parking brake, apply the service brake with the left foot to prevent movement when the parking brake is released. Then grasp the parking brake release lever with the left hand and pull until the Park Brake is fully released.

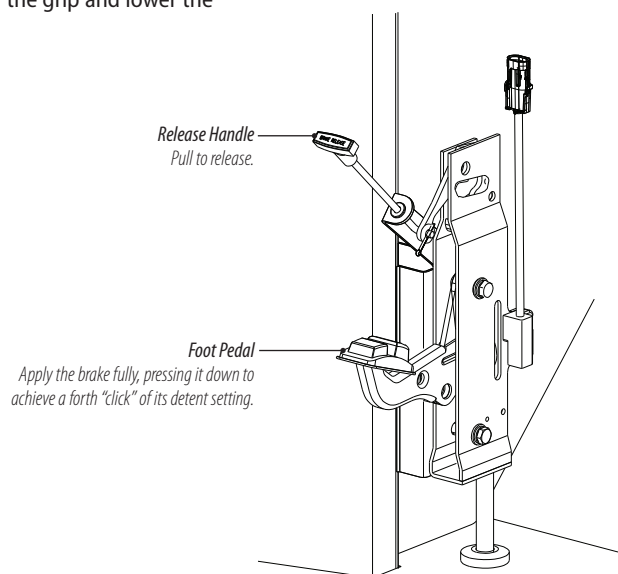
**CAUTION** *Always release the parking brake fully. Leaving it in a partially released position can allow the shoes of the parking brake mechanism to drag while the bus is operated, resulting in overheating and accelerated wear of the parking brake shoes and drum.*

Optionally, your bus may be equipped with a right side parking brake lever. This option places the hand operated parking brake to the right of the driver's seat mounted on the floor.

To apply the parking brake, grasp the grip handle of the lever and pull firmly upward. When properly adjusted, a detent resistance is felt at the end of the lever's travel. The lever is designed to require 90-100 pounds of pressure to fully apply the parking brake. Always apply the brake fully, pulling it upward to the full extent of its travel.

To release the parking brake, apply the service brake with the left foot to prevent movement when the parking brake is released. Then grasp the parking brake lever with the left hand, press the thumb release button on top of the grip and lower the lever *fully* all the way against its lower stop.

The parking brake lever's grip incorporates a threaded adjustment mechanism to allow a service technician to make fine adjustments to the cable tension. The adjustment is made by loosening a set screw in the grip handle and then rotating the grip on its shaft. This adjustment is designed to be performed in the service facility, not during normal operation of the bus. During normal operation, the grip should not be free to rotate. If the Driver ever finds the grip free to rotate when applying or releasing the lever, it should be taken as indication that the setscrew is not properly tightened. This condition should be reported to service personnel, and proper adjustment and tightening should be performed.



## Driver's Seat, Standard

The standard Driver's seat in the Blue Bird Vision is mounted on a spring-loaded pedestal. Several manual adjustments are provided for maximum control, safety and comfort:

**Height Control.** The telescoping cylindrical tubes of the seat base enclose a coil spring which pushes the seat height upward when the seat is not loaded. A hand operated lever on the right side of the seat mount latches the seat into one of several height increments, and tightening the adjacent hand-operated knob locks the seat securely at the current height. To change the height, crouch beside the seat and loosen (counterclockwise) the knob on the seat base. This allows the spring in the seat base to raise the seat when the lever is raised. Raise the lever and hold it while pushing the seat down to the desired height. Release the lever. Raise / lower the seat to ensure it snaps into the nearest of the preset notches. Then tighten the locking knob securely.

**Back Tilt Control.** Turn the large knob located at the bottom of the left side of the seat back, where the seat back attaches to the seat bottom.

**Lumbar Support.** The knob located at mid height on the right side of the seat back tightens / loosens a lumbar support built internally into the seat back.

**Seat Bottom Fore / Aft Slide.** A lever located under the front edge of the seat bottom releases the seat track allowing the seat to be adjusted fore or aft. While seated, pull the lever toward the left. Slide the seat fore or aft to the desired position and release the lever. Slide the seat slightly to ensure the lever latches into one of its locking notches.

**Seat Bottom length.** Under the front edge of the seat bottom, directly above the slide release lever is a handle which allows the seat bottom to be pivoted forward, effectively "lengthening" the seat bottom for Drivers with longer legs. To move the seat base to the forward position, stand beside the seat. Grasp the front handle with your right hand, and the side of the seat bottom with your left. Lift the seat slightly and pivot it forward. Then press it down firmly into position.

Pivoting the seat bottom forward in this way also clears the seat bottom from the seat back, allowing the bottom to be hinged forward to gain service access to the seat pedestal mechanism.

### Driver Lap & Shoulder Belt

To use the seat belt/shoulder harness, pull out an adequate amount of webbing and engage the buckle. The retractors will pull the harness snugly into place. You may adjust the height of the shoulder harness by positioning the bracket to the most comfortable level. The buckle can be released by pressing on the button at the center.

**WARNING** The driver's seat belt should be worn any time the bus is moving.

*The upper mount of the shoulder harness is adjustable for proper position across the Driver's chest. Press down on the release button and slide the strap mount to the desired height. Release the button and ensure that the slide latches into the nearest preset notch.*





Back Tilt Adjustment



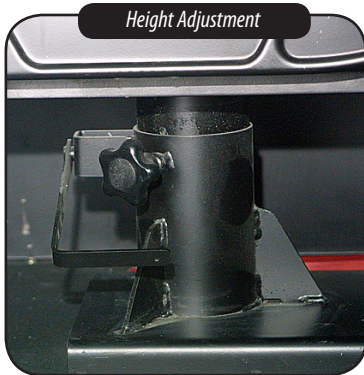
Lumbar Adjustment



Standard Driver Seat



Fore / Aft Slide Release



Height Adjustment



Rear Position



Front Position



Flipped Open

## Driver's Seat, Air

The air ride Driver's seat in the Blue Bird VISION is mounted on an air-powered scissor mechanism which houses its own electric air compressor. Several manual adjustments are provided for maximum control, safety and comfort:

**Height Control.** The front-most (red) switch located on the side of the seat bottom adjusts seat height. Press the top or bottom side of the rocker switch to raise / lower the seat.

**Lumbar Support.** The rear-most (white) switch located on the side of the seat bottom adjusts the lumbar support. Press the top or bottom side of the rocker switch to increase / decrease lumbar support.

**Back Tilt Control.** To adjust the overall tilt of the seat back, turn the large knob located at the bottom of the left side of the seat back, where the seat back attaches to the seat bottom.

**Seat Bottom Fore / Aft Slide.** A lever located under the front edge of the seat bottom releases the seat track allowing the seat to be manually adjusted fore or aft. While seated, pull the lever toward the left. Slide the seat fore or aft to the desired position and release the lever. Slide the seat slightly to ensure the lever latches into one of its locking notches.

**Seat Bottom length.** Under the front edge of the seat bottom, directly above the slide release lever is a handle which allows the seat bottom to be pivoted forward, effectively "lengthening" the seat bottom for Drivers with longer legs. To move the seat base to the forward position, stand beside the seat. Grasp the front handle with your right hand, and the side of the seat bottom with your left. Lift the seat slightly and pivot it forward. Then press it down firmly into position.

Pivoting the seat bottom forward in this way also clears the seat bottom from the seat back, allowing the bottom to be hinged forward to gain service access to the seat pedestal mechanism.

### Driver Lap & Shoulder Belt

To use the seat belt/shoulder harness, pull out an adequate amount of webbing and engage the buckle. The retractors will pull the harness snugly into place. You may adjust the height of the shoulder harness by positioning the bracket to the most comfortable level. The buckle can be released by pressing on the button at the center.

**WARNING** The driver's seat belt should be worn any time the bus is moving.

*The upper mount of the shoulder harness is adjustable for proper position across the Driver's chest. Press down on the release button and slide the strap mount to the desired height. Release the button and ensure that the slide latches into the nearest preset notch.*





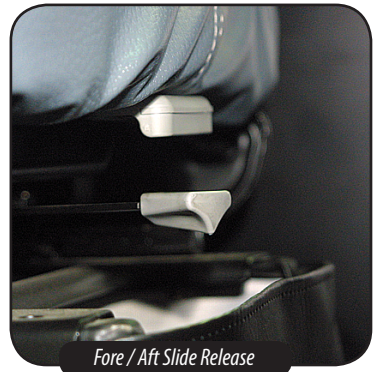
*Back Tilt Adjustment*



*Lumbar & Height Adjustments*



*Air Ride Driver Seat*



*Fore / Aft Slide Release*

## Interior Compartments

Several interior compartments provide convenient access to service-related components. These are not storage compartments, and should only be opened for service purposes. Of these compartments, the one most applicable to the Driver is the PDU, which contains the main fuse panel.

**CAUTION** *The PDU, entrance door header, and wiring channels described in this section are not storage compartments. Do not place loose items in these compartments.*

**Power Distribution Unit (PDU).** The large black cover below the center of the dash is the main electrical panel for the Vision, and is an area of primary importance to service technicians troubleshooting electrical and device communications systems. The PDU is also referred to as Zone A of the Multiplex electrical system because it contains the Main Bus Controller module. The PDU also contains the J-1939 data link interface plug, a diagnostic interface connection used by service technicians.

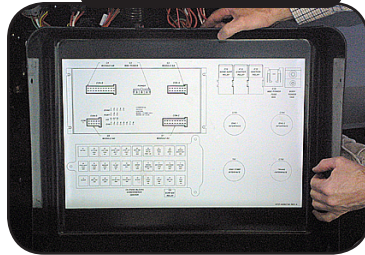
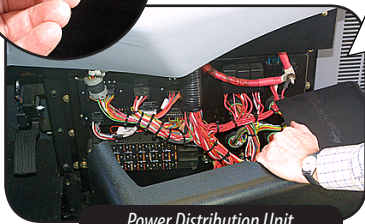
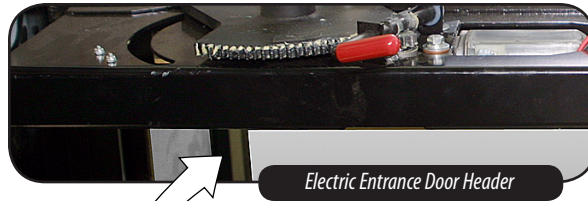
The PDU contains most of the fuses used in the Vision. A chart on the inside of the cover identifies the individual fuses. The PDU cover is easily removable without tools, secured by two thumbscrews, one on each side of the cover near the top.

**Entrance Door Header.** A removable panel above the entrance door provides service access to the door opening / closing mechanism when equipped with optional electric Bode entrance door. This compartment is a service access and should not be used for storage.

**Wiring Channels.** The molded housings which run the length of the bus above the passenger area windows, are wiring channels which contain the harnesses for the body. A service technician can remove the screws which retain the channels to gain access to the harnesses.

**Left Console Driver Storage Box.** A hinged lid just rearward of the left console switch panels provides access to a convenient storage compartment for Driver's items. The tray of this compartment is removable for service access to electric components underneath.

**Right Glove Box.** A large capacity glove box is molded into the right side of the dash housing, near the entrance door.



## Passenger Seats

Blue Bird passenger seats are built to comply with Federal Motor Vehicle Safety Standards (FMVSS).

The VISION's passenger seats are through-bolted to the floor of the passenger compartment.

**WARNING** *School bus seat spacing is strictly regulated. The seat dimensions and spacing are engineered to provide "compartmentalization" of the passengers according to stringent safety requirements and testing. Do not alter the passenger seat spacing or configuration.*



### Passenger Area Heaters

Some VISION buses are equipped with optional passenger area heaters. The exact placement and BTU rating of these heaters varies depending upon specific options and seating configurations. Two types of passenger area heaters may be installed on VISION buses:

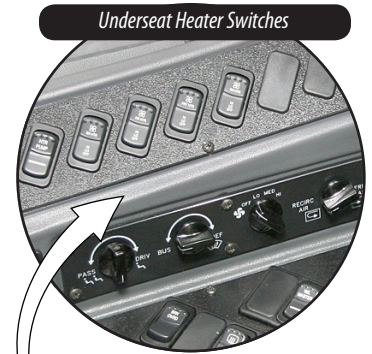
**Convection Perimeter Heaters.** This type of heater system is fully enclosed within the main floor-to-wall body frame members which run the length of the body on each side. Engine coolant is circulated through finned heating tubes running inside the C-channels. Heated air circulation relies upon natural convection, rather than forced air.

**Underseat Heaters.** This type of heater system uses several individual heater units mounted to the underside of strategically located seats in the passenger area. Engine heated water reaches these heating assemblies via tubes running in the body at the floor. Each underseat heater unit has its own electrically driven circulation fan. The fans are controlled by 3 position (High / Off / Low) rocker switches mounted in the upper panel of the Driver's side console.

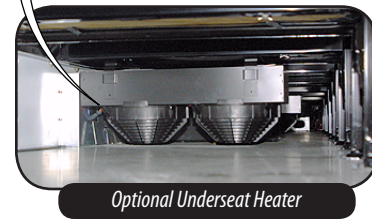
**Heater Cut-off Valves.** The VISION's heaters operate by circulating engine coolant which is heated by the normal operation of the engine. Red-painted handled valves are provided in the engine compartment to isolate coolant flow to the engine, thereby removing all internal heaters from the circuit. Some bus operators choose to turn these valves off during summer months.



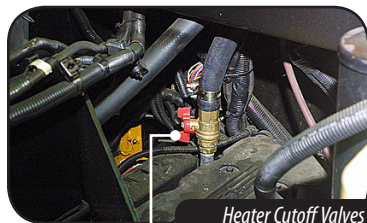
Optional Convection Heaters



Underseat Heater Switches



Optional Underseat Heater



Heater Cutoff Valves

Top of engine toward firewall

Right side of engine near frame rail



## Passenger Windows

Opening split sash windows in the Blue Bird VISION, operate similarly to other windows familiar to school bus Drivers. To lower a window, place an index finger in both of the spring loaded sliding latches and slide them inward away from the frame. Hold them inward as you slide the window sash downward.

There are four intermediate opening positions between fully closed and fully opened. When the sash is opened to the desired height, release the latch slides and then push the top of the sash frame upward or downward to make sure the latches on both sides engage one of the position notches. When the window is in one of the intermediate positions, the sash can be pushed upward to close without first retracting the latches. However, the notches of the fully-opened positions are designed to latch more securely. To close a window that is fully open, slide the latches inward and then slide the sash.

The windows are designed for maintenance free operation. However, a light silicone spray lube may be applied to the slides and frames as needed to help ensure smooth operation.

Damaged latches can be replaced without removal of the window or sash. Repair technicians should refer to the Vision Service Manual for the procedure.



*Push inward on both slide latches to lower window.*



*Each window has five open positions. When in any of the top four positions, the window sash can be closed (raised) without retracting the latches.*



*When the window is in its fully open (fully lowered) position, the latches must be retracted to close the window.*

## Emergency Exits

All emergency exits on this Blue Bird bus meet FMVSS specifications.

In true emergency situations, every second counts. It is therefore essential that every school bus Driver be completely familiar with the location and operation of all emergency exits. Read the following descriptions thoroughly, but also practice operating each of the exits to have not only a mental memorization, but also a tactile familiarity with the amount of force required to operate the opening, the amount of space available around the opening, etc. Checking for proper operation of each emergency exit must be part of the daily pre-trip inspection regimen.

Emergency exits are clearly identified with the words "EMERGENCY EXIT." Basic operating instructions are also printed on labels affixed on or near each exit.

The bus is equipped with an audible alarm that sounds when an emergency exit is unlatched. On the VISION, the DID screen also identifies the open exit(s).

**WARNING** All "Emergency Exits" should be inspected and tested daily. The labels and decals should be considered part of this inspection and should be maintained in a clearly legible condition.

### Rear Emergency Door

The rear emergency door is opened by lifting the long horizontal handle all the way upward and pushing the door outward. The door is equipped with a hold-open telescoping strut at the top of the opening. When the door is fully opened, a pawl in this strut rotates to prevent the door from falling shut. To close the door, push it outward to the end of the strut's travel. This causes the pawl to rotate again, allowing the door to close. Close the door smoothly, push it against the frame firmly to compress its seal, and close the handle latch fully.

### Vandal Lock

The rear emergency door may be equipped with an optional vandal lock. This is a sliding-bolt type latch or optional key lock with a sensor switch which detects when the vandal lock is closed. If the vandal lock is closed, the engine cannot be started, and an audible alert sounds. The vandal lock must be open during normal operation.

Door hold-open strut



**Emergency Pushout Windows**

Four of the windows in the passenger area are emergency pushout windows, two located in the front half of the bus and two in the rear half. There are two variations, the installation of which depend upon state specifications: vertically hinging and horizontally hinging. Vertical hinging pushout windows are hinged at the front side and swing outward like a gate. Horizontally hinged pushout windows are hinged at the top and push outward and upward.

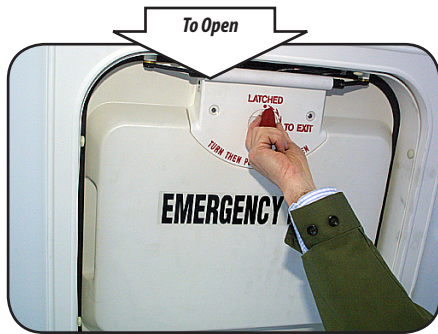
To open the pushout window, rotate the red handle parallel to the glass and away from the window frame, as indicated by the nearby decal. Then push the window outward.

The emergency windows should be operated daily as part of the Driver's pre-trip inspection. A light spray lubricant may be used on the window latches and hinges to keep them in smooth operating condition.

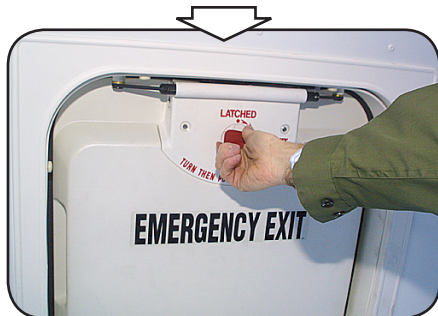


### Emergency Roof Hatch

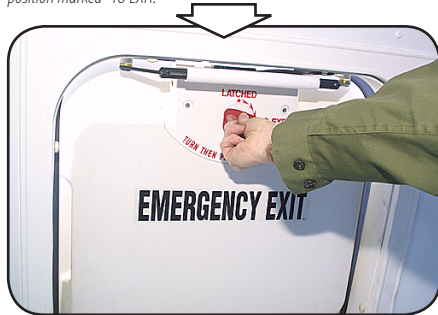
Depending upon options and/or regulation, the Vision may be equipped with one or two roof-mounted emergency escape hatches.



Grasp the red knob.



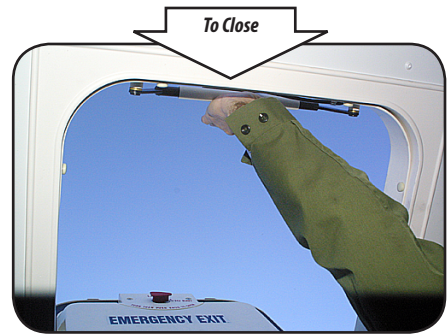
Rotate the red knob from the position marked "LATCHED" to the position marked "TO EXIT."



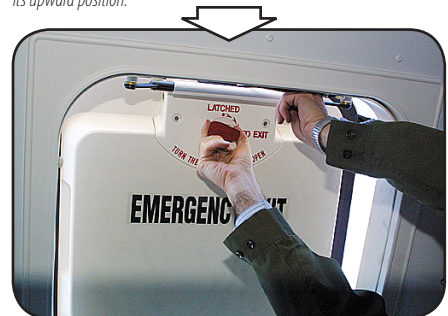
Push sharply upward on the red knob.



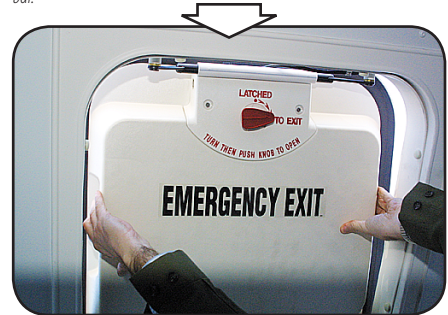
Push the hatch all the way open.



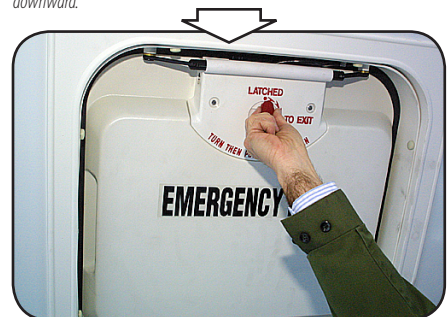
Push the white bar upward with the heel of your hand, snapping it in its upward position.



Pull the hatch downward, engaging its opening side with the white bar.



Grasp the two handholds on the sides of the hatch and pull firmly downward.



Turn the red knob to the position labeled "LATCHED."

**Entrance Door Emergency Release**

Depending upon purchase options, the entrance door may be manually-operated, electrically operated, or air operated.

Manually operated doors employ a door control rod connected to a handle mounted on the dash panel near the Driver. An over-center cam latching mechanism is released by the driver's thumb or palm when the handle is opened, and snaps back into latched position when closed.

Electric or air-operated doors are equipped with emergency release levers so that passengers can open the door even if the power is off or disabled.

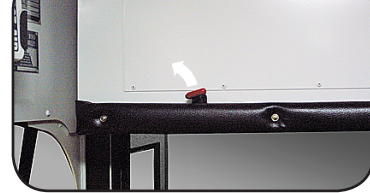
The optional electrically-controlled entrance door is driven by a motor and gear mechanism in the door header panel. A lever protruding from the header panel serves to disengage the drive gear mechanism so that the door can be manually pushed open or shut. This serves a dual purpose: To allow the driver to close the door after parking and leaving the vehicle, and to serve as a quick door release in the case of emergency.

To release the door, push the lever upward to rotate it 90° counterclockwise. The door can then be pushed open or closed manually.

To re-engage the door drive mechanism, rotate the lever 90° clockwise.

Air-operated doors use system air pressure to open the door. Air-operated doors are also equipped with an emergency release lever mounted above the door. In the case of air pressure failure, the door closure can be released by flipping the lever toward the Open direction indicated.

*Electrically Operated Door Emergency Release*



*Push upward to release the door mechanism so that the door can be manually opened or closed.*



*Rotate the lever downward to engage the door mechanism for normal control of the door by the switch panel.*



*Air Operated Door Emergency Release*



## Exterior Compartments

### Engine Compartment

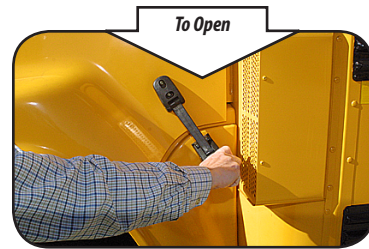
The engine compartment hood of the Vision is mounted on a torsion spring hinge mechanism just above the front bumper, and is retained in its closed position by two spring latches, one on each side of the hood near the body's front cowl. The system is designed for very easy unassisted one-person opening / closing, and unobstructed access to engine compartment regular service components.

To open the engine hood:

1. Unlatch the right side hood latch. Lift the latch handle and free the elastic latch from the notches of the cowl-mounted bracket. Repeat this for the latch on the left side of the bus.
2. At the front of the bus, grasp the handhold above the center of the grille. Pull lightly backward. The torsion hinge is balanced in such a way as to require very little effort to lift the hood. As the hood raises, control it with the free hand, especially in windy conditions. Open the hood fully until it stops slightly beyond vertical. A spring-cushioned cable on the engine compartment side stops the hood at its open position. A latch strut on the right side of the hood trips to prevent the hood from accidentally falling shut after being opened fully.

To close the engine hood:

1. Standing just forward of the right front tire, grasp the engine hood overhead with the right hand. With the left hand, rotate the release cam of the hold-open strut. Slowly lower the hood. The balance of the torsion spring hinge allows the hood to be lowered in a slow and controlled fashion. There is no need to suddenly drop the hood to engage a catch. Slowly lower the hood onto its rear supports.
2. Grasp the handle of the hood hold-down latch and hook the end of the elastic strap into the notches of the cowl-mounted bracket. Then close the latch handle fully. Similarly secure the latch on the left side of the vehicle.



*Release the hood hold-down latches.*



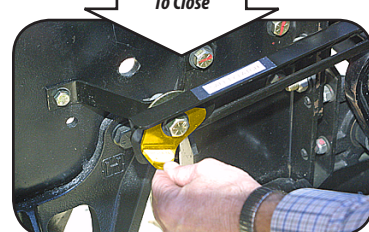
*Pull forward lightly on the front handhold.*



*A spring-loaded cable limits the opening range and helps support the hood in the open position.*



*The hold-open strut automatically trips to prevent accidental closure.*



*Rotate the hold-open cam to release the strut.*



*Gently lower the hood into position and re-latch the hold-down latches.*

**Battery Compartment**

A hinged door located on the left side of the Vision directly below the Driver's window provides access to the vehicle's batteries. The batteries are mounted on a metal tray which is retained by a pin. To access the batteries, open the compartment door, remove the retaining pin, and slide the tray outward.



*The Vision's battery compartment.*

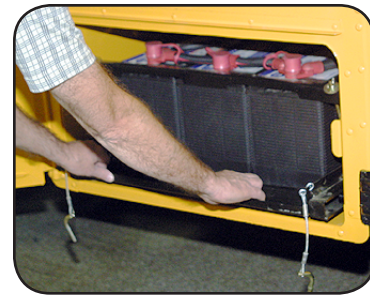
**Fuel Filler**

The fuel tank of the Vision is located between the chassis frame rails in the rear overhang portion of the vehicle. The fuel filler door is located on the right side of the vehicle body, rearward of the rear axle. Read and abide by the warnings on the decal on the inside of the filler door.

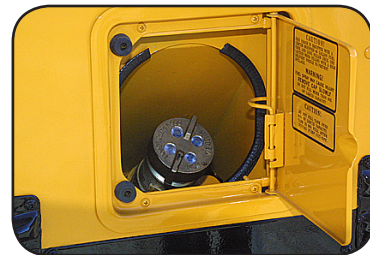
**WARNING** Remove the fuel cap slowly. Observe fueling instructions that are printed on the inside of the fuel access door to avoid fire and/or explosion that could result in serious bodily harm or death. Never fill to more than 95% liquid capacity. 95% capacity is reached at the initial pump cut-off.



*Remove the retaining pin...*



*... and slide the battery tray outward.*



*Fuel filler door*

## Keeping Your Bus Looking New

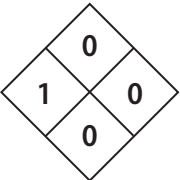
Before cleaning and waxing your bus a few basic rules should be followed:

- Start your project with the bus out of direct sunlight.
- Make sure the paint is not warm to the touch before applying any cleaning product or wax.
- Spray your bus with ample amounts of water before washing. Use the water to spray off dirt and other contaminants that will scratch the surface.
- Wash and rinse in sections so the wash soap doesn't dry before being rinsed off.
- Drying your bus after washing is necessary to prevent water spots – mineral deposits that etch the outline of a drop of water into your vehicle's paint.
- Read the manufacturer's directions on all products used prior to use.

**Wash.** In order to preserve your vehicle's finish, Blue Bird requires protection of the finish by washing a minimum once every 3 months.

- Wash the vehicle in lukewarm or cold water.
- Use a lamb's-wool or paint-safe microfiber washing mitt to prevent scratching the surface.
- Do not use hot water or wash in the direct rays of the sun.
- Do not use strong soap or chemical detergents.

Only cleaners with an HMIS rating of 1,0,0,0 or less should be used to clean the buses. This HMIS rating is available on all product MSDS.

<b>Hazard Rating (NFPA/HMIS)</b> Health = 1    Reactivity = 0 Fire = 0      Special = 0		<b>Rating Scale</b> 0 = Minimum    1 = Slight 2 = Moderate    3 = Serious 4 = Severe
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To wash units, Blue Bird Corporation recommends Bird Bath™ Bus Wash & Wax Concentrate, available from authorized Blue Bird Dealers. Bus Wash & Wax is a concentrated vehicle wash (rated triple-zero) that is recommended to be mixed at up to a 20/1 ratio for new and reconditioned buses.

**CAUTION** *Pressure washing may cause damage to finish. Pre-test pressure washer on a similar surface before applying pressure and chemicals to your vehicle. Pressure washers that re-circulate should filter the water to remove abrasive grit.*

Magnesium chloride, calcium chloride and other salts, ice melting agents, road oil and tar, tree sap, bird droppings, chemicals from industrial chimneys, and other foreign matter may damage vehicle finishes if allowed to remain on painted surfaces. Prompt washing may not completely remove all of these deposits. Additional cleaners may be needed. When using chemical cleaners developed for this purpose, be certain they are safe for use on painted surfaces.

### Wax

Wax your bus a minimum of once a year with a nonabrasive wax. This is required to remove accumulated residue and eliminate any weathered appearance. It is essential that units are not waxed in direct sunlight.

Products labeled cleaner wax or polish should not be used as they are somewhat abrasive and can actually remove some paint from the surface of the vehicle. Care should be taken when choosing a wax to make sure that it does not contain abrasive materials i.e.; calcium carbonate, pumice, plastic beads, etc.

- Before waxing, thoroughly wash and dry the bus.
- Never wash or wax a bus in direct sunlight or if the paint is hot to the touch. The sun can soften the paint and make it more susceptible to scratching.
- Use a lamb's-wool mitt for washing and soft cotton rags or microfiber towels for waxing. Do not use rags for waxing; they can trap dirt and scratch the finish. Synthetic fabrics and brushes can also scratch the finish.
- Wash and wax in small sections. This saves time and if the wax stays on too long, it can be difficult to remove.

### Bus Downtime Treatment

During periods of bus downtime, Blue Bird Corporation recommends the application of Bird Bath™ Bus Guard Protectant available from Blue Bird authorized dealers to protect exterior surfaces. Bus Guard is a triple-zero product that, when properly applied, protects against harmful UV rays and other damaging environmental conditions. For sufficient protection, see product instructions for the proper application requirement.

*Owners should refer to the limited warranty statement supplied with the vehicle regarding their responsibilities for care and maintenance of the vehicle during the warranty period.*

#### Approved Waxes

- Mequiar's Gold Class Liquid Wax
- Mequiar's NXT Generation® Tech Wax® 2.0 Paste or Liquid
- Black Magic Wet Shine Liquid Wax
- Turtle Wax Carnauba Car Wax T-6
- Turtle Wax 1 Step Wax & Dry T-9
- Nu Finish NFP-80



**Floor Covering.** Regular cleaning and care will prolong the life of floor covering and improve the general appearance. Floor coverings should be swept daily and mopped weekly with a mild detergent and water. Do not use floor sweeping compounds. Be sure to remove dirt, pencils, paper, and any other debris that may cause the emergency door to seal improperly. Do not use harsh detergents or excessive amounts of water. Do not use a water hose to wash out the bus. Deterioration and damage to the wood floor could occur.

**CAUTION** *Petroleum products, such as oil and grease, quickly deteriorate the floor covering. These types of products should be removed from the surface as soon as possible. Continuous care must be exercised in the stepwell area, where foreign objects can create a safety hazard. The accumulation of dirt and foreign material in the stepwell area creates a hazard for passengers and could prevent the doors from operating properly. Ensure that screws for floor trims and aisle trims are seated tightly.*

**Hinges, Window Slides, Latches.** Light household or automotive spray lubricants such as WD-40 or silicone based lubricants may be applied as needed. Household glass cleaners may be applied to window glass.

**Seats and Upholstery.** Mild soap and a damp rag may be used for routine cleaning. Household or automotive cleaners formulated for automotive vinyls may be used to clean stains from the passenger seat cushions. Avoid cleaners or coatings which leave the surfaces slippery.

**Product Identification Information**

**Federal Vehicle Certification Plate**

This decal certifies that the vehicle complies with all applicable Federal Motor Vehicle Safety Standards (FMVSS) in effect on the date of manufacture. Do not remove, deface or cover this decal.

MANUFACTURED BY	
<b>BLUE BIRD BODY COMPANY</b>	
DATE OF MFR. 01/04	DATE 03/09
INC. VEH. MFG. BY	DATE 03/09
SUITABLE TIRE - RIM CHOICE	
GVWR : 13503 KG (29760 LB )	
GAWR : FRONT 4537 KG (10000 LB ) WITH	10R22.5 TIRES
22.5X7.50 RIMS. AT 758 KPA (110 PSI) COLD SINGLE	
GAWR : REAR 8966 KG (19760 LB ) WITH	10R22.5 TIRES
22.5X7.50 RIMS. AT 723 KPA (105 PSI) COLD DUAL	
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT IN 03/02	
V.I.N.	TYPE CLASSIFICATION SCHOOL BUS

**Axle Record and Chassis Service Number Plate**

This plate is located inside the bus above the windshield toward the right side. It contains the serial numbers of the bus chassis and several major chassis components. These numbers are important references when ordering parts or seeking bus-specific service information from your Blue Bird distributor.

**Body Serial Number and Service Number Plate**

Also located above the windshield on the front upper panel. This plate contains the Body Number and several specifications pertaining to the body configuration. The Body Number is a very important reference whenever ordering parts or seeking service information.

*Axle Record & Chassis Service Plate*




*Body Serial & Service Number Plate*



**Data Plates Reference**

The illustrations below replicate the data fields on the Chassis and Body data plates. To create a convenient reference, fill in the data from the plates of the bus in which this manual is stored. This information is essential when ordering parts or obtaining service information.

FURNISH INFORMATION BELOW WHEN ORDERING AXLE PARTS			
CHASSIS SERIAL	<input type="text"/>	ENGINE SERIAL	<input type="text"/>
TRANSMISSION	<input type="text"/>	CATALYST NO. & DATE	<input type="text"/>
FRONT AXLE	<input type="text"/>	BRAKE DRUM	<input type="text"/>
REAR AXLE	<input type="text"/>	BRAKE DRUM	<input type="text"/>
REAR AXLE RATIO	<input type="text"/>	REAR AXLE DIFFERENTIAL	<input type="text"/>
CHASSIS SERVICE NO.	<input type="text"/>		

	<h1>BLUE BIRD</h1> <h1>FORT VALLEY</h1>
	<p>FORT VALLEY, GEORGIA</p> <p>BODY NO. <input type="text"/></p> <p>MODEL YEAR <input type="text"/></p> <p>MFG. BODY DATE <input type="text"/></p> <p>STATE / PROVINCE <input type="text"/></p> <p>EQUIPPED CAPACITY <input type="text"/></p> <p>SPECIFICATION YEAR <input type="text"/></p> <p>MAX. DESIGN CAPACITY <input type="text"/></p>
<p><b>BLUE BIRD</b></p>	<p>BODY SERVICE NO. <input type="text"/></p>



## Before Placing the Bus in Service

Upon taking delivery of any new school bus, Blue Bird recommends the following items be double-checked by your service technician before placing the bus in routine pupil transportation service:

- Check the suspension U-bolt torque.
- Check the service brake adjustment.
- Check the park brake adjustment on units equipped with hydraulic brakes.
- Check the torque on all the body “tie-down” bolts.
- Check the torque on the driveline universal joint straps.
- Check all engine, transmission, and other running gear fluids.
- Check the condition and air pressure of all tires.

## Daily Pretrip Inspection

A daily pre-trip Driver inspection is required for all school buses. The guidelines below are Blue Bird recommendations specific to the VISION. They neither supersede nor replace pre-trip checklists provided by your pupil transportation administration or CDL requirements.

**WARNING** *Overnight parking of the school bus should always be on level and secure ground. A thorough pre-trip exterior walkaround inspection involves visual inspection of tires and areas under the bus. Do not perform an exterior walk-around inspection unless it is certain that the bus is prevented from movement. Before performing the exterior inspection, enter the bus and make sure the transmission is in neutral, and that the parking brake is fully on.*

### Exterior Walkaround

1. Approach bus from the front, to begin general exterior inspection.
  - 1.1 On approach, look for any sideways leaning or twisting of the bus which may suggest tire problems, axle misalignment, or structural damage.
  - 1.2 Visually inspect the condition of front bus markings such as the School Bus sign, and reflective markings. Note that the windshield is clean.
  - 1.3 Note that the crossing arm is properly secure and unbroken.
  - 1.4 Grasp mirror brackets to check them for secure mountings. Check for broken or cracked mirrors, and clean the mirrors if needed.
  - 1.5 Look underneath the engine compartment for any unusual conditions such as dangling harness wires. Look at the ground underneath for signs of fluid leakage, broken glass, or other debris.



- ✓ Markings in good condition.
- ✓ Windshield clean.
- ✓ Crossing arm secure.
- ✓ Mirror brackets tight.
- ✓ No leaks, debris underneath

2. Proceed around the left side (Driver's side) of the bus.

2.1 Check the front left tire. Check for proper inflation pressure. Check the tread depth, and look for any signs of physical damage. Normal tread wear should be uniform across the width of the tread. Inspect the rim for bends or other damage. Check that all lug nuts are in place. If the bus is equipped with oil lubricated axles, check the sight glass in the center of the hub for proper oil level.

**WARNING** *Tire inflation pressure must not exceed the specifications of the tire and/or wheel rim manufacturer for the application. The inflation pressure embossed on the tire sidewall does not take the wheel or rim capacities into consideration. Tires should not be inflated above the pressure listed on the Federal Certification plate without consulting your tire/wheel distributor.*

2.2 Check the Stop Arm for any signs of physical damage.

2.3 Open the battery compartment door and inspect the batteries. Check for corrosion on the battery terminals and for loose connections. Close the compartment and make sure it is secure.

3. Step back for an overall view of the left side.

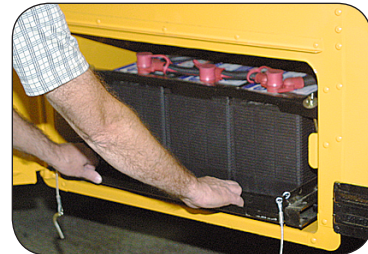
3.1 Check that all markings are legible and in good condition, including emergency exit signs and reflective tapes.

3.2 Check for broken windows and any other signs of vandalism.

3.3 Check that all windows are clean.



- ✓ Stop Arm in good condition.
- ✓ Tire condition & pressure.
- ✓ Lug nuts, axle oil level.



- ✓ Batteries secure.
- ✓ Terminals secure & corrosion free.



- ✓ Markings in good condition.
- ✓ Windows clean & in good condition.

4. Approach the rear axle, at the front of the rear tire.
  - 4.1 Look under the bus, and across to the other side of the axle. Visually inspect for any missing suspension bolts, signs of cracks, misalignment, or other physical damage on the opposite side. View the shock absorber for signs of oil seepage.
  - 4.2 Inspect the left rear tires. Check for correct inflation pressure in both the outer and inner tires. Check the tread depth, and look for any signs of physical damage. Normal tread wear should be uniform across the width of the tread. Inspect the rim for bends or other damage. Check that all lug nuts are in place. Look at the axle center caps for missing nuts or signs of axle lubricant leakage.
  - 4.3 Look under the bus, behind the rear tires, and view along the back of the axle all the way across to the opposite side. Be watchful for any signs of oil leakage on the rear side of the axle; missing, bent, misaligned, or broken axle/suspension fasteners. Look on the ground for any signs of leaking fuel, broken glass, or other debris.



- ✓ Rear axle undercarriage, suspension normal.
- ✓ Inner and outer tires pressure, condition.
- ✓ Lug nuts, axle cap nuts in place.
- ✓ Free of leaks, seepage, debris.

5. Proceed around to the rear of the bus.
  - 5.1 Inspect the tailpipe for general condition or blockage.
  - 5.2 Step back for an overall view of the rear. Check that all markings are legible and in good condition, including emergency exit signs and reflective tapes. Check for broken windows and any other signs of vandalism.



- ✓ Tailpipe clear.
- ✓ Markings in good condition.
- ✓ Windows clean & in good condition.

6. Proceed around to the right side of the bus. Approach the rear axle, at the rear of the rear tire.

6.1 Open the fuel filler door and ensure that the fuel cap is in place and securely tightened.

6.2 Look under the bus, behind the rear tires, and view along the back of the axle all the way across to the opposite side. Be watchful for any signs of oil leakage on the rear side of the axle; missing, bent, misaligned, or broken axle/suspension fasteners. Look on the ground for any signs of leaking fuel, broken glass, or other debris.

6.3 Inspect the right rear tires. Check for correct inflation pressure in both the outer and inner tires. Check the tread depth, and look for any signs of physical damage. Normal tread wear should be uniform across the width of the tread. Inspect the rim for bends or other damage. Check that all lug nuts are in place. Look at the axle center caps for missing bolts or signs of axle lubricant leakage.

6.4 At the front of the rear tires, look under the bus, and across to the other side of the axle. Visually inspect for any missing suspension bolts, signs of cracks, misalignment, or other physical damage on the opposite side. View the shock absorber for signs of oil seepage.

6.5 Step back for an overall view of the right side. Check that all markings are legible and in good condition, including emergency exit signs and reflective tapes. Check for broken windows and any other signs of vandalism. Check that all windows are clean.



- ✓ Fuel cap in place & secure.
- ✓ Rear axle undercarriage, suspension normal.
- ✓ Inner and outer tires pressure, condition.
- ✓ Lug nuts, axle cap nuts in place.
- ✓ Free of leaks, seepage, debris.
- ✓ Windows clean & in good condition.

**Entrance Area Inspection**

7. Approach the entrance door. Visually inspect the entrance door glass for cracks, the frame for structural damage and the closure seals for wear or damage.

7.1 Open the door and inspect the stepwell for ice or debris that may be hazardous to passengers. Ensure that the entire entrance area is free of obstructions such as loose tools or cleaning equipment.

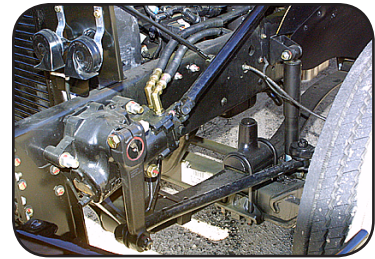
7.2 Grasp the entrance handrail and check it for secure mounting.



- ✓ Door clean and in good condition.
- ✓ Steps clean; treads in good condition.
- ✓ Free of ice, oil, loose items.
- ✓ Handrail secure.

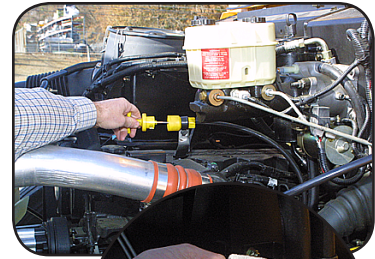
### Engine Compartment Inspection

8. Step to the right side of the bus, just forward of the entrance door. Unlatch the hood latch. Walk to the opposite side and release the other hood latch. Step to the front of the hood, grasp the hood handhold and pull back to raise the hood completely. Step to the left side (Driver's side) front wheel to proceed with the under-hood inspection.
  - 8.1 Visually inspect the inner side of the wheel. If equipped with hydraulic brakes, inspect the calipers for any sign of brake fluid leakage. Inspect the front axle and suspension for missing, bent, misaligned, or broken fasteners. Inspect the shocks for signs of oil leakage.
  - 8.2 Visually inspect the steering gear mechanism. Look for signs of fluid leakage.
  - 8.3 Check the engine oil level.
  - 8.4 Check the brake fluid level, if the bus is equipped with hydraulic brakes.
  - 8.5 Check the hydraulic fluid level.
  - 8.6 Check the transmission fluid level.

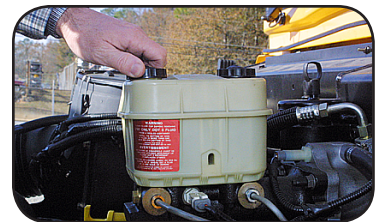


✓ Inner side of left front wheel.

✓ Steering gear.



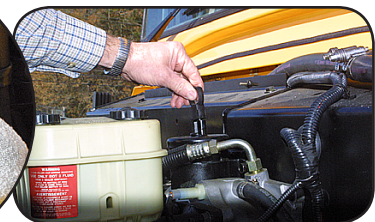
✓ Engine oil.



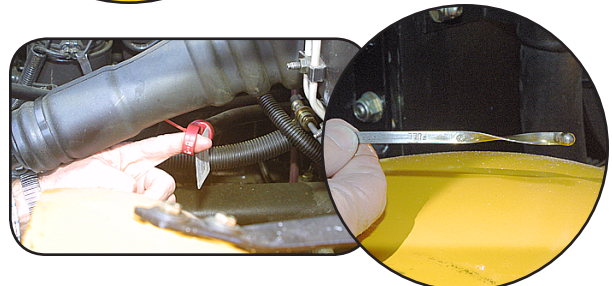
✓ Brake fluid.



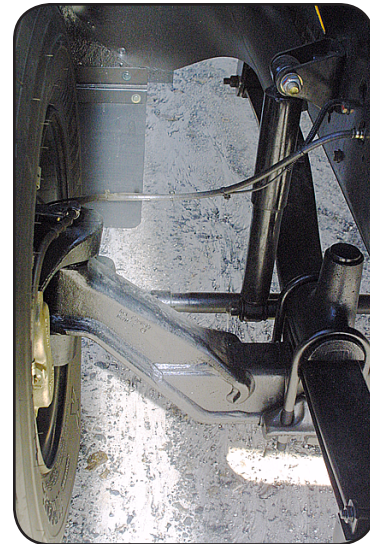
✓ Hydraulic fluid.



✓ Transmission fluid.

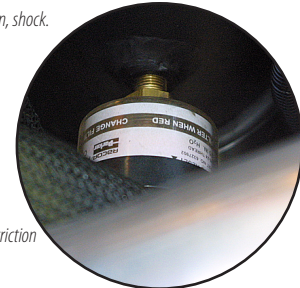


9. Step to the right side of the engine compartment.
  - 9.1 Visually inspect the inner side of the wheel. If equipped with hydraulic brakes, inspect the calipers for any sign of brake fluid leakage. Inspect the front axle and suspension for missing, bent, misaligned, or broken fasteners. Inspect the shocks for signs of oil leakage.
  - 9.2 Look at the air intake restriction indicator and ensure it is not indicating a restricted air intake.
  - 9.3 Visually inspect the alternator and its connections for signs of corrosion, broken wires, or other physical damage.
  - 9.4 Check the engine coolant reservoir fluid level.
  - 9.5 Check the washer reservoir fluid level.
  - 9.6 Inspect the engine fan / alternator belt for tightness and any signs of excessive wear or damage.
  - 9.7 Inspect both sides of the radiator for debris and signs of damage.
10. Turn the cam lever of the engine hood hold-open strut. Close and latch the right side hood latch.
  - 10.1 Reach up and inspect the condition of the right windshield wiper blade.
  - 10.2 Walk to the left side and latch the left side hood latch. Reach up and inspect the condition of the left windshield wiper blade.

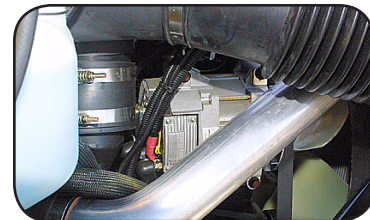


✓ Inner side of right front wheel.

✓ Suspension, shock.



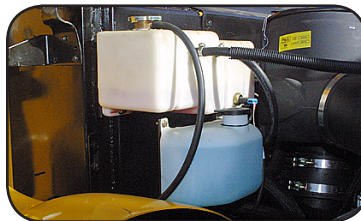
✓ Intake restriction indicator.



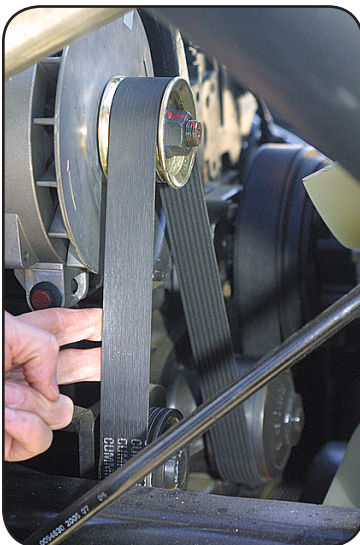
✓ Alternator connections.

✓ Engine coolant level.

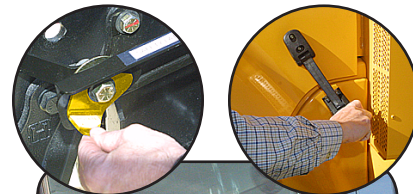
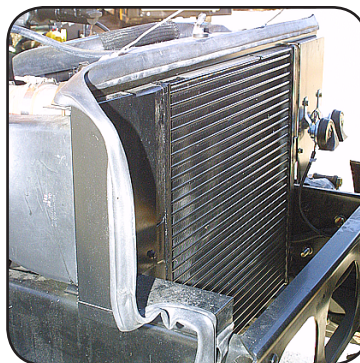
✓ Washer fluid level.



✓ Belt condition.



✓ Radiator clear of obstructions, debris.



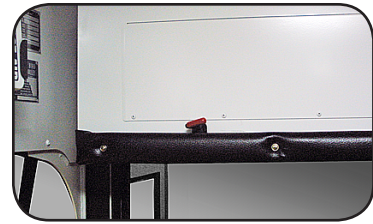
✓ Close hood, latch right side. Check wiper blade.

✓ Latch left side. Check wiper blade.



### Instrumentation & Driver's Alert Checks

11. Enter the bus. If the bus is equipped with an electrically-operated or air-operated door, ensure that the emergency release is not tripped. Be seated in the driver's seat. Insert the ignition key and turn it to the first On position, but do not start the engine. All the instrument panel lights and the Message Display Center illuminate.
- 11.1 Visually scan the lights, watching for any that do not illuminate. The gauges sweep during their initialization process. Then the indicator lights and Message Display module change to their normal monitoring mode. Turning the ignition switch to On awakens the Multiplex system. Certain conditions, such as a locked vandal lock or unlatched emergency exit, may cause audible alerts. Audible alerts may also be heard if the Message Display Center has recorded error codes.
- 11.2 Note the condition of the battery charge as indicated by the instrument panel voltmeter. Fully charged batteries are necessary to complete the pre-trip inspection.
- 11.3 Turn on the interior dome lights. Walk toward the rear of the bus, correcting any conditions (such as unlatched emergency windows, roof hatches, or latched rear emergency door vandal lock) that were alerted when the ignition switch was turned on.
- 11.4 Return to the Driver's seat. Turn off the dome lights. Test other equipment switches in the upper panel of the side console (varies according to options).



✓ Engage door control.



✓ All indicators & Message Display illuminate during initialization.

✓ After initialization, voltmeter indicates full battery charge.



✓ If Vandal lock or other alerts are indicated, turn on dome lights and correct the condition.

✓ Return to seat and check other left console devices.

**Exterior Lights Check**

12. With the help of an assistant, operate all of the exterior lights and verify that they are all working properly.
  - 12.2 Note operation of all running lights, marker and clearance lights, and warning lights on the front of the bus.
  - 12.3 Note operation of all side marker and clearance lights on the left side of the bus.
  - 12.4 Note operation of all side marker and clearance lights on the right side of the bus.
  - 12.4 Note operation of all running lights, marker and clearance lights, and warning lights on the rear of the bus.

### Passenger Area Inspection

14. Perform a general inspection of the cleanliness of the passenger area, and a functional check of all emergency exits.
  - 14.1 Open the Rear Emergency Door, checking it for proper operation. Ensure that the audible alert sounds when the door latch is opened. Close the door and ensure that it latches securely and that the audible alarm goes off.
  - 14.2 Slowly walk toward the front of the bus, inspecting the condition of the interior as you go. Look for soiled or cut seat upholstery. Grasp each seatback as you proceed, checking it for secure mounting. Look for damaged or dirty windows. Watch for any loose items such as cleaning supplies or tools.
  - 14.3 Upon reaching the rearmost roof hatch, fully open it, ensuring proper operation and that the audible alert sounds. Close it securely ensuring that the audible alert stops.
  - 14.4 Similarly open and close the two rear emergency exit windows, ensuring proper operation and that the audible alert sounds when unlatched and stops when fully closed and latched.
  - 14.5 Proceed forward, checking condition of each seat, window, and floor area between seats.
  - 14.6 Upon reaching the frontmost roof hatches and emergency windows, test them as described above.
  - 14.7 Proceed forward, checking condition of each remaining seat and seat barrier, window, and floor area between seats.



- ✓ Emergency door & alert buzzer working.
- ✓ Emergency roof hatches & alerts working.
- ✓ Emergency windows & alerts working.
- ✓ Seat mountings secure.
- ✓ Seat upholstery clean & in good condition.
- ✓ Windows clean & in good condition.
- ✓ Aisle clear; no loose items.

### Emergency Equipment Check

15. Having reached the front of the bus again, check all emergency equipment.

- Check the fire extinguisher charge and expiration date.
- Inspect the flare kit and / or roadside hazard triangular reflector kit for full content and secure stowage.
- Inspect the fire axe and/or crowbar for secure mounting.
- Inspect the first aid kit and body fluid kit for fully-stocked content and secure mountings.

**Prepare For Driveaway**

16. Return to the Driver's seat.
  - 16.1 Adjust the seat height, back, and position.
  - 16.2 Press the steering column release pedal and adjust the steering wheel position.
  - 16.3 Check the alignment and positioning of all rearview mirrors, interior and exterior for optimum view. Adjust as necessary.



- ✓ Fire extinguisher charged, securely stowed.
- ✓ First aid, body fluid kit(s) stocked, securely stowed.
- ✓ Axe, crowbar secured.
- ✓ Hazard reflector, flare kit(s) stocked, secured.
- ✓ All other emergency equipment in full working condition.

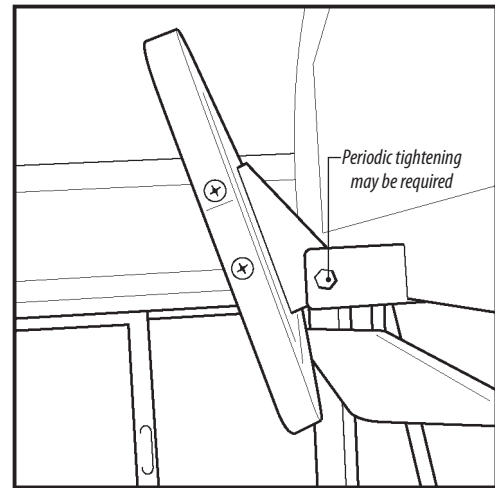


- ✓ Adjust seat, steering wheel.
- ✓ Check all mirrors adjustments.

## Mirrors and Mirrors Adjustment

Inside rearview mirrors can be adjusted by loosening the bolts and nuts in the slotted holes on the mirror brackets. Because this is a friction mount, periodic tightening of these bolts and nuts may be required. Adjust the mirror to give the operator a clear view of the bus interior and the roadway to the rear.

**WARNING** *The mirror system on this Blue Bird bus has been designed to meet all field-of-view regulations. However, it is the responsibility of the driver to properly adjust the mirrors to provide adequate safety. Mirrors provide additional visibility and they must be properly adjusted for each driver prior to each trip. Mirrors are not a substitute for proper driver training and caution. Never move the bus until each disembarking passenger is accounted for and clear of the vehicle. Failure to strictly adhere to this procedure can result in serious injury or death.*



Interior Mirror

The Blue Bird vision is equipped with four external rearview mirrors. The curbside rearview flat mirror and convex mirrors are mounted from the top of the bus, near the top right-hand corner of the windshield in a common housing. The driver's side rearview mirrors are mounted near the bottom left-hand corner of the windshield.

Two hood-mounted crossview mirrors provide view in front of the bus and along each side. The hardware for the fender mounts must be maintained at 20 – 25 Ft lb. torque to minimize vibration.

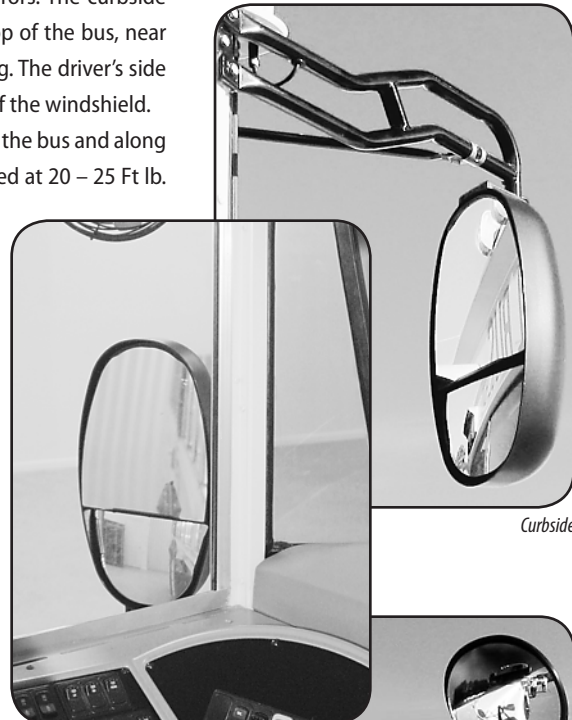
**CAUTION** *Do not over-torque the mirror mounting hardware.*

The outside rearview mirrors are designed to allow the seated driver a comprehensive view of the areas at each side of the bus and to the rear of the bus.

**WARNING** *There is a "blind spot" directly behind the bus that extends several feet to the rear of the vehicle.*

Mirrors must be adjusted for each individual driver of the bus.

1. Ensure the driver's seat is properly adjusted.
2. Adjust the right-hand flat mirror so that the tops of the right-hand windows are visible in the upper edge of the mirror and the right-hand side of the bus is visible along the vertical, inside edge.
3. Adjust the right-hand convex mirror so that the view in the convex mirror overlaps the view provided by the flat mirror above it. The right-hand side of the bus must be visible in this mirror as well.



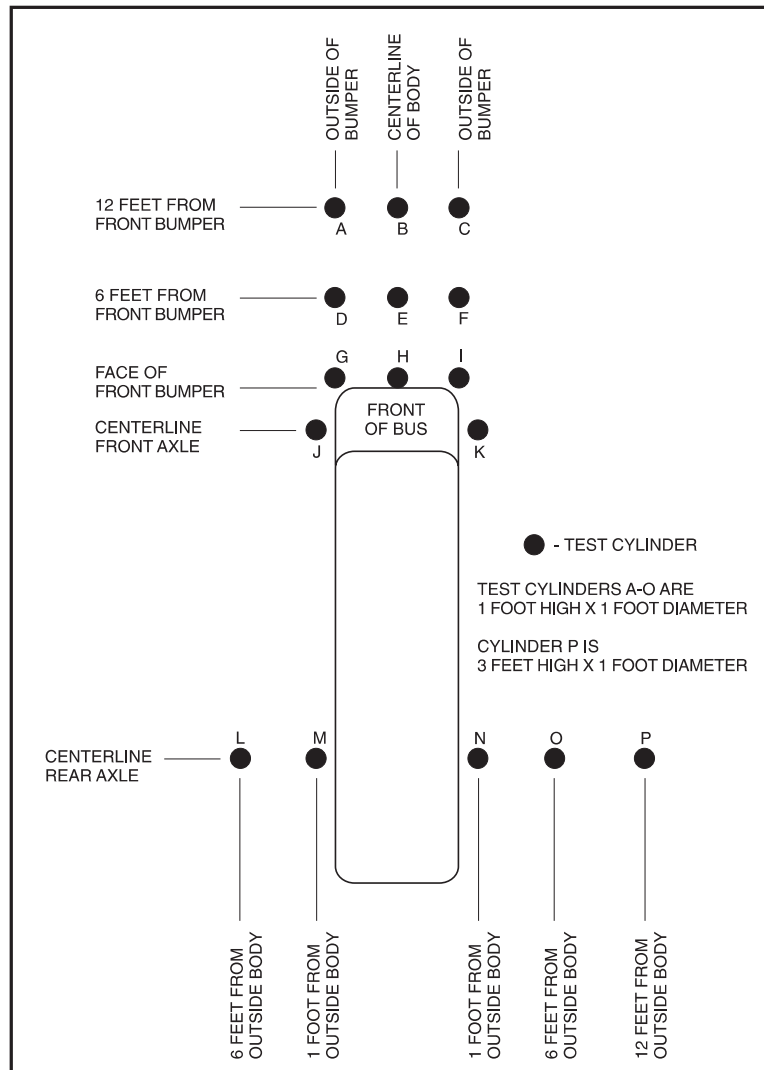
Curbside

Driver's Side



Hood Mounted

4. Adjust the left-hand flat mirror in the same manner as described for the right-hand flat mirror.
5. Adjust the left-hand convex mirror in the same manner as described for the right-hand convex mirror.
6. Adjust the elliptical cross-view mirrors by positioning each mirror so the arrow embossed on the mirror head points directly at the driver's eyes.
7. The final adjustment of the mirror system must be accomplished to provide the seated driver a view consistent with the requirements of FMVSS 111.



- The driver must be able to see the entire test cylinder in each location.
- The driver must be able to see the entire top surface of cylinders "M" and "N".
- The driver must have a view of at least 200 feet from the surface of the mirror.
- The elliptical cross-view mirrors should be adjusted so the seated driver has a complete view of all cylinders "A" through "P", when they are positioned as shown in the illustration, and not directly visible.
- The view provided by the elliptical mirrors must overlap the view afforded by the rear view driving mirror system.

All mirrors must be cleaned and adjusted as necessary to provide a safe driving environment. The use of a mild ammonia/water solution is recommended to clean mirrors.

## **Routine Operation**

In terms of vehicle controls, driving a modern school bus like the VISION is not radically different from driving a passenger car, truck, or van. Features like power assisted brakes and steering, and modern suspensions and transmissions have removed much of the fatiguing aspects and “big truck” feeling of school buses in earlier decades. Therefore, becoming comfortable with operating the VISION will be easy.

However, the differences which do exist are extremely important and the diligent pupil transportation Driver must be ever mindful to avoid being lulled into a mental state of complacency. Despite the ease of operation, modern school buses are still very large vehicles; and the cargo they carry is the most precious of all.

This chapter describes some of the general differences which a Driver new to school bus operation may experience, and specific feature and equipment differences of the VISION in particular with which the Driver will interact every day.

## **Maneuvering Safety**

School buses are operated in a wide variety of conditions ranging from Southwestern desert roads to tight inner-city alleyways. Refer to the dimensions chart in the General Specifications chapter to understand some of the considerations imposed by the physical size and geometry of the bus which may come into play in your school route environment. The proportionally long wheelbase means that the height of rises and humps which the bus can traverse without contacting the underskirt is dependent not just upon their height, but on their length or duration of the hump.

The rear overhang of school buses is longer than other vehicles. This must be borne in mind in situations such as nearing curbs or embankments on sharply-rising grades, as well as in tight turns as the body overhang “swings around” behind the rear wheels.

The Driver is responsible for determining that the loading area is clear before stopping to load passengers, and must ensure that all unloaded passengers are clear before moving the bus.

States and other regional school bus administration organizations sometimes conduct training or practice seminars such as school bus “rodeos.” Blue Bird encourages participation in any program designed to increase the skill and safety of our nation’s school bus force.

## Prior to Starting the Engine

For the most complete engine starting details, refer to the engine manufacturer's Operator's Manual. A copy of this manual is provided in the material shipped with your new Blue Bird bus. The information and/or instructions in the manufacturer's manual takes precedence over the more limited information in this manual.

Your Blue Bird bus is equipped with an engine alarm system, designed to help prevent major damage due to high coolant temperature and/or low engine oil pressure. If so equipped, when the engine coolant temperature exceeds 210° F (99° C) and/or the engine lubricating oil pressure falls below 6 psi, an alarm will sound.

**CAUTION** *The engine must be shut down as soon as safely possible when the alarm sounds to avoid costly engine damage.*

**WARNING** *Engine exhaust contains products of combustion that may be harmful to your health. Always start and operate the bus in a well-ventilated area. If the engine must be operated in an enclosed area, vent the exhaust to the outside.*

Perform the required, daily, under-the-hood inspection and maintenance. Also perform any other periodic maintenance prior to starting the engine. This routine can help avoid costly major repairs later.

## Starting the Engine

**WARNING** *Never use ether as an aid in trying to start the engine.*

To start the engine normally:

1. Engage the parking brake and place the transmission in neutral.
2. Turn the keyed ignition switch to the "ON" position.
3. Once the "Wait to Start" light is no longer illuminated, turn the key to "START", to crank the engine. The air inlet heater will turn on if the sum of the coolant temperature and the air inlet temperature is less than 109° F (25° C). The "Wait to Start" indicator time may vary somewhat depending upon the temperature. Colder temperatures may increase the time the "Wait to Start" indicator illuminates. Once the engine is started, the Wait to Start indicator may cycle on/off as the engine warms. It is okay to operate the bus after the first time the Wait to Start indicator has gone off.

**CAUTION** Wait until the “Wait to Start” light is no longer illuminated before turning the ignition to the “Start” position. Do not crank the engine continuously for more than 30 seconds. If the engine has not started in 30 seconds, allow the starter motor to cool for at least 2 minutes. Do not engage the starter when the engine is running. Do not attempt to start the engine under load.

4. While the engine is cranking, the instrument panel lights will go off. After the engine is running, the gauges will cycle through their startup sequence. After the startup sequence, if any indicator lights remain on, take appropriate action according to the indicated condition.

**CAUTION** The oil pressure should rise within 15 seconds after the engine starts. Do not increase engine speed until the oil pressure gauge indicates normal. If oil pressure is not indicated on the gauge in 15 seconds, do not operate the bus. Stop the engine and refer to qualified service personnel.

5. Release the key switch and allow it to return to the “ON” (or run) position immediately after the engine starts. After the engine starts, ensure that the transmission is still in the neutral position. Once a normal engine oil pressure and air pressure are established, the vehicle may be operated at a light load and speed.
6. After the engine has started, the air inlet heater may continue to run in a “continuous” mode or intermittently. The air inlet heater will automatically turn off when the sum of the engine coolant temperature and the air inlet temperature exceeds 127° F (35° C).
7. If the engine is operated at a light load and low speed, it will reach normal operating temperature more quickly than if it idles at no load. When idling in cold weather, increase the engine idle speed to a maximum of 1200 revolutions per minute (RPM); this is the “HIGH IDLE” function. Do not exceed the no-load recommended RPM during the warm up process. Limit unnecessary idle time to 10 minutes.

### High Idle Function

The high idle control positions the throttle at high idle. This allows the engine to warm up faster than at the normal low idle position. High idle is limited to 1000 to 1200 revolutions per minute (RPM). High idle can be activated by a switch in the driver’s area. With the transmission in the neutral position and the park brake set, move the toggle switch to the “HIGH IDLE” position to maintain a constant engine RPM above the normal idle speed.

**CAUTION** Do not move the toggle switch to the high idle position unless the transmission is in Neutral and the park brake is engaged.



High Idle Switch

## Engine Cooling System

In today's modern engine designs, accurate maintenance of the cooling system is critically important to engine life. Simply maintaining coolant level and performing occasional coolant changes does not adequately ensure that the cooling system is healthy. The chemical balance of engine coolant must always be correct. This requires diligent adherence to the engine manufacturer's coolant specifications, maintenance schedules, and procedures. Accurate coolant system maintenance records should be kept.

The engine coolant level in the reservoir should be checked daily as a part of routine pre-trip inspection. But whenever the coolant level is low, it must be replenished with only pre-mixed coolant of the same type and brand installed. Never top off coolant with plain water.

Careful pre-trip inspection and a program of routine maintenance checks of the condition of the cooling system by service technicians should ensure against enroute emergencies such as worn hoses or loose clamps resulting in coolant loss. In the case of such an emergency, however, if anything other than original premixed coolant is added in order to allow the bus to proceed to a service facility, the coolant system must be completely drained, flushed, and properly refilled with approved coolant before being returned to routine service. Any enroute event requiring topping off of the coolant should be reported to service personnel responsible for maintenance of the bus.

**WARNING** *Exercise extreme care when removing the cap from the engine coolant reservoir. Always allow time for the engine to cool before removing the cap. The pressurized coolant may be very hot and can spray out, causing serious burn injuries.*

### Coolant Types

Engine coolant is generically divided between two types; "standard" and "long-life" (or "extended-life"). Extended-life coolants generally allow longer intervals between coolant changes (sometimes requiring additives to be added near the midpoint of their service life, and/or for special testing to be performed at certain intervals). Engine manufacturers, however, differ somewhat in regards to specifications for coolants which they recognize as "long-life" when used in their respective engines.

Blue Bird buses built as of March 26, 2009 come from the Blue Bird factory with one of two types of coolant. The standard coolant is Fleetguard ES Compleat 50/50 premix, which is blue in color. This coolant is considered standard life when installed in Cummins engines.

Cummins equipped buses purchased with an extended life coolant option have been filled with Fleetguard ES Optimax 60/40 premix, which is red in color.



Blue Bird installs a decal on or near the deaeration tank filler which state the type of coolant installed at the factory. The decal states the approved premixed coolant and coolant manufacturer's part number for one gallon quantities. The decal also lists the manufacturer's part number for the concentrate which is approved for mixing with the premix for stronger glycol concentration. Another decal near the fill neck indicates warnings for the service technician.

**CAUTION** *When replenishing or replacing coolant, only use coolant of the same type already installed. Never mix coolants of different color, type, or brand. Plain water is corrosive at engine operating temperatures. Never add plain water to the system. When using concentrated coolant to raise the glycol concentration for extreme temperature environments, Blue Bird recommends only mixing the concentrate with pre-mixed coolant of the same type; not mixing with water.*

### Coolant Testing and Replacement

Each engine manufacturer has its own specific requirements for coolant testing and maintenance. Therefore, refer to the engine Operator's Manual for your bus and follow the engine manufacturer's maintenance specifications.

Blue Bird recommends strictly abiding by the engine manufacturer's testing and maintenance schedules and draining, flushing, refilling procedures to maintain compliance with the engine warranty requirements. Blue Bird also recommends that you maintain accurate vehicle-specific service records of all coolant system maintenance procedures performed.

The cost of the testing is the owner's responsibility as part of the engine manufacturer's requirements for testing and maintaining the engine and coolant.

For Cummins engines using Fleetguard ES Compleat coolant, send coolant samples to Fleetguard for Monitor C testing, as specified in the Cummins Operator's Manual. Label sample as Conventional coolant.

For Cummins engines using Fleetguard ES Optimax extended life coolant, send coolant samples to Fleetguard for Monitor C testing, as specified in the Cummins Operator's Manual. Label sample as Extended-Life coolant.

**CAUTION** *Never mix coolant types.*

Routine coolant addition (top-off) must match the installed coolant type and brand. Do not mix coolants of different colors, types, or brands in the same engine.

**CAUTION** *Always mix concentrate with premix coolant, not water.*

If concentrated coolant is added in order to raise the glycol ratio, use only the concentrate version of the same premix coolant type and brand as installed. Do not mix the concentrate with water. Instead mix the concentrate with the premix version of the same coolant.

**CAUTION** Only add tap water in emergency situations.

A regularly-scheduled bus inspection and maintenance program should be followed to prevent coolant losses due to damaged or worn hoses, loose clamps, etc.

If coolant is lost while the bus is in use, and roadside emergency measures are called for, replenish the coolant with the same premix type and brand if possible. If the proper coolant is not available, and water must be used, use only de-ionized water if possible. Ordinary tap water should only be used if proper coolant or de-ionized water are not available.

Whenever tap water alone has been added, the bus should be taken to a service facility and the entire cooling system should be completely drained, flushed, and refilled with premix coolant.

Blue Bird buses equipped with Cummins engines may also be equipped with an optional coolant filter. The coolant filter should be replaced every 6 months or 6,000 miles; whichever occurs first. The coolant filter element installed at the Blue Bird factory is compatible with all of the above-described coolants:

*BLUE BIRD NUMBER 00064641*

## **Shutters**

The optional radiator shutters assist in maintaining a constant engine temperature by limiting the air flow through the radiator. The shutter blades are powered by air pressure from the brake system on the vehicle. The shutters are controlled automatically by an Alarmstat which is located in the upper radiator hose and an electric solenoid in the air line controlling the shutters. Shutters should be inspected regularly and kept free of obstructing debris. The pivot points of the louvers and their linkages should be lubricated annually with an anti-seize compound, such as BB # 2550549. The shutters must be cleaned and lubricated yearly. More frequent lubrication, especially during the winter months, is required on buses operating in climates that use salt and other corrosive elements on the roadways.



## Service Brakes

Your Blue Bird vision may be fitted with hydraulic disc brakes or air-powered drum type brakes, depending on the options chosen at the time of manufacture.

Although they perform the same task, hydraulic brakes and air brakes differ in “feel.” Air brakes also may require additional wait time before driving the bus during warmup, to allow air system pressure to build to normal operation levels. The type of brakes installed also determines the type of parking brake installed.

### About Hydraulic Brakes

**WARNING** *Hydraulic brakes are power assisted. The brakes will be noticeably less effective when the engine is not running. The bus should not be moved without the engine running.*

The hydraulic brakes are arranged in a dual system, whereby the front brakes and the rear brakes operate independently of each other. The braking function is significantly diminished by the loss of either the front or the rear brakes; however, it will be possible to stop the bus.

**WARNING** *Do not continue to operate the bus with the loss of either the front or the rear portion of the system. Stop the vehicle and obtain professional assistance immediately.*

The hydraulic brake system includes an auxiliary electric pump which serves as a backup for the hydraulic pressure supplied by the power steering pump. With the engine not running and the key switch in the “ON” position, the electric pump will come on. This will provide some assistance in the brake system, but it will be much less effective than the power assist provided by the power steering pump.

**WARNING** *Check the operation of this auxiliary pump before each trip. If it fails to come on when the key is turned to the “ON” position, before the engine starts do not operate the bus. Seek immediate professional assistance.*

**WARNING** *Inspect the level of the brake fluid in the reservoir on a regular basis. Too little fluid in the system will cause a malfunction. Be careful to put only brake fluid in the brake system and power steering fluid in the steering system.*

If the brake pedal depresses more than normal, or feels “mushy”, check the reservoir level. If you need to add fluid (DOT-3) frequently, have the system checked out by a professional mechanic.

**Parking Brake (With Hydraulic Brakes)**

A Blue Bird vision equipped with hydraulic brakes employs a foot-operated parking brake, located to the Driver's lower left. When the driver presses this lever into the engaged position, a mechanical linkage causes a brake shoe assembly to close around a brake drum attached to the driveshaft, preventing the bus from moving. (It should be noted that this type parking brake becomes inoperative if the driveshaft is disconnected, as when the bus is being prepared for towing.) The mechanical parking brake must be kept adjusted properly for maximum holding power.

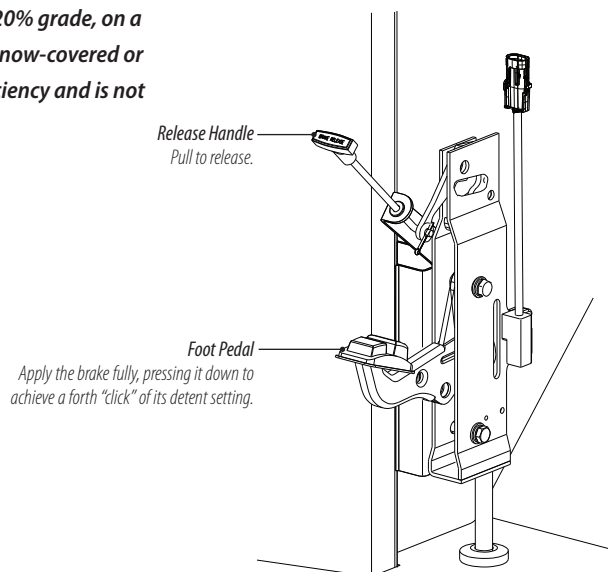
When the parking brake is properly adjusted, the lever is designed to require a minimum of 130 pounds of pressure to apply the parking brake. Always apply the brake fully, pressing it down to achieve a forth "click" of its detent setting.

To release the parking brake, apply the service brake with the left foot to prevent movement when the parking brake is released. Then grasp the parking brake release lever with the left hand and pull until the Park Brake is fully released.

The parking brake should hold the fully loaded bus on a 20% incline on a dry paved surface. If the incline is wet or covered with ice or snow, do not park on it. The brake will hold, but the tires may not.

**CAUTION** Always release the parking brake fully. Leaving it in a partially released position can allow the shoes of the parking brake mechanism to drag while the bus is operated, resulting in overheating and accelerated wear of the parking brake shoes and drum.

**WARNING** The parking brake is designed to hold on a 20% grade, on a clean, dry, and smooth road surface. Parking on wet, icy, snow-covered or loose aggregate surface will greatly diminish braking efficiency and is not recommended. Always use wheel chocks.



### About Air Brakes

The optional air brakes system on the Blue Bird VISION uses compressed air pressure to operate drum brakes. The system is divided into two separate circuits; one for rear brakes (primary) and one for front (secondary). The two circuits have their own air supplies. However, the system is designed so that if pressure in either circuit drops to certain levels, the other system can supplement the pressure.

An air compressor mounted on the engine operates whenever the engine is running and maintains a normal operating pressure range within the storage tanks. The bus cannot be driven until air pressure is sufficient for normal operation. Therefore, if the bus has been parked for an extend period, or if the tanks have been drained, as in normal maintenance procedure to expel built-up moisture, it is normal for additional time to be required for the air system to fully charge.

As air is compressed, moisture vapor tends to condense inside the storage tanks. The tanks are equipped with bleeder valves to allow removal of this built-up moisture, and should be used daily, usually when the bus is parked for the night. Some buses are equipped with an air dryer to assist collection and expulsion of the excess moisture during operation. The storage tank is mounted under the bus, outboard the frame rail on the driver's side, and on buses equipped with an air dryer, the dryer is mounted inboard of the frame rails just forward of the storage tank. During normal operation, the compressor cycles between its load mode and unload mode. As this occurs, the air dryer occasionally expels a blast of air (chuff) which can be heard by the driver. This is a normal "backflush" behavior of the air dryer.

### Parking Brakes (With Air Brakes)

On Blue Bird VISION buses equipped with air brakes, the parking brake function is provided not by the air pressure, but by coil springs incorporated within the rear wheel brake actuation chambers. When the parking brake valve on the dash is pulled outward, air pressure is vented from the rear brake actuators, allowing the springs to engage the rear brakes and locking the rear wheels. When the parking brake valve is pushed in, it allows the air pressure in the rear brake actuators to overcome the spring pressure, thereby releasing the rear spring brakes.

Therefore, although the parking brake control is an air valve, it is not air pressure which applies the parking brake, but the absence of it. The parking brake is applied by mechanical springs which are released (caged) when the air system pressure is sufficient for normal brakes operation. Pushing in the parking brake valve to release the parking brake does not release air pressure, it applies it to cage the spring brakes. This is why the parking brake button automatically "pops out" if you try to release the parking brake before sufficient air pressure has built up.

If for any reason the air reserve in both primary and secondary circuits brake drops below a safe minimum, the spring brakes automatically engage and lock the rear wheels. If this occurs enroute, the Driver should call for professional service assistance. Provisions are made for a qualified service technician to mechanically release the spring brakes to allow the bus to be towed for repair.



*Pull to apply parking brakes. Push to release.*

*The parking brake valve does not apply air brakes. It applies air to release the mechanical spring brakes.*

*The park brake valve cannot release the spring brakes until sufficient air is in the system for normal service air brakes operation. If it is pushed in before system pressure is present, it will automatically "pop out."*

**Parking**

Each time you park the bus or leave the driver's seat while the engine is running the following procedure must be followed:

1. Apply the service brakes to bring the vehicle to a complete stop, and continue to hold the brake pedal.
2. Ensure the engine idle is in the "low" position (High Idle switch is off).
3. Shift the transmission to Neutral.
4. Apply the park brake. (On buses equipped with hydraulic brakes, press the pedal down to achieve a forth "click" of its detent setting. On buses equipped with air brakes, Pull the Park Brake valve.)
5. Release the service brake pedal, allowing the park brake to take on the load of holding the bus.
6. If parked in any unusual situation, such as a severe incline, chock the wheels and take any other precautionary measures necessary to ensure the bus doesn't move.

If this procedure is not followed, the bus could move unexpectedly and cause serious injury or death and/or property damage.

**CAUTION** *Do not allow the bus to coast in neutral. This practice can result in transmission damage. Engine retard and braking assistance is not available when the transmission is in neutral. It may not be possible to get the transmission back into gear while the bus is moving.*

Do not idle in "R" (reverse) for more than five minutes. Extended idle time in "R" (reverse) may cause transmission overheating and damage. Always select "N" (neutral) whenever time at idle exceeds five minutes.

## Allison Automatic Transmissions

**Important:** Allison supplies far more detailed information about your particular transmission than space allows in this manual. Although we try to cover the most important points here, it is imperative that you read and understand the Allison Transmission Operator's Manual for more details about operation, care, and maintenance. If you did not receive this manual with your bus, please contact the transmission supplier. Both Blue Bird Body Company and Allison Transmissions continually strive to improve the quality and performance of their respective products. For this reason, information and instructions in the Allison Transmission Operator's Manual supplied with the bus will take precedence over the general information in this publication.

### Allison Model 2000 Bus Series Transmission

The Allison transmission provides five forward speeds and one reverse. The transmission is controlled with the selector lever located to the driver's right. The selector lever must be in the "N" position (neutral) to start the engine. If the engine starts in any other position, the neutral start switch is malfunctioning and should be repaired immediately. Use "D" (drive) for all normal driving conditions. The service brake must be applied before the transmission will shift from neutral to drive or reverse. If an attempt is made to shift the transmission into drive or reverse without applying the service brake it will remain in neutral, an audible alarm will sound, and the Range Inhibit light on the instrument panel will come on. If this occurs, apply the service brake and then select the desired gear. The vehicle will begin to move in first gear, and as you press the accelerator, the transmission will upshift automatically. As the vehicle slows down, the transmission will automatically downshift to the correct gear. Use "1" or "2" when the road, load, or traffic conditions make it desirable to restrict the automatic shifting to a higher range. When the conditions improve, return the range selector to the normal driving position D. These positions also provide progressively greater engine braking power (the lower the gear range, the greater the braking effect). Use "1" when pulling through mud or snow or driving up steep grades. This position provides maximum engine braking power. Use "R" (reverse) for backing the bus. The bus should be completely stopped before shifting from a forward gear to reverse. Reverse gear provides the greatest traction.



*For more information on the Allison transmission, read the transmission operator's manual which was delivered with the bus.*

### Allison 2000 Bus Series Transmission Gear Selection

**WARNING** *When leaving the vehicle while the engine is running, the operator must be sure the transmission is in Neutral, the parking brake is engaged, and the wheels are chocked. The vehicle may move unexpectedly without these precautions.*

**R—Reverse.** Use reverse to back up the vehicle. The vehicle must stop completely, with the engine returning to idle speed, before shifting from forward to reverse or from reverse to forward. If your bus is equipped with a reverse warning signal, it will activate when shift selector is in reverse.

**CAUTION** *Do not idle in "R" (reverse) for more than five minutes. Extended idle time in "R" (reverse) may cause transmission overheating and damage. Always select "N" (neutral) whenever time at idle exceeds five minutes.*

**N—Neutral.** Use neutral to start the engine, to check vehicle accessories, and for extended periods of engine idle operation. If the vehicle starts in any other range, seek service immediately.

**WARNING** *Do not allow your vehicle to coast in neutral. This practice can result in transmission damage. Engine retard and braking assistance is not available when the transmission is in neutral. It may not be possible to get the transmission back into gear while the bus is moving.*

**D—Drive.** When "D" is selected, the vehicle will begin to move in first gear and the transmission will upshift automatically through each gear as speed increases. As the vehicle slows down, the transmission will downshift automatically.

**CAUTION** *Do not idle in "D" (drive) for more than five minutes. Extended idle time in "D" (drive) may cause transmission overheating and damage. Always select "N" (neutral) whenever time at idle exceeds five minutes.*

**1, 2, D Gears.** Occasionally, the road conditions, load, or traffic conditions will make it desirable to restrict shifting to a higher gear. Positions "D", "2", and "1" provide progressively greater engine power and braking for going down grades (the lower the gear, the greater the braking effect).

**1 Gear.** Use position "1" gear when pulling through mud and deep snow, when maneuvering in tight spaces, or while driving up or down grades. Low gear provides the vehicle with its maximum power and maximum engine braking power.

**Park.** If your bus is equipped with a "Park" selection, use it only after coming to a complete stop, and then apply the parking brake. Do not rely upon the transmission park pawl position alone to prevent the bus from rolling.



### Allison Model 3000 Bus Series Transmission

The Allison electronic transmission provides five forward speeds and one reverse. Fourth gear is a 1-to-1 ratio while the fifth gear is an overdrive with a 0.75-to-1 ratio. The push-button shift selector is located on the right area of the dash. The transmission and selector must be in neutral to start the engine.

The service brake must be applied before the transmission will shift from neutral to drive or reverse. If an attempt is made to shift the transmission into drive or reverse without applying the service brake it will remain in neutral, an audible alarm will sound, and the Range Inhibit light on the instrument panel will come on. If this occurs, apply the service brake and then select the desired gear.

Transmission and shift selector will return to "N" when engine is stopped and power switched off. If it does not return to "N" or if it starts in any other gear, the unit has malfunctioned. Seek service immediately.

The push-button shift selector has "R", "N", "D", down arrow, up arrow, a "MODE" button, and a digital display. When a range button is pressed, a tone sounds, the "SELECT" indicator displays the chosen operation (if the Electronic Control Unit [ECU] determines the shift is acceptable), and the transmission shifts to the starting range as indicated on the monitor display. In "DRIVE", selection of a specific gear can be accomplished by pressing the "UP" or "DOWN" arrow buttons. Conditions resulting in the "CHECK TRANSMISSION" light, located in the instrument cluster, will disable the pad and no tones will sound (see Check Transmission Light).

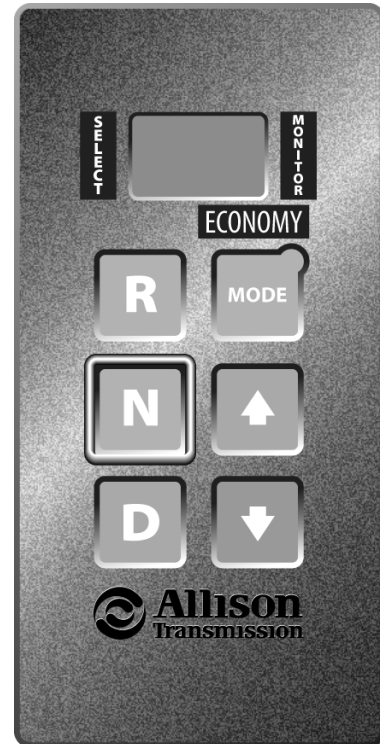
The "MODE" button, located on the push-button shift selector, activates an alternate shift schedule. By default, the start up is in primary or power mode. Pressing the "MODE" button causes the transmission to enter the economy mode. The display will indicate the economy mode is engaged. In economy mode, the transmission shifts to higher gear at lower engine rpm.

### Allison Model 3000 Bus Series Transmission Gear Selection

**WARNING** *When leaving the vehicle while the engine is running, the operator must ensure the transmission is in "Neutral", the parking brake is engaged, and the wheels are chocked. The vehicle may move unexpectedly without these precautions.*

**R—Reverse.** The vehicle must be completely stopped before shifting from forward to reverse or from reverse to forward. The select indicator and the monitor will display "R" when the vehicle is in reverse.

**N—Neutral.** Use neutral to start the engine, to check vehicle accessories, and for extended periods of engine idle operation. Under normal operation, the transmission is directed by the ECU to neutral during the startup procedure. This occurs automatically with the push-button selector. If the vehicle starts in any range except neutral, seek service immediately.



**WARNING** Do not allow your vehicle to coast in neutral. This practice can result in transmission damage. Engine retard and braking assistance is not available when the transmission is in neutral. It may not be possible to get the transmission back into gear while the bus is moving.

**D—Drive.** When “D” is selected, the vehicle will start to move in first gear and the transmission will upshift automatically through each gear as the speed increases. As the vehicle slows down, the transmission will downshift automatically. The select indicator will display the highest gear available and the monitor will display the current operating gear.

**2, 3, 4, 5 Gears.** Occasionally, the road conditions, load, or traffic conditions will make it desirable to restrict the automatic shifting to a lower gear. Positions “5”, “4”, “3”, and “2” provide progressively greater engine braking for going down grades (the lower the gear, the greater the braking effect). Push the “Up” or “Down” arrow to the desired gear. The select indicator will display your choice and the monitor will display the gear the bus is operating in.

**1 Gear.** Use position “1” gear when pulling through mud and deep snow, when maneuvering in tight spaces, or while driving up or down grades. Low gear provides the vehicle maximum power and maximum engine braking power.

The transmission incorporates a hold feature to prohibit upshifting beyond the gear selected during normal driving. For downhill operation, however, the transmission may upshift beyond the selected gear when the engine’s governed speed is exceeded, and damage to the engine is possible.

### Range Inhibit Feature

The transmission communicates with the engine to prevent over-rev conditions which could otherwise result in transmission or engine damage. If one of the range limiting transmission settings (D, 2 or 1) are selected, the transmission’s range inhibit feature will take over and allow the transmission to shift to the next range if engine RPM exceeds certain speeds. Therefore, although the use of a range inhibiting transmission setting to utilize engine braking is an acceptable practice, the Driver must still control the downhill acceleration with brakes to be prepared for unexpected upshifts. When the selected transmission range is being over-ridden, the Range Inhibit indicator message will appear in the instrument panels message display center.

**CAUTION** If the transmission will not shift into “D” (drive), or “R” (reverse), it may be because of an adverse operating condition such as; engine RPM too high or service brakes not applied when attempting to shift from neutral. Check for the “RANGE INHIBITED” message or “CHECK TRANS” light. See the appropriate section of the Allison transmission manual.



### Allison Automatic Transmission Driving Tips

**Accelerator Control.** The pressure of your foot on the accelerator pedal influences the automatic shifting. An electronic signal tells the ECU how far the driver has depressed the pedal, and the transmission adjusts its shifting for maximum performance.

**Downshift or Reverse Inhibitor Feature with Allison 3000 PTS Transmission.** Although there is no limitation on upshifting, there is a limit on downshifting and shifts from neutral into drive or reverse. If a downshift or neutral-to-range shift is selected when the engine speed or throttle position is too high, the ECU/TCM will not allow the shift until reaching a lower speed. If idle speed is too high, shifts to range are prohibited. A continuous “beep” tone sounds when reverse is selected during forward movement or if a neutral-to-range shift is selected at too high an engine speed.

**Cold Weather Starts.** Most Allison transmissions are programmed to restrict operation until operating temperature is reached. When the transmission fluid temperature is below  $-25^{\circ}\text{F}$  ( $-32^{\circ}\text{C}$ ), the transmission will not shift into an operating range, and the “Check Transmission” light illuminates. When the transmission fluid temperature is between  $-24^{\circ}\text{F}$  and  $20^{\circ}\text{F}$  ( $-31^{\circ}\text{C}$  to  $-7^{\circ}\text{C}$ ), the transmission will operate in 1st, 2nd, or Reverse only. If there is no other problem with the transmission, the “Check Transmission” light will not be illuminated. For transmission fluid temperatures above  $20^{\circ}\text{F}$  ( $-7^{\circ}\text{C}$ ), the transmission shifts and operates normally. Read the cold weather operation instructions in the Allison Transmission™ Operator’s Manual supplied with the bus.

**Using the Engine to Slow the Vehicle.** To use the engine as a braking force, shift the range selector to the next lower range. If the vehicle is exceeding the maximum speed for a lower gear, use the service brakes to slow the vehicle to an acceptable speed where the transmission may be downshifted safely. After reaching the lower speed, the ECU will automatically downshift the transmission. Engine braking provides good speed control for going down grades. When the vehicle is heavily loaded, or the grade is steep, it may be desirable to select a lower range before reaching the grade. If engine-governed speed is exceeded, the transmission will upshift automatically to the next range.

**CAUTION** *The transmission incorporates a hold feature to prohibit upshifting above the range selected during normal driving. For downhill operation, select a lower transmission range. However, if engine governed speed is exceeded, the transmission may upshift to the next higher range. Use the vehicle brakes to prevent exceeding engine governed speed in the held range.*

**WARNING** *If you only downshift or only use the service brakes when driving down a steep grade, you can lose control. To maintain control, combine downshifting, braking, and other retarding devices. Downshifting to a lower transmission range increases engine braking and helps maintain control. The transmission has a feature to prevent automatic up shifting above the lower range selected. However, during downhill operation, if the engine governed speed is exceeded in the lower range, the transmission may upshift to the next higher range. This will reduce braking and could cause a loss of control. Apply the vehicle brakes or other retarding device to prevent exceeding engine governed speed in the lower range selected.*

#### **Electric Retarder (If Equipped)**

- The electric retarder control switch is mounted on the vertical panel, left of the driver. It has five positions (one "off" and four retard positions). Each higher number increases the amount of retardation to slow the vehicle.
- Remember the retarder is a vehicle slowing device, not a stopping device. A full stop must be accomplished with the service brakes.
- Always release the accelerator completely before applying the retarder.
- Do not use the retarder when road surfaces are slippery.
- Consult the retarder manufacturer's Owner's or Operator's Manual for additional information.



### Transmission Indicator Lights

The instrument panel contains two indicator lights and one priority message associated with the transmission:

**Range Inhibited (priority message).** Under certain operating conditions, the Transmission Control Module (TCM) may restrict gear selection to protect the engine / transmission from damage. For example, if a downshift would cause the engine to over-rev, the transmission may not respond to a change at the shift lever until engine RPM decreases. When this occurs, the RANGE INHIBITED warning will appear in the message display center. See the Range Inhibited Light and Shift Inhibits section of the Allison Transmission operator's manual for more information.

**Check Transmission.** While driving, be alert to any abnormal shifting, unusual sounds or vibrations, smells, or frequent illumination of a transmission priority message. If you experience any of these, get service immediately.

**Transmission Temperature.** An oil temperature readout in the message display center of the instrument panel indicates the transmission oil temperature. Extended operations at low vehicle speeds with the engine at full throttle can cause excessive oil temperatures. These temperatures may overheat the engine cooling system and lead to engine and/or transmission damage.

If excessive temperature is indicated by the engine coolant temperature gauge, stop the vehicle and check the cooling system. If the cooling system appears to be functioning properly, shift to neutral and accelerate the engine to 1,200–1,500 rpm. This will reduce the transmission temperature to operating level within two or three minutes. If high temperature persists, stop the engine and have the overheating condition investigated by service personnel.

If the transmission oil temperature readout indicates excessive temperature, check the oil level in transmission (refer to the Oil Check Procedure in your Allison Transmission Operator's Manual). Stop the vehicle and shift to neutral. Accelerate the engine to 1,200–1,500 rpm. The temperature should return to normal within two or three minutes before the vehicle resumes operation. Normal temperature for both on and off-highway operation is 160° to 200° F. Oil temperature should never exceed 250° F. If the sump oil temperature reaches 250° F, the TCM will inhibit operation in the higher gears and turn on a priority message in the message display center indicating high transmission temperature.

If high temperature in either engine or transmission persists, stop the engine and have the overheating conditions investigated by maintenance personnel.

**CAUTION** *The engine should never be operated for more than 30 seconds at full throttle with the transmission in gear and the vehicle not moving. Prolonged operation of this type will cause the transmission oil temperature to become excessively high and will result in damage to the transmission.*

**Exhaust System**

New federally mandated emission standards affect all buses equipped with 2010 emission compliant diesel engines. Both nitrogen oxide (NOx) and particulate matter are reduced by 90 percent from 2004 levels. The exhaust system of the Cummins engine in Blue Bird buses are *aftertreatment* systems which incorporate a *Diesel Particulate Filters* (DPF) and a Selective Catalytic Reduction (SCR) system instead of ordinary mufflers. These sophisticated exhaust systems reduce emissions by trapping exhaust-borne particulates (soot) in a filter built into the DPF. The SCR system then reduces NOx levels through a chemical reaction changing the NOx into harmless nitrogen and water.

Soot accumulates in the DPF over time and must be removed by a process referred to as *regeneration*. Regeneration is conceptually similar to the cleaning mode of a self-cleaning oven in that heat is required to remove the soot.

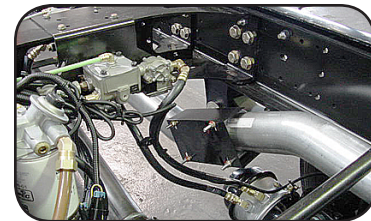
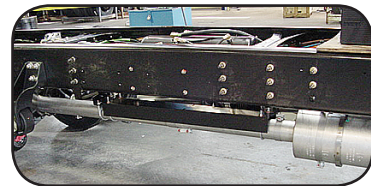
The rate at which soot accumulates is dependent upon multiple conditions including the quality of the diesel fuel, type of engine oil, and ambient temperature, engine load, and other factors. Regeneration occurs in three ways:

- Some regeneration occurs “naturally” whenever operating conditions (speed, engine load, etc.) result in exhaust system temperatures high enough to oxidize accumulated soot. This unassisted regeneration process can generically be referred to as “passive” regeneration.
- Regeneration can be caused by raising the temperature of the exhaust system. Cummins engines are equipped with systems designed to increase exhaust temperature when the ECM senses that regeneration is needed, and when certain requirements, including a minimum travel speed, are met. This automatic “heat assisted” mode can be generically referred to as “active” regeneration.
- Regeneration can be manually activated by means of a switch. This procedure is generically referred to as “stationary” regeneration, and should only be performed by or under the direction of a qualified service technician, and in a controlled environment to avoid the potential for human injury or fire hazards.

The need for regeneration is communicated to the driver by a set of visual and audible signals in the instrument panel. An additional alert, the High Exhaust System Temperature (HEST) indicator, notifies the driver whenever exhaust system temperature is high due to recent regeneration.

Eventually, the normal ash accumulation which results from the regeneration process must be removed from the DPF, using equipment designed for the purpose at qualified engine service facilities. Refer to the engine manufacturer’s documentation for these service intervals. The engine operator’s manual provided with your bus contains additional information about exhaust system regeneration, and should be read and understood by the driver.

**CAUTION** *In 2007 diesel engines, use only diesel fuel labeled Ultra Low Sulfur, per the engine manufacturer’s specifications. In Cummins, use oils meeting API CJ-4/SL and Cummins Engine Standard CES-20081. See Cummins Owners Manual ISB 6.7L CM2150 for details.*



*The exhaust systems of 2010 emission compliant engines incorporate engine-specific Diesel Particulate Filters, which operate at higher temperatures during their Regeneration cycles. The front exhaust pipes are insulated, and heat shields are installed at locations along the exhaust tubing.*



## DPF Regeneration In Blue Bird Buses

As with most new mechanical processes, the introduction of more sophisticated exhaust systems in 2010 emission standards-compliant engines has generated some degree of initial confusion. Engine manufacturers have designed their own methods to accomplish the regeneration (cleaning) of the DPF, and therefore describe the process in somewhat differing terms.

The Cummins equipped Blue Bird bus system is not complicated. Nor should the regeneration process be regarded with alarm. Both Drivers and service technicians should be at least conceptually familiar with the regeneration process.

As soot builds up in the DPF filter, the driver is notified in several stages by visual and audible alerts. The alert system is designed to provide reasonable and comfortable fore-warning and adequate opportunity for the needed regeneration. As the need for regeneration becomes more severe, the alerts become increasingly imperative; and the penalty for postponing the needed regeneration also increases.

When the earliest alerts occur, there is typically ample time to complete a route and then have a Stationary Regeneration procedure performed at a proper facility. If early alerts are ignored, and the condition is allowed to worsen, the engine will eventually de-rate automatically, and performance will reduce noticeably. If the condition is allowed to become severe, a Stationary Regeneration may not be possible, and the DPF may require removal and treatment using specialized equipment. Therefore, to minimize disruption of your bus operation, the regeneration-related alerts should be heeded and responded to at their early stages as a matter of routine.

### Aftertreatment Terms

The following summarizes some of the terms associated with the exhaust systems of Blue Bird buses equipped with 2010 emission standards compliant engines. Both the driver and technician should become familiar with the following terms:

**Aftertreatment.** The process of highly filtering engine exhaust in order to reduce emissions, and of purging the exhaust system of accumulated exhaust residue.

**DPF (Diesel Particulate Filter).** A component in the exhaust system which takes the place of a traditional muffler. A DPF contains a special dissimilar metals filter which traps particulate accumulation (soot), which is then converted to carbon dioxide by the aftertreatment process. The Cummins DPF also contains a catalytic converter.

**Regeneration.** The process of cleaning accumulated soot from the filtering components inside the DPF. Regeneration occurs at high exhaust system temperatures to turn the soot into carbon dioxide gas. Regeneration can be thought of as conceptually similar to the clean cycle of a self-cleaning oven.

**WARNING** *Postponing regeneration beyond the early indications may result in the engine being automatically de-rated, and reduction of power while driving.*

**WARNING** *The aftertreatment regeneration process can cause extremely high exhaust gas temperatures hot enough to ignite or melt common materials, and to burn people.*

*Carefully read, understand, and abide by all instructions, warnings, and cautions in the engine manufacturer's operator's manual (and other related engine manufacturer's literature) regarding safe operation when the HEST indicator is on.*

*Carefully read, understand, and abide by all instructions, warnings, and cautions in the engine manufacturer's operator's manual (and other engine manufacturer's literature) regarding safety conditions when performing Stationary regeneration.*

**HEST Indicator (High Exhaust System Temperature).** An instrument panel indicator which appears when the exhaust temperature is unusually high due to recent regeneration. This is a normal behavior of the aftertreatment system, intended to notify the driver and technician that the exhaust system temperature is high and that caution should be observed around the exhaust system.

**DPF Indicator.** An instrument panel indicator which displays when particulate accumulation has reached a preset level in the DPF, and regeneration is needed. The bus should either be operated with a more demanding duty cycle until the indicator goes off, or it should be scheduled for a Stationary Regeneration at a service facility.

### Levels of Notification

Regeneration—the process which clears soot accumulation in the DPF—occurs automatically as the bus is operated, as long as certain operating conditions (such as minimum speed thresholds) are met. When bus operating conditions do not provide adequate opportunity for the regeneration system to keep the DPF clear, soot begins to accumulate. A system of driver alerts keeps the driver informed of when the exhaust system is in need of regeneration, and of high exhaust temperature associated with regeneration. Several levels of regeneration alerts occur in sequence, each indicating a more imperative warning.

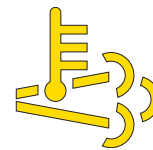
**High Exhaust Temperature Notification.** The High Exhaust System Temperature (HEST) indicator appears to alert the driver when exhaust temperature is unusually high and that prudent judgement should be applied regarding the proximity of people or combustibles to the exhaust system. For example, the bus should not be parked on a surface of grass or weeds.

With the Cummins engine, the HEST indicator appears whenever the exhaust temperature is high (752°F or above), regardless of moving speed.

The driver should be familiar with and abide by all instructions, warnings, and cautions in the engine manufacturer's operator's manual regarding safe operation when the HEST indicator is on.

- The HEST alert appears in the instrument panel.
- The audible alarm sounds one beep.

#### HEST Notification



*The HEST alert appears in the instrument panel's warning bank.*



*The audible alert sounds one beep.*

**Level 1 Regeneration Notification: DPF Indicator Appears.** In low-demand operating conditions, it is possible that the regeneration system does not have sufficient opportunity to prevent particulate build-up in the DPF. The ECM senses that accumulation is occurring and that regeneration is needed. The driver is notified as follows:

- The DPF Regeneration alert activates.
- The audible alert sounds one beep.

The above indicates that regeneration of the DPF is needed at the earliest convenience. The regeneration can be accomplished in either of two ways: If practical, the bus could simply be operated for a while at a speed above the automatic regeneration threshold; or the bus could be taken to a suitable location to have a Stationary Regeneration procedure performed.

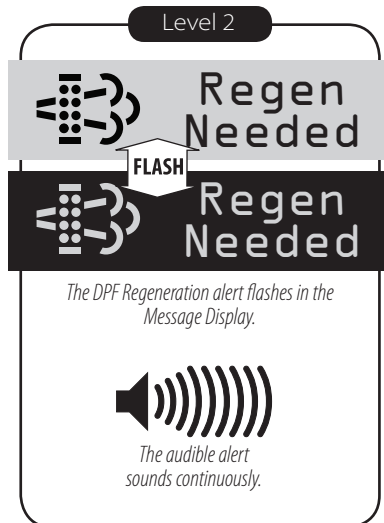
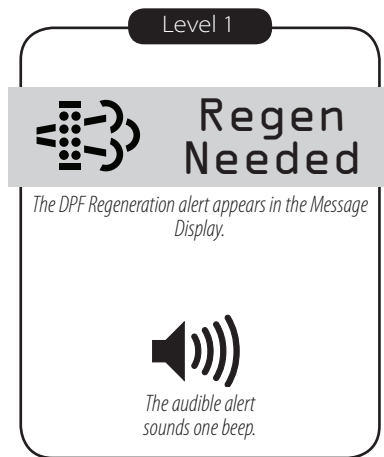
If the bus is operated at a minimum highway driving speed (40 mph Cummins), the automatic regeneration system will activate. If minimum speed is maintained long enough (usually 20-30 minutes), the automatic regeneration mode can likely reduce the soot sufficiently to cause the DPF icon to go off.

Therefore, the first appearance of the DPF icon should be perceived by the driver as a normal notification of action that needs to be taken, but not as an emergency situation. Typically, even if the bus route does not afford immediate opportunity for higher-speed operation, there is sufficient time to finish the bus route and return to the bus maintenance shop before the higher level of notification occurs. Exactly how much “warning time” the first appearance of the DPF indicator represents is dependant upon specific operating conditions. However, current data from Cummins suggest that, at this level of notification, the DPF needs to undergo regeneration within the next two to six hours of bus operation. If regeneration does not begin, a more imperative notification will activate.

**Level 2 Notification: DPF Indicator Blinks.** If the bus continues to be operated without taking the measures indicated by a Level 1 Notification (described above), particulate accumulation continues, and a more imperative notification occurs:

- The DPF Regeneration alert begins to flash.
- The audible alarm sounds continuously.
- The engine may be automatically de-rated.

The above indications should be interpreted as a more imperative alert that the exhaust system is in need of regeneration soon. As soon as practical, the bus should be operated at or above the minimum speed needed to allow automatic regeneration to activate, or a Stationary Regeneration must be performed. Again, situation-specific variables apply. Current data from Cummins suggest that at this level of notification, the DPF needs to be regenerated within the next one to two hours of bus operation. Otherwise, the third level of notification will occur.



**Level 3 Notification: Check Engine Indicator Appears.** If the bus continues to be operated without taking the measures indicated by a Level 2 Notification, particulate accumulation worsens. These indicators are activated:

- The DPF Regeneration alert continues to flash.
- The audible alert sounds continuously.
- The engine is automatically de-rated.
- The Check Engine alert appears.

The above indicates that a Manual Regeneration must be performed as soon as possible. Because the engine is automatically de-rated it may not be possible to drive at sufficient speed to cause active regeneration to occur.

With the Cummins engine, depending upon the severity of the accumulation, the regeneration switch may not be allowed to initiate a regeneration without use of Cummins’s PC-based diagnostic software, Insite.

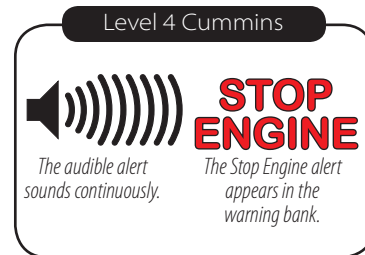
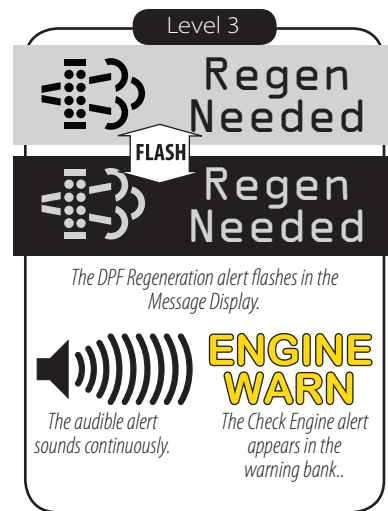
**Level 4 Notification: Stop Engine Indicator Appears.** If the bus continues to be operated without taking the measures indicated by a Level 3 Notification, particulate accumulation reaches a critical level. Engine power is automatically *further* de-rated by the ECM. These indicators are activated:

- The DPF Regeneration alert deactivates.
- The audible alert sounds continuously.
- The engine is further de-rated.
- The Check Engine alert deactivates.
- The red Stop Engine alert appears.

The above indicates that accumulation has progressed to critical levels and the bus should be stopped with the engine off as soon as it is safe to do so. The bus should remain shut down until the aftertreatment system has been serviced.

With the Cummins engine, the regeneration switch will not be allowed to initiate a regeneration without use of Cummins’s PC-based diagnostic software, Insite.

Removal and cleaning of the DPF using specialized equipment may be required.





### Stationary Regeneration Precautions

During active regeneration, the exhaust system can reach extremely high temperatures. Automatic active regeneration, which occurs while driving the bus, is programmed to occur only when the bus is moving at a minimum speed, and it stops when the vehicle slows or stops.

With the Cummins engine, the HEST indicator appears whenever the high temperature condition exists.

When performing a Stationary Regeneration, the entire process occurs for an extended period while the bus is stopped. It is therefore critical that prudent human safety and fire hazard precautions are followed. Those precautions include:

- Read, understand, and abide by all the precautions pertaining to regeneration procedures in the engine manufacturer's Operator's Manual.
- If at all possible, the Stationary Regeneration procedure should be conducted at a service facility by trained technicians.
- The Driver's first priority is the safety of the passengers. If a Stationary Regeneration must unavoidably be done by the Driver under a qualified technician's direction, alternate transportation should be arranged first, or passengers should be removed under proper supervision to a location away from the bus.
- Select an appropriate location to park the vehicle.
  - Choose a surface that will not burn or melt under high temperature, such as clean concrete or gravel, *not grass or asphalt*.
  - Ensure that nothing that can burn, melt, or explode (gasoline, wood, paper, plastics, fabric, compressed gas containers, hydraulic lines) is near the exhaust outlet. Abide by all instructions, warnings, and cautions in the engine manufacturer's operator's manual regarding safe operation when performing a Stationary Regeneration.
- Park the bus securely.
  - Set the parking brake. Put the transmission in Neutral. Chock the wheels.

- Secure the exhaust area.
  - If bystanders might enter the area, set up barriers to keep people safely away from the exhaust outlet.
  - If the procedure is performed indoors at a service facility, attach an exhaust discharge pipe rated for at least 1500°F.
  - Keep a fire extinguisher nearby.
- Check exhaust system surfaces to confirm that no tools, rags, grease, debris or any other objects are on or near the exhaust system.
- Start the engine.
- Operate the Regeneration Switch to begin the regeneration process.
- Monitor the process. If any unsafe condition occurs, shut off the engine immediately. During the regeneration process, the engine may change speed, and the turbocharger may whistle. When the process is complete, the engine will return to normal idle speed. Exhaust gas and exhaust surface temperatures will remain elevated until they have had time to cool to normal levels.

### **SCR System in Blue Bird Buses**

The Selective Catalytic Reduction (SCR) system uses diesel exhaust fluid (DEF) as a chemical reactant. The DEF converts to ammonia in the exhaust stream. This ammonia reacts with NO<sub>x</sub> over a catalyst to form harmless nitrogen gas and water.

In an SCR system, the rate at which DEF is sprayed must be tightly controlled. If the rate is too high, not all of the ammonia will react with the NO<sub>x</sub> and some ammonia will “slip” through the catalyst. If the rate is too low, the desired NO<sub>x</sub> reduction will not be achieved. Both situations are undesirable and must be avoided.

The DEF-SCR system basically consists of three elements:

**SCR Catalyst.** The catalyst is mounted in the exhaust stream. It is similar in outward appearance to a small muffler. It contains chemical compounds which, in the presence of ammonia, help transform nitrogen oxides into harmless nitrogen and water.

**DEF dosing system.** The DEF dosing system and the decomposition reactor spray a fine mist of DEF under all environmental conditions. The DEF amount has to be carefully controlled so that the availability of ammonia is closely matched to the amount of NO<sub>x</sub> being produced by the engine in real time.

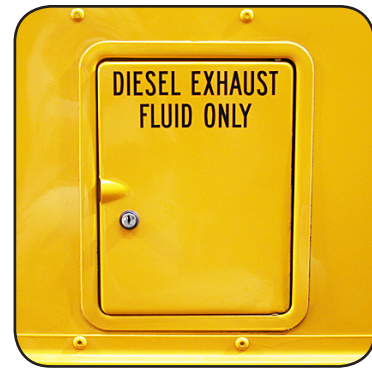
**DEF.** DEF is carried on board the bus as a water solution in a 15 gallon storage tank. The storage tank is sized to minimize operator filling, but within packaging and weight constraints of the vehicle. The storage tank and DEF dosing system is protected from freezing since the DEF-solution solidifies at approximately 11°F (-12°C).

The SCR system consumes DEF at a rate of approximately 2% of the amount of fuel used, depending on bus operation. Therefore a 15 gal tank of DEF will treat approximately 750 gallons of diesel fuel.

The DEF tank level indicator can be found in quadrant 3 of the message display center located in the instrument cluster. This display provides a constant reading indicating the percent of DEF in the tank. If a problem is identified with the amount of fluid or the quality of the DEF a priority message will appear in quadrant 1 of the message display center indicating the fault.

Keeping adequate levels of DEF in the tank is crucial to the operation of the SCR system. When low levels in the DEF tank are indicated, refill the tank using only approved DEF solution. The DEF has its own tank and fill port with a blue cap. You will notice the fill port is smaller than the diesel fuel port. This is to prevent putting diesel fuel into the DEF tank. Conversely, care should be given not to put DEF in the diesel fuel tank. Read all decals carefully before refilling.

Refer to Blue Bird and Cummins Service Manuals for detailed description of the aftertreatment system.



*DEF Fill Door*



*DEF Fill located to the left of the entrance door.*



*Diesel Fill*

**DEF Levels of Priority Notification**

A system of driver alerts keeps the driver informed of when the DEF is in need of service. When fluid is low or contaminated, several levels of alerts occur in sequence, each indicating a more imperative warning. When priority warnings occur, they will appear in Quad 1 of the Message Display in lieu of the odometer reading while Quad 3 indicates fluid level in the DEF tank at all times. The notifications are as shown below.

**DEF Level 1.** When the DEF level reaches 10% in the tank, a **DEF LEVEL LOW** warning will appear in Quad 1 of the Message Display at which point the amber DEF warning icon will appear in the lower left warning bank. This warning is accompanied with a single beep.


**DEF Level 2.** When the DEF level reaches 5% in the tank, a **DEF LEVEL CRITICAL** warning will appear in Quad 1 of the Message Display, this DEF LEVEL CRITICAL warning display will flash from positive to negative and the amber DEF Warning icon will remain in the lower left warning bank. This warning is accompanied with repeating beeps.

**DEF Level 3.** When the DEF level reaches 2.5% in the tank, a **DEF LEVEL DERATE** warning will appear in Quad 1 of the Message Display, this DEF LEVEL DERATE warning display will flash from positive to negative. The amber DEF Warning icon will commence flashing in the lower left warning bank and an additional amber Engine Warning light will appear. At this point a 25% engine torque derating will occur.


**Level 1**

**DEF Level Low**

*The DEF Level alert appears in the Message Display.*



*The DEF Warning will appear in the Warning Bank.*



*The audible alert sounds one beep.*


**Level 2**

**DEF Level Critical**


**FLASH**

**DEF Level Critical**

*The DEF Level alert appears in the Message Display.*



*The DEF Warning will appear in the Warning Bank.*



*The audible beeps repeatedly.*


**Level 3**

**DEF Level Derate**

**FLASH**

**DEF Level Derate**


*The DEF Level alert appears in the Message Display.*



*The DEF Warning will flash in the Warning Bank.*

**ENGINE WARN**

*The Engine Warning will appear in the Warning Bank.*



*The audible beeps repeatedly.*



**DEF Level 4.** When the DEF level reaches 0% in the tank, a **DEF TANK EMPTY** warning will appear in Quad 1 of the Message Display, this DEF TANK EMPTY warning display will flash from positive to negative. The amber DEF Warning icon will continue flashing in the lower left warning bank and the amber Engine Warning light will be illuminated. Continued 25% engine torque derating.

**DEF Level 5.** When DEF system can no longer maintain pressure, a **DEF SPEED LIMIT** warning will appear in Quad 1 of the Message Display, this DEF SPEED LIMIT warning display will flash from positive to negative. The amber DEF Warning icon will continue flashing in the lower left warning bank. The amber Engine Warning light will remain illuminated and a red Stop Engine light will appear. At this point a 5 MPH speed limit will be introduced with the 25% engine torque derating.


Level 4

**DEF Tank Empty**

FLASH

**DEF Tank Empty**


*The DEF Level alert appears in the Message Display.*



**ENGINE WARN**

*The Engine Warning will appear in the Warning Bank.*

*The DEF Warning will flash in the Warning Bank.*



*The audible beeps repeatedly.*


Level 5

**DEF Speed Limit**

FLASH

**DEF Speed Limit**

*The DEF Level alert appears in the Message Display.*




**ENGINE WARN**

*The Engine Warning will appear in the Warning Bank.*

*The DEF Warning will flash in the Warning Bank.*

**STOP ENGINE**

*The Stop Engine Light will appear in the Warning Bank.*

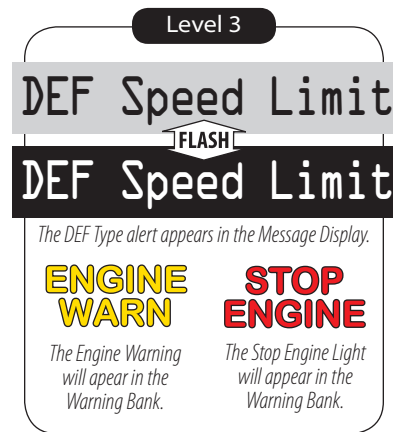
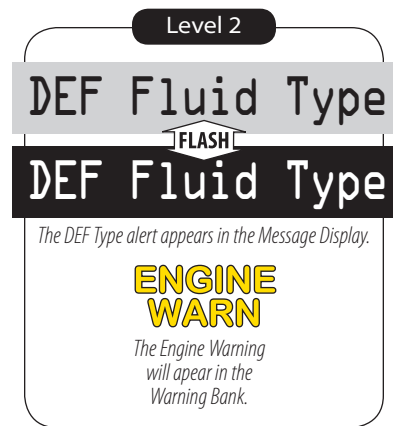
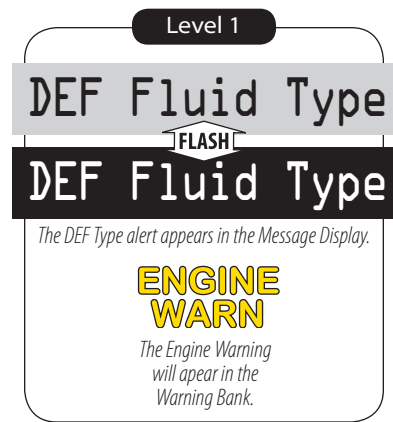


*The audible beeps repeatedly.*

**DEF Type Level 1.** When incorrect fluid or mixture is introduced into the tank, a **DEF FLUID TYPE** warning will appear in Quad 1 of the Message Display, this DEF FLUID TYPE warning display will flash from positive to negative. The amber Engine Warning light will appear in the lower left warning bank. The integrity of the DEF solution needs to be checked using a refractometer. DEF system service should be attained within 10 hours or subsequent levels of derating will occur.

**DEF Type Level 2.** The **DEF FLUID TYPE** warning in Quad 1 of the Message Display continues to flash from positive to negative. The amber Engine Warning light will appear in the lower left warning bank. At this point a 25% engine torque derating will occur. DEF system service should be attained within 10 hours or subsequent levels of derating will occur.

**DEF Type Level 3.** After 10 Hours at level 2, a **DEF SPEED LIMIT** warning will appear in Quad 1 of the Message Display, this DEF SPEED LIMIT warning display will flash from positive to negative. The amber Engine Warning light will remain illuminated and a red Stop Engine light will appear. At this point a 5 MPH speed limit will be introduced with the 25% engine torque derating.





**SCR Fault Level 1.** When an SCR System Fault is detected, a **SCR SYSTEM FAULT SEE ENGINE DIAGNOSTIC** warning will appear in Quad 1 of the Message Display, this SCR SYSTEM FAULT SEE ENGINE DIAGNOSTIC will flash from positive to negative. The amber Engine Warning light will appear in the lower left warning bank. Engine diagnostic codes should be recorded and appropriate repairs should be made. DEF system service should be attained within 10 hours or subsequent levels of derating will occur.

**SCR Fault Level 2.** After 10 Hours at level 1 the amber Engine Warning light *WILL* be illuminated and a 25% engine torque derating will occur. DEF system service should be attained within 30 hours or subsequent levels of derating will occur.

**SCR Fault Level 3.** After 30 Hours at level 2 the amber Engine Warning light and the Stop Engine light *WILL* be illuminated. At this point a 5 MPH speed limit will be introduced with a 25% engine torque derating.

**Level 1**

**SCR System Fault  
See Engine Diagnostic**

**FLASH**

**SCR System Fault  
See Engine Diagnostic**

*The SCR Fault alert appears in the Message Display.*

**ENGINE  
WARN**

*The Engine Warning  
will appear in the  
Warning Bank.*

**Level 2**

**SCR System Fault  
See Engine Diagnostic**

**FLASH**

**SCR System Fault  
See Engine Diagnostic**

*The SCR Fault alert appears in the Message Display.*

**ENGINE  
WARN**

*The Engine Warning  
will appear in the  
Warning Bank.*

**Level 3**

**SCR System Fault  
See Engine Diagnostic**

**FLASH**

**SCR System Fault  
See Engine Diagnostic**

*The SCR Fault alert appears in the Message Display.*

<p><b>ENGINE WARN</b></p> <p><i>The Engine Warning will appear in the Warning Bank.</i></p>	<p><b>STOP ENGINE</b></p> <p><i>The Stop Engine Light will appear in the Warning Bank.</i></p>
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## General Propane Tank Filling Procedures

The most important procedure of filling any propane tank is safety. Understanding the properties & characteristics and safe handling practices of the fuel is required before conducting any propane tank filling efforts.

A propane powered vehicle is equipped with a propane tank built to and certified to the regulations of the American Society of Mechanical Engineers (ASME). These tanks have a data plate with pertinent information including the ASME stamp and the plate must be securely attached and legible or the tank should be taken out of service and replaced. There are no requirements for re-certifying ASME tanks however inspection is required and maintenance is recommended if there are signs of corrosion.

Propane tanks are filled to 80% capacity to allow for the liquid fuel to expand and contract depending on ambient or other influent temperatures. All tanks built for use on motor vehicles are equipped with overfilling prevention protection. The National Fire Protection Association (NFPA) have required motor vehicle propane tanks be equipped with a stop filling device to automatically prevent overfilling or filling the tank beyond the maximum recommended capacity of 80%. This automatic stop fill system provides the primary method of preventing overflow of the fuel tanks. This rule has been in effect since January 1, 1984.

As a secondary means of preventing an overflow condition of the fuel tanks and a means of verifying the accuracy of the automatic stop fill device, the tanks are equipped with an 80% fixed maximum liquid level outage valve (Manual bleeder valve). The valve would be used to verify when the liquid fuel reaches the 80% level at which point the fill process would be stopped. This valve can be used when filling and releases fuel in a vapor phase until the fuel reaches the 80% level at which time a stream of liquid will appear indicating the fuel level in the tank is 80%. Most propane fueling stations will want to open this bleeder valve however since the propane motor vehicle tank is equipped with an overflow prevention device it is not necessarily required and may be prohibited in certain municipalities where the release of hydrocarbons to the atmosphere is prohibited. The NFPA ruled that when the tank is equipped with an overflow prevention device the use of the 80% bleeder valve is not required.

**WARNING** *Technicians working with, or around, fuel systems should be properly trained to utilize extreme care and caution at all times. Failure to exercise extreme caution and care may lead to serious accidents which can result in property damage, personal injury and/or death.*

## Propane Powered Motor Vehicle Filling Procedures

1. Entering the propane fueling station.
  - 1.1 Park the vehicle in close proximity to the motor fuel dispensing station.

**WARNING** NO SMOKING ALLOWED.

2. Turn off and remove the vehicle ignition key.
3. Exit the vehicle and ask all passengers to step outside the vehicle.
  - 3.1 Some stations may ask all passengers to stand outside the area where the fill process is taking place.
  - 3.2 Some stations could be self-service and the driver would perform the filling process; however in this case the driver has to be trained and certified to obtain an authorized filling station dispenser access card.
4. The attendant may need to inspect the propane tank for corrosion, dents and verify the data plate displays the ASME stamp and other pertinent information is correct. An attendant can refuse to fill your propane tank if it does not pass this inspection. Regular inspection and maintenance of your tank will prevent refusal to fill the tank.
5. Verify the meter is set to zero.
  - 5.1 If the dispenser is an electronic dispenser it will set to zero automatically once the transaction has been initiated.

**WARNING** For passenger safety, Blue Bird recommends all occupants disembark to a safety zone before fuel filling procedures take place.

**WARNING** Technicians working with, or around, fuel systems should be properly trained to utilize extreme care and caution at all times. Failure to exercise extreme caution and care may lead to serious accidents which can result in property damage, personal injury and/or death.



6. Connect the fuel nozzle to the vehicle fueling receptacle.
  - 6.1 The propane fueling nozzle has to be screwed on securely.
    - A. Wear protective gloves while fueling a propane tank.
    - B. Remove the protective cap from the vehicle fueling receptacle.
    - C. Mate the nozzle coupling to the fueling receptacle.
    - D. Turn the nozzle coupling in a clockwise direction; two or three turns until secure. A soft rubber washer or o-ring seals the connection so over tightening is not required.
    - E. Most nozzles for motor vehicle fueling are much like a gasoline type nozzle. The nozzles are also minimum bleed type for safety and to meet hydrocarbon release requirements in certain jurisdictions.
7. Turn on the propane dispenser/pump and begin the filling process.
  - 7.1 Open the nozzle to begin filling.
  - 7.2 Do not fill the tank based on a mechanical float gauge reading or the fuel level gauge on the dashboard.
  - 7.3 Pay attention and never walk away from the filling process.
  - 7.4 As a primary method of determining when the tanks are full (80% capacity) an 80% stop fill device will automatically stop the filling process when the liquid propane reaches an 80% liquid level capacity in the tanks.
  - 7.5 As a secondary method of determining when the tanks are full (80% capacity) an 80% fixed maximum liquid level outage valve (Manual bleeder valve) can be used.
    - A. Open the 80% fixed liquid level valve (located at the fill port)
    - B. Vapor will be vented from the valve during the filling process
    - C. When liquid propane begins to vent the from the valve the tanks have filled to 80% capacity
    - D. Immediately close the 80% fixed liquid level valve

E. Immediately close the filling nozzle

*NOTE: The 80% fixed liquid level valve can be used to verify the accuracy of the automatic stop fill device*

8. Release or close the fueling nozzle.
  - 8.1 Turn off the fuel dispenser/pump.
  - 8.2 Carefully and slowly unscrew the fueling nozzle (unscrew counter clockwise).
    - A. A minimum bleed nozzle should have released any pressure left in the space between the nozzle and the receptacle when closed and should not bleed any pressure when unscrewing the connection.
    - B. Some nozzles will have more pressure trapped between the nozzle and the receptacle so it is necessary to slowly unscrew the connection to allow pressure to bleed off before removing the nozzle completely. Some nozzles will be equipped with a small bleeder valve to release this trapped pressure before disconnecting the nozzle.
9. Replace the nozzle and fuel transfer hose on the dispenser.
10. Verify there are no leaks at the tank filling receptacle and replace the protective cap.
11. Document the amount of fuel received.
12. The fueling process is complete.

**WARNING** *During a propane vehicle fueling process fuel may be emitted to the immediate area. There could be a combustible fuel mixture around this immediate area. The person performing the re-fueling process has total responsibility for safety in the immediate area.*

**NOTES:**

- It is unlawful to fill a non-compliant tank or a tank that poses a safety violation.
- Any person performing the re-fueling process must be trained and certified in the procedures of filling propane tanks and in the procedures of safe handling.

## Enroute Emergencies

In the case of any enroute emergency, the Driver must ensure the safety of the passengers before performing any procedure on the bus. Safely maneuver the bus to the nearest safe location; a parking lot or emergency lane if possible, and take appropriate measures to arrange for pick up of the passengers and notify public safety officials.

**WARNING** *No one should attempt to transport passengers without thorough knowledge of the controls and safety equipment. See the Driver Orientation and Pretrip Inspection sections of this manual, and thoroughly familiarize yourself with the locations of all emergency equipment.*

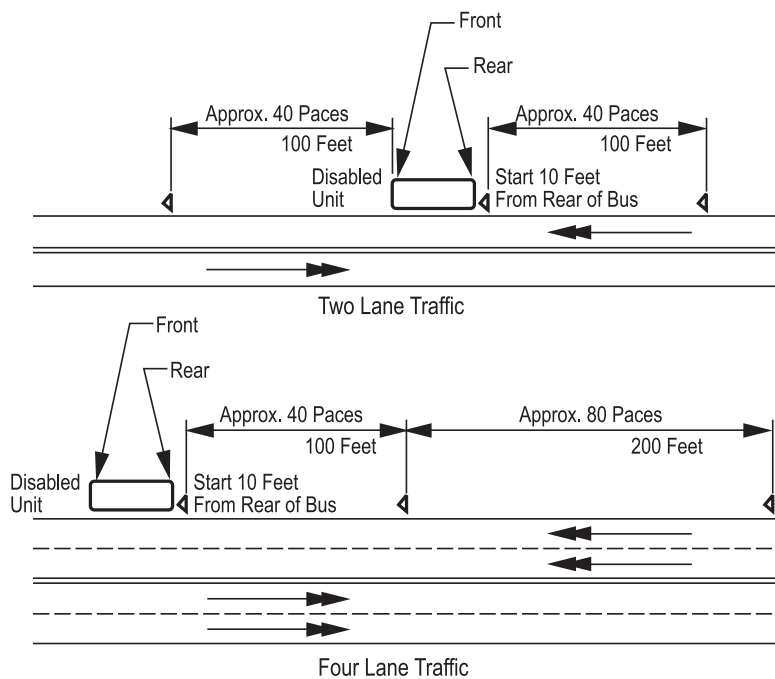
It is assumed that the Driver will seek immediate assistance of qualified service technicians in the event of any mechanical failure. The information in this section is only to provide some information which may be helpful to service technicians rendering assistance.

## Using Triangular Hazard Reflectors

In the event that the bus must be parked in an emergency lane or road shoulder, deploy the triangular roadside hazard reflectors as follows:

On a two-lane roadway, place a triangular marker 100 feet (about 40 paces) to the front of the vehicle, with reflective side facing oncoming traffic. Place another triangular marker 100 feet (about 40 paces) to the rear of the vehicle, with the reflective side toward overtaking traffic.

On a four-lane roadway, place one triangular marker 100 feet (about 40 paces) to the rear of the vehicle. Place another triangular marker 200 feet (about 80 paces) from the first marker (300 feet behind the vehicle). The reflective side should be facing overtaking traffic.



## Using Booster Cables

**WARNING** *Ensure that the ignition switch of the disabled vehicle is in the "OFF" position. Always connect the POS (+) battery cable first. Connect the NEG (-) cable to the chassis, away from the batteries. The batteries produce a highly flammable gas. Do not smoke while working near batteries. Take all precautions to prevent sparks from any source in the proximity of the batteries.*

1. Ensure the posts on the jumper and bus batteries are clean.
2. Using the RED jumper cable, connect the POS (+) terminal of the bus battery to the POS (+) terminal of the jumper battery.
3. Using the BLACK jumper cable, connect one end to the NEG (-) terminal of the jumper battery.
4. Connect the other end of the BLACK jumper cable to a solid chassis ground on the bus, such as the engine. Do not connect the black jumper cable to the NEG (-) terminal of the bus battery.

**CAUTION** *Do not crank the engine for more than 30 seconds. Allow the cranking motor to cool at least 2 minutes between attempts to start the engine.*

5. Allow time for the jumper battery to boost the bus battery before attempting to start the engine.
6. After the engine starts, remove the NEG (-) BLACK booster cable from the ground on the bus.
7. Remove the NEG (-) BLACK booster cable from the terminal of the booster battery.
8. Remove the POS (+) RED booster cable from the POS (+) terminal of the bus battery.
9. Remove the RED booster cable from the POS (+) terminal of the booster battery.



## Starting Problems

For more detailed instructions, refer to the engine manufacturer's Operator's Manual.

One or more of the following items may cause an occasional starting problem:

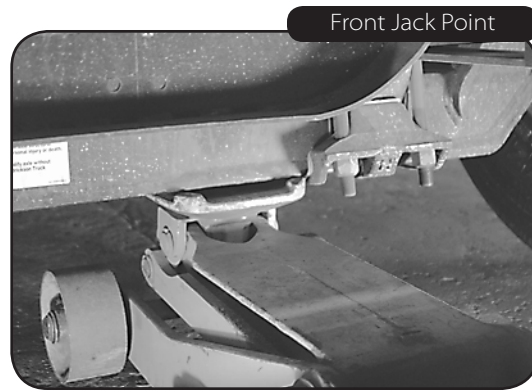
- The Park Brake must be on to start the bus.
- The Transmission must be in Neutral.
- If the bus is equipped with Vandal Locks, the bus will not start unless the doors or windows equipped with Vandal Locks are closed.
- Low battery charge.
- A malfunctioning starter.
- Problems with the wiring harness or connections.
- Out of fuel.

## Jacking and Towing

### Jack Points

**WARNING** Proper jacking procedures and basic safety measures must be observed to ensure the safety of personnel while working under the bus. Always check the serviceability of any lifting equipment prior to use. Ensure that the lifting device is of sufficient strength to handle the bus, and that the surface provides the necessary firmness to support the weight of the bus concentrated on the footprint of the jack. Never move under a bus supported only by a hydraulic jack.

1. Park the bus on a flat, level surface of sufficient firmness to support the jack.
2. Chock the wheels in both directions.
3. Use only jacks and jack stands of sufficient capacity to support the bus. Following the jack manufacturer's recommendations, place the jack securely under the axle at the spring or suspension beam, nearest the tire/wheel to be repaired.
4. Jack the bus only to the height necessary to service.
5. Support the bus with blocks or jack stands under the frame rails.



### Towing

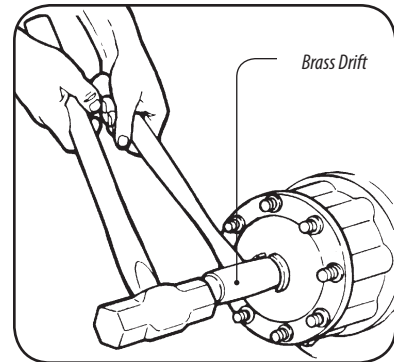
If the bus is towed with the rear wheels on the road, the driveshaft must be prevented from turning in order to avoid possible damage to the automatic transmission. This is accomplished by removing the rear axle shafts, and covering their openings with caps to prevent rear axle lubricant spillage.

Also, on VISION buses equipped with air brakes, if full normal air pressure cannot be provided the air system, the spring brakes must be mechanically caged to prevent their engagement.

1. Apply the parking brake and chock the wheels while preparing the vehicle for towing.
2. Remove the stud nuts and washers from the center hub.

3. To loosen the tapered dowels which surround each stud, use a 1.5" diameter brass drift and 5-6 lb hammer. Hold the brass drift against the center of the axle shaft flange, inside the round driving lugs. Firmly striking the end of the brass drift with the hammer will dislodge the tapered dowels.

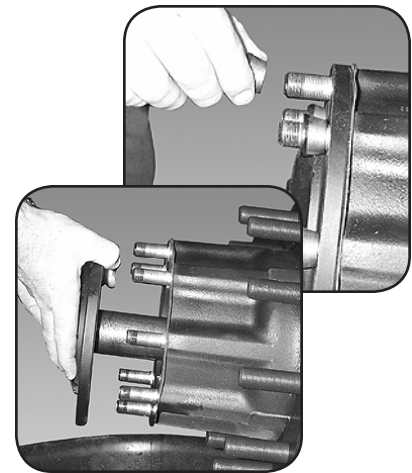
**CAUTION** Do not use a chisel or wedge to loosen the axle shaft and tapered dowels. Doing so can damage the axle shaft, gasket, seal, or axle hub.



4. Mark the axle shaft so that it can easily be identified for reinstallation on the side of the axle from which it is removed. Carefully remove the axle shaft, taking measures to catch the axle lubricant which may spill. Install a cover plate over the open end of the hub to prevent dirt contamination and lubricant spillage during towing.

5. Repeat the above procedure to remove the other axle shaft.
6. If the bus is equipped with air brakes, and if full working air pressure is not present in the system, the spring brakes must be mechanically caged before the vehicle can be towed. Proceed as follows:

**WARNING** Caging the spring brakes disables the parking brake. Ensure that the bus is completely secured against rolling by wheel chocks before caging the spring brakes.

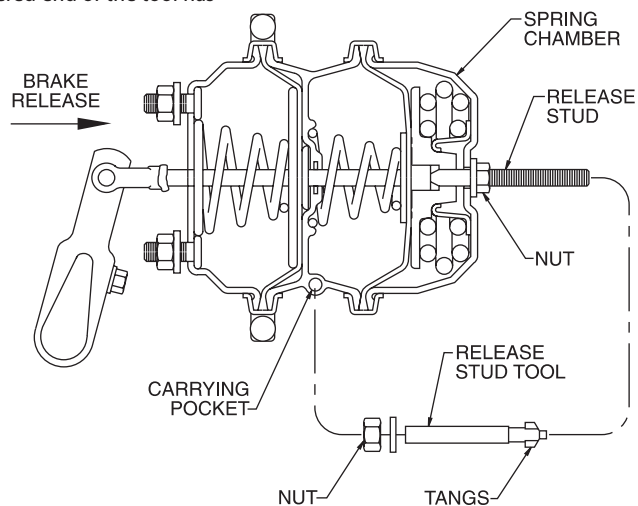


- 6.1 On each of the rear combination brake chambers, a special release stud tool is carried in a storage socket cast into the body of the chamber. Remove the nut and washer from the end of the release stud tool, and remove the tool from its socket.

- 6.2 Remove the rubber dust cap from the access hole in the upper end of the spring brake chamber. Insert the toggle end of the release stud tool into the access hole. Be sure that the tapered end of the tool has entered the hole in the piston inside the chamber. Insert the tool until it bottoms.

- 6.3 Rotate the release stud tool a quarter turn clockwise and pull outward, to engage the toggle end with the piston. While holding the bolt in its engaged position, install the washer and nut onto the end of the tool. Turn the nut down against the flat washer until finger tight.

- 6.4 Using a 3/4" hand wrench, (do not use an impact-type wrench), turn the release nut clockwise until the internal spring is fully caged.



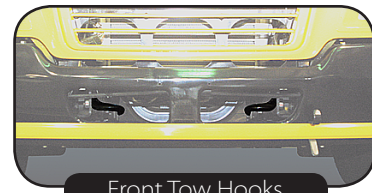
- 6.5 Repeat the procedure for the spring brake chamber on the opposite side of the bus. The spring brakes are now released, having their springs compressed by the release bolts.
  
7. With the axle shafts removed and air spring brakes caged, the bus is prepared for towing. The Vision may be equipped with optional tow hooks, located just inside the access openings of the front and/or rear bumper. Appendix 1 of the Front Axle & Suspension chapter contains additional information about towing procedure.

#### Air Tank Schrader Valve

The supply (wet tank), primary (rear brake reservoir), and secondary (front brake reservoir) air tanks are mounted under the bus, inboard of the chassis frame rails. The supply tank is mounted toward the front of the bus on the left side.

The supply tank is fitted with a Schrader valve to allow manual pressurization of the system for service or testing purposes by using a common air hose, without having to charge the system by running the engine and compressor.

If a service truck rendering assistance is equipped with compressed air, the Schrader valve can be used to pressurize the air brake system of an inoperative Vision, so that its spring brakes can be released in order to move the bus.

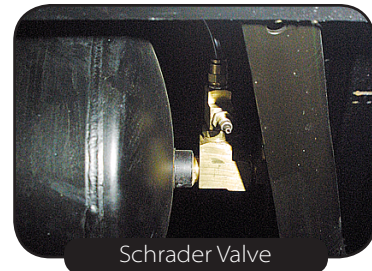


Front Tow Hooks



Rear Tow Hooks

**WARNING** The tow hooks are designed for horizontal pulling only; not for lifting. Never attempt to lift the bus by the tow hooks.



Schrader Valve

## **Scheduled Maintenance**

A regularly-scheduled maintenance regimen will ensure that the bus(es) you operate are always ready for safe, reliable, and efficient duty. Although it is assumed that maintenance tasks will be performed by your operation's Service Technician(s,) not by the Driver, the information in this chapter is provided for convenience, given that the Drivers Handbook will usually reside with the bus.

The Driver, however, is the individual most intimately familiar with the normal sounds, behaviors, and performance of the vehicle. The Driver should be alert to any unusual or changing conditions and bring them to the attention of the service staff. A few Notes pages are provided at the back of this handbook for that purpose.

For more comprehensive service and maintenance information, the Service Technician should obtain and become familiar with the current Blue Bird Service Manual for the particular model(s) being serviced.

**Fluids & Filters**

Fluids & Filters, Vision				
Fluid	Type	Capacity	Filter	Comments
<b>Engine, Cummins ISB</b>				
Engine Oil	High-Quality SAE 15W-40 heavy duty engine oil, such as Valvoline Premium Blue	21.4 Quarts (including filter) 19 Quarts (without filter change)		See your Cummins ISB Owner's Manual for more details.
Engine Coolant	Cummins, Fleetguard ES Compleat 50/50 premix (standard only)	6.8 Gallons (excluding heater system)	BB 0064641 Wix 24070	Cummins equipped buses may have optional extended-life coolant installed. Never mix different coolant colors, types, or brands. See Engine Cooling System chapter for details..
<b>Transmission</b>				
Transmission Fluid	Transynd™	7.4 Quarts (7 liters)	BB 0033381	Transmission refill capacity is substantially less than the initial fill because some fluid remains in the transmission cavities after draining.
<b>Rear Axle</b>				
Axle Oil (RS19-144)	Hypoid Gear Oil	33.3 pints (15.2 liters)		See Rear Axle Viscosity Chart for appropriate viscosity.
Axle Oil (RS21-145)		33.3 pints (15.2 liters)		
Axle Oil (RS23-160)		39.5 pints (18.7 liters)		
<b>Front Axle</b>				
Front Axle Grease	Chevron Dura Lith Grease EP NLGI 2	2.1 pounds		
Front Axle Oil	Chevron RPM Synthetic Transmission Fluid SAE 50	4 pints (1.9 liters)		
<b>Brake System</b>				
Brake Fluid	DOT 3		Fluid BB 0067254	DOT 3 and DOT 5 must not be mixed. If brake system becomes contaminated with DOT 5, the system must be flushed, and major components may require replacement.
Brake Interlock	DOT 5		Fluid BB 1940881	On units with hydraulic brakes and brake interlock feature*
<b>Hydraulic System</b>				
Hydraulic Steering	Dexron III™	3 quarts (approximate)		
<b>Pneumatic System</b>				
AD-9 Air Dryer Element			BB 0020138	On units with air brakes.
AD-IP Air Dryer Element			BB 0066221	On units with air brakes.
<b>Fuel System</b>				
Fuel Filter / Water Separator			BB 1967009	
<b>Other</b>				
Windshield Washer Fluid		1.05 gallons		
Diesel Exhaust Fluid (DEF)		15 gallons	DEF Tank Filter BB 10011120	DEF is an Aqueous Urea solution 32% (AUS 32). Must meet DIN V 70070.



### Rear Axle Viscosity /Temperature Chart

Meritor Lubricant Specification	Description	Cross Reference	Minimum Outside Temperature	Maximum Outside Temperature
0-76-A	Hypoid Gear Oil	GL-5, S.A.E. 85W/140	+10° F (-12.2° C)	*
0-76-B	Hypoid Gear Oil	GL-5, S.A.E. 80W/140	-15° F (-26.1° C)	*
0-76-D	Hypoid Gear Oil	GL-5, S.A.E. 80W/90	-15° F (-26.1° C)	*
0-76-E	Hypoid Gear Oil	GL-5, S.A.E. 75W/90	-40° F (-40° C)	*
0-76-J	Hypoid Gear Oil	GL-5, S.A.E. 75W	-40° F (-40° C)	+35° F (+1.6° C)
0-76-L	Hypoid Gear Oil	GL-5, S.A.E. 75W/140	-40° F (-40° C)	*

\* No upper limit on these temperatures. However, axle sump temperature must never exceed + 250° F (121° C).

## Maintenance Task Schedule

Ensure that the Safety Information, warnings and instructions are read and understood before operation or maintenance procedures are performed. Use whichever interval listed (time, mileage, engine hours) occurs first. Engines operated in severe operating conditions may require more frequent maintenance. See engine manufacturer's specifications for more information.

### As Specified by Engine Manufacturer

#### Engine

Test Engine Oil	Perform oil sample analysis per operators manual.
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### As Specified by Engine Manufacturer

#### Cooling System

Replace Coolant	See your Engine Operator's Manual. Use only premixed coolant(s) approved by the engine manufacturer. Never mix different types or brands of coolant.
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#### Engine

Replace Oil & Filter	See Engine operators manual for oil and filter specifications and maintenance interval.
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Adjust Valves	See Engine manufacturer's Service Manual for interval.
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### As Specified by Transmission Manufacturer

#### Transmission

Adjust Transmission Shift Cable	See Transmission Chapter.
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### First 100 Miles Then Every 12,000 Miles

#### Tires & Wheels

Inspect & Tighten Lug Nuts	Torque to 450-500 ft lb with calibrated torque wrench. Do not over-tighten. Do not lubricate nuts or studs. Operating conditions may require more frequent checks.
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### First 1000 Miles Then Every 3 Months or 6000 Miles

#### Frame

Inspect & Tighten Body Tie Downs Body Tie Down Clamps	Inspect for missing, damaged rubber pads. Tighten clamps to 37-41 ft lb.
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Inspect & Tighten Body Tie Downs Firewall Box Isolator Mounts	Inspect rubber discs for cracking or damage. Inspect spring & fastener for damage. Tighten to 52-56 ft lb.
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Inspect & Tighten Body Tie Downs Front Isolator Mounts	Inspect rubber blocks for cracking or damage. Inspect spring & fastener for damage. Tighten to 52-56 ft lb.
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Inspect & Tighten Body Tie Downs Rear Isolator Mounts	Inspect rubber discs for cracking or damage. Inspect spring & fastener for damage. Tighten bracket to 70-80 ft lb. Tighten Isolator to 54-58 ft lb.
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**First 1000 Miles Then Every 6 Months or 6000 Miles**
**Axle & Suspension, Front**

Inspect & Tighten SofTek Spring Suspension U-Bolts	Tighten to 285–305 ft lb.
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**Axle & Suspension, Rear**

Inspect Comfort Air Suspension Ride Height	Shock length, eye-to-eye: 22.68" +/- 0.25"
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**First 1000 Miles Then Every 6 Months or 12,000 Miles**
**Axle & Suspension, Rear**

Inspect & Tighten Comfort Air Suspension U-Bolts	Tighten 7/8" U-Bolts to 400–450 ft lb. Tighten 3/4" U-Bolts to 260–320 ft lb.
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**First 1000 Miles Then Every 12 Months or 12,000 Miles**
**Heaters & Defrosters**

Inspect Front Heater Hoses & Clamps	Inspect for evidence of leaks or deterioration. replace with proper parts.
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**Axle & Suspension, Front**

Inspect & Tighten AirTek Suspension Axle To Suspension Fasteners	Tighten to 285–305 ft lb.
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**First 5000 Miles Then Every 12 Months or 24,000 Miles**
**Transmission**

Replace Transmission Sump Filter
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**First 5000 Miles Then Every 24 Months or 24,000 Miles**
**Transmission**

Replace Transmission Main Fluid Filter
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**First 11,000 Miles Then Every 6 Months or 5000 Miles**
**Cooling System**

Inspect Charge Air Cooler	Inspect for clogging debris.
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**First Month Then Every 3 Months or 3000 Miles**
**Cooling System**

Inspect & Tighten Hose Clamps	Tighten radiator hose clamps to 90 in lb. Tighten heater hose clamps to 45 in lb.
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**Every Day**
**Doors**

Test Wheelchair Lift	Follow the manufacturers recommendations.
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**Emergency Equipment**

Inspect Fire Extinguisher Charge	Ensure that Extinguisher Charge is not expired.
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Inspect Fire Extinguisher Mounting Bracket	Ensure that Extinguisher bracket is secure and operates correctly.
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Inspect First Aid Kit Contents	Ensure that kit supplies are fully replenished, clean, and not expired.
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Inspect First Aid Kit Mounting Bracket <sup>1</sup>	Ensure that mounting bracket is secure and operates correctly.
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**Emergency Exits**

Inspect All Emergency Exits	Test all emergency exits for proper operation, including warning buzzer.
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**Warning Devices & Signs**

Test Stop Arms & Crossing Arms	
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**Windows**

Inspect All Mirrors	Clean, adjust mirrors.
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Inspect All Windows	Clean Windshield, door glass, driver's window, rear vision windows, rear door windows.
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**Brakes**

Inspect Air Brakes Air Lines & Fittings	Inspect for leaks or physical damage.
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Drain Air Brakes Air Tanks	Drain daily in cold weather; weekly in warm weather.
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Inspect Air Brakes Brake Chambers	See Air Brakes Chapter for inspection criteria.
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Inspect Air Brakes Brake Shoes	Wear depends upon application environment. See Meritor Cam Brakes Appendix in Air Brakes Chapter for guidelines.
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**Cooling System**

Inspect Coolant Level	Top off with premixed coolant of same type as installed. Never mix coolants of different colors, types, or brands. See engine Operator's Manual for details.
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Inspect Entire Cooling System	Visually inspect for any signs of leakage.
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### Electrical

Inspect All Lights	Check all running, stop, marker, hazard, and warning lights for proper operation.
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### Engine

Inspect Oil Level	See Engine operators manual for oil specifications.
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### Fuel System

Inspect Fuel Cap

Inspect Water Separator Petcock Drain	Check for water contamination.
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### Intake System

Inspect Intake Tract Duct & Elbow	Visually inspect for proper fit and sealing, cuts, abrasions, signs of dirt contamination.
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Inspect Intake Tract Restriction Indicator	Replace filter element if indicator is red.
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### Steering

Inspect Power Steering Fluid Level	Replenish to full mark. Dexron III.
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### Tires & Wheels

Inspect All Tires & Wheels	Check air pressure. Visually inspect tires, tread wear, lug nuts, including spare.
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### Transmission

Inspect Transmission Fluid Level	Check production order for proper type of fluid to be added.
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## Every Week

### Seats

Inspect & Tighten Passenger Seats Cushion Screws	Inspect for loose cushions clips.
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Inspect Passenger Seats Seat Belts	Lubricate buckles, clean webbing as required. Replace any damaged webbing straps.
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Inspect Passenger Seats Upholstery	Inspect for cuts, tears, wear and soiled areas.
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### Brakes

Inspect Hydraulic Brakes Pads	Replace if worn to within 1/8" lining remaining.
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## Every 50,000 Miles

### Fuel System

Inspect Spark Plugs	Inspect gap and condition; Inspect wiring
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## Every 60,000 Miles

### Fuel System

Replace Fuel Filter

**Every 90,000 Miles**
**Fuel System**

Replace Spark Plugs

**Every Month or 3000 Miles**
**Doors**

Lubricate All Doors Vandal Locks	Spray Apply lubricant into key locks. Use LPS #1 for sliding bolt locks.
Adjust Jack Knife Door Air Pressure	See Body Construction / Doors / Jack Knife Door
Lubricate Jack Knife Door Hinge Pins	LPS 1
Adjust Jack Knife Door Roller Bracket	Adjust for proper open/closed position.
Adjust Jack Knife Door Switch	See Body Construction / Doors / Jack Knife Door
Adjust Outward Opening Door Control Rod	
Adjust Outward Opening Door Control Rod Bracket	Adjust for full and secure closure without binding.
Adjust & Lubricate Outward Opening Door Linkage	Adjust linkage for firm closure, and to ensure rear panel closes first.
Lubricate Outward Opening Door Pivots	Lubricate pivot pins with LPS #1.
Adjust Outward Opening Door Roller Bracket	Adjust for full and secure closure without binding.
Lubricate Wheelchair Lift Lube Points	See model-specific literature provided with lift.

**Emergency Exits**

Lubricate All Emergency Exits Hinges	LPS #1
Lubricate Rear Emergency Door Hinges	Lubricate at hinge grease fittings.
Lubricate Rear Emergency Door Hold-Open	Apply ASTM D4950 GC-LB Grade 2
Lubricate Roof Hatch Hatch Seal and Latch	Silicone lubricant to prevent sticking of rubber seal. Spray silicon lubricant into latch mechanism.

**Floor**

Inspect Floor Drains	Check drain hole in each body section under window for debris obstruction.
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**Seats**

Lubricate Driver's Seat	Lubricate per manufacturers recommendation.
Inspect & Tighten Passenger Seats Mountings	Use standard torque for bolt size , tread type and grade.



### Warning Devices & Signs

Lubricate Stop Arm, Electric 4-Point Pivot	Lubricate four hinge pivot points with Try-Flow lubricant
Inspect & Tighten Stop Arm, Electric Fasteners	Check interior and exterior fasteners for loosening.

### Windows

Lubricate Passenger Windows Latches & Slides	Use silicone lubricant.
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### Brakes

Inspect Hydraulic Brakes Fluid	DOT-3 brake fluid.
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### Electrical

Inspect Battery Electrolyte Level	Replenish with distilled water.
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## Every Month or 5000 Miles

### Warning Devices & Signs

Adjust Stop Arm, Air Air Pressure	Adjust for full deployment and retraction
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## Every Month or 12,000 Miles

### Axle & Suspension, Rear

Inspect Rear Axle Lubricant Level	If low, refill to bottom of filler opening. Use same lubricant type as already installed.
Inspect Spring Suspension Whole Assembly	Visually inspect for damage.

## Every 3 Months

### Exterior Structure

Wash Body	Wash the vehicle in lukewarm or cold water. Do not use hot water or wash in the direct sunlight. Only cleaners with an HMIS rating of 1,0,0,0 or less should be used to clean the buses. See Exterior Cleaning section of Driver's Handbook for further information.
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## Every 3 Months or 3000 Miles

### Cooling System

Inspect Radiator Fins	Clean debris from fins.
Inspect Water Pump Belt	Inspect condition and tension of belt.

**Every 3 Months or 5000 Miles**
**Brakes**

Lubricate Air Brakes S-Cam	See Meritor Cam Brakes Appendix in Air Brakes Chapter for guidelines.
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Lubricate Hydraulic Brakes Calipers	Lube per meritor specs.
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**Driveline**

Lubricate Driveshafts Slip Joint	Grease meeting NLGI Grade #2 grease specifications.
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Lubricate Driveshafts U-Joint Bolts	Grease meeting NLGI Grade #2 grease specifications.
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Inspect & Tighten Driveshafts U-Joint Bolts	Tighten to 45–50 ft lb.
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**Electrical**

Inspect Alternator Connections	Inspect for loose wires, damaged terminals, damaged insulators.
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Inspect Battery Ground Strap	Check for solid connection, tight fasteners and absence of corrosion.
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**Fuel System**

Inspect Fuel Lines	Inspect for leaks or signs of abrasion.
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Inspect Fuel Tank Vent	Inspect for obstruction.
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**Intake System**

Inspect Air Cleaner Filter Element	Inspect for proper seating, secure lid. Replace if soiled, wet, or damaged.
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Inspect Intake Tract All Fasteners	Inspect for signs of contaminate infiltration, loose clamps, wear spots, holes in piping
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Inspect Intake Tract Charged Air Tubing	Inspect for signs of contaminate infiltration, loose clamps, wear spots, holes in piping
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Inspect & Tighten Intake Tract Hose Clamps	Tighten to 10 in lb.
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Inspect & Tighten Intake Tract Spring Loaded Clamps	Tighten to near full spring compression.
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Inspect Intake Tract Support Bracket	Visual inspection. Repair damaged parts immediately.
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Inspect & Tighten Intake Tract T-Bolt Clamps	Tighten to 50 in lb.
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Inspect & Tighten Intake Tract Worm Gear Clamps	Tighten to 38–42 in lb.
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### Steering

Lubricate Axle Steering Linkage Drag Link	NLGI #2 EP multipurpose grease rated GC-LB or equivalent.
Lubricate Axle Steering Linkage King Pins	NLGI #2 EP multipurpose grease rated GC-LB or equivalent.
Lubricate Axle Steering Linkage Tie Rod Ends	NLGI #2 EP multipurpose grease rated GC-LB or equivalent.
Lubricate Intermediate Steering Shaft Slip Joint	Lubricate splines with multipurpose grease.

### Every 3 Months or 24,000 Miles

#### Brakes

Inspect Air Brakes Air Dryer	See Bendix appendix for specific model in Air Brakes Chapter.
Inspect Hydraulic Brakes Booster & Master Cylinder	Inspect for signs of leakage or physical damage.

### Every 6 Months

#### Exterior Structure

Wax Body	Use of a nonabrasive wax is recommended to remove accumulated residue and eliminate any "weathered appearance". It is essential that units are not waxed in direct sunlight. See Exterior Cleaning section of Driver's Handbook for further information and approved waxes.
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### Every 6 Months or 5000 Miles

#### Warning Devices & Signs

Lubricate Destination Sign Hinges	
Lubricate Destination Sign Roller Gears	Lightweight grease such as White Lube.

#### Axle & Suspension, Front

Inspect AirTek Suspension Air Spring	Inspect for wear, abrasions, cuts, or other damage.
Inspect AirTek Suspension Ride Height	Shock length, eye-to-eye: 18.5" +/- .25"
Inspect & Tighten AirTek Suspension Ride Height Control Valve Bolts	Tighten to 8–10 ft lb.
Inspect & Tighten AirTek Suspension Shackle Bracket Pivot Bolts	Tighten to 300–325 ft lb.

**Every 6 Months or 6000 Miles**
**Axle & Suspension, Front**

Lubricate AirTek Suspension Grease Fittings	Use NLGI #2 EP or equivalent. Lube with suspension loaded.
Inspect & Tighten AirTek Suspension Shock Absorbers	Inspect for signs of leakage, wear, or damage. Tighten mounting bolts to ( 125 ft.lbs - 135 ft,lbs )
Inspect AirTek Suspension Whole Assembly	Visually inspect for damage.
Lubricate SofTek Spring Suspension Grease Fittings	Use NLGI #2 EP or equivalent.
Inspect & Tighten SofTek Spring Suspension Shackle Bracket Pivot Bolts	Tighten to 380–420 ft lb.
Inspect & Tighten SofTek Spring Suspension Shock Absorbers	Inspect for signs of leakage, wear, or damage. Tighten mounting bolts to 215 ft lb.
Inspect & Tighten SofTek Spring Suspension Spring Pin Lock Bolts	Tighten to 380–420 ft lb.
Inspect SofTek Spring Suspension Whole Assembly	Visually inspect for damage.

**Axle & Suspension, Rear**

Inspect & Tighten Comfort Air Suspension Shock Absorbers	Inspect for signs of leakage, wear, or damage. Tighten upper shock mounts to 50–70 ft lb. Tighten lower shock mounts to 150–180 ft lb.
Inspect Comfort Air Suspension Whole Assmebly	Visually inspect for damage.

**Brakes**

Replace Air Brakes Air Compressor Filter	
Clean Air Brakes Check Valves	
Clean & Lubricate Air Brakes Treadle Valve	See Bendix Treadle Valve Appendix in Air Brakes Chapter.
Clean Air Compressor Governor	
Inspect Hydraulic Brakes Calipers	Inspect for signs of leakage or physical damage.
Adjust Hydraulic Brakes Park Brake Lever	Adjust engagement pressure at the lever to 90–100 lb.




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**Cooling System**


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Replace Coolant Filter

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Lubricate Shutters Pivots

Use Never Seize spray lubricant.

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**Electrical**


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Inspect Battery Battery Posts

Clean and apply anti corrosion agent.

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**Exhaust System**


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Inspect Exhaust Pipe Joints

Inspect for loose clamps, leaks, damage.

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**Fuel System**


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Replace Fuel Filter Filter Element

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Clean Fuel Filter Inlet Screen

Clean. Replace if damaged.

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**Steering**


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Lubricate Steering Gear Pitman Arm Pivot

NLGI #2 EP multipurpose grease rated GC-LB or equivalent. Use hand-operated grease gun.

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**Every 6 Months or 10,000 Miles**


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**Engine**


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Test Engine Oil

Perform oil sample analysis per Caterpillar specifications.

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**Every 6 Months or 12,000 Miles**
**Axle & Suspension, Rear**

Inspect & Tighten Comfort Air Suspension Air Spring Anchor Bolts	Tighten to 20–30 ft lb.
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Inspect & Torque Comfort Air Suspension Air Spring Fasteners	Torque to 30–35 ft lb.
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Inspect & Tighten Comfort Air Suspension Leveling Valve Mount Bolt	Tighten to 60–85 in lb.
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Inspect & Tighten Comfort Air Suspension Lever Linkage Locknut	Tighten to 100–150 in lb.
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Inspect & Tighten Comfort Air Suspension Lower Shock Mount	Tighten to 260–320 ft lb.
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Inspect & Tighten Comfort Air Suspension Quick Align Bolts	Tighten to 525–575 ft lb.
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**Brakes**

Lubricate Air Brakes Cam Shaft Housing	NLGI #2 EP multipurpose grease rated GC-LB or equivalent. Use hand-operated grease gun.
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Lubricate Air Brakes Haldex Slack Adjusters	See Haldex lubricant specs in Air Brakes chapter.
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Lubricate Air Brakes Meritor Slack Adjusters	See Meritor lubricant specs in Air Brakes chapter.
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**Engine**

Inspect Belt & Tensioner	Closely inspect Belt & Tensioner
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Clean Crankcase Breather	Clear breather hose of debris or obstruction.
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**Steering**

Lubricate Steering Column	Vision manual says to lubricate steering column. Where? With what? Check model applicability
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**Every 12 Months**
**Intake System**

Test Intake Tract Restriction Indicator	Test indicator with vacuum gauge and pump.
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**Every 12 Months or 12,000 Miles**
**Heaters & Defrosters**

Tighten Front Heater Fasteners	All fasteners holding such heaters in place in unit. For details on fasteners check installation prints.
Clean Front Heater Filter & Core	Clean dust from cores. Replace filter elements.

**Axle & Suspension, Front**

Inspect & Tighten AirTek Suspension Air Spring Fasteners	See a instl. diagram for torque spec's.
Inspect & Tighten AirTek Suspension Pin Lock Bolts	Tighten to 380–420 ft lb.

**Axle & Suspension, Rear**

Inspect Comfort Air Suspension Ride Height	Shock length, eye-to-eye: 24.68" +- .25"
Inspect Comfort Air Suspension Ride Height	Shock length, eye-to-eye: 21.75" +- .25"
Inspect & Tighten Comfort Air Suspension Shock Absorbers	Inspect for leakage or damage. Torque upper mount bolts to 50–70 ft lb. Torque lower mount bolts to 160–180 ft lb.
Inspect & Tighten Comfort Air Suspension Torque Arm Bolts	Torque to 150–205 ft lb.
Inspect & Tighten Comfort Air Suspension U-Bolts	Torque 7/8" bolts to 400–450 ft lb. Torque 3/4" bolts to 260–320 ft lb.
Inspect & Tighten Rear Axle U-Bolts	Tighten to 300–350 ft lb.
Inspect Spring Suspension Rebound Pins	Verify that cotter pins are installed.
Inspect & Torque Spring Suspension Shock Absorbers	Inspect for signs of leakage, wear, or damage. torque locknuts to 75–100 ft lb.
Inspect & Tighten Spring Suspension Spring Radius Fasteners	Tighten locknuts to 100–125 ft lb.

**Cooling System**

Test Entire Cooling System	Pressure Test Cooling system.
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**Steering**

Inspect Hydraulic Pump Body & Seals	Inspect for leaks.
Inspect Steering Gear Body & Seals	Inspect for leaks.

**Every 12 Months or 24,000 Miles****Brakes**

Clean Air Brakes Pop Off Valves

**Fuel System**

Inspect Fuel Pressure Regulator

Leak check all connections

Inspect Injectors

Check for external leaks

**Steering**

Replace Hydraulic Reservoir Fluid

Dextron III.

Replace more frequently in severe operating conditions.

Clean reservoir filter screen at each change. Replace filter if damaged.

**Transmission**

Inspect Transmission Vent

Clear vent hose of debris or obstruction.

**Every 12 Months or 50,000 Miles****Axle & Suspension, Rear**

Replace Rear Axle Petroleum Based  
Lubricant

Hypoid Gear Oil. Viscosity depends upon operating climate.  
See Viscosity/Temperature chart.


**Every 12 Months or 90,000 Miles**
**Axle & Suspension, Rear**

Replace Rear Axle Synthetic Lubricant	Viscosity depends upon operating climate. See Viscosity/Temperature chart.
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**Fuel System**

Inspect Controller	Check for damage; Check connection
Inspect & Tighten Controller Mounting Bracket	
Inspect Fuel Lines	Check line routing securing points; Inspect lines for damage
Inspect & Tighten Fuel Pressure Regulator	Must be securely attached to rail bracket
Inspect Fuel Pressure Regulator Electrical connectors	
Inspect & Tighten Fuel Pressure Regulator Mounting Bracket	
Inspect & Tighten Fuel Rail and Injectors	Rail bracket securely attached
Inspect Fuel Tank	Check for rust, dents, or external impact damage
Inspect Fuel Tank	Leak check all tank fittings and connections
Inspect Fuel Tank Retaining devices	Check all tank retaining devices
Inspect Injector Hose	Check for hose integrity
Inspect & Tighten Injectors	Injectors securely attached to rail bracket
Inspect Wire Harness	Check under hood routing and connections; Check under body routing and connections;

**Every 24 Months or 24,000 Miles**
**Brakes**

Clean Air Brakes Parking Brake Valve	See Bendix Appendixes in Air Brakes Chapter.
Clean Air Brakes Quick Release Valves	See Bendix Appendixes in Air Brakes Chapter.
Clean Air Brakes Relay Valves	See Bendix Appendixes in Air Brakes Chapter.
Clean Air Brakes Spring Brake Valve	See Bendix Appendixes in Air Brakes Chapter.

**Every 24 Months or 225,000 Miles**
**Exhaust System**

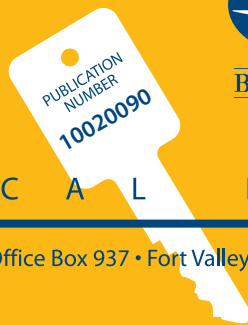
Replace DEF Supply Module Filter
Replace DEF Tank Filter







BLUE BIRD



T E C H N I C A L P U B L I C A T I O N S

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