

# KING COUNTY DEPARTMENT OF TRANSPORTATION

# OPERATOR'S GUIDE DIESEL-ELECTRIC 60FT. LOW FLOOR TRANSIT BUS



This operator's guide is effective for only those coaches with the following Identification Numbers:

## **SR1507**

Vehicle Identification Number	<b>Unit Number</b>
5FYH5YU02BB038950	6922
5FYH5YU04BB038951	6923
5FYH5YU06BB038952	6924
5FYH5YU08BB038953	6925
5FYH5YU0XBB038954	6926
5FYH5YU01BB038955	6927
5FYH5YU03BB038956	6928
5FYH5YU05BB038957	6929
5FYH5YU07BB038958	6930
5FYH5YU09BB038959	6931
5FYH5YU05BB038960	6932
5FYH5YU07BB038961	6933



## **SR1507 continued**

Vehicle Identification Number Unit Number
5FYH5YU09BB038962 6934
5FYH5YU00BB038963 6935



## **Revision Index**

Do Not Discard, please insert into Index Section of your manual

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The information and specifications contained throughout this manual are up to date at the time of publication. New Flyer Industries Canada ULC reserves the right to change the content of this manual at anytime without notice.

Printed in Canada



#### ™ NOTE:

The National Highway Traffic Safety Administration (NHTSA) has requested that the following statement be provided for your information.

If the property believes that its vehicle has a defect which could cause a crash or could cause injury or death, inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying New Flyer Industries Canada ULC.

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 and New Flyer Industries Canada ULC.

To contact NHTSA either call the Auto Safety Hotline toll-free at 1-888-327-4236 (or 366-0123 in the Washington, DC area) or write to: NHTSA, U.S. Department of Transportation, Washington, DC 20590. Other information about motor vehicle safety can be obtained from the Hotline.



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## 1. INTRODUCTION

This manual describes the operating features and safety equipment of the New Flyer Transit Vehicle. All personnel involved in the operation of the vehicle should be acquainted with this manual and should familiarize themselves with the vehicle before providing any public service. Knowing the contents of this manual and following its recommendations will help to assure safe and trouble-free operation.

It is not the intention or responsibility of this manual to give instruction in the use of common sense, basic skills and rules of driving; therefore, it is assumed that you, the operator, are fully qualified to operate a public transit vehicle.

This manual and any other supplied should be considered a permanent part of the vehicle and remain with the vehicle at all times. The information and specifications throughout this manual are up to date at time of publication. New Flyer reserves the right to change the content of this manual at any time without notice. Any malfunction which interferes with the safe operation of the vehicle should be reported immediately to the appropriate service personnel.

#### ™ NOTE:

New Flyer urges you the driver to read this publication carefully, as well as the following manual which is readily available from the manufacturer.

- Cummins ISL Owner's Manual
- Allison Electric Drive Systems Operator's Manual



## **Hybrid Operating Principles**

This vehicle is powered by the E<sup>P</sup> System, a parallel hybrid that blends both mechanical and electrical power paths to drive the vehicle. The system consists of a diesel engine, Drive Unit, Energy Storage System (ESS), Dual Power Inverter Module (DPIM), and electronic controls.

The diesel engine is conventionally mounted and coupled to the drive unit. The drive unit is an arrangement of three planetary gearsets, two clutches, and two motor/generators that work together with an electronic control unit to provide two continuously variable operating ranges.

The vehicle is driven by torque from the diesel engine which is blended with inputs from the electric motors. The motors supply the initial propulsion force required to accelerate the vehicle from a standstill; the diesel engine primarily propels the vehicle at cruising speeds.

The energy storage system consists of roof-mounted storage batteries and the DPIM unit. The AC energy provided by the motor/generators is converted to DC energy by the DPIM unit and stored in the batteries. The DPIM unit also converts the stored DC energy back to AC in order to drive the motor/generators when required.

During vehicle deceleration, the electric motors in the drive unit can be driven by the weight of the vehicle, through the driveline, to create electrical energy. This process, known as "regenerative braking", also slows the vehicle by imposing a drag on the driveline.



## **VEHICLE SPECIFICATIONS**

	VEHICLE TYPE
Model	New Flyer DE60LFR transit bus
Customer	King County Department of Transportation - SR1507
Build Year	2011
	ENGINE & FUEL
Engine	Cummins ISL 9.0L (EPA 2010)
Horsepower	330 HP - 1050 ft-lb.
Fuel	Ultra low sulfur diesel
Usable Fuel Capacity	125 U.S. gallons (473 liters)
НҮВ	RID DRIVE SYSTEM
Drive Unit	Allison E <sup>V</sup> 50 Drive™
	Maximum output speed 3300 RPM
	Maximum output torque during propulsion 4000 ft-lb.
	Maximum regenerative torque during braking 2200 ft-lb.
Energy Storage System (ESS2)	Allison nickel-metal hydride battery pack Gen 2 (roof-mounted)
Dual Power Inverter Module (DPIM2)	Allison hybrid inverter Gen 2 (roof-mounted)
	DIMENSIONS
Length (over bumpers)	60.7 ft. (18.5 m)
Width	8.5 ft. (2.6 m)
Height	11.0 ft. (3.35 m)
Wheelbase (front to center)	19.0 ft. (5.8 m)
Wheelbase (center to rear)	25.3 ft. (7.7 m)
Wheelbase (front to rear)	44.3 ft. (13.5 m)
Turning Radius	42.5 ft. (12.9 m)
Vehicle Weight (approx.)	47,520 lbs. (21,555 kg)
Gross Vehicle Weight Rating (GVWR)	66,780 lbs. (30,290 km)



AXLES & SUSPENSION	
Front Axle	MAN V8 65L
Front Gross Axle Weight Rating (GAWR)	14,770 lbs. (6,700 kg)
Center Axle	MAN HONG-1100
Center Gross Axle Weight Rating (GAWR)	24,250 lbs. (11,000 kg)
Rear Axle	MAN HP-1352-B (5.44:1)
Rear Gross Axle Weight Rating (GAWR)	27,760 lbs. (12,590 kg)
Suspension	Air springs & shock absorbers
W	HEELS & TIRES
Tires	Firestone 305/70R22.5
Rim Mounting	10 bolt hub piloted
Maximum Load	Single Tires - 7,390 lbs. @ 120psi Dual Tires - 6,940 lbs. @ 120 psi
ARTICULATED JOINT	
Hydraulically Controlled Mechanism	ATG Artic-O-Mat Limbo II 350
Maximum Pivot Angle	49°
DESTINATION & ROUTE SIGNS	
Front Destination	Luminator electronic, Gen 4
Side Destination	Luminator electronic, curbside & streetside
Rear Route	Luminator electronic
Streetside Route Sign	Luminator electronic
Operators Display Keyboard (ODK)	Luminator electronic ODK4
	LIGHTING
Interior	Pretoria 24V LED, Gen 4



COOLING SYSTEM	
Engine & Hydraulic Cooling System	Thermasys radiator/charge air cooler
	Hydraulically- driven cooling fan, 9 blade 34" O.D.
	Parker, hydraulic reservoir & manifold
	Parker fan drive pump
	Parker fan drive motor
Hybrid Cooling System	Engineered Machined Products (EMP) rooftop oil cooler with 6 electronically-controlled fans
	Rocore hydraulic oil cooler, located in the engine compartment
	HVAC SYSTEM
HVAC Unit	1 Thermo King R5E-M67A front rooftop heater/evaporator unit
	1 Thermo King R5 CHP-M43 front rooftop condenser unit
	1 Thermo King R5E-M67B rear rooftop heater/evaporator unit
Auxiliary Heaters	1 Mobile Climate Control defroster unit
	Webasto Thermo 230 auxiliary coolant heater
	2 Mobile Climate Control Whisper center heaters
	2 Mobile Climate Control rear section floor heaters
	SEATING
Driver's	USSC Q91
Passenger	40NE, Aries
Seating Capacity	56
Wheelchair Stations	2 (seats fold up & lock)



	BRAKE SYSTEM
Mechanical Components	Internal expanded S-cam type
	Automatic slack adjusters
Service Brake	Full air operated
	Meritor Wabco ABS & ATC controlled
Parking Brake	Spring applied, air released
WINDOWS	
General	Arow Global fixed black anodized frame
	44% light transmittance, grey tinted laminated glass
Emergency Escape	6 streetside & 3 curbside windows
Driver's Window	2 piece full sliding interior & exterior handle
	72% light transmittance green tinted, laminated glass
DOORS	
Entrance	Vapor medium slide glide, Gen 4
Exit	Vapor wide slide glide
	Exit door driver controlled, acoustic sensor controlled
Controls	Front & rear door control push buttons
	Door manual control valve
ACCESSIBILITY FEATURES	
Wheelchair Ramp	New Flyer hydraulically-operated, located at entrance door
Kneeling	Full front suspension
	Curbside center suspension
	Curbside rear suspension



SAFETY FEATURES	
Emergency Escape Exits	6 streetside & 3 curbside windows
	2 roof hatches
Fire Extinguisher	5 lb. ABC rating located in equipmnet box on curbside luggage rack
Safety Triangles	Located in equipment box on curbside luggage rack
Emergency Air Release Control Valve	Entrance & exit doors
Fire Suppression System	Amerex AVSN System
Accelerator & Brake Interlocks	Refer to "Interlock System" in the Safety Information section of this manual for interlock information.
Sensitive Edges	Exit doors
Brake Monitoring System	MGM E-Stroke display module located inside the electronic equipment enclosure. E-stroke brake sensor on all brake chambers and a Brake Alert indicator on the instrument panel
Video Surveillance System	Apollo Video RoadRunner 8 with 6 cameras
MULTIPLEXING SYSTEM	
Vansco Multiplex System VMM J1939 Network	VMM 2820 Modules VMM 1210 Modules Pocket Gateway Module

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## **Vehicle Identification**

The New Flyer vehicle identification plate is located in the driver's area of the vehicle interior. The plate lists the Gross Vehicle Weight Ratings (GVWR), the Vehicle Identification Number (VIN) and the Gross Axle Weight Ratings (GAWR) for all axles.

## **Warnings & Cautions**

Two types of headings are used in this guide to attract your attention. These notations will be highlighted with the icons below.



WARNING:



Used when an operating procedure or practice, if not correctly followed, could result in personal injury or loss of life.



CAUTION:



Used when an operating procedure or practice, if not strictly observed, could result in damage to or destruction of equipment.

## **Contacting New Flyer**

If additional information is required, contact the Customer Service Department of:

New Flyer Industries Canada ULC 25 DeBaets Street Winnipeg, Manitoba Canada R2J 4G5

tel: (204) 982-8437 fax: (204) 667-5769



## 2. SAFETY INFORMATION

## **Safety Procedures**

Do not drive the vehicle if:

- Indicators, instruments or gauges show that a major vehicle operating system is malfunctioning.
- Exhaust fumes seep into the passenger compartment.
- Beneath the vehicle, puddles of engine oil, hydraulic fluid, or coolant have formed.
- Seating stanchions and grab rails are loose or damaged.
- Driving mirrors are broken, missing or cannot be properly adjusted.
- Any exterior or interior light is broken, discoloured, or malfunctioning.

Report the occurrence of any of the above to maintenance personnel so the vehicle can be serviced before beginning revenue service.

- Do not operate the vehicle without fastening the seat-belt.
- Make sure obstructions do not block or interfere with your safe range of driving and operating vision.
- Have any debris or garbage removed from the passenger area and the doors.
   This is important to eliminate any foot obstructions that could cause tripping or falling.
- Make sure all exterior and interior access doors and panels are securely shut and latched.
- Do not smoke around the fuel storage areas, the fuel filling area or during refueling. Do not smoke in areas where fuel, hydraulic fluid, drive unit oil or any other flammable fluid has leaked.



## **Safety Equipment**

A hand-held fire extinguisher is located in the equipment box which is mounted on the curbside luggage rack. Use the extinguisher only after the vehicle is in a safe location, and all passengers are evacuated. Use only if there is no risk to your personal safety.

Safety triangles are located in the equipment box. Position these triangles at the front and rear of the vehicle to warn other drivers during emergency situations.

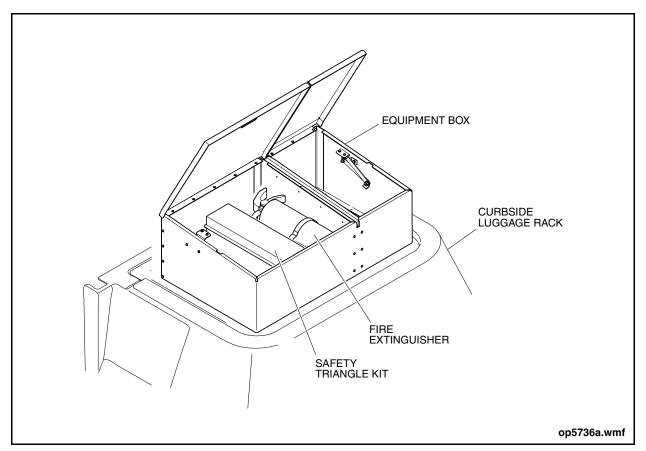


Figure 1: Safety Equipment



## **Interlock System**

Interlocks disable the accelerator and apply the rear brakes. The interlocks function only when the Master Run switch is in DAY-RUN or NIGHT-RUN position, the Door Master switch is in the ON position, the vehicle speed is below 2 mph, and any of the following conditions occur:

- Exit doors are open.
- Exit door emergency valves are activated.
- Vehicle is kneeling.
- Wheelchair ramp is not stowed.
- Maximum joint angle is exceeded while reversing.
- Parking brake is applied.
- Hill holder switch is activated.
- Loss of air pressure at exit doors.

The Interlock System is intended to protect passengers from an inadvertent vehicle movement and to protect the articulating joint from component damage. Located behind the front destination sign access door are the Door Master and Joint toggle switches. Use these switches to disable the system for maintenance purposes or in an emergency.

#### ™ NOTE:

The brake treadle must be momentarily depressed to release the interlocks.



## **Fire Suppression System**

The vehicle is equipped with a Fire Suppression System. The system protects the passengers and vehicle against fire. If a fire is detected in the engine compartment a dry chemical extinguishing agent is discharged to suppress the fire.

The Fire Suppression System components that are located in the driver's area include the Manual Actuator switch and control panel. Refer to "Fire Suppression System" in this manual for a description of these components and the system operation.

#### ™ NOTE:

An alarm sounds and the engine shuts down when the Fire Suppression System is activated.

## **Exit Door Sensitive Edges**

Mounted to the leading edges of the exit door panels are rubber seals that are sensitive to pressure. If, while closing the doors, they strike an object or passenger, a signal from the sensitive edges sounds an alarm and prompts the doors to fully reopen. Once they fully open the doors will again close.

#### ™ NOTE:

The Interlock System prevents the vehicle from moving until the exit doors are fully closed.

## **Video Surveillance System**

A video surveillance system records events as they occur on the vehicle. The system consists of a digital video recorder, six cameras, a microphone and a remote event monitor. The video recorder is located in the electronic equipment enclosure. The cameras are located through the interior of the vehicle.

The microphone is mounted under the destination sign compartment. The DVR power relay is activated when the Master Run switch is set to either the DAY-RUN, NIGHT-RUN or NIGHT-PARK position.



## 3. EMERGENCY INFORMATION

## **Escape Exits**

#### **Side Windows**

Six curbside and three streetside windows function as emergency exits and are identified by decals on the window panels.

To operate the emergency window, pull the red handle down and hold. Push out on the bottom of the window frame. The window will open on hinges at the top of the frame. To close, release the handle and slam window shut.

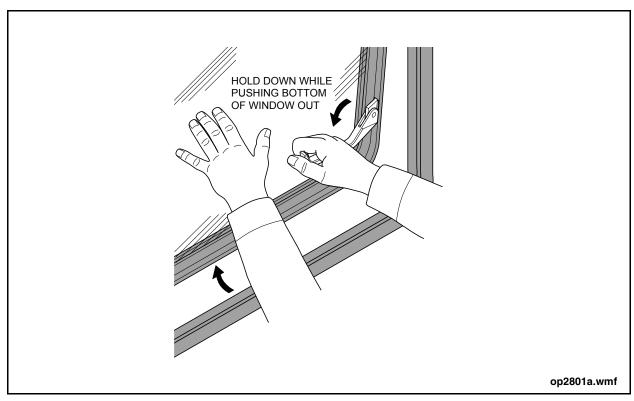


Figure 2: Window Emergency Handle



#### **Roof Hatches**

Both roof hatches are electrically operated for ventilation and are manually opened for use as emergency exits.

- 1. Push the hatch up to the full OPEN venting position.
- 2. Turn the release latch knob 90° left or right to unlock.
- 3. Push the handle outward so the hatch swings open on the fixed hinge.
- 4. To close, return the hatch to its full OPEN position. Line up and push the separated hinge halves together. Turn the latch knob to the latched position.
- 5. Push up on the hatch to ensure proper engagement. Pull the hatch downwards to close.

#### For Ventilation

Open the hatch to the desired position by holding the handles and exerting outward pressure toward the end being opened. To close the vent, grasp the handles and pull the hatch downward.

The most effective hatch positions for ventilation are:

- Front hatch forward end open.
- Rear hatch rear end open or fully open.

This allows fresh air to enter the front vehicle hatches while warmed, stale air escapes through the rear vehicle hatch.



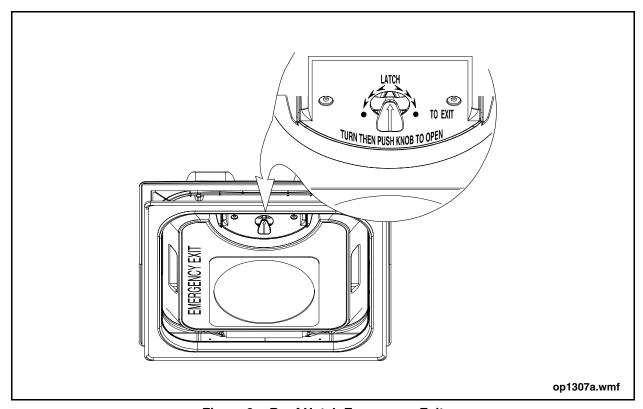


Figure 3: Roof Hatch Emergency Exit

#### **Emergency Release Control Valve, Entrance Door**

The entrance door emergency release control valve is located behind a breakable window in the door mechanism access cover. In an emergency, break the window to access the control valve knob. Rotate the knob 90° counter-clockwise to release air pressure from door operator, then push the doors open. As the doors open they activate the header and curb lights.

#### **Emergency Release Control Valve, Exit Door**

The exit door emergency exit control valve is located to the left of the exit door header, behind a hinged window. In an emergency, pull the window open to access the control valve knob. Rotate the control valve knob 90° counter-clockwise to release air pressure from the door operator, then push the doors open. As the doors open they activate the header and curb lights, the brake interlocks, and the Rear Door Open indicator.



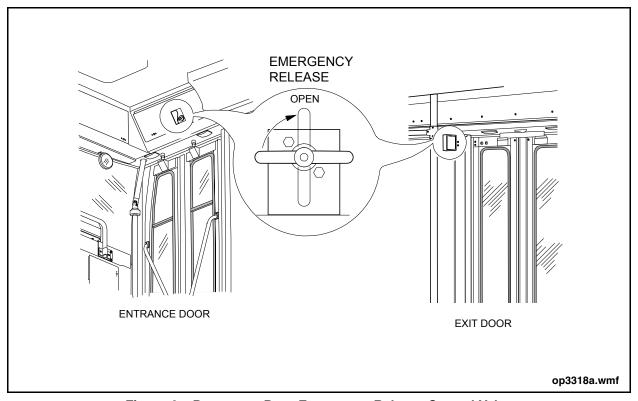


Figure 4: Passenger Door Emergency Release Control Valve

## **Vehicle Evacuation & Shutdown**

In the event of an emergency, follow the evacuation and shutdown procedure in the sequence shown:

- 1. Pull the vehicle over to a safe location.
- 2. Apply the parking brake
- 3. Open the front and rear passenger doors.
- 4. Direct all passengers to a safe area, away from the vehicle.
- 5. Shutdown the vehicle by setting the Master Run switch to the STOP-ENGINE position.
- 6. Alert the transit authority of the emergency.
- 7. Retrieve the Emergency Responder Guide, if available, and exit the vehicle.





## **WARNING:**



Assess the situation to determine whether it is safe to approach the rear curbside area of the vehicle before proceeding with the following steps.

- 8. Approach the rear curbside area of the vehicle and open the Battery Disconnect access door.
- 9. Shut off all 12/24 VDC electrical power to the vehicle by setting the Battery Disconnect switch to the OFF position.
- 10. Wait for emergency response personnel to arrive and assist them by providing details of the emergency and handing over the Emergency Responder Guide, if available.

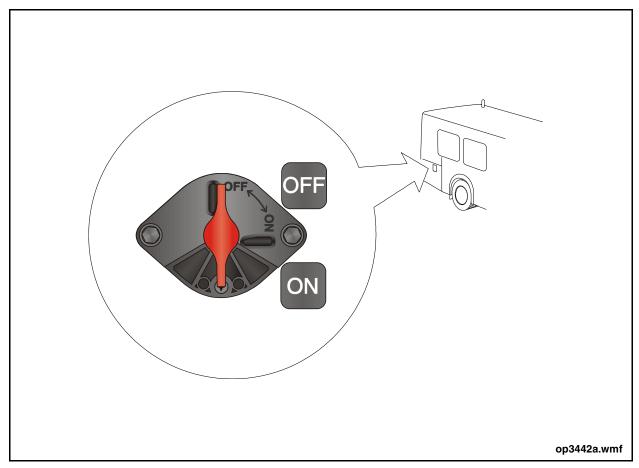


Figure 5: Battery Disconnect Switch



## 4. TO ENTER THE VEHICLE

- 1. Locate the front door open switch in the front tow compartment.
- 2. Open the access door and move the switch to open the door.
- 3. If the entrance door does not open, exhaust air from the entrance door cylinder as follows:
  - a. Slide the front portion of the driver's window back to gain access to the entrance door dump valve control.
  - b. Reach over the side console and press the green FRONT DOOR push button.
  - c. Open the door manually by pushing on the door panels' outside edges.

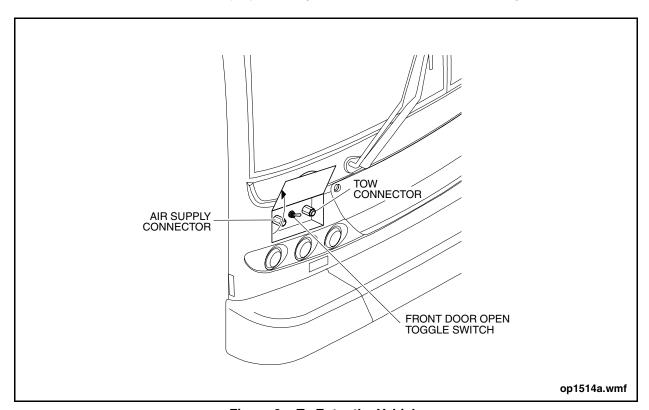


Figure 6: To Enter the Vehicle



## 5. DRIVER'S CHECK LIST

Check the following before putting the vehicle into transit service. Any problems discovered should be brought to the attention of the service personnel.

## **Exterior**

#### General

- Battery Disconnect switch is in the ON position.
- Engine Run switch in engine compartment is in the FRONT position.
- Check for any fluid puddles under the vehicle.
- Check all exterior panels for any visible damage.
- Check the air intake grille and the exhaust tailpipe for any blockage.
- Bumpers are securely mounted and no damage is evident.
- Check artic joint bellows for cuts, tears or other damage
- Check artic joint bellows for damage.
- Bike rack is securely mounted and functions properly

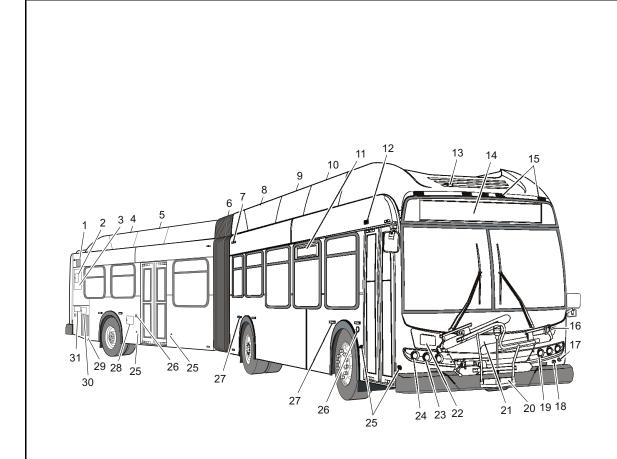
#### **Access Doors**

- Visually inspect door panels for any evidence of damage.
- Check that the access doors unlatch and open easily. Ensure gas struts function properly and maintain door in opened position (where applicable).
- Inspect door panel interior rubber bumpers condition or whether missing.
- All access doors must be closed and securely latched (where applicable) prior to operating vehicle.

#### Windows

- Check that all windows are closed.
- Ensure window glass is clean and no visible evidence of cracks or other damage.
- Inspect condition of window frames and seals for any damage.





- 1. Air Intake Grille
- 2. Diesel Exhaust Fluid Manual Fill Access Door
- 3. Air Filter Access Door
- Hybrid Oil Cooler & DPIM
   Rear HVAC Evaporator Unit
- 6. Bellows Assembly
- 7. Side Marker Light
- 8. Hybrid Battery Pack
- 9. Front HVAC Condenser Unit
- 10. Front HVAC Evaporator Unit
- 11. Side Destination Sign
- 12. Exterior Speaker
- 13. Traffic Signal Emitter
- 14. Front Destination Sign
- 15. Clearance Marker Lights
- 16. Driver's Lower Vent

- 17. Windshield Washer Filler
- 18. Towing Electrical Connector
- 19. Headlight, High Beam
- 20. Bike Rack
- 21. Defroster/Wiper Motor Access Door
- 22. Towing Air Line Connections
- 23. Headlight, Low Beam
- 24. Front Turn Light
- 25. Curb Lights
- 26. Ramp/Kneel Warning Light
- 27. Side Turn Light
- 28. Fuel Filler Access Door
- 29. Battery Access Door
- 30. Battery Cutoff Switch Access Door
- 31. Diesel Exhaust Fluid Pressure Fill Access Door

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Figure 7: Front Exterior View



#### **Mirrors**

- Inspect condition of mirror housing, glass, and mounting brackets
- Check that mirror head can be easily rotated for adjustment (where applicable).

#### Lights

- Ensure all lights are clean and not obstructed in any way.
- Check that lights are securely mounted with no missing attaching hardware.
- Inspect lenses for cracks or other damage.

#### **Tires**

- Check tire air pressure and ensure it is within the manufacturer's recommended range.
- Inspect tire tread for abnormal wear, cuts, separation, missing tread, or any other visible defects.
- Inspect tire sidewalls for bulges, cuts, gouges, abrasions, or any other visible defects.

#### Wheels

- Check for any missing or loose wheel nuts.
- Closely inspect condition of wheel studs if any wheel nuts were found to be loose or missing.
- Visually inspect wheel for any evidence of dents, cracks, deformation, or other damage.
- Inspect wheel surface for pitting or excessive corrosion.



### **Interior**

#### General

- Ensure farebox is securely mounted and operates properly.
- Check all interior panels for any visible damage.
- Ensure front and side destination signs are securely mounted.
- Roller blinds are securely mounted and function properly.
- Check that roof hatches open in all ventilation positions and close properly.
- Ensure that roof hatches function properly in the emergency release position.
- Visually inspect condition of passenger signal system and verify operation.
- Ensure door controller moves freely through all operating positions and doors open/close accordingly.
- Door Master switch is in the ON position.
- Check that all driver's seat adjustments function properly and maintain position.
- Inspect condition of driver's seat-belt and ensure that it functions properly.
- Inspect condition of wheelchair restraint system and ensure that all mechanisms function properly.
- Check steering wheel operation with engine running. Steering should operate smoothly without binding or erratic movement.
- Check steering wheel tilt/telescope lever functions properly.
- Ensure that the wheelchair ramp functions properly and that the alarm sounds when stowing or deploying the wheelchair ramp.

## **Fire Suppression System**

- Ensure the safety pin on the Manual Actuator switch is securely installed.
- Ensure all indicators on the fire suppression control panel illuminate after pressing the Push to Test button.

#### **Access Doors**

- Visually inspect interior door panels for any evidence of damage.
- Check that the access doors unlatch and open easily. Ensure gas struts function properly and maintain door in opened position (where applicable).
- Check for any missing or damaged rubber bumpers on the inside of the door panel.
- All access doors must be closed and securely latched (where applicable) prior to operating vehicle.



#### Seats

- Ensure seats are clean and there is no evidence of cuts, tears, or other damage.
- Ensure seats are securely mounted to seat rail and floor (where applicable).

#### Floor

- Check overall condition of flooring for cleanliness.
- Inspect flooring for any evidence of excessive wear, cuts, or other damage.
- Inspect edges of flooring and nosing for evidence of lifting or separation.
- Ensure the wheelchair ramp is fully stowed flush with the flooring surface and does not provide a tripping hazard.

#### **Windows**

- Check that windows are clean and undamaged.
- Check operation of emergency release mechanism on all windows so equipped.
   Ensure windows release from the frame and open fully outward for emergency egress.
- Check operation of all windows equipped with slider or tilt openings. Windows should slide or tilt easily and not be loose in the frame.

#### **Mirrors**

- Check condition of mirror glass for cracks or other damage.
- Ensure mirrors are securely mounted and maintain their adjusted position.
- Ensure mirrors offer a clear view and are not obstructed.

#### **Passenger Doors**

- Check that doors open/close properly.
- Check door panels for dents, deformation or other damage.
- Inspect door panel glass for cleanliness and ensure glass is not cracked or otherwise damaged.
- Inspect door edges and seals for condition and proper sealing.

## **Modesty Panels/Barriers**

- Inspect condition of panels for sharp edges, cracks, or any other damage.
- Ensure panels are securely mounted to stanchions and vehicle structure.



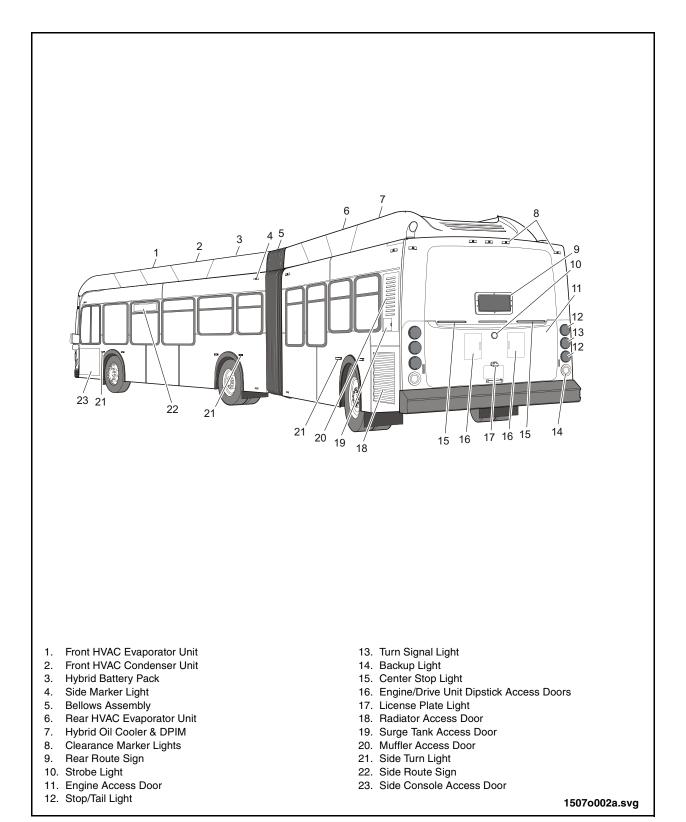


Figure 8: Rear Exterior View



#### Stanchions & Grab Rails

- Inspect for bent or cracked tubing, rails, or any other damage.
- Ensure that all stanchions and grab rails are securely mounted.
- Inspect for any sharp edges.
- Inspect for any missing attaching hardware.
- Inspect condition and secure mounting of grab straps (where applicable).

#### Lights

- Ensure all lights are clean and not obstructed in any way.
- Check that lights are securely mounted with no missing attaching hardware.
- Inspect lenses for cracks or other damage.

#### **Indicator Lights**

#### NOTE:

From this point on, items on the driver's check list require activating the vehicle's Multiplexing System and starting the engine. Turning the Master Run switch on the side console to DAY-RUN or NIGHT-RUN activates the Multiplexing System. Wait for the system to activate before starting the engine. Refer to the Vehicle Operation Section of this manual for details on engine starting.

- The Stop Request indicator illuminates when the passenger signal system is activated.
- The W/C Stop Request indicator illuminates when the wheelchair passenger signal system is activated.
- The Parking Brake indicator illuminates when the parking brake is applied.
- The Stop indicator illuminates when the brakes are applied.
- The Turn indicator illuminates and flashes when the turn signal switch is activated or the Hazard switch is turned on.
- The Rear Door Open indicator illuminates when the exit door is open.
- The High Beam indicator illuminates when the high beam headlights are on.
- The Kneel indicator illuminates when the kneeling system is activated.
- The No Gen and Stop Engine indicators illuminate momentarily, then extinguish.
- The remaining indicators relate to vehicle operation concerns and should be checked by service personnel.



#### **Electrical Control Systems**

- The Master Run switch controls the electrical circuits. Refer to the Instrumentation & Controls Section of this manual for more information.
- Service compartment light switches activate service lights in the rear electrical panel, the engine compartment and the engine compartment fuse box.
- Hazard lights function with the Master Run switch in any position.
- Horn sounds when horn button on steering wheel pressed.
- Rear brake lights illuminate when the brake pedal is applied.
- Destination/route sign circuits function with the Master Run switch in DAY-RUN, NIGHT-RUN or NIGHT-PARK positions.
- All side console control switches function.
- Passenger signal and chime circuits function.
- Accelerator treadle accelerates the engine.
- Drive Unit Selector switch functions.
- Backup lights illuminate when the drive unit is switched to reverse.
- HVAC System functions when the engine is running.
- Speedometer functions when the vehicle is moving.
- Windshield washers spray washer fluid onto windshield.
- Wipers operate (on wet windshield) without streaks, scraping or noisy operation.

#### **Air Control Systems**

- Normal vehicle operation pressure ranges from 105 to 125 psi (724 to 862 kPa).
- Low Air indicator illuminates and an alarm sounds if the air system pressure drops below 75 psi (517 kPa).
- Entrance and exit doors open and close smoothly.
- Brake treadle application slows and stops the vehicle smoothly.
- Parking brake valve application holds the vehicle stationary when level or on a 20% maximum incline grade when on dry concrete.
- Door manual control valve, located below the side console, shuts off the air supply to the entrance door mechanism. When in the OFF position, the doors can be pushed open.
- Splash guards clear the ground (vehicle on level surface) with the air system pressure at or above 105 psi (724 kPa).
- Compressor cuts in when the air system pressure drops to approximately 105 psi (724 kPa) and shuts off at approximately 120 to 125 psi (827 to 862 kPa).



## 6. DRIVER'S AREA

The driver's area includes the first eight feet of interior space measured from the front windshield.

This section describes the controls and components within the driver's area. A brief outline of the functions and operating procedures of each accompanies the description.

## **Driver's Window**

#### **Front Portion**

Pull the sash handle back to open the front portion of the window. Push the handle forward to close.

#### **Aft Portion**

Pinch the sash handle to release the lock. Pull the handle forward (keeping handle pinched) to open the rear portion of the window.

Push the handle rearward, pinch and release to close and lock the aft sash.

## **Mirrors**

There are six mirrors located throughout the vehicle interior: an aisle mirror, an upper right mirror, an entrance area mirror, an overhead convex mirror, an exit area mirror and a bike rack mirror.

#### **Aisle Mirror**

This rectangular mirror located above the windshield is used for viewing the vehicle's interior.

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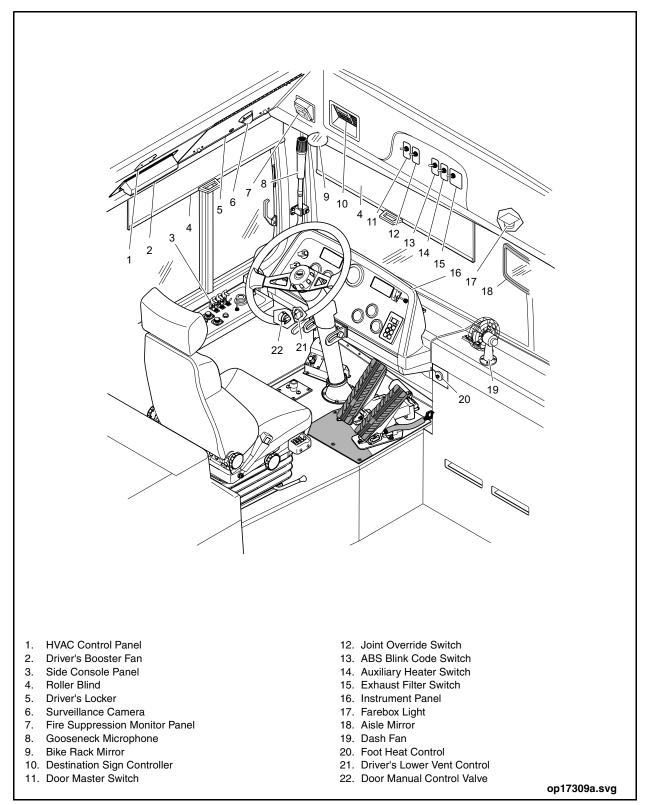


Figure 9: Driver's Area



## **Upper Right Mirror**

Located to the right of the aisle mirror, the upper right mirror is used to view the rear step area mirror.

### **Entrance Area Mirror**

The convex entrance mirror is mounted on the ceiling above the entrance door and provides a view of the entrance area.

### **Driver's Area Mirror**

This mirror is located aft of the entrance door and provides a view of the front aisle and area immediately behind the driver.

### **Exit Area Mirror**

This mirror is located on the aft exit door stanchion and provides a view of the exit door area.

### **Bike Rack Mirror**

This mirror is located in the upper left corner of the front windshield. Adjust this mirror to provide a view of the bike rack.

# **Roller Blinds**

There are two roller blinds in the driver's area; one for the front windshield and the other for the driver's window. The blinds can be extended or retracted by either pushing or pulling on their handles.

# **Electronic Equipment Enclosure**

The electronic equipment enclosure is located on the streetside wheelhousing and is used for storing the vehicle communication and monitoring equipment. The lockable access door provides security for the stored contents and the slide-out trays provide easy access for servicing the electronic equipment.



# **Driver's Locker**

Located above the driver's window, the driver's locker is for storing personal belongings.

# **Fire Suppression System**

The Fire Suppression System components that are located in the driver's area include the Manual Actuator switch and control panel. Refer to the Fire Suppression System Section of this manual for a description of these components and the system operation.

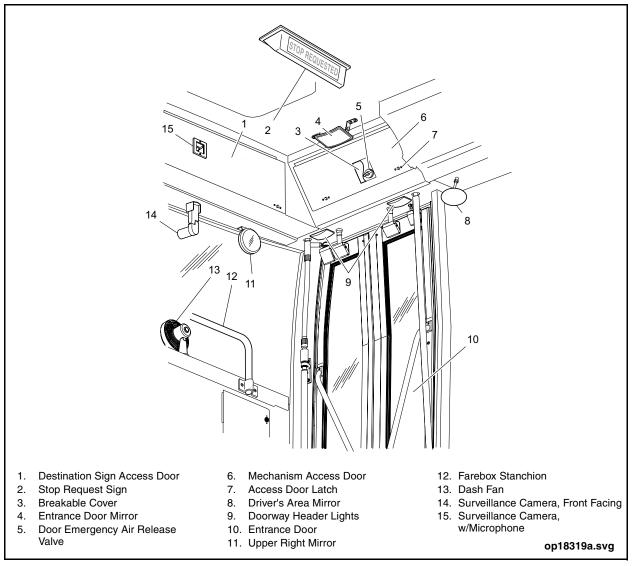


Figure 10: Front Entrance View



# **Driver's Seat**

The USSC Q91 driver's seat is an adjustable air suspension seat consisting of a steel frame base and back panel and molded foam cushions. The seat-belt retracts to holders beside the seat cushion.

Nine controls adjust the positioning of the seat, seat cushions, and shoulder belt loop guide to suit the needs of the individual. Make position adjustments to provide for the best driving visibility and control.

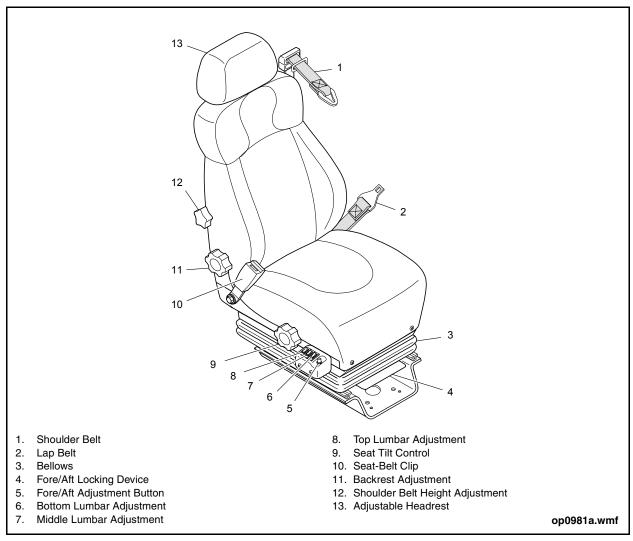


Figure 11: Driver's Seat



## **Lumbar Adjustment**

Three rocker switches on the right side of the seat adjust the top, middle and bottom lumbar. The rocker switches admit or release air pressure to three air bags in the seat back. When making adjustments, momentarily hold the switches in position to allow time for air movement.

## **Height Adjustment**

The knob on the front left corner of the seat adjusts the height. Turn the knob counterclockwise to raise the seat and clockwise to lower it. Pull the knob out to dump air pressure and reset to the previous adjustment by pushing the knob in.

## **Tilt Adjustment**

Adjust the seat's fore and aft tilt with the large control knobs on the side of the seat. Turn the knob clockwise to tilt forward and counter-clockwise to tilt rearward.

## **Fore & Aft Track Adjustment**

The fore and aft track adjustment has nine position settings. Push the button located in front of the lumbar adjustment switches to unlock and slide the seat to the desired position. Release the button and move slightly fore or aft to set lock. Raising the slide handle below the bellows at the front of the seat will release the slides and allow the seat to move forward or backward.

## **Back Recline Adjustment**

Adjust the backrest to the desired recline position by turning the control knobs located at the bottom of the backrest.

## **Shoulder Belt Loop Guide**

The upper adjustment knob on the right side of the backrest is used to adjust the belt loop guide. Turn the knob clockwise to raise the guide or counter-clockwise to lower it.



# **Suspension Lockout/Limiter Control**

Located on the left rear of the seat is a three-position lever to control seat suspension movement. The outward position allows full seat suspension movement; the middle position limits the suspension and the inward position locks the suspension.

# **Steering Wheel & Horn**

## **Steering Wheel**



DO NOT make adjustments to the tilt steering while the vehicle is in motion.



DO NOT turn the steering wheel if the engine is not operating except in emergency situations.



DO NOT OPERATE THE VEHICLE if any of the following conditions exist:

- Binding or resistance in the steering wheel operation (with the vehicle in motion).
- Unusual noises related to steering.
- Steering wheel vibration.
- Looseness, binding or resistance in the tilt/telescopic mechanism.

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A hydraulic powered steering system turns the front wheels when moving the steering wheel left or right (the engine must be operating to power the system). The tilt/telescopic steering column offers a range of positions for the steering wheel. A lever on the left of the column controls both tilt and telescopic functions. Push to telescope and pull to tilt.

A lever at the steering column to instrument panel attachment point allows additional tilt adjustment of the steering column. To adjust, operate the lever to loosen the pinch bolt and move the steering column to the desired position. Lock column in position with adjusting lever.

#### Horn

The horn button, located in the center of the steering wheel, operates the dual horn.

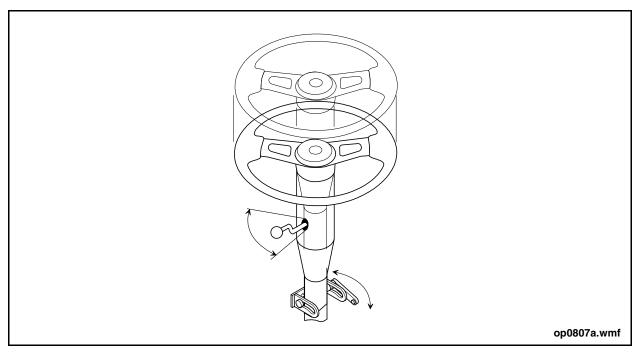


Figure 12: Steering Wheel Adjustment



# **Public Address System**

The Public Address System (P.A.) allows the communication of messages to the public both inside and outside the vehicle. Components of the system include:

- A gooseneck microphone located on the left front window pillar.
- Eight interior speakers located above the side windows.
- An exterior speaker located above the entrance door.
- A driver's speaker located above the driver.
- A Speaker Select toggle switch on the side console.

#### **™** NOTE:

Consult your Transit Authority for information on the operation of this system.

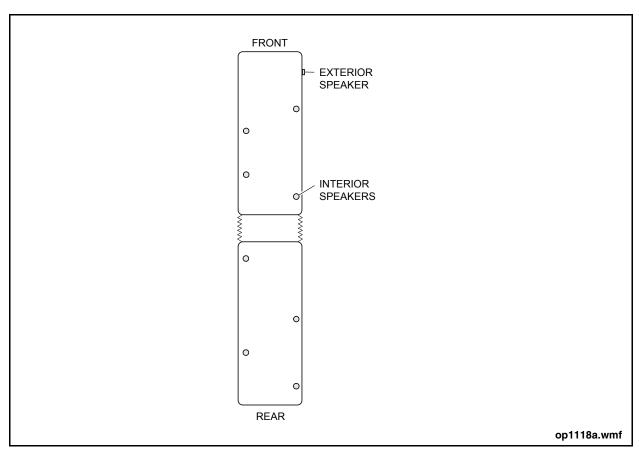


Figure 13: P.A. System Layout



# **Destination/Route Signs**

#### ™ NOTE:

The following information provides basic introductory information on ODK and Luminator Destination Sign System operation. Your transit authority management establishes policies about system operation and should be consulted before its use. Manuals are available from Luminator which provide more information about the Operator's Display Keyboard and the Luminator Destination Sign System.

## **System Description**

The vehicle's destination/route signs are controlled by an Operator's Display Keyboard (ODK4) located in the panel of the front destination sign access door. The ODK consists of a liquid crystal display (LCD) display screen with six soft keys, six corresponding hard keys, keypad with numbered (0-9) switches, enter key, and left/right arrow keys.

The sign system is controlled through programmed instructions stored in ODK memory through its liquid crystal display (LCD) touchscreen and keypad. Messages displayed on the vehicle signs can also be displayed on the ODK touchscreen.

#### ™ NOTE:

The touch sensitive soft keys labeled on the LCD touchscreen will vary per the menu being displayed and are functionally indentical to the blue hard keys located directly beneath them and can be used interchangeably.

The codes translate into message writing data preprogrammed into the system's memory. The message writing data then controls the signs to display the selected information.

The system data processor begins sending and updating message writing data for the ODK to display when the system is powered-up. Turning the Master Run switch from STOP-ENGINE to DAY-RUN or NIGHT-RUN will power-up the system. Boot and application code versions momentarily display when power is applied to the ODK, followed by a brief system initialization message. The last message entered before power shutdown then displays on the ODK.

Powering-down occurs when the Master Run switch is turned to STOP-ENGINE. Upon powering-down, front and side destination signs will blank immediately or after a preset delay.



## **Operating the ODK**

Basic operation of the Sign System involves presetting transit authority message codes into the sign system using the ODK. The message codes correlate to preprogrammed destination names, public relations messages, and route numbers unique to each transit authority. If required, multiple sets of message codes may be entered to allow for a quick and complete sign change while in route. Key function and basic operation instructions are described in the two sections that follow.

### **ODK4 Operating Keys**

Six soft keys are located on the bottom of the LCD display screen. The function of these softkeys is identical to the corresponding hard keys located directly below the display screen. The soft keys and hard keys can be used interchangeably. The keys function as follows:

- MENU used to access advanced programming (some may require a password).
- RUN used to enter run number. This function is determined by transit authority programming.
- ROUTE used to enter route number. This function is determined by transit authority programming.
- P/R used to enable public relations message code entry. This switch may be disabled if public relation messages are not available.
- ROUTE press to enable route number entry. Route number entry may be either coded or be the actual route number for display.
- DEST A and DEST B used to enable respective destination message code entry for message display change. These switches are permanently enabled.

All destination and public relations (P/R) messages can be set an viewed from the ODK.

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### **Basic Operating Procedures**

Basic operating procedures are as follows:

 Set RUN number - press the RUN key on the default screen. Enter the run number via the ODK number pad and then press ENTER. The message "RUN button not used" will appear if the manual entry feature has been disabled.

### ™ NOTE:

To change a RUN number, use the left/right arrow keys to high-light a number and then press CLEAR (or press DEL to delete an entire string).

Set ROUTE number - press the ROUTE key on the default screen. Use the ODK keypad to enter a route number or left/right arrow keys to highlight a letter, then press SELCT to select it. After entering the route number, press the hard ENTER key. The route number just entered will be displayed on the ODK as well as on the route signs. This route number will persist when you go from DEST A to DEST B without having to re-enter it.

#### ™ NOTE:

To change a ROUTE number, use the right arrow key to move the square cursor to the end of the string and then use the left arrow key to move cursor back to the left to erase existing numbers (you cannot simply overwrite them).

 Set Public Relations (P/R) message - press the P/R key on the default screen. Enter the P/R message code number via the ODK number pad and press ENTER. The P/R code number will display on the ODK display screen and the route signs approximately 5 seconds after it is entered.

#### ™ NOTE:

To change a P/R code number (or clear the message altogether) use the left/right arrow keys to highlight a number and press CLEAR to erase it (or press DEL to delete an entire string) then press ENTER.

 Set Destination A or B message - press the DestA key on the default screen to set the DestA message. Enter the destination code number via the OKD number pad and press the hard ENTER key. The destination code number will display on the ODK display screen and the route signs approximately 5 seconds after it is entered. Setting Destination B is performed in the same manner as setting Destination A.



#### ™ NOTE:

To change a destination number, use the right arrow key to move the square cursor to the end of the string and then use the left arrow key to move cursor back to the left to erase existing numbers (you cannot simply overwrite them).

 Set Display Brightness Level - press MENU on the default screen to access menu options. From the MENU screen press the PREF key. From the PREF screen press the BRGHT key. From the BRGHT screen touch the brightness level bar at the top of the screen or use the left/right arrow keys to set the brightness level, then press OK.

### NOTE:

To return the display to the original factor default brightness level press the DFLTS key from the PREF screen, then press YES

 Set Aisle Light Dimming Level - press MENU on the default screen to access menu options. From the MENU screen press the DIMNG key. From the DIMNG screen touch the dimming level bar at the top of the screen or use the keypad left/ right arrow keys to set the dimming level, then press OK.

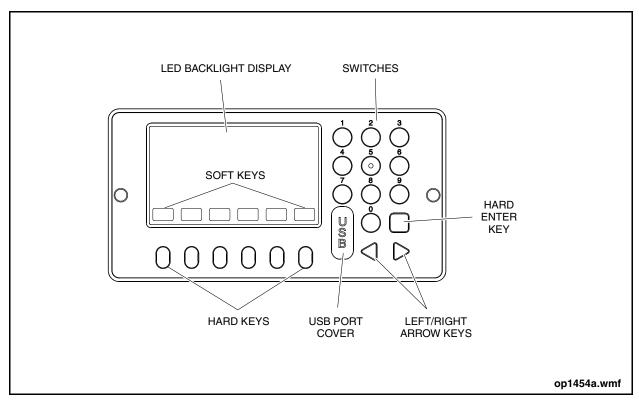


Figure 14: Operator's Display Keyboard (ODK)



# 7. EXIT DOOR AREA

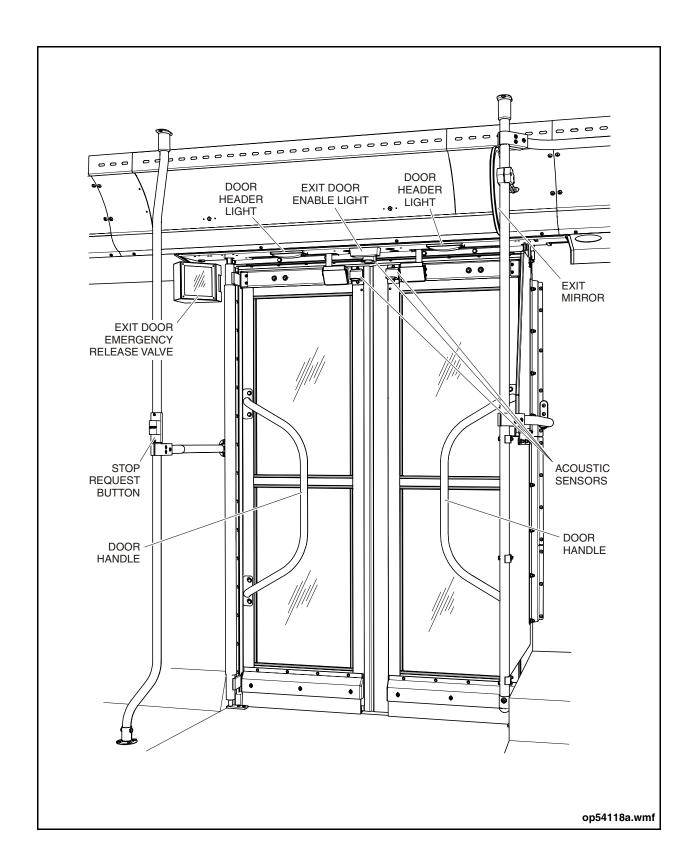
The exit door area includes the following components:

- A slide glide style door that is air-opened and air-closed
- An acoustic sensor object detection system
- An exit door emergency release valve
- · A green LED exit door enabled light
- Stanchion-mounted stop request buttons

Pushing the rear door controller, will open the exit door which will be indicated by the illumination of the green overhead light. The door header lights will illuminate as soon as the exit door is open and will remain illuminated for five seconds after the door closes. If an object or obstruction is detected by the door sensitive edges or the acoustic sensors, the doors will automatically re-open.

In the event of an emergency situation with an inoperable door, the emergency release valve located in the upper left corner can be operated to release air pressure from holding the door closed. Refer to the Emergency Information section of this manual for emergency release valve operating instructions.







# 8. INSTRUMENTATION & CONTROLS

## **Instrument Panel**

**Turn Indicators (Green)** 



**WARNING:** 



If turn signal indicators do not operate as described, DO NOT **OPERATE THE VEHICLE.** 

The turn indicators, symbolized by directional arrows, flash on either side of the instrument panel when the right-hand or left-hand floor-mounted turn signal switch is pressed.

When the Hazard switch is activated, both turn indicators flash together. Failure of these lights to flash normally indicates that the flasher module is not functioning.

## No Gen Indicator (Red)



CAUTION:



If the no gen indicator remains illuminated while the engine is operating, DO NOT OPERATE THE VEHICLE.

The no gen indicator, symbolized by a battery, illuminates when the alternator is not charging. The no gen indicator illuminates when the Master Run switch is in the DAY-RUN or NIGHT-RUN position and the engine is not operating. The no gen indicator turns off once the engine is operating.



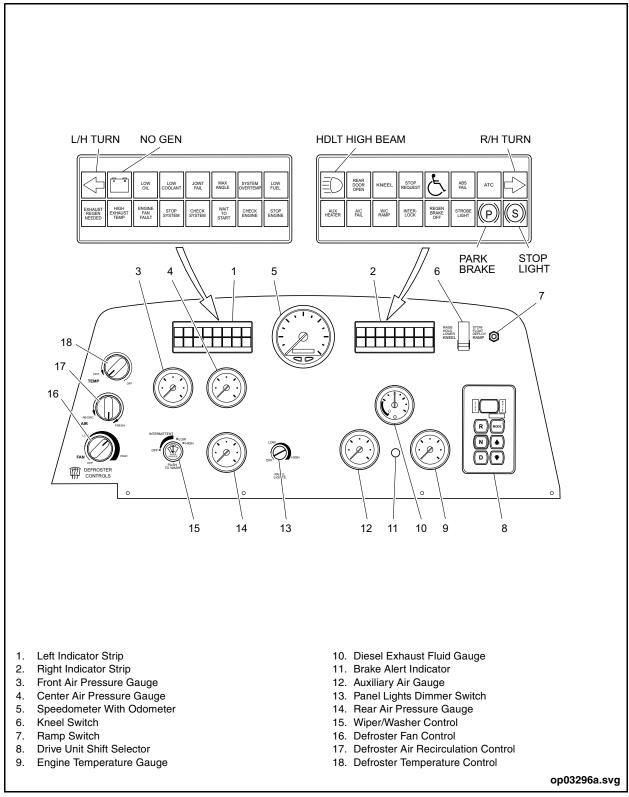


Figure 15: Instrument Panel



## Low Oil Indicator (Red)



CAUTION:



If the low oil alarm continues and the indicator remains illuminated, DO NOT OPERATE THE VEHICLE.

The Low Oil indicator illuminates if the engine oil pressure is too low for proper engine lubrication. The Low Oil indicator is accompanied by a warning buzzer.

Before starting the engine, positioning the Master Run switch to DAY-RUN or NIGHT-RUN illuminates the Low Oil indicator and sounds its alarm. This occurs momentarily and is a normal electrical system test.

#### ™ NOTE:

If this indicator remains illuminated, the Engine Protection System engages to initiate an automatic engine shutdown sequence.

## **Low Coolant Indicator (Amber)**

The Low Coolant indicator illuminates if too little coolant is in the engine to maintain normal engine operating temperature.

### MOTE:

The surge tank of this vehicle is equipped with two coolant level sensors. If the coolant level drops sufficiently to activate the second, or lower, sensor, the Engine Protection System engages to initiate an automatic engine shutdown sequence.

# Joint Fail Indicator (Red)

The Joint Fail indicator illuminates and flashes if the articulating joint electronic controller detects a system fault.



## Max Angle Indicator (Red)

The Maximum Angle indicator illuminates if the articulation joint reaches its maximum left or right turning angle during forward or reverse operation. An alarm accompanies indicator activation.

### ™ NOTE:

In reverse the interlocks apply to stop the vehicle if motion continues beyond the maximum angle. Driving forward will release the interlocks.

## **System Overtemp Indicator (Red)**

The System Overtemp Indicator illuminates if the oil in the Drive System or Dual Power Inverter Module (DPIM) exceeds the maximum rated operating temperature. Immediately move the vehicle to a safe area and shut down the system.

## **Low Fuel Indicator (Amber)**

The Low Fuel indicator illuminates when the level of diesel fuel in the tanks has reached the minimum level for reliable vehicle operation.



## **Exhaust Regen Needed Indicator (Amber)**

This indicator will either illuminate steady or flash and may illuminate in combination with the Check Engine indicator to indicate the various stages of soot buildup in the muffler particulate filter. Refer to the following chart for a description of various conditions and actions required when this indicator illuminates.

EXHAUST REGEN NEEDED INDICATOR FUNCTION							
DPF SOOT LEVEL	EXHAUST REGEN NEEDED INDICA- TOR	CHECK ENGINE INDICA- TOR	STOP ENGINE INDICA- TOR	ENGINE DERATE	PROCEDURE		
Low to Medium	On	Off	Off	None	Increase vehicle duty cycle to allow mobile active regeneration.		
Medium to High	Flashing	Off	Off	None	Increase vehicle duty cycle to allow mobile active regeneration.		
High	Flashing	On	Off	Derate (Note 1)	Notify service personnel to perform stationary regeneration.		
Severe	Off	Off	On	Severe Derate (Note 2)	Stop engine at earliest opportunity & notify service personnel. (Note 3)		

Note 1: Moderate derate of engine torque.

Note 2: Severe derate of engine speed.

Note 3: Stationary regeneration will be disabled.



## **High Exhaust Temp Indicator (Amber)**



**WARNING:** 



If the High Exhaust Temp indicator on the instrument panel illuminates, ensure the exhaust outlet is not located where it could cause damage to persons or any materials which could melt or explode, and that nothing is within 2 feet of the outlet. Ensure no combustible materials are within 5 feet of the outlet. Exhaust outlet temperatures can reach 1500°F (800°C) when this indicator illuminates.

The High Exhaust Temp indicator illuminates if exhaust temperatures exceed those temperatures normally experienced during the regeneration process. High exhaust temperatures indicate a possible fault in the exhaust aftertreatment system.

### ™ NOTE:

Notify service personnel if this indicator should illuminate.

## **Engine Fan Fault (Amber)**

The Engine Fan Fault indicator will illuminate if a low hydraulic fluid level is detected or fan speed is high with cold engine temperature. Notify maintenance personnel if this indicator illuminates.

# **Stop System Indicator (Red)**

The Stop System Indicator illuminates if a major fault or unsafe operating condition is detected in the Electric Drive System, immediately move the vehicle to a safe area and shut down the system.



## **Check System Indicator (Amber)**



N CAUTION:



If the Check System indicator illuminates for more than 30 seconds, remove the vehicle from traffic to a safe location, shut the engine down and apply the parking brake.

The Check System indicator illuminates if a non-critical fault is detected in the Electric Drive System.

## **Wait to Start Indicator (Amber)**

The Wait to Start indicator illuminates before engine start-up with the Master Run switch in the DAY-RUN or NIGHT-RUN position. The indicator will remain illuminated for up to 30 seconds while the intake air heater system operates.

#### B NOTE:

The intake air heater system will only operate when the sum of the coolant and air inlet temperature is less than 77°F (25°C).

# **Check Engine Indicator (Amber)**



CAUTION:



If the Check Engine indicator remains illuminated after engine start-up, advise service personnel. Avoid extended periods of operation with this indicator illuminated

The Check Engine indicator illuminates if the engine requires service. The indicator is controlled by the engine's ECM, which monitors engine sensor output. The indicator will illuminate if sensor output signals fall outside of a predetermined range.



## Stop Engine Indicator (Red)

The Stop Engine indicator illuminates if an engine operating condition occurs that will result in damage to the engine. The indicator is controlled by the engine's ECM. When the indicator illuminates a buzzer will sound and the system will initiate an engine shutdown sequence.

As an operation check, the Stop Engine indicator should remain illuminated momentarily when the engine is started.

#### № NOTE:

If this indicator remains illuminated, the engine will continue running for 30 seconds. Use this interval to drive out of traffic to a safe area.

## **High Beam Indicator (Blue)**

The high beam indicator, symbolized by a headlight, illuminates when the vehicle headlights are in the high beam mode of operation. Pressing the dimmer switch returns the headlights to normal low beam operation.

## **Rear Door Open Indicator (Red)**

The Rear Door Open indicator illuminates when the Rear Door Control switch is activated and the exit door opens.

# **Kneel Indicator (Amber)**

The Kneel indicator illuminates when the suspension is in the kneeling mode and is lowering the vehicle to the curb.

# **Stop Request Indicator (Red)**

The Stop Request indicator illuminates when the passenger signal system has been activated.

# W/C Stop Request Indicator (Amber)

The Wheelchair Stop Request indicator illuminates when the wheelchair passenger signal system has been activated.



## ABS Fail Indicator (Amber)

The ABS Fail indicator illuminates if the ABS System requires service. The indicator illuminates momentarily at engine start-up as part of a system check. It also displays blink codes during system diagnostics. Refer to the Vehicle Operation Section of this manual for more information.

## **ATC Indicator (Amber)**

The ATC indicator illuminates when the Automatic Traction Control System is operating to limit drive wheel spin on slippery surfaces.

## **Aux Heater Indicator (Amber)**

The Auxiliary Heater indicator illuminates when the engine coolant heater functions. It starts automatically in cold conditions to heat the engine coolant to operating temperature.

#### ™ NOTE:

The engine coolant heater operates only when the Master Run switch is in either the DAY-RUN or NIGHT-RUN position.

# A/C Fail Indicator (Red)

The A/C Fail indicator illuminates if the HVAC unit malfunctions.

# W/C Ramp Indicator (Red)

The Wheelchair Ramp indicator illuminates to indicate operation of the wheelchair ramp.

# Interlock Indicator (Red)

The Interlock indicator illuminates when the interlocks apply. This is a safety system that disengages the accelerator and applies the rear brakes during operation of the exit doors, the kneeling system or the wheelchair ramp.



## Regen Brake Off Indicator (Red)

The Regen Brake Off indicator illuminates to indicate that the regen braking switch on the side console is in the OFF position and that power is disconnected from the auxiliary braking system.

## **Strobe Light Indicator**

The Strobe Light indicator illuminates when the strobe light switch on the side console is in the ON position.

## Parking Brake Indicator (Red)

The parking brake indicator, symbolized by a circled letter P, illuminates when the parking brake control valve is applied. Activating the parking brake illuminates the stop lights indicator and all red stop lamps.

## **Stop Lights Indicator (Red)**



**WARNING:** 



If the stop lights indicator does not operate as described, DO NOT OPERATE THE VEHICLE.

The stop lights indicator, symbolized by a circled letter S, illuminates each time the service brake or parking brake control valve is applied. If under these circumstances the indicator does not illuminate, then any or all rear stop lights are malfunctioning.

# **Air Pressure Gauges**

Individual analog air pressure gauges are used to monitor the vehicle's front, center, and rear air brake systems. An LED indicator at the bottom of the gauge illuminates and a warning buzzer sounds if air pressure drops below 75 psi (517 kPa). If air pressure exceeds the normal operating range, the LED indicator will flash. Normal operating pressure range is 105 to 125 psi (724 to 862 kPa).

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## Speedometer/Odometer

This gauge indicates the vehicle's forward speed and displays the distance travelled.

The digital display can be used as a standard odometer or as a trip odometer with trip-1 and trip-2 functions. It can also be set to display operating hours. The mode and set buttons below the display are used to select the desired function.

The speedometer will initialize as soon as the Master Run switch is set to the DAY-RUN or NIGHT-RUN position. During this self-test process all gauges will sweep to zero points, the speedometer display panel will display all alphanumeric segments, and all indicators on the left-hand and right-hand indicator strip will illuminate momentarily.

### **Kneel Switch**



# **CAUTION:**



When placed in the RAISE position the Kneel toggle switch will latch and continue to raise the vehicle until full ride height is reached at which point the raising action will automatically stop. In order to interrupt the raising operation during its cycle, the toggle switch must be set to the HOLD position.

This three-position momentary switch is used to operate the vehicle's kneeling system. The kneeling system lowers the front and curbside rear of the vehicle approximately 3 to 4 inches by exhausting air from both front suspension and the curbside center and rear air springs. Boarding the vehicle becomes easier, particularly for small children and the handicapped.

#### **LOWER**

This position lowers the vehicle, activating the interlocks, the audible alarm and the exterior warning lights. The instrument panel Kneel indicator also illuminates.

### NOTE:

The Kneel toggle switch is a momentary spring loaded switch that will operate in the LOWER position only as long as pressure on the switch is maintained.



#### **RAISE**

This position raises the vehicle automatically to its full ride height. Once the vehicle has reached normal ride height, the interlocks will release (with doors closed), the alarm will silence and the exterior warning light and Kneel indicator will both extinguish.

#### NOTE:

Closing the switch guard locks the switch in the RAISE position.

#### **HOLD**

During the kneeling cycle, this position stops kneeling operations, silences the alarms and extinguishes the exterior warning lights. The Kneel indicator and the interlocks remain activated.

## **Ramp Switch**



**CAUTION:** 



The Ramp toggle switch is a momentary type. If pressure is removed, the switch returns to the center FLOAT position and operation ceases.

This is a three-position switch that controls the wheelchair ramp.

#### **DEPLOY**

This position activates the ramp from the closed position to the open position.

#### **FLOAT**

This position shuts off power to the pump, allowing the ramp to free-fall to either the open or the closed position. Upon cycle completion this becomes an off position.

#### **STOW**

This position is used to move the ramp from the open to the closed position.

Refer to the Wheelchair System Section of this manual for operating procedures.



#### ™ NOTE:

Notify service personnel if the gauge consistently registers pressure levels outside of the normal range.

### **Drive Unit Shift Selector**



CAUTION:



Be sure to bring the vehicle to a full stop before shifting from drive [D] to reverse [R] or vice versa.

The Drive Unit shift selector is located on the right hand side of the instrument panel. The shift selector module has six push-button switches and a green LED display. Three switches control the reverse [R], neutral [N] and drive [D] selections. The other switches are MODE, UP arrow and DOWN arrow. Their functions are as follows:

 The UP and DOWN arrows initiate the drive unit diagnostics system when pressed simultaneously. Press them once for diagnostics and twice for oil level readings.

#### ™ NOTE:

A back-up alarm activates when reverse [R] is selected.

## **Water Temperature Gauge**

The water temperature gauge indicates engine coolant temperature. The hot engine indicators in the gauge and on the instrument panel indicator will illuminate if the engine overheats. An alarm will sound and the engine protection system will initiate an automatic shutdown sequence

# **Brake Alert Indicator (Red)**

The Brake Alert indicator illuminates if an abnormal braking event occurs on any brake chamber, such as failure to activate, excessive brake stroke, dragging brakes, or overheated brake linings.



## **Diesel Exhaust Fluid Gauge**

The diesel exhaust fluid gauge shows the level of exhaust fluid. Notify maintenance personnel if the level is low.

## **Auxiliary Air Gauge**

The auxiliary air gauge indicates air pressure of the front accessories tank.

## **Panel Lights Dimmer Switch**

The Panel Lights Dimmer switch controls the brightness of the instrument and the side console panel lighting. Rotating the dimmer knob clockwise increases the brightness and counter-clockwise decreases the brightness of the panel lights.

## **Wiper/Washer Control**

The wiper control switch operates the left-hand and right-hand wiper motors. The intermittent position allows turning of the control knob to vary the delay of the wiper sweep in times of light rain. In the low or high position the wipers operate at fixed speeds. Pushing down on the knob operates the windshield washer pump to spray fluid onto the windshield.

#### 🖙 NOTE:

The windshield washer bottle filler is located near the streetside headlight.

# **Driver's Climate Controls**

#### **Defroster Fan Control**

The defroster Fan knob on the instrument panel controls the speed of the driver's heater/defroster fan. Turning the knob from the extreme left (OFF position) to the right provides infinitely variable fan speeds settings.

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### **Defroster Air Recirculation Control**

The Air knob on the instrument panel controls the amount of fresh air circulated through the driver's heater/defroster system. This knob can be set to recirculate all or a portion of air entering the heater compartment and admit a corresponding amount of fresh air.

## **Defroster Temperature Control**

The Temp knob on the instrument panel controls the temperature of the air blowing from the defroster. Turn the knob from left to right to decrease temperature and from right to left to increase temperature.

### **Driver's Vent**

Located at the left front of the vehicle, the vent allows outside air in during forward motion. It is a hand operated vent that is controlled by a knob located forward and left of the steering column. To open the vent, rotate the knob clockwise and rotate counterclockwise to close.

### **Driver's Foot Heat**

This control lever is located on the front panel to the right of the instrument panel. It regulates air from the defroster to the foot control area. Moving the lever from its highest position down, gradually increases air flow.

### ™ NOTE:

Use the Temperature control knob on the instrument panel to set the foot heat air temperature.

### **Driver's Booster Fan**

Located above the side window, the driver's booster fan draws air from the vehicle's streetside air duct. A knob on the assembly provides variable fan speed control and a movable flap directs the air flow.



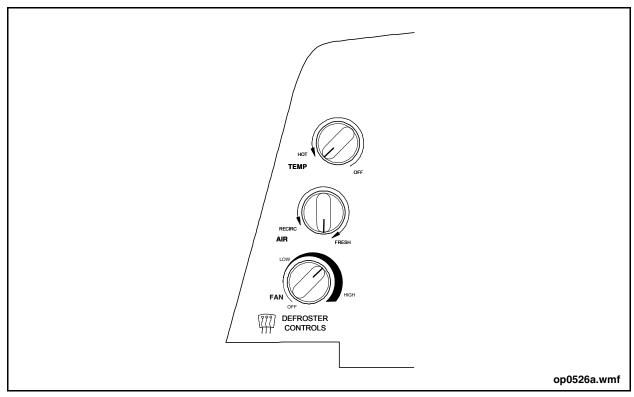


Figure 16: Driver's Area Climate Controls

# **Side Console Switch Panel**

# **Fan Speed Switch**

The Fan Speed toggle switch controls the main heater blower fan speed. Position switch to either HIGH or LOW for desired speed.

## **Dash Fan Switches**

The RH and LH Dash Fan toggle switches control the dash fans. To run a fan, reposition a switch from OFF to either HIGH or LOW for a desired speed.



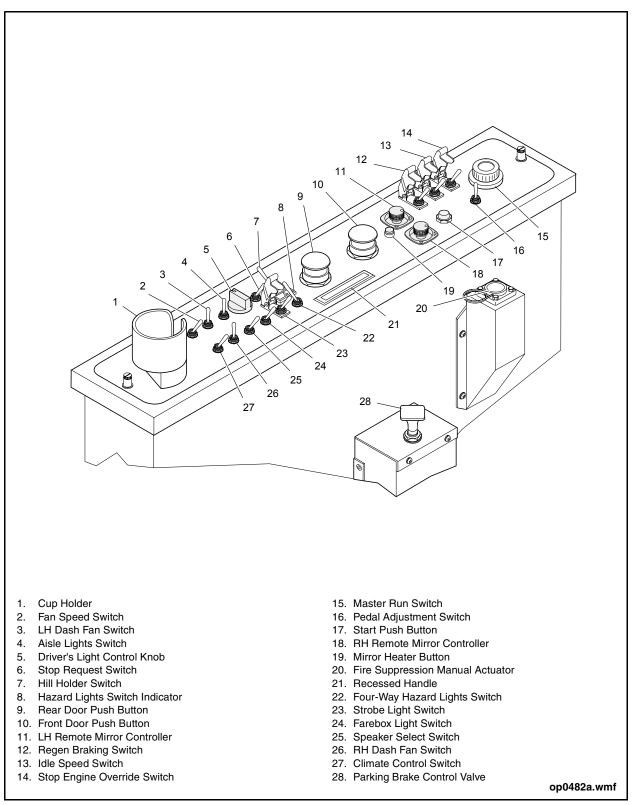


Figure 17: Side Console Panel



# **Aisle Lights Switch**

The following table displays the lights that will be illuminated based on the positions of the Aisle Lights switch and Master Run switch.

AISLE LIGHTS SWITCH OPERATION						
AISLE LIGHTS SWITCH POSITION	MASTER RUN SWITCH POSITION	ILLUMINATED LIGHTS				
ON	DAY-RUN	Streetside (1-9) Curbside (1-9)				
ON	NIGHT-RUN	Streetside (1-9) Curbside (1-9)				
ON	NIGHT-PARK	Streetside (None) Curbside (None)				
PARTIAL*	DAY-RUN	Streetside (1-9) Curbside (1,5)				
PARTIAL*	NIGHT-RUN	Streetside ((1-9) Curbside (1,5)				
PARTIAL*	NIGHT-PARK	Streetside (None) Curbside (None)				
OFF	ANY POSITION	Streetside (None) Curbside (None)				
* The front two light panels will only illuminate when the entrance doors are open						



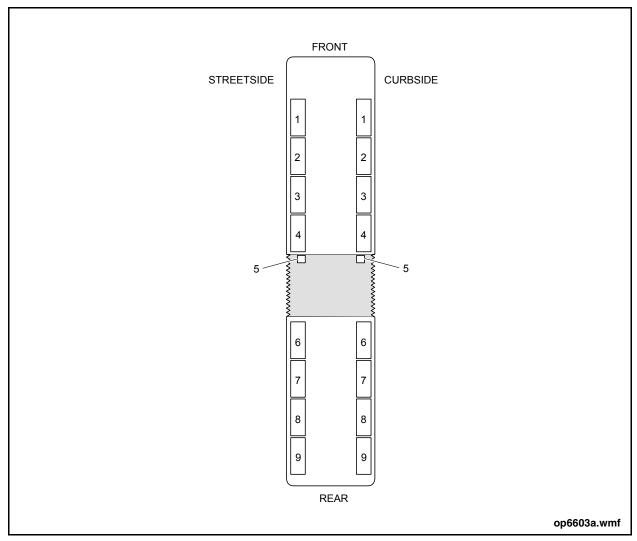


Figure 18: Interior Lighting Panels

## **Driver's Light Control Knob**

The Driver's Light knob controls the light above the driver's area. Turning the knob from the extreme right [OFF] to high [H] illuminates the light. Setting the knob to a position between high [H] and low [L] adjusts the light's brightness.

# **Stop Request Switch**

The Stop Request toggle switch controls the stop request indicators of the passenger signal system. Setting the switch to the OFF position deactivates the stop request sign, the instrument panel indicator, and the chime.



### Hill Holder Switch

The Hill Holder switch is a momentary toggle switch that operates the vehicle's brakes. Positioning and holding the switch to ON applies the brakes. Release the switch when the drive unit torque can move the vehicle in the desired direction. Use the switch to prevent unexpected motion when starting on a hill.

## **Hazard Lights Switch Indicator**

The Hazard Lights Switch indicator illuminates when the Master Run switch is in the NIGHT-RUN or NIGHT-PARK position. It serves only to highlight the position of the Four-Way Hazard Lights switch.

### **Rear Door Control**

The exit door control is a push switch that controls the exit door. Push the switch once to open the door. Push the switch a second time to close the door.

### **Front Door Control**

The entrance door control is a push switch that controls the entrance door. Push the switch once to open the door. Push the switch a second time to close the door.

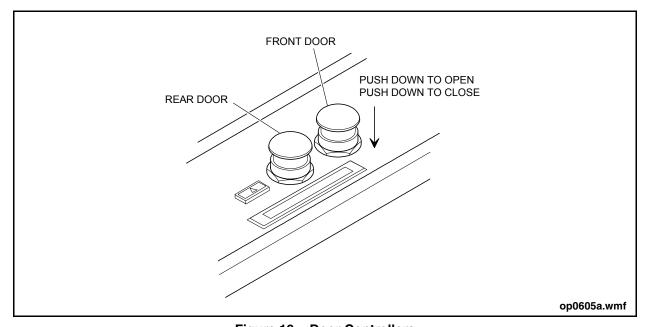


Figure 19: Door Controllers



### **Mirror Heater Button**

This push-button powers the heater elements behind the right and left exterior mirrors. The button illuminates to confirm heater element operation.

### **Remote Mirror Controllers**

The remote mirror controllers control the left and right remote mirror assemblies. Use the four directional tilt function of the dial to move the mirror into the desired position.

## Regen Braking Switch

The Regen Braking toggle switch is a guarded switch located on the side console and controls power to the auxiliary braking system. Lifting the guard and positioning the switch to ON enables the system. The OFF position disables the system and illuminates the Regen Brake OFF indicator on the instrument panel.

#### ™ NOTE:

Consult your transit authority for specific operating conditions during which the Regen switch should be used.

# **Idle Speed Switch**



CAUTION:



Excessive engine idling is not recommended by the engine manufacturer. Operate engine at fast idle speed if idling for periods longer than 10 minutes. Consult your local transit authority for operating policy.

The Idle Speed toggle switch activates the preset fast idle to increase the engine RPM to maintain optimum engine operating temperature during periods of extended idling. Activating the fast idle following a cold engine start also allows quicker engine warm-up.

#### NOTE:

The FAST position on the Idle Speed switch only operates if the engine is running, the drive unit shift selector is in the neutral [N] position and the parking brake is applied.



## **Stop Engine Override Switch**



WARNING:



Apply the Stop Engine Override switch only for emergencies, such as moving the vehicle from traffic to a safe stopping area. The override interval is 30 seconds.

The Stop Engine Override toggle switch is used to override the engine shutdown system in an emergency. Refer to the Vehicle Operation Section of this manual for more information

### Master Run Switch

The Master Run switch is a 4-position rotary switch. The DAY-RUN, NIGHT-RUN, and NIGHT-PARK positions are used to activate the vehicle Multiplexing System and energize various 12/24V electrical circuits. The STOP-ENGINE position is used to shutdown the engine and de-energize the Multiplexing System and most 12/24V electrical circuits except those associated with safety functions. The Battery Disconnect switch must be set to the OFF position in order to disconnect the remaining 12/24V circuits from the vehicle batteries. The following table provides a list of circuits energized by the various Master Run switch positions:

### ™ NOTE:

The Multiplexing System is programmed to remain active for 30 minutes after the Master Run Switch is set to the STOP-ENGINE position.

MASTER RUN SWITCH OPERATION						
CIRCUIT OR SYSTEM	STOP- ENGINE	DAY- RUN	NIGHT- RUN	NIGHT- PARK		
Headlights, high beam		х				
Headlights, low beam (Note 4)			х			
Four-way hazard lights	х	х	х	х		
Turn lights (Note 3)	х	х	х	х		
Stop lights	х	х	х	х		



MASTER RUN SWITCH OPERATION						
CIRCUIT OR SYSTEM	STOP- ENGINE	DAY- RUN	NIGHT- RUN	NIGHT- PARK		
Strobe light	х	х	х	х		
Clearance/marker lights			х	х		
Tail lights			х	х		
License plate light			х	х		
Backup lights & alarm (Note 1)		х	х			
Aisle lights, normal	х	х	х	х		
Aisle lights, on (Note 3)	х	х	х	х		
Instrument panel illumination			х	х		
Instrument panel dimmer			х	х		
Driver's lamp (Note 3)	х	х	х	х		
Service compartment lights (Note 3)	х	х	х	х		
Entrance & exit door lights with door open (Note 2)		х	х	х		
Instrument panel warning indicators		х	х			
Drive unit shift selector		х	х			
Brake & accelerator interlocks		х	х			
Destination sign operation		х	х	х		
Door controller	х	х	х	х		
Horns	х	х	х	х		
Regenerative braking (Note 1)		х	х			
Driver's alarm		х	х			
Fire suppression & alarm	х	х	х	х		
Parking brake alarm (Note 3)	х			х		
Kneeling operation & alarm		х	х			
Wheelchair ramp & alarm		х	х	х		



MASTER RUN SWITCH OPERATION							
CIRCUIT OR SYSTEM	STOP- ENGINE	DAY- RUN	NIGHT- RUN	NIGHT- PARK			
Passenger signal system		х	х				
HVAC system (Note 1)		х	х				
Auxiliary heater		х	х				
Wiper control		х	х				
Remote mirrors		х	х				
Surveillance cameras		х	х				
Heated mirrors		х	х	х			

Note 1: Engine must be running

Note 2: DAY-RUN also requires W/C ramp deployed

Note 3: Multiplexing system must be active

Note 4: Daytime running lights (DRL) operate at reduced intensity with Master Run switch in DAY-RUN position

### **Pedal Adjustment Switch**

The Pedal Adjustment switch controls the position of the brake and accelerator pedals. The FWD position moves the pedal assembly forward, the RWD position moves the assembly back and the HOLD position will maintain the desired adjustment.

### NOTE:

The Pedal Adjustment switch is not functional unless the parking brake is applied.



### **Start Push Button**



**WARNING:** 



Put the shift selector in neutral [N] and apply the parking brake before starting the engine. If the parking brake indicator does not illuminate, DO NOT OPERATE THE VEHICLE.

This momentary push button on the side console allows the operator to start the engine without leaving the driver's seat.

#### ™ NOTE:

The electronic control system limits engine cranking time to 14 seconds; the starting circuit is then locked out for 60 seconds before engine cranking is allowed to resume.

### **Four-Way Hazard Lights Switch**

The Hazard Lights toggle switch has an ON and OFF position. When the switch is ON, the instrument panel turn indicators and the exterior turn signal lights flash.

When the switch is OFF, the exterior signal lights function only as turn signals. The exterior signal lights and instrument panel turn indicators flash when the left or right turn signal foot-switch is pushed and held.

Activate the four-way hazard lights when the transit vehicle is stopped or parked in an area and may block traffic or present a possible hazard to following or approaching vehicles. Also use the four-way hazard lights when the vehicle is being towed.

### **Strobe Light Switch**

The Strobe Light switch is a guarded toggle switch. Lifting the guard and setting the switch to the ON position activates the strobe light mounted on the rear panel of the vehicle.

### ™ NOTE:

Consult your local transit authority for policy on operating the strobe light.



### **Farebox Light Switch**

The Farebox Light switch is a two-position switch controlling the light above the farebox. In the NORMAL position the light is only on when the entrance door is open. Use the ON position to illuminate the light when the door is closed.

### **Speaker Select Switch**

The Speaker Select switch controls operation of the exterior speaker. In the INTERIOR position only the speakers inside the vehicle are activated. Use the BOTH position to activate the exterior speaker also.

### **Climate Control Switch**

The Climate Control toggle switch is a two-position toggle switch that controls the HVAC System. In the AUTO position, the system will heat or cool the vehicle interior to maintain a preset temperature. The OFF position disables the system.

### **Parking Brake Control Valve**



WARNING:



If the air pressure is below 40 psi (276 kPa), the parking brake valve will return to the applied position.

This valve controls the application or the release of the parking brake. Pulling up on the control knob applies the parking brake. Pushing down on the knob releases the parking brake.

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## **Foot Operated Controls**

### **Brake Treadle**

The brake treadle, located to the left of the accelerator treadle, controls the application and release of the service brakes. The brake treadle also controls the retarder function. Refer to the Vehicle Operation Section of this manual for specific operating procedures on the retarder.

Brake application is proportional to the amount of treadle movement applied. Pressing the brake treadle illuminates the tail lights and the stop light indicator.

### **Accelerator Treadle**

The accelerator treadle, located to the right of the brake treadle, controls the engine throttle. Acceleration of the engine is proportional to the amount of treadle movement applied.

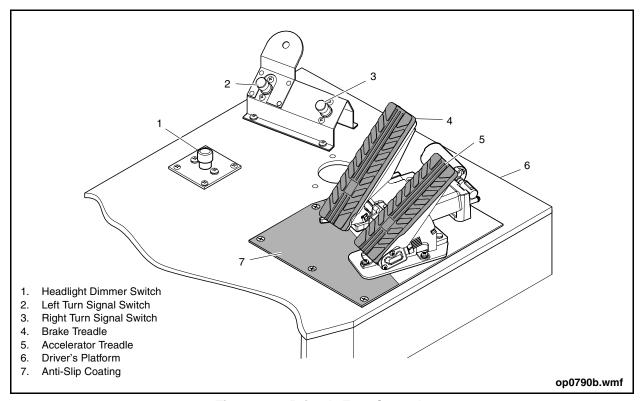


Figure 20: Driver's Foot Controls



### **Headlight Dimmer Switch**

The headlight dimmer switch is a heel-activated click-in switch located adjacent to the side console. Pressing the switch changes the headlight operating mode between either high beam or low beam. The blue high beam indicator on the instrument panel indicates the high beam mode.

### **Turn Signal Switches**

Two bracket-mounted momentary-on switches control the right and left turn signal lights when held depressed. The left or right turn signal indicators on the instrument panel illuminate when the respective floor switch is activated.

### **Miscellaneous Controls**

### **HVAC Control Panel**

An HVAC unit control panel is installed above the driver's window. The unit is equipped with four keys and an LED display. The keys allow the operator to raise or lower the vehicle temperature set points for up to three separate climate-controlled zones on the vehicle. An RS-232 diagnostic access port allows service technicians to load software upgrades or perform vehicle diagnostics with the use of a personal computer.

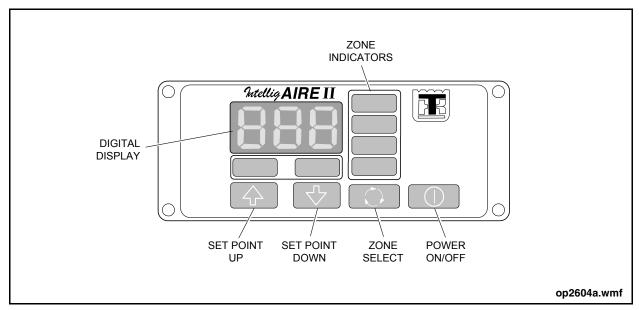


Figure 21: HVAC Control Panel



#### **Door Master Switch**



**WARNING:** 



Greater attention to passenger safety must be given whenever operating the vehicle with the Door Master switch in the OFF position, as this position disables several safety features and will allow the following conditions to occur:

- Vehicle can be moved with exit door open (brake interlocks disabled).
- Drive unit can be shifted without foot on brake treadle.
- Drive unit can be shifted and vehicle moved with wheelchair ramp deployed.
- Exit doors can be opened at any speed by using the emergency release control valve.

The Door Master toggle switch, located in the destination sign compartment, controls power to the brake interlocks and exit door. When the switch is in the ON position, the entrance and exit doors are fully functional. In this mode, opening the exit door, kneeling the vehicle or operating the wheelchair ramp engages the interlocks. Engaging the interlocks applies the rear brakes and deactivates the accelerator.

When the switch is In the OFF position, the brake interlocks are released (interlocks will not engage). The entrance door remains fully functional and the exit door does not function. A warning buzzer sounds and the Rear Door Open indicator illuminates on the instrument panel. In this mode, the exit door only opens if the emergency release control valve is activated. The control valve is located behind the breakable window to the left of the exit door.

#### Joint Override Switch

The Joint Override toggle switch is located behind the destination sign access door. It is a two position momentary switch that controls artic joint electrical system circuits. Pulling the switch down temporarily overrides the interlocks that apply at maximum angle.



#### **ABS Switch**

The ABS switch, located in the destination sign compartment, is used by service personnel to troubleshoot the ABS System. Pulling the switch to BLINK CODE and releasing activates the blink code diagnostic capabilities. The blink code sequence displays on the instrument panel ABS Fail indicator.

### **Auxiliary Heater Switch**

The Auxiliary Heater switch controls operation of the auxiliary engine coolant heater. Positioning the switch to ENABLE allows the heater to function in response to heat requirements from either the Defroster Temperature Control switch or the Climate Control switch. Positioning the switch to DISABLE will inhibit operation of the auxiliary engine coolant heater.

### **Exhaust Filter Switch**

The Exhaust Filter switch, located in the destination sign compartment, is a 3-way toggle switch with NORMAL, INHIBIT and REGEN positions. This switch is used by service personnel as required to regenerate or burn soot off of the muffler filter. The function of the switch settings is as follows:

- NORMAL this position is used for everyday vehicle operation. Regeneration will occur as needed while the vehicle is being driven.
- INHIBIT this position is used when the vehicle is parked inside for servicing or any other situations where the regeneration process must be disabled for safety reasons.
- REGEN this position is used by service personnel to initiate a forced regeneration when the vehicle is parked in a safe location. The engine speed and exhaust temperature will increase as the muffler filter regenerates.

### **Door Manual Control Valve**

This air control valve is located above the foot-operated controls and on the side of the side console panel. Turning it to the OFF position releases the air controlling the entrance door. This allows manual operation of the door for initial vehicle entry. For normal entrance door operation, position the door manual control valve to ON.



### **Signal Control Emitter**

A Signal Control Emitter is installed on the front exterior roof of the vehicle. This device is designed to transmit a coded infrared signal when the vehicle is running behind its preprogrammed route schedule. The signal is detected and decoded by traffic controller circuitry at vehicle intersections. The intersection control circuitry can provide a green light signal to the vehicle on a priority basis.

### NOTE:

Consult your Transit Authority for specific guidelines on Signal Control Emitter activation.



## 9. FIRE SUPPRESSION SYSTEM

## **Description**

The Fire Suppression System protects the passengers and vehicle against fire. A dry chemical extinguishing agent discharges through four fixed nozzles in the engine compartment and two nozzles in the muffler compartment to suppress a fire. The major components of the system include:

- Fire suppression control panel located in the driver's area, to the left of the destination sign access door.
- Manual actuator switch located below the driver's side console.
- Six heat sensor thermostats four in engine compartment and two in muffler compartment.
- Six discharge nozzles four in engine compartment and two in muffler compartment.
- Two extinguishing agent cylinders one in rear streetside overhead light compartment and one beside muffler compartment.

### **Fire Suppression Control Panel**

The control panel is used to inform the operator or service personnel of the fire suppression system status. The LED indicators and audible alarm indicate basic system status. Detailed event text messages are shown on the panel display. The control panel serves as the fire suppression central control and coordinates communication between all modules. Ensure that the "System OK" message is displayed on the panel before operating the vehicle.

The "System Test Confirm" button tests the audible alarm and LED indicator function. This test button is also used to confirm system configuration.

Press and hold the test button for one second to initiate a self-test of the audible alarm and LED indicator lights. This test will take approximately 10 seconds to complete.

Pressing and holding the test button will engage and test all relay operations in addition to testing the audible alarm and LED indicator circuits. Press the Relay Reset button to reset all the relays. Pressing the test button will also display "Vehicle Safety Network, Firmware:, and Configuration:"



## **Screen Display Messages**

The following table lists the various events that provide a screen display.

SCREEN DISPLAY MESSAGES								
EVENT TYPE	EVENT CAUSE	EVENT RECORD	OPERATION DISPLAY	LED INDICATION	AUDIBLE ALARM			
Trouble	Communicati ons Error	No Response Invalid Response Invalid Module Missing Module Invalid Command Software Error	Trouble Module# Comm	Yellow Trouble Steady	Pulsed			
Trouble	Sensor Trouble	Sensor Missing Sensor Wrong Sensor Disables	Trouble Module# Sensor#	Yellow Trouble Steady	Pulsed			
Trouble	Over- Temperature Level 1	Variable Overheat Sensor Level 1 Exceeded		Yellow Trouble Steady	Single Pulse			
Trouble	Over- Temperature Level 2	Variable Overheat Sensor Level 2 Exceeded		Yellow Trouble Steady	Steady On			
Trouble	Discharge	Open Circuit at Actuator	Trouble Module# Discharge	Yellow Trouble Steady	Pulsed			
Trouble	Pressure Low	Open Circuit at Pressure Switch Input	Trouble Module# Press. Low	Yellow Trouble Steady	Pulsed			
Fire	Fire	Fire	FIRE Module# Sensor#	Red Fire Steady	Steady On			
None	System	Various	None	No	No			
None	System	Clock Set Configuration Written Configuration Erased Configuration Reset Self-Test Relays Cleared Alarm Silenced Reset (at power-on) User Reset (logo button) Event Log Erased Configuration Mismatch Power Failure Maintenance Schedule Set Maintenance Disabled	None	No	No			



## **Operation**

Heat from a fire will close the normally open contacts of one of the heat sensors. This action will short the system's electrical circuit and electrically actuate the solenoid in the agent cylinder. The system can also be manually activated using the manual actuation switch on the driver's side console. The dry chemical extinguishing agent will then be routed to the distributor and released from the discharge nozzles. The control panel in the driver's area will display the current system condition.

Actuation of the Fire Suppression System will also cause the engine protection system to shut down the engine, ensuring that the fuel flow stops. Bring the vehicle to a safe stop and ensure that all passengers exit the vehicle safely.

During system discharge of the suppressant expect a high noise level and possibly a large cloud of extinguishing chemical.

#### № NOTE:

Avoid breathing the dry chemical dust. It will irritate the throat and lungs.

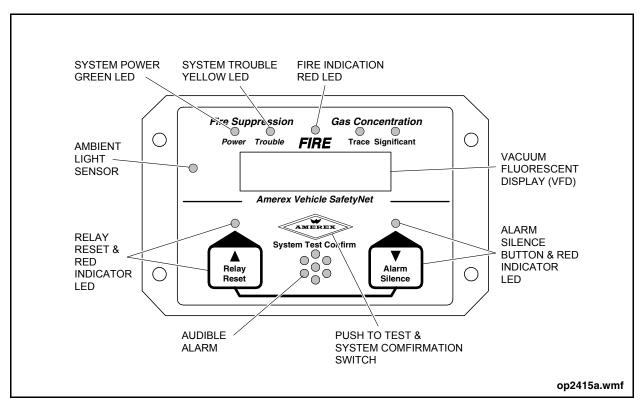


Figure 22: Fire Suppression Control Panel



### **Manual Actuator Switch**

The Manual Actuator switch is located on the driver's side console and is used to manually initiate the discharge of the extinguishing agent. Pulling a safety pin out and pressing down on the switch initiates the discharge. Check that the safety pin is installed before operating the vehicle.

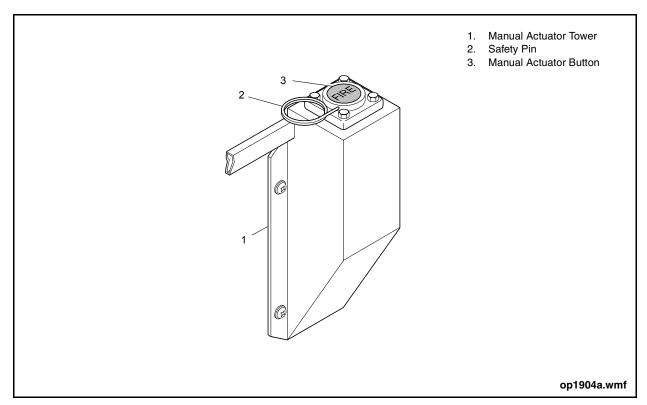


Figure 23: Manual Actuator



## **10.VEHICLE OPERATION**

## **Pre-Start Checks & Adjustments**

A daily routine inspection of the vehicle should reveal any required repairs or adjustments. These need to be reported to service personnel to maintain the best operating condition of the vehicle. When it is ready for service perform the following steps upon entry.

- Activate the electronic control system by turning the Master Run switch to the DAY-RUN or NIGHT-RUN position.
- Adjust the driver's seat for individual comfort.
- Adjust the tilt/telescopic steering column to suit.
- Adjust all mirrors for unobstructed views.
- Check that the Door Master switch is in the ON position.
- Check horn operation.

## **Drive Unit Operation**



**CAUTION:** 



Be sure to bring the vehicle to a full stop before shifting from drive [D] to reverse [R] or vice versa.

Selection of the automatic Drive Unit operating ranges is by the shift selector module on the instrument panel. There are three operating range selection buttons for reverse, neutral and drive [labeled R, N, D]. The red LED display will show reverse, neutral and drive selections as [R] and [N] and [F]. Operate the Drive Unit using the following procedure:

- 1. Before starting the engine
  - a. Check that the Drive Unit is in neutral [N].
  - b. Check that the parking brake is on.
  - c. Apply the brake treadle.
- 2. With the engine running and idling at normal speed, apply firm pressure on the brake treadle and make the desired range selection.



- 3. Release parking brake and the brake treadle to proceed.
- 4. To change direction bring the vehicle to a full stop, apply firm pressure on the brake treadle and make the desired range selection.

### NOTE:

A back-up alarm activates when reverse [R] is selected.

5. When parking or shutting down the vehicle come to a full stop, apply the parking brake, select neutral [N] and release the brake treadle.



**WARNING:** 



NEVER leave the driver's seat while the drive unit is in gear.

## **Regenerative Braking System**

Regenerative braking is provided by the diesel engine system and the drive unit system. During vehicle deceleration the engine and drive units are being driven, through the driveline, by the weight of the vehicle. Under this condition the motor/generators in the drive unit create electrical energy and slow the vehicle by imposing a load on the driveline. This process is referred to as "regenerative braking".

Pressing the (Down) arrow while in forward operation commands the Drive Unit to increase the regenerative braking effect. The Pushbutton Shift Selector displays F or L to identify the level of regenerative braking in use. The Drive unit remains in the selected regenerative braking mode until the Master Run Switch is Place in NIGHT-PARK or STOP-ENGINE, the ( $\uparrow$ ) (Up) or ( $\downarrow$ ) (Down) arrows are used, or N (Neutral) is selected. When the Master Run Switch is placed in the DAY-RUN or NIGHT-RUN position or N (Neutral) is selected, the system returns to the default regenerative braking level.

The regenerative braking system can be disabled by using the Regen Brake switch located on the side console.

#### ™ NOTE:

Consult your local transit authority for specific operating conditions under which the Regen Brake switch should be used to disable the regenerative braking system.



## **Anti-Lock Braking System**



WARNING:



Keep stopping distances the same as those for similar non-ABS equipped vehicles.

The Anti-Lock Braking System (ABS) functions to bring the vehicle to a safe, controlled stop during emergency braking situations. Through computer monitoring of wheel speeds the system controls brake pressure to prevent wheel lock-up. If during brake application the ABS system senses imminent wheel lock-up it engages automatically thus increasing vehicle stability and control.

To operate under normal conditions use the standard braking technique. For emergency braking apply firm and constant pressure to the brake treadle. If required the ABS system will activate automatically producing a pulsing sensation to the brake treadle and a hissing sound. These are normal indications of ABS system operation. During emergency braking avoid "pumping" the brakes as this defeats the pulsing action of the ABS system and will increase your stopping distance.

If the ABS on one wheel malfunctions the system will retain normal braking on that wheel. Should the entire ABS system malfunction the system will also retain normal braking. The ABS Fail indicator on the instrument panel will illuminate if a malfunction occurs.

#### ™ NOTE:

After ABS System service the ABS Fail indicator will remain illuminated at engine start-up. Driving the vehicle above 4 mph should extinguish the indicator. If the indicator remains illuminated, contact service personnel.

### **Automatic Traction Control**

The vehicle's Automatic Traction Control (ATC) System activates automatically to prevent drive wheel spin when accelerating or starting the vehicle from a stand still.

The system uses components of the ABS System to apply the brakes to a drive wheel that loses traction and spins. This transfers the engine torque to the wheel with better traction. If both drive wheels spin, the system reduces engine torque to improve traction. The ATC indicator on the instrument panel illuminates to confirm system operation.



## **Starting the Engine**



WARNING:



Put the shift selector in neutral [N] and apply the parking brake before starting the engine. If the parking brake indicator does not illuminate, DO NOT OPERATE THE VEHICLE.

To operate the vehicle the Battery Disconnect switches must be in the ON position. Check the switches by opening the battery disconnect access door at the rear of the vehicle. These connect the engine starter and vehicle electrical circuits to the battery power.

#### NOTE:

Refer to the Driver's Check List Section of this manual before operating the vehicle.

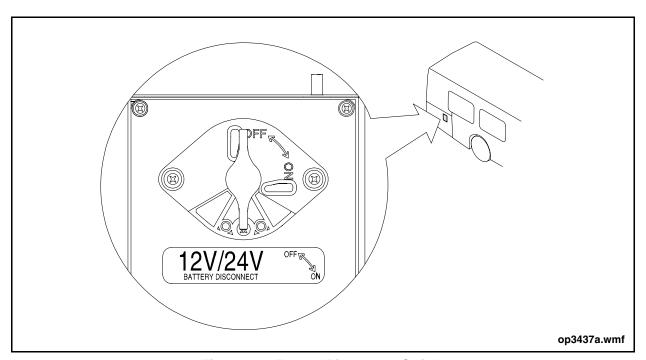


Figure 24: Battery Disconnect Switch



### **Master Run Switch**

Turn the Master Run switch (on side console) to DAY-RUN or NIGHT-RUN position. This activates the vehicle's Multiplexing System. Illuminated indicator lights and sounding alarms signify an active Multiplexing System.

#### ™ NOTE:

When restarting less than 30 minutes after engine shut down, the Multiplexing System responds instantly.

### **Start Push Button**



**WARNING:** 



Put the shift selector in neutral [N] and apply the parking brake before starting the engine. If the parking brake indicator does not illuminate, DO NOT OPERATE THE VEHICLE.

With the vehicle's Multiplexing System active, push and hold the Start push button until the engine starts. Release the start push button as soon as the engine starts.

#### ™ NOTE:

Allow 3-4 seconds after setting the Master Run switch to the DAY-RUN or NIGHT-RUN positions before pressing the Start Push Button. This brief delay will allow the Hybrid System to initiate and enable the starter push button function.

If the Starting System fails to operate, check the following:

- The Master Run switch is in the DAY-RUN or NIGHT-RUN position.
- The shift selector indicator shows neutral [N].
- The engine compartment Engine Run switch is in the FRONT position.
- The parking brake is applied.

#### ™ NOTE:

The Multiplexing System limits continuous Starting System operation to 14 seconds; the circuit is then disconnected for 60 seconds to allow the Starting System to cool down.

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## **Operational Checks**

Once the engine is operating the operator should observe the following:

- The air system pressure is between 105 and 125 psi (724 and 862 kPa) and the suspension is at full height. The Air System requires a working pressure of 105 to 120 psi (724 to 827 kPa).
- The No Gen indicator is off when the engine is operating.
- Drive Unit Selector neutral [N] indicator remains illuminated.
- Parking brake and stop light indicator remain illuminated as long as the parking brake is applied.
- Door controller is operational.
- Position the Door Master switch to the OFF position and attempt to open the exit door by using the side console door controller. The exit door should not be operational; the entrance door should remain operational.
- Return the Door Master switch to the ON position.
- Wiper and washer controls are operational.
- Defroster/heater controls (on dash) are operational.
- Exterior lights operate during exterior light test. To conduct test, ensure engine is running and parking brake is applied, then press both turn switches simultaneously. All exterior lights will illuminate for two minutes. The lights are extinguished by shifting the drive unit out of neutral [N]. This feature enables one person to test the exterior light system.
- The destination sign controller is active.

### **Parking Brake**

The parking brake indicator illuminates when the parking brake is applied. If the parking brake indicator is not illuminated, apply the parking brake by pulling up on the parking brake control valve knob. If the parking brake indicator does not illuminate, DO NOT OPERATE THE VEHICLE.

Press the brake treadle before releasing the parking brake. Release the parking brake by pushing down on the control knob. The parking brake indicator extinguishes.

### NOTE:

Reapply parking brake.



### **Stop Lights**

The stop lights indicator illuminates when the rear stop lights are on. If the indicator is not illuminated, check for rear stop light failure.

#### Low Air

The Low Air indicators illuminate to warn of an unsafe air system pressure level. A warning buzzer sounds when a Low Air indicator is activated. DO NOT OPERATE THE VEHICLE until the alarm system is canceled.

The air pressure gauges indicate the air system pressure levels of the air brake system. The air system will maintain pressure levels above the low operating limit of 105 psi (724 kPa) during normal vehicle operation.

### **Check Engine**

The Check Engine indicator on the instrument panel illuminates momentarily before starting. The Check Engine indicator extinguishes before the engine starts. If the Check Engine indicator remains illuminated, DO NOT OPERATE THE VEHICLE.

### **Shift Selector Display**

At engine start-up the shift selector's red display shows [N] to indicate that the drive unit is in neutral. This should occur automatically at each engine start-up.

#### No Gen

When illuminated, the No Gen indicator signals that the alternator is NOT charging. The indicator remains illuminated until the engine starts. If the indicator fails to remain illuminated until the engine starts, DO NOT OPERATE THE VEHICLE.



### **Operator Display Keyboard (ODK) Messages**

Check that the destination sign control unit correctly programs electronic destination sign messages.

### **Rear Door Open Indicator**

Push the rear door push button to check that the Rear Door Open indicator illuminates when the doors open.

### NOTE:

Exit doors will open and the interlocks will be engaged.

Pushing the rear and front door push buttons a second time, closes the entrance and exit doors and extinguishes the Rear Door Open indicator. Check that the exit doors are closed. If the exit doors are not closed and the Rear Door Open indicator is still illuminated, DO NOT OPERATE THE VEHICLE.



## **Day-Time Operation**

When the engine is operating, check the following:

- The air system pressure is between 105 and 125 psi (724 and 862 kPa) and the suspension is at full height. The air system requires a working pressure of 105 to 120 psi (724 to 827 kPa).
- The No Gen indicator is off when the engine is operating.
- Drive Unit Shift Selector neutral [N] indicator remains illuminated.
- Parking brake and stop light indicator remain illuminated as long as the parking brake is applied.
- Daytime running lights operation.
- Front, side and rear destination/route sign lights.
- Door controller operation.
- The Door Master switch, when placed in the OFF position, disables the exit door and inhibits the brake interlocks.
- Aisle lights operation.
- Return the Door Master switch to the ON position.
- Wiper and washer controls operation.
- Defroster/heater control (on dash) operation.

## **Night-Time Operation**

For night-time operations, ensure the Master Run switch is placed in the NIGHT-RUN position. Check the following in addition to the day-time checks:

- Instrument panel illumination lights.
- Headlight operation (high and low beam).
- Front and rear identification and marker lights.
- Tail lights.
- License plate light.
- Panel lights dimmer changes the brightness of instrumentation backlights and panel text.
- Interior lights can be turned on using the Aisle Lights switch.



## **Pre-Trip Brake Test**



**WARNING:** 



Before driving the vehicle conduct the following test sequence. If the test reveals a fault, advise service personnel and DO NOT OPERATE THE VEHICLE.

Conduct the following test sequence to ensure that the air brake system is functioning properly.

- 1. Apply the parking brake.
- 2. Start the engine and check the following:
  - a. The low pressure warning devices switch off as the air pressure builds.
  - b. If the air pressure gauges were reading below 90 psi (620 kPa), the readings increase back to 90 psi (620 kPa) in less than three minutes.
  - c. The readings of the three air pressure gauges level off at 120 to 125 psi (827 to 862 kPa).
- 3. Release the parking brake.
  - a. Make multiple light brake treadle applications and check the following:
    - i. The air pressure gauge readings stabilize at 105 psi (724 kPa) as the air compressor begins its pumping cycle.
    - After continued multiple light brake treadle applications the low pressure warning devices activate as the air pressure gauge reading falls to 75 psi (517 kPa).
  - b. Release the brake treadle and reapply the parking brake.
- 4. Allow the air system to fully recharge.
- 5. Stop the engine and proceed as follows.
  - a. Release the parking brake.
  - Apply the brake treadle fully, hold and check the following:
    - i. Upon treadle application the air pressure gauge reading does not drop more than 18 psi (124 kPa).

#### ™ NOTE:

Tap the gauges to be sure their needles are not stuck.



- ii. The air pressure on each of the three gauges does not drop more than 3 psi (20 kPa) per minute.
- iii. There are no audible air leaks.
- c. Release the brake treadle and apply the parking brake.
- 6. Restart the engine to recharge the air system. When the reading levels off at 120 to 125 psi (827 to 862 kPa) release the parking brake.
- 7. Move the vehicle slowly and test brake response.

## **Moving the Vehicle**

- 1. Fasten driver's seat-belt.
- 2. Close the doors by turning the door controller handle to position #1. The Rear Door Open indicator should be off.
- 3. Apply the brake treadle and release the parking brake. The parking brake indicator extinguishes.
- 4. Shift the Drive Unit Shift Selector into the desired gear.

### ™ NOTE:

The neutral [N] indicator extinguishes and the appropriate range letter appears in the display.

- 5. Release the brake treadle and lightly apply the accelerator treadle to slowly move vehicle from the parking area. The stop lights indicator extinguishes.
- 6. Check the steering wheel for vibrations, looseness or binding while the vehicle is in motion. If any abnormalities are present, DO NOT OPERATE THE VEHICLE.



## **Parking the Vehicle**

**!**\

**WARNING:** 



The parking brake must be applied when parking the vehicle. When parking downhill, be sure the front wheels are turned into the curb; when parking uphill, be sure the front wheels are turned away from the curb.

- 1. Bring the vehicle to a complete stop using the brake treadle. The stop lights indicator illuminates. Shift the Drive Unit selector into neutral [N].
- 2. Apply the parking brake and release the brake treadle. The parking brake indicator illuminates.
- 3. Operate the front door control switch to open the entrance door.
- 4. Turn the Master Run switch to the STOP-ENGINE position.
- 5. Exit the vehicle.
- 6. Manually close the entrance doors.

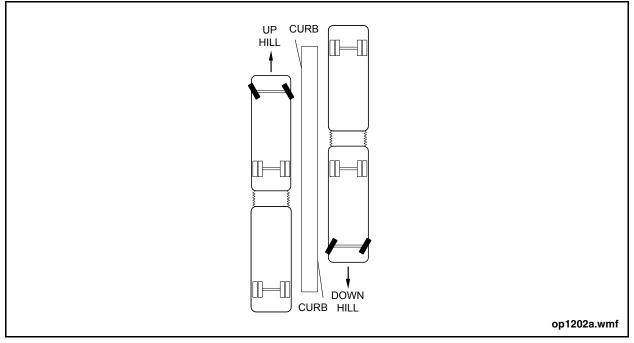


Figure 25: Parking on an Incline



## **Operating the Vehicle in Reverse**



CAUTION:



Continuing in reverse after disengaging the interlocks, risks damage to the articulating joint.

Reverse operation of the vehicle requires paying special attention to the articulating joint angle. Just as a trailer can reach a "jackknife" position the articulating joint can reach a potentially damaging maximum angle position. To reduce this risk vehicle safety systems limit reverse speed to 3 mph and an alarm warns of articulating joint maximum angle.

Three types of alarms sound as the articulating joint moves closer to its maximum angle. An interrupted alarm sounds as the angle is near the maximum. The interrupted alarm frequency increases upon reaching the maximum angle. If the stops of the articulating joint contact each other, the alarm sound becomes constant.

The interlocks apply upon reaching the articulating joint maximum angle to stop further reverse movement. To release the interlocks and allow movement for correction, use the Joint Override toggle switch behind the destination sign access door. Switch activates provides 20 seconds to correct the maximum angle condition before reapplying the interlocks.

## **Jump Start Connection**

Behind the battery access door is a jump start connector to supply power to the batteries when normal engine starting is not possible. It uses a quick connect assembly to ensure a safe and correct electrical connection to the battery poles.

#### B NOTE:

Advise service personnel if starting difficulties occur.

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## **Engine Protection System**



CAUTION:



If engine shutdown occurs, DO NOT attempt an engine restart unless absolutely necessary. Continuing engine operation without fault correction may result in engine damage.

The New Flyer vehicle is equipped with an automatic shut down system to prevent engine damage. If the Stop Engine indicator illuminates, the Engine Protection System initiates a power reduction cycle that lasts 30 seconds. After that time the engine will shut down.

#### NOTE:

Use the 30 seconds to remove the vehicle from traffic. Contact service personnel for further instructions.

## Kneeling

The vehicle's kneeling operations are controlled by the Kneel switch on the instrument panel. This switch is used to raise, hold, or lower the vehicle.

### **Kneeling Procedure**

1. Bring the vehicle to a complete stop, put shift selector in neutral, apply the parking brake and press the front door control switch to open the entrance door. Kneeling will not be enabled if the door is closed.

#### NOTE:

Brake and accelerator interlocks engage when the entrance door is open and kneeling is in process.



WARNING:



Prior to kneeling the vehicle, ensure that boarding passengers stand clear of the vehicle and no obstructions exist.



- 2. Lift the switch guard and hold the Kneel switch in the LOWER position until the vehicle is completely kneeled. Boarding passengers must stand clear and wait until the vehicle has lowered before entering the vehicle.
- 3. Set the Kneel switch to the RAISE position and close the switch guard once passengers have safely boarded. The vehicle will raise automatically to its full ride height.

### **Kneeling Exterior Signal**

Amber lamps located beside the entrance and rear exit doors indicate when the kneeling system is in operation. A warning beeper also sounds.

## **Passenger Signal System**

This passenger signal system is activated by the following devices:

- Stop request cord
- Exit door stanchion push button
- Wheelchair area touch pad

Activating the signal system causes the following to occur:

- Stop request sign illuminates. The sign extinguishes when the system is reset.
- Stop Request indicator on instrument panel remains illuminated until the system is reset.
- A chime sounds once when the passenger signal system is activated. A different tone sounds if the wheelchair passenger signal system is activated.

The system is cancelled (reset) and the lights are extinguished by:

- Opening the entrance door with the door controller.
- Opening the exit door, once enabled with the door controller.
- Pushing the Stop Request switch to CANCEL and releasing.

The stop request sign extinguishes when the entrance or exit doors are fully open.

### **Stop Request Cord**

Stop request cords are located on either side of the vehicle interior. Pulling a cord activates the system.

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### **Stop Request Button**

A stop request button is located on the exit door stanchion. Pressing the button activates the system.

### **Wheelchair Stop Request Touch Pad**

Stop request touch pads are located under each longitudinal hinged seat in the wheel-chair stations. Pushing a touch pad activates the passenger signal system. A chime sounds a different tone to alert of a wheelchair passenger stop request.

### **Entrance & Exit Door Lights**

The entrance and exit doorways are lit by header lights (above the door), step lights and curb lights. Moving the door controller to open a door activates these lights. The lights extinguish as the doors close.

#### ™ NOTE:

The exit door curb lights extinguish after a five second delay.



## 11.WHEELCHAIR SYSTEM

The wheelchair system consists of a wheelchair ramp and wheelchair restraint system.

## Wheelchair Ramp

The New Flyer vehicle is equipped with a wheelchair ramp system to assist passengers in boarding and exiting the vehicle.



WARNING:



When the ramp is in STOW or DEPLOY, the brake interlocks are activated. The vehicle will not move until the ramp is fully stowed and the switch is in the FLOAT position.

Before this system can be energized, the following conditions must exist:

- Ensure passenger safety during the wheelchair ramp operations. Monitor the passenger's position during the operation cycle.
- Loading or unloading the passengers must be performed in a flat, open area. DO NOT deploy the ramp where trees, telephone poles, fire hydrants, or similar obstacles may jeopardize passenger safety or damage the ramp.
- Be familiar with ramp functions and operation before operating the equipment.
- DO NOT conduct the 'STOW" operation with a passenger on the lift.
- Passengers are to board the ramp only when it's at ground level, and the 'DEPLOY" cycle is complete.

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## **CAUTION:**



Release the switch after the ramp has passed the 90° position. This prevents the oil and pump from overheating.

The switch to control this feature is located on the instrument panel. The three positions of the switch enable the wheelchair ramp mechanism to perform the following operations:

#### **DEPLOY**

This position activates the ramp from the closed position to the open position.

#### **FLOAT**

This position shuts off power to the pump, allowing the ramp to free-fall to either the open or the closed position. Upon cycle completion, this becomes an off position.

#### **STOW**

This position is used to move the ramp from the open to the closed position.

### NOTE:

When the wheelchair ramp is in motion, an audible alarm sounds, and the exterior lift warning light illuminates and flashes.

### **Deploying the Ramp**

- 1. Bring the vehicle to a complete stop in a flat, unobstructed area, one to three feet from the curb. Check for obstructions and be certain that there is adequate clearance to deploy the ramp.
- 2. Apply the parking brake.
- 3. Place the drive unit shift selector in neutral [N].
- 4. Kneel vehicle if required.

#### MOTE:

Parking brake and stop light indicators on the instrument panel will illuminate.



5. Move the door controller to the door open position, (#2, #3 or #5).



CAUTION:



Make sure the area in which the ramp will DEPLOY is clear of people and any obstructions.

- 6. Move the Ramp toggle switch to DEPLOY.
- 7. After the ramp has passed the vertical 90° position, release the switch. The ramp continues to lower until it reaches the ground.

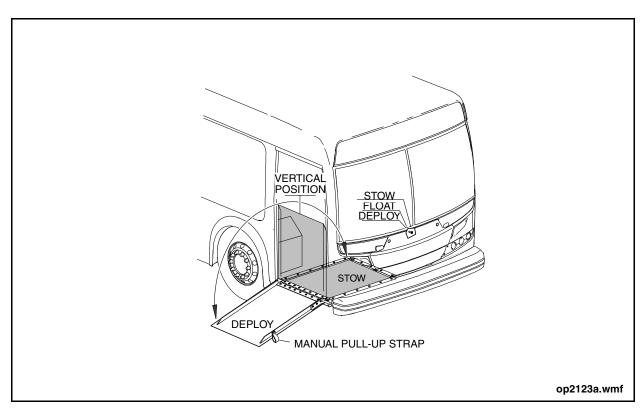


Figure 26: Wheelchair Ramp Operation



### **Raising the Ramp**



**WARNING:** 



Check for obstructions and be sure that all passengers are at a safe distance. Keep objects and passengers off the lift platform during the STOW operation.

1. Once the passenger has boarded the vehicle safely and is clear of the ramp, move the toggle switch to the STOW position.

#### ™ NOTE:

An audible alarm sounds when the ramp is moving.

- 2. Raise the vehicle from the kneeling position.
- 3. Close the entrance door.
- 4. Disengage the parking brake and proceed to the next stop.

### **Ramp Emergency Procedures**

In case the wheelchair ramp power unit fails, the unit may be hand-operated by using a pull-up strap located on the ramp's corner.



## **Wheelchair Restraint System**

The forward seat positions are equipped with a Wheelchair Restraint System for security of handicapped passengers. For optimum passenger safety be sure to follow the operating procedures to complete all the necessary restraint system connections.



CAUTION:



The wheelchair wheel-lock is for use on large diameter steel wheels only. Use both rear red belts if not using the wheellock.

### **Operating Procedures**

- 1. Move the flip-up seat cushions up to the lock position.
- 2. Extend the shoulder belt and temporarily clip it to the belt retainer on the double flipup seat. This will allow easy access for final securing of the passenger.
- 3. Back the wheelchair into the restraint area, in front of the barrier, facing forward (facing driver's area). Set wheelchair brake.
- 4. Locate two tie-down belts at the base of the barrier and attach each belt to solid rear frame members of wheelchair as follows:
  - a. Pull the tie-down belt release handle located on the face of the barrier.
  - b. Attach extended end of each tie-down belt to a solid rear frame member of wheelchair.
  - c. Move release handle back into position to take up belt slack.
  - d. Check belts to ensure they are secure.
- 5. Attach the two front tie-down belts to solid front members of the wheelchair as follows:
  - a. Press the retractor release button on window side tie down belt and pull belt to extend.
  - b. Attach the extended end to a solid front frame member of the wheelchair.
  - c. Take up the belt slack by pressing the release button again.
  - d. Turn the belt retractor knob until tight.
  - e. Remove the aisle tie-down belt from storage.
  - f. Attach the stud end securely into the floor anchor.
  - g. Press the retractor release button and pull the belt to extend.



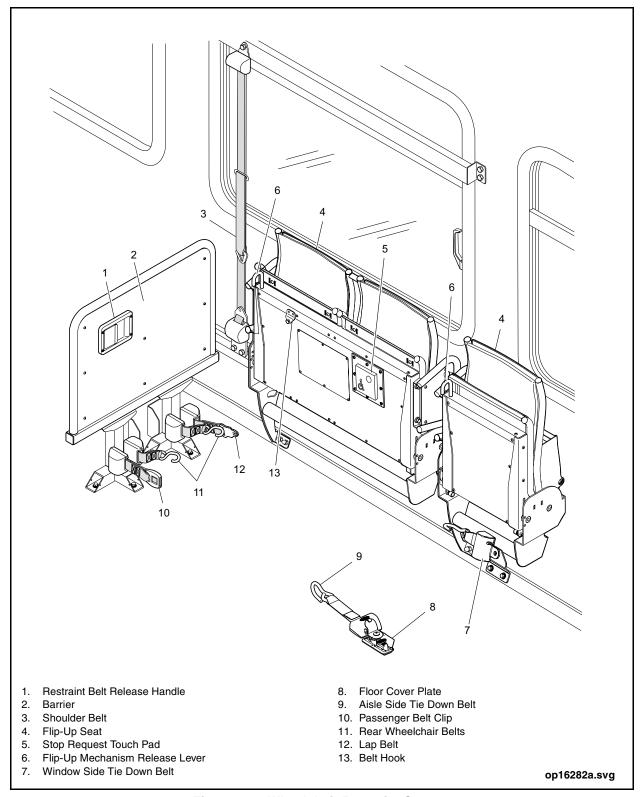


Figure 27: Wheelchair Restraint System



- h. Attach the belt hook to a solid front frame member of the wheelchair.
- i. Take up the belt slack by pressing the release button again.
- j. Turn the belt retractor knob until tight.
- 6. Secure the passenger by extending the lap belt across to the aisle side clip and fasten. Do not place belt over armrest.
- 7. Extend window-side shoulder belt and connect to stud on lap belt Ensure that belt clips and buckle are securely engaged.
- 8. Check the belt locks by pulling on each end to ensure they engage.



## 12.BIKE RACK SYSTEM



**WARNING:** 



Loading or unloading bike from the streetside endangers the passenger. LOAD OR UNLOAD THE BIKE FROM THE CURB-SIDE ONLY.

The bike rack system allows the passenger to load and unload a bike without driver assistance. In the case of children under ten, however, have an adult assist in loading and unloading the bike.

Be sure to load and unload the bike from either the front of the rack or from the curbside.

## **Loading Operation**



CAUTION:



To ensure safe vehicle operation, NEVER load a bike onto the bike rack which will in any way obstruct the headlamps. ALWAYS verify that the headlamps are unobstructed whenever a bike has been loaded onto the bike rack.

- 1. Remove water bottles, pumps or other loose items from bike prior to loading.
- 2. Squeeze bike rack handle UP to release latch.
- 3. Fold down bike rack.
- 4. Lift bike onto rack, fitting wheels into proper wheel slots.
- 5. Raise the support arm over the front tire so that the hook rests at the highest point on the front wheel. Bike is now held firmly in place.



# **Unloading Operation**

- 1. Unload from curb or from in front of vehicle.
- 2. Raise support arm off the tire.
- 3. Lift bike out of wheel slots and set down.
- 4. If there are no other bikes on the rack, lift it until the rack swings into the lock position against the vehicle.



# **13.NOTES**







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