www.ARBOCsv.com Telephone: 574-825-4880 Fax: 574-825-1755

Equess

ARBOC Specialty Vehicles, LLC.

Service & Operations Manual

Contents

To Our Valued Customer,

Thank you for your business and congratulations on your purchase of your purchase of the ARBOC Equess. Every ARBOC Specialty Vehicles, LLC. Bus we build complies with or exceeds ADA standards. Our primary focus is on all of your passengers, all of the time.

Our Equess features premium technology for safety, reliability, and ease of operation. Your understanding of the parts and procedures to maintaining the vehicle is vital to your satisfaction. We hope that you will find this manual to be an informative and useful reference tool. Remember that this unit is larger than a typical automobile. Care must be taken to ensure all paths are clear before moving any bus in any direction. Safe operation requires care and common sense.

This guide was crafted to familiarize the operator with basic procedures. It must be read and understood before driving and operating the controls. It is not all-inclusive of situations that may occur. Operators must have a level of skill and familiarity that does not come without conventional experience. Once understood and practiced, operation will be straightforward and comfortable.

In this guide you will find examples of standard and optional equipment. Your Equess bus is equipped as specified and may have features in addition to this guide's content. There may also be examples represented that are not part of your bus as built. All information contained is based on information available at the time of printing. With our program of ongoing improvement, ARBOC Specialty Vehicles, LLC reserves the right to make changes without notice.

ARBOC Specialty Vehicles, LLC provides multiple documents on your specific unit to the dealership that can be obtained that may not be part of this manual. This information can be found at your customer link at www.arbocsv.com. Information includes:

- **ARBOC Limited Warranty**
- **Floor Plan** – document that shows the layout of the bus floor plan as ordered and initially produced
- **Unit Information Sheet** – document identifies all of the options that were included on the bus at time of production
- **Product Data Sheet** –document contains the model and serial numbers of the primary optional components that were installed on the bus at the time of production. These are required by suppliers for proper replacement and warranty coverage.
- **Weight Analysis** – document contains details the curb weight of that bus as built for each wheel location.
- **Paint Schematic** - document identifies any special paint or decals that were included in the production of the bus.
- **Parts List** – list of components used during the production of the bus.
- **Front End Alignment Sheet** – document shows the alignment specifications for the vehicle prior to shipping

Please contact ARBOC Specialty Vehicles, LLC Service Operations with any questions and/or suggestions at 1-888-953-5555.

This Owner's Manual covers the Equess bus produced by ARBOC Specialty Vehicles, LLC. Before operating or servicing your bus, you must read, understand and follow the instructions and safety warnings in this manual. Your bus may not be equipped with some of the optional equipment shown in the illustrations in this manual.

Read and understand this manual and the manufacturers manuals provided with your bus. Make sure that you understand the controls and operating instructions before attempting to operate the bus. **Improper operation is dangerous!**

The safety of risk in this manual is denoted by the safety alert symbol: 

The level of risk is indicated by the following signal words:

DANGER
Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

WARNING
Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

NOTICE
Indicates a situation that could result in damage to the bus or other property.

Hazards from Operation

WARNING
Ensure all paths are clear to prevent injury or death. Mirrors are provided for safety. It is the operator's responsibility to adjust them properly before moving the bus.

WARNING
Risk of injury or bus damage. Do not attempt to operate controls on ARBOC Specialty Vehicles panel until a clear path for the doors and ramp is confirmed.

Hazards from Maintenance

WARNING
Risk of crushing. Do not enter area under bus before confirming that Transmission is in park and parking brake is set. Place "Do Not Operate" tag on steering wheel.

WARNING
Falling hazard. Wet surfaces can cause slips and falls. Never put a bus into service with a floor wet from washing.

Vehicle Operation Safety

Do not drive the vehicle if:

- Indicators, instruments or gauges show that vehicle operating systems are malfunctioning.
- Exhaust fumes are evident in the passenger compartment.
- Beneath the vehicle, engine oil, hydraulic fluid, or coolant has been leaking.
- Seating stanchions and grab rails are loose or damaged.
- Wheelchair restraints are inoperative.
- Driving mirrors are broken, missing or cannot be properly adjusted.
- Exterior or interior lights are broken, discolored, or malfunctioning.

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

Before operating the vehicle:

- Ensure seat belts (if equipped) are fastened.
- Obstructions do not block or interfere with your safe range of driving and operating vision.
- Any debris or garbage is removed from the passenger area and the doors. This is important to eliminate any foot obstructions that could cause tripping or falling.
- All exterior and interior access doors and panels are securely shut and latched.

Safety Equipment

Additional safety equipment may be installed in your vehicle per transit requirements and locations. Prior to usage of the vehicle, locations of these items and training on usage should occur.

- **Fire Extinguisher**: 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:** Position the triangles at the front and rear of the vehicle to warn other drivers during emergency situations.

Vehicle Safety Systems

Exit Door Sensitive Edges: Pressure sensitive rubber seals are mounted to the leading edges of both the front and rear door panels. If they encounter an object or passenger during door closure, the doors fully reopen. The doors will again close once they have fully reopened.

Vehicle Evacuation & Shutdown

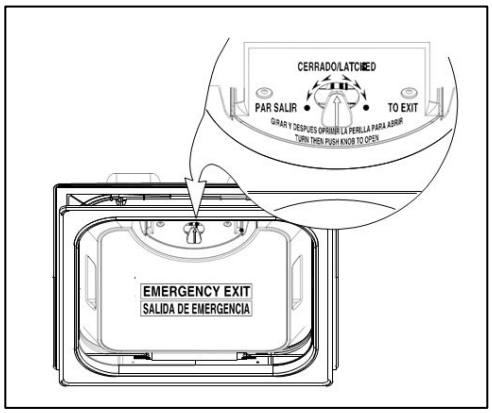
In the event of an emergency, follow the evacuation and shutdown procedure in the sequence shown:

1. Pull the vehicle over to a safe location.
2. Apply the parking brake
3. Open the front and rear passenger doors.
4. Shutdown the vehicle by turning the run switch to the ‘OFF’ position.
5. Direct all passengers to a safe area, away from the vehicle.
6. Alert the transit authority of the emergency.
7. Approach the rear streetside area of the vehicle and locate the Battery Disconnect Switch (behind the roadside lower DEF/Battery access door).
8. Shut off all 12V electrical power by setting the switch to the ‘OFF’ position.
9. Wait for emergency response personnel to arrive and assist them by providing details of the emergency.

Emergency Exits

Side Windows: The windows which function as emergency exits are identified by labels and red egress lights.

To operate the emergency window, pull the red handle downward. Push out on the bottom of the window frame. The window will open on hinges at the top of the frame. To close, Push the window open ¼ of the way and let it close on its own.



Roof Hatch: Your bus is equipped with emergency exit windows and an emergency exit in the roof.

In order to open the emergency exit roof hatch, rotate red handles and push the hatch upward.

Standard Doors Emergency Release Handle: In order to release the entry doors, pull the red handle 90 degrees until it is facing you and push the doors open. To re-engage, close the doors and push the red handle back against ABS plastic access panel.

Vapor Doors Emergency Release Handle: In order to release the entry doors, break open the Plexiglas cover by pulling hard, rotate the red handle 90 degrees until you hear air release and push the doors open. To re-engage, close the doors and rotate the red handle back 90 degrees against ABS plastic access panel.

Low Floor Semi-Monocoque Chassis

The Spirit of Equess is a purpose built semi-monocoque chassis in accordance with the chassis specifications including (not limited to):

VEHICLE TYPE	
Model	ARBOC Spirit of Equess
Build Year	2021/2022
ENGINE	
Engine	Diesel: *Cummins* B6.7 CNG: *Cummins* 6.7N
Horsepower	240 HP Diesel/220 HP CNG
Torque	560 ft-lb. @ 1800 RPM Diesel/540 ft-lb. @1800 RPM CNG
FUEL	
Fuel	Ultra-low Sulphur diesel (CNG Option)
Usable Fuel Capacity	70 U.S. gallons
TRANSMISSION	
Transmission	*Allison* B220
Transmission Controls	6-speed automatic with transmission cooler
DIMENSIONS	
Length (over bumpers)	2700 27’-0” Overall Length 3000 30'-0" Overall Length 3500 34'-10" Overall Length
Width	100 inches maximum excluding mirrors
Height	104 inches Diesel maximum excluding roof hatch or A/C units 121 inches CNG
Wheelbase	2700 156 inches 3000 196 inches 3500 259 inches
Turning Radius	2700 = 27 feet (wall to wall) 3000 = 31 feet (wall to wall) 3500 = 35 feet (wall to wall)
Approach/Departure Angle	9 Degrees
Gross Vehicle Weight Rating (GVWR)	29,000 lbs. (Limitation by Transmission)

AXLES & SUSPENSION	
Front Axle	*ZF RL 82 EC AXLE/WHEEL HUBS*
Front Gross Axle Weight Rating (GAWR)	18,660 lbs. (Limitation by Transmission)
Front Axle Ride Height	11 inches (ground to bottom of sidewall aft of front wheel)
Suspension Air Springs	(2) Vibracoustic V1E201
Suspension Shock Absorbers	(2) Sachs 471700006149
Rear Axle	*ZF AV133 OFFSET PORTAL AXLE/WHEEL HUBS*
Rear Gross Axle Weight Rating	28,068 lbs.
Rear Axle Ride Height	11 inches (ground to bottom of sidewall aft of front wheel)
Suspension Air Springs	(4) Vibracoustic V1E26a
Suspension Shock Absorbers	(4) Sachs 471700006149
Gear Box/Driveshaft	*RJ Link* G2 V-Drive/*Action Machine* Spicer 1810
STEERING	
Steering Gear	*TRW Automotive* THP60 Series
Pressure Relief	2,683 psi
Steering Column	*Douglas* Autotec 9204 Series
Power Steering Reservoir	*Dorman* 603-5206
Power Steering Pump	*TRW Automotive* EV18 Series
WHEELS & TIRES	
Tires	*Goodyear* Endurance RSA ULT
Tire Size	275/70Rx22.5 J Rated
Inflation Pressure	120 psi
Rim Mounting	8 Bolt hub piloted
Wheels	Steel (powder coated white)

BRAKE SYSTEM	
Brakes, Mechanical (front)	*Knorr-Bremse* SN7 Series
Brakes, Mechanical (rear)	*Knorr-Bremse* SN7 Series
Service Brake Chamber (front)	*Bendix* Size 14
Service Brake Chamber (rear)	*Bendix* Size 16/24
Antilock Braking System (ABS)	*Bendix* ABS on all wheels
Parking Brake Application	Spring brake chamber applied with push/pull control valve located on side console
Parking Brake Release	Spring brake chamber released with application of air from push/pull control valve located on side console
HVAC SYSTEM	
HVAC Unit	*Determined by option*
Dash Defroster	*Pro-Air*
Floor Mounted Heaters	Low Profile Heaters (determined by option)
Compressor	Passenger TM43 or TM55 Operator TM16
Refrigerant	R134A
COOLING SYSTEM	
Engine Radiator	*EMP* Integrated Electronics with 12v Fans and Fan Reversal
Transmission Oil Cooler	*Rocore* oil to water heat exchanger located in the engine compartment
AIR SYSTEM	
Compressor	*Wabco* 37.4 CFM Twin Cylinder
Air Dryer	*Bendix* AD-IS w/ Wet Tank, Auto Purge & Pressure Protection Valves
Air Tanks	Bendix auto drain valves standard (Heated auto drain optional)
STARTING SYSTEM	
Starter	*Cummins/Denso* PA90L
MULTIPLEXING SYSTEM	
Multiplexing Module (VMM) System with J1939 Network Communication	*Parker Vansco* (3) Master

CHARGING SYSTEM	
Alternator	*Leece-Neville*
Alternator Voltage	12 Volt
Alternator Current	420 amp
Alternator Cooling	Air
Voltage Regulator	Integrated
Batteries	Dual
Battery Type	Maintenance-free, Deep Cycle
Battery Group Size	31
Battery Charge Voltage	14.3 ± 0.2 Volts
Battery Cranking Capacity	1560 CCA
EXTERIOR LIGHTING	
Headlights	12 Volt Halogen low beam, high beam & amber turn lights
Exterior Stop/Taillights	12 Volt LED
Side Turn/Marker Lights	12 Volt LED
Clearance Lights	12 Volt LED
INTERIOR LIGHTING	
Passenger Lights	12 Volt LED
INSTRUMENTATION	
Instrument Panel	*Parker Vansco*
Communication Ports	J1939 located in operator station, Front Electrical Panel and engine compartment

DOORS	
Entrance Door	*Std A&M Systems* Electric Door/*Optional Vapor* Slide Glide Air optional
Entrance Door Opening Size	39" wide minimum clear opening (35" w/standard entry assist handles) and 76" high clear opening.
Limit Switches	Mechanical microswitches/ Hall effect sensors on Vapor Doors
Driver's Door Control	Std Toggle switch on dash/Optional Vapor 5 position lever on side console
Door Entry Exterior Control	Toggle Switch under curbside front bumper
Emergency Egress	Std Manual Lever at the Door Header/Vapor Rotational Release on front bulkhead
WINDOWS	
General	*Lippert* Solid (T-Slider option)/Arow Global Solid (Upper Tip in optional)
Mounting	Clamp Ring
Frame	Black anodized aluminum
Glazing	Lippert Tempered glass/Arow Global 5mm Safety laminate
Driver's Window	Front slider with interior handles
Glazing	Std Tempered glass/Arow Global 5mm Safety Glass laminate
Emergency Egress	2 curbside & 2 streetside identified with labels
SEATING	
Driver's	*USSC* 9210 MLX w/Integrated Lap & Shoulder Belt
Passenger	*Freedman Seating*
FLOOR & SUBFLOOR	
Subfloor	*Performax* Engineered Wood
Flooring	*Altro* Flooring
Sealant	*Altro*
SAFETY FEATURES	
Emergency Escape Exits	(1) Roof Hatch
Exit Door Emergency Release	Release Handle
Sensitive Edge	Exit Door Panels

ACCESSIBILITY FEATURES	
Wheelchair Ramp	*Braun (Ricon optional)*
Wheelchair Ramp Width	Front single fold out 49” ADA/Rear 68 inch bi-fold ADA
Wheelchair Ramp Slope Ratio	1:6 Knelt
Wheelchair Ramp Max. Load Capacity	1000 lbs.
Kneeling	Front suspension

Important Decal Information and Location

ARBOC Specialty Vehicles, LLC provides several informative decals.

1. Vehicle Certification Labels are located inside the bus above the driver’s head and identify the following:
    A. Vehicle manufacturer and all identifying VIN Tag & model numbers, and Gross Vehicle Weight Rating (GVWR)
    B. Gross Axle Weight Rating (GAWR) for both front and rear
    C. Cold tire inflation for front and rear tires
    D. Date of Manufacture
    E. EPA and or CARB Emissions certification labels
2. **A/C and Belt Routing Labels** are located behind the lower curbside rear door and will provide component information including model and serial numbers. Belt routing information is also provided. See below for examples:
3. **Fuse Sheets** are located in the forward and rear electrical compartment doors.

Suggested Pre-trip Inspection

Prior to entering into service, ARBOC Specialty Vehicles suggests that a pre-trip inspection of the bus is conducted:

1. Engine Compartment
    a. Engine oil
    b. Coolant
    c. Transmission fluid
    d. Power steering
    e. V Drive Oil
    f. Hoses for leaks
    g. Belts for wear and tension
    h. Cables for fraying and security
2. Exterior
    a. All exterior lights for proper operation
        i. Front Lights – Headlights, Right Front Turn Signal, Left Front Turn Signal, and Clearance Lights
        ii. Side Lights - Side Turn Marker Lights
        iii. Rear Lights – Taillights, Stop/Brake Lights, Reverse Lights, Four-way Flashers, Right Rear Turn Signal, Left Rear Turn Signal, Rear Side Marker Lights, License Plate Light, and Clearance Lights
    b. Windshield wipers
    c. Windshield for cracks
    d. Tires
        i. Wear and Damage – Replace worn or damaged tires before driving bus
        ii. Air Pressure – Inflate to recommended air pressure shown on the Fed Tag located in driver door jamb
        iii. Lug Nuts
    e. Side Windows
    f. Body Damage
    g. Under engine – fluid leaks
    h. Bike Rack (optional) for function
    i. Storage compartment doors (optional) for function
    j. Disconnect switch is in the “ON” position.
3. Interior
    a. Driver Compartment
        i. Wiper controls
        ii. Windshield washer fluid
        iii. Horn
        iv. Adjust driver seat
        v. Adjust steering wheel
        vi. Adjust interior/exterior mirrors
        vii. ARBOC Control Panel Function Test
            1. Door open/close
            2. Ramp deploy/stow
            3. Interior Lights
            4. Auxiliary floor heater
    b. Emergency exits – side windows, rear window/rear door, and emergency exit handle above the passenger entry door – verify that they are closed/latched
    c. Passenger seats and belts (if equipped) – damage and function
    d. Mobility Aid Securement – damage and function
    e. Fire Extinguisher (optional) – check level of charge
    f. Emergency Triangle Kit (optional)
    g. Verify the interior of the bus is clean and free of debris.

Battery Disconnect

The Battery Disconnect Switch is located in the engine compartment under the lower hatch and above the Rear Electrical Panel. Rotate the rotary switch to the “ON” position before starting the bus and to the “OFF” position when the bus is being removed from service. This will prevent the batteries from being depleted if an accessory is left on.

NOTICE
The engine will not start with the Battery Disconnect Switch ‘OFF’.

Starting the Bus

- The battery disconnect switch must be in the “On” position
- Hold the outside door open switch to open the door
  - This will allow 20 seconds to enter the bus
- While seated in the driver’s seat turn the master run switch located on the driver’s side console to “Day Run” in the daytime or “Nite Run” at night
  - Wait about 20 seconds while the computers enable
- Press the “Engine Start” button located on the lower left front dash panel

Functions and how the Interlocks apply

Interlocks and Functions

There are two types of Interlocks on the 2021-2022 Equess

1. A 40% application of service brakes (Brake pedal) and deactivation of the throttle pedal
2. A requirement to apply the park brake

Door Open sequences

- Front Door
  - The front door will only open below 2 mph
  - If the driver fails to close the door the bus will close the door at 2 mph
    - If the driver keeps the door open lever or switch in the open position the door will open again below 2 mph
  - **NOTE:** If the ramp is deployed and the bus shuts off the door may close. If it does, then once the bus is turned back on the door will open again after 20 seconds. No damage to the ramp will occur.

- Rear Door
    - The rear door will open only below 2 mph
    - Once the door opens a 40% service brake and throttle deactivation will occur preventing the bus from moving until the door is closed

Kneeling

- To kneel the bus
    - The front doors must be open
    - Once the kneel switch is pressed a 40% service brake application and throttle deactivation will occur
    - The bus will remain knelt until the door is closed
        - As the bus accelerates from stop the bus recovers from kneel thus meeting the 3.5 second specification to allow the bus to recover. The Equess actually recovers within 2 seconds in the manner.

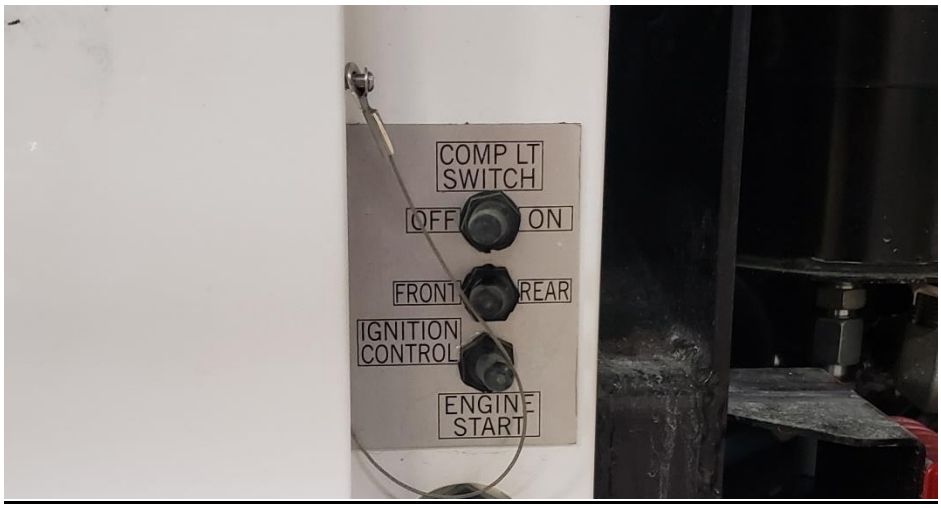
Front or Rear Ramp Deploy

- To deploy the ramp the following conditions must be met. NOTE: The ramp may be deployed with the bus at ride height or knelt.
    - Bus below 2 mph
    - Doors open
    - Park Brake applied
- Once the ramp is stowed and the park brake released the bus will return to driving condition
- NOTE: Should one turn the ignition off while the front ramp is deployed the doors will close, however no damage to the ramp will occur
    - After the ignition is returned to the “Day Run” or “Nite Run” positions the door will open after 20 seconds

Fast Idle

- To Apply Fast Idle
    - Activate the Fast Idle switch located on the side console
        - The bus must be in neutral and park brake applied
        - Fast Idle will increase the engine speed (RPM) to approximately 1000 RPM.
        - The fast speed idle shall also engage when the voltage is below 11 volts, transmission in neutral, and park brake applied.

Rear Run Functions



- The bus is equipped with a rear run switch function to allow mechanics to work on the vehicle and operate the engine under safe conditions
    - The safely operate the engine from the rear the following must be met
        - The battery disconnect switch must be on
        - The drivers master run switch needs to be in the off position
        - Turn the rear run switch labeled “Front Rear” to the rear position
            - This disables the engine start functions at the driver’s interior position
        - You may now start the engine using the rear “Engine Start” switch.
    - When finished return the rear run switch to the front position.

Warning Alarms

An exterior alarm or beeper will sound if any of the following conditions occur:

- The backup alarm sounds if the transmission is shifted into reverse [R].
- The ramp alarm sounds if the vehicle is in the process of deploying the ramp.

A driver’s warning buzzer, located on the side console behind the shifter, sounds if the engine is running and any of the following conditions occur:

- Stop engine - The Stop Engine indicator illuminates, and the buzzer sounds if the engine ECM has detected a major engine fault. An automatic engine limp home or shutdown process will be initiated.
- Low air pressure - If any brake air tank falls below 75 psi, an indicator light on the instrument panel will illuminate and the warning buzzer will sound.
- Low oil pressure - If the engine ECU detects an unsafe oil operating pressure, it will cause the indicator light on the instrument panel to illuminate, the warning buzzer to sound, and initiate an automatic engine limp home or shutdown process.
- Low coolant level - The low coolant sensor in the surge tank will detect a low coolant level and illuminate the Low Coolant indicator and activate the warning buzzer.
- Hot engine - If the engine coolant temperature switch detects an unsafe operating temperature, it will cause the Hot Engine indicator to illuminate and the warning buzzer to sound.
- Hot transmission - If the Transmission Fluid Temperature switch detects an unsafe operating temperature, it will cause the Hot Transmission indicator to illuminate and warning buzzer to sound.

Multiplex System

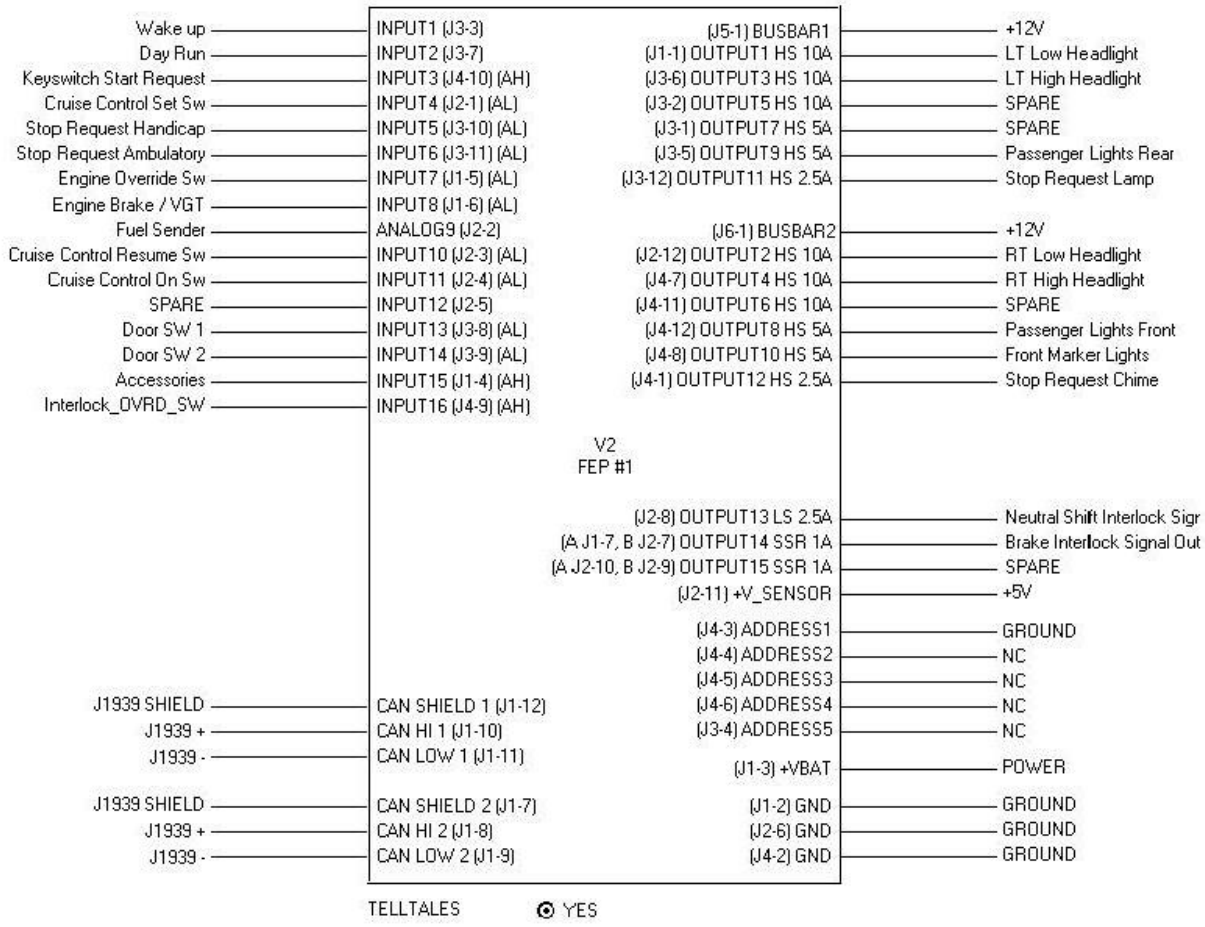
The vehicle shall be equipped with a heavy-duty SAE J1939 (12 volt) Multiplex controlled electrical system. All components are to be selected and integrated to function in an environment characterized by low engine (alternator) speeds and high amperage draws due to lights, air compressor, wheelchair ramp, 4-way flashers, air conditioning/heater, and other accessories in constant operation.

- System remains active for 10 minutes after vehicle ignition key has been cycled to 'OFF'.
- The system can be awoken by cycling the Key 'ON/OFF' or entry door switch.

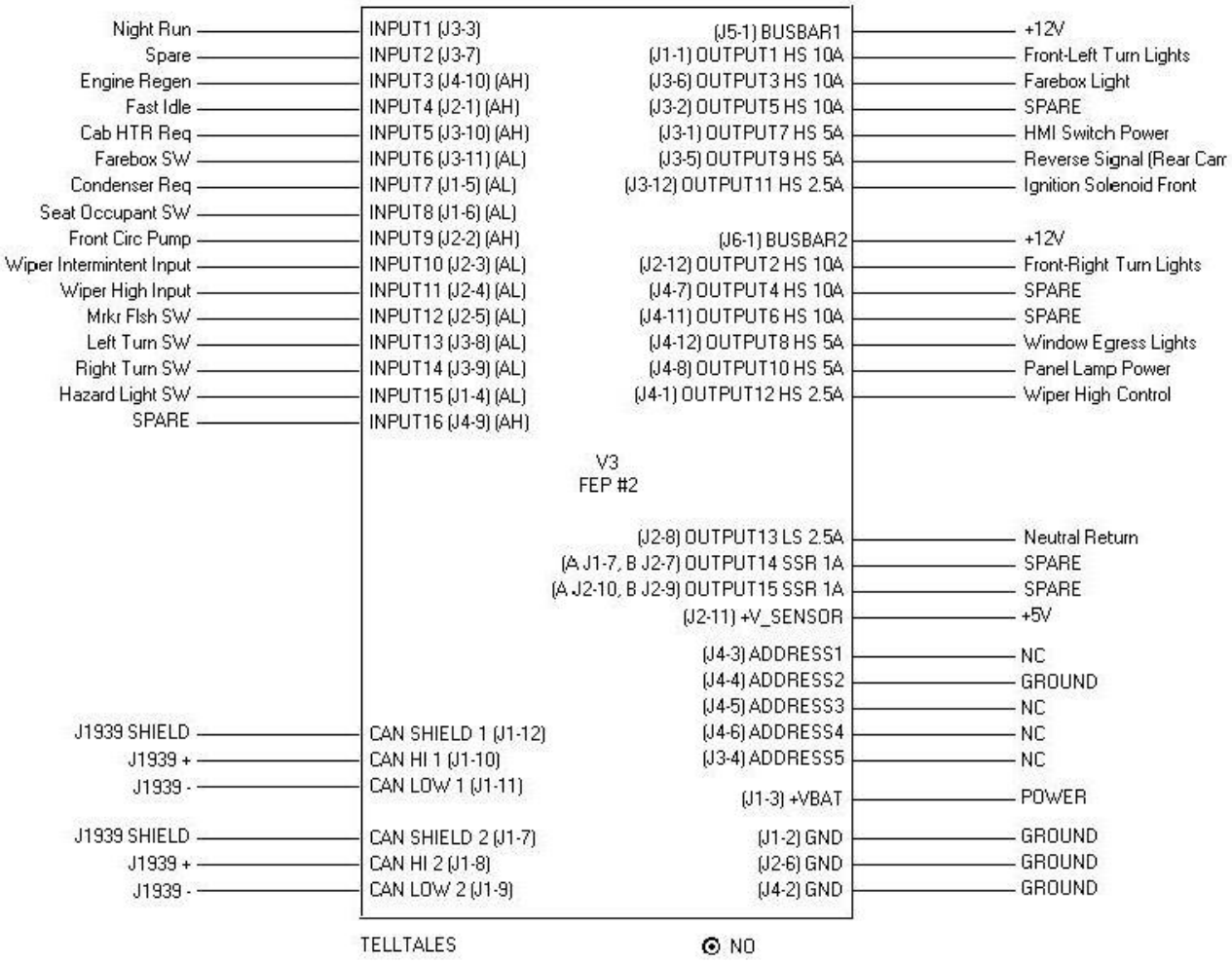
Parker Vansco

The standard configuration for the Main Module contains (16) inputs and (15) outputs. The other Control modules also contain (16) inputs and (15) outputs. Additional items will be fused in the Power Distribution Module (PDM). Although every unit may vary, below is an example. For unit specifics, please check the Vehicle Program Sheet in your Customer Link.

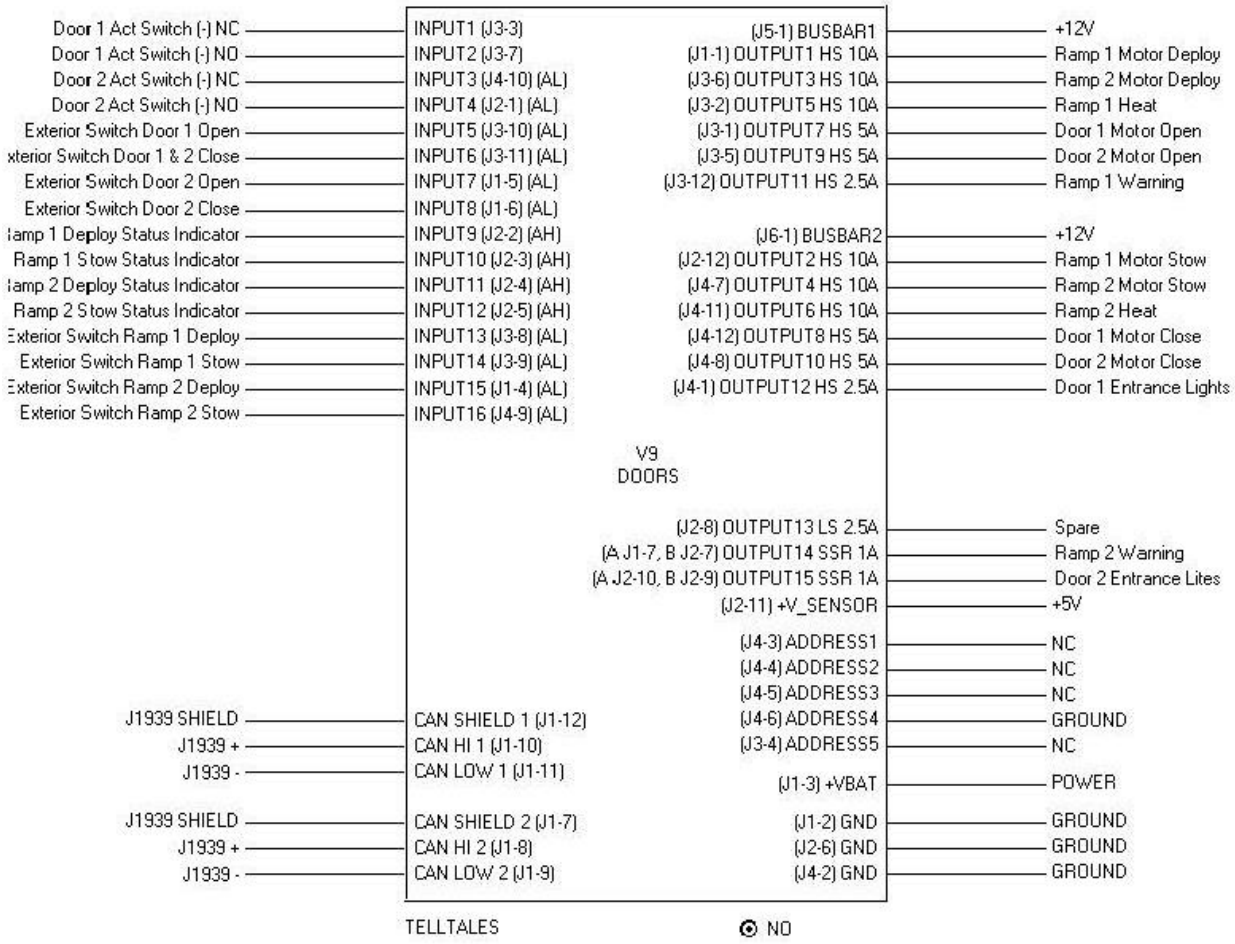
A1 – Control Module (located in forward electrical compartment)



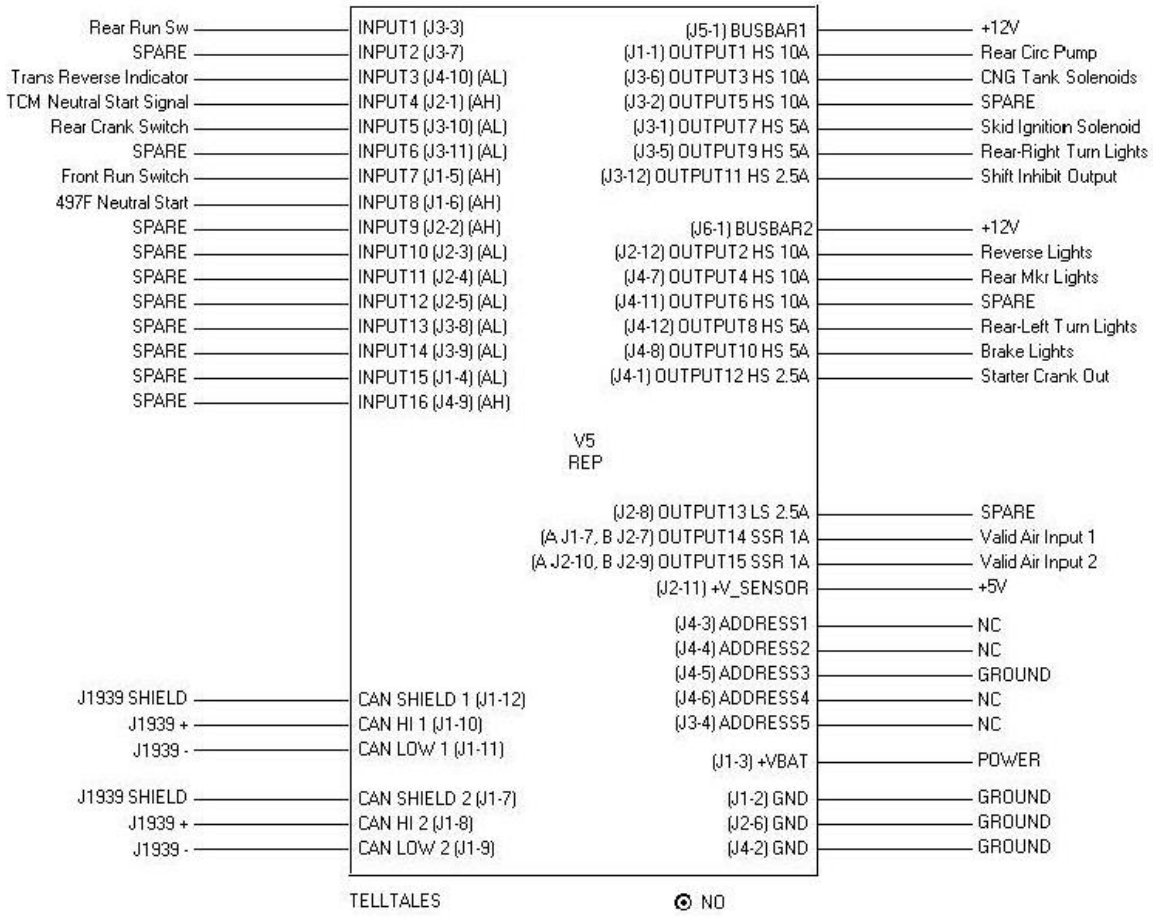
A2 – Control Module (located in forward electrical compartment)



A3 – Control Module (located in Curbside Transition Module compartment behind front door)



A4 – Control Module (located in rear engine electrical compartment)



Structure

The frame is a semi-monocoque construction of high strength steel. Caution must be taken when modifying or repairing any structural members.

A. Upper Rear Curbside Access Door, Charge Air Cooler Access/Engine oil dipstick
B. Diesel Fuel System Access Door, Fuel Filter and prime function
C. Lower Rear Curbside Access door, drive belts
D. Front Electrical Panel Door
E. Roadside Fuel Access Door, Fuel tank sender
F. Upper Roadside Rear Access Door, Radiator
G. Lower Roadside Access Door, batteries, DEF tank, battery disconnect switch

Fueling the Bus (Diesel)

The Equess is equipped with two fill ports, one on either side of the bus located in the upper side doors just behind the axle.

Fueling the Bus – Compressed Natural Gas (CNG)

The fueling port for the C.N.G. is on the curbside. The full door does not need to be opened to fuel the bus, only the black dropdown door.

Engine Compartment

There are several engine access doors located at the rear of the vehicle (see previous page). Two rear doors and two doors on roadside and two doors on curbside. The two rear doors are equipped two assist cylinders to support the door when in the open position. The upper rear door is equipped with a smaller door for access to the coolant surge tank and sight glass. The side access doors swing open to the front of the bus.

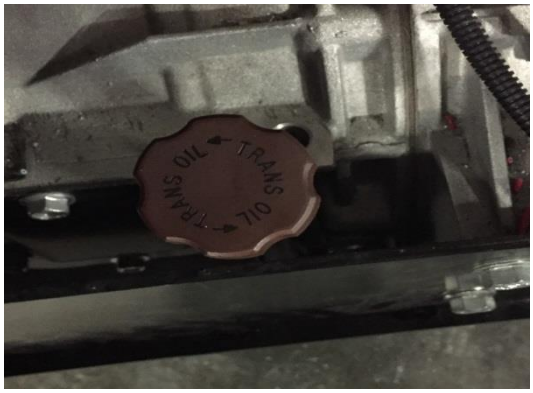
- **Engine Oil Level:** The oil dipstick and fill are located next to each other behind the upper rear curbside access door.

- **Diesel Exhaust Fluid (DEF) Tank:** The Diesel Exhaust Fluid (D.E.F.) can be filled on the roadside behind the lower door. The translucent tank in the bottom of the cavity is the Diesel Exhaust Fluid (D.E.F.) tank. The Fluid level can be checked visually by shining a light through the tank, if adequate light is not available, and observing the fluid level.

CAUTION
Ensure that the D.E.F. is full before every trip. The D.E.F. is used to help cool the exhaust system and the bus can have errors in the exhaust system if not properly cooled.

NOTICE
C.N.G. busses will not have a D.E.F. tank.

- **Transmission Oil Level:** To check this, there is a brown knob in the bottom center behind the lower rear engine door. A dipstick is attached to the knob for ease of level checking.



- **Engine Coolant Levels:** A level indicator sight glass is located behind the upper rear door behind the small square door at the top just left of center.

Battery Compartment

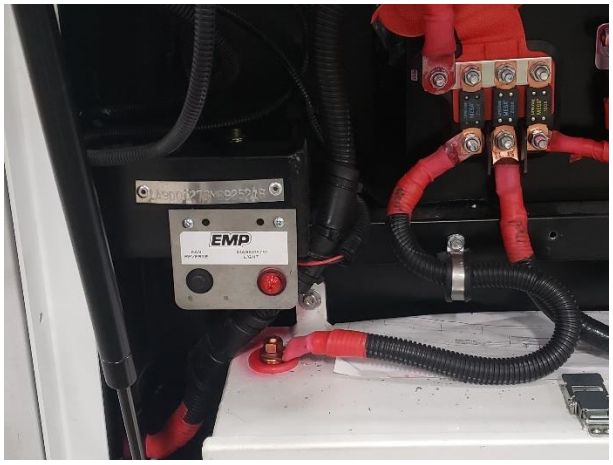
The battery tray is a slide out style tray, constructed of stainless steel on stainless steel rollers, is located on the roadside rear behind the lower rear access door. The battery disconnect switch is also mounted in this this location.

Surge Tank Compartment

The surge tank is mounted above the engine and can be accessed through the upper rear access door.

Radiator & Charge Air Cooler (CAC)

The radiator is mounted on the roadside behind the upper roadside access door. Caution should be exercised when working on the bus with the engine running as the radiator and CAC electric fans will be running. The Charge Air Cooler is mounted on the curbside behind the upper rear curbside access door. The Radiator and CAC have a fan reversal panel located on the Roadside of the rear engine compartment. Periodically the fans should be reversed to clear dust and debris.



Drivers AC, Heater and Defroster

The driver's heater/defroster access door is inside centered in the lower vertical dash. It can also be accessed from below the front of the bus.

Windshield

- The front windshield consists of three windshield sections that are formed from laminated safety glass and are installed in the front mask apertures.
- The driver's side window consists of a slide-open sash style window with tinted safety glass and is retained within a clamp style anodized aluminum frame.
- Passenger windows are located along both sides of the vehicle and consist of tinted safety glass windows retained within a clamp-type anodized aluminum frame.

Lighting

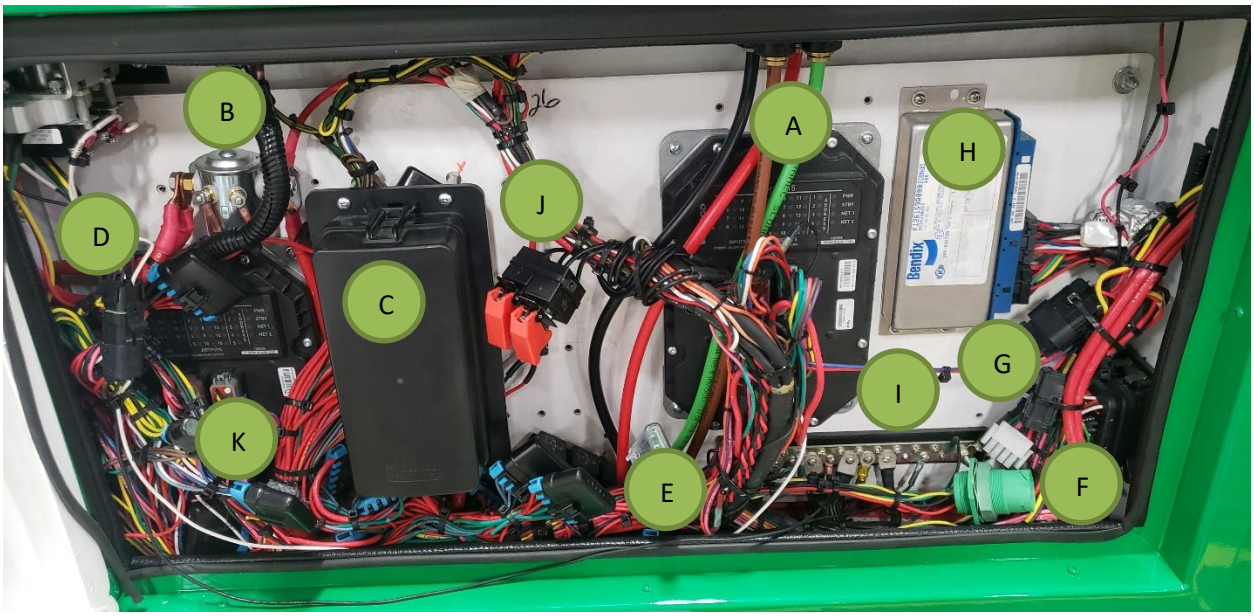
- The exterior lighting system consists of headlights, turn indicators clearance markers, stop lights, taillights, backup lights, kneeling lights, and curb lights.

Air Tank Drain Valves

Air system tanks are provided with auto drain valves with heated drain valves as options.

Front Electrical Compartment

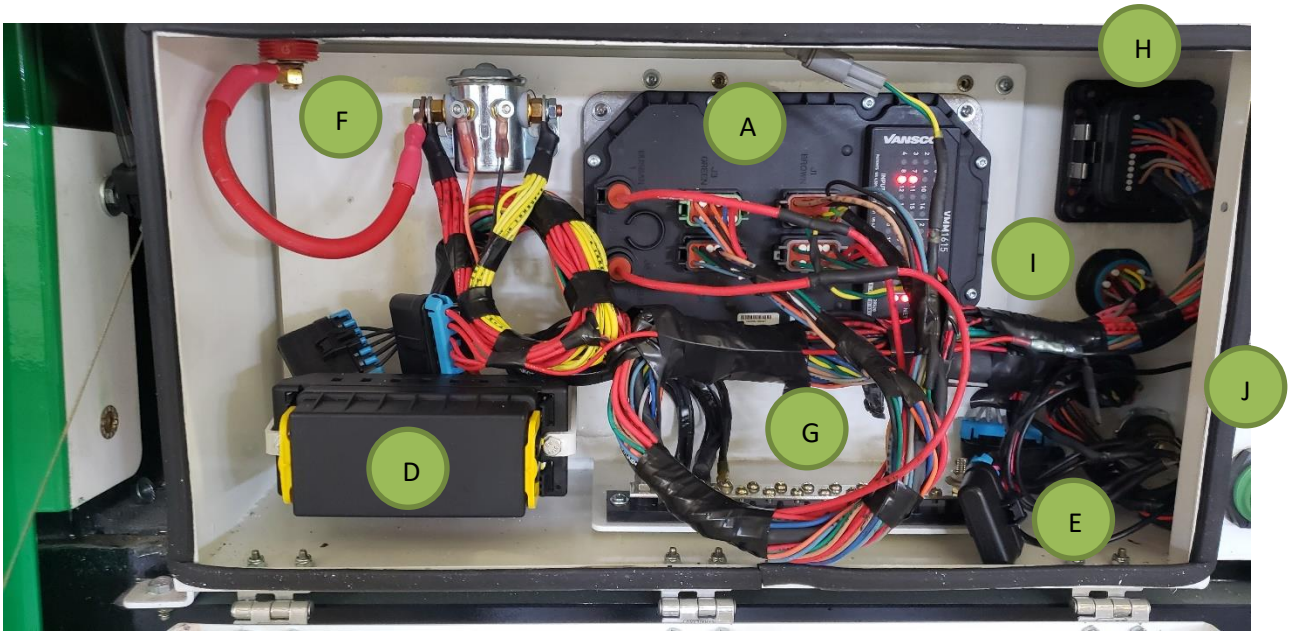
The Forward Electrical Panel contains the Parker Vansco controller (A1) and (A2), primary fuse panel, ABS controller, wiper relays and the interlock override switch.

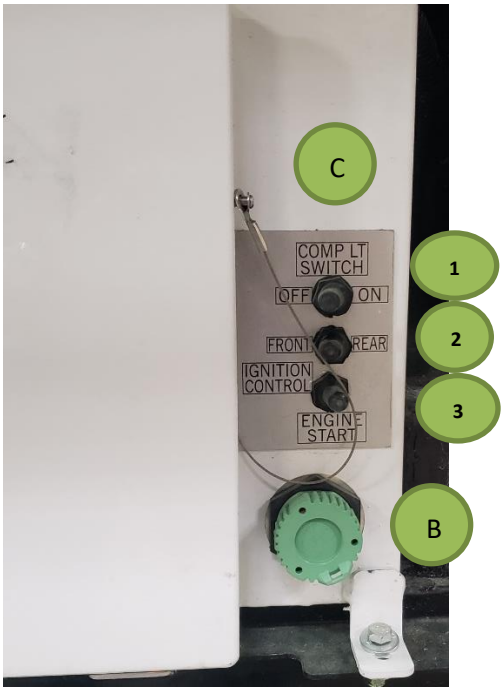


A. Parker Vansco Controller
B. Ignition Solenoid
C. Main Fuse Block
D. Wiper Relays
E. Ignition Solenoid Circuit Breakers
F. J1939 Diagnostic Port
G. Wiper Relay Circuit Breaker
H. ABS Module
I. Ground Bus Bar
J. Interlock Override Switch
K. Parker Vansco Controller

Rear Electrical Compartment

The Rear Electrical Panel Contains the J1939 Diagnostic port, three rear control switches, rear fuse block, rear relay block, and the ignition relay block. A picture layout is below.



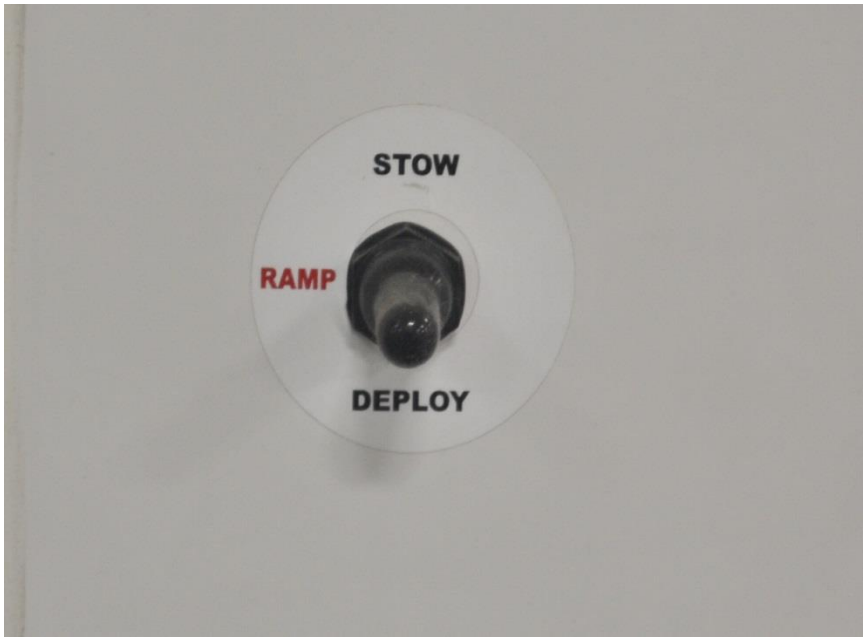


A. Parker Vansco Controller
B. J1939 Diagnostic Port
C. Rear Switches
   1. Compartment Light
   2. Rear Run
   3. Rear Start
   D. Rear Fuse Block
E. Rear Electrical Panel Relay Block
F. Ignition Relay Solenoid
G. Negative Terminal Block
H. Engine Skid Harness Connection
I. Engine Harness Connection
J. Transmission Harness Connection

Exterior Ramp Toggle Switch

The vehicle shall be equipped with a Ramp Activation System that includes Exterior Ramp Toggle Switch located to the right of the front entry door.

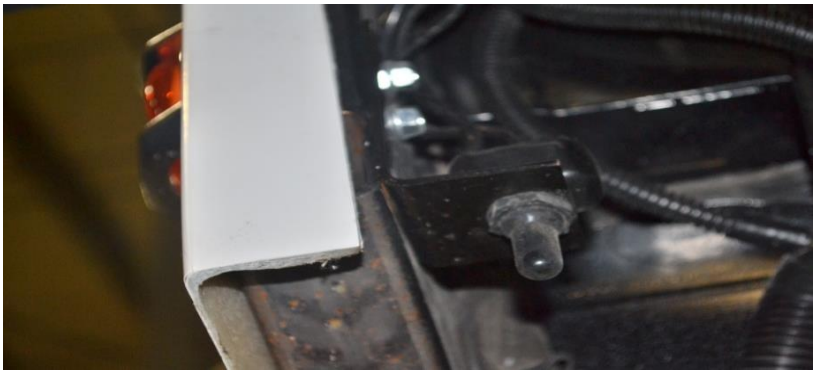
- This switch is for the operator to deploy the ramp from outside the bus if needed.
- The Battery Disconnect Switch must be on and the bus must be running for this switch to function.



Emergency Door Toggle Switch

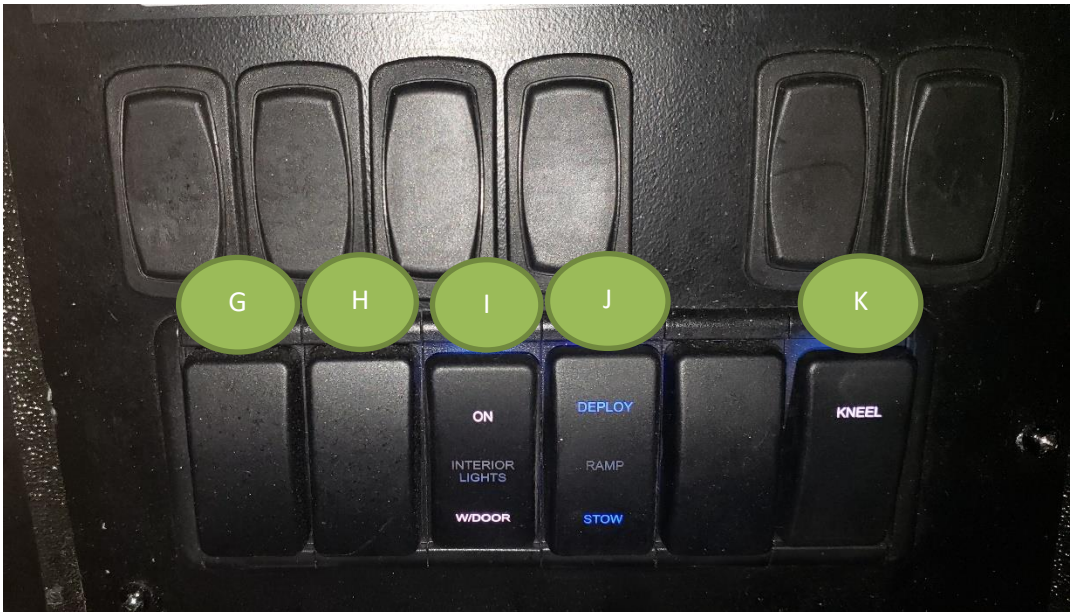
The emergency door toggle switch is located under the front of the bus just behind the bumper on the curbside of the vehicle and will allow you to open / close the entry door from the exterior of the unit.

- The switch will function with the battery disconnect switch in the “OFF” position as long as the battery has a good charge (12VDC).



The instrument panel houses the electronic instrument cluster. The instrument cluster includes gauges, LCD display screen and odometer, telltale indicators, and control buttons. The instrument panel is also fitted with controls and switches for operating electrical and mechanical devices.

A. Bright/Dim Switch	• This switch allows the operator to change the intensity of the dash backlighting by momentarily pressing the switch in the desired direction.
B. Dome Light Switch	• With the switch in the up position the dome light above the driver will illuminate • With the switch in the down position, the dome light above the driver will deluminate
C. Mirror Heat	• This switch energizes the heater for the mirrors to aid in de-fogging and de-icing in cool / cold temperature areas.
D. Fast Idle	• The switch manually activates the engine fast idle. The transmission must be in neutral and the park brake on. The fast idle will automatically engage when voltage drops below 11V
E. Engine Regen	• This switch allows the operator to manually start the Engine Regen cycle to clean particulates from the exhaust system.
F. Engine Start	• After the master run switch is placed in either Day Run or Night Run press this switch to start the bus



G. Standard Front Door Switch	• With the switch held in the open position, the front door will open • With the switch held in the close position, the front door will close
H. Optional Rear Door Switch	• With the switch held in the open position, the rear door will open • With the switch held in the close position, the rear door will close
I. Interior Lights	• With the switch in the on position, the interior lights will turn on and stay on • With the switch in the with door position, the interior lights will turn on when the door opens fully • When in Night Run and the switch off the lights will come on with the door open and when the door is closed the rear most lights will turn on and the front most lights will turn blue
J. Ramp Deploy/Stow	• With the Vehicle in neutral, the parking brake engaged and the passenger door fully open, press and hold the RAMP switch in the “DEPLOY” position until the ramp is fully extended. • Press and hold the RAMP switch in the “STOW” position to retract the ramp. • If the switch is released at any time before passing the 90 degree point, the ramp will stop AND RETRACT. If the switch is released after the center mark, gravity will take over and deploy the ramp. THIS METHOD IS NOT RECOMMENDED.
K. Kneel Switch	• This allows the operator to lower the front of the bus to a lower height to assist patrons with disabilities entering and exiting the bus. • When initiating kneel the service brake needs to be applied and the doors closed. Once kneeling starts the interlocks will apply 40% service brake, deactivate the throttle and kneel the bus • When the doors are closed the interlocks will release t=and the bus recovers quickly as the bus leaves the stop.

The Right Hand Cluster

The Right Hand Cluster is a touch screen panel. When turning the master rotary run switch on the screen defaults to the fuel gauge bar graph and the DEF tank bar graph. In the upper RH corner of the screen is a settings button that is passcode enabled to allow specific screen settings set by the factory. The RH arrow on the screen enables the user to scroll through various information and diagnostic screens.

The Left Hand Cluster

DESCRIPTION	DISPLAY TEXT	COLOR
LEFT TURN	GREEN ARROW	GREEN
LOW COOLANT	LOW COOLANT	AMBER
WAIT TO START	WAIT TO START	AMBER
CHECK SYSTEM	CEHCK SYSTEM	AMBER
PARK BRAKE	(“P”)	RED
HIGH BEAM	BLUE SYMBOL	BLUE
ABS	ABS FAIL	AMBER
ENGINE WARNING	ENGINE SYMBOL	AMBER
ENGINE STOP	STOP ENGINE	RED
ENGINE HOT	HOT ENGINE	AMBER
LOW OIL	LOW OIL	RED
EXHAUST REGEN NEEDED	EXHAUST REGEN NEEDED	AMBER
RIGHT TURN	GREEN ARROW	GREEN
DPF REGEN	REGEN SYMBOL	AMBER
CHECK ENGINE	CHECK ENGINE	AMBER
LOW AIR	RED LIGHT ON AIR GUAGE	RED
INTERLOCKS	INTERLOCK	RED
AC FAIL	AC FAIL	RED
CRUISE CONTROL	CRUISE	GREEN
HOT EXHAUST	HOT EXHAUST TEMP	AMBER

Side Console Panel

The driver's side console is located to the left of the driver's seat, below the driver's side window. The panel is fitted with pneumatic and electrical control devices and switches. A side console access door, located on the exterior streetside of the vehicle, also gives access to its lower electrical components.

A. Parking Brake	• Push the actuator to engage the parking brake • Pull the actuator to release the parking brake

B. Shifter Controller	• The shifter control is a dual digit display.
	  ○ There are two ways of shifting gears:
	  ○ Direct gear selection with R, N, D
	  ○ Cycle gear selection with the arrows
	• The MODE button is not used in the Spirit of Equess

C. Switch Bank	• Engine Brake
	  ○ This switch activates the Engine Brake, Variable Geometry Turbo (VGT) and will not be heard
	  ○ The Engine Brake engages automatically when the bus is above 10mph
	• Hazard Flasher
	  ○ This switch activates the bus hazard lights

D. Adjustable Volume Buzzer	• Turn the face of the buzzer to allow different amounts of sound to be heard from the buzzer

E. Master Run switch	• Turn the knob to operate the bus as appropriate.
	  ○ Park – Accessory ignition power, does not start engine
	  ○ Day Run – Allows engine to start but does not turn nighttime headlights or interior nighttime lights on
	  ○ Night Run – Allows engine to start and turns on all exterior lights for nighttime operation and interior nightime lighting

F. Vapor Door Control (Optional)	• Opens and closes the doors. ○ Follow the marked directions on the console to open and close the doors

Lifting Procedures

Read this information first, before you attempt to raise the vehicle off the shop floor and set on jack stands. It is important that these instructions and the safety guidelines be closely followed.

DANGER

DO NOT use non-standard or makeshift lifting or blocking systems. These could result in the vehicle falling off the lifting or blocking equipment resulting in severe injury or death to working personnel.

DANGER

DO NOT allow individuals to board vehicle while it is supported solely by a raising device.

DANGER

DO NOT run engine or engage transmission while vehicle is on raising device.

DANGER

If left on the raising device for any length of time, ensure safety stands are placed under vehicle at the designated areas and that a filtered shop air supply is connected to vehicle. The auxiliary air pressure prevents suspension system leak down which causes the vehicle to sag and become imbalanced while on the safety stand.

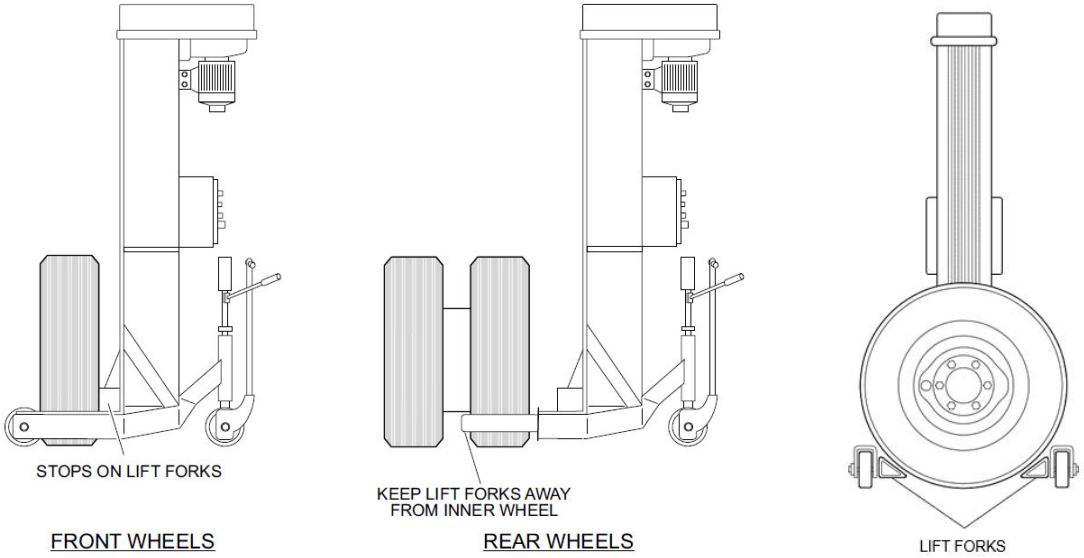
Three methods for raising the vehicle for servicing are: lifting with wheel lifts, hoist- ing with floor hoists and jacking using a specific jacking attachment. These three systems are the only ones endorsed by this manual. All of the working procedures are based on using these systems:

1. **Wheel Lift System**
   a. Position wheel lift, centering each tire exactly between the lift forks. Make sure each tire is tightened up against the stop.
   b. Make sure all wheel lifts are sitting squarely on the floor. Also check that the lift forks at the drive wheels support only one (outside) drive wheel on each side of the drive axle.
   c. Determine that each tire is squarely seated in the lifting forks before raising. Ensure the wheel lift system is set up to simultaneously lift the four-wheel lift points.
   d. Always inspect above lift area, before raising vehicle to ensure that nothing will interfere with the procedure or cause damage to the vehicle.
   e. Release parking brake.
   f. Raise the vehicle high enough to provide adequate working clearance.
   g. Position a jack stand squarely under each reinforced jacking point on the frame. Each jack stand must have a minimum weight bearing capacity of 12,000 lbs. (5,443 kg).

WARNING

At this point make sure each jack stand is precisely at the same height and is sitting completely level on the shop floor.

   h. Raise the contact pad of each jack stand until it positively seats in the jacking point.
   i. Slowly and carefully lower the wheel lifts until the weight of the vehicle is take up on the jack stands.



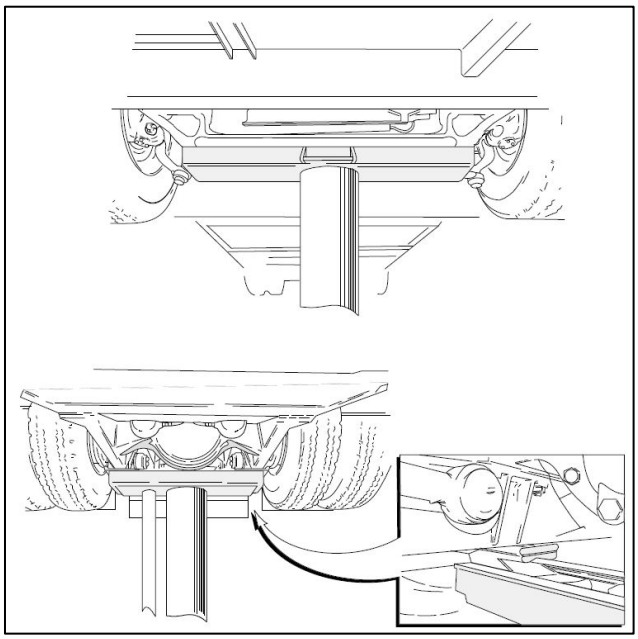
2. Hoisting the Vehicle

a. Position vehicle over hoist and align hoist posts and adapter pads so these will contact the designated points.
b. Note hoisting points:
    i. At Rear - hoist on suspension beams below axle.
    ii. At Front - hoist on hoisting points.
c. Raise hoist posts just enough so that hoist adapter pads positively contact the axle hoist points.
d. Release parking brake.
e. Always inspect above hoist area, before raising the vehicle to ensure that nothing will interfere with the procedure or cause damage to the vehicle.
f. Ensure that hoist adapter pads are still properly located, then raise vehicle.
g. Raise front and rear of vehicle at the same rate, maintaining correct level at all times.
h. Raise the vehicle high enough to provide adequate working clearance.
i. Engage hoist safety locks.
j. Position a jack stand squarely under each reinforced jacking point on the frame. Each jack stand must have a minimum weight bearing capacity of 12,000 lbs. (5,443 kg).

WARNING

At this point make sure each jack stand is precisely at the same height and is sitting completely level on the shop floor.

k. Raise the contact pad of each jack stand until it positively seats in the jacking point.
l. Slowly and carefully lower the center post hoists until the weight of the vehicle is taken up on the jack stands.



3. Jacking the Vehicle

a. Apply the park brake.
b. Place blocks behind the rear wheels.
c. Locate the chassis lifting point.
d. Using a 10" bottle jack on a stable, level surface, jack the vehicle as follows:
    i. Position the bottle jack under the jacking lifting point.
    ii. Raise the bottle jack to its maximum height.
    iii. Place support blocks under the chassis tube assembly.
    iv. Lower the bottle jack to rest the chassis tube assembly on the blocks.
e. Lower the vehicle using the bottle jack as follows:
    i. Position the bottle jack under the jacking lifting point.
    ii. Raise the bottle jack to free the support blocks.
    iii. Remove the support blocks.
    iv. Lower and remove the bottle jack.

Towing Safety

The operator of the towing vehicle is ultimately responsible for safely securing and towing the vehicle. Ensure that the operator of the towing vehicle is aware of the safety requirements and towing procedures.

- Follow all State (provincial in Canada) and local traffic regulations.
- A vehicle safety restraint system must be used that is independent of the primary lifting and towing attachments.
- All loose or protruding parts of a damaged vehicle should be secured prior to towing.
- Do not go under a vehicle which is being lifted by the towing equipment, unless the vehicle is adequately supported by safety stands or appropriate blocking.
- No towing operation should be attempted for any reason which jeopardizes the safety of the operator, wrecker, bystanders or other motorists.
- Do not exceed the recommended maximum speed of 35 mph (55 km/h) while towing.
- Reduce speed over uneven roads, railway tracks or other obstacles.
- Do not exceed the maximum front and minimum rear clearance specifications when the vehicle is raised.
- The vehicle being towed must have its steering secured with the wheels positioned straight ahead.
- If the vehicle being towed is not equipped with an electrical plug for operating the vehicle tail lights, a light bar must be placed at the rear bumper of the towed vehicle.
- If towing from the front, disconnect the drive shaft to prevent any accidental damage to the transmission

Towing Methods

The Equess is equipped with tow hooks on the front and rear of the vehicle. The vehicle can be towed using a flat or raised method. ARBOC recommends the flat towing method to minimize the likelihood of damage to the vehicle. Extra care must be taken when using the raised towing method to ensure adequate ground clearance at the rear of the vehicle. Rear towing is not recommended due to insufficient ground clearance at the front of the vehicle and the problem of locking the front wheels in a straight position.

DIAGNOSTIC TOOLS		
Item	**ARBOC Part #**	**Explanation**
Computer/ Toughbook 31 Core 13.1" Touch	2006836	The main Equess diagnostics software and tools require a Windows PC to interface to the bus. A customer's existing PC may be used if it is Windows 7 or higher and can be located within cable length of the bus diagnostic connectors (laptop or PC on a cart). We offer a standard option for purchase of a laptop PC
Diagnostic Tools, Nexiq USB Link 2 Bluetooth Edition	2006846	The Nexiq USB Link 2 is a blue interface box that connects a commercial vehicle J1939 CAN network to a computer through an adapter cable. It can also be used to connect to vehicles equipped with an OBDII port like Ford and GM cutaways. Software on a computer is required to do anything once the connection is made. Cummins INSITE, Allison DOCS, Parker Vansco and Bendix ACOM software can all use a Nexiq to communicate with the Equess bus through the round green J1939 connector. There are other proprietary adapters available as well, but the Nexiq is universal enough to be used by all four software packages.
SUBSCRIPTION: Cummins Insite v.8.x (Re-Newable Each Year)		Cummins INSITE software is used to talk directly with the Cummins engine in the Equess. We use it to set up the interface between the engine and the rest of the bus when we commission a vehicle. We set things like governed speed, the rear axle ratio, and how the engine is supposed to get from and send information to Parker Vansco, the instrument panel, the transmission and brakes, and other devices. INSITE is used by technicians for reading diagnostic codes from the engine when the engine detects a hardware issue with the engine, allowing a tech to diagnose problems. The obtained codes can be used on the *Cummins Quickserve* website to obtain troubleshooting worksheets and instructions. Other diagnostic procedures can be performed using the software as well, for example an exhaust REGEN can be forced using the software. The software observes and reports all engine sensor values and can chart and log data from the engine while running and driving to observe what is going on. Cummins INSITE requires an annual subscription, which generates a license key that is assigned to a specific computer.

Exterior Check

- Wheels are undamaged and studs and nuts are secure.
- Tires correctly inflated.
- Vehicle is level.
- Exterior panels are undamaged.
- No fluid leaks exist under vehicle.
- No fluid leaks exist at axles.
- Surge tank coolant level is correct.
- Heating system reservoir coolant level is correct.
- Power steering reservoir level is correct.
- Engine oil level is correct.
- Transmission fluid level is correct.
- Fuel tanks are full.
- Diesel exhaust fluid (DEF) tank is full.

Operational Check

Start the vehicle and check the following for correct condition and operation.

- Low air warning indicator and buzzer.
- Instrument panel indicators.
- Turn signals.
- Mirror condition and adjustment.
- Window and windshield visibility.
- Windshield wipers and washer.
- Destination signs.
- Front and rear doors.
- Exit door sensitive edge.
- Wheelchair ramp.
- Interior and exterior lights.
- Steering column.
- Headlights.
- Instrument panel gauges
- Brake pedal.
- Parking brake.
- Accelerator.
- Transmission shift selector.
- Air system charges to 125 psi within 5 minutes if system is fully depleted.

Engine Compartment

Crankcase Breather Tube

Check breather tube for kinks, dents, or other damage. Also check inside of tube for sludge, debris, or ice formation (in freezing conditions). Clean or replace tube as required

Aftertreatment Exhaust Piping

Inspect exhaust aftertreatment system for leaks cracks, and loose connections. Inspect for leaks at V-band connections and tighten clamps as necessary.

Air Intake Piping

Inspect air intake tubes and hoses, for evidence of wear, punctures, or other damage. Inspect for loose connections and tighten clamps as necessary.

Wheelchair Ramp

Inspect the wheelchair ramp area for cleanliness on a regular basis depending on operating conditions. Exposure to salt, sand, or slush during the winter months may require inspection on a daily basis. Likewise, operating in gritty, dusty conditions during the summer months will require more frequent inspections. Clean any dirt or foreign matter from the ramp, hinge, and operating shaft areas. Inspect the recessed area between the floor and ramp for any accumulation of debris. Manually deploy and stow the ramp to check for smooth operation.

1. Put Battery Disconnect Switch in the 'ON' position.
2. Enter the bus and start the engine.
3. Open Entry door to a fully open position which will cause the interior lights to illuminate.
4. Engage the parking brake.
5. Deploy the ramp.
6. Stow the ramp.
7. Once the ramp is stowed, close the door(s).

Kneel

1. Start the bus
2. While your foot is on the service brake release the park brake
3. Keep the door closed
4. Apply the kneel switch and be sure that the interlock application of 40% service brake engages along with deactivation of the throttle.
5. Hold the switch down until kneeling stops.
6. When ready close the door
    a. The interlocks will release, and the bus will begin returning to ride height immediately and reach ride height within 3 seconds. No damage to any components will occur.

Stop Request

1. Put Battery Disconnect Switch in the 'ON' position.
2. Enter the bus and start the engine.
3. Start the bus.
    a. For systems with the pull string stop request, pull down on a section of the string (between the eyelets), listen for the chime and look for the flashing sign, if installed. After the test, rest the system by fully opening and closing the main entry door to ensure proper operation of the stop request system
    b. For systems with the push button stop request, push one of the buttons, listen for the chime and look for the flashing sign, if installed. The push button system will reset automatically. For the handicap stop request, these push buttons are located under the folding seats. The handicap stop request will produce two chimes.
4. Once the stop request test is completed, return the bus to normal operation.

Wheelchair Tie-Down & Occupant Restraints

- Check the retractors by pulling out the webbing to ensure they are locking properly
- Check to ensure webbing is not cut, frayed, damaged or contaminated by polishes, oils or chemicals
- Check that metal parts are not worn, broken or cracked
- Check pin connector bushings to ensure they are not cracked, broken or missing
- Check that all mounting hardware, such as bolt, nuts, etc. are secure
- Check floor anchorages to ensure cleanliness and securement
- Check shoulder belt anchorages for proper securement and operation
- Check lap and shoulder belt webbing to ensure it is not cut, frayed, damaged or contaminated with polishes, oils or chemicals
- Check buckles for damage and ensure proper operation
- Check male buckle pin connector bushing to ensure it is not cracked, broken or missing
- Check any other parts of the securement system and accessories that may not be specifically indicated in this checklist, but are pertinent to a safe operational system

Floor Covering

Inspect the interior flooring for cleanliness on a regular basis depending on operating conditions. Exposure to salt, sand, or slush during the winter months may require inspection on a daily basis.

CAUTION

DO NOT clean the vehicle interior with pressure washing equipment. This type of cleaning causes excessive soaking of the floor covering and can result in separation of the rubber floor covering from the floor substrate, warping or deterioration of the floor substrate, and possible damage to floor mounted equipment such as floor heaters.

- Vacuum or sweep the floor area daily to remove surface soil before it becomes embedded in the rubber floor covering.
- Wash the floor using a mild detergent and a minimum amount of water to avoid soaking seams and edge areas.
- Visually inspect rubber flooring for gouges, cracks, seam separation, lifting, or any other damage.

Radiator

Test the function of the fan reverse switch and LED indicator on a weekly basis or any time service work is being performed in the engine compartment. Operating the fan reverse switch will not only clear debris from the radiator core but will also confirm operation of the LED indicator which is used to display diagnostic fault codes. If any active fault codes are indicated, refer to Section 6 of this manual for trouble- shooting and vendor information.

HVAC Systems Test

Operate all systems periodically, especially during the off season. By operating the system weekly for short intervals (5 to 10 minutes) year-round, the internal parts of the compressor will remain lubricated. Off- season operation also helps reduce com- pressor shaft seal leakage and allows early detection of refrigerant loss.

CAUTION

Prior to operating the compressor during winter months, you must warm up the vehicle interior to normal operating temperature of 60 to 76° F (5 to 21° C). Unless this precaution is taken, liquid refrigerant might be forced into the compressor, causing severe damage

Primary (Suction) Fuel Filter

Drain any accumulated water from the fuel filter on a weekly basis as follows:

1. Set the Battery Disconnect switch to the OFF position.
2. Open the vent cap located on top of the clear cover.
3. Place a suitable plastic or metal container of at least 8 ounces capacity beneath the drain valve at the base of the fuel filter.
4. Open the drain valve 1 to 1 1/2 turns and allow any water to drain out of the fuel filter. Close the drain valve and hand tighten as soon as clean fuel begins to flow out of the drain. Drain the least amount of fuel as possible.
5. Hand-tighten the vent cap until a click is heard.
6. Start the engine, check for leaks, and operate at fast idle for at least one minute to purge any air from the system.

Air Tanks

It is recommended that all air tanks be checked monthly. Performing this inspection on a regular basis will assure there are no issues during operation of the bus. The tanks are equipped with Bendix Auto Drain valves.

The following factors can influence that amount of water that can collect in the air tanks:

- An outside air source was used to charge the system and did not pass through the air dryer.
- Exceptionally high air usage, exceeding 25% compressor duty cycle due to either heavy accessory demand or system leakage
- Daily temperature range exceeds 30°F (17°C) resulting in condensation. Under these conditions the presence of small amounts of moisture is normal and should not be considered as an indication that the air dryer is not functioning properly.

HVAC Systems Test

Perform a visual inspection of the HVAC system every month or 6,000 miles (9,600 km), whichever occurs first.

Fire Extinguisher

Inspect the fire extinguisher every month as follows:

- Ensure the fire extinguisher is securely mounted in its proper location.
- Check that the safety pin lock is installed.
- Ensure that the hose is in good condition and the nozzle is not obstructed.
- Confirm that the cylinder pressure indicated on the gauge is within the green operating range.

Auxiliary Coolant Heater (if equipped)

The coolant heater should be operated on a monthly basis during the non-heating season to ensure that fresh fuel is circulated through the system. Operating the coolant heater on a regular basis will preclude any starting problems at the beginning of the heating season. Start the engine when cold and operate the coolant heater for approximately ten minutes with the heater fans at their low-speed setting.

Radiator

Inspect and clean the radiator on a quarterly basis or more frequently if operating under harsh conditions.

1. Check hose connections and tighten clamps as necessary. Cracked, swollen or deteriorated hoses must be replaced.
2. Check radiator and charge air cooling cores for leaks and for accumulation of dirt which obstructs air passage. As required, operate the fan reverse button located to the left of the rear electrical box to assist in removing debris from the cores. Repair all cooling system leaks immediately.
3. Inspect the radiator mountings and tighten mounting bolts if necessary.
4. Inspect for clearance between fan blades and fan guards.
5. Inspect air recirculation seals at baffles around radiator assembly. Seals must be in good condition.
6. Inspect fan blades for cracks, broken tips, or other damage.
7. Inspect charge air cooler hoses and piping for leaks, holes, cracks, or loose connections.
8. Inspect the radiator and surrounding area for evidence of corrosion as follows:
    a. Inspect the steel fan shroud that encloses the radiator for damage or evidence of corrosion. Clean as necessary or replace.
    b. Inspect the lower mounting bracket for corrosion and accumulation of debris. Clean, prime, and repaint as necessary.
    c. Inspect the bottom of the radiator and drain plug for evidence of corrosion. Clean, prime, and repaint as necessary.
    d. Inspect the surrounding structural tubing for evidence of corrosion. Clean, prime, and repaint as necessary.
9. Repair or replace any defective part.

Entry Door Limit Switches (A&M electric swing out doors only)

1. Disengage the RED emergency exit handle.
2. Open the access door above the RED emergency handle.
3. Grab the large silver rods on the back of the door header.
4. Push the rods as far as they will go towards the front and the rear of the bus.
5. Reengage the RED emergency handle while holding one of the bars in place.
6. Test the door operation for smooth operation.
7. With the doors fully open, deploy and stow the ramp to ensure the ramp does not strike the door.

Battery Disconnect Switch

1. With the bus not running, place the Master Body Switch in the ‘ON’ position.
2. Using a Multimeter, check that 12VDC voltage to ground is found on both sides of the switch.
3. Turn the Master Body Switch to the ‘OFF’ position.
4. Using a Multimeter, check that 12VDC voltage to ground if found on only one side of the switch.
5. Replace the Master Body Switch if any voltage is found on both sides of the switch in the ‘OFF’ position.

Emergency Exits

1. With the bus not running and the Battery Disconnect Switch in the ‘OFF’ position release the RED Emergency handles on the window and push the window out.
2. Using a light soap and water mix on a clean washcloth, wipe down the rubber gasket/seal around the outside and inside of the window.
3. Using a clean washcloth and water mix re-wipe down the rubber gasket/seal around the outside and inside of the window ensuring there is no soap left on the gasket/seal.
4. Leave the window open until the gasket/seal dries completely.
5. Using a light, inspect the gasket/seal for rips, tears, gouges etc.
6. Once the gasket/seal has been verified clean, close and re-latch the window.

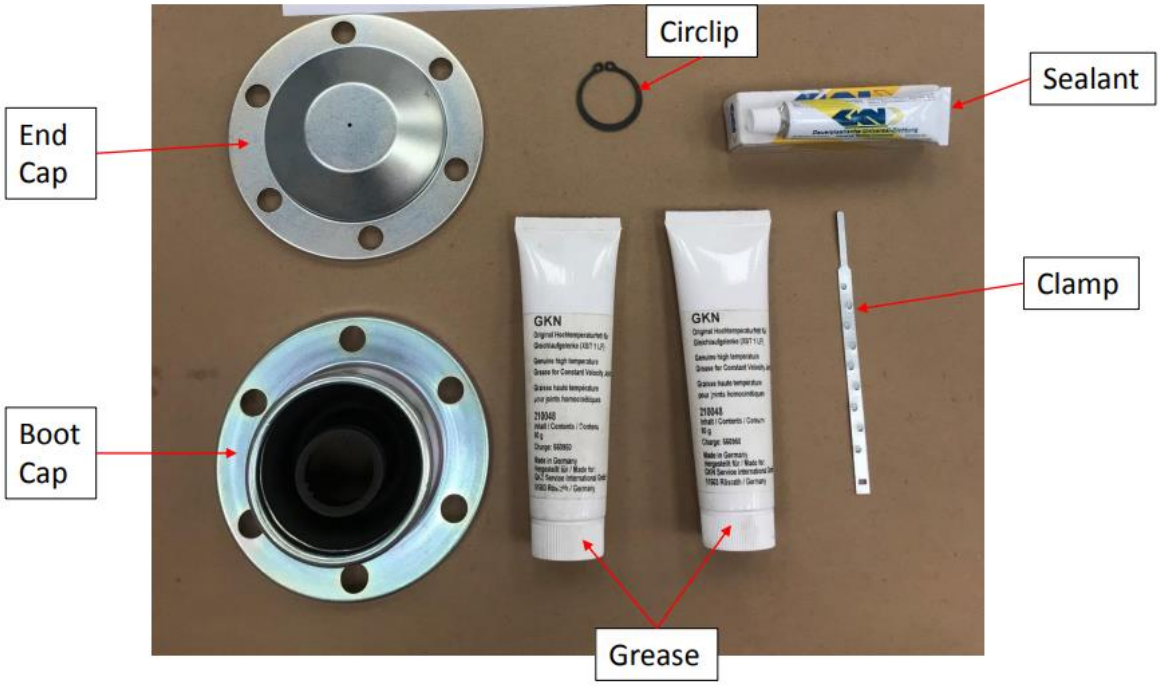
Battery Tray

1. Pull the bus inside a garage.
2. Turn the engine off and turn the battery disconnect switch to off.
3. Unlatch and roll out the auxiliary battery tray.
4. Disconnect the positive and negative cables from the auxiliary batteries.
5. Remove the batteries from the tray.
6. Clean out the battery tray.
7. Examine the breakers located above the rear electrical panel.
8. Using a light weight bearing grease, grease the slides on the bus and the tray.
9. Re-install the batteries.
10. Turn the battery disconnect switch to the on position
11. Start the bus.
12. Test all systems

SERVICE INTERVALS	HOURS	MILES	MONTHS
V-drive initial break-in oil and filter change	25	1,000	
V-drive subsequent oil and filter change	1,000	15,000	
Check transmission fluid level	40		1
Check v-drive oil level	40		1
Check power steering level	40		1
Drain reservoirs	300	8,000	
Inspect M-40QR modulator valves and other brake valves	500	10,000	
Chuff test	500	10,000	
Clean and inspect treadle valve assembly	1,500	25,000	
Lubricate treadle roller, roller pin, hinge pin, and grease between plunger and mounting plate with Barium grease per BW-204-M	1,500	25,000	
Inspect electronic accelerator treadle assembly	1,500	25,000	
Brake pad wear inspection		25,000	
Inspect steering shafts, rods and rod boots			3
Check air cleaner restriction	250	7,500	
Check charge air piping	250	7,500	
Check charge air cooler	250	7,500	
Door system inspection			3
Inspect Video Surveillance System			3
Verify ride height			3
Underbody Inspection, including but not limited to: air springs, shock absorbers, brake chambers, axles, axle linkages; steering components, steering box and miter box; rear axle vent tube, mud flaps; underbody lines and cables, and exposed flooring; ride height valves and linkages; fluid leaks, component damage and signs of corrosion			3
Lubricate bike rack			3
Door system lubrication			6
Check and test engine coolant quality	1,000	15,000	
Check batteries, cables, and connections	1,000	15,000	
Check radiator pressure cap	1,000	15,000	
Change air dryer cartridge		10,000	
Re-torque 3 air dryer bolts to 360-420 in-lbs		10,000	
Re-torque 4 purge reservoir bolts to 300-360 in-lbs		50,000	
Operation and leakage tests		50,000	
Change power steering fluid		50,000	
Change power steering filter		50,000	
Transmission fluid change (TES-668 rated fluid)	2,500	30,000	
Change transmission external filter	2,000	20,000	

SERVICE INTERVALS	HOURS	MILES	MONTHS
Rear axle oil level check		25,000	
Caliper running clearance and rubber boot check		15,000	
- or at pad service/brake work			
Front axle axial play inspection		25,000	
Front axle noise inspection		25,000	
Front axle tightness inspection		50,000	
Grease front axle		25,000	
Grease steering box		25,000	
Clean and lubricate ramp	750 cycles	5,000	
Inspect, clean and lubricate ramp internal components	750 cycles	5,000	
Aim headlights			12
Driveshaft inspection		10,000	
Disassemble propshaft & inspect condition of joints-if needed, replace grease		30,000	
Change engine oil and filters	1,500	20,000	
Change fuel filters	1,000	15,000	
Check drive belts and tensioners	2,500	30,000	
Check air compressor discharge line	1,000	30,000	
Check cooling system and radiator hoses	3,000	60,000	
Steam clean engine/Radiator/CAC	3,000	60,000	
Change crankcase ventilation filter	4,000	75,000	
Rear axle oil change - 17.5 liters		100,000	
Rear hubs - grease compact bearings		310,000	
- or at any brake rotor change			
Adjust overhead rocker arms set	10,000	150,000	
Clean DPF	3,500	75,000	
Change DEF dosing unit filter	6,500	200,000	

Boot Rework



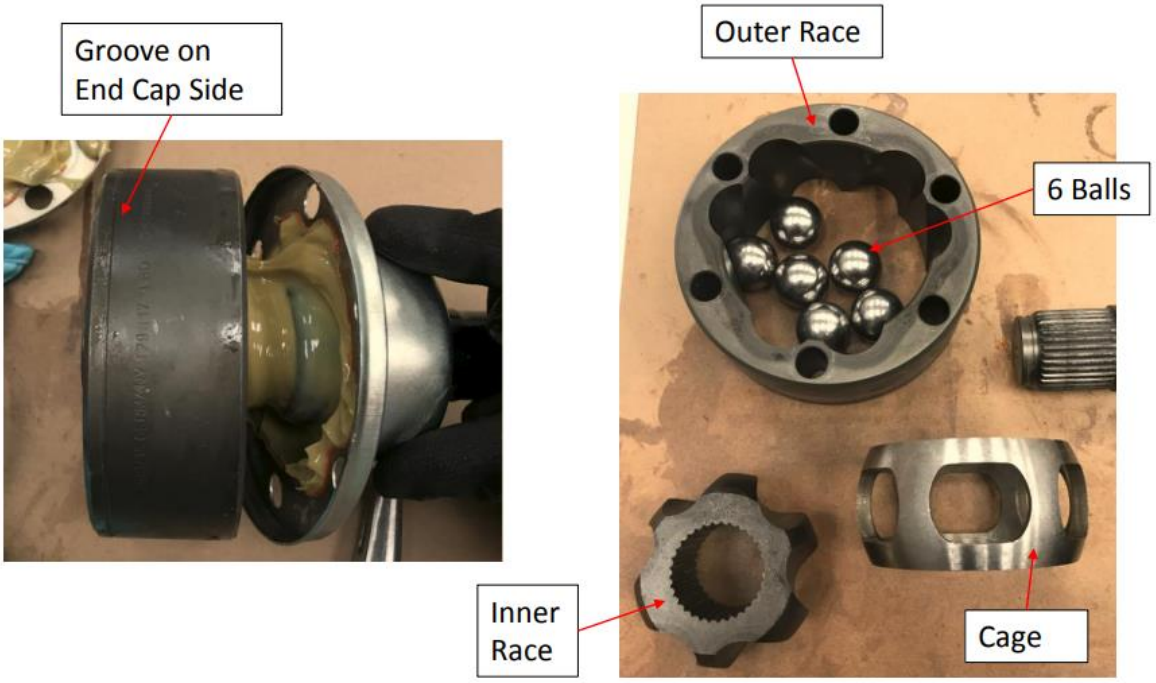
Tools

- Pictured
  - Clamp Pliers
    - Optional Husky 8” Groove Joint Pliers 48063 w/ 3D printed adaptors
  - Lightweight hammer (e.g. 5 oz tack hammer)
  - Internal Snap Ring Pliers
- Not Pictured / Optional
  - 10mm Allen Wrench
  - Gloves
  - Screwdriver

Disassembly Notes

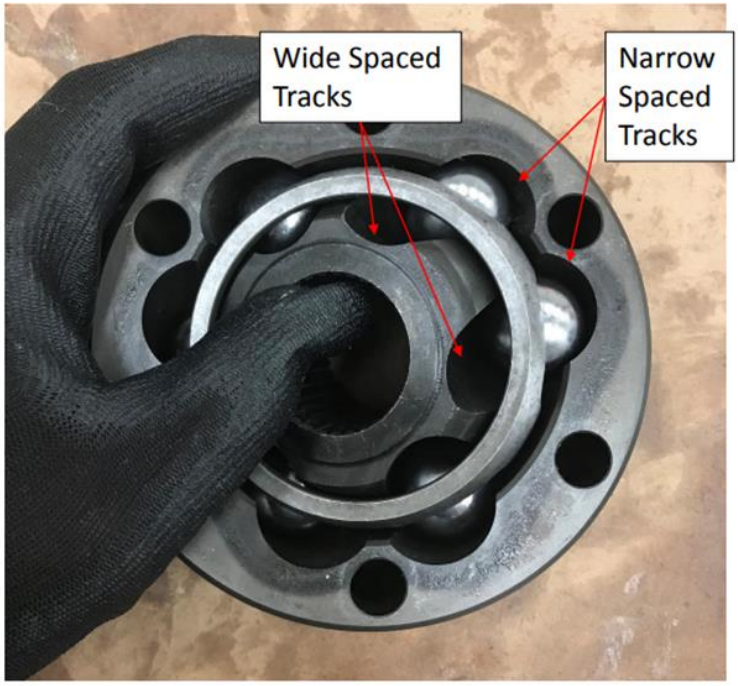
- Boot cap and end cover could be removed by tapping the perimeter with the hammer or a screwdriver. These will be discarded as the replacement is available in the boot kit.
- The joint should slide easily off of the barshaft once the circlip is removed.
- The joint could be wiped off thouroughly if washing out is not possible.
- Note the orientation of the joint outer race, cage, and inner race if dissassembling the joint.

Joint Assembly Orientation



Joint Assembly Orientation

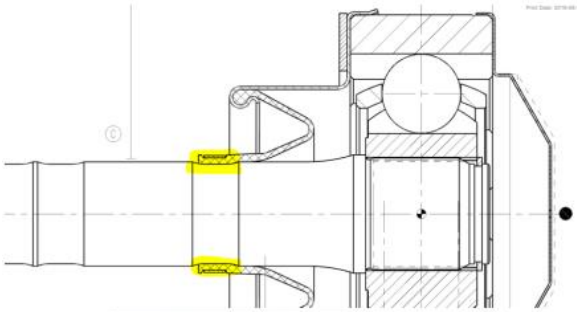
- Phasing between Inner and Outer Race is critical!
- Inner race and cage should plunge and articulate freely. If misassembled, the joint will still plunge, but will seize at a 0° joint angle.
- Orientation should be as shown.



Reassembly Notes

- The boot cap can be difficult to locate on the shaft. A blunt item or probe could be used to assist with pushing the boot onto the barshaft past the spline. Care needs to be taken not to tear or damage the boot.
- The boot cap should be located over the groove in the barshaft as shown on the next slide.
- One grease tube could be loaded into the boot area while the other can be loaded into the joint (in the extended position) as shown on the next slide.
- If not installing the shaft immediately into a vehicle, the washers and a spare adaptor flange should be used to clamp down the boot cap and end cap to ensure that they are properly seated on the outer race and that the sealant is compressed.
  A sticker or piece of tape should also be used to cover the vent hole in the end cap to prevent grease loss or contamination.

Boot Groove & Greasing



Instruction for the boot and grease exchange

Joint size 21 -
type 105 / 111 / 165

Disassembly

- Remove the driveshaft. Keep the washer plates for reassembly. **Attention! Support the free end of the driveshaft to prevent overbending!**
- Open and remove the clamp at the small diameter.
- Remove the end cover and the boot cap carefully by using a little hammer. Keep the end cover for reassembly.
- Open and remove the circlip.
- Pull the joint carefully from the shaft. If necessary support the inner race and drive out the shaft by a mandrel. **Attention! Do not punch the cage or the outer race; in this case the joint could get damaged!**
- Pull the boot cap from the shaft.
- Wipe the grease out of the joint and out of the end cover. Then wash out the joint thoroughly. **Attention! Do not use oil dissolving liquids!**
- Remove remaining sealing gel from the sealing surfaces. **Attention! Assure that the sealing surfaces will not be damaged!**

Instruction for the boot and grease exchange

Joint size 21 -
type 105 / 111 / 165

Reassembly

- Apply new sealing gel on the clean surface of the end cover and the new boot cap. Assure that the sealing seam is not interrupted and below the bores. **Attention! Application of the sealing gel according the attached paper for correct sealing gel application!**
- Push the new boot cap onto the shaft.
- Assemble the joint onto the shaft. If slight hammering is necessary apply a force only on the inner race (the use of a bushing is recommended). **Attention! Do not punch the cage or the outer race; in this case the joint could get damaged!**
- Set the circlip.
- Fill 150 g of grease into the ball tracks on both sides of the joint. **Attention! The sealing surfaces have to remain free from grease!**
- Position the holes of the boot cap and end cover and assemble by careful and slight hammering.
- Push the boot into the correct position and fix it with a new clamp.
- Fit in the driveshaft reusing the washer plates. **Attention! Support the free end of the driveshaft to prevent overbending!**

The transit authority is responsible for the performance of all scheduled maintenance as outlined in this preventive maintenance manual to maintain the vehicle warranty. New Flyer/ARBOC reserves the right to deny warranty coverage on claims due to lack of maintenance, misuse, abuse or neglect.

The maintenance intervals indicated in this manual are based upon average vehicle use and typical operating conditions. Unusual vehicle operating conditions, such as geographic environmental conditions, will require service at more frequent intervals. It is the customer's responsibility based upon experience with localized environmental conditions and local regulations to determine if more frequent intervals are required.

All the described maintenance operations must be performed by qualified personnel using standard shop practices. All replacement parts used for maintenance services or repairs must be OEM parts or parts with equivalent quality and performance. Use of inferior parts will void the warranty. Warranty claims in question must be supported by preventive maintenance records. For a full copy of the Warranty, see the Limited Warranty found in the Customer Link.

STANDARD WARRANTY COVERAGE: The basic components originally built, installed, or modified by ARBOC, which a Customer does not get a choice in supplier option such as the windows, floor covering, suspension, interior ABS, stanchions, and electrical system including lights, switches, entry door are warranted free from defects in workmanship or materials for a period of 36 months or 75,000 miles, whichever occurs first. **ANY ACTION FOR BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTIES OR FOR REVOCATION OF ACCEPTANCE MUST BE COMMENCED BY THE EARLIER OF 39 MONTHS AFTER THE ORIGINAL PURCHASER TAKES DELIVERY OF THE VEHICLE OR 3 MONTHS AFTER THE VEHICLE'S ODOMETER REACHES 75,000 MILES.**

POWERTRAIN WARRANTY COVERAGE: The basic structural components originally built, installed, or modified by ARBOC, such as the Engine & Powertrain, Transmission, Drive Axle, and Emissions System are warranted free from defects in workmanship or materials for a period of 60 months or 100,000 miles, whichever occurs first. **ANY ACTION FOR BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTIES OR FOR REVOCATION OF ACCEPTANCE COVERING THE STRUCTURE MUST BE COMMENCED BY THE EARLIER OF 63 MONTHS AFTER THE ORIGINAL PURCHASER TAKES DELIVERY OF THE VEHICLE OR 3 MONTHS AFTER THE VEHICLE'S ODOMETER REACHES 100,000 MILES.**

STRUCTURAL WARRANTY COVERAGE: The basic structural components originally built, installed, or modified by ARBOC, such as the exterior sidewall structure, rear wall structure, roof structure, floor structure, and chassis frame sections are warranted free from defects in workmanship or materials for a period of 84 months or 250,000 miles, whichever occurs first. **ANY ACTION FOR BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTIES OR FOR REVOCATION OF ACCEPTANCE COVERING THE STRUCTURE MUST BE COMMENCED BY THE EARLIER OF 87 MONTHS AFTER THE ORIGINAL PURCHASER TAKES DELIVERY OF THE VEHICLE OR 3 MONTHS AFTER THE VEHICLE'S ODOMETER REACHES 250,000 MILES.**

MANUFACTURER SUPPLIED COVERAGE: The optional accessories and/or components covered by separate manufacturer warranties and originally installed by ARBOC including, but not limited to electronic components (alternators, batteries, TVs, radios, PA systems, destination signs, camera systems), air conditioning/heating (not related to chassis system), paint, wheelchair ramps, safety equipment, and seating equipment. Warranty terms on these items will be subject to separate manufacturer warranties and may be administrated separately by the component manufacturer.

Consumable maintenance items such as (but not limited to) lights, light bulbs, lamps, belts, bushings, and items with progressive wear characteristics, lubricants, fluids, filters, hoses, wiper blades and tires are not covered by warranty.

The transit authority is responsible for the performance of all scheduled maintenance as outlined in this preventive maintenance manual to maintain the vehicle warranty. For compliance to warranties covering the following equipment, refer to complete preventive maintenance intervals and procedures contained in the applicable vendor supplied information found in your Customer Link:

- A&M Systems: Standard Door Header
- Vapor Doors: Optional Door System
- Cummins: Engine
- Allison: Transmission
- ZF North America: Front & Rear Axle Assemblies
- RJ Link International: Gearbox V-Drive
- Shaw DEF Tank
- EMP Cooling Package
- HVAC (by sales option)