Bus Owner's Manual

Ford Chassis - 450/550 Series

Congratulations,

and thank you for purchasing a Krystal Enterprises Vehicle

You have taken ownership of a true luxury vehicle which is in a class all its own. We are providing this manual to familiarize you with your new Krystal Enterprises Professional Bus. This manual shall serve as a reference document for the operations and maintenance procedures that shall be required throughout the life of your vehicle. This edition covers all our Ford Chassis models, and is designed to be used in conjunction with the original chassis manufacturer's owner's literature, as well as all other component manufacturers literature.

IMPORTANT: PLEASE READ CAREFULLY

For your safety and the safety of others, we ask that you completely familiarize yourself with this manual, and all other operators manuals before you operate this vehicle for the first time.

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Pre-Trip Inspection (suggested minimum)

Any item not passing inspection, must be reported immediately, before operating vehicle

FAILURE OF HIGHLIGHTED ITEM(S) TO PASS INSPECTION WILL CAUSE VEHICLE TO BE GROUNDED

Item	Inspection Procedure	Pass	Fail
1	Check preventative maintenance schedule: for services due at present mileage		
2	Check operation of: drivers seat and seat belt		
3	Check operation of: steering wheel and shift levers		
4	Check operation of: turn indicators		
5	Check operation of: foot pedals and parking brake		
6	Check operation of: all gauges, for normal readings with engine running		
7	Check operation of: dash indicator lights with key on, engine not started, then again with engine started		
8	Check operation of ventilation system: heating, defrosters, fans and air conditioning		
9	Check: horn, wipers, washers, and mirrors for cleanliness, adjustment, operation and damage		
10	Check condition of: fire extinguisher, warning reflectors and first aid kit		
11	Check: all doors, glass and windows: for operation, cleanliness, and damage.		
12	Check: all emergency exits for operation, warning devices, markings, to be free and clear		
13	Check interior lighting: for operation and damage		
14	Check Side Passenger Entry Door - Emergency Exit Operation & Sensitive Edge if equipped		

Pre-Trip Inspection (suggested minimum)

Any item not passing inspection, must be reported immediately, before operating vehicle

FAILURE OF HIGHLIGHTED ITEM(S) TO PASS INSPECTION WILL CAUSE VEHICLE TO BE GROUNDED

Item	Inspection Procedure	Pass	Fail
15	Check Side Passenger Entry Door: for damage and proper closing operation		
16	Check exterior lighting: for operation and damage		
17	Check exterior: for cleanliness, markings and damage		
18	Check fuel cap: in place and secure		
19	Check all tires and wheels: for tread depth, cracks & bulges, missing lug nuts, and air pressure 80 psi for E-450 and 95 psi for F-550		
20	Check: oil level		
21	Check: transmission fluid level		
22	Check: engine coolant level		
23	Check: power steering fluid level		
24	Check: brake fluid level		
25	Check: belts for tension and wear		
26	Check operation of: cameras, if applicable		
27	Check operation of: PA system, if applicable		
28	Check operation of: audio and video system, if applicable		
29	Check wheelchair lift: for proper function or damage and securement station equipment		

GENERAL VEHICLE SAFETY WARNINGS

NO STANDEES ARE ALLOWED,
AT ANY TIME, WHILE THE VEHICLE IS IN MOTION.

DISCONTINUE OPERATION OF THE VEHICLE, IF THE LOW AIR WARNING LIGHT COMES ON, OR UNTIL THE PROBLEM WITH THE SYSTEM CAN BE RESOLVED.

DISCONTINUE OPERATION OF THE VEHICLE, IF ANY CRITICAL ITEM ON THE PRE-TRIP INSPECTION LIST FAILS TO PASS, OR UNTIL ALL PROBLEMS HAVE BEEN RESOLVED.

IF A DOOR AJAR WARNING LIGHT IS LIT,
CHECK ALL DOORS FOR PROPER CLOSURE. NEVER OPERATE THIS VEHICLE UNTIL THE PROBLEM HAS BEEN RESOLVED.

THIS BUS IS NOT DESIGNED TO TOW ANOTHER VEHICLE OR TRAILER
DO NOT ATTEMPT TO TOW OR PULL ANOTHER VEHICLE WITH THIS BUS.

ATTENTION

WHEN OPERATING A VEHICLE WITH A VAPOR DOUBLE PANEL AIR OR ELECTRIC ACTUATED PASSENGER ENTRANCE DOORS, THE FOLLOWING PRECAUTIONS SHOULD BE TAKEN.

AIR DOORS

The Emergency Release Valve System - ***(must be checked on a daily basis)***
Once the emergency release valve has been actuated (by turning the red handle counter clockwise), it should be possible to open the doors by pushing outward with your hand after about 5 seconds.

The Obstruction Sensing System (Sensitive Edge) - ***(must be checked on a daily basis)***
Only when the door is closing, can reversing be actuated. The reversing motion should be shut off at about 10 to 30 mm before the final closing position. If the reversing process actuates too late, the sensitivity of the differential pressure switch should be adjusted again. Call the KRYSTAL SERVICE DEPT.

ELECTRIC DOORS

The Emergency Release Lever System - ***(must be checked on a daily basis)***
Once the emergency release lever has been actuated (by pushing the red handle from right to left as indicated on the sticker), it should then be possible to open the doors by pushing the panels outward with your hand.

Air Door Emergency Release Valve

EMERGENCY USE ONLY

NOTE:

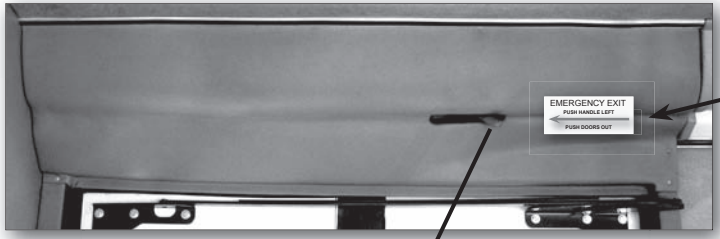
VALVE MUST BE CHECKED DAILY, PRIOR TO VEHICLE OPERATION

CAUTION!

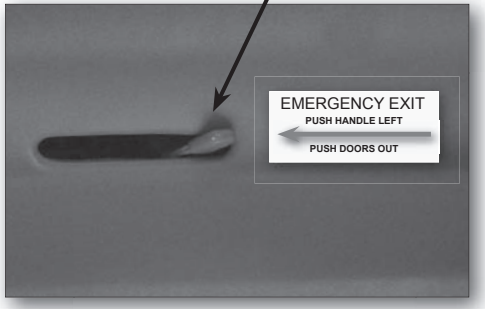
For Emergency Door Opening, turn the red valve counter clockwise, this will release the door after about 5 seconds, then the door can be pushed open.

Electric Door Emergency Release Lever

Electric Door Motor Cover



Emergency Exit Lever Decal



Emergency Exit Lever

NOTE:

LEVER MUST BE CHECKED DAILY, PRIOR TO VEHICLE OPERATION

EMERGENCY USE ONLY

Pre-Trip Inspection

- ❑ Is each securement station properly equipped with four securement straps, a lap belt, and a shoulder belt?
- ❑ Are all straps and belts in good working condition? Any defects such as cut, frayed, contaminated or damaged webbing, improperly functioning buckles or hardware, or broken or worn parts, require replacement of the entire strap or belt assembly.
- ❑ Are all floor anchorages, (i.e., tracks or plates), clear of dirt or debris to allow for proper system fitting attachment?
- ❑ Is there a clean, dry container in the vehicle to allow for storage of the system when not in use?
- ❑ Is the vehicle equipped with a web/belt cutter for use in the event of an emergency evacuation?
- ❑ Are complete system operational instructions, in either printed or decal form, located within the vehicle compartment to serve as a reference?

CAUTION! Never utilize the Occupant Restraint System unless you are fully trained, if you're not sure what to do, always call your Kinedyne Representative for Assistance!

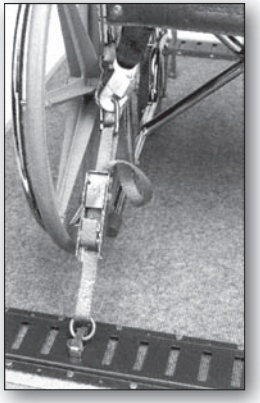
Typical Wheelchair Securement Methods

Front Strap Attachment

Lap Belt Attachment

With the wheelchair and occupant facing toward the front of the vehicle, center the wheelchair between the floor tracks or plates. As you position the wheelchair, remember that the securement straps need to have approximately a 45° angle from the floor tracks or plates to where they attach to the frame. Also, keep in mind the proper extension and placement of the occupant restraint shoulder belt. Apply the wheel locks or turn off

Typical 4-Point Restraint with Lap & Shoulder Belt



Rear Strap Attachment

For Specific Operating Instructions and System Care and Maintenance, Refer to Your Kinedyne Literature

Air Door Lock Pin Assembly

CAUTION!

Security Pin must be removed during bus operation.

Pin is only to be used for security, if bus is not in operation.

Dual Overhead Parcel Rack

Overhead Parcel Rack (right side shown)

CAUTION!

Do not overload Parcel Racks.
Do not fasten parcels to retainer bars.

Emergency Egress Window Operation

Lift up on lever to disengage latch

Windows with Emergency Exit stickers are designated emergency exits. Follow the directions on the sticker.

Lift levers and push window out

Emergency Roof Hatch Exit

SEE MANUFACTURERS LITERATURE
FOR ADDITIONAL INFORMATION

This is a **Dual Purpose** hatch used for Emergency Egress and Ventilation purposes.

SUGGESTED MAINTENANCE
Periodically inspect attaching fasteners for evidence of loosening due to tampering, and regularly clean surface with a mild soap and water.

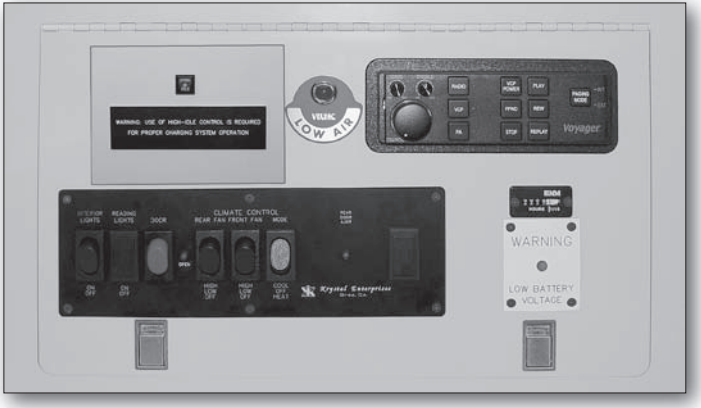
CAUTION: When removing graffiti, it is the customers responsibility to ensure cleaning solutions are compatible with the materials used on Safety Vents. Solutions containing, acetone, ether, lacquer thinner, or other solvents can destroy the high strength properties of many engineering plastics - AVOID these cleaners

For Emergency Exit

For Ventilation

Overhead Control Panels Assemblies

E-450 Overhead Control Panel



F-550 Overhead Control Panel

E-450 with PA in Console

Controls - Indicator and Accessory Switches

When the Low Air warning light is lit, this indicates the normal operating air supply has fallen below safe operating levels

Discontinue Operation

The Low Battery Light indicates a low battery condition exists, and the Charge Protect System needs to be engaged.

The Hour Meter accumulates the number of hours your ignition has been turned on.

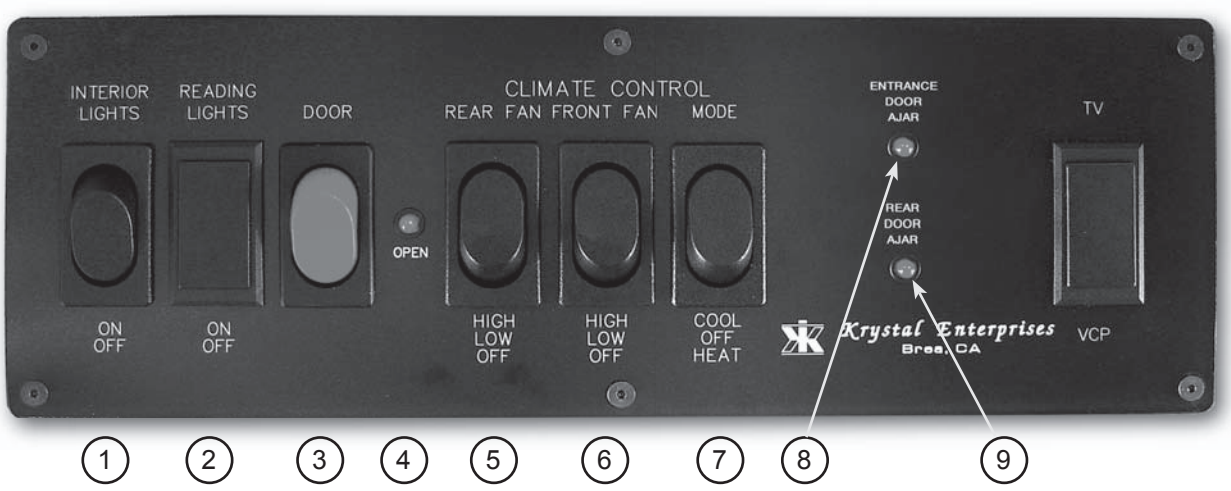
This switch turns on or off, the (optional) ceiling lights.

This switch must be on to power the (optional) Wheelchair Lift.

This switch operates (optional) Destination Sign when equipped.

This switch operates the (optional) in step heater when equipped.

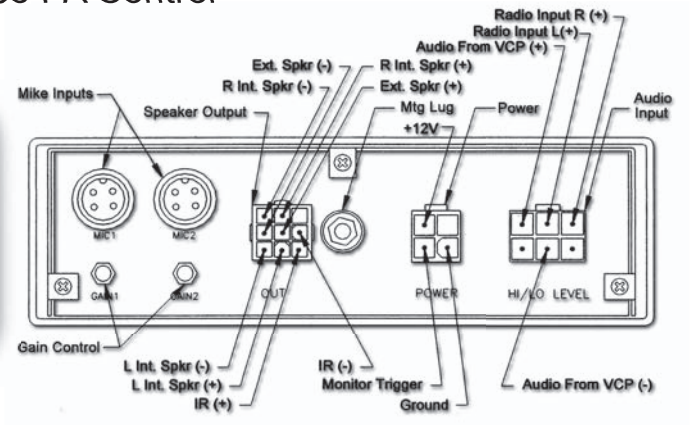
Drivers Overhead Control Panel



1 Interior Lights	6 Front Fan Control **(hi - low - off)**
2 Reading Lights (optional)	7 Climate Control Mode **(cool - off - heat)**
3 Door Switch (open or close passenger door)	Note: Cool mode = A/C on both front & rear Heat mode = Heat from front unit only
4 Door Open Indicator Light (**WARNING DEVICE**)	8 Entrance Door Ajar Light (**WARNING DEVICE**)
5 Rear Fan Control **(hi - low - off)**	9 Rear Door Ajar Light (**WARNING DEVICE**)

Audio/Video PA Control

FRONT VIEW



REAR VIEW

1 On/Off Volume Control - controls power and volume	8 VCP Play - starts the tape playing
2 Bass Control - increases or decreases bass	9 VCP Fast Forward - fast forwards tape
3 Treble Control - increases or decreases treble	10 VCP Stop - stops tape
4 Radio Mode - enables radio, indicator light will be on	11 VCP Replay - rewinds and replays from start of tape
5 PA Mode - enables PA, indicator light will be on	12 VCP Rewind - rewinds tape
6 VCP Mode - enables VCP, indicator light will be on	13 Paging Mode - (Internal or External) press button once to engage system, press again to toggle between internal/external
7 VCP Power	

SEE MANUFACTURERS LITERATURE FOR ADDITIONAL INFORMATION

Quick Reference Guide

BCP (Battery Charge Protection Mode)

Note: This system has been set-up for **Automatic Battery Charge Protection**, which becomes active whenever the following enabling conditions are met:

ENABLING CONDITION:

- Vehicle NOT moving (speed=0 MPH).
- Service Brake NOT pressed.
- Vehicle Transmission Range in Park/Clutch NOT pressed.
- RPM's inside of safe operating range.
- Transmission Fluid Temperature below 240˚ F.
- Engine Coolant Temperature below 230˚ F.
- Brake Lights Functional
- Foot Off Accelerator Pedal

AUTOMATIC BATTERY CHARGE PROTECTION

Any time your vehicle is Powered-up", Charge Protection is automatically engaged, ***THIS FUNCTION SHOULD NOT NORMALLY BE DISABLED.***

- Charge Protection will remain in effect until which time, any of the above stated ENABLING CONDITIONS are no longer met, or until you manually dis-engage the BCP button on the DRIVERS OVERHEAD CONTROL PANEL, see photo at right.

TO DEACTIVATE "**AUTOMATIC BATTERY CHARGE PROTECTION**" OR "**FAST IDLE"** Do the following:

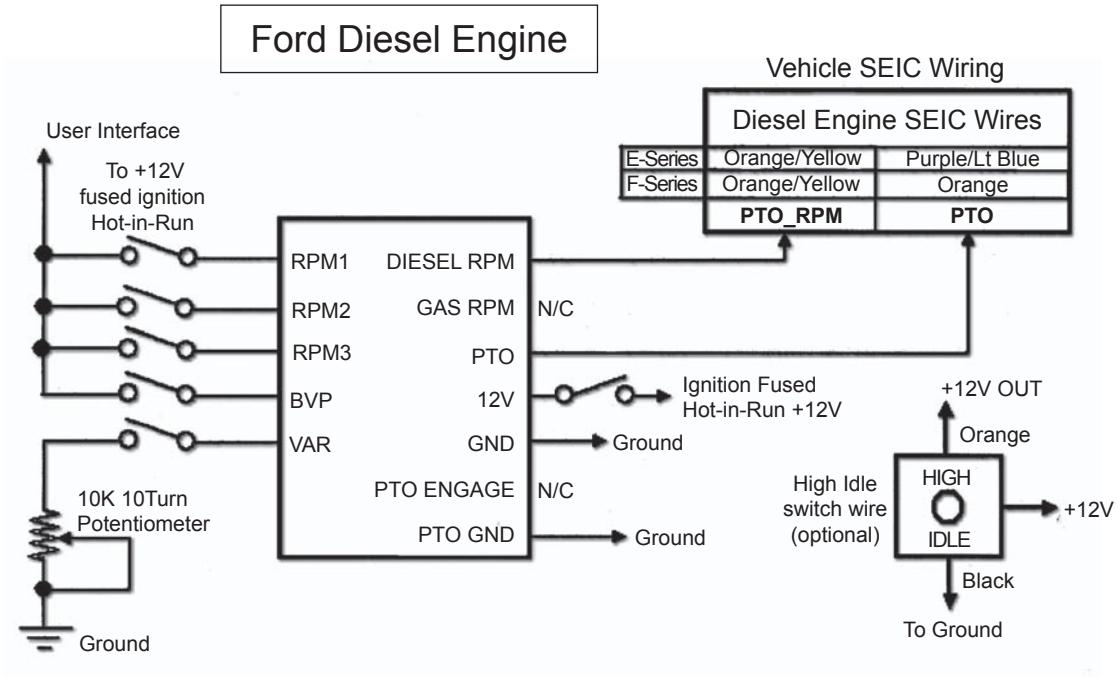
- Press the Manual Engage button on the DRIVERS OVERHEAD CONTROL PANEL and release.

Fast Idle system will only be turned off when the button is released.

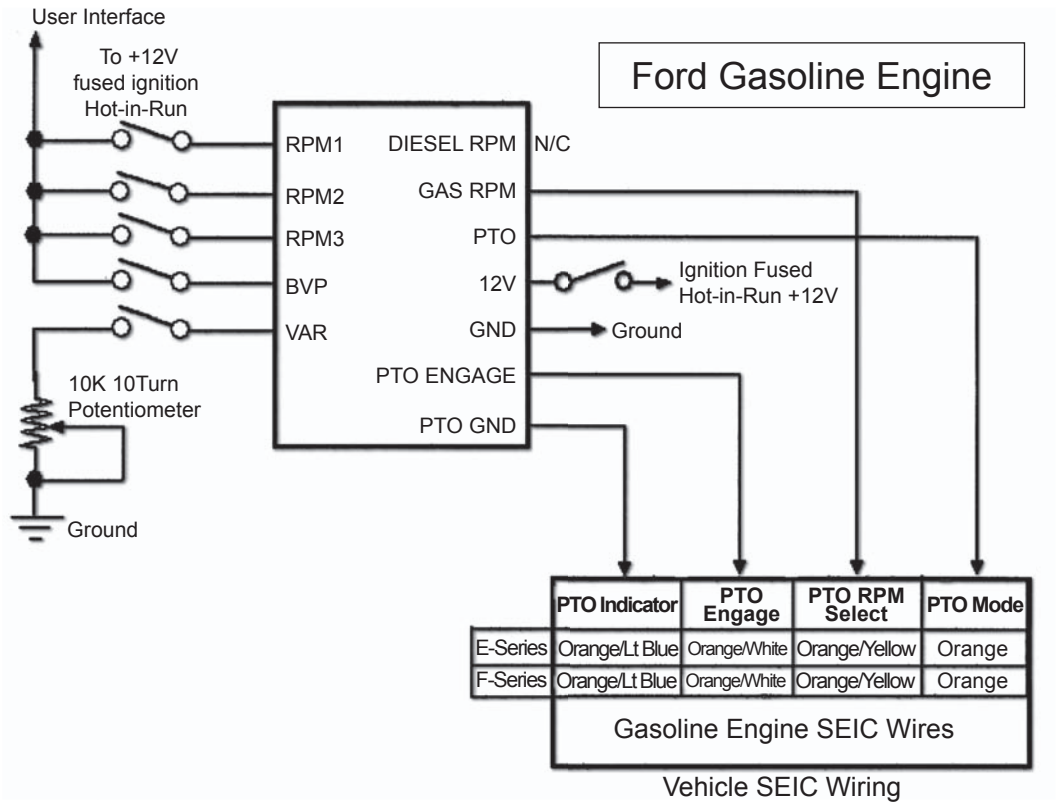
- To exit "**AUTOMATIC CHARGE PROTECTION Mode**", simply depress the service brake pedal. See the **Off Road Engineering** literature for specific details regarding other operating parameters.

Fast Idle Switch is shown as mounted on Driver's Overhead Control Panel (ref. page 20)

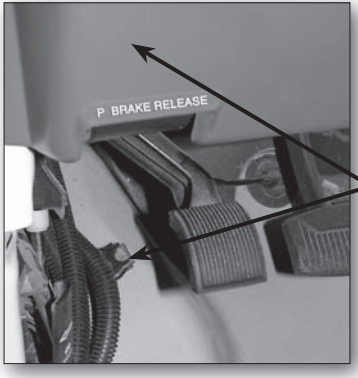
HIC900 Throttle Controller Wiring Diagram - DIESEL



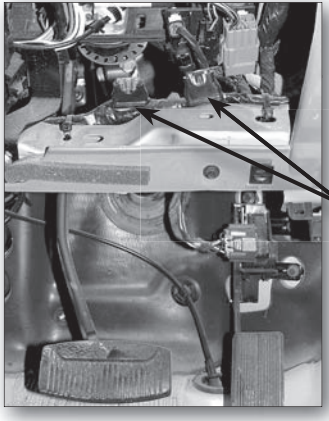
HIC900 Throttle Controller Wiring Diagram - GASOLINE



Charge Protection System Components

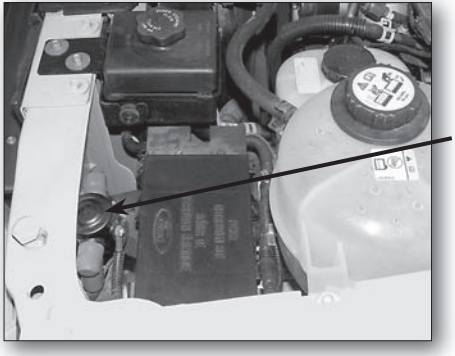


E-450 Charge System Fuse, located behind panel & Rear Ignition Power Fuse (shown with kick panel removed)



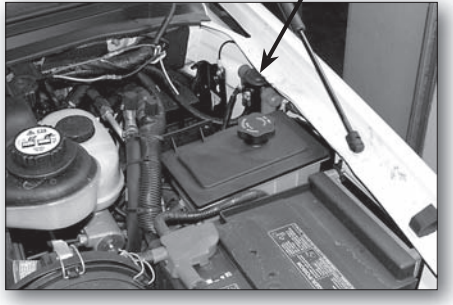
F-550 Charge System and Rear Power Fuse (located behind panel under steering column)

F-550 Charge Isolator Solenoid (located in engine compartment-drivers side)

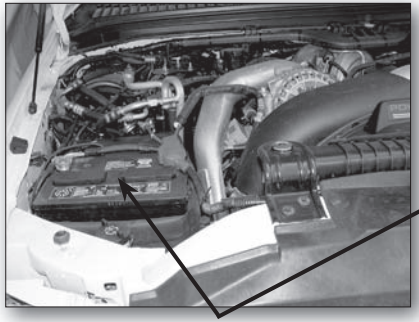


E-450 Charge Isolator Solenoid located in engine compartment -drivers side. (diesel version shown)

Gas version is located below primary battery.

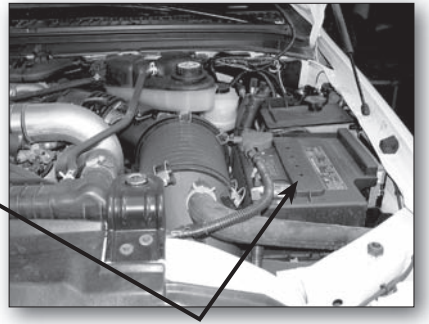


Battery Location - Primary and Secondary



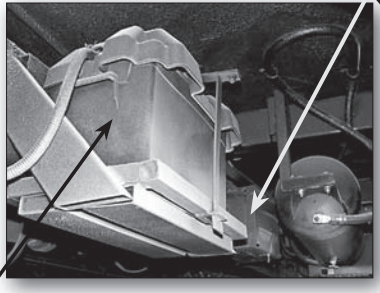
F-550 Primary Battery Location

F-550 Diesel Engine Compartment



F-550 Primary Battery Location

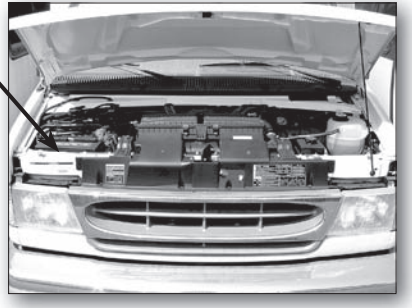
E-450 Diesel Primary Battery Location



Under Floor Auxiliary Battery (curb side) for E-450 & F-550 (E-450 diesel shown)

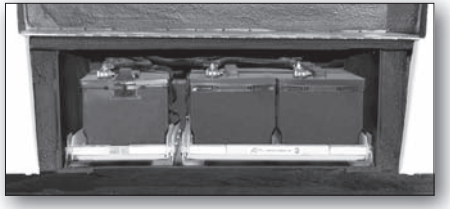
E-450 2004 and Older Models

E-450 2004 and Older Models



E-450 Diesel Engine Compartment

E-450 2005 and Newer Models



2005 E-450 Primary & Secondary Slide Out Battery Compartment Located on Curb Side of Vehicle

E-450 Heated Mirror Switch and Mirror Control Switch

CAUTION!

Leaving the heated mirror switch on in hot weather, may cause mirror to crack.

Heated Mirror Switch

This switch controls the ON/OFF activation of the heated mirror function.

Mirror Control Switch

This switch includes a center toggle switch that allows the operator to switch from right to left mirror. The center position of the toggle defeats all mirror operations.
When either the left or right mirror is engaged, the 4 arrow switches allow the mirror to move in 4 different directions for precise adjustment.

Video Entertainment Center

Bulkhead Mounted TV and DVD

Basic Operating Instruction

Bulkhead mounted TV and DVD

[The TV may be viewed with
or without using the DVD]

For specific detailed information see
Manufacturers DVD Operating Instructions.

1. Turn on the TV using the power on the TV or the button on the remote (Note: TV must be set to Video #1 for DVD to work)
2. To view video, push the TV/Video button to switch between TV and DVD(Video).
3. To view tapes select VCP, then press the DVD power button on the remote.
4. The DVD buttons on the remote will now Operate all the functions of the DVD

SEE MANUFACTURERS LITERATURE
FOR ADDITIONAL INFORMATION
ON BOTH COMPONENTS

Back-Up Camera Controls and Operation

LCD Monitor
(located in bulkhead above passenger seat on E-450
or in dash area on passenger side of F-550)

NOTE:
To reverse image on monitor, push button on back of camera

Back-Up Camera
(located on rear of vehicle)

Monitor Controls

1. **Power Button**, glows dimly when system is connected fully manual, becoming bright upon activation
2. **A/B input Select Button**, toggles active display between AV1 and AV2 inputs
3. **Day/Night Mode Button**, toggles intensity of LCD screen for day or night operation, (day=maximum intensity, night=less intensity)
4. **Picture Adjustment Menu Button**, accesses on-screen-display, to adjust (brightness, contrast, color, tint). Use the Volume control to adjust each up or down, as indicate by a bar graph at bottom on screen.
5. **Volume Button**, controls +- output volume of built-in speaker, when feature is connected. Also used in Picture Adjustment Mode.

System Operation

This system consists of two major components:
1. The Back-Up Camera 2. LCD Monitor

The system may be connected two ways:
1. **Fully manual**, requiring the power button on the LCD Monitor to be pushed to energize the system and activate the monitor.
2. **Automatic**, which activates the monitor whenever the ignition is turned to accessory or the engine is started.

SEE MANUFACTURERS LITERATURE FOR ADDITIONAL INFORMATION

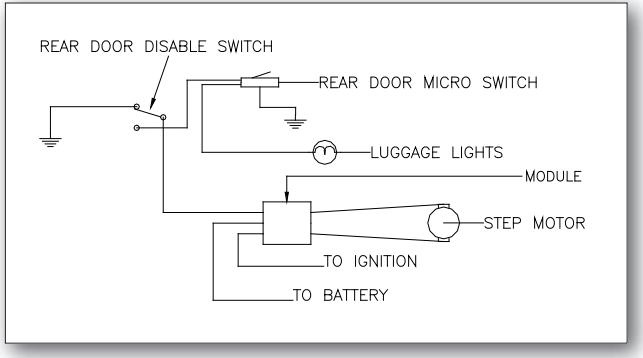
Rear Step Operation

SEE MANUFACTURERS LITERATURE FOR ADDITIONAL INFORMATION

For the double rear step (shown above) and the single rear step, operation is the same. The schematic (this page) explains the electrical operation of both steps. The **power switch** allows you to enable or disable step operation. When the step is enabled, opening the rear door automatically extends the step.

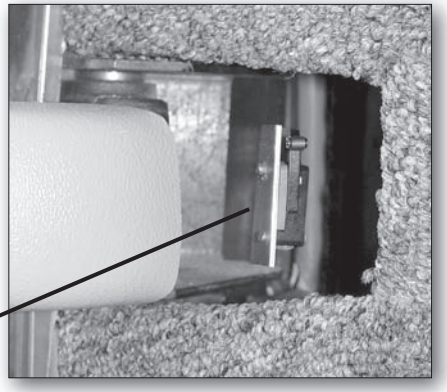
Note: See Manufacturers literature regarding periodic lubrication requirements.

Rear Step
Operational Schematic



Rear Cargo Door Micro Switch

Rear Door and Hinge Assy

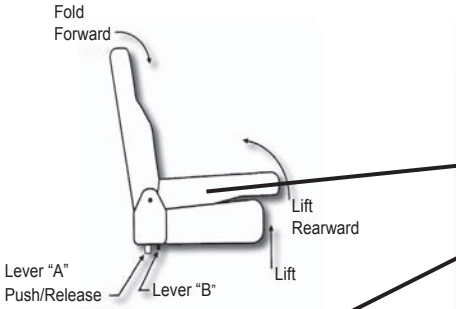


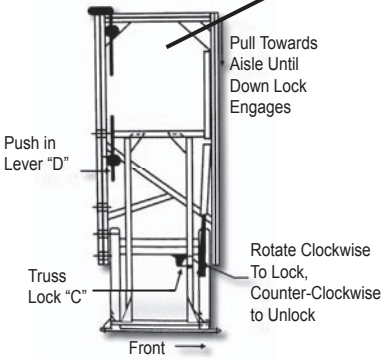
Cargo Door Micro Switch

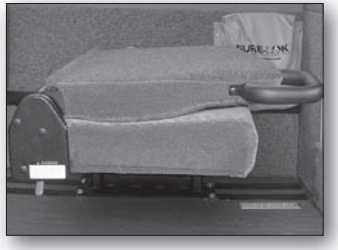
The switch is located at the rear cargo door upper hinge, shown at left and above. It operates the rear interior lights and also activates the door-ajar light on the front overhead control panel.

This switch works in conjunction with the rear step, allowing the power switch (shown on previous page) to enable or disable step operation.

Foldaway Seating







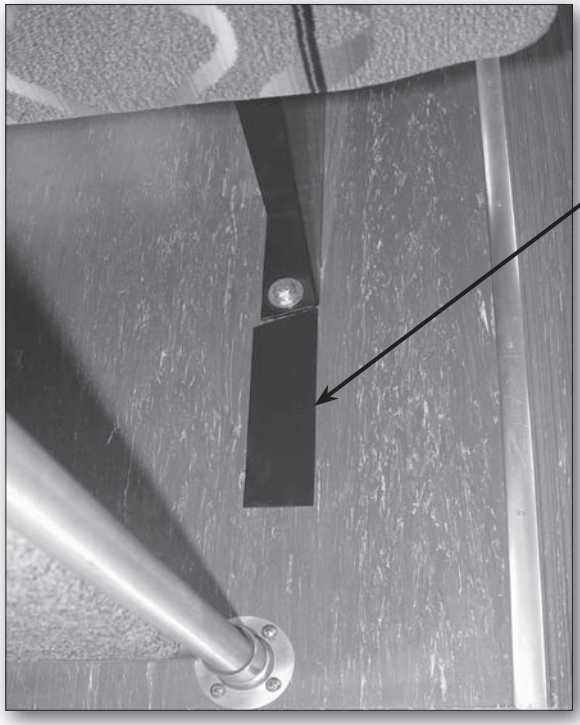
To Lower

1. Rotate the Truss Lock "C" to unlock the assembly, then push Lever "D" and pull the top of the seat toward the aisle until it is locked in the down position.
2. Push lever "A" forward, and lift the back cushion until the lever "A" has snapped back into the locked position.

To Raise

1. Push lever "A" forward, and fold the back cushion down against the seat cushion until lever has snapped back into locked position.
2. Push lever "B" upward, and lift the seat into the fold away position, and rotate the Truss Lock "C" to lock the assembly in place.

Bus Passenger Seating - Moving or Adding



Bus seating is mounted into the floor of the vehicle as shown in the photo to the left.

To move or add seating:

1. Remove the black plastic track cover, so the track is exposed.
2. Next remove the nut from the base.

NOTE: Nut must be perpendicular to the track when the seat is re-attached to the seat track.

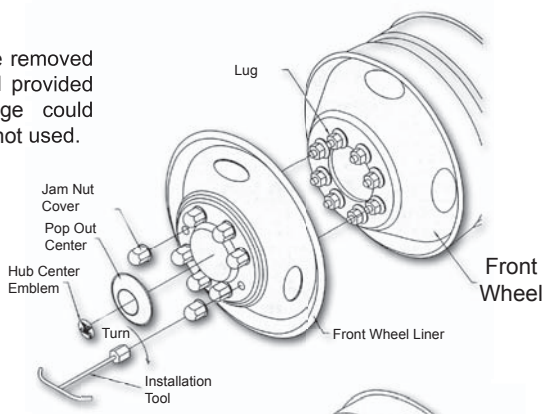
CAUTION: Bolts must be torqued to 35 ft.. Lbs.

Caution: ***When Adding Seating, Do Not Exceed Weight Distribution/ Payload Limitations.***

Stainless Steel Wheel Liners

C A U T I O N !

Wheel liners should only be removed using the Wheel Liner Tool provided with your vehicle. Damage could occur if the supplied tool is not used.



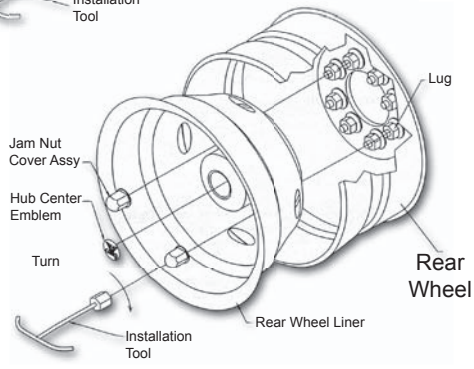
INSTALLATION - REMOVAL INSTRUCTIONS

NOTE: *When removing or installing, never remove the original equipment lug nuts.*

1. **TO REMOVE**, simply place the Wheel Liner Tool over the Jam Nut Covers.
2. Remove Jam Nut Covers from each wheel and remove Liners

1. **TO INSTALL**, determine the correct placement of liners for proper hand hole alignment.
2. Install Liner over studs, then install Jam Nut Covers w/built-in jam nuts onto the studs. Using the Wheel Liner Tool, tighten all Jam Nuts

SEE MANUFACTURERS LITERATURE FOR ADDITIONAL INFORMATION



Air Conditioning Assembly E-450 & F-550

ACC Front Air Conditioning

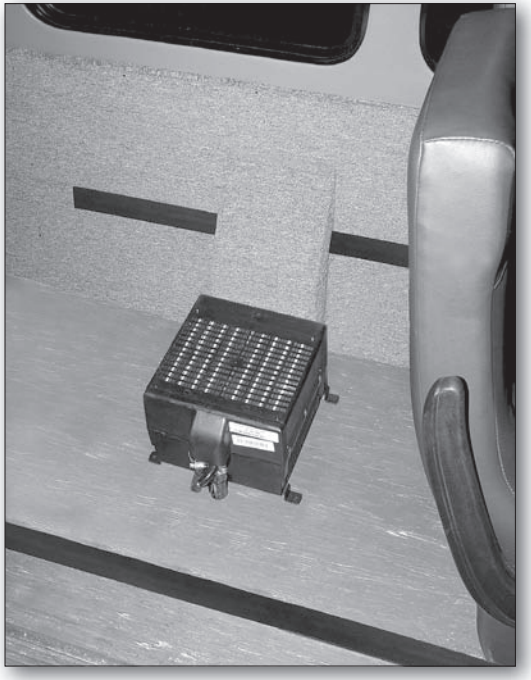
These units also provide heat when A/C is not required, by toggling switch on the overhead control panel

Optional ACC Rear Air Conditioning

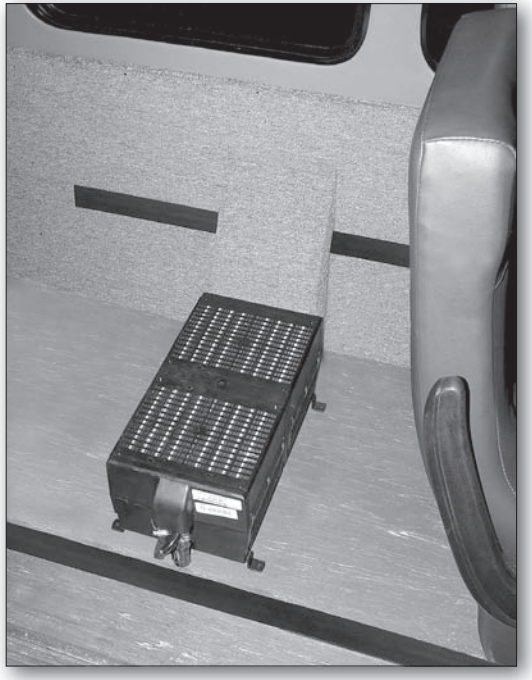
This unit only operates when the dash A/C is turned on. A/C only - No Heat

These units are operated by the driver, using the controls on the Overhead Control Panel , see page 22.
For information on A/C charging specifications, see the A/C Charging Chart on page 67.

Rear Floor Heater Assembly E-450 & F-550



30,000 BTU Model



65,000 BTU Model

Both units are turned on when the heat mode is selected on the Drivers Overhead Control Panel (see page 22)

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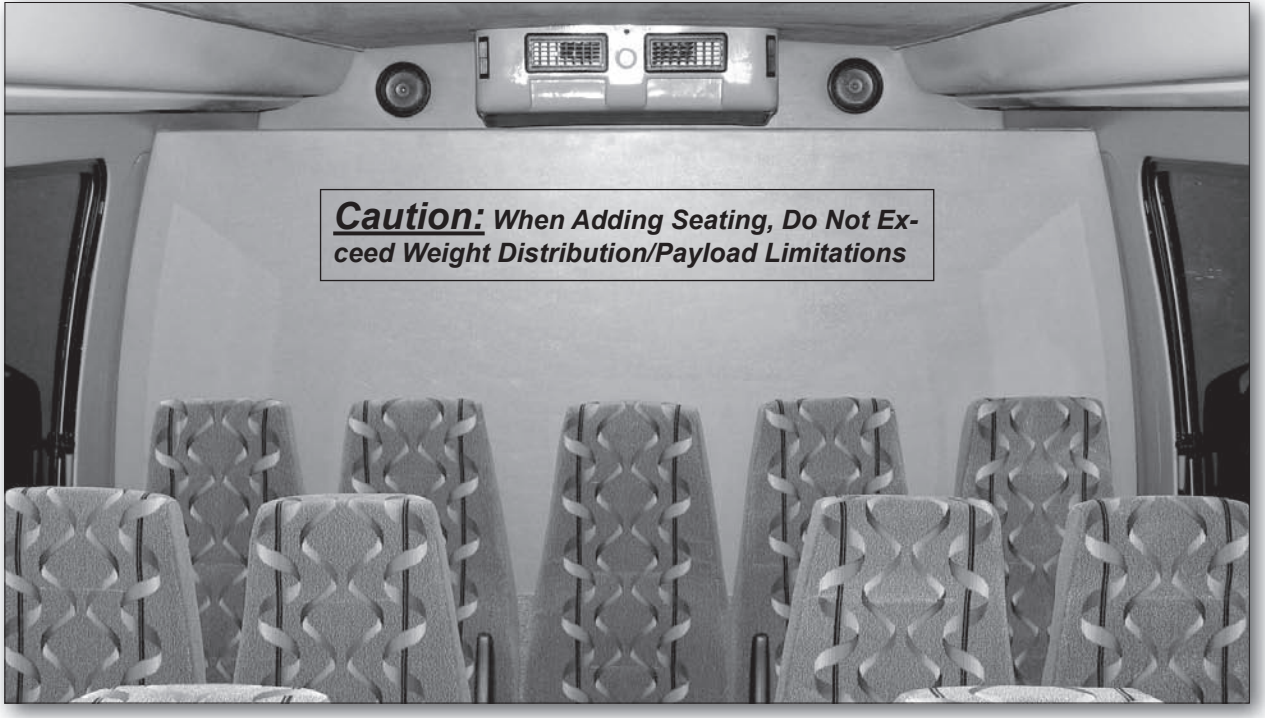
Standard Movable Wall - Front View



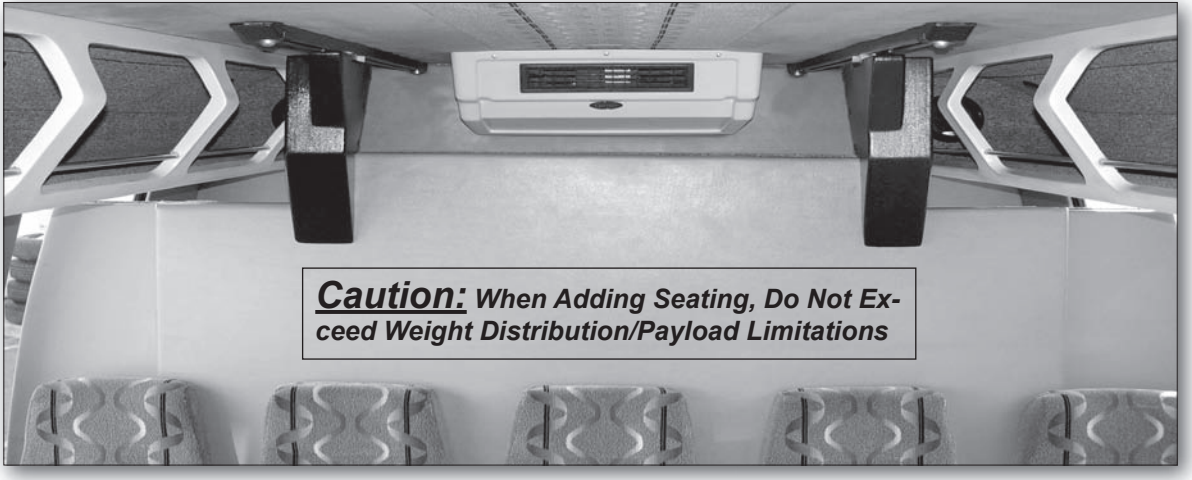
Movable Wall shown above in the forward position

Standard Movable Wall - Rear View

The standard movable wall can be moved by doing the following:

1. Remove the seats from in front of the wall
2. From the baggage compartment side, remove the plastic track cover on both the side wall and floor to expose the track.
3. Disengage the top latches at the outside corners of the wall.
4. From the front side of the wall, loosen the bolts.
5. With assistance on both sides of the wall, push evenly on both sides and slowly move the wall to the desired position.
6. When securing wall, make sure to re torque all bolts to 35 ft.. lbs. Note: if seats are installed, seat bolts must also be torqued to 35 ft.. lbs.
7. Replace all plastic track covers and engage top latches

E-Z Move Wall - Open Front



E-Z Move Wall Operating Instructions

Movable Wall to the open position (with luggage compartment)

1) Release the top two clamps located on the ceiling.
2) Enter bus through the rear door and release bottom clamp
3) Push the movable wall at the upper most centrally located handle to the stop
4) Release the divider clamp and slide out each divider half. Rotate the clamp assembly into the seat track and engage clamps. ***SAFETY ALERT***
5) Engage the top two clamps into the locked position ***SAFETY ALERT***

SAFETY ALERT

Clamps must be locked down before operating vehicle

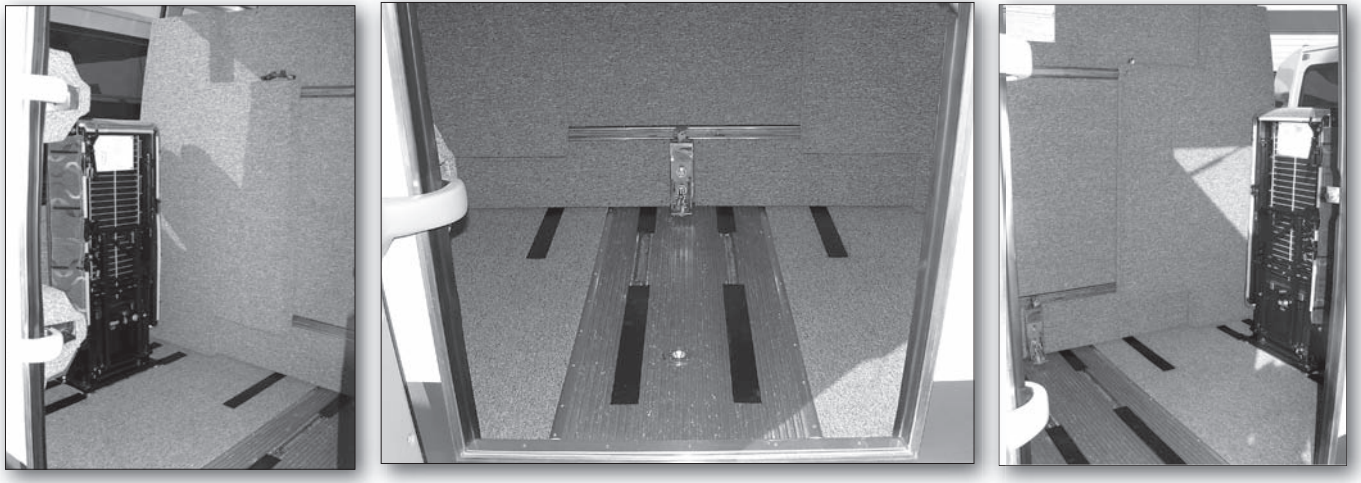
Movable Wall to the closed position (no luggage compartment)

1) Release the top two clamps located on the ceiling.
2) Enter bus through the rear door.
3) Release and rotate the clamp assembly (divider) out of the seat track. Slide the divider to the stop and engage the divider clamp to lock down the dividers.
4) Pull the movable wall at the upper most centrally located handle to the stop.
5) Engage the bottom clamp into the receiver located in the floor. ***SAFETY ALERT***
6) Close the rear door. Enter the bus, walk to the rear and engage the top two clamps into the locked position. ***SAFETY ALERT***

SAFETY ALERT

Clamps must be locked down before operating vehicle.

E-Z Move Wall - Open Rear

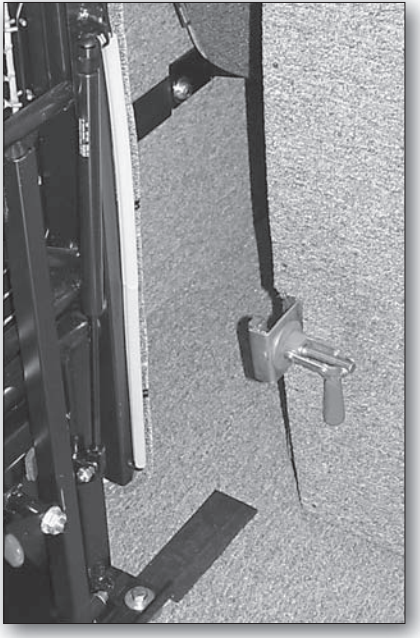


To Open and Close E-Z Move Wall

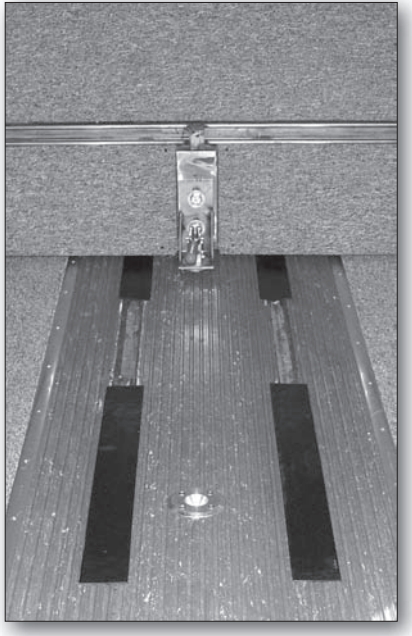
Instructions for Opening and Closing the E-Z Move Wall shown on the previous page, may also be found mounted on the back of the Movable Wall. Follow the instructions for Open Position - (with luggage compartment) or Close Position - (no luggage compartment)

SAFETY ALERT: ALL CLAMPS MUST BE LOCKED DOWN BEFORE OPERATING VEHICLE

E-Z Move Wall Clamp Assemblies



LH & RH Lower Clamp Assembly
(LH shown)

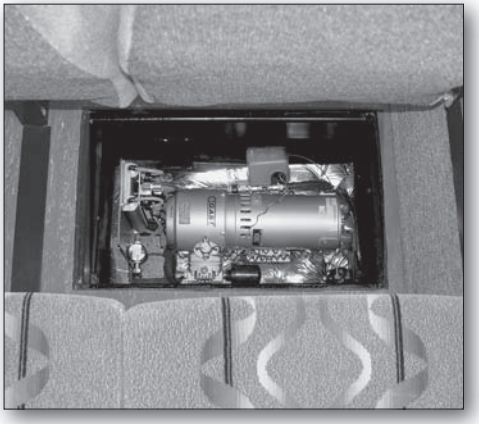


Center Lower Clamp Assembly

LH & RH Ceiling Clamp Assembly
(RH shown)

SAFETY ALERT: ALL CLAMPS MUST BE LOCKED DOWN BEFORE OPERATING VEHICLE

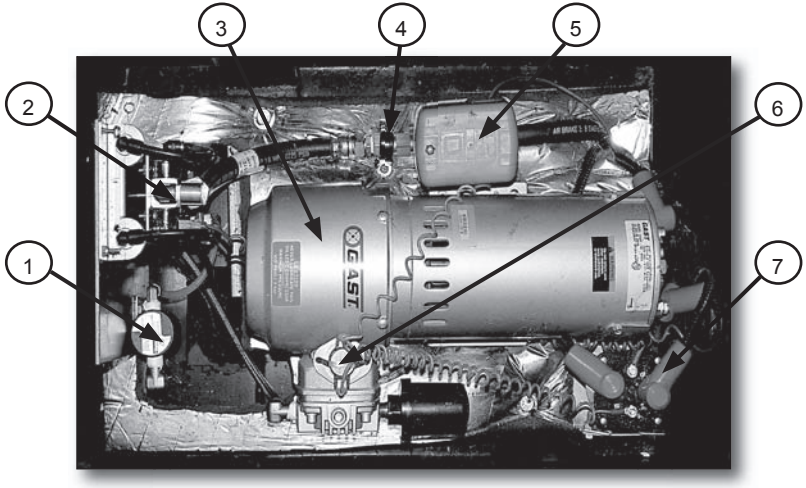
Compressed Air Supply Assembly



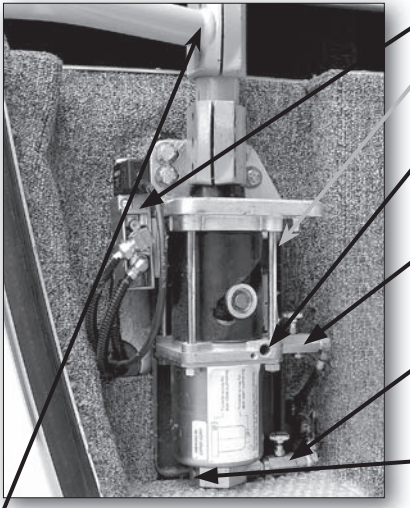
On the F-550 (shown above) The air supply compressor assembly is located beneath the floor hatch, between the passenger seats midway back on the right side of the vehicle.

On the E-450 the air supply compressor is located beneath the first right hand side passenger seat.

1	Pre-Filter
2	Air Dryer
3	Compressor
4	Check Valve
5	Pressure Switch
6	Over Temperature Sensor
7	Solenoid Switch



Air Operated - Single Plug Door



CAUTION! Never attempt adjustment of the Boomerang Arm, call KRYSTAL SERVICE

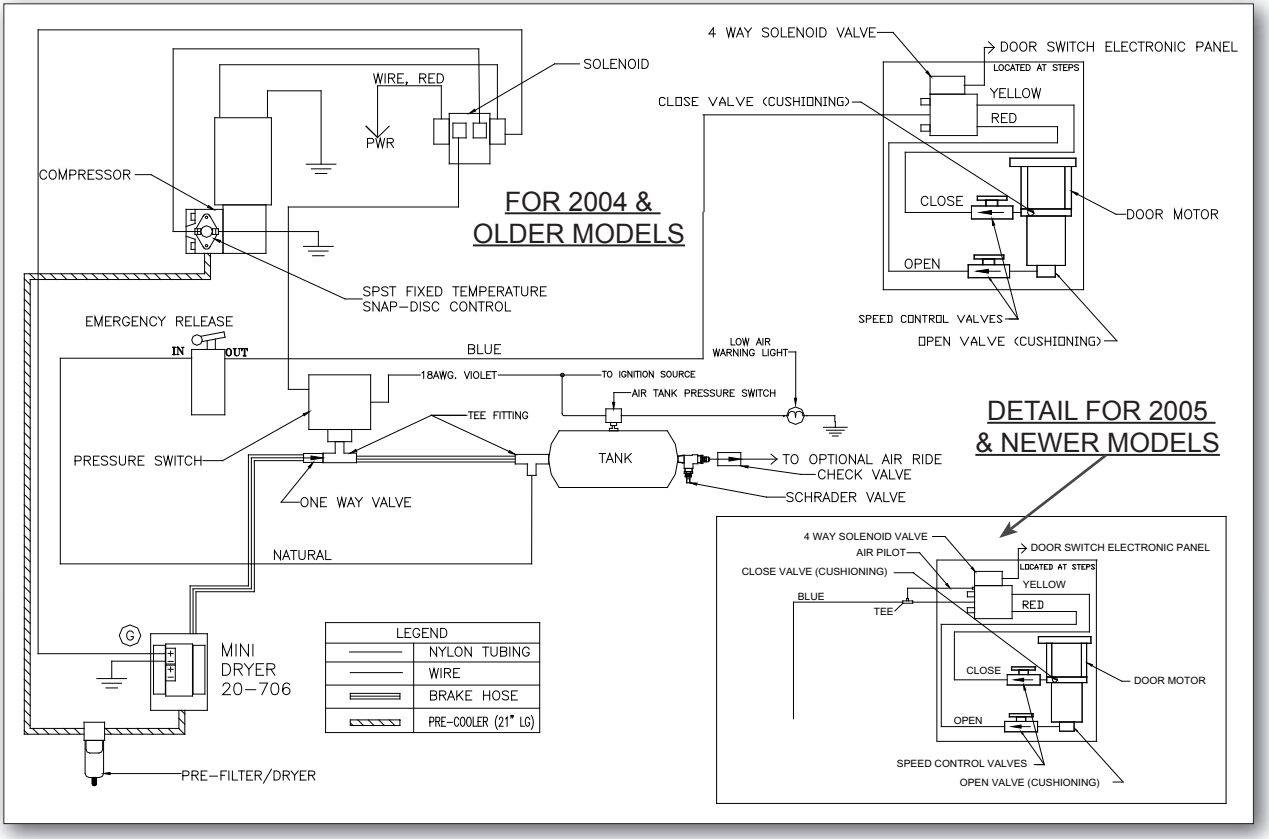
Single Plug Door System
(door shown partially open)

Secondary Entry Door Switch - used on air operated door systems, located on passenger door post

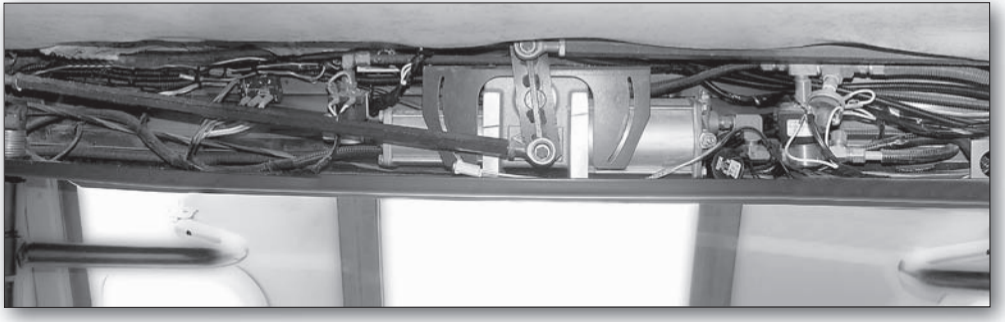
Air Door Speed Adjustment Procedure

1. Remove the air motor cover located in the stepwell.
2. Using the photo on this page, identify the speed control valves. Using a 3/8” wrench, loosen the locknuts on both valves.
3. Operate the door and adjust both valves until the opening and closing speeds are equal and acceptable. Then tighten both locknuts.
4. Using a flat blade screwdriver, adjust the opening and closing cushioning valves on the air motor, then replace cover.

Compressed Air Schematic - Single Plug Door



Air Operated - Double Plug Door



Secondary Entry Door Switch - used on air operated door systems, located on passenger door post

ATTN: Double Plug Air Door Speed Is Factory Set

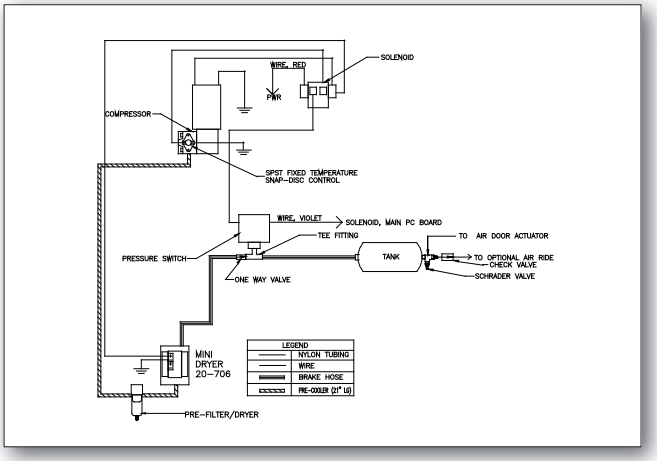
If adjustments become necessary, do not attempt adjustments.
Contact the Krystal Service Dept., at 1-800-Krystal (579-7825)

CAUTION!

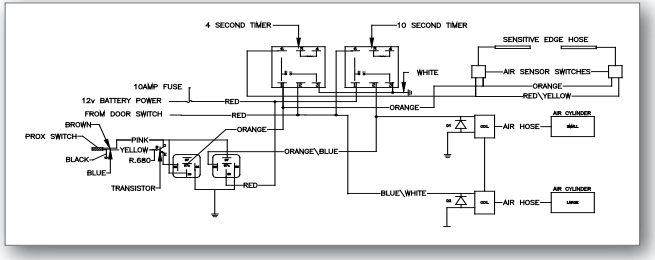
The Emergency Release Valve System - **(must be checked on a daily basis)**
Once the emergency release valve has been actuated (by turning counter clockwise), it should be possible to open the doors by pushing outward with your hand after about 5 seconds.

The Obstruction Sensing System (Sensitive Edge) - **(must be checked on a daily basis)**
Only when the door is closing, can reversing be actuated. The reversing motion should be shut off about 10 to 30 mm before the final closing position. If the reversing process actuates too late, the sensitivity of the differential pressure switch would require re-adjustment. Call the KRYSTAL SERVICE DEPT.

Compressed Air Schematic - Double Plug Doors



Air Schematic for Double Plug Doors



Electrical Schematic for Doors with Sensitive Edge

Double Plug Door System w/Sensitive Edge
(doors shown partially open)

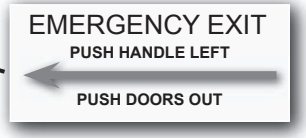
For Larger Schematics See Electrical Section pg 108-109

Electric Swing Doors

Electric door motor Cover

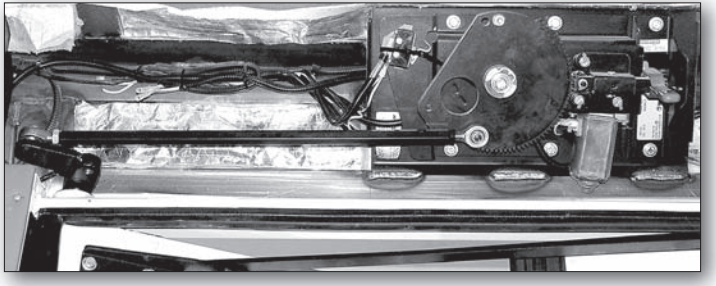
For removal of door motor cover

1. Remove black rubber strip from molding channel
2. Remove exposed screws in aluminum channel
3. Remove screws from 3 corners of cover



Emergency Exit Lever Decal

Electric door motor with control arm



NOTE:

LEVER MUST BE CHECKED DAILY, PRIOR TO VEHICLE OPERATION

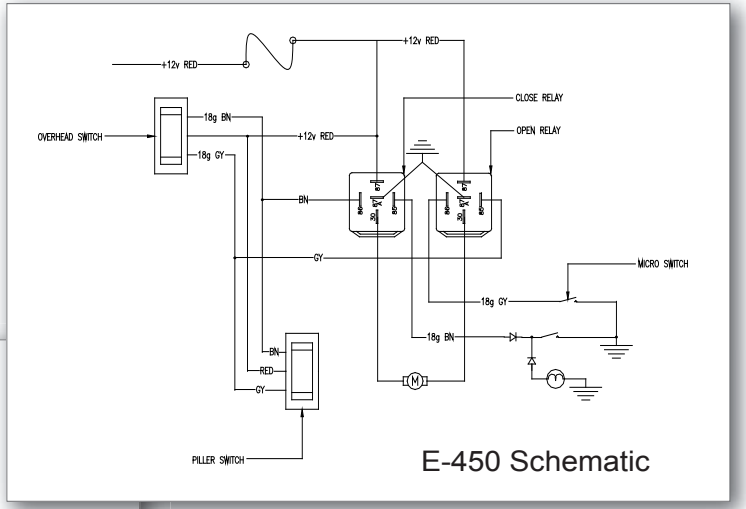
Electric Door Adjustment Procedure

Door Speed Is Factory Set

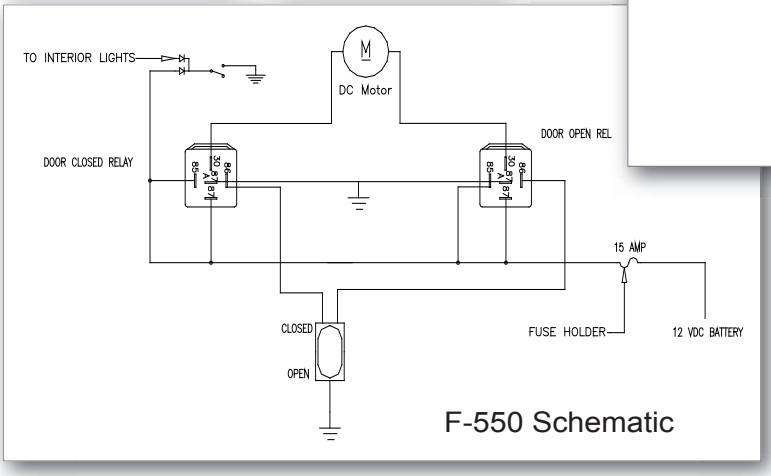
If adjustments become necessary, do not attempt adjustments. Contact the Krystal Service Dept., at 1-800-Krystal (579-7825)

Swing Door System - Electrical Schematic

Swing Door System



E-450 Schematic



F-550 Schematic

For Larger Schematics See Electrical Section pg110-111

Braun Rear Door Wheelchair Lift

User Instructions

Passenger Loading and Unloading

Do not exceed the 800 pound load capacity of the lift. Prior to lift operation, the lift should be inspected for proper function. ***If any problems exist***, DO NOT USE LIFT. Contact Braun Corp. at 1-800-THE LIFT for repair.

Passengers loading from the ground level, should back onto the platform. All passengers loading onto the platform, should be positioned fully within the yellow boundaries, facing outward from the vehicle, with the wheelchair locks locked, gripping handrails if able. Electric wheelchairs should be turned off.

UNFOLD The UNFOLD function deploys the lift from the upright position, with the platform extended flat at floor level, with the roll stop vertical.

FOLD The FOLD function raises the lift from the horizontal floor level position, bringing the platform back to a full upright position

DOWN The DOWN function lowers the platform to the ground level, and extends the roll stop to a flat position, for wheelchair egress.

UP The UP function raises the roll stop to full vertical position, before raising the platform from ground level to the floor level position for unloading.

C A U T I O N ! ***Never raise or lower lift if roll stop is malfunctioning***

C A U T I O N!

YOU MUST READ AND UNDERSTAND THE MANUFACTURERS OPERATORS MANUAL BEFORE EVER OPERATING THIS LIFT

Braun Rear Door Wheelchair Lift

Lift Closed

Lift Extended

Lift Lowered

Emergency Back-Up Operation

In the event of an electrical system failure, this lift system provides for full manual operation. Locate the back-up pump release valve, and the hand pump handle on the motor housing.

To Unfold the Platform 1. Place the slotted end of the pump handle onto the back-up pump release valve, and turn counterclockwise until the platform reaches floor level.

2. Turn the release valve clockwise to stop the platform (make sure valve is tight but not over tight)

To Lower Platform and Roll Stop

1. Repeat step 1 in the previous procedure to lower the lift to the ground level.

To Fold Roll Stop and Raise Platform

1. Place the slotted end of the pump handle onto the back-up pump release valve, and turn clockwise to close valve.
2. Insert handle into back-up pump, and pump until platform reaches floor level.

To Fold Platform Up

1. Repeat step 2 above until fully upright.

Note: ***Refer to Operator's Manual for Detailed Operating & Maintenance Procedures***

Ricon Rear Door Wheelchair Lift

Lift Motor Assy

ATTENTION!
When the green light is lit, the lift needs service

Basic User Instructions

Passenger Loading and Unloading

Do not exceed the 800 pound load capacity of the lift. Prior to lift operation, the lift should be inspected for proper function. ***If any problems exist***, DO NOT USE LIFT. Contact Ricon Corp. at 1-818-322-2884 for repair.

Passengers loading from the ground level, should back onto the platform. All passengers loading onto the platform, should be positioned centrally on the platform, facing outward from the vehicle, with the wheelchair locks locked, and restraint belt fastened. Electric wheelchairs should be turned off.

UNFOLD The UNFOLD function deploys the lift from the upright position, with the platform extended flat at floor level, with the roll stop vertical.

FOLD The FOLD function raises the lift from the horizontal floor level position, bringing the platform back to a full upright position

DOWN The DOWN function lowers the platform to the ground level, and extends the roll stop to a flat position, for wheelchair egress.

UP The UP function raises the roll stop to full vertical position, before raising the platform from ground level to the floor level position for unloading.

C A U T I O N ! ***Never raise or lower lift if roll stop is malfunctioning***

Back-up Pump

Pump Handle
(not shown)

Lift Control

Release Valve

C A U T I O N !

YOU MUST READ AND UNDERSTAND THE MANUFACTURERS OPERATORS MANUAL BEFORE EVER OPERATING THIS LIFT

Ricon Rear Door Wheelchair Lift

Lift Closed

Lift Extended

Lift Lowered

Emergency Back-Up Operation

In the event of an electrical system failure, this lift system provides for full manual operation. Locate the back-up pump release valve, and the hand pump handle on the motor housing.

To Deploy the Platform 1. Place the slotted end of the pump handle onto the back-up pump release valve, and turn counterclockwise ¼ turn until the platform reaches floor level.

2. Turn the release valve clockwise to stop the platform (make sure valve is tight but not over tight)

To Lower Platform and Roll Stop

1. Repeat step 1 in the previous procedure to lower the lift to ground level.

To Fold Roll Stop and Raise Platform

1. Place the slotted end of the pump handle onto the back-up pump release valve, and turn clockwise to close valve.

2. Insert handle into back-up pump, and pump until platform reaches floor level.

To Stow Platform Up

1. Repeat step 2 above until fully upright.

***Note:* Refer to Operator's Manual for Detailed Operating & Maintenance Procedures**

Braun UVL 600X Series Under Vehicle Wheelchair Lift

User Instructions

Passenger Loading and Unloading

Do not exceed the 750 pound load capacity of the lift. Prior to lift operation, the lift should be inspected for proper function. ***If any problems exist,*** DO NOT USE LIFT. Contact Braun Corp. at 1-800-THE LIFT for repair.

Passengers loading from the ground level should back onto the platform. All passengers loading onto the platform, should be positioned in the center of the platform, **facing outward from the vehicle**, with the wheelchair locks locked.

UP The UP function deploys the lift from stow position, and raises the platform to floor level.

DOWN The DOWN function deploys the lift form the stowed position, lowers the platform to ground level and lowers the front barrier after reaching the ground.

STOW The STOW function raises or lowers the platform to the stowed level, and then moves it inward to the stow position.

DOOR CLOSE (Optional) The DOOR CLOSE function only operates when automatic door openers are installed. The function only operates when the platform is stowed or fully extended at ground level.

CAUTION!

YOU MUST READ AND UNDERSTAND THE MANUFACTURERS OPERATORS MANUAL BEFORE EVER OPERATING THIS LIFT

Braun Under Vehicle Wheelchair Lift

Lift Closed

Lift Extended

Lift Lowered

Lift Raised

Emergency Back-Up Operation

In the event of an electrical system failure, the UVL system provides for full manual operation. Locate the manual release cable, manual down valve, and the hand pump on the power pack.

To move platform from STOW, pull the manual release cable. Twist the "T" handle to lock in the released position. The platform can now be pulled outward.

To raise the platform, make sure the manual down valve is turned fully clockwise. Pump the hand pump handle until you reach the desired platform height.

To lower the platform, turn the manual down valve SLOWLY counter-clockwise to lower the platform. **To lower the front barrier**, remove the release pin at the barrier actuator end. Lift will not continue operating unless release pin is re-inserted fully. **To move platform to STOW position**, first be sure the platform is at STOW height. Pull and lock the manual release cable. Push the platform inward to re-engage release cable mechanism.

***Note:* Refer to Service Manual for Maintenance, Adjustment, and Trouble Shooting Procedures**

Standard Chassis Specification for E450 Super Duty RV Cutaway

Chassis	E-450 Super Duty RV Cutaway
GVWR - Total	14,050 lbs
Front Axle	Twin I-Beam
Front Springs	Coil - Computer Selected
Stabilizer Bar	Front & Rear
Rear Axle Type	Full Floating
Rear Axle Ratio	Gas=4.63 Diesel=4.10
Rear Springs	Leaf
Shock Absorbers	Gas Pressurized
Engines	6.8 Liter Triton EFE V-10 Gas 6.0 Liter Power Stroke V-8 Diesel
Fast Idle Controller	Gas - Penntex Diesel - Ford or InterMotive
Transmission	Torque Shift 5-Speed Automatic w/Tow Haul Mode
Alternator	Gas - Pentex 200 Amp
	Diesel - Ford Dual 110 Amp
Batteries - Chassis	Dual 84 & 63 AMP HR, 1400 CCA
Batteries - Coach	Single 112 AMP HR, 800 CCA Deep Cycle Marine

Standard Chassis Specification for E450 Super Duty RV Cutaway

Steering	Power Assisted
Steering Column	Locking, Energy Absorbing, Tilt w/ Cruise Control
Brakes	4 Wheel ABS Power Disc Brakes
Fuel Tank	55 Gallon
Cab Paint	Oxford White
Glass	Tinted All Windows, Power Assisted Door
Lights	Halogen Sealed Beam Headlights
Air Conditioner	8,000 BTU Cab with R-134a
Heater/Defroster	4-Speed Fan
Safety	3-Point Shoulder/ Lap Belts
Air Bags	Dual Safety Restraint System
Windshield Wipers	Intermittent
Gauges/Instrumentation	Voltmeter, Oil Pressure, Temperature, Fuel Gauge
Mirrors	Heated/ Power Remote 10” x 7”
Tires	LT225/75R16
Wheels	16.5” 8 - Hole, Stamped Steel
Wheelbase	KK22=158”, KK24=176”, KK28=209”

Standard Equipment on E450 Shuttle Buses

- 6.8 Liter Fuel Injected V-10 Gas Engine
- Power Steering
- 4-Wheel ABS Power Disc Brakes
- Heavy Duty Dual Batteries
- Electronic 4-Speed Auto Transmission
- Radial Tires LT225/75R16
- 50 States Emissions
- 55 Gallon Fuel Tank
- Adjustable Tilt Steering Wheel
- Cruise Control
- Engine Oil Cooler
- Transmission Oil Cooler
- Automatic High Idle Controller
- Drive Shaft Guards
- .063 Aluminum Exterior Side Walls
- Welded Steel Cage Frame
- Cab Running Boards
- Captains Chairs - Driver/Co-Pilot
- 3/4” Resin Laminated Floor
- 2” Fiberglass Insulation
- Commercial Grade Carpet
- Ribbed Rubber Aisle
- Mid-High Seats with Level 3 Fabric
- 53,000 BTU A/C System
- AM/FM Stereo Cassette w/CD & Clock
- Power Cab Door Locks
- Power Cab Windows
- Back-up Alarm
- Valance Lighting
- Air Actuated Sedan Entry Door
- Full Body Undercoating
- Base White Body Color
- Power Remote/Heated Mirrors
- 80% Tinted Windows w/UV Protection
- 200 Amp Alternator (Gas)
- Dual 110 Amp Alternator, (Diesel)
- Brake Interlock (for wheelchair only)
- S/S Wheel Inserts
- Movable Luggage Partition (KK28)
- Rear Luggage Door w/Electric Step (KK28)
- Sedan Style Wheelchair Lift Door (KK22W & KK24W)

Standard Chassis Specification for F550 Super Duty Cab & Chassis

GVWR - Total	19,000 lbs
Front Axle	Mono-Beam
Front Springs	Twin Coil
Stabilizer Bar	Front & Rear
Rear Axle Type	Full Floating
Rear Axle Ratio	4.88 (Gas & Diesel)
Rear Springs	Leaf, Single Stage, Constant Rate & Auxiliary
Shock Absorbers	HD Gas Pressurized
Engines	6.8 Liter Fuel Injected V-10 Gas Engine 6.0 Liter Power Stroke V-8 Diesel
Fast Idle Controller	Gas - Penntex
	Diesel - Ford or InterMotive
Transmission	Torque Shift 5-Speed Automatic w/Tow Haul Mode
Alternator	Gas - Pentex 200 Amp
	Diesel - Ford Dual 110 Amp
Batteries - Chassis	Dual Maintenance Free 78 Amp Hr, 1300 CCA
Batteries - Coach	Single 112 AMP HR, 800 CCA Deep Cycle Marine

Standard Chassis Specification for F550 Super Duty Cab & Chassis

Steering	Power Assisted
Steering Column	Locking, Energy Absorbing, Tilt w/ Cruise Control
Brakes	4 Wheel ABS Power Disc Brakes
Fuel Tank	40 Gallon w/19 Gallon Aux. Tank
Cab Paint	Oxford White
Glass	Tinted All Windows, Power Assisted Door
Lights	Halogen Sealed Beam Headlights
Air Conditioner	8,000 BTU Cab with R-134a
Heater/Defroster	4-Speed Fan
Safety	3-Point Shoulder/ Lap Belts w/Adjustable D-Rings
Air Bags	Dual Safety Restraint System
Windshield Wipers	Intermittent
Gauges/Instrumentation	Tachometer, Trip Odometer, Voltmeter, Oil Pressure, Coolant Temperature, Fuel Gage, Indicator Lights
Mirrors	Heated/ Power Remote 10” x 7”
Tires	LT225/70R19.5
Wheels	19.5” 8 - Hole, 8-Lug Steel
Wheelbase	KK30=218”, KK33=250 ⅜”

Standard Equipment on F550 Shuttle Buses

- 6.8 Liter Fuel Injected V-10 Gas Engine
- Power Steering
- 4-Wheel ABS Power Disc Brakes
- Heavy Duty Dual Batteries
- Electronic 4-Speed Auto Transmission(gas only)
- Radial Tires LT225/70R19.5
- 50 States Emissions
- 40 Gallon Fuel Tank w/19 Gallon Aux. Tank
- All Season Radial Tires LT225/75R16F
- Adjustable Tilt Steering Wheel
- Cruise Control
- Engine Oil Cooler
- Transmission Oil Cooler
- Automatic High Idle Controller
- Drive Shaft Guards
- .063 Aluminum Exterior Side Walls
- Welded Steel Cage Frame
- Cab Running Boards
- Captains Chair Driver & Co-Pilot
- 3/4" Resin Laminated Floor
- 2" Batted Fiberglass Insulation
- Commercial Grade Carpet
- Ribbed Rubber Center Aisle
- Mid-High Seats with Level 3 Fabric
- 68,000 BTU A/C System w/Dual Compressors
- AM/FM Stereo Cassette
- Power Cab Door Locks
- Power Cab Windows
- Back-up Alarm
- Valance Lighting
- Air Actuated Sedan Style Entry Door
- Full Body Undercoating
- Base White Body Color
- Power Remote Side View Mirrors
- 80% Tinted Windows w/UV Protection
- 200 Amp Alternator (Gas)
- Dual 110 Amp Alternator, (Diesel)
- Vented Emergency Escape Hatch
- S/S Wheel Inserts
- Movable Luggage Partition (KK30/KK33)
- Rear Luggage Door w/Electric Step (KK30/KK33)
- Sedan Style Wheelchair Lift Door (KK30W & KK33W)

General Vehicle Dimensional Specifications-Body & Chassis by Model

Features ↓ Models →	KK22	KK24	KK28	KK30	KK33
GVWR	14,050 #	14,050 #	14,050 #	19,000 #	19,000 #
Wheelbase	158”	176”	209”	218”	250”
Overall Length	23’ 0”	25’ 6”	28’ 3”	30’ 8”	33’ 6”
Turning Radius	28’ 5”	30’ 6”	35’ 7”	37’ 1”	37’ 2”
Interior Body Length (without Luggage)	178”	204”	226”	242”	274”
Clear Door Opening - Luggage Door	30½” x 64½”	30½” x 64½”	30½” x 64½”	30½” x 64½”	30½” x 64½”
Clear Door Opening - Single Plug	29½” x 81”	29½” x 81”	29½” x 81”	29½” x 81”	29½” x 81”
Clear Door Opening - Double Plug	40½”	40½”	40½”	40½”	40½”
Clear Door Opening - Swing Doors	42”	42”	42”	42”	42”
Clear Door Opening - Wheelchair Lift Door	42” x 73¾”	42” x 73¾”	42” x 73¾”	42” x 73¾”	42” x 73¾”
Exterior Height	112”	112”	112”	114”	114”
Exterior Width (excluding Mirrors)	96”	96”	96”	96”	96”
Exterior Width (including Mirrors)	111”	111”	111”	111”	111”
Interior Width - at Floor	89½”	89½”	89½”	89½”	89½”
Interior Width - at Shoulder	92”	92”	92”	92”	92”
Aisle Width	18”	18”	18”	18”	18”

General Vehicle Dimensional Specifications-Body & Chassis by Model (cont)

Features ↓ Models →	KK22	KK24	KK28	KK30	KK33
Seat Cushion Length	18”	18”	18”	18”	18”
Floor Height from Ground at Rear	31”	31”	31”	33”	33”
1st Step from Ground	11¾”	11¾”	11¾”	12½”	12½”
Riser Height	6¾”	6¾”	6¾”	9½”	9½”
Step Height	10¾”	10¾”	10¾”	12½”	12½”
Movable Wall Depths(approx)- E-450	36-40”	30-32”	28-36”	N/A	N/A
Movable Wall Depths(approx)- F-550	N/A	N/A	N/A	29-63”	30-54”
UVL Wheelchair Lift Door Opening	N/A	N/A	N/A	42”	42”

General Body Materials and Construction Measurements

Size of Steel Tubing used in Body Sidewall & Roof Structure	1” x 1”
Center line Spacing of Tubing used in Body Sidewall & Roof Structure	32”
Gauge of Steel Tubing used in Body Sidewall & Roof Structure	16
Aluminum Sidewall Material	.063
One Piece Aluminum Roofing Material	.040
Size of Steel Tubing used in Main Floor Structure	2” x 4”
Center line Spacing of Tubing used in Floor Structure	32” max.
Gauge of Steel Tubing used in Floor Structure	12
Thickness of Double Backed Insulated Fiberglass Batting Insulation	2”
Window Size	32 x 40”

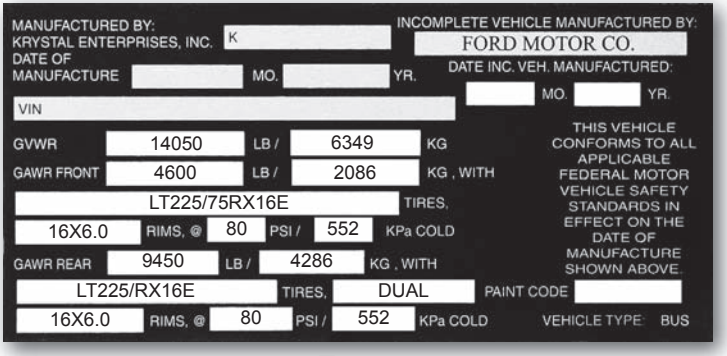
Air Conditioning Charging Chart

MODEL BY BTU'S	VENTING	FREON CHARGE
E40 Bus 1999 with ACC A/C		
68,000 BTU	4 vents	5.50 lbs.**
86,000 BTU	6 vents	6.0 lbs.**
40,000 BTU **w/ FACTORY TIE IN**	w/factory tie in	11.0 lbs.**
F550 Bus 2000 with ACC skirt condenser		
68,000 BTU	4 vents	5.50 lbs.**
86,000 BTU	6 vents	6.00 lbs.**
40,000 BTU **w/ FACTORY TIE IN**	w/factory tie in	11.50 lbs**
F550 ALL with ACC front condenser		
68,00 BTU	4 vents	4.25 lbs.**
40,000 BTU **w/ FACTORY TIE IN**	w/factory tie in	11.50 lbs.**
E450 2000 with Carrier A/C		
68,000 BTU	add on unit	5.00 lbs.**
40,000 BTU **w/ FACTORY TIE IN**	w/factory tie in	5.50 lbs.**
Roof Top Carrier A/C	Ducted	7.0 lbs.** per compressor
E450 w/ACC 2004-2005 Models		
68,000 BTU	4 vents	5.25 lbs**.
40,000 BTU **w/ FACTORY TIE IN**	2 vents	10.0 lbs.**

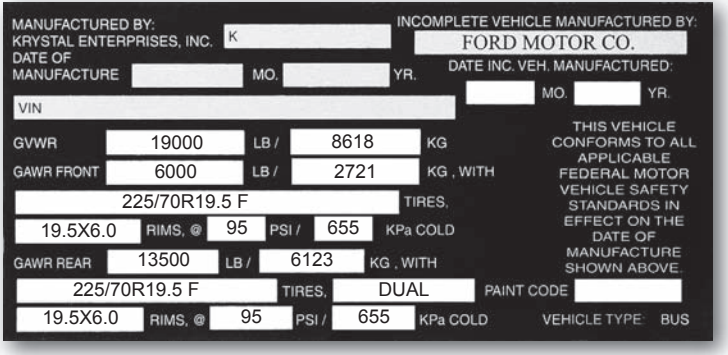
**NOTE: These figures may vary depending on atmospheric conditions

Vehicle Manufacturers Identification Label

E-450



F-550



LABEL EXPLANATION

K # - This is your permanent Krystal Vehicle Identification number.

VIN # - This is your DMV Vehicle Identification Number.

GVWR -This is the gross rated weight capacity of your vehicle

GAWR Front -This is the rated weight capacity of the front axle

GAWR Rear -This is the rated weight capacity of the rear axle

Date Incomplete Vehicle Manufactured - This is the date the chassis was produced by FORD

Date Of Manufacture by Krystal - This is the date the vehicle was completed by KRYSTAL.

Paint Code - This is the master number for the paint specification and color used on your vehicle.

Tires, Rims - This indicates the required tire and rim sizes, and air capacities for your specific vehicle.

Note:

All ½" bolt/nut assemblies joining the Ridewell hangers to the FORD frame must be torqued to 120 ft. lbs. (dry) or 90 ft. lbs (lubricated)

If any bolts are found to be loose or damaged, replace with ½"-20 SAE GRADE 8 hardware.

This sticker is located on your chassis suspension.

RIDEWELL SUSPENSION TORQUE CHART			
BOLT SIZE	LUBRICATED THREADS		
1 ½"	HANGER	1,100 FT -LB	(1490 N-m)
1 ¼"	HANGER	750 FT -LB	(1020 N-m)
1 ⅛"		500 FT -LB	(680 N-m)
1"	GRADE 5	360 FT -LB	(490 N-m)
1"	GRADE 8	460 FT -LB	(625 N-m)
⅞"		350 FT -LB	(475 N-m)
¾"	GRADE 5	160 FT -LB	(220 N-m)
¾"	GRADE 8	190 FT -LB	(260 N-m)
⅝"		100 FT -LB	(135 N-m)
*¾"		50 FT -LB	(70 N-m)
*½"		25 FT -LB	(35 N-m)
*AIR SPRING CONNECTION ONLY			
After suspension has been in operation for approximately 6,000 miles (10,000 KLMS), all fasteners must be re-tightened to specified torque. Repeat every 15,000 miles (25,000 KLMS) **DO NOT OVER TORQUE!**			

PREVENTATIVE MAINTENANCE SCHEDULE

The following Maintenance Schedule is provided as a convenient reference for the specified systems and components, which require periodic service.

These schedules are not intended to be a complete list of all possible services to be performed on a regular basis, nor is it suggested that more frequent services not be considered.

Because of the different types of operations coaches are subjected to, the severity of service must be considered when establishing maintenance intervals. Therefore, any such intervals given in the following schedule must be adjusted according to the particular type of operation in which your particular vehicle will be used. The intervals given are Krystal Enterprises, Inc. recommendations and should be considered as maximum intervals. It should be noted that maintenance inspection and service operations of shorter intervals are always preferable to longer intervals.

PREVENTIVE MAINTENANCE SCHEDULE

THE FOLLOWING PAGES SPECIFY THE MINIMUM REQUIREMENTS THAT ARE NECESSARY TO PROPERLY MAINTAIN YOUR VEHICLES SYSTEMS AND COMPONENTS

CHECK EVERY DAY:

- ► all items on Pre-Trip inspection (see page 8)
- ► side passenger door emergency release valve operation
- ► side passenger entry door, operation, locking, damage, and adjustment
- ► emergency roof hatch
- ► emergency egress window latches
- ► function of all interior and exterior lights
- ► check all seat belts for proper operation
- ► tire pressure, E-450 80 psi, F-550 95 psi
- ► fluid leaks from, transmission, engine, power steering, engine coolant, gear oil, fuel

CHECK EVERY MONTH:

- ► windshield washer fluid level
- ► and drain fuel filter/water separator
- ► door linkage and pivot arm lubrication
- ► and lube rear Kwikee step, (if equipped)
- ► and clean air intake filter for A/C system
- ► tires for wear, and tread depth

PREVENTIVE MAINTENANCE SCHEDULE

AT 5,000 MILES/600 HOURS DO THE FOLLOWING:

- ► change engine oil and replace filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► inspect torque specifications on Ridewell Suspension System
- ► lube door seals with silicon spray, check for proper sealing
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems

AT 10,000 MILES/1200 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► clean battery terminals
- ► check the torque of all door hardware on Vapor door systems

AT 15,000 MILES/1800 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires

PREVENTIVE MAINTENANCE SCHEDULE

- ► inspect engine air filter
- ► replace engine and frame mounted fuel filters
- ► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
- ► inspect engine cooling system and hoses
- ► inspect brake system
- ► inspect exhaust system and heat shields
- ► inspect automatic transmission fluid and external filter element
- ► check wheels for end play and noise
- ► inspect and lubricate 4 x 2 ball joints (E-450 only)
- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped
- ► re-inspect torque settings on Ridewell Suspension System
- ► clean air compressor intake filter
- ► lube door seals with silicon spray, check for proper sealing
- ► check air system for leaks, and electrical connections
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems

AT 20,000 MILES/2400 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth

- ► rotate tires
- ► inspect engine air filter
- ► clean battery terminals
- ► check the torque of all door hardware on Vapor door systems

AT 25,000 MILES/3000 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► check the torque of all door hardware on Vapor door systems
- ► clean condenser coils

AT 30,000 MILES/3600 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► replace engine air filter
- ► replace engine and frame mounted fuel filters
- ► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
- ► inspect engine cooling system and hoses

PREVENTIVE MAINTENANCE SCHEDULE

- ► inspect brake system
- ► inspect exhaust system and heat shields
- ► change automatic transmission fluid and external filter element
- ► check wheels for end play and noise
- ► inspect and lubricate 4 x 2 ball joints (E-450 only)
- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped
- ► clean air compressor intake filter
- ► clean battery terminals
- ► lube door seals with silicon spray, check for proper sealing
- ► re-inspect torque settings on Ridewell Suspension System
- ► check air system for leaks, and electrical connections
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems
- ► inspect drive belts and replace if necessary

AT 35,000 MILES/4200 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires

► inspect engine air filter
► check the torque of all door hardware on Vapor door systems

AT 40,000 MILES/4800 HOURS DO THE FOLLOWING:
► change engine oil and replace oil filter
► inspect tires for wear and inspect tread depth
► rotate tires
► inspect engine air filter
► clean battery terminals
► check the torque of all door hardware on Vapor door systems

AT 45,000 MILES/5400 HOURS DO THE FOLLOWING:
► change engine oil and replace oil filter
► inspect tires for wear and inspect tread depth
► rotate tires
► inspect engine air filter
► replace engine and frame mounted fuel filters
► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
► inspect engine cooling system and hoses
► inspect brake system
► inspect exhaust system and heat shields
► check wheels for end play and noise

PREVENTIVE MAINTENANCE SCHEDULE

- ► inspect and lubricate 4 x 2 ball joints (E-450 only)
- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped
- ► clean air compressor intake filter
- ► lube door seals with silicon spray, check for proper sealing
- ► re-inspect torque settings on Ridewell Suspension System
- ► check air system for leaks, and electrical connections
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems

AT 50,000 MILES/6000 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► clean battery terminals
- ► check the torque of all door hardware on Vapor door systems
- ► clean condenser coils

AT 55,000 MILES/6600 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter

- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► check the torque of all door hardware on Vapor door systems

AT 60,000 MILES/7200 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► replace engine and frame mounted fuel filters
- ► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
- ► inspect engine cooling system and hoses
- ► inspect brake system
- ► inspect exhaust system and heat shields
- ► change automatic transmission fluid and external filter element
- ► check wheels for end play and noise
- ► lubricate 4 x 4 hub needle bearings
- ► lubricate 4 x 2 wheel bearings
- ► replace wheel bearing grease seal
- ► inspect and lubricate 4 x 2 ball joints (E-450 only)

PREVENTIVE MAINTENANCE SCHEDULE

- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped
- ► clean air compressor intake filter
- ► clean battery terminals
- ► lube door seals with silicon spray, check for proper sealing
- ► re-inspect torque settings on Ridewell Suspension System
- ► check air system for leaks, and electrical connections
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems
- ► inspect drive belts and replace if necessary

AT 65,000 MILES/7800 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► check the torque of all door hardware on Vapor door systems

AT 70,000 MILES/8400 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter

- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► clean battery terminals
- ► check the torque of all door hardware on Vapor door systems

AT 75,000 MILES/9000 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► replace engine and frame mounted fuel filters
- ► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
- ► inspect engine cooling system and hoses
- ► inspect brake system
- ► inspect exhaust system and heat shields
- ► check wheels for end play and noise
- ► inspect and lubricate 4 x 2 ball joints (E-450 only)
- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped clean air compressor intake filter

PREVENTIVE MAINTENANCE SCHEDULE

- ► lube door seals with silicon spray, check for proper sealing
- ► re-inspect torque settings on Ridewell Suspension System
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems
- ► clean condenser coils

AT 80,000 MILES/9600 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► clean battery terminals
- ► check air system for leaks, and electrical connections
- ► check the torque of all door hardware on Vapor door systems

AT 85,000 MILES/10200 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► check the torque of all door hardware on Vapor door systems

AT 90,000 MILES/10800 HOURS DO THE FOLLOWING:

- ► change engine oil and replace oil filter
- ► inspect tires for wear and inspect tread depth
- ► rotate tires
- ► inspect engine air filter
- ► replace engine and frame mounted fuel filters
- ► inspect steering linkage, suspension, ball joints, driveshafts, and driveshaft guards
- ► inspect engine cooling system and hoses
- ► inspect brake system
- ► inspect exhaust system and heat shields
- ► check wheels for end play and noise
- ► inspect and lubricate 4 x 2 ball joints (E-450 only)
- ► inspect and lubricate steering idler arms
- ► replace cabin air filter, if equipped
- ► inspect half shaft boots, if equipped clean air compressor intake filter
- ► clean battery terminals
- ► lube door seals with silicon spray, check for proper sealing
- ► re-inspect torque settings on Ridewell Suspension System
- ► check air system for leaks, and electrical connections
- ► lube Vapor door rotary drive mechanism
- ► check the torque of all door hardware on Vapor door systems

► inspect drive belts and replace if necessary

AT 95,000 MILES/11400 HOURS DO THE FOLLOWING:

► change engine oil and replace oil filter
► inspect tires for wear and inspect tread depth
► rotate tires
► inspect engine air filter
► check the torque of all door hardware on Vapor door systems

AT100,000 MILES/12000 HOURS DO THE FOLLOWING:

► change engine oil and replace oil filter
► inspect tires for wear and inspect tread depth
► rotate tires
► inspect engine air filter
► clean condenser coils
► clean battery terminals
► check the torque of all door hardware on Vapor door systems

SUPPLEMENTARY PREVENTIVE MAINTENANCE INFORMATION

In addition to the required Preventative Maintenance information included in the previous schedule, the following specific exceptions should be noted.

Yellow Coolant:
Must be changed every 5 years or 100,000 miles (whichever comes first), then after initial change, every 3 years or 50,000 miles.

Rear Axle Lubricant:
Must be changed every 50,000 miles

Transfer Case Fluid:
Must be replaced every 60,000 miles

Change Rear Wheel Drive Axle Fluid:
On Dana axles using synthetic fluid, fluid must be changed every 150,000 miles

Check your FORD Owner's Guide Supplement, for special operating condition maintenance requirements, that may be applicable due to your specific vehicle operating profile.

User Notes - Preventive Maintenance

Additional User Notes	Additional User Notes

Basic Troubleshooting Guide

The following section details basic troubleshooting techniques that will help you to understand and determine the best course of action regarding some commonly encountered problems.

PROBLEM	POSSIBLE SOLUTIONS
VIBRATION: Noises or Vibration at high speeds only, or in a certain range of speeds:	A certain range of speeds indicates a damaged or otherwise out-of-balance drive line, Contact the Service Dept. Only SELECT drive line shops that are qualified to properly balance the multiple drive line extensions used in your bus. The Krystal Service Dept. can recommend one near you.
REAR A/C BLOWER INOPERATIVE	Check to make sure the FORD front A/C unit is on. If the rear A/C is still not working, call the Krystal Service Dept.
MOVING CARGO PARTITION TO ADD ADDITIONAL SEATING ***Caution: Do Not Exceed Weight Distribution/Payload Limitations***	Remove seats in front of the Partition Wall and loosen all four bolts securing the wall. Then go behind the wall and remove the channel nut on the floor, this will allow the wall to be move back and then additional seating can be installed. Note: torque Seat Bolts to 35 ft. lbs.
EXTERIOR LIGHTING	E-450: One or all exterior clearance lights inoperative, please refer to the FORD wiring schematic in the Krystal Electrical Schematic Manual F-550: Exterior running lights work off of the Krystal relay board.
SLIDER WINDOWS HARD TO OPEN AND CLOSED	If any of the windows start to stick during opening or closing, simply spray both side tracks with silicone spray and work the windows a few times to lubricate the tracks. This should be done approximately every three months.

Basic Troubleshooting Guide

PROBLEM	POSSIBLE SOLUTIONS
PAGING SYSTEM INOPERATIVE	Check the 5 amp fuse on the circuit board above the driver. Wiring schematics and instructions for the paging system are located in this manual on page 23.
NO TELEVISION RECEPTION	If the TV has power, but you cannot pickup any stations, make sure VCP mode button on the P.A. System is engaged and the VCP power button is engaged.
REAR VCP & TV INOPERATIVE	Check to make sure all connections on the back of both units are tight. Check the fuse located at the front face of the TV, and on the backside of the VCP.
EXTERIOR SEALANTS CRACKING OR LIFTING	If the exterior seams of the bus ever crack or start lifting, simply clean the area with rubbing alcohol or mineral spirits completely. After this has been done you can remove the old silicone by using a sharp knife or razor cutter. Clean the area again with the above cleaners and apply a thin bead of white exterior silicone and smooth the bead with your finger for a smooth appearance.
REAR ELECTRIC STEP INOPERATIVE	Check to make sure the step switch is turned on. This switch is located inside the cargo area on the right hand sidewall. If this will not power up the step, call the Krystal Service Dept. The rear step should be lubricated every 30 days to ensure proper operation of the step.
REAR STEREO/CD INOPERATIVE	Check to make sure all connections are tight. Also remove the stereo and check the fuse located on the backside of the stereo.

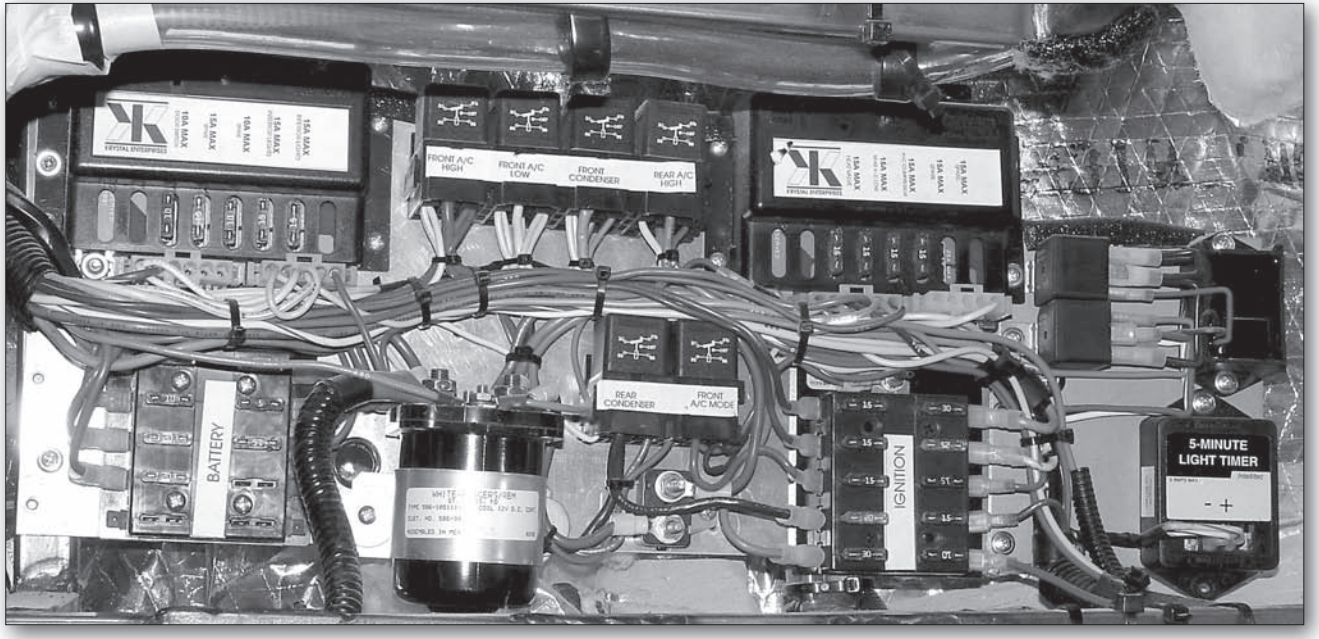
Basic Troubleshooting Guide

PROBLEM	POSSIBLE SOLUTIONS
CANNOT REMOVE WATER FROM LAVATORY	Make sure fresh water tank has water in it and the water pump switch is in the on position. NOTE: Always be sure to turn the water pump switch off when not in use. Failure to do so could cause a steady drain on the auxiliary battery or could cause damage to the water pump. The fresh water fill is located under the bus at the rear of the vehicle.
PASSENGER LIGHTS INOPERATIVE	Check to make sure the switch on the overhead control panel is turned on. NOTE: There is a 5 minute light timer for the interior lights which will automatically turn them off when the door is open. The interior light switch needs to be turned on for at least 10 seconds to reset the timer.
BACK-UP ALARM INOPERATIVE	Check to make sure reverse lights are coming on, if not, check the fuse located in the FORD fuse panels.

Troubleshooting Notes

PROBLEM	POSSIBLE SOLUTIONS

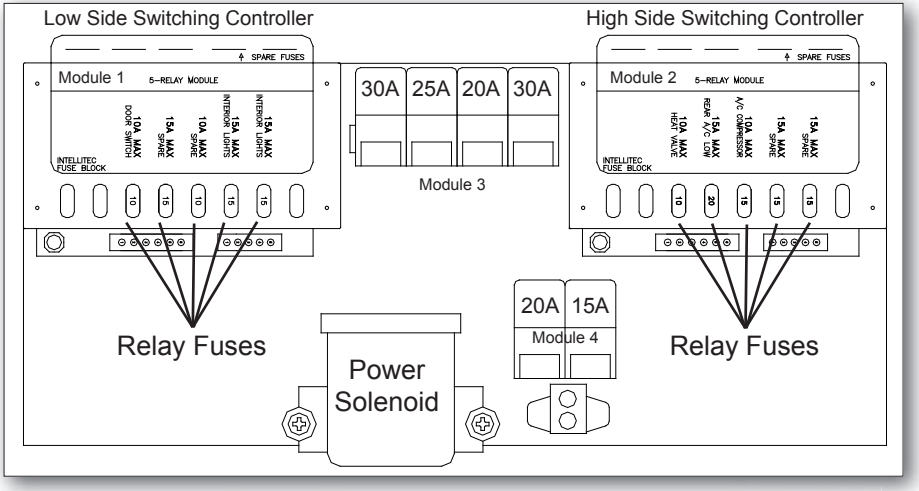
E-450 Circuit Board Assembly

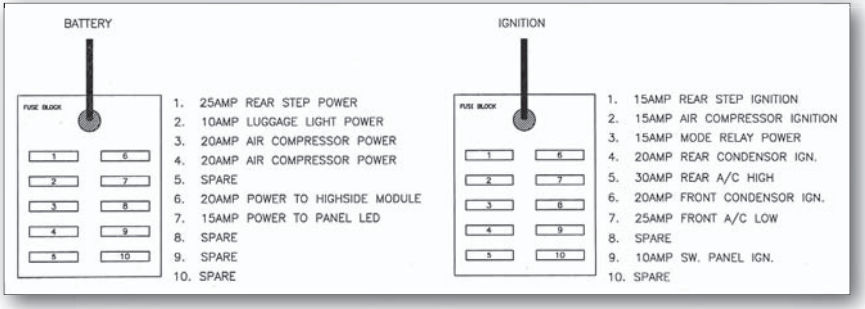


Circuit Board located in compartment above driver

See fuse & relay legend on next page

E-450 Circuit Board - Electrical Diagrams





Relay Module Legend
(all amperage are maximum)

Module 1 (from left to right)
1. Door Switch 10A
2. Spare 15A
3. Spare 10A
4. Interior Lights 15A
5. Interior Lights 15A

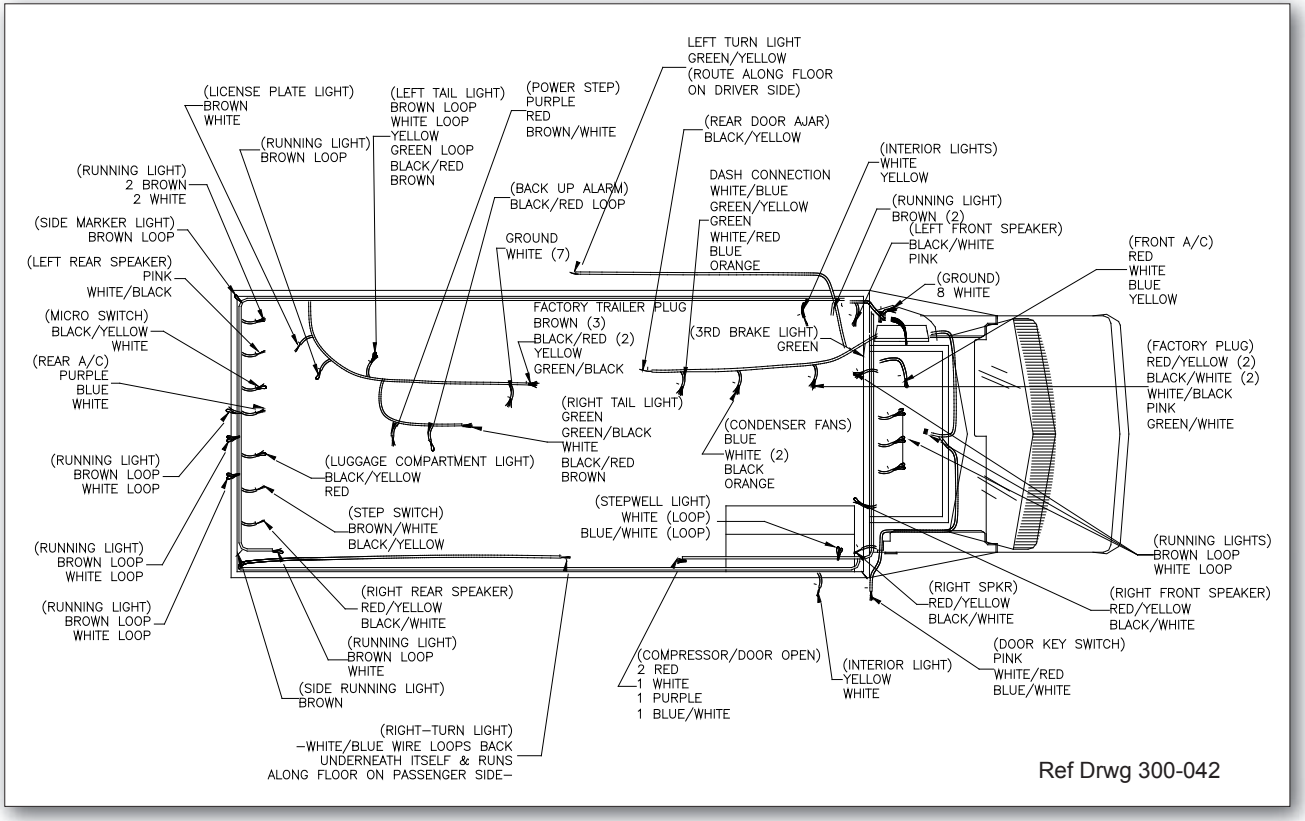
Module 2 (from left to right)
1. Heat Valve 10A
2. Rear A/C Low 15A
3. A/C Compressor 10A
4. Spare 15A
5. Spare 15A

Module 3 (from left to right)
1. Front A/C High 30A
2. Front A/C Low 25A
3. Front Condenser 20A
4. Rear A/C High 30A

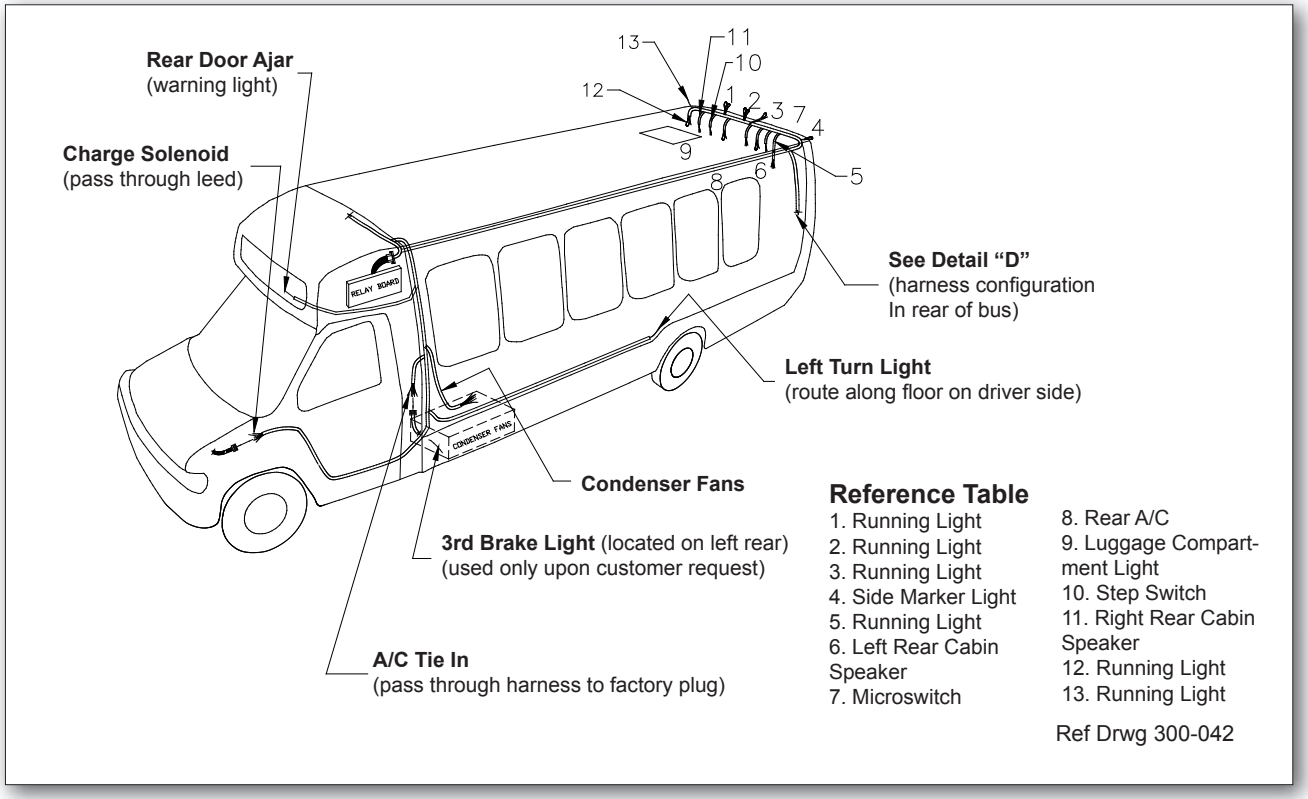
Module 4 (from left to right)
1. Rear Condenser 20A
2. Front A/C Mode 15A

Battery & Ignition
Fuse Legend

E-450 Shuttle Bus-Wiring Diagram



E-450 Shuttle Bus - Drivers Side Wiring Diagram

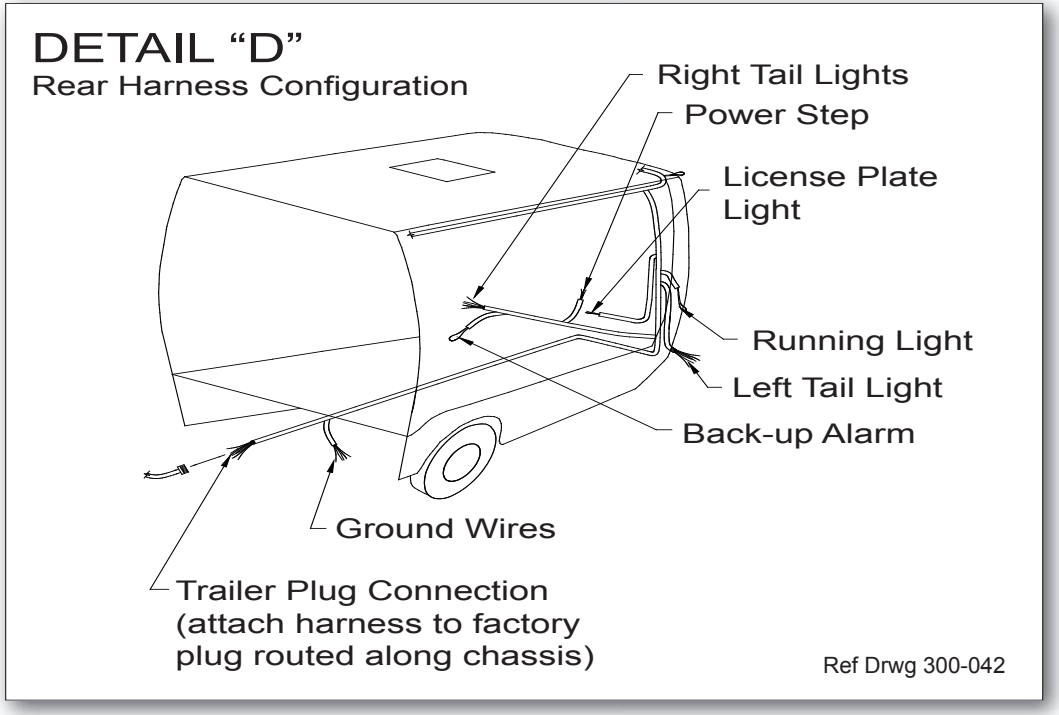


Reference Table

1. Running Light
2. Running Light
3. Running Light
4. Side Marker Light
5. Running Light
6. Left Rear Cabin Speaker
7. Microswitch
8. Rear A/C
9. Luggage Compartment Light
10. Step Switch
11. Right Rear Cabin Speaker
12. Running Light
13. Running Light

Ref Drwg 300-042

E-450 Shuttle Bus - Rear Wiring Diagram



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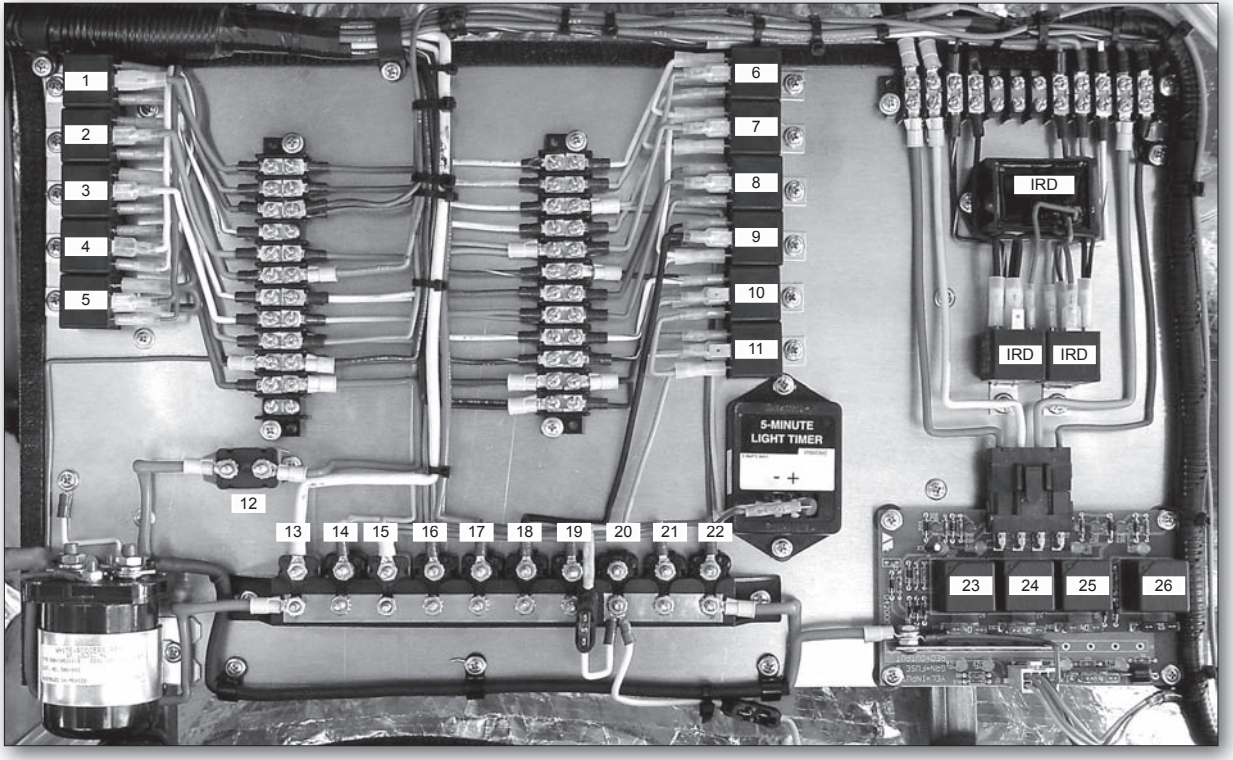
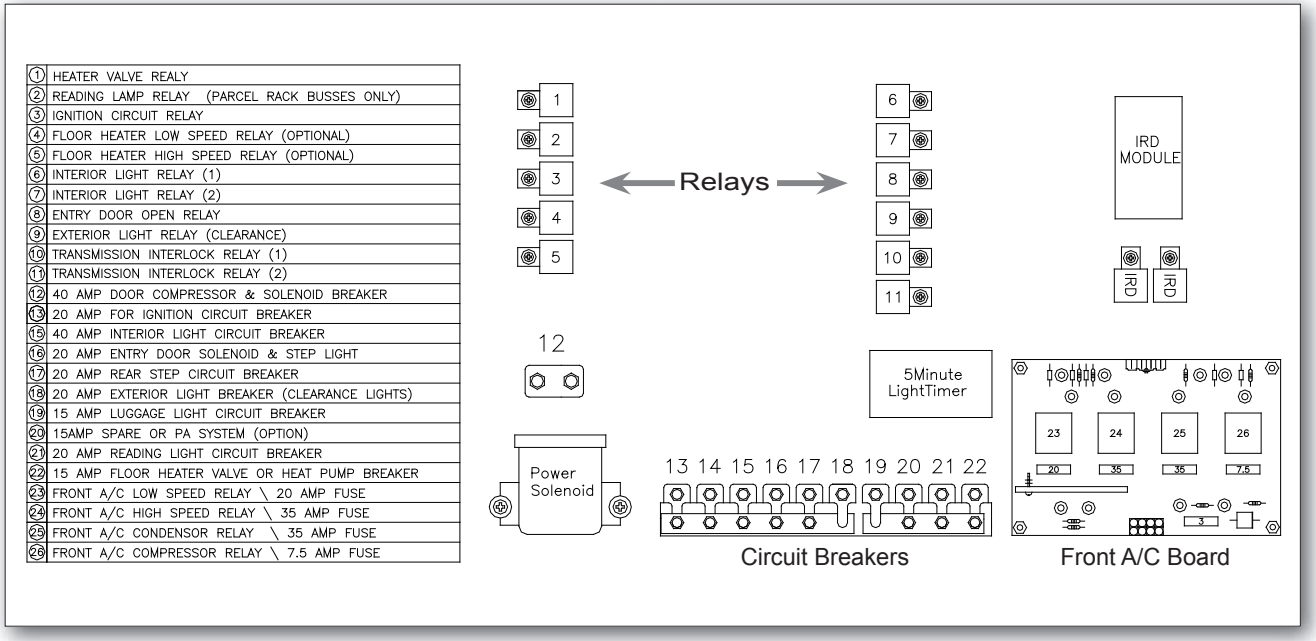
F-550 Circuit Board Assembly Ver. 1

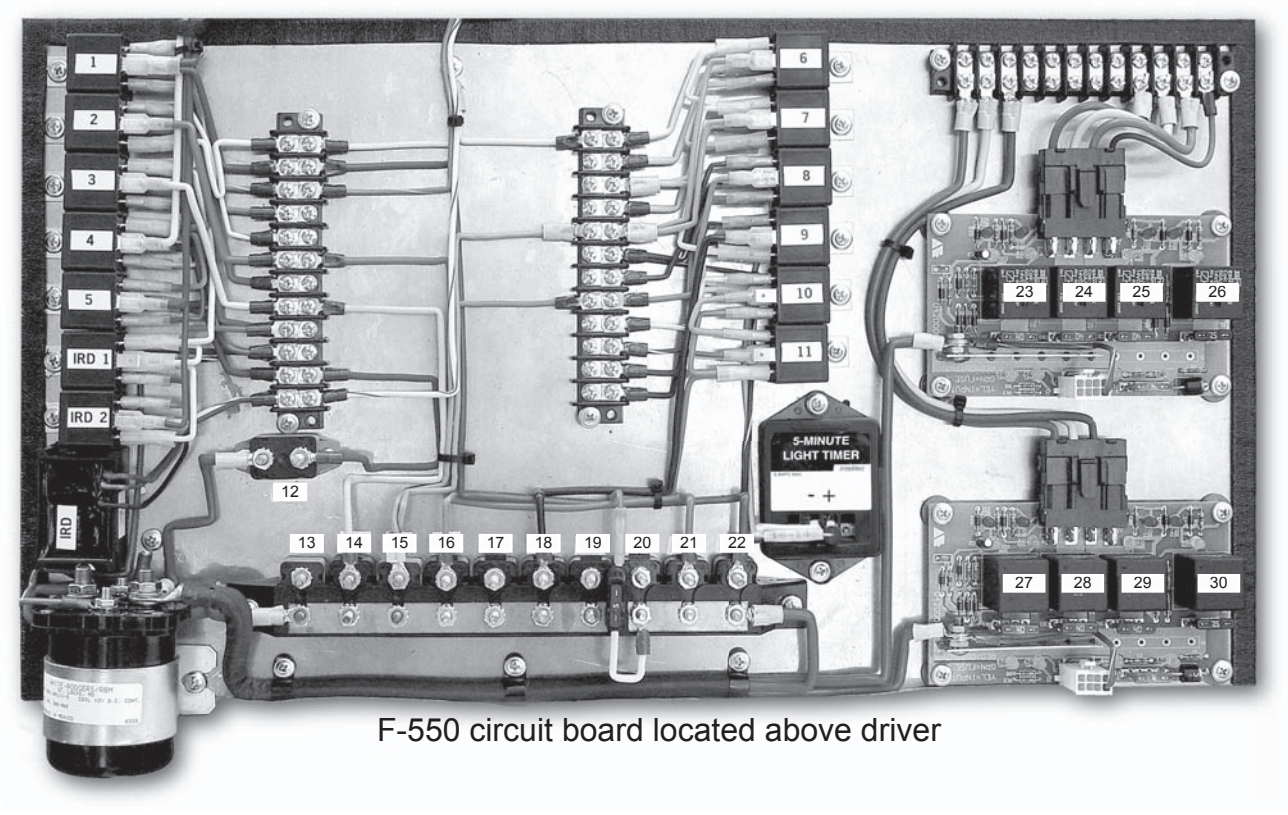


F-550 circuit board located above driver

F-550 Circuit Board Ver 1 - Electrical Diagram



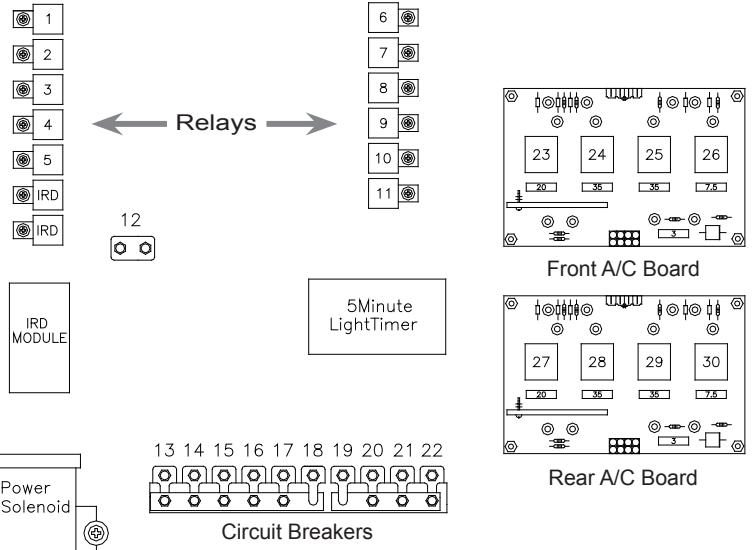
F-550 Circuit Board Assembly Ver. 2



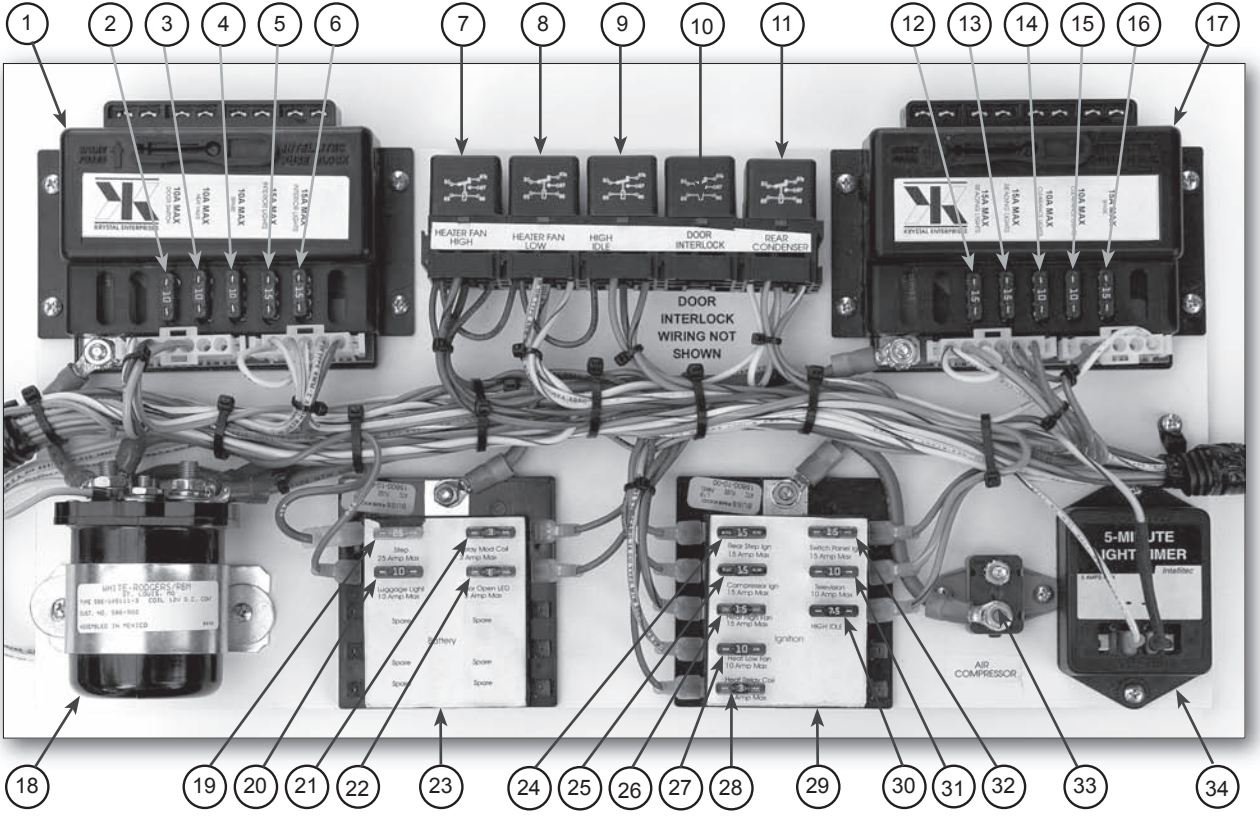
F-550 circuit board located above driver

F-550 Circuit Board Ver 2 - Electrical Diagram

1	HEATER VALVE REALY
2	READING LAMP RELAY (PARCEL RACK BUSSES ONLY)
3	IGNITION CIRCUIT RELAY
4	FLOOR HEATER LOW SPEED RELAY (OPTIONAL)
5	FLOOR HEATER HIGH SPEED RELAY (OPTIONAL)
6	INTERIOR LIGHT RELAY (1)
7	INTERIOR LIGHT RELAY (2)
8	ENTRY DOOR OPEN RELAY
9	EXTERIOR LIGHT RELAY (CLEARANCE)
10	TRANSMISSION INTERLOCK RELAY (1)
11	TRANSMISSION INTERLOCK RELAY (2)
12	30 AMP FLOOR HEATER RELAY POWER (OPTIONAL)
13	40 AMP AIR DOOR COMPRESSOR & SOLENOID
14	20 AMP FOR IGNITION CIRCUIT BREAKER
15	40 AMP INTERIOR LIGHT CIRCUIT BREAKER
16	20 AMP ENTRY DOOR SOLENOID & STEP LIGHT
17	20 AMP REAR STEP CIRCUIT BREAKER
18	20 AMP EXTERIOR LIGHT BREAKER (CLEARANCE LIGHTS)
19	15 AMP LUGGAGE LIGHT CIRCUIT BREAKER
20	15AMP SPARE OR PA SYSTEM (OPTION)
21	20 AMP READING LIGHT CIRCUIT BREAKER
22	15 AMP FLOOR (HEATER VALVE OR HEAT PUMP)
23	FRONT A/C LOW SPEED RELAY \ 20 AMP FUSE
24	FRONT A/C HIGH SPEED RELAY \ 35 AMP FUSE
25	FRONT A/C CONDENSOR RELAY \ 35 AMP FUSE
26	FRONT A/C COMPRESSOR RELAY \ 7.5 AMP FUSE
27	REAR A/C LOW SPEED RELAY \ 20 AMP FUSE
28	REAR A/C HIGH SPEED RELAY \ 35 AMP FUSE
29	REAR A/C CONDENSOR RELAY \ 35 AMP FUSE
30	REAR A/C COMPRESSOR RELAY \ 7.5 AMP FUSE



E-450 & F-550 Modular Circuit Board Assembly Ver. 3

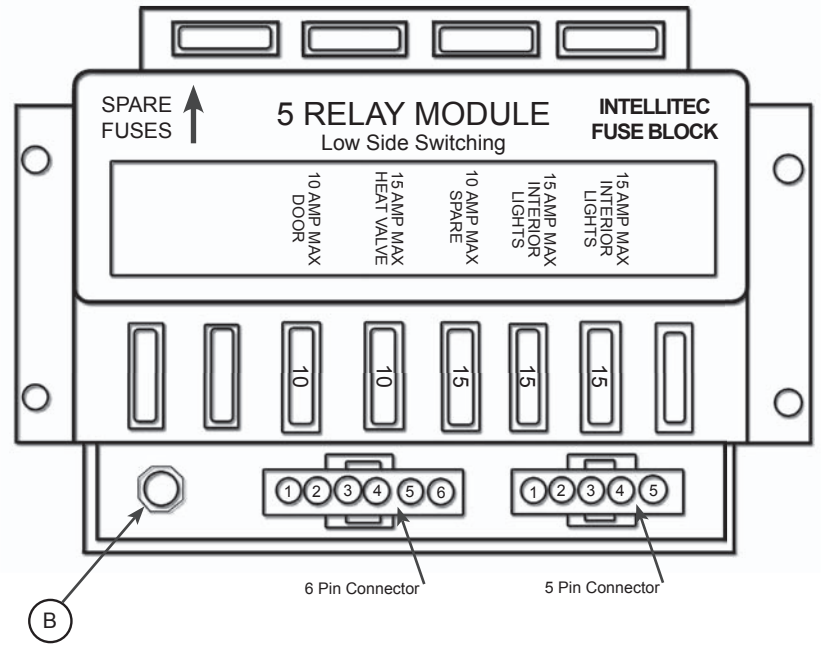


E-450 & F-550 Modular Circuit Board Assembly Ver. 3 Legend

1	Low Side Modular Switching Unit	18	Power Solenoid
2	Door - 10 amp fuse-max	19	Step- 25 amp fuse-max, 12 ga Red #260
3	Heat Valve - 15 amp fuse-max	20	Luggage Light- 10 amp fuse-max, 16 ga Red #320
4	Spare - 10 amp fuse-max	21	To High Side Module- 3 amp fuse-max, 16 ga Red
5	Interior Lights - 15 amp fuse-max	22	To Panel LED- 3 amp fuse-max, 18 ga Red/Wht
6	Interior Lights - 15 amp fuse-max	23	Battery Fuse Block Module
7	Heater Fan Relay-HIGH	24	Rear Step IGN-15 amp fuse-max, 16 ga Purple #280
8	Heater Fan Relay-LOW	25	Air Comp. IGN-15 amp fuse-max, 16 ga Purple #280
9	High Idle Relay	26	Heater Fan-HIGH, 15 amp fuse-max, 14 ga Red/Blk
10	Door Interlock Relay	27	Heater Fan-LOW, 10 amp fuse-max, 14 ga Yell/Red
11	Rear Condenser Relay	28	Heater Relay Coil, 3 amp fuse-max, 18 ga Red
12	Reading Lights- 15 amp fuse-max	29	Ignition Fuse Block Module
13	Reading Lights- 15 amp fuse-max	30	High Idle- 7.5 amp fuse-max, 14 ga Org/Blk
14	Clearance Lights- 10 amp fuse-max	31	Television- 10 amp fuse-max, 14 ga Org/Yell
15	Clearance Lights- 10 amp fuse-max	32	Switch Panel IGN- 15 amp fuse-max, 16 ga Purple #280
16	Spare- 15 amp fuse-max	33	Air Compressor Circuit Breaker
17	High Side Modular Switching Unit	34	Five (5) Minute Light Timer

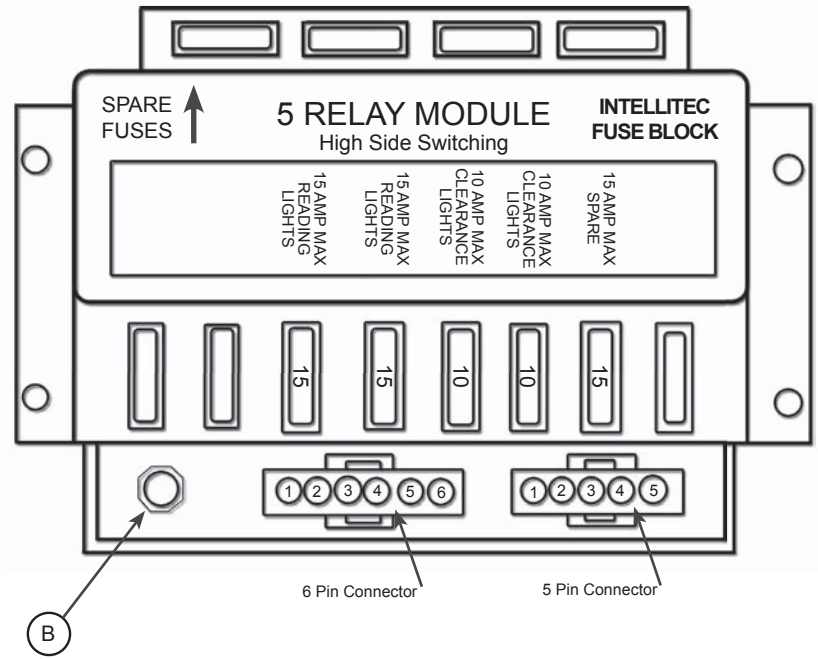
See detailed diagrams of items 1 & 17
(Low/High Side Switching Modules) on pages 102-103

E-450 & F-550 LOW SIDE RELAY SWITCHING MODULE Ver. 3



PIN	**6 PIN CONNECTOR**
1	Door Switch- 18 Ga Wht (to 5 min timer 18 ga Wht/Blk)
2	To Door- 16 Ga Blu/Wht #420C
3	Heat Valve Trigger- 18 Ga Grn/Blk
4	Heat Valve- 14 Ga Grn #400
5	Coil #3- Not Used
6	Output #3- Not Used
PIN	**5 PIN CONNECTOR**
1	To Interior Light Switch- 18 Ga Yel (to 5 min. timer+side- 18 Ga Yel/Blk with Diode)
2	Interior Lights- 14 Ga Yel- #350#B
3	To Interior Light Switch- 18 Ga Yel
4	Interior LIghts- 14 Ga Yel- - #350#A
5	Coil Common- 16 Ga Red- Battery- To Pin #1 On Fuse Block
B	To Battery- 8 Ga Red

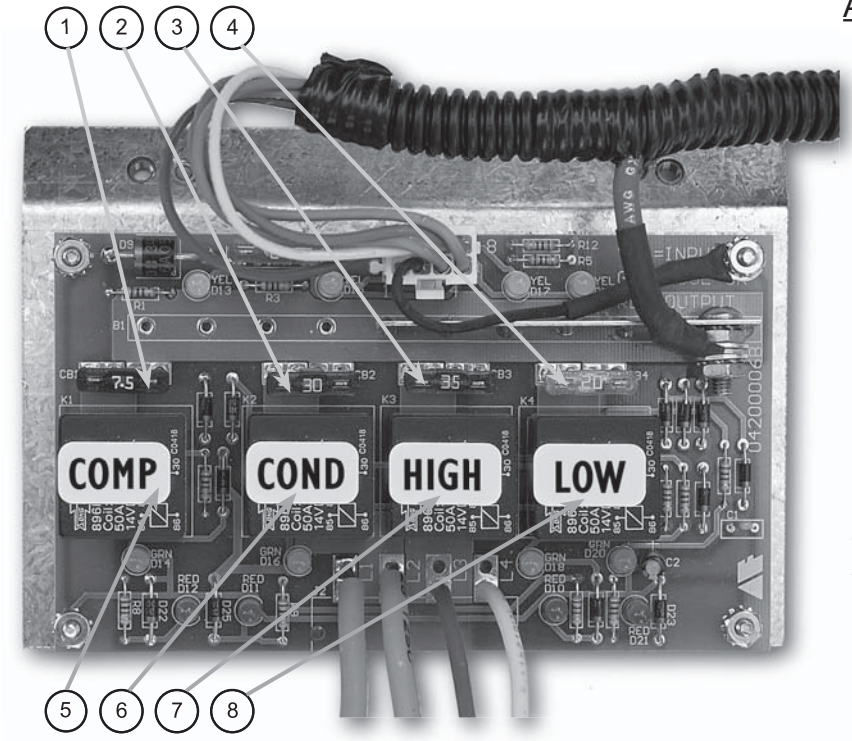
E-450 & F-550 HIGH SIDE RELAY SWITCHING MODULE Ver. 3



PIN	6 PIN CONNECTOR
1	From Reading Light- 18 Ga Wht/Pupl
2	To Reading Lights #D- 16 Ga Org #700
3	Jumper from Pin#1- 18 Ga Wht/Pupl
4	To Reading Lights #E- 14 Ga Org #700
5	Clearance Lights #F- 16 Ga Brn/Wht #230
6	Clearance Lights #G- 14 ga Brn #230
PIN	5 PIN CONNECTOR
1	Clearance Lights-Jumper-16 Ga Brn/Wht #230
2	Clearance Lights #H- 14 Ga Brn #230
3	Not Used
4	Not Used
5	Coil Common- 16 Ga Wht
B	To Battery- 8 Ga Red

E-450 & F-550 Front & Rear A/C Module

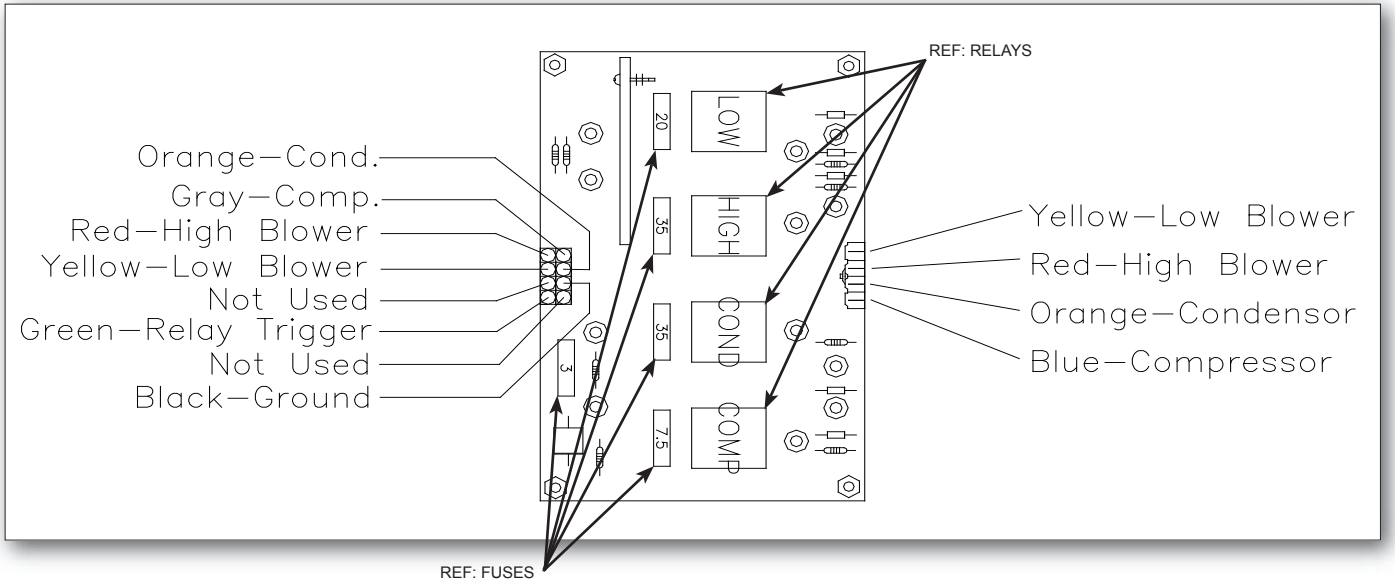
As used on 2004 & later models



ITEM NO	DESCRIPTION	COMMENT
1	7.5 amp Compressor Fuse	
2	30 amp Condensor Fuse	
3	35 amp High Side Fuse	
4	20 amp Low Side Fuse	
5	Compressor Relay	
6	Condenser Relay	
7	High Side Relay	
8	Low Side Relay	

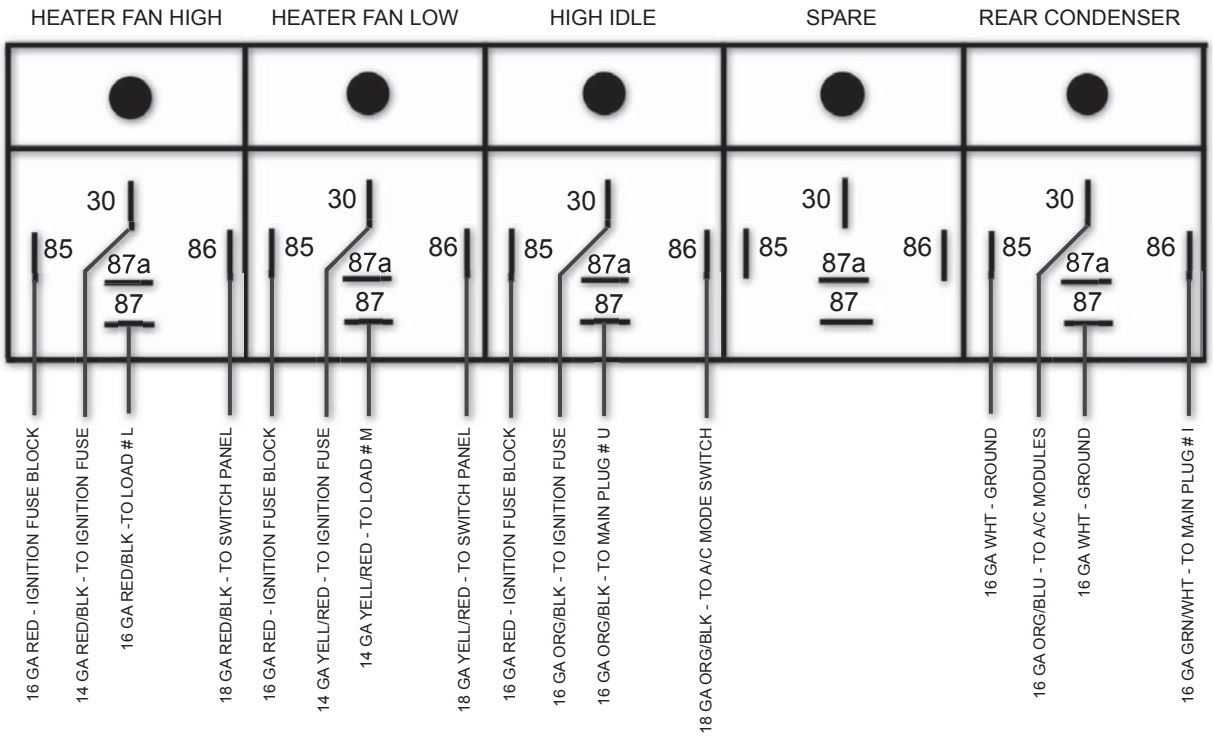
These modules are used to control all A/C functions for the front and rear A/C units. Each A/C unit requires one (1) module each.
These modules are mounted in the header above the driver, behind the driver's control panel.

Front/Rear A/C Module Wiring Diagram

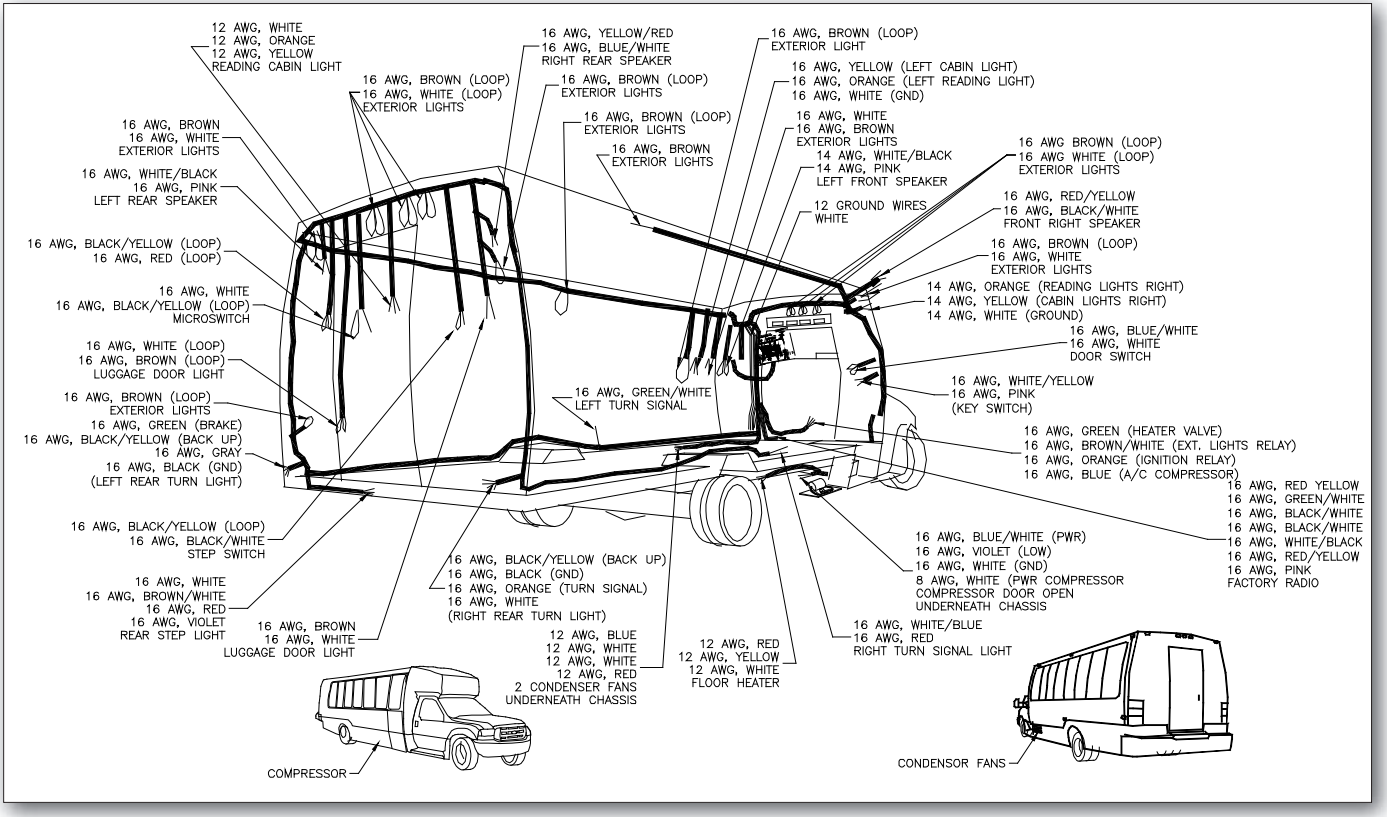


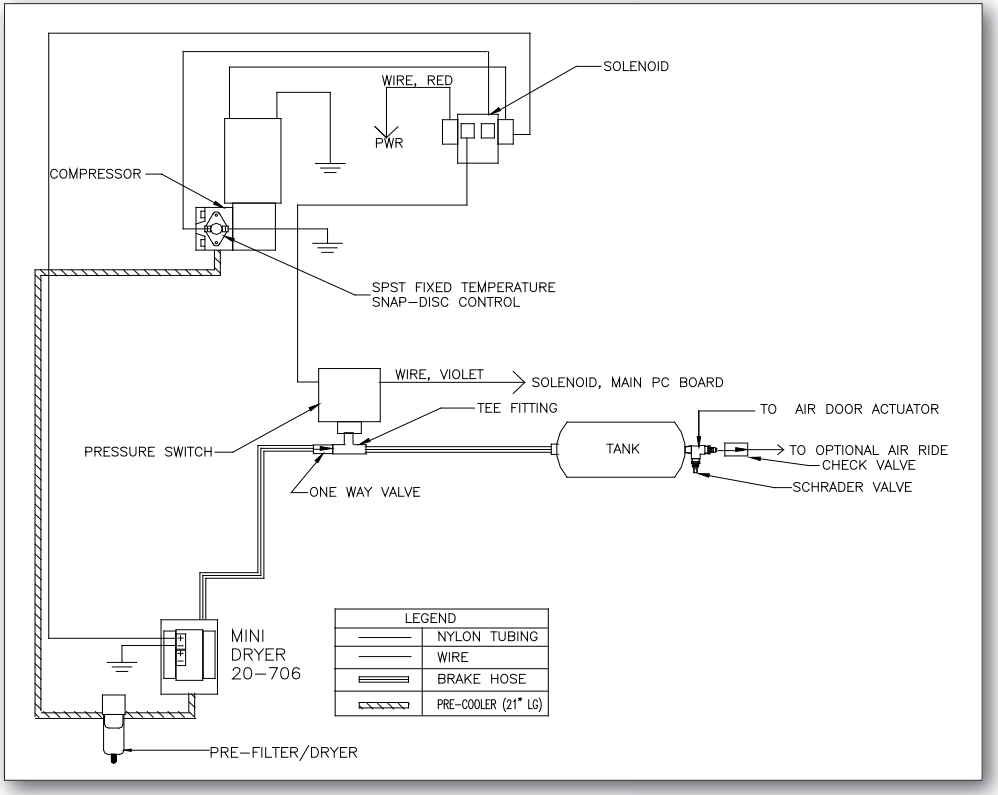
Detail of A/C Module wiring as shown in photos on pg. 104

E-450 & F-550 RELAY BUSS VER D

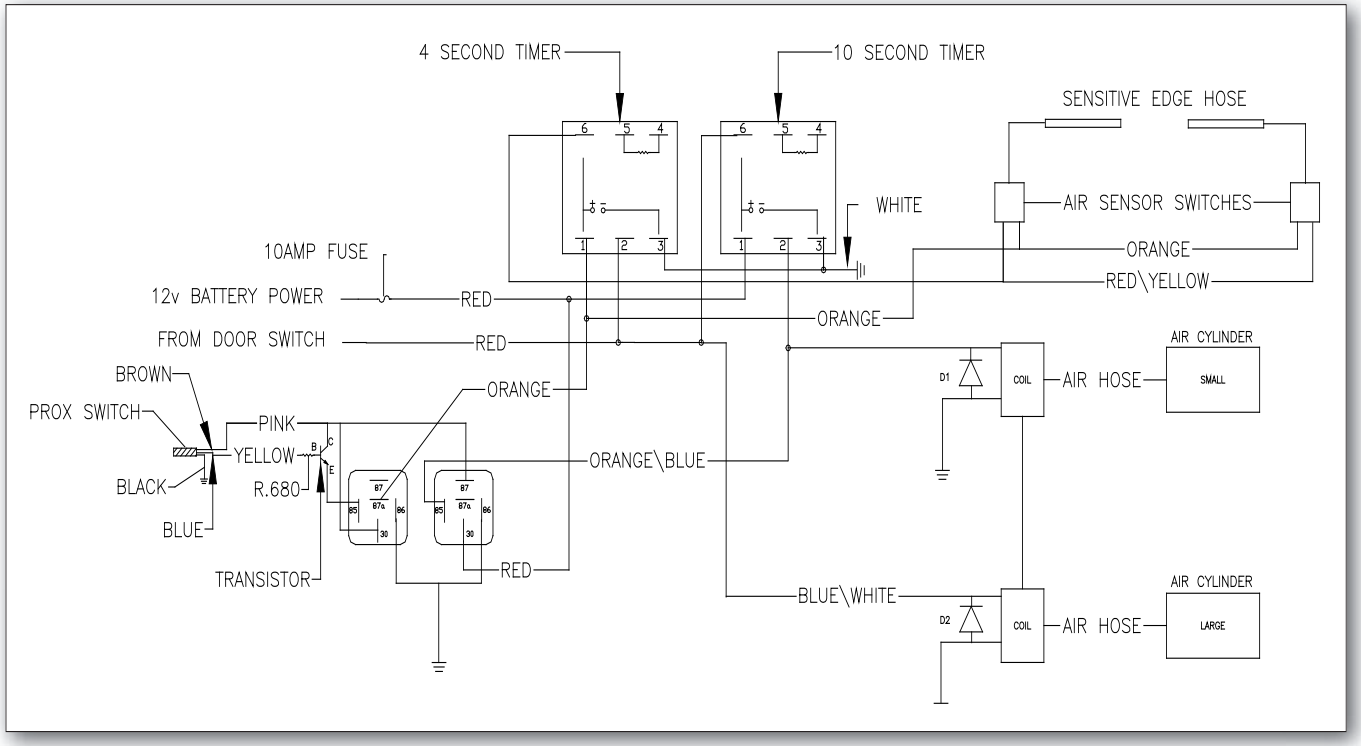


F-550 Shuttle Bus -Wiring Diagram

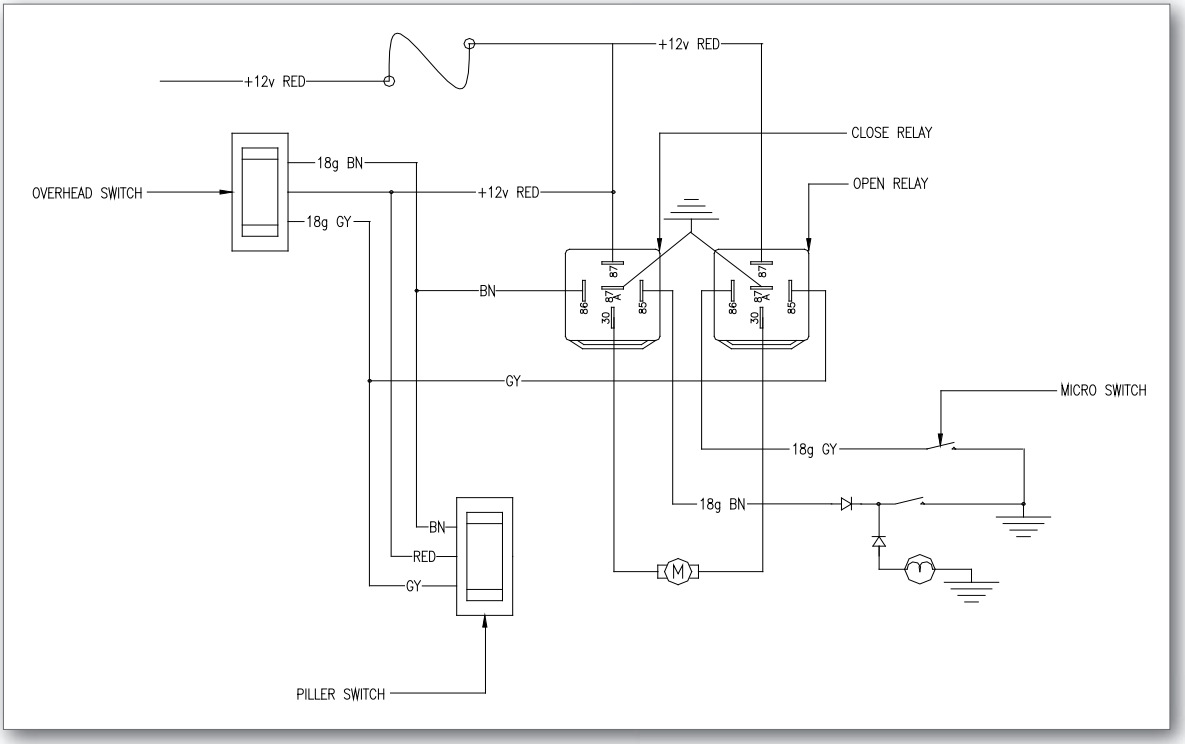




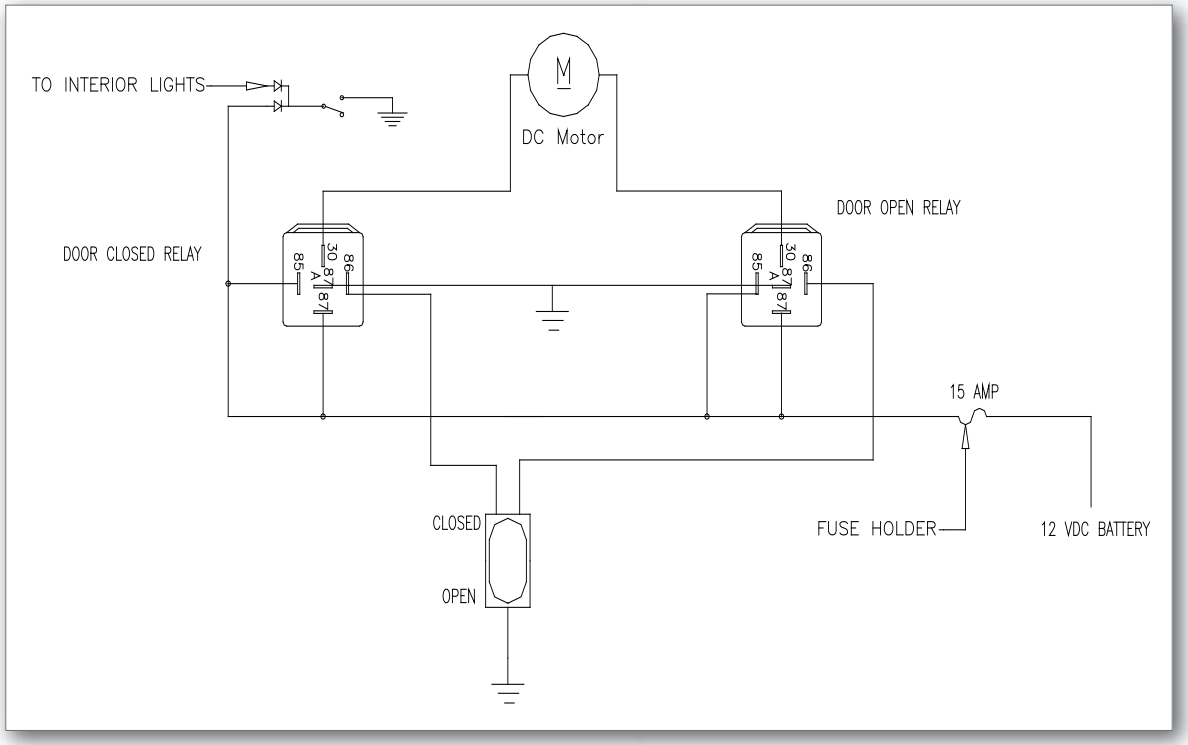
Double Plug Air Door Schematic (ref. pg 49)



Electrical Schematic for Doors with Sensitive Edge (ref. pg. 51)



E-450 Electrical Schematic for Swing Doors System (ref. pg. 51)



F-550 Electrical Schematic for Swing Door System (ref. pg 51)

OBTAINING PARTS

When parts are required for a warranty repair, all parts will be handled by the KRYSTAL Service Department.

All other Non-Warranty parts needs can be handled by contacting the KRYSTAL PARTS DEPARTMENT, directly at 1-800-845-4883. You may purchase parts directly over the counter, or have them shipped to you, usually within 24 hours. In order to expedite your parts order, please have your KRYSTAL ENTERPRISES serial number, which starts with K-#######, and is located on the drivers door jamb of all our vehicles.

UNDERSTANDING WARRANTY POLICY ***(read the following sections carefully)***

Should your bus require service related to the converted areas of the vehicle, ***read this section first, before taking any action.*** By doing so, you will clearly understand the KRYSTAL SERVICE PROCESS, and avoid possible delays. NEVER initiate a warranty repair without prior approval of the KRYSTAL SERVICE DEPARTMENT. Not following this procedure could void your warranty reimbursement for that particular repair.

WHO SHOULD PERFORM WARRANTY SERVICE ON YOUR VEHICLE

If there is any doubt as to whether or not a repair is related to the KRYSTAL WARRANTY, call the KRYSTAL SERVICE DEPARTMENT at 1-800-845-4883, this may save you time wasted at a chassis dealer or another shop, for a problem appropriately solved by contacting KRYSTAL SERVICE DEPARTMENT.

If the problem is conversion related, then it can either be repaired at our Brea, California facility, or by a shop that we recommend in your area, or by a shop of your choice. This procedure is true of both warranty and non-warranty repairs. Depending on the nature of the problem, it may be necessary to have the warranty repair done at our Brea, California facility.

CAUTION ABOUT TOWING!

If it becomes necessary to tow your bus, a flat bed rig is preferred. UNDER NO CIRCUMSTANCES, should the bus be towed by lifting the rear end, serious frame damage can occur.

WARRANTY VERSUS NON-WARRANTY

Whether a particular problem is covered under the KRYSTAL WARRANTY depends, in some cases, on several factors. The KRYSTAL SERVICE DEPARTMENT, determines coverages ahead of time on a case-by-case basis, either over the phone or at our Brea, California facility.

HAVING NON-WARRANTY REPAIRS PERFORMED

If the service manager has determined that the repair is not covered, or you are sure that it is not covered, we would be happy to recommend a shop in your area, or schedule an appointment with the KRYSTAL SERVICE DEPARTMENT, whichever is more convenient.

HAVING WARRANTY REPAIRS PERFORMED

There are three (3) methods:

1. Repair is done at the KRYSTAL SERVICE DEPARTMENT, in Brea, California
2. Repair is done at a KRYSTAL authorized service facility near you.
3. Repair is done at a shop of your choice, with prior approval of the KRYSTAL SERVICE DEPARTMENT

HAVING WARRANTY REPAIRS PERFORMED (con't)

If either method 2 or 3 as described on the previous page are to be used, you must obtain pre-authorization and a KRYSTAL ENTERPRISES SERVICE DEPARTMENT repair authorization number (R.A.N), in advance of performing any repairs. Both requirements my be accomplished from a single phone call to the KRYSTAL SERVICE DEPARTMENT, at 1-800-845-4883.

If method 3 is used, simply pay for the work and mail a copy of the invoice with the repair authorization number, and your KRYSTAL vehicle ID number, which is found on the vehicle ID tag on the drivers door jamb) on the invoice, so your claim(s) can be processed without any problems. You will be reimbursed within 30 days.

Send all invoices to the service manager at:

KRYSTAL ENTERPRISES
Attn: Service Department Manager
2701 East Imperial Highway
Brea, California 92821

Vendor Reference Listing

Vendor	Warranty Period
AUTOMOTIVE CLIMATE CONTROL A/C 1-800-462-6322	2 Years, Unlimited Miles
AUDIOVOX TV & VCP 1-800-274-1886	1 Year, Unlimited Miles
CARRIER A/C 1-800-673-2431	2 Years, Unlimited Miles
FIRESTONE TIRES 1-800-356-4644	1 Year Replacement, No Charge
FORD HOTLINE 1-800-343-5338	3 Years, 36,000 Miles Bumper to Bumper 3 Years, 100,000 Miles on Diesel Engine
FORD ROADSIDE ASSISTANCE 1-800-241-3673 (24 HOUR HOTLINE)	See FORD Manual
FREEDMAN SEATING 1-713-929-6100	2 Years or 20,000 Miles, Whichever Comes First
PHOENIX USA 1-931-561-6128	3 Years
KRYSTAL SERVICE DEPT 1-800-579-7825	See Copy of Krystal Warranty
KWIKEE ELECTRIC STEPS 1-800-736-7366	1 Year or 12,000 Miles, Whichever Comes First
MICHELIN TIRES 1-800-847-8475	1 Year Replacement, No Charge
PENNTEX ALTERNATORS 1-800-590-2818	18 Months, or 75,000 Miles, Whichever Comes First
ROSEN 1-866-467-6736	1 Year, Unlimited Miles
PANASONIC 1-949-251-1851	1 Year, Unlimited Miles
SHURFLOW WATER PUMPS 1-800-854-3218	2 Years, Unlimited Miles
SONY STEREO 1-800-282-2848	1 Year, Unlimited Miles

Vendor Reference Listing

Vendor	Warranty Period
TRANSPEC WORLDWIDE 1-810-274-9400	1 Year, Unlimited Miles
VELVAC MIRRORS 1-800-783-8871	1 Year, Unlimited Miles
VOYAGER PA SYSTEM 1-800-274-1886	1 Year, Unlimited Miles
INTERMOTIVE VEHICLE CONTROLS 1-530-823-2332	2 Years or 24,000 Miles

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KRYSTAL ENTERPRISES
LIMITED WARRANTY

Krystal Enterprises (hereinafter referred to as Krystal Enterprises and Krystal) is the final stage manufacturer of an incomplete vehicle, which is manufactured and separately warranted by the incomplete vehicle manufacturer. This limited Warranty thus does not extend to any part or portion of the incomplete vehicle except as specifically required by any applicable Federal law or regulation.

Krystal Enterprises warrants to the original purchaser of each new Krystal Enterprises bus, that all parts (except electronic parts which are warranted by their original manufacturer) installed by Krystal will be free from defects in material and workmanship under normal use and service for one (1) year, with unlimited mileage, from the date of purchase by the original retail customer.

Krystal Enterprises further warrants to the original purchaser of each new Krystal Enterprises bus, the body structure which is defined as the cage, skin, front and rear caps, and floor structure to be free from defects, in material and workmanship under normal use and service for five (5) years or 100,000 miles, whichever comes first, from the date of purchase by the original retail customer.

In the event of a Warranty claim, Krystal reserves the right to replace or repair the defective part. The original retail customer must return the bus to the original selling Authorized Dealer for the necessary authorization and parts. THE DEALER MUST OBTAIN, PRIOR TO PERFORMING ANY WORK, A REPAIR AUTHORIZATION NUMBER (R.A.N) ON ANY KRYSTAL ENTERPRISES BUS. If the selling Dealer is unable to remedy the situation, the original retail customer should contact the Warranty Department of Krystal Enterprises. If the selling

dealer does not perform repair work on premise, the Dealer must call the Krystal Warranty Department for instructions on proceeding with the repair via an authorized repair facility.

If the bus was not purchased from a Krystal Authorized Dealer, the original retail customer must contact the Krystal Warranty Department to receive information and prior authorization for any needed repair work.

Provided that prior authorization was obtained from the Warranty Department of Krystal Enterprises, all labor costs associated with the repair or replacement of defective parts will be paid by Krystal. Krystal reserves the right to make a physical inspection of the bus by authorized factory personnel following any complaint prior to any repair.
Krystal shall have no liability for any defect or damage caused by the original owner's use of parts or services which are not authorized by Krystal or for any parts or paint which have been subject to misuse, neglect or accident, or have been subject to external mechanical or chemical influences, especially stone chips, airborne rust or industrial fall-out. This Limited Warranty ***DOES NOT*** cover loss to time. Inconvenience, loss of use of any vehicle, cost of rented replacement vehicle, or lodging or mileage expense in connection with any warranty repairs.

NO PERSON IS AUTHORIZED TO ALTER OR CHANGE IN ANY WAY
THE TERMS AND CONDITIONS OF THE ABOVE STATED LIMITED WARRANTY

It is the policy of KRYSTAL ENTERPRISES, INC. to incorporate product improvements to our products whenever possible or practical to do so. We reserve the right to make changes and or improvements at any time without incurring any obligation to make such changes on previously sold products. Additionally, the information and specifications contained within this manual are current at time of printing. Subsequently all information contained in this manual is subject to change at any time, without notice.

Please note that this manual applies to all FORD models and explains standard equipment as well as many options, and may include equipment not presently installed on your vehicle.

KRYSTAL ENTERPRISES, INC.

Rev-2