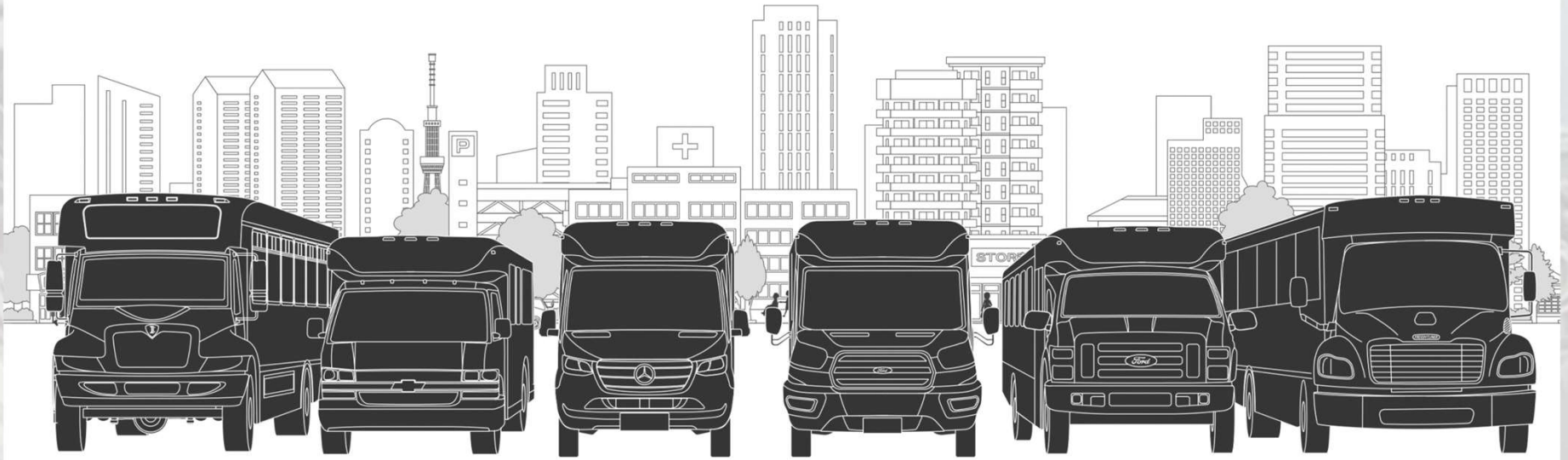




FOREST RIVER
BUS & VAN



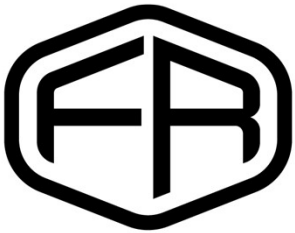
Minnesota Transit conference 2025 Reliability-Innovation-Partnership

Who we are

- Largest midsize bus manufacture 100,000 units delivered
- Best of 8 companies with 750 years combined sales experience
- Serving Agencies Nationwide

OUR MISSION

- WE LISTEN
- Attend conferences
- Visit Customers
- feedback loops
- Bridge the gap between sales & production:
- Continuous improvement initiatives
- Vendor alignment with our mission

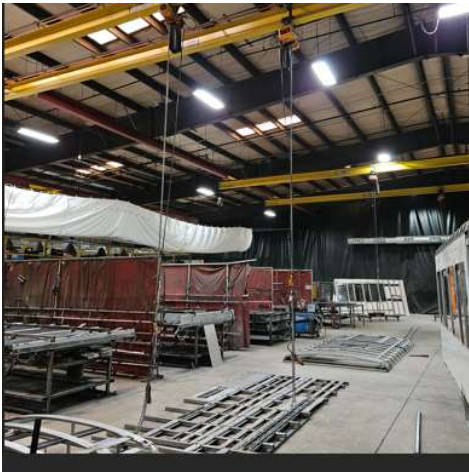


FOREST RIVER

BUS & VAN

Investing in our future

- **FOR OUR TEAM:**
 - Weld shop air filtration system 2024
 - Paint shop expansion 2025
- **CUSTOMER FOCUSED:**
 - Customer/Dealer visits
 - Listen
 - Mobile Field service vehicle
- **WARRANTY:**
 - We will be a single point of contact for warranty, work through your dealer
- **PRODUCTION LINE:**
 - New tablet-based quality system
 - Testing phase (PDAC)



New to 2025

Game Changer:



Shift n Step:



New this Year:



- Chevy chassis are now on the contract
- Buy America compliant
- Lead times will be greater than Ford
- Limited availability



TransAir[®]
MANUFACTURING CORP.

BY  **LIPPERT[®]**

PREVENTATIVE MAINTENANCE

**What do I need to do to keep
my Trans/Air system in good
working order?**

- **Preventative maintenance schedule**
- **Maintenance check lists**



Preventative Maintenance Schedule

Item	What to Check	Weekly	Monthly
Compressor Belts	Tension and Wear	Check	
* Properly tensioned belt ensures maximum compressor performance and belt life.			
Evaporator Filters	Cleanliness	Check	Clean
* A properly maintained filter maximizes air flow and system performance.			
Hoses	Secured and Protected	Check	
* Properly supported hoses prevent the possibility of refrigerant leaks.			
Wiring Harnesses	Secured and Protected	Check	
* Properly supported harnesses prevent the possibility of electrical shorts.			
Condenser Coil	Cleanliness	Check	Clean
* A properly maintained condenser coil will ensure maximum heat transfer and system performance			
Sight Glass Moisture Indicator	Color	Check	
* Deep Green = Absence of moisture * Yellow = Moisture is present IMMEDIATE SYSTEM SERVICE REQUIRED			

Preventative Maintenance Check List

Bus # _____

Date: _____

Engine Compartment

- Tension and inspect belts ☐
- Inspect hoses and fittings for leaks and wear ☐
- Check compressor mount ☐

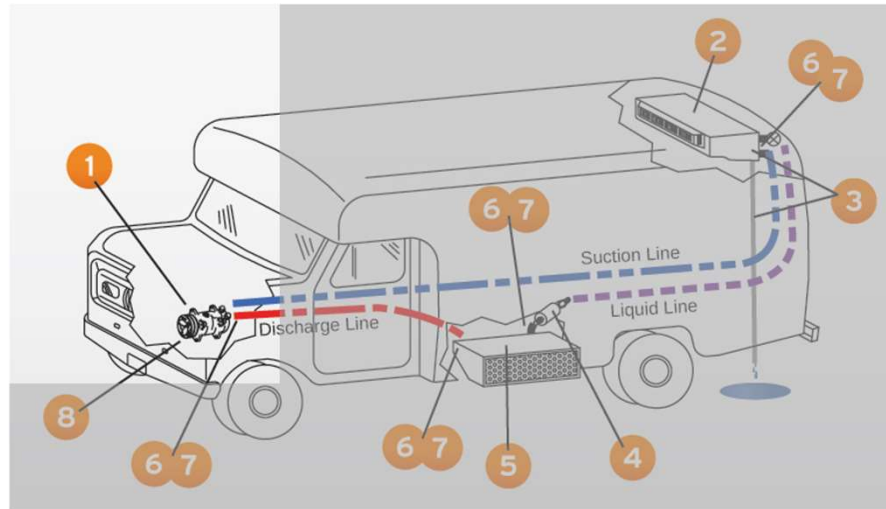
Condenser (s)

- Clean condenser coil ☐
- Check condenser coil for damage ☐
- Check operation of condenser fans ☐
- Inspect hoses & fittings for leaks and wear ☐
- Check sight glass for moisture indicator ☐

Evaporator (s)

- Clean filter ☐
- Check operation of evaporator blowers ☐
- Inspect hoses & fittings for leaks and wear ☐
- Check condensate drain lines ☐

Preventative Maintenance Schedule

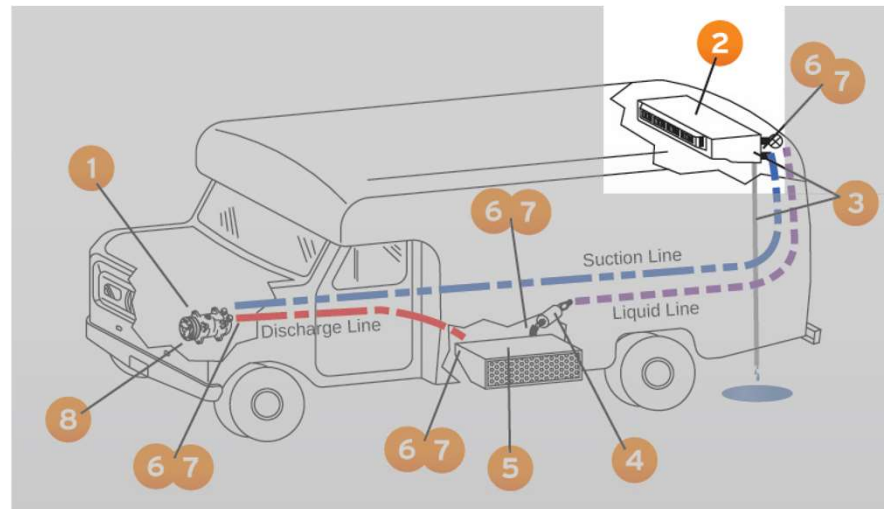


1 - Charge Level / Pressure (Yearly)

- Use Pressure / Temperature Chart
- The correct pressure, at ambient temperature, verifies proper refrigerant charge
- Recharge as needed using the most current version of the Trans/Air Charging Chart (Part # 501264) found at www.transairmfg.com / Customer Support / Support Documents / Installation
- Recharging must be done by a Qualified Technician

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

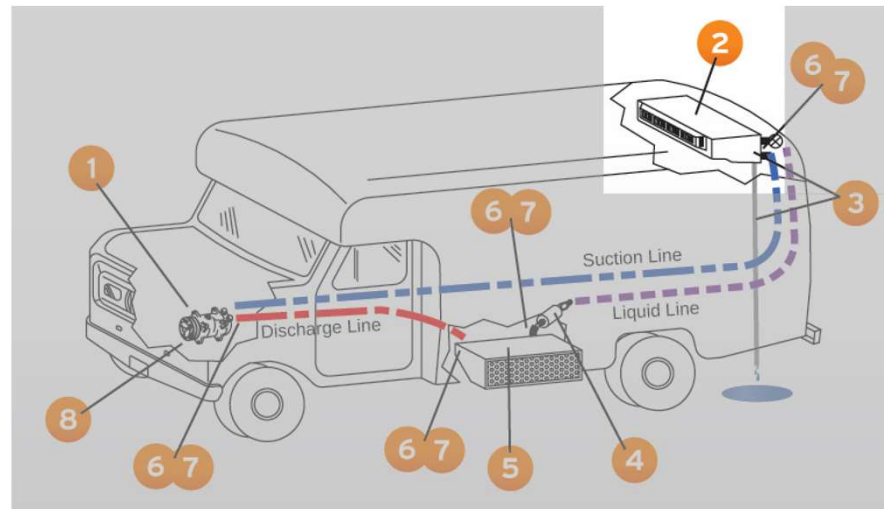


2 - Evaporator Coil(s) (Weekly)

- Check general cleanliness
- A properly maintained (clean) evaporator coil will ensure maximum heat transfer and system performance

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

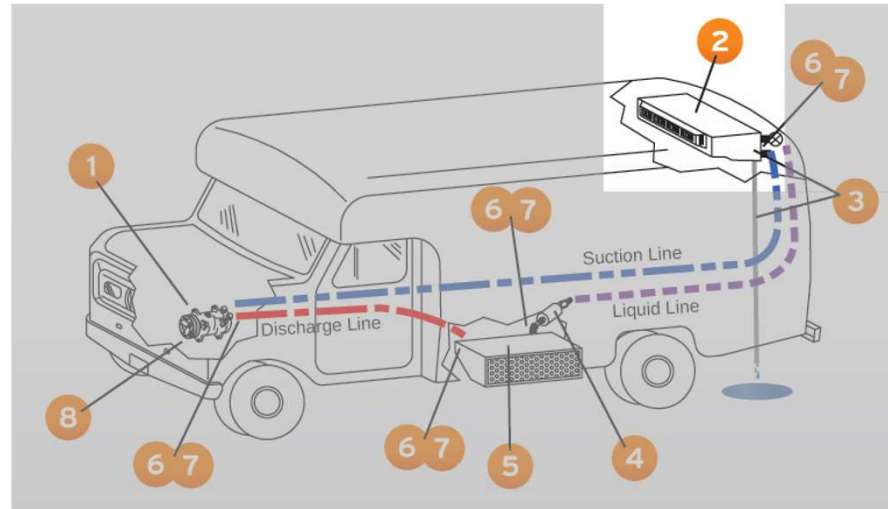


2 - Evaporator Filter(s) (Weekly)

- Check general cleanliness
- A properly maintained (clean) evaporator filter maximizes air flow and performance

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

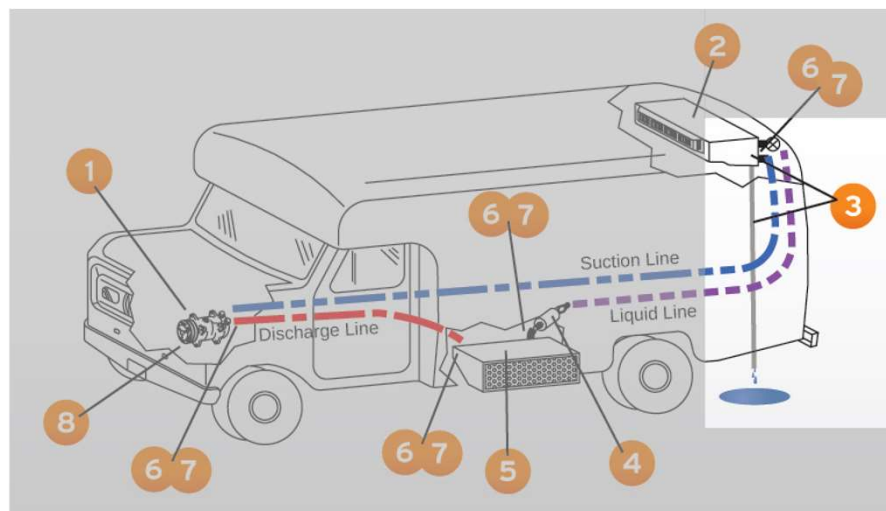


2 - Evaporator Blower(s) (Monthly)

- Check general function
- Proper air flow across evaporator coil allows for efficient heat transfer
- Check to make sure all blowers are actually operating

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

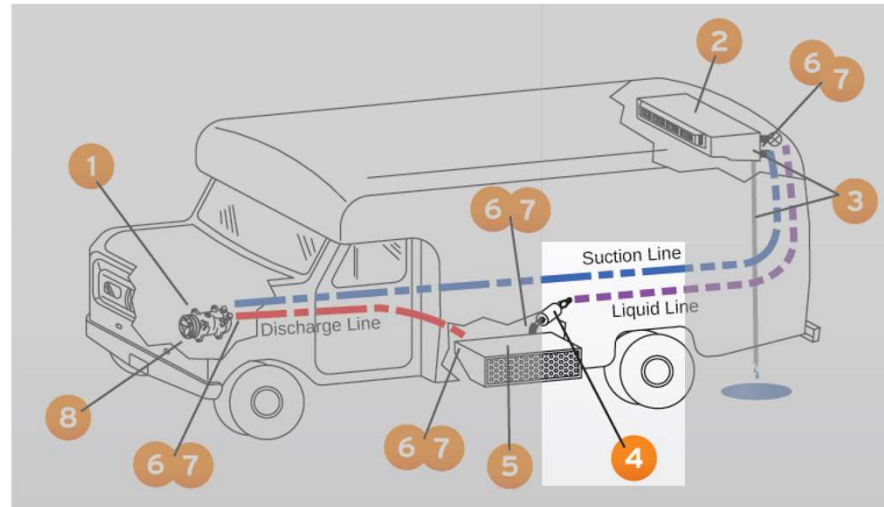


3 - Evaporator Drain Line(s) (Yearly)

- Ensure that kazoo & hose are secured and free from debris
- Properly located drain line will keep water from collecting in the evaporator drain pan
- On a hot humid day, the evaporator should drip water under the vehicle

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

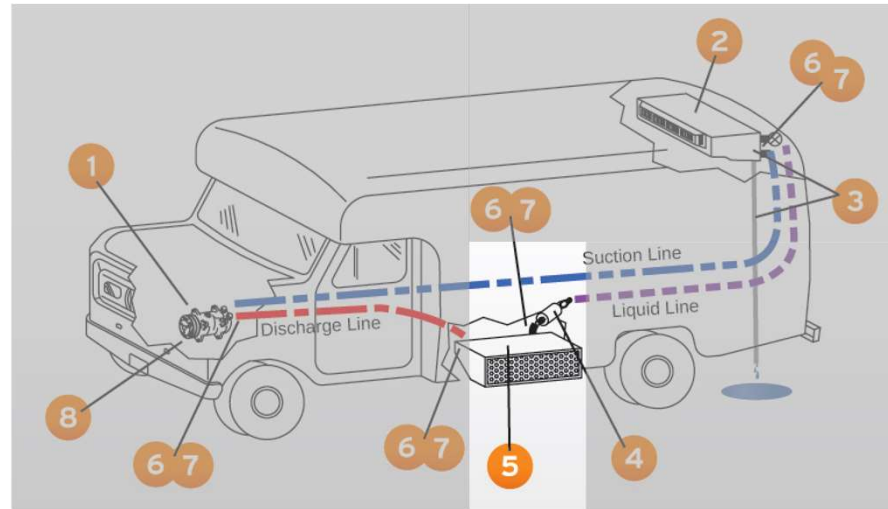


4 - Sight Glass / Moisture Indicator(s) (**Monthly**)

- Check color
- Deep Green OR Blue= Absence of Moisture
- Yellow OR Pink = Moisture is present =
Immediate service is required to prevent system damage

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

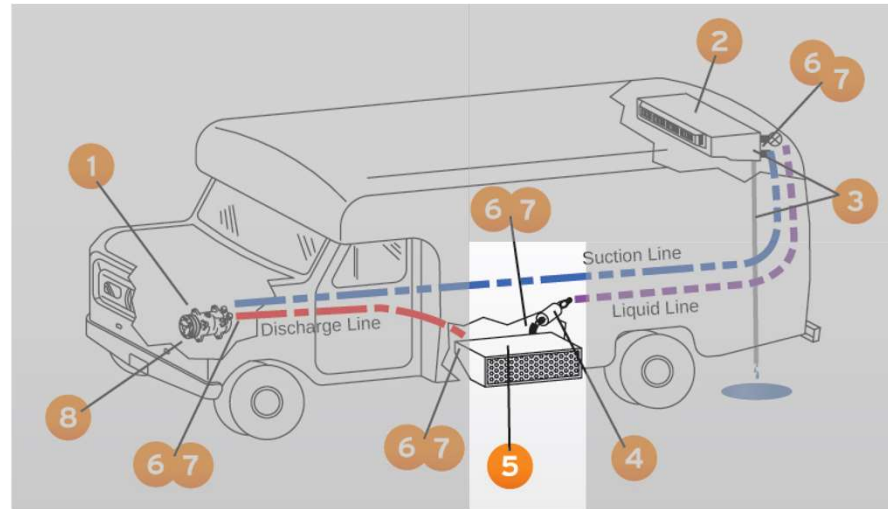


5 - Condenser Coil(s) (Monthly)

- Check general cleanliness
- A properly maintained (clean) condenser coil will ensure maximum heat transfer and system performance
- Clean with non-caustic cleaner

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

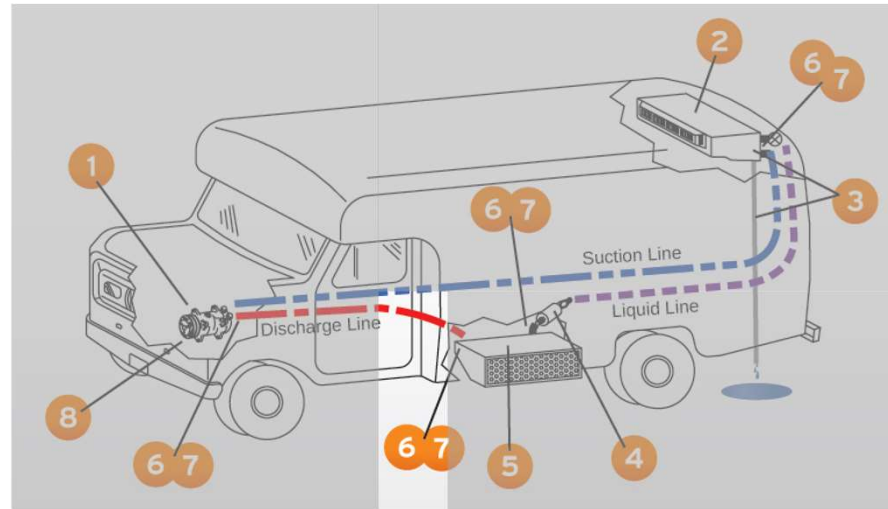


5 - Condenser Fan(s) (Monthly)

- Check general function
- Proper air flow across condenser coil allows for efficient heat transfer
- Check to make sure all fans are operating when compressor is engaged

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

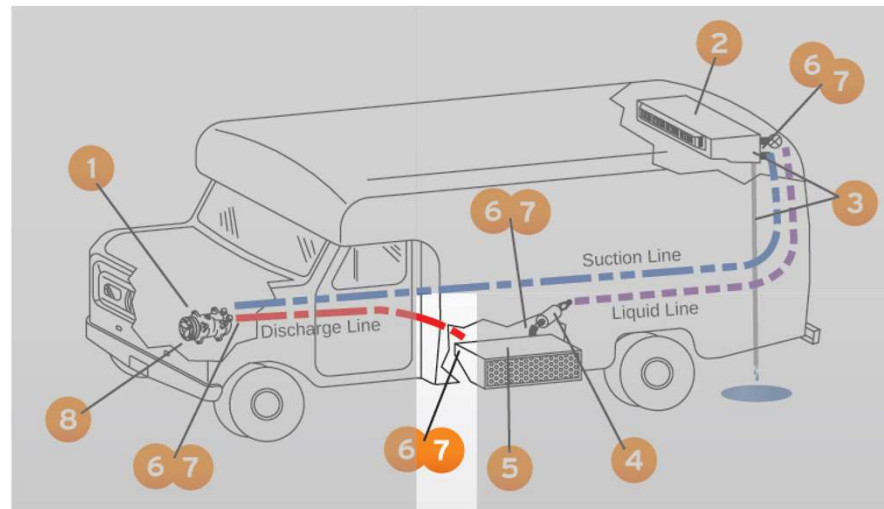


6 - Hose / Piping (Monthly)

- Ensure they are secured and protected
- Properly supported hoses prevent the possibility of refrigerant leaks
- Check for residue around connections (sign of refrigerant leak) / Hose Wear from rubbing other objects / loose or missing clamps

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule

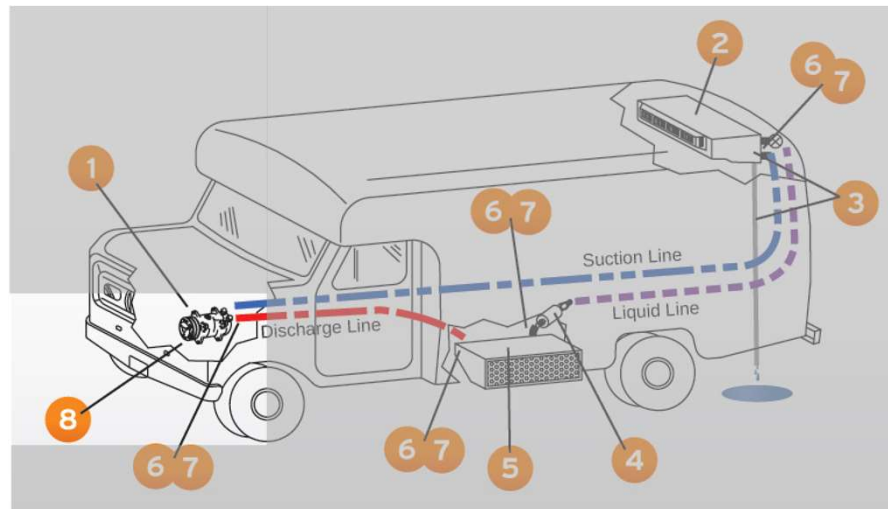


7 - Wiring Harness(es) (Monthly)

- Ensure they are secured and protected
- Properly supported harnesses prevent the possibility of electrical shorts
- Keep harness from anything hot, sharp, or moving.

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

Preventative Maintenance Schedule



8 - Compressor Belt(s) (**Weekly**)

- Check for tension and wear
- Properly tensioned belts will ensure maximum compressor performance and belt life

Use extreme caution around engine compartment and any other moving parts.
Have system serviced by a qualified technician.

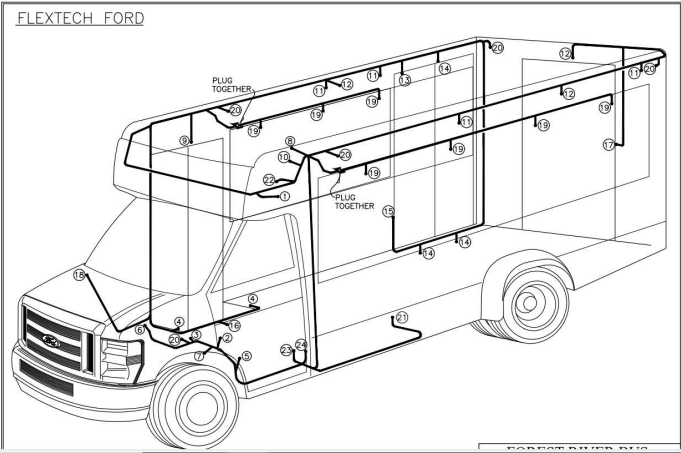
Electrical Overview

How the install relates to the wiring schematics

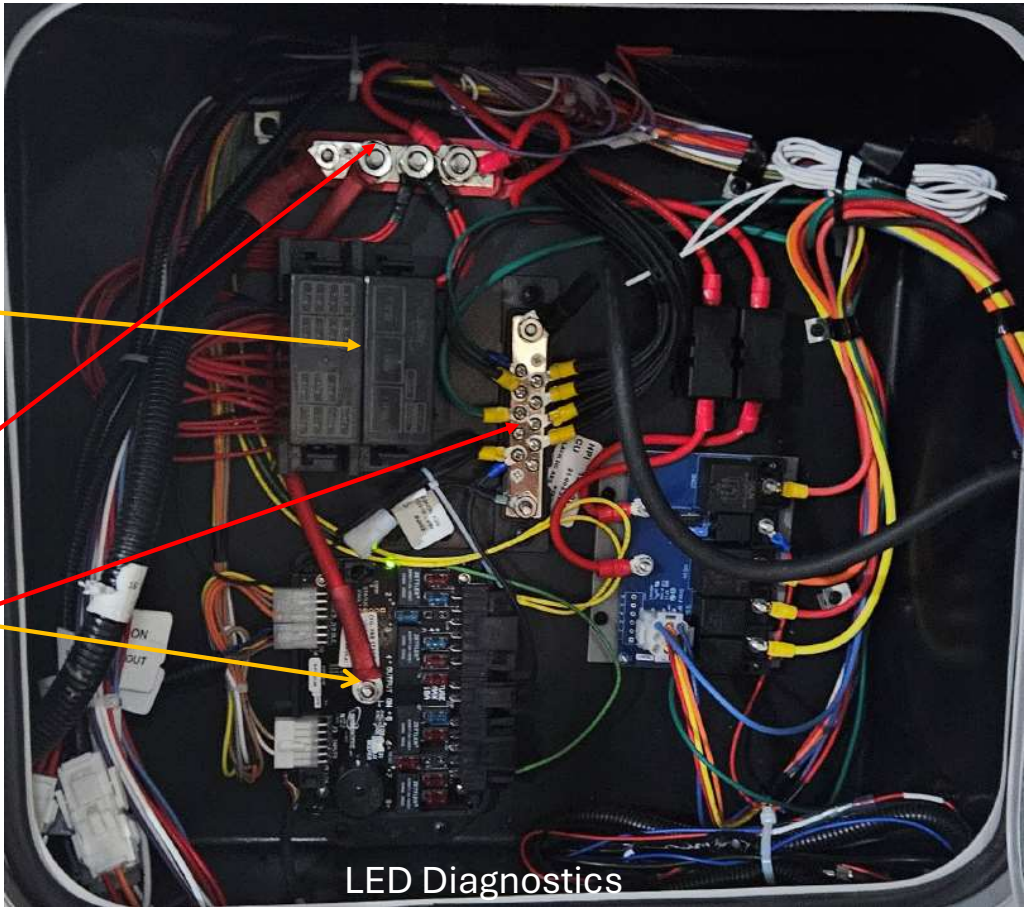
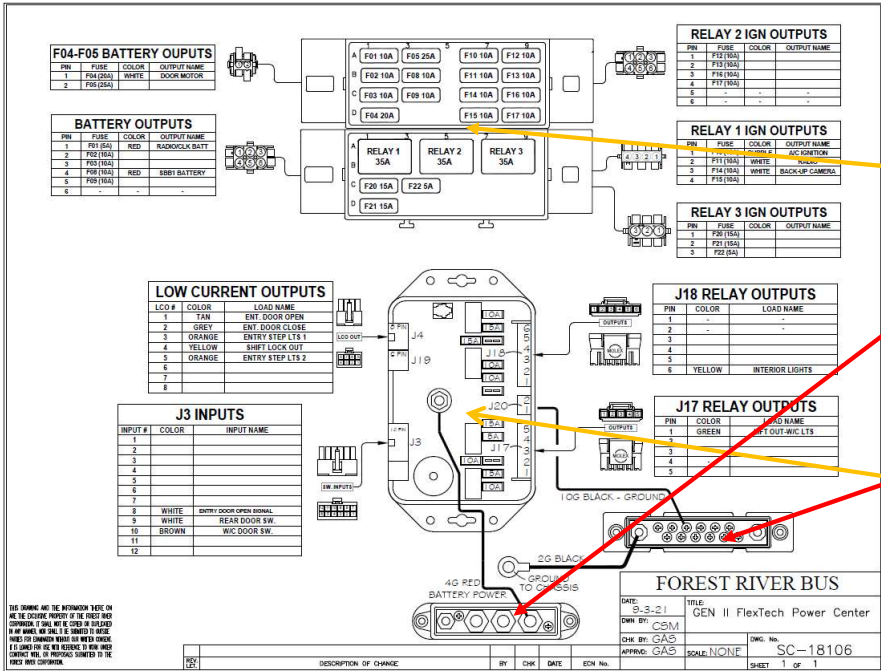
ELECTRICAL SYSTEM



- Each electrical center is built specific to your unit
- Fewer parts=fewer breakdowns
- Plug and play=faster installs and repairs
- Real time diagnostic
- Customizable to your needs



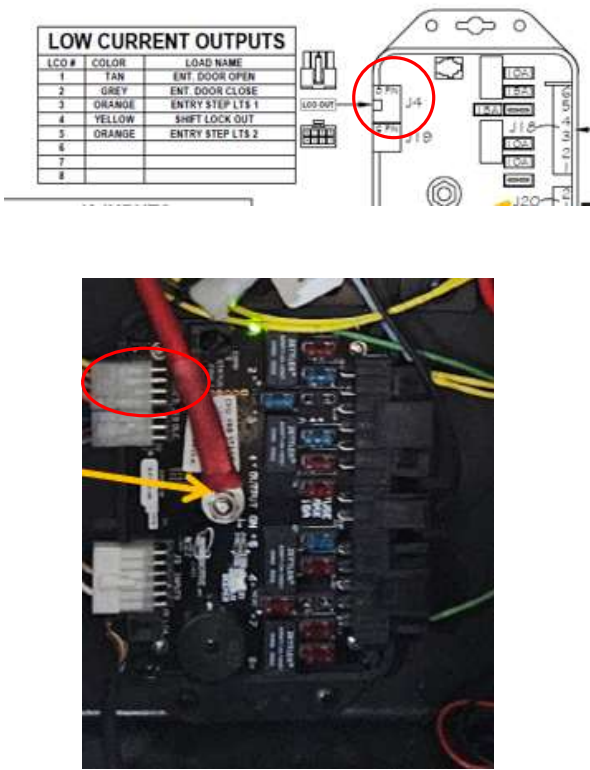
The main power center



FlexTech Configuration Summary

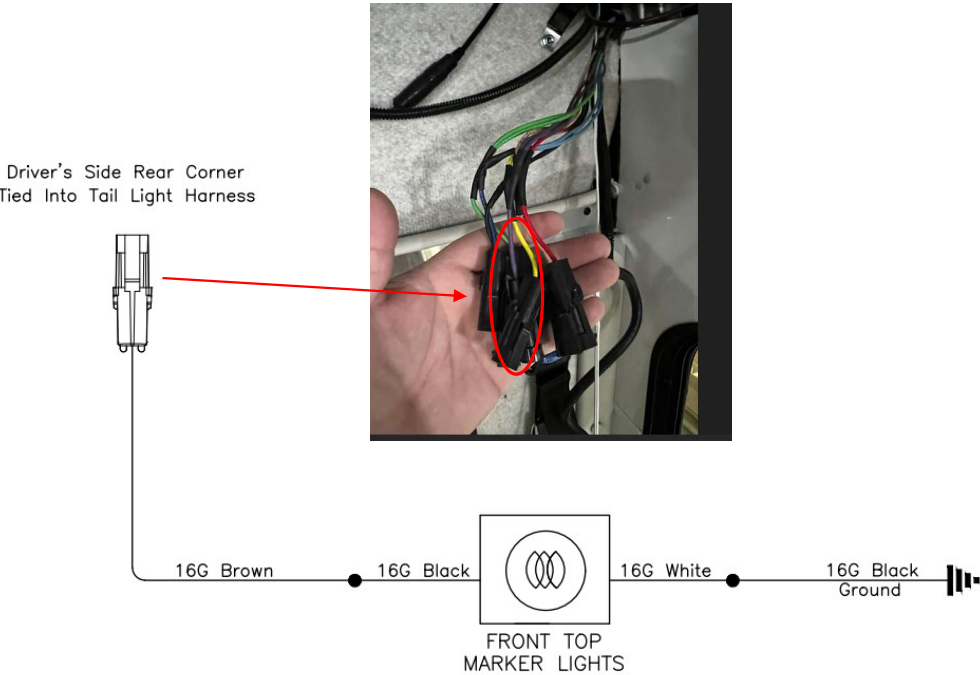
Configuration: FRB STAND

PRPC: Low Current Outputs								
	LCO1	LCO2	LCO3	LCO4	LCO5	LCO6	LCO7	LCO8
Label:	ENTRY DOOR OPEN	ENTRY DOOR CLOSE	STEP LTS 1	SHIFT LOCK OUTPUT	STEP LTS 2	VSS 2.2Hz/MPH	-	4 WAY FLASHING LTS
Pin Number:	(J4-1)	(J4-2)	(J4-3)	(J4-4)	(J4-5)	(J4-6)	(J4-7)	(J4-8)
Wire colors: (solid-stripe)	TN	GY	OG	YE	OG			YE-BN
Max Load:	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A
Nominal Load:	0.15A	0.15A	-	-	-	-	-	-
IGN/VBAT:	Battery Hot	Battery Hot	Battery Hot	Ignition Hot	Battery Hot	Ignition Hot	Ignition Hot	Ignition Hot
Mode:	Momentary	Momentary	Momentary	Momentary	Momentary	Momentary	Momentary	Flashing - Momentary
Timers:	Off time: 0 On time: 0	Off time: 0 On time: 0	Off time: 0 On time: 0	Off time: 0 On time: 0	Off time: 0 On time: 0		Off time: 0 On time: 0	Off time: 0.5 On time: 2.0
Equation:	Eqn. 1	Eqn. 1	Eqn. 1	Eqn. 1	Eqn. 1	Eqn. 1	Eqn. 1	Eqn. 2
Logic A:	SBB1 IN ENTRY DOOR SW OPEN Active	SBB1 IN ENTRY DOOR SW CLOSE Active	PRPC IN IN8 AUX Door = Active	None	PRPC IN IN8 AUX Door = Active	2.2Hz/MPH	None	PRPC OUT HAZARDS Off
Logic B:	None	None	None	None	None	None	None	PRPC OUT DOOR INPUT On
Logic C:	TR = P	TR = P	None	None	None	None	None	PRPC OUT 4 WAY FLASH On
Logic D:	PRPC IN TRANS=PAR K 4 ENTRY DOOR < 3.0	PRPC IN TRANS=PAR K 4 ENTRY DOOR < 3.0	None	None	None	None	None	PRPC OUT DISABLE TRIGGER On
Logic E:	None	None	None	None	None	None	None	None
Logic F:	None	None	None	None	None	None	None	None
Eqn. 1: (A OR B) AND (C OR D) AND (E OR F) Eqn. 2: (A AND B) OR (C AND D) OR (E AND F)								



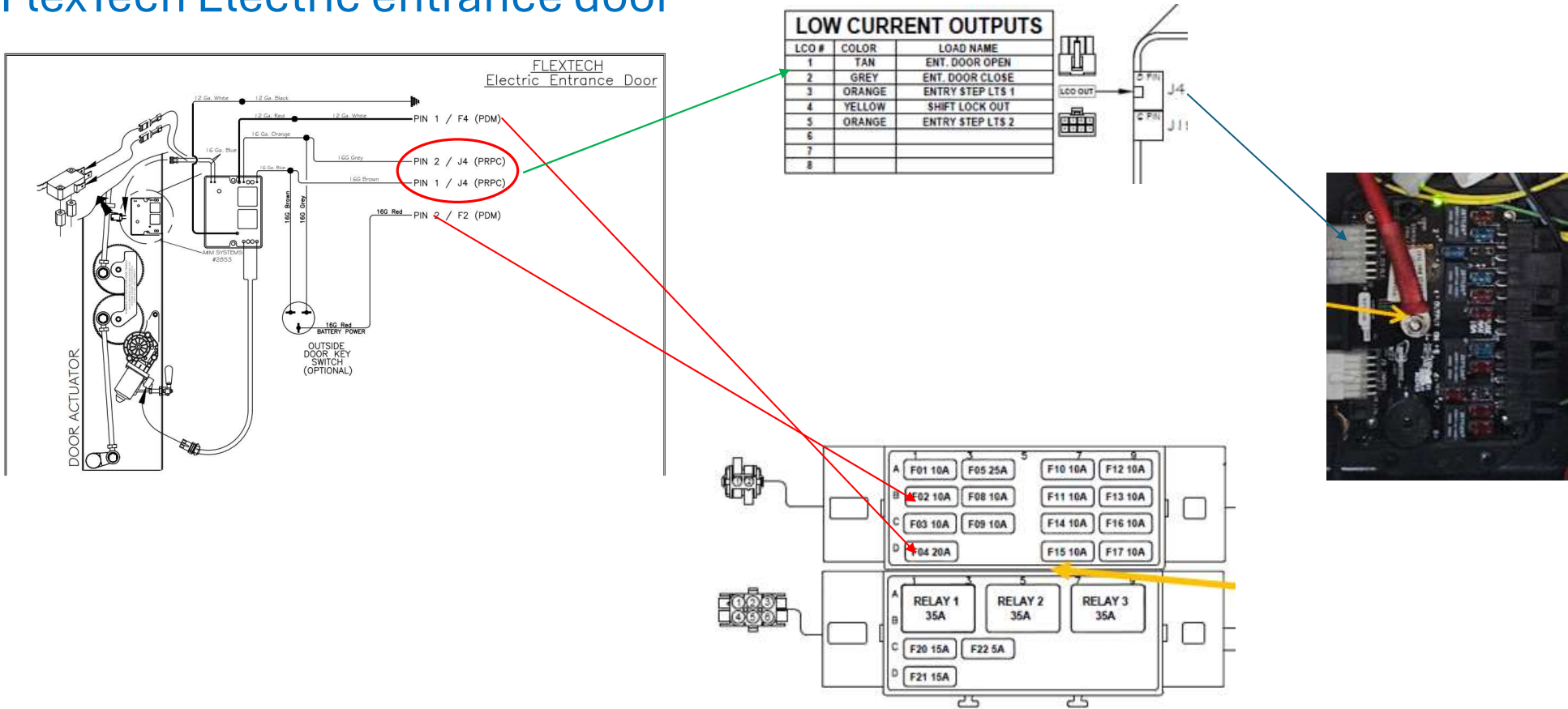
- LCOs (Low Current Outputs) are triggered by multiple driver inputs, such as the entry door, PB, WC, or rear door being opened

FlexTech Front top marker lights

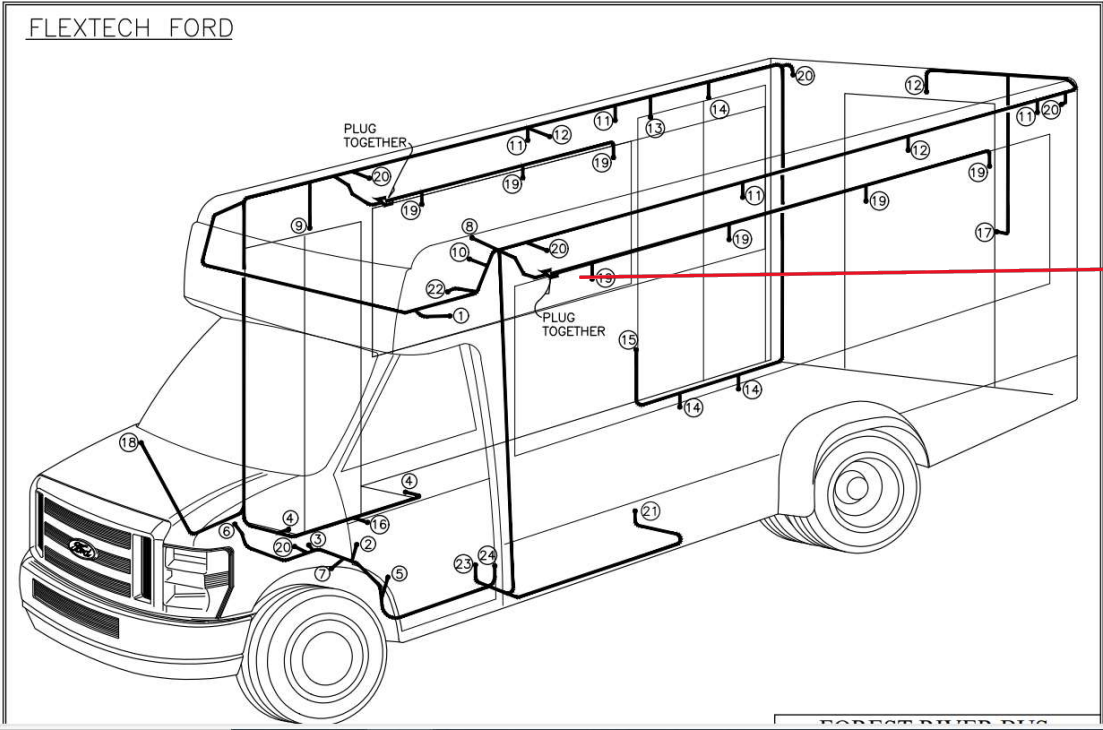


- This harness runs the length of the bus. It begins inside the front cap, supplying power to the front marker lights, then continues along the driver-side wire bar. From there, it connects to the rear cap harness, which ultimately ties into the Ford plug located under the bus between the rear frame rails.

FlexTech Electric entrance door

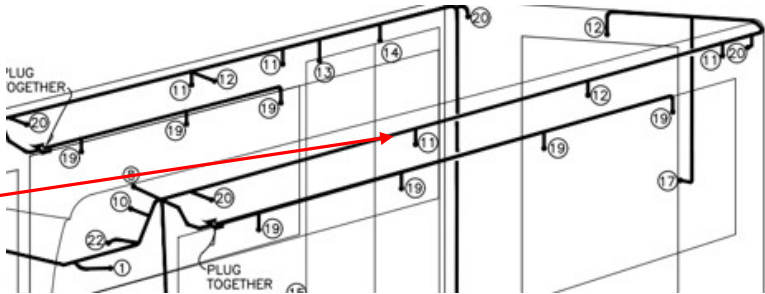
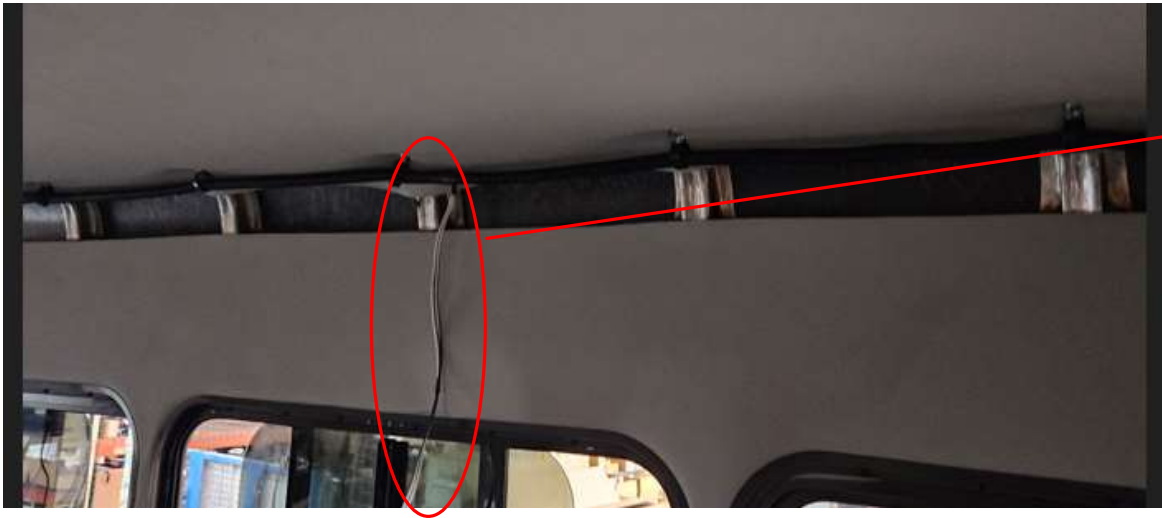


FlexTech harness routing



- Overhead luggage rack drops when needed.
- Our harness are built specific for each unit.

Wire Bar Harness

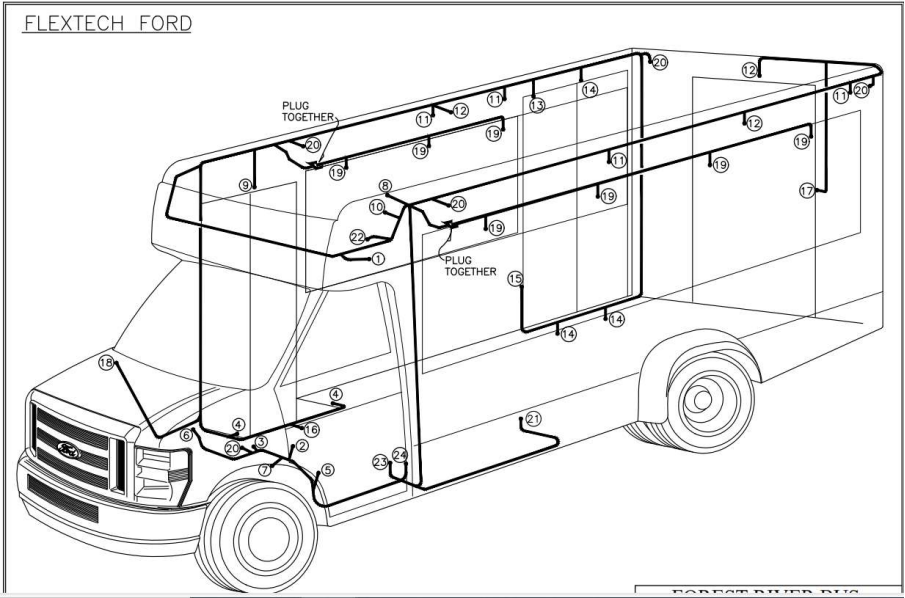


- The wire bar harness runs down both sides of the unit, p clamped every 16"
- For units up to 26 foot there are 4 wire drops two per side for interior lighting. Additional lighting can be specked.

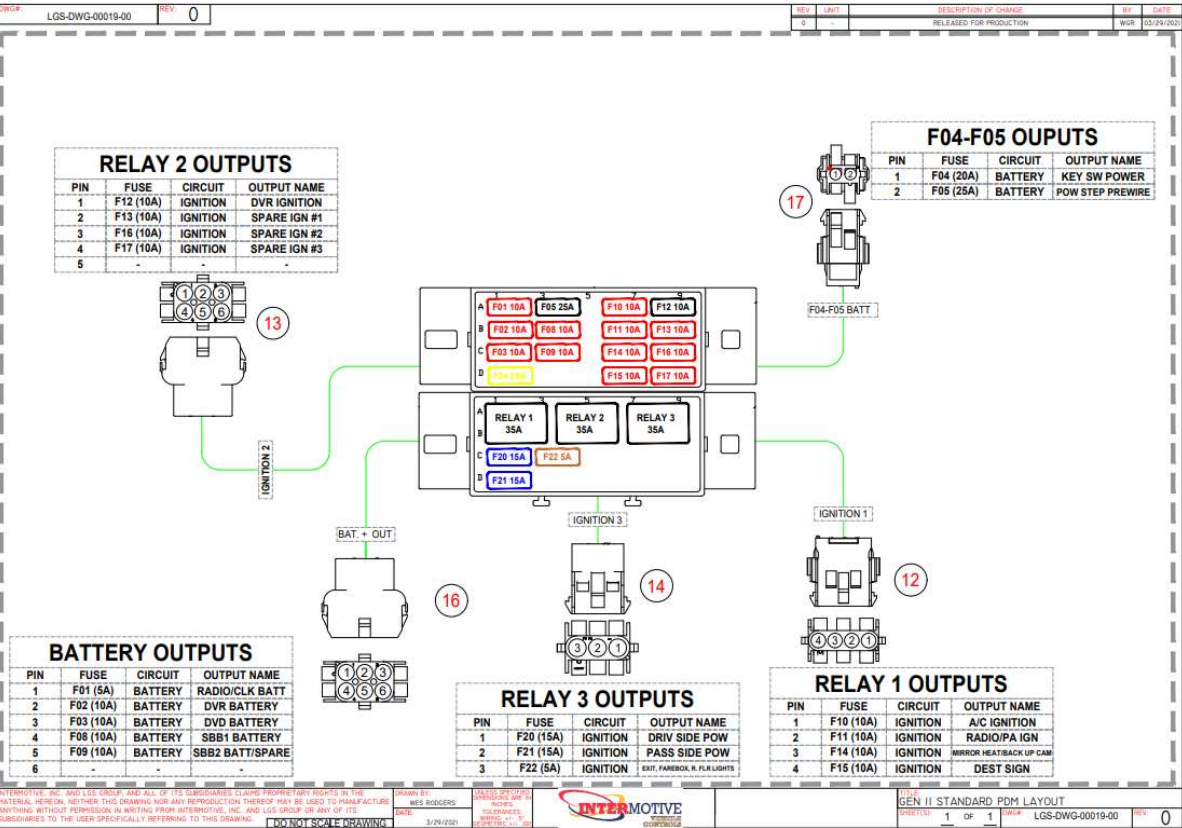
FlexTech wiring schedule

#	DESCRIPTION	DESCRIPTION DETAIL	WIRE GAUGE	WIRE COLOR
1	Main Distribution Panel			
2	OEM Ignition Tie-In		16	BLUE
3	Intermotive Module		16	WHITE
4	Step Lights		16	ORANGE
5	OEM Tail Light Tie-In		16	BROWN
6	Radio & PA	Battery	16	RED
		Ignition	16	WHITE
7	Power Mirror		16	WHITE
8	TV/ Video		16	ORANGE
9	Electric Door Header	Motor Power	12	GRAY
		Door Closed	16	WHITE
		Door Open	16	BROWN
10	Marker Light		16	BROWN
11	Interior Light		16	YELLOW
12	Emergency Exit Lights		16	PURPLE
13	Lift Door Switch		16	BROWN
14	Lift Door Activated Lights		16	GREEN
15	Lift Activation from Interlock		16	GREEN
16	Step Heater		14	BROWN
17	Rear Door Switch		16	WHITE
18	Exterior Door Key	Door Open	16	WHITE
		Door Closed	16	BLUE
19	Reading Lights	Switched Power	16	GREEN
		Ignition Power	16	PURPLE
20	Speakers		20	RED/Blk, YELLOW/Blk, GREEN/Wht & BLUE/Wht
21	Heater- Standard Front or Optional Rear Location	High Heat	14	ORANGE
		Low Heat	14	RED
22	Driver Dome Light		16	ORANGE & WHITE
23	Driver Dome OEM Tie-In		16	ORANGE & WHITE
24	Heater Fan OEM Tie-In	High Fan	18	ORANGE
		Low Fan	18	RED

- This is an example of our standard wire drop/locations of the wiring system

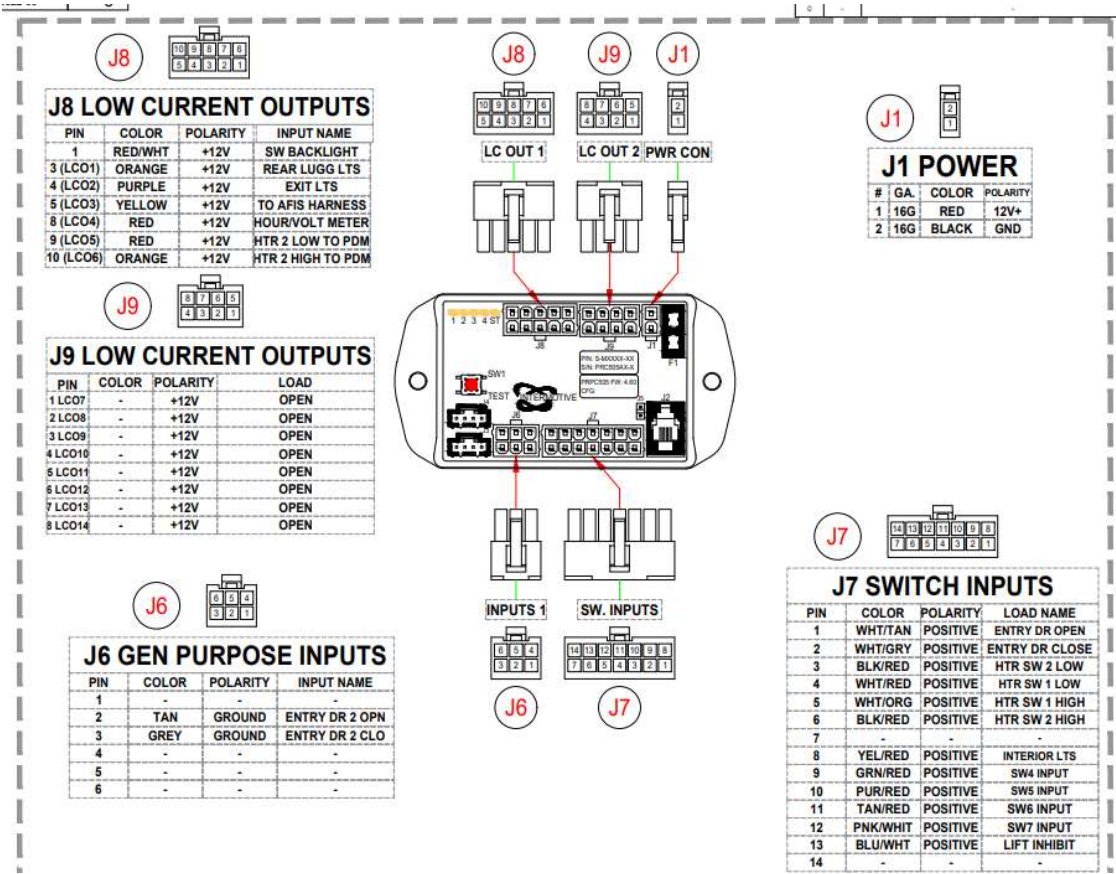


Relay layouts

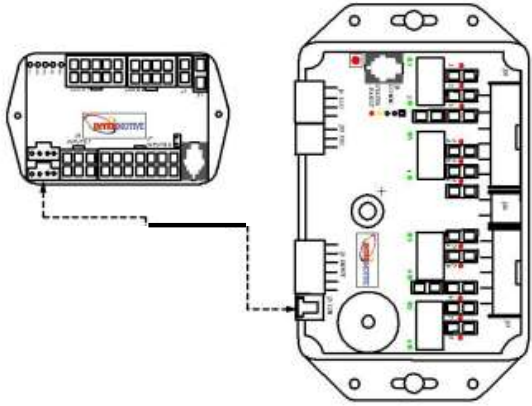


- Provides extra fuse protection for optional components on both battery and ignition circuits, and offers additional tie-in points so you don't need to use the OEM fuse panel.

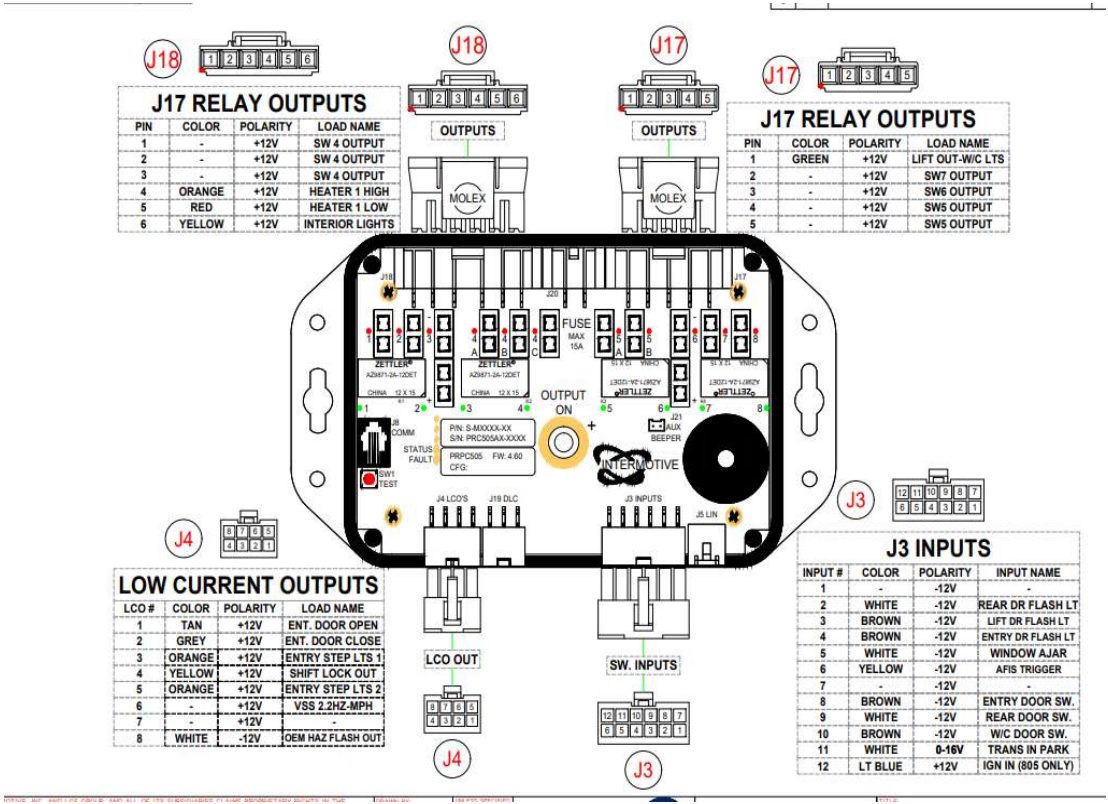
Switch backer board



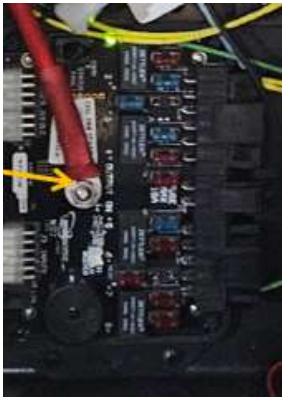
- This is the switch panel module, located beneath the switch panel. It communicates directly with the PRPC board.



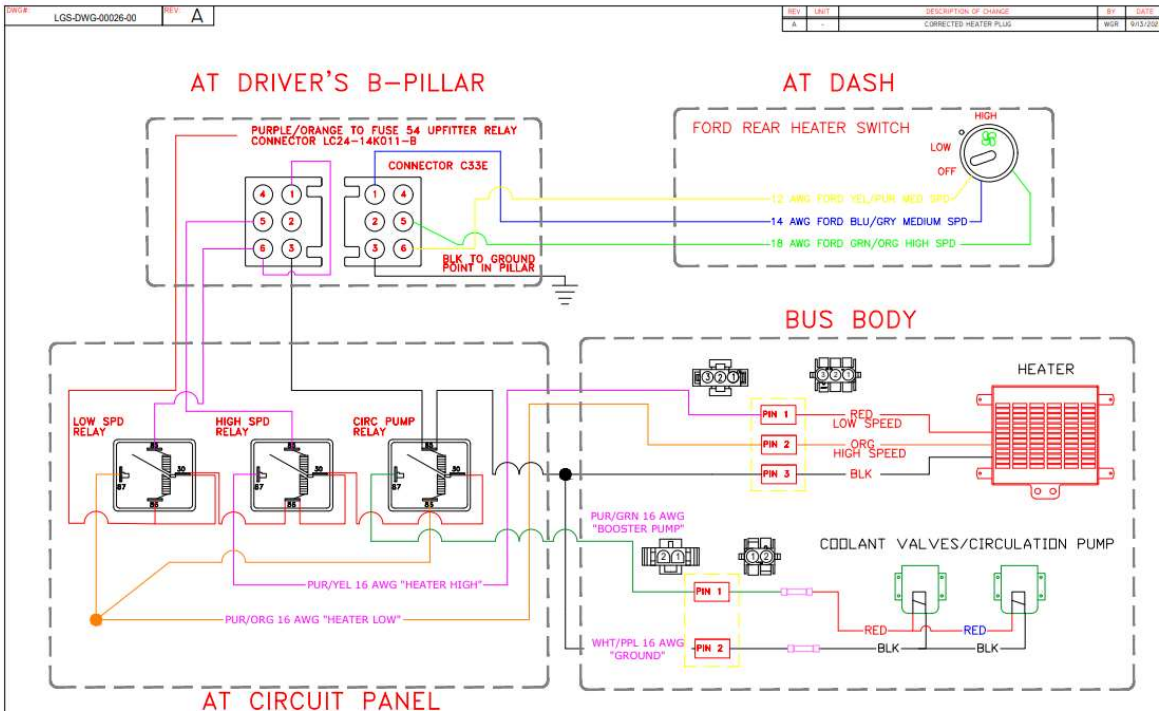
Standard configuration layout



- Programable relay power center, (PRPC) controls Switch outputs is programable and has a built-in alarm for when you need one.
- Has LED lights indicating whether you have a blown fuse or not.

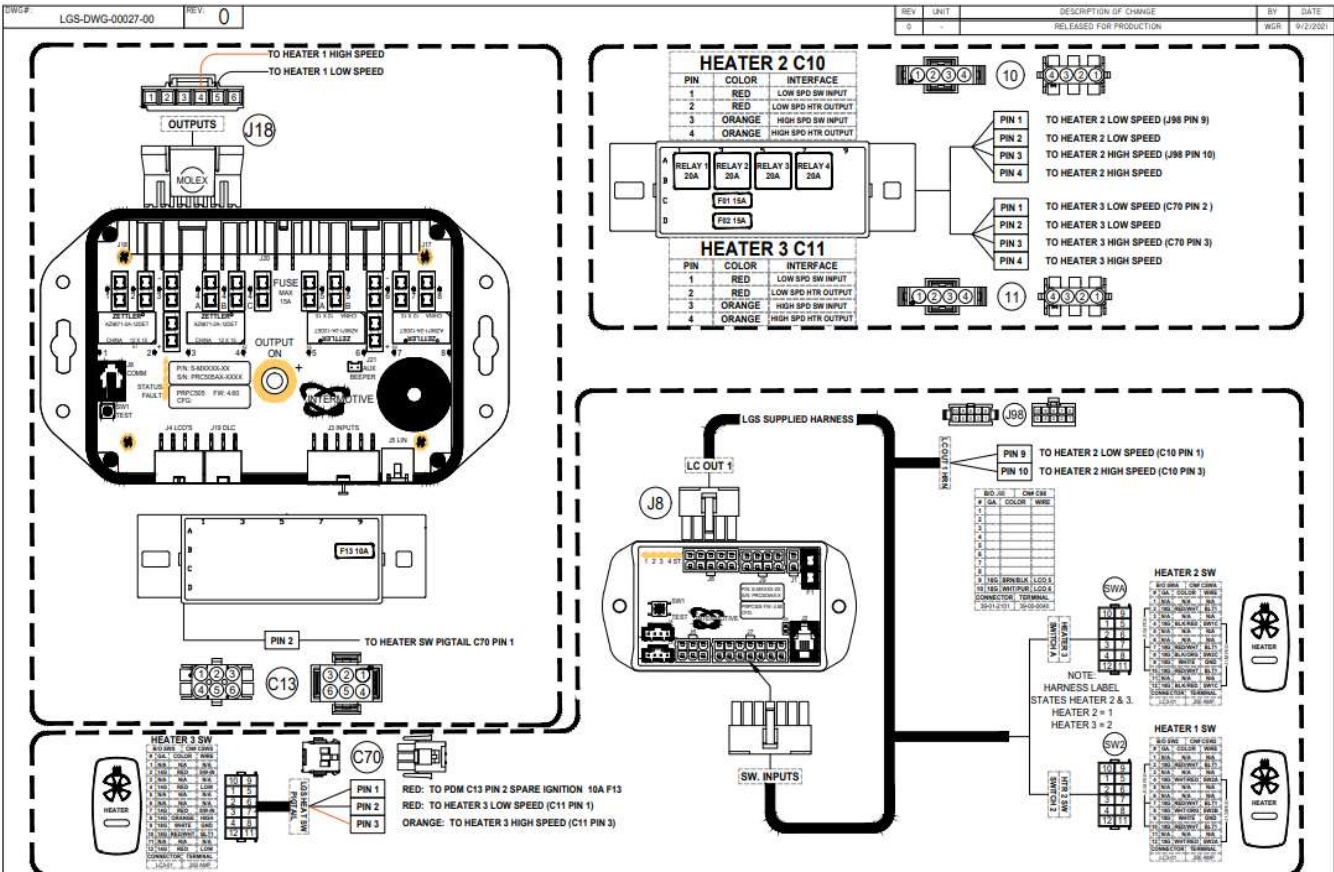
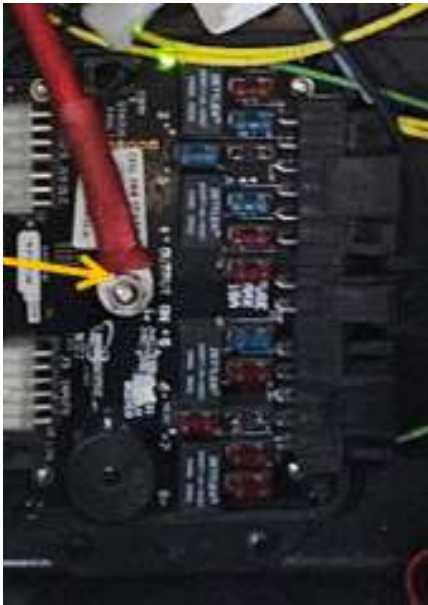


Heater layout at board

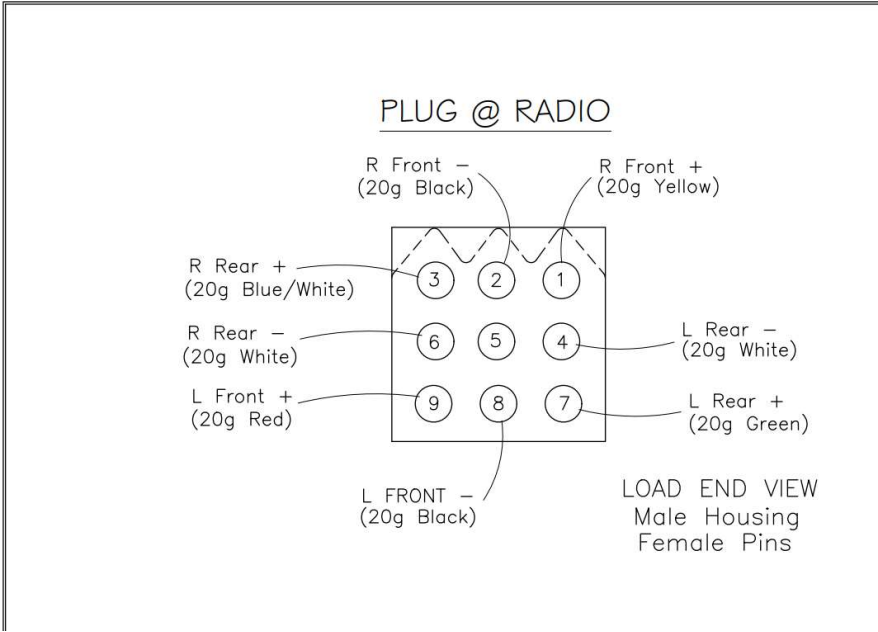


- Multiple Heaters use different schematics
- OEM controlled auxiliary heater shown
- Note that multiple heaters will use a different schematic

Heater wiring layout

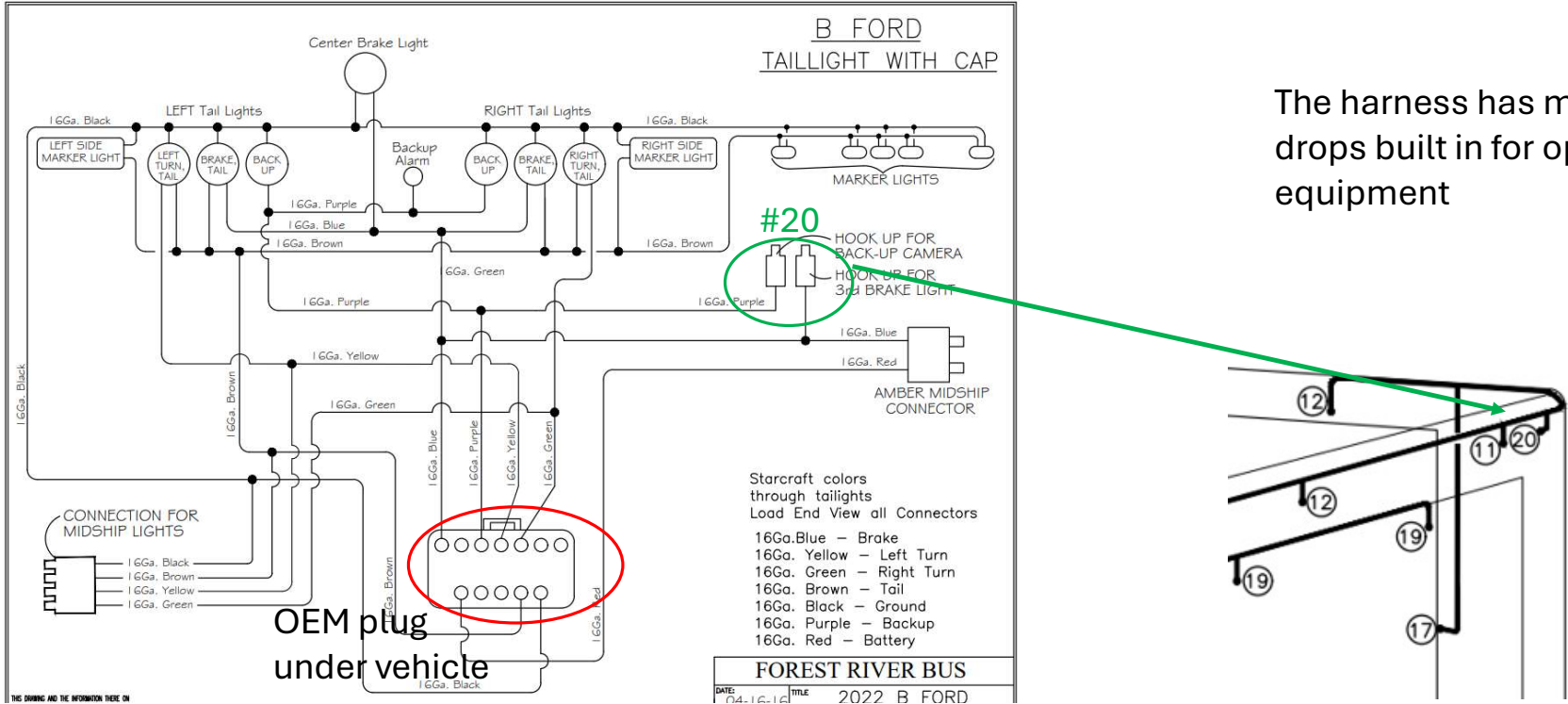


Radio plug



- Speaker shut off excluding OEM

Ford taillight with cap



Rear Cap Harness



The rear cap harness is secured with adhesive zip ties. For troubleshooting, key sections of the harness can be accessed through the light openings. Common failure points include connectors that may not be fully seated, which can be checked by removing the light. Each light includes over 6” of extra wire to allow for repairs



Looking Forward:
We are Partnering with our
customers to ensure
safety and reliability that
supports both operators
and passengers.

Questions and Opportunities