General Bus, AC and Lift Maintenance

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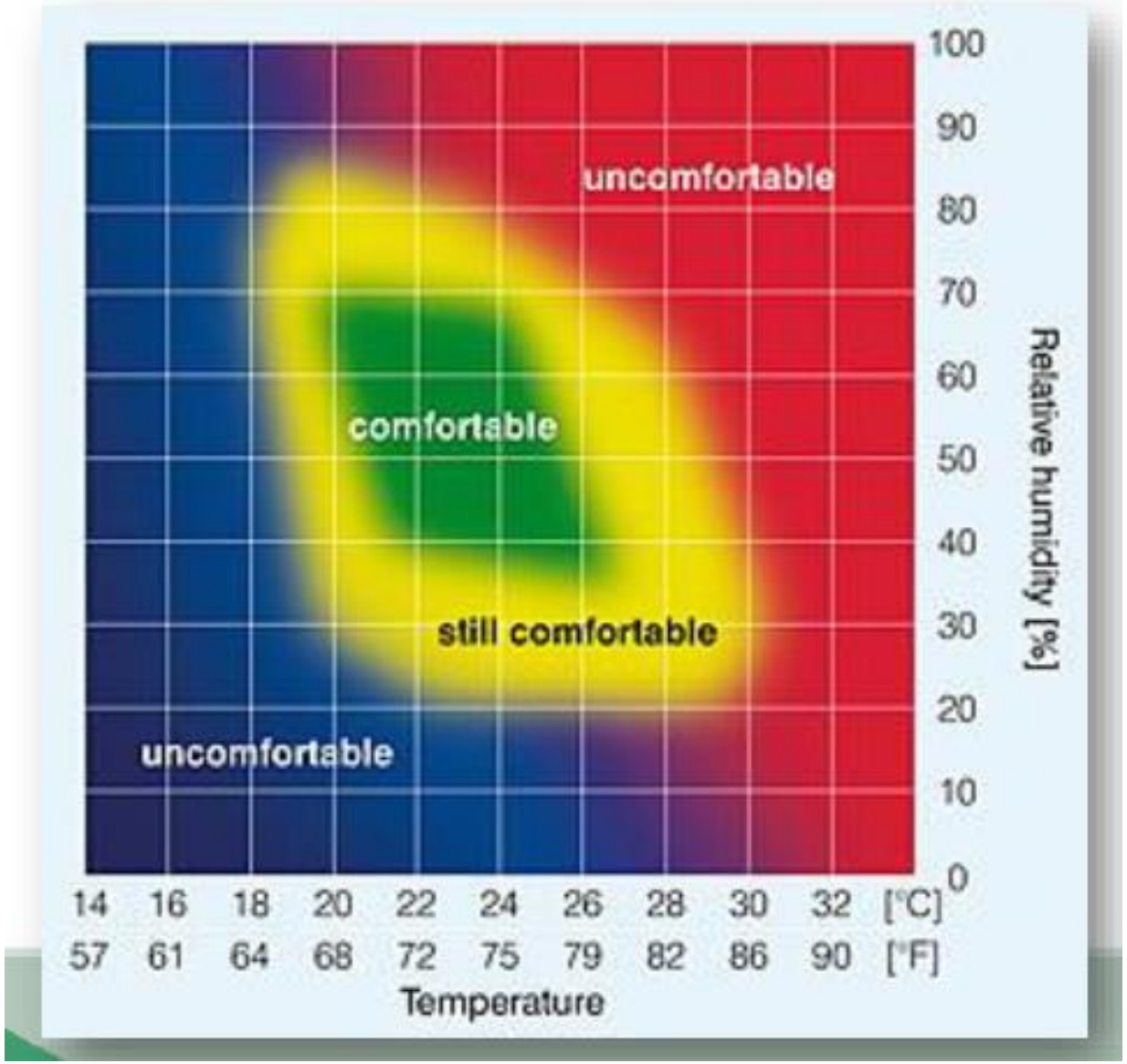
NORTH CENTRAL
BUS & EQUIPMENT, INC
employee owned

Trans/Air®
Manufacturing Corporation

Must Do's to get the Most from Your Bus AC

Get into the Comfort Zone



Bus Air Conditioning

What is bus air conditioning?

Goal of Air Conditioning

- ✓ Reduce Temperature
- ✓ Filter Air
- ✓ Dehumidify
- ✓ Circulate Air

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#1

Register your bus a/c system for warranty.
This is important for several reasons…

- ✓ If you call for help the manufacturer can know what you have in your bus
- ✓ Occasionally there are product improvements or service bulletins that can affect reliability or performance
- ✓ In some rare cases a Safety Campaign is necessary and it is critical to get in touch with the affected bus operators

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#2

Do a delivery Inspection to ensure the system is operating properly

- ✓ Check the sight glass to ensure the system is dry when delivered – if this is not addressed a compressor failure is in your future

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#3

Train drivers on proper operation of the system controls, this will alleviate service write ups

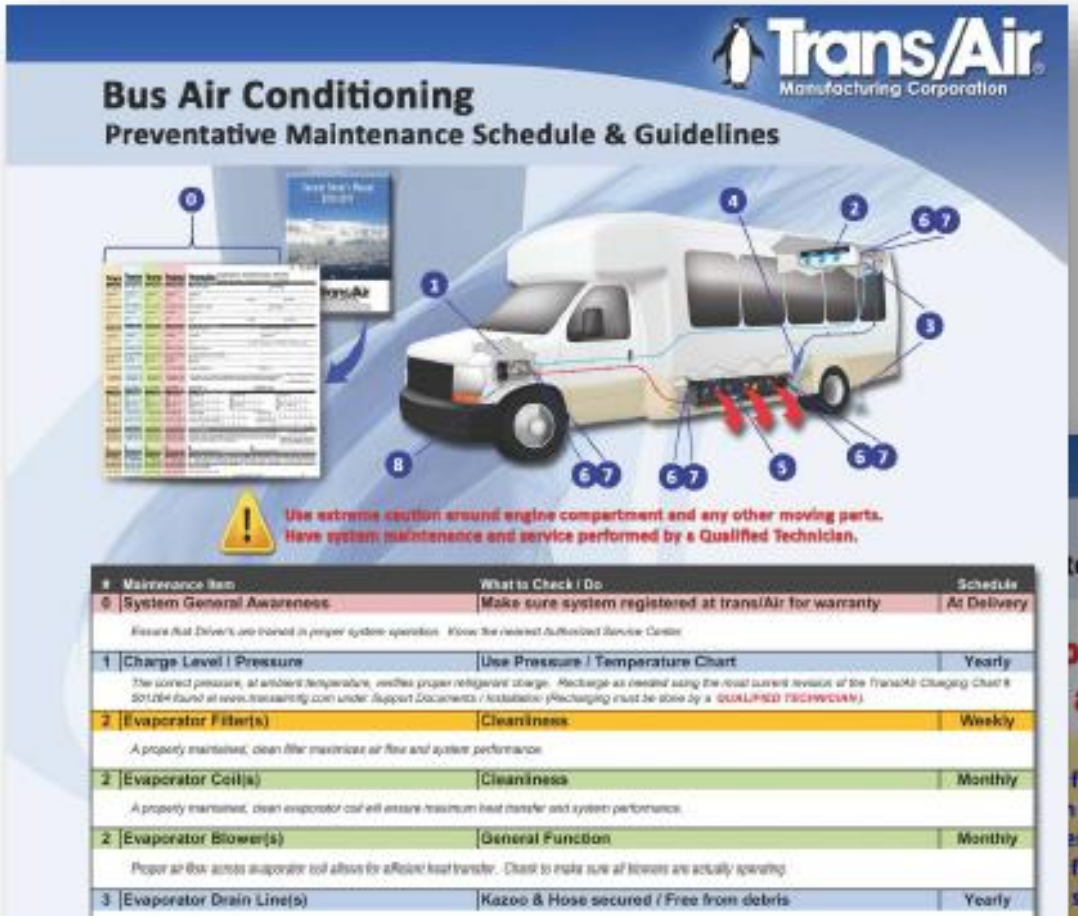
- ✓ In colder temps below 65 degrees the system will generally not engage the compressor
- ✓ Percentage of service calls are from not turning on the system

Top 10 Actions

<u>Must Do's</u> to Get the Most from Your Bus AC

#4

Do a pre-season check-up



Trans/Air Manufacturing Corporation

Bus Air Conditioning

Preventative Maintenance Schedule & Guidelines

Use extreme caution around engine compartment and any other moving parts. Have system maintenance and service performed by a Qualified Technician.

#	Maintenance Item	What to Check / Do	Schedule
0	System General Awareness	Make sure system registered at transAir for warranty	At Delivery
	Ensure that Driver's are trained in proper system operation. Know the nearest Authorized Service Center		
1	Charge Level / Pressure	Use Pressure / Temperature Chart	Yearly
	The correct pressure, at ambient temperature, verifies proper refrigerant charge. Recharge as needed using the most current revision of the TransAir Charging Chart # 501264 found at www.transairmfg.com under Support Documents / Installation (Recharging must be done by a QUALIFIED TECHNICIAN).		
2	Evaporator Filter(s)	Cleanliness	Weekly
	A properly maintained, clean filter maximizes air flow and system performance		
2	Evaporator Coil(s)	Cleanliness	Monthly
	A properly maintained, clean evaporator coil will ensure maximum heat transfer and system performance.		
2	Evaporator Blower(s)	General Function	Monthly
	Proper air flow across evaporator coil allows for efficient heat transfer. Check to make sure all blowers are actually operating		
3	Evaporator Drain Line(s)	Kazoo & Hose secured / Free from debris	Yearly

Bus Air Conditioning

tenance Schedule & Guidelines

ons require

a Qualified Technician:

from engine compartment

hose connections

nger area from Evaporator/Ducts

from evaporator area

system performance

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#5

If during your check out you find a leak…

Do not just add refrigerant

- ✓ A leak of refrigerant also leaks lubricant
- ✓ Over time just topping off the refrigerant will reduce the lubricant to a level where you will have the equivalent of running an engine without oil

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#6

If you have a compressor failure it is generally a symptom not a cause

You must find the reason it failed before putting another compressor on the bus

- ✓ Clutch – low voltage, alternator failure, bad ground, lubricant leaked out, cross wired systems, cycling from Low Pressure or high pressure, etc.
- ✓ Must properly flush and clean system or you will be replacing many compressors on this system
- ✓ Be sensitive to lubricant levels – too much or too little is an issue

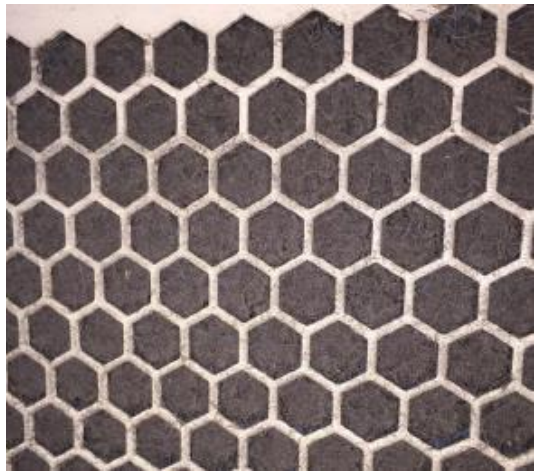
Top 10 Actions

Must Do's to Get the Most from Your Bus AC

Clean Coils Cool!

#7

- ✓ Clean evaporator inlet filters – in extreme cases can cause compressor failure or reduced performance
- ✓ Condenser coils cleaned with non-caustic cleaner

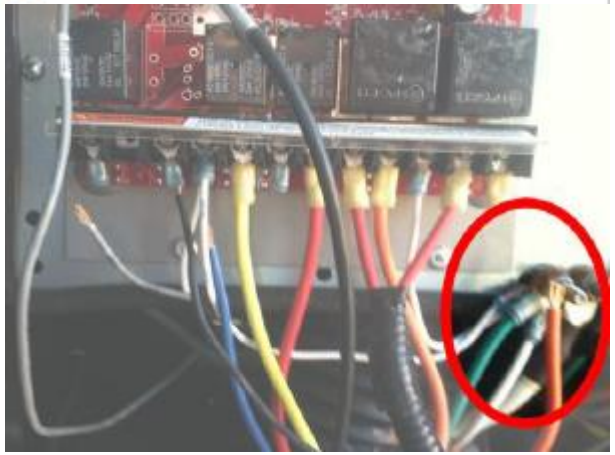


Top 10 Actions

Must Do's to Get the Most from Your Bus AC

#8

Electrical connections must be checked occasionally for evidence of heat, corrosion, or chaffing



Top 10 Actions

Must Do's to Get the Most from Your Bus AC

Trans/Air

#9

Listen for noisy motors or squealing belts

Top 10 Actions

Must Do's to Get the Most from Your Bus AC

Trans/Air

#10

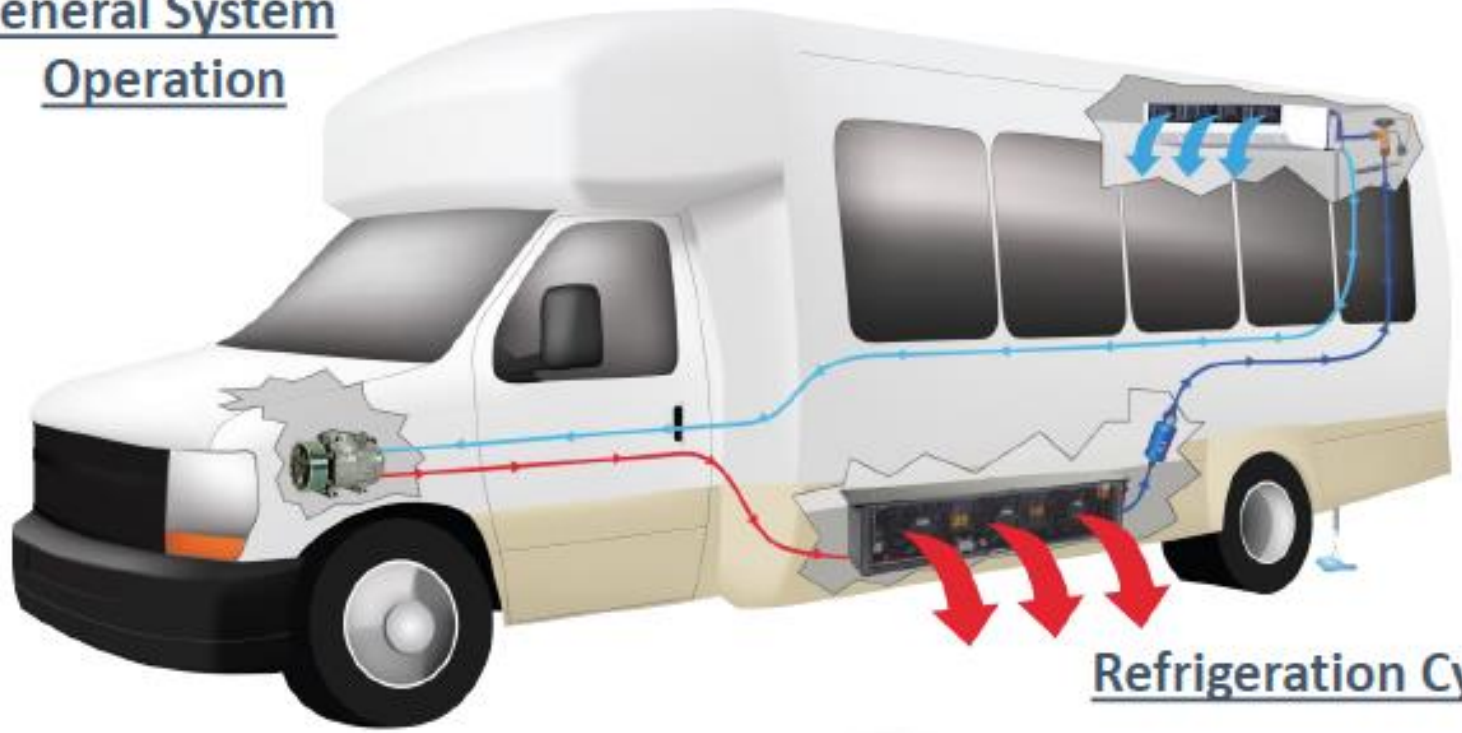
WE CARE!

Do not hesitate to inform someone if you are having an issue with your A/C system

Bus Air Conditioning

What is bus air conditioning?

General System Operation

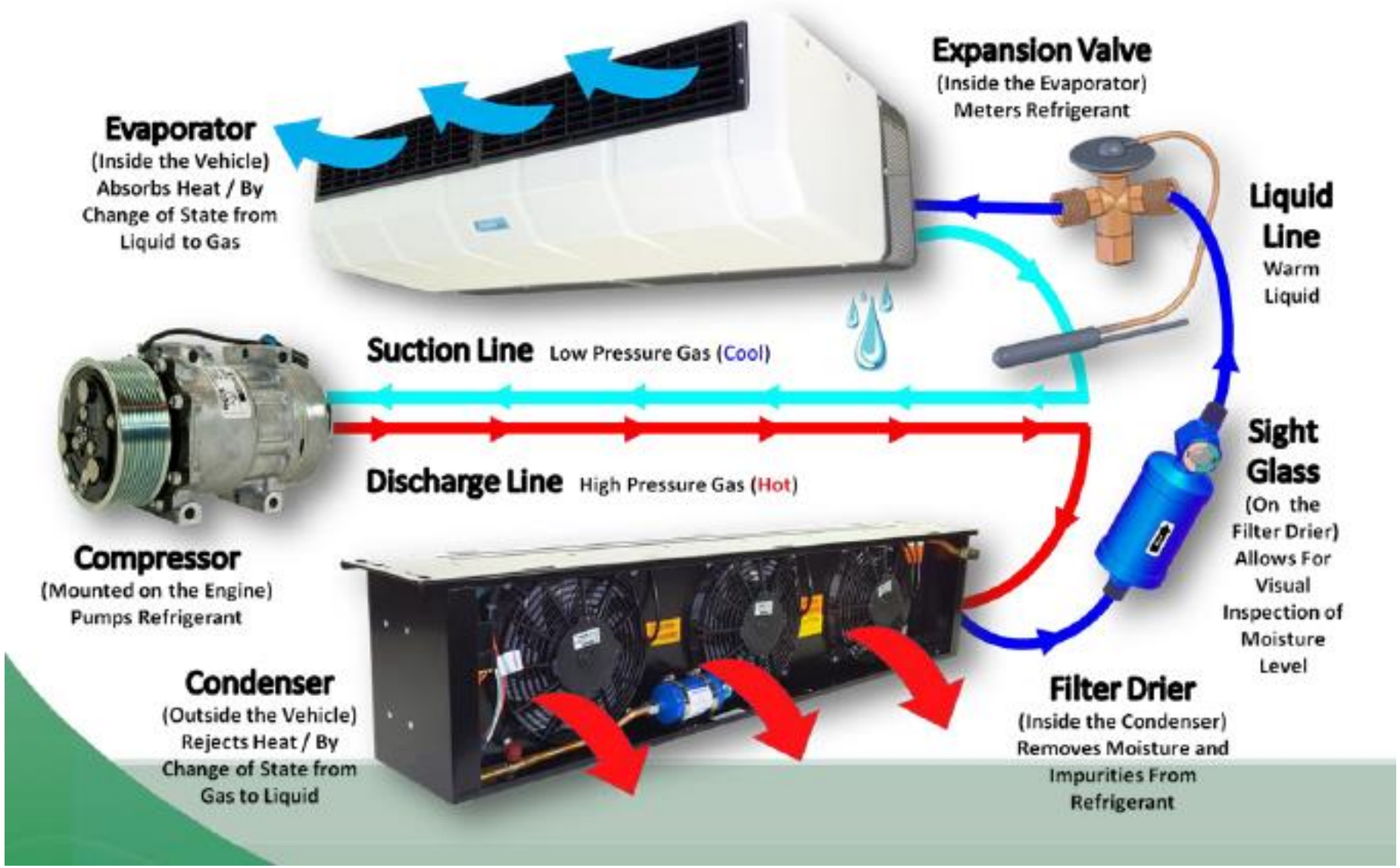


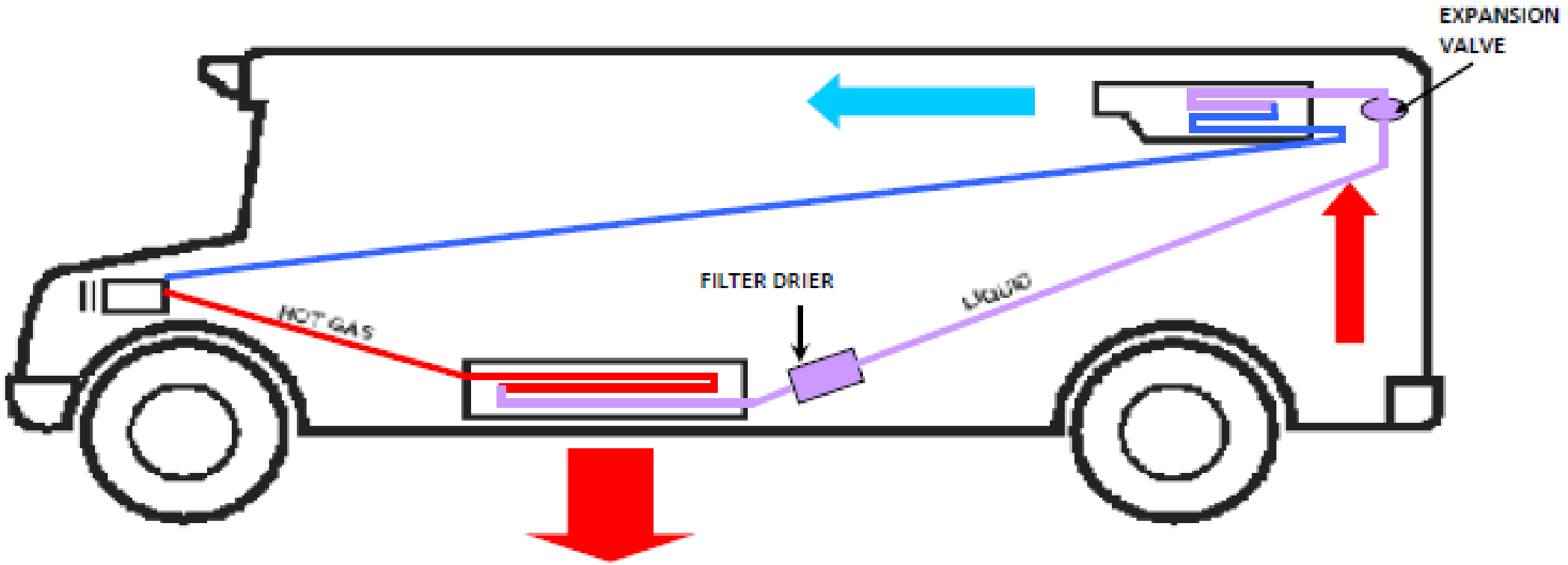
Refrigeration Cycle

Bus Air Conditioning

What is bus air conditioning?

1. Engine driven compressor pumps hot gas refrigerant through discharge line to condenser.
2. Hot gas refrigerant condenses or undergoes a change of state into a liquid.
3. Condenser rejects heat transferred to the refrigerant by the evaporator to the outside air.
4. Compressor moves liquid refrigerant through the filter drier to the expansion valve which meters the liquid into the evaporator.
5. Liquid refrigerant changes from high pressure to low pressure, evaporates or undergoes a change of state into a gas.
6. Evaporator transfers heat from the passenger compartment into the refrigerant
7. Low pressure, superheated gas returns to the compressor through the suction line
8. The cycle is repeated


Evaporator
(Inside the Vehicle)
Absorbs Heat / By
Change of State from
Liquid to Gas
Expansion Valve
(Inside the Evaporator)
Meters Refrigerant
Liquid
Line
Warm
Liquid
Suction Line Low Pressure Gas (Cool)
Discharge Line High Pressure Gas (Hot)
Sight
Glass
(On the
Filter Drier)
Allows For
Visual
Inspection of
Moisture
Level
Compressor
(Mounted on the Engine)
Pumps Refrigerant
Condenser
(Outside the Vehicle)
Rejects Heat / By
Change of State from
Gas to Liquid
Filter Drier
(Inside the Condenser)
Removes Moisture and
Impurities From
Refrigerant


EXPANSION
VALVE
FILTER DRIER
HOT GAS
LIQUID

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 ☐

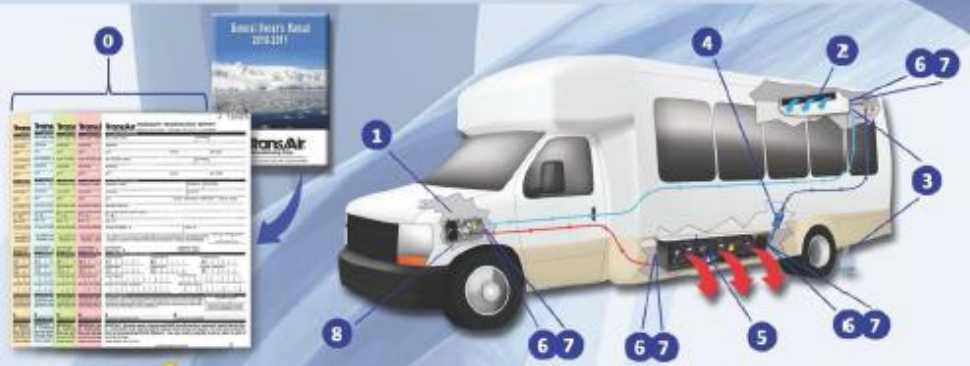
Evaporator (s)

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

Bus Air Conditioning

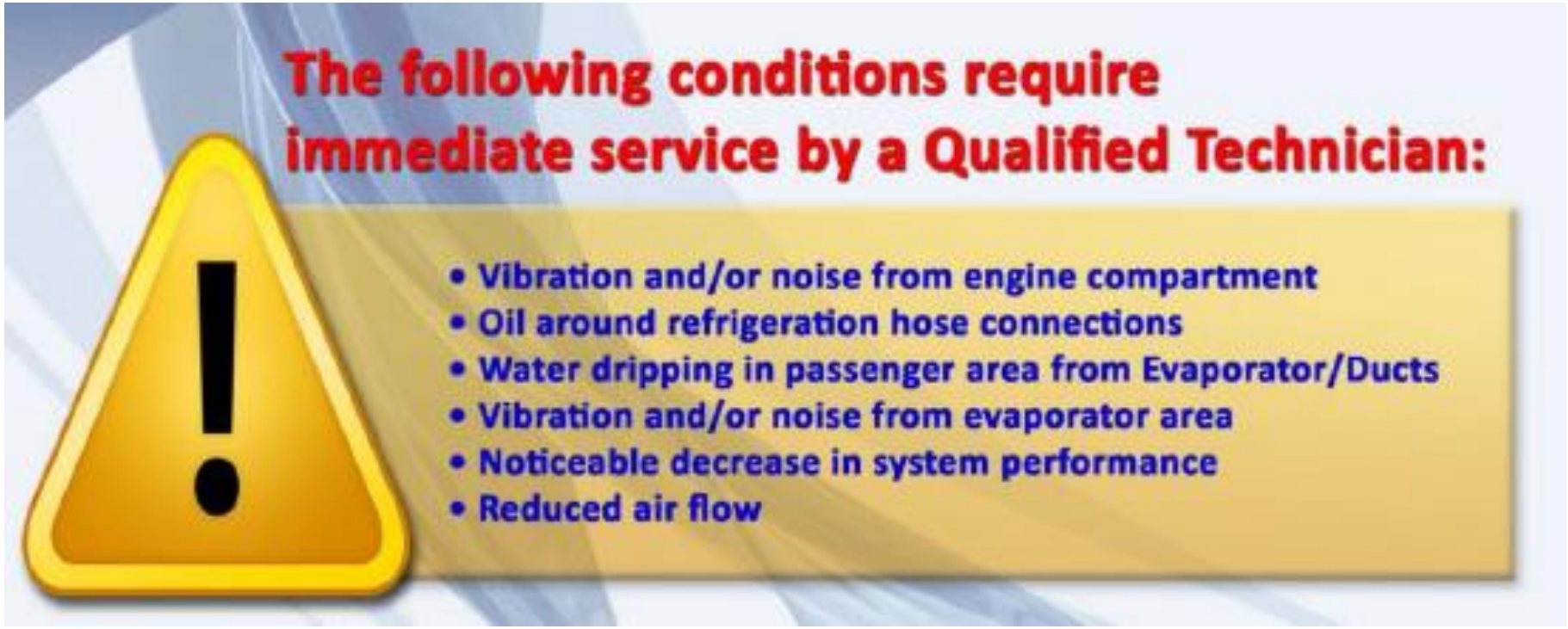
Preventative Maintenance Schedule & Guidelines

Trans/Air Manufacturing Corporation



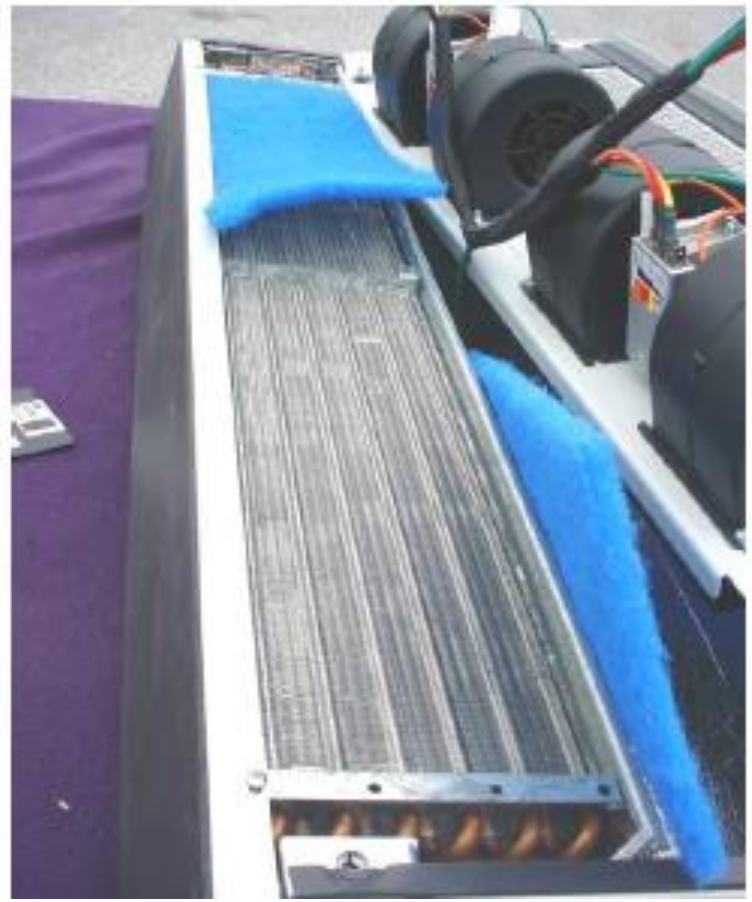
Use extreme caution around engine compartment and any other moving parts.
Have system maintenance and service performed by a Qualified Technician.

#	Maintenance Item	What to Check / Do	Schedule
0	System General Awareness	Make sure system registered at trans/Air for warranty	At Delivery
	Ensure that Driver's are trained in proper system operation. Know the nearest Authorized Service Center.		
1	Charge Level / Pressure	Use Pressure / Temperature Chart	Yearly
	The correct pressure, at ambient temperature, verifies proper refrigerant charge. Recharge as needed using the most current revision of the Trans/Air Charging Chart # 501264 found at www.transairmfg.com under Support Documents / Installation (Recharging must be done by a QUALIFIED TECHNICIAN).		
2	Evaporator Filter(s)	Cleanliness	Weekly
	A properly maintained, clean filter maximizes air flow and system performance.		
2	Evaporator Coil(s)	Cleanliness	Monthly
	A properly maintained, clean evaporator coil will ensure maximum heat transfer and system performance.		
2	Evaporator Blower(s)	General Function	Monthly
	Proper air flow across evaporator coil allows for efficient heat transfer. Check to make sure all blowers are actually operating.		
3	Evaporator Drain Line(s)	Kazoo & Hose secured / Free from debris	Yearly
	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.		
4	Sight Glass / Moisture Indicator(s)	Color	Monthly
	Deep Green OR Purple= Absence of Moisture *Yellow OR Pink = Moisture is present - IMMEDIATE SYSTEM SERVICE IS REQUIRED TO PREVENT SYSTEM DAMAGE*		
5	Condenser Coil(s)	Cleanliness	Monthly
	A properly maintained, clean condenser coil will ensure maximum heat transfer and system performance. Clean with non-caustic cleaner.		
5	Condenser Fan(s)	General Function	Monthly
	Proper air flow across condenser coil allows for efficient heat transfer. Check to make sure all fans are actually operating when compressor is engaged.		
6	Hoses / Piping	Secured and protected	Monthly
	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 clamping.		
7	Wiring Harness(es)	Secured and protected	Monthly
	Properly supported & protected harnesses prevents the possibility of electrical issues.		
8	Compressor Belt(s)	Tension and wear	Weekly
	Properly tensioned belts ensures maximum compressor performance and belt life.		


The following conditions require immediate service by a Qualified Technician:
• Vibration and/or noise from engine compartment
• Oil around refrigeration hose connections
• Water dripping in passenger area from Evaporator/Ducts
• Vibration and/or noise from evaporator area
• Noticeable decrease in system performance
• Reduced air flow

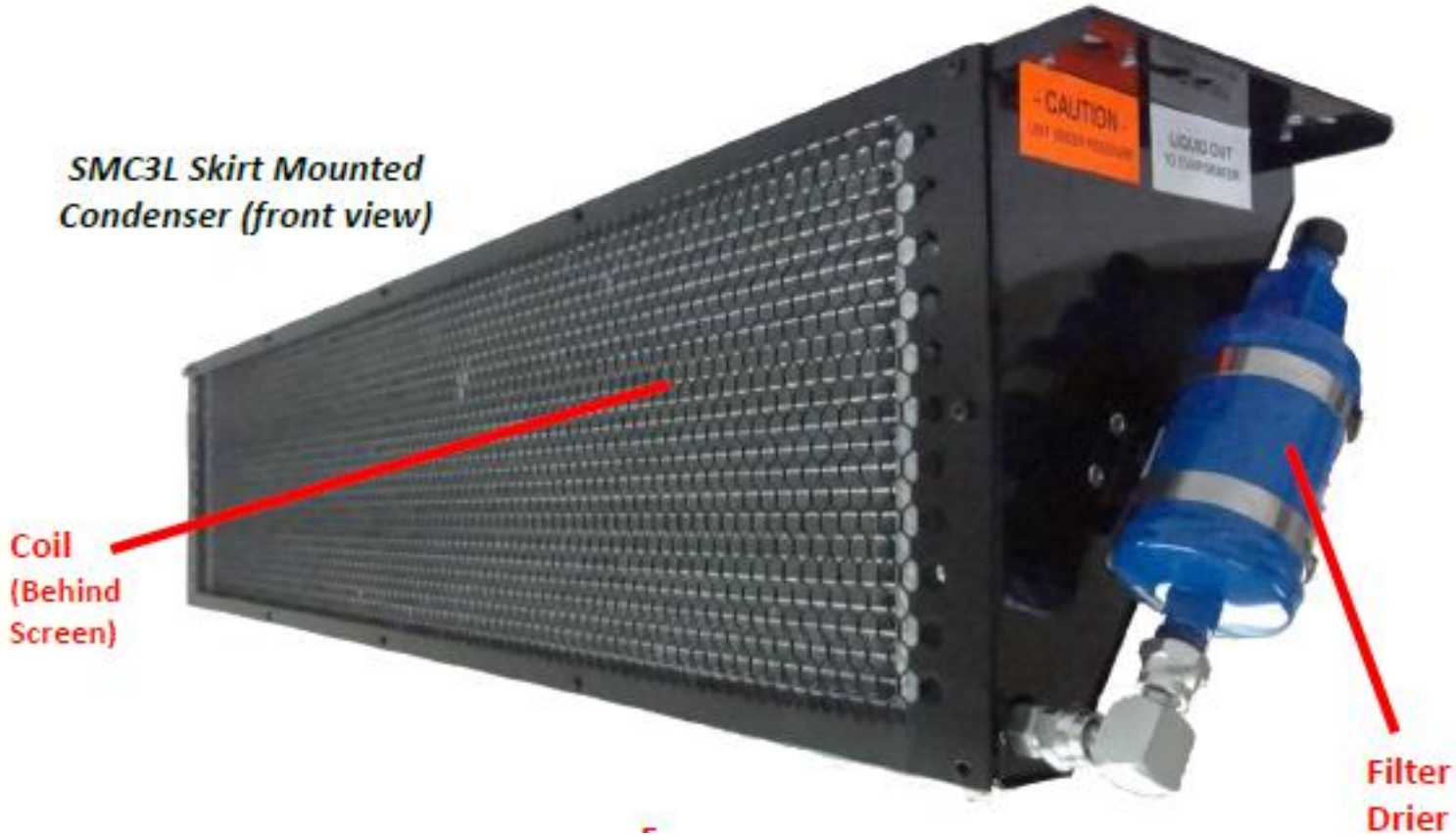
Evaporator Filter

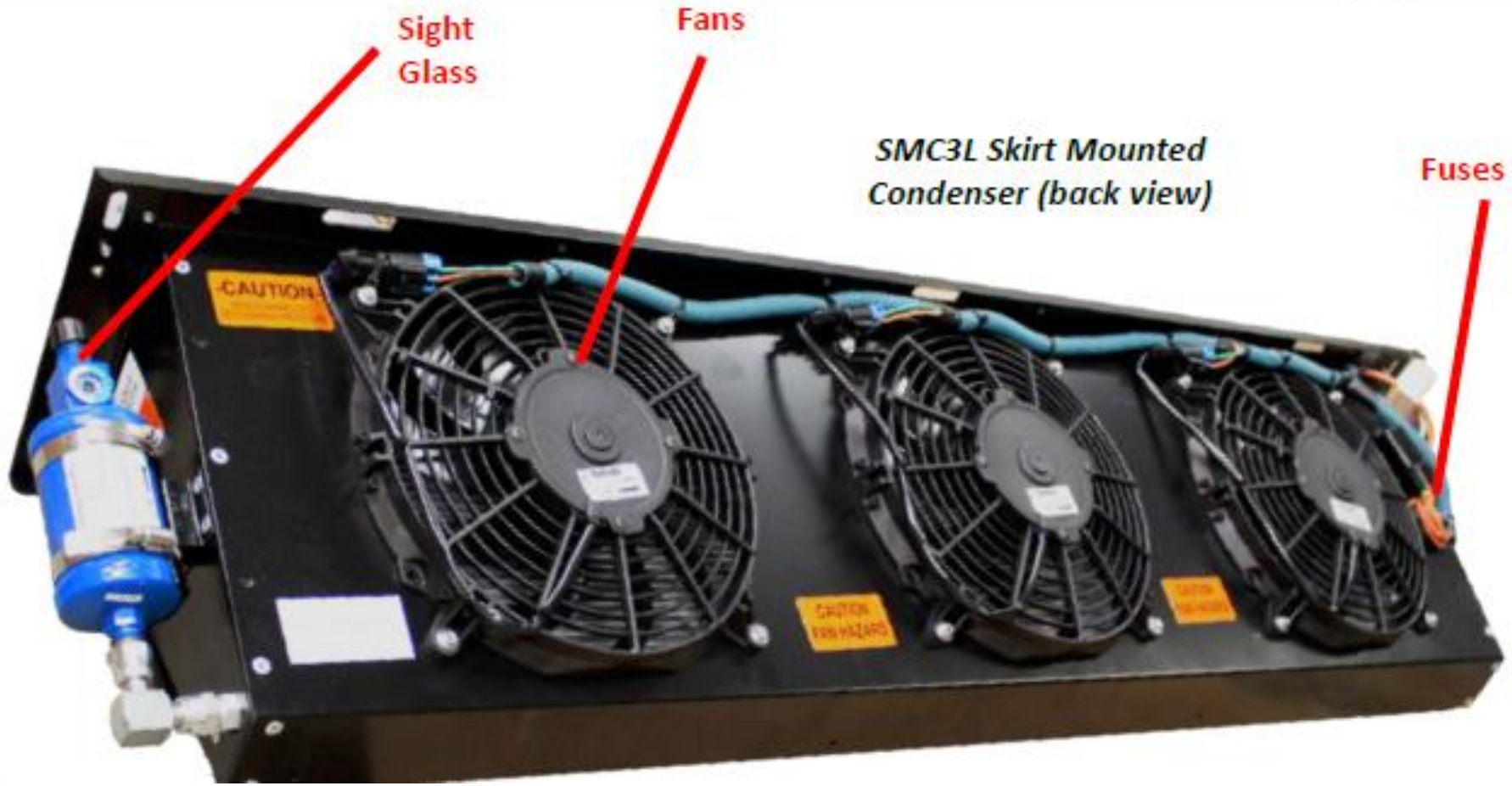
- ✓ Large filter medium



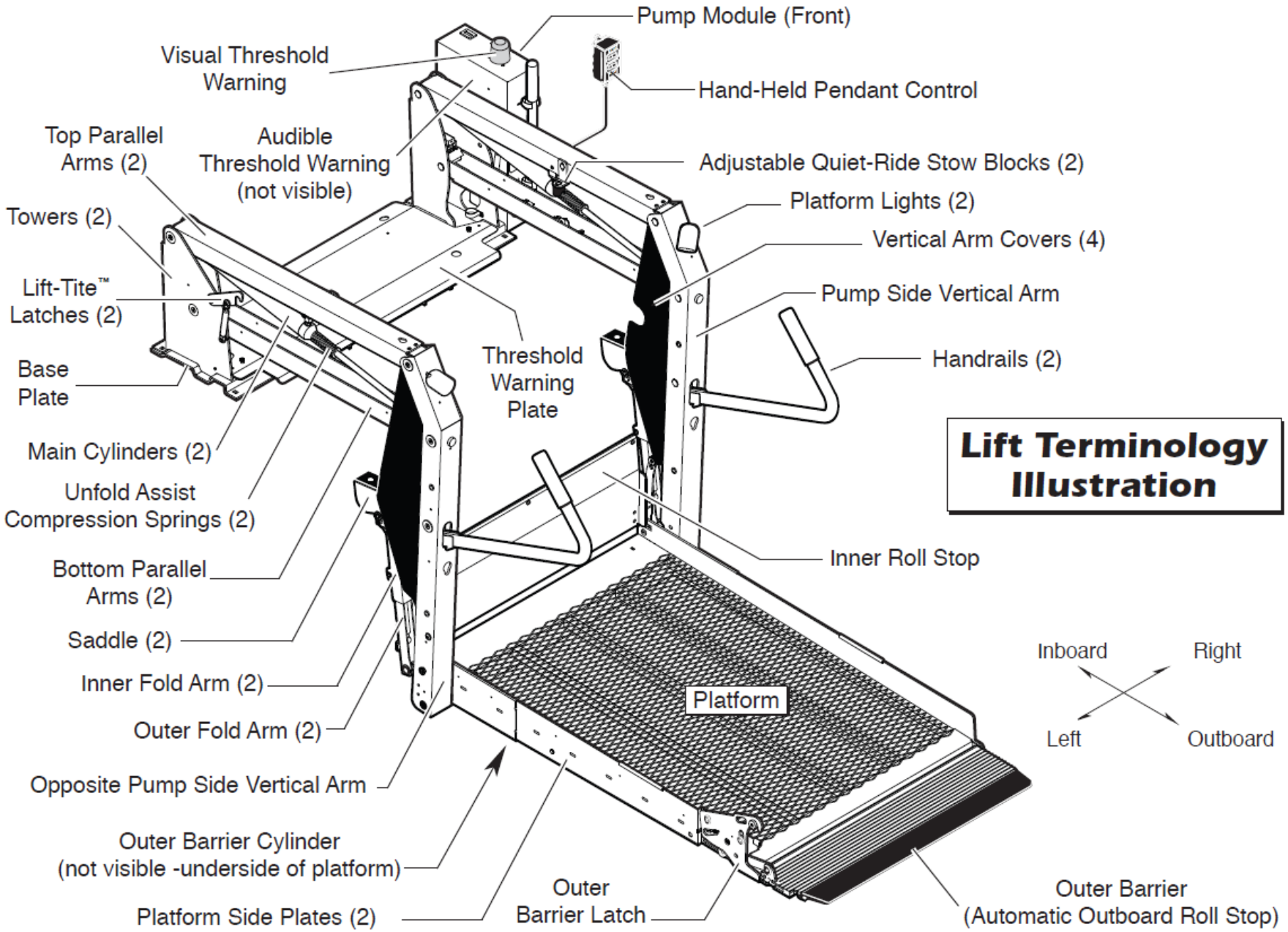
Key Condenser Components

SMC3L Skirt Mounted Condenser (front view)



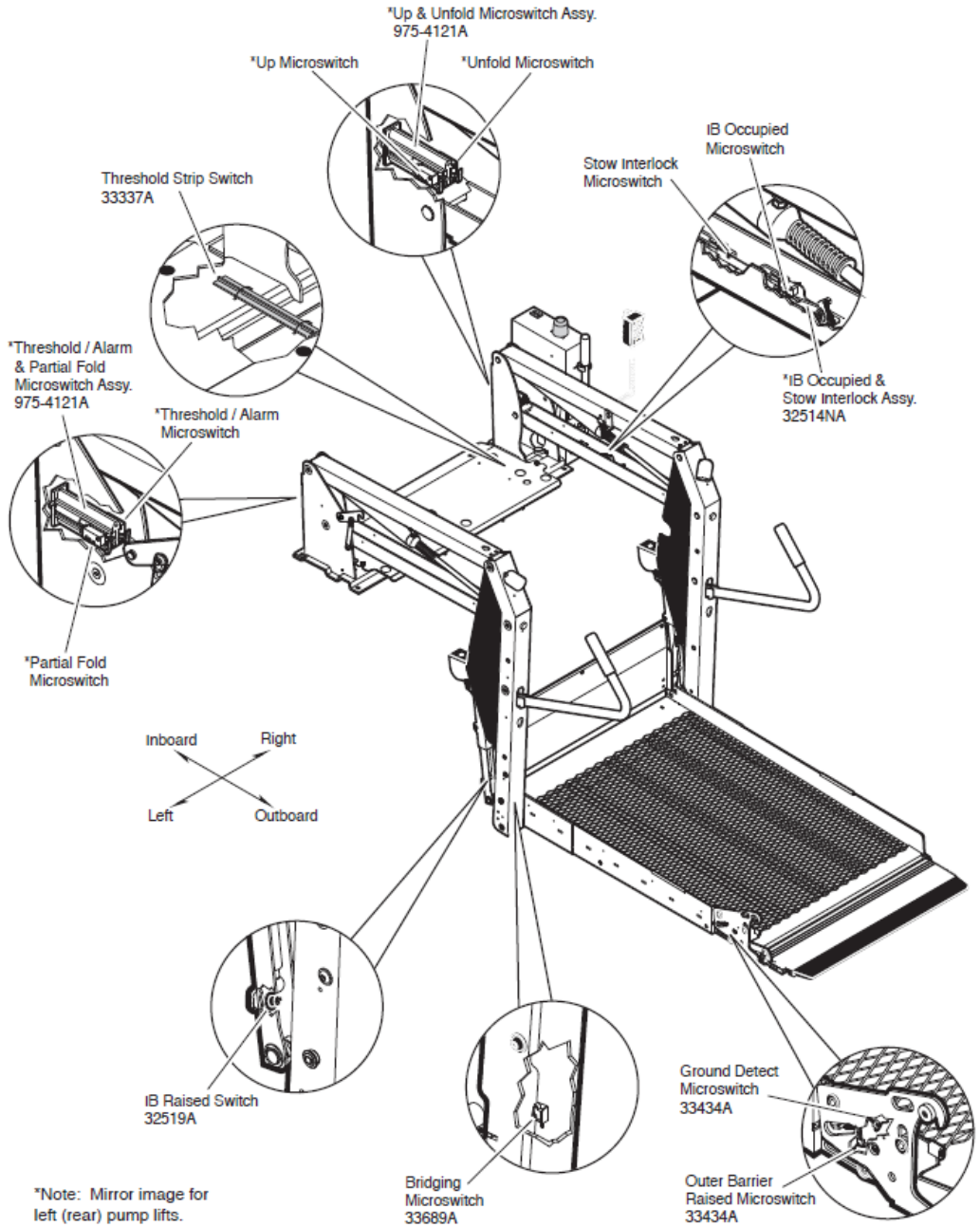

Sight Glass
Fans
SMC3L Skirt Mounted Condenser (back view)
Fuses
CAUTION

Wheelchair lifts



Lift Terminology Illustration

Switch and Sensor Locations



*Note: Mirror image for left (rear) pump lifts.

Maintenance and Lubrication

All listed inspection, lubrication and maintenance procedures should be repeated at 750 cycle intervals following the scheduled 4500 cycle maintenance procedures. These intervals are a general guideline for scheduling maintenance procedures and will vary according to lift use and conditions. Lifts exposed to severe conditions (weather, environment, contamination, heavy usage, etc.) may require inspection and maintenance procedures to be performed more often than specified.

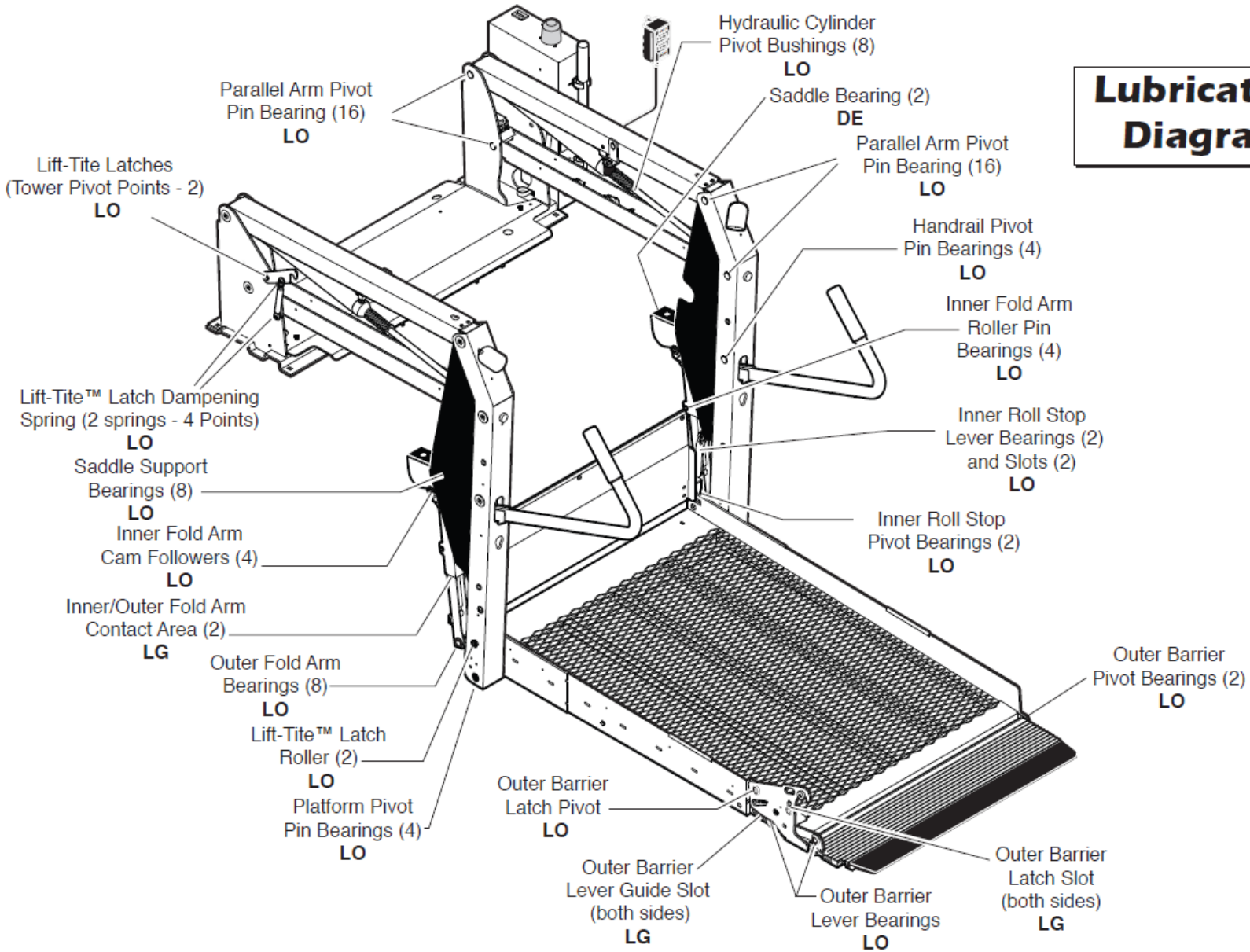
Cycle Counter: NL-2 Series lift models are equipped with a cycle counter located on the top of the pump module. This cycle counter allows the lift attendant/operator to easily track the number of cycles during daily inspections of the lift.

Discontinue lift use immediately if maintenance and lubrication procedures are not properly performed, or if there is any sign of wear, damage or improper operation. Contact your sales representative or call The Braun Corporation at 1-800-THE LIFT®. One of our national Product Support representatives will direct you to an authorized service technician who will inspect your lift.

See the Maintenance/Lubrication Schedule for recommended applications per number of cycles.

Lubricant	Type	Specified (recommended) Lubricant	Available Amount	Braun Part No.
LO - Light Oil	Light Penetrating Oil (30 weight or equivalent)	LPS2, General Purpose Penetrating Oil	16 oz. Aerosol Can	15807
DE - Door-Ease	Stainless Stick Style (tube)	Door-Ease Stick (tube)	1.68 oz.	15806
LG - Light Grease	Light Grease (Multipurpose)	Lubriplate	14 oz. Can	15805

Lubrication Diagram



Maintenance and Lubrication Schedule

750 Cycles	Outer barrier pivot points (2)	Apply Light Oil - See Lubrication Diagram
	Outer barrier latch pivot point	Apply Light Oil - See Lubrication Diagram
	Outer barrier latch slot	Apply Light Grease to both sides of slot. See Lubrication Diagram
	Outer barrier lever bearings (2)	Apply Light Oil - See Lubrication Diagram
	Lift-Tite™ latches (tower pivot points - 2)	Apply Light Oil - See Lubrication Diagram
	Lift-Tite™ latch gas (dampening) spring pivot points (2 springs - 4 points)	Apply Light Oil - See Lubrication Diagram
	Inspect Lift-Tite™ latches and gas springs for wear or damage (bent, deformed or misaligned), positive securement (external snap rings) and proper operation	Resecure, replace damaged parts or otherwise correct as needed. Note: Apply Light Grease to Lift-Tite™ latch tower pivot point if replacing latch.
	Inspect outer barrier for proper operation	Correct or replace damaged parts.
	Inspect outer barrier latch for proper operation, positive securement, and detached or missing spring	Correct or replace damaged parts and/or relubricate. See Lubrication Diagram
continued	Adjust fold pressure and outer barrier fold pressure (if applicable)	See applicable service manual

Maintenance and Lubrication Schedule

continued		
750 Cycles	Verify NHTSA Operations Checklist	See NHTSA Operations Checklist
	Inspect lift for wear, damage, or any abnormal condition	Correct as needed.
	Inspect lift for rattles	Correct as needed

1500 Cycles	**Perform all procedures listed in previous section also**	
	Inner/outer fold arms (2)	Apply grease (synthetic) to contact areas between inner/outer fold arms. See Lubrication Diagram.
	Platform pivot pin bearings (4)	Apply Light Oil - See Lubrication Diagram
	Outer fold arm bearings (8)	Apply Light Oil - See Lubrication Diagram
	Inner roll stop pivot bearings (2)	Apply Light Oil - See Lubrication Diagram
	Inner roll stop lever bearings (2)	Apply Light Oil - See Lubrication Diagram
	Inner roll stop lever slot (2)	Apply Light Oil - See Lubrication Diagram
	Saddle support bearings (8)	Apply Light Oil - See Lubrication Diagram
continued	Inner fold arm roller pin bearings (4)	Apply Light Oil - See Lubrication Diagram

Maintenance and Lubrication Schedule

continued		
1500 Cycles	Inner fold arm cam followers (4)	Apply Light Oil - See Lubrication Diagram
	Parallel arm pivot pin bearings (16)	Apply Light Oil - See Lubrication Diagram
	Handrail pivot pin bearings (4)	Apply Light Oil - See Lubrication Diagram
	Hydraulic cylinder pivot bushings (8)	Apply Light Oil - See Lubrication Diagram
	Outer barrier lever guide slot	Apply Light Grease to both sides of slot. See Lubrication Diagram.
	Inspect Lift-Tite™ latch rollers for wear or damage, positive securement and proper operation (2)	Correct, replace damaged parts and/or relubricate.
	Inspect inner roll stop for: • Wear or damage • Proper operation. Roll stop should just rest on top surface of the threshold plate. • Positive securement (both ends)	Resecure, replace or correct as needed. See Platform Angle Instructions and Tower Microswitch Adjustment Instructions.
	Inspect handrail components for wear or damage, and for proper operation	Replace damaged parts
	Inspect microswitches for securement and proper adjustment.	Resecure, replace or adjust as needed. See Microswitch Adjustment Instructions.
continued		

Maintenance and Lubrication Schedule

continued	Make sure lift operates smoothly	Realign towers and vertical arms. Lubricate or correct as needed.
	Inspect external snap rings: • Outer fold arm (6) • Lift-Tite™ latch roller (2) • Lift-Tite™ latch gas (dampening) spring (4) • Inner fold arm cam followers (4) • Inner fold arm roller pins (4) • Outer barrier hydraulic cylinder mounting pin (2) • Inner roll stop lever bracket pins (2)	Resecure or replace if needed.
1500 Cycles	Inspect inner roll stop locks (2) and torsion springs (2) for wear or damage and for proper operation.	Replace damaged parts and resecure as needed. Apply Light Oil to inner roll stop lock pivot points.
	Inspect outer fold arm pins (2), axles (2) and bearings (8) for wear or damage and positive securement	Replace damaged parts and resecure as needed. Apply Light Oil.
	Remove pump module cover and inspect: • Hydraulic hoses, fittings and connections for wear or leaks • Harness cables, wires, terminals and connections for securement or damage • Relays, fuses, power switch and lights for securement or damage	Resecure, replace or correct as needed.

Maintenance and Lubrication Schedule

	Perform all procedures listed in previous section also	
	Inspect cotter pins on platform pivot pin (2)	Resecure, replace or correct as needed
	Hydraulic Fluid (Pump) - Check level. Note: Fluid should be changed if there is visible contamination. Inspect the hydraulic system (cylinder, hoses, fittings, seals, etc.) for leaks if fluid level is low.	Use Braun 32840-QT hydraulic fluid (Exxon® Univis HVI 26). Do not mix with Dextron III or other hydraulic fluids. Check fluid level with platform lowered fully. Fill to maximum fluid level indicated on reservoir (specified on decal). Do not overfill. If fluid level decal is not present - measure 1-3/8" from the fill port to locate fluid level.
4500 Cycles	Inspect cylinders, fittings and hydraulic connections for wear, damage or leaks	Tighten, repair or replace if needed.
	Inspect outer barrier cylinder hose assembly (hose, fasteners, connections, etc.) for wear, damage or leakage	Tighten, repair or replace if needed.
	Inspect parallel arms, bearings and pivot pins for visible wear or damage	Replace if needed.
	Inspect parallel arm pivot pin mounting bolts (8)	Tighten or replace if needed.
continued	Inspect platform pivot pins, bearings and vertical arms for wear, damage and positive securement	Replace damaged parts and resecure as needed. Apply Light Grease during reassembly procedures.

Maintenance and Lubrication Schedule

continued **4500 Cycles**	Inspect inner/outer fold arms, saddle, saddle support and associated pivot pins and bearings for visible wear or damage	Replace if needed.
	Inspect gas springs (cylinders) for wear or damage, proper operation and positive securement	Tighten, replace or correct as needed
	Inspect saddle bearing (UHMW - 2)	Apply Door-Ease or replace if needed. See Lubrication Diagram.
	Inspect vertical arm plastic covers	Resecure or replace if needed.
	Inspect power cable	Resecure, repair or replace if needed.
	Mounting	Check to see that the lift is securely anchored to the vehicle and there are no loose bolts, broken welds, or stress fractures.
	Decals and Antiskid	Replace decals if worn, missing or illegible. Replace antiskid if worn or missing. See Decals and Antiskid section on pages 38-40.

Consecutive 750 Cycle Intervals	Repeat all previously listed inspection, lubrication and maintenance procedures at 750 cycle intervals.

Braun and Ricon websites

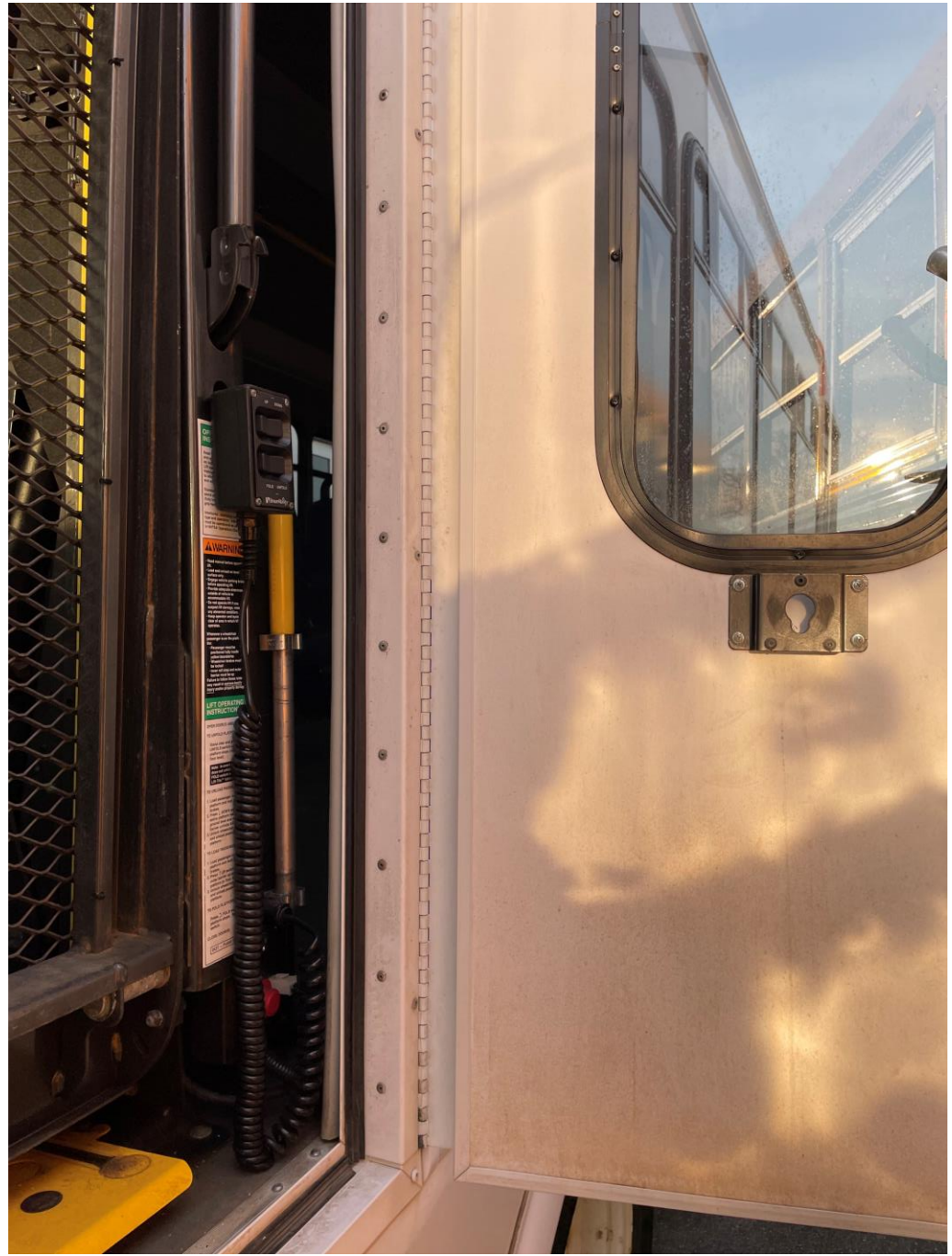
- https://www.braunability.com/us/en/commercial/support/manual-index.html

- https://www.riconcorp.com/support_techdocs_manuals.asp

W/C tie down storage

Clean floor

W/C lift door lubrication points


WARNING

Drivers' door

Entrance door

Door retainers and supports

Body seams

Corrosion

Sealing preperation

Sikaflex 221

Sealant used on body seam

Discussion points

- Step treads
- Flooring
- Paint finish
- Windows
- Under body
- Batteries and Electrical system
- Seat belts
- Wipers and washer system
- Maintenance program


E350