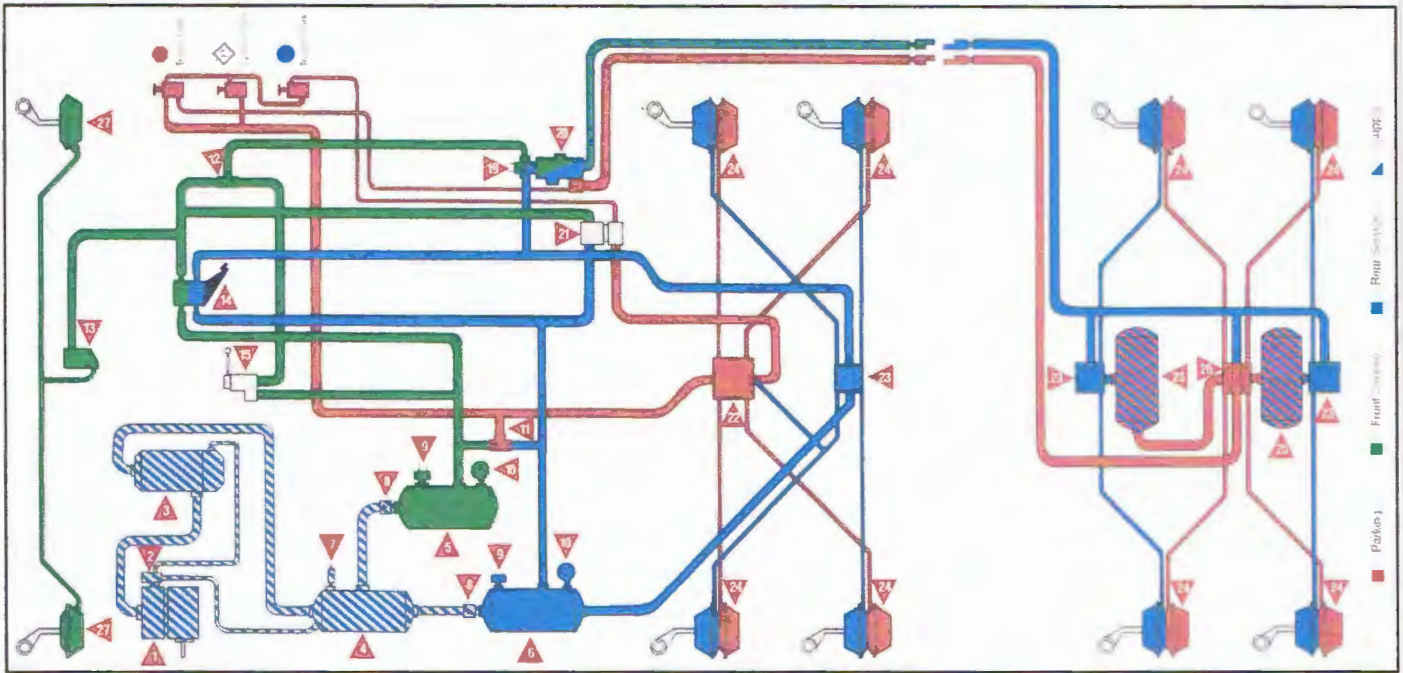


AIR BRAKE SYSTEM TROUBLESHOOTING



SYMPTOM	CAUSE	REMEDY
1 Compressor Passes excessive oil	Restricted oil return Excessive ring wear	Make sure oil return line is free of kinks and sharp bends. Minimum return line should be 5/8" O.D. or 1/2" I.D. Make sure oil return in compressor and mating engine surfaces are clear and aligned. Use caution when using gasket sealant. Check air intake to make sure air is properly filtered. Check discharge line for restriction or carbon build up. Clean or replace as necessary. Check compressor cooling system. Min. water line - 1/2" O.D. Min flow rate - 2.5 gal/min at engine governor speed. Water temp. 200° F max. Check engine or compressor air cleaner - replace as necessary. Test for excessive engine crankcase pressure. Clean breather or replace positive crankcase ventilation valve. Check air valves for leaks at exhaust ports. Check lines for cracks or leaks at fittings.
Excessive build up and recovery time (85-100 PSI in 40 seconds with engine at full governed RPM)	Excessive air leak in system	Check discharge line for restrictions and carbon build-up. Clean or replace line as necessary.
Noisy compressor	Restricted air discharge line, or sticking reservoir inlet check valve Unloader valves sticking Faulty or mis-adjusted air governor Faulty compressor drive Loose drive gear or pulley	Clean and lubricate. If plungers are bent, replace with new unloader kit. Replace governor. Check pulley to make sure belt is not slipping. If gear driven check gear. Replace if worn. Check compressor drive system. Tighten if necessary. Torque the crankshaft nut to 100 ft. lbs. maximum. Do not use impact wrench. Inspect drive gear and coupling. Fiber gears should be replaced when compressor is changed. Test governor for proper operation. Inspect air lines to and from governor for kinks and restrictions. Replace if necessary. Clean and lubricate. If unloader stems are worn, replace.
Pumps beyond cut-out	Excessive worn drive gear Faulty or mis-adjusted governor or governor is improperly installed Unloader valves sticking	Check governor reservoir line for kinks, restriction. Clean or replace line as necessary. Only adjust after making sure gauge is accurate. To raise pressure setting, turn adjustment screw counter-clockwise. To lower pressure setting, turn adjusting screw clockwise (1/4 turn = 4/6 PSI.) See #1 cause - Excessive air leak.
2 Governor Flutters	Restricted reservoir line Out of adjustment	Check governor for proper "cut-out" pressure. Repair or replace governor. Repair or replace as necessary.
3 Air Dryer Dryer is constantly cycling or purging	Excessive air leak in system	Check to see that air is passing through compressor discharge line. Check for kinks, bends or excessive carbon build up. Clean or replace discharge line. See #1 cause - Excessive air leak.
Dryer does not purge or exhaust air	Defective governor Defective check valve between dryer and first tank Kinked or plugged discharge Excessive air leak in system Line between governor and dryer kinked, plugged or frozen Faulty heater or thermostat (allowing purge valve to freeze) Faulty purge valve.	Check to make sure air flows through purge control line when compressor is unloaded. Clean or replace purge control line. Repair or replace thermostat/heater. After determining air reaches purge valve, repair or replace purge valve.
4 Supply Reservoir Excessive water accumulation Excessive oil accumulation	Failure to drain tank Compressor passing excessive oil Contaminated air dryer desiccant cartridge	Drain tank daily. Install air dryer or automatic drain valve. See #1. Replace desiccant cartridge.
5 Front Brake Reservoir Excessive oil or water accumulation Loses air pressure	See #4 See #8 and #11	
6 Rear Brake Reservoir Excessive oil or water accumulation Loses air pressure	See #4 See #8 and #11	
7 Safety Valve Pops off at 150 PSI Pops off below 150 PSI Will not function	System pressure too high Plugged governor sensing line Faulty safety valve Faulty safety valve	Check governor "cut-out" setting. Readjust if necessary or replace governor if faulty. Clean or replace line. Replace valve #7. Test with shop air at 150 PSI. Replace valve if it does not pop off at 150 PSI.
8 One-Way Check Valve Allows air to bleed back to supply reservoir	Dirty or faulty one-way check valve	Replace valve #8.

AIR BRAKE SYSTEM TROUBLESHOOTING

<p>9 Low Pressure Switch Will not operate at pressures below 60 PSI</p> <p>Buzzer or light will not operate</p>	<p>Faulty buzzer or light Faulty dash gauge Bad ground connection</p>	<p>Repair or replace #9. Repair or replace #10. Check all wiring and ground to buzzer, light and low pressure switch.</p>
<p>10 Dash Gauge Improper reading</p>	<p>Faulty dash gauge</p>	<p>Calibrate or replace gauge #10.</p>
<p>11 Two-Way Check Valve Front or rear brake reservoir loses air pressure</p>	<p>Check valve not seating properly</p>	<p>Replace valve #11.</p>
<p>12 Two-Way Check Valve Foot valve leaks at exhaust port when hand valve is applied. Hand valve leaks at exhaust port when foot valve is applied.</p>	<p>Check valve not seating properly Check valve not seating properly</p>	<p>Replace valve #12 or #19. Replace valve #12.</p>
<p>13 Limiting and Quick Release Valve Front brakes release too slowly Severe front brake application. Leaks at exhaust port.</p>	<p>Possible contamination in valve Faulty valve Bad diaphragm in valve</p>	<p>Replace valve #13. Replace valve #13. Replace valve #13.</p>
<p>14 Foot Valve Leaks at exhaust with all brakes released.</p> <p>Leaks at exhaust with hand valve applied and foot valve released. Leaks at exhaust with foot brake applied. Brakes not modulating properly. First no brakes, then on all at once.</p>	<p>Leak in anti-compounding system</p> <p>Faulty two-way check valve Possible contamination in valve or faulty foot valve Faulty relay valve</p>	<p>Check #21 (Springbrake Valve) for bad double check valve causing back flow to foot valve. Repair or replace #21. Replace check valve #12 or #19. Replace foot valve #14. Replace relay valve #23.</p>
<p>15 Trailer Hand Control Valve Leaks at exhaust when only foot valve is applied. Leaks at exhaust port when in applied or released position.</p>	<p>Faulty two-way check valve Faulty hand control valve</p>	<p>Replace check valve #12. Replace hand control valve #15.</p>
<p>16 Trailer Charge Dash Valve (red octagon knob) Will not automatically pop out when air pressure is below 40 PSI. Trailer brakes will not immediately apply when valve is pulled.</p> <p>Leaks at exhaust port.</p>	<p>Faulty dash valve Dash valve not exhausting properly Faulty tractor protection valve Faulty dash valve</p>	<p>Replace dash valve #16. Replace dash valve #16. If dash valve will exhaust, replace tractor protection valve #20. Replace dash valve #16.</p>
<p>17 Tractor-Trailer Park Valve (yellow diamond knob) Leaks at exhaust port. Parking brakes will not release. Parking brakes will not apply.</p>	<p>Faulty park valve Defective springbrake valve Defective springbrake valve Defective springbrake</p>	<p>Replace valve #17. Replace valve #21. Replace valve #21. See #24.</p>
<p>18 Tractor Park Valve (round blue knob) Leaks at exhaust port. Tractor parking brakes will not release. Tractor parking brakes will not apply.</p>	<p>Faulty park valve Defective springbrake valve Defective springbrake valve Defective springbrake</p>	<p>Replace valve #18. Replace valve #21. Replace valve #21. See #24.</p>
<p>19 Double Check Valve with Stop Light Switch Brake lights will not come on when foot brake is applied.</p>	<p>Contamination in valve Bad wiring or bulb</p>	<p>Replace valve #19. Repair or replace as needed.</p>
<p>20 Tractor Protection Valve Will not respond to trailer charge valve. Will not shut off air in tractor service line when trailer air pressure is below 45 PSI.</p>	<p>Defective tractor protection valve</p>	<p>Replace valve #20.</p>
<p>21 Springbrake Valve Will not allow modulating control of springbrakes via foot valve after loss of service brake air pressure. Leaks at exhaust.</p>	<p>Faulty valve</p> <p>Contamination in valve</p>	<p>Replace valve #21.</p> <p>Replace valve #21.</p>
<p>22 Springbrake Control/Relay Valve Leaks at exhaust port. Slow application or release of springbrakes.</p>	<p>Contamination in valve Piston in springbrake control valve is sticking. Possible problem with springbrake, eg: misaligned push rod and slack adjuster</p>	<p>Replace valve #22. Replace valve #22.</p> <p>See #24, #27.</p>
<p>23 Service Brake Relay Valve Leaks at exhaust port with springbrakes released. Leaks at exhaust port with service brake applied.</p>	<p>Possible leak at center seal in springbrake Contamination in valve Faulty relay valve</p>	<p>Replace with new piggy back. Replace relay valve #23. Replace relay valve #23.</p>
<p>24 Tandem Springbrakes Service brakes are slow to apply.</p> <p>Service brake leaks Park brake slow to apply or release</p> <p>Springbrake leaks when parking brakes are released.</p>	<p>Problem with relay valve #23 or springbrake valve #21 Possible problem with foundation brakes Brakes not properly adjusted Restriction or leak in air line Diaphragm failure Faulty springbrake control valve Diaphragm failure Leak in air system – not enough air pressure Broken return spring Broken barrel spring Center seal leaking in brake</p>	<p>Replace valve(s) #21 & #23. Check linings, S-cams, rollers and return springs. See #27. Repair or replace. Replace diaphragm. Replace #22. Replace piggy back. Repair leak. Replace service chamber Replace piggy back. Replace piggy back. Leak may be heard at relay valve #22.</p>
<p>25 Trailer Air Reservoir Excessive oil or water accumulation</p>	<p>See #4</p>	
<p>26 Springbrake Valve Leaks at exhaust port. Slow application or release of trailer park brakes.</p>	<p>Faulty or contaminated valve Possible problem with springbrake</p>	<p>Replace #26. See #24. Park brake slow to apply or release.</p>
<p>27 Service Chamber Leaks Slow to apply or release.</p>	<p>Diaphragm failure Faulty relay valve Restriction in air line Faulty quick release valve Possible problem with foundation brakes Brakes not properly adjusted</p>	<p>Replace diaphragm. Replace relay valve #23. Repair or replace line. Replace #13. Check linings, S-cams, rollers and return springs.</p>

AIR BRAKE SYSTEM TROUBLESHOOTING

- 1.) Before replacing any valve with a new or remanufactured valve, be sure to blow the air lines out either using the vehicle's own air supply or shop air. Dirt is the greatest cause of premature air valve failure.
- 2.) If pipe dope is used on fittings, use it sparingly. This can also get into the unit and cause a failure.
- 3.) When installing fittings into a remanufactured valve, do not over tighten or it will crack the casting.
- 4.) With the introduction of spring brakes, anti-compounding and 121 air brake systems, because a valve is leaking air out of its exhaust, does not mean the valve is at fault. If a spring brake is leaking from the the spring brake to the service brake side, that air will travel back up the service line and out the exhaust of the next valve back. Before replacing a valve that has air leaking from its exhaust, disconnect the delivery lines from that valve to determine if air is being fed back from some other valve or unit.

TRUCKS, TRACTORS and BUSES

1.) Insufficient Brakes

- Brakes need adjusting, lubricating or relining.
- Low air pressure in the brake system (below 60 psi).
- Brake valve delivery pressure below normal.
- Wrong size actuators and/or slack adjusters.
- Failure of part of a dual air system.
- If remote mounted brake valve, check linkage.

2.) Brakes Apply Too Slowly

- Brakes need adjusting or lubricating.
- Low air pressure in the brake system (below 60 psi).
- Insufficient brake valve delivery pressure.
- Excessive leakage with brakes applied.
- Restricted tubing or hose.
- Treadle travel restricted.
- If remote mounted brake valve, check linkage.

3.) Brakes Release Too Slowly

- Brakes need adjusting or lubricating.
- Brake valve not returning to fully released position.
- Restricted tubing or hose.
- Exhaust port of brake valve, quick release valve, or relay valve restricted or plugged.
- Faulty brake valve, quick release valve, or relay valve.
- If remote mounted brake valve, check linkage.

4.) Brakes Do Not Apply

- No air pressure in brake system.
 - Restricted or broken tubing or hose.
 - Faulty brake valve.
- If remote mounted brake valve, check linkage.

5.) Brakes Do Not Release

- Brake rigging binding.
- Brake not in fully released position.
- Faulty brake valve or relay valve.
- Restricted or collapsed tubing or hose.
- If remote mounted brake valve, check linkage.

6.) Brakes Grab or Erratic Brake

- Grease on brake lining = reline brakes.
- Faulty brake valve or relay valve.
- Brake rigging binding.
- No vehicle load = high brake pressure.

7.) Uneven Brakes

- Brakes need adjusting, lubricating or relining.
- Improper axle mounting.
- Grease on brake lining - reline brakes.
- Brake shoe return spring broken.
- Brake drum out of round.
- Brake chamber diaphragm failure.
- Wrong brake lining.
- Broken slack adjuster or foundation brake parts.

8.) Air Pressure Will Not Rise To Normal

- Faulty air gauge (registering incorrectly).
- Excessive valve or fitting leakage.
- Governor out of adjustment.
- Slipping compressor drive belt.
- Faulty compressor.
- Broken supply line.

9.) Air Pressure Rise To Normal Too Slowly

- Excessive valve or fitting leakage.
- Excessive reservoir volume.
- Clogged compressor air strainer.
- Engine speed too slow.
- Compressor discharge valve or inlet valves leaking.
- Compressor drive belt slipping or faulty drive coupling.
- Worn compressor.
- Excessive carbon in compressor cylinder head or discharge line.

10.) Air Pressure Rises Above Normal

- Faulty air gauge (registering incorrectly).
- Governor out of adjustment.
- Faulty governor and safety valve.
- Restriction in line between governor and compressor or restricted unloading valve.
- Too much clearance at compressor unloader valves or compressor unloading mechanism stuck in closed position.

11.) Air Pressure Drops Quickly With Engine Stopped and Brakes Released

- Leaking brake valve.
- Leaking tubing or hoses.
- Compressor discharge valves leaking.
- Governor leaking.
- Excessive leakage elsewhere in the air brake supply system.
- Inadequate reservoir volume - high air demand.

12.) Air Pressure Drops Quickly With Engine Stopped and Brakes Fully Applied

- Leaking brake chamber, actuator, rotochamber or brake cylinder.
- Valve left open.
- Leaking brake valve.
- Leaking tubing or hose line.
- Excessive water in reservoirs.
- Inadequate reservoir volume.

13.) Compressor Knocks Continuously or Intermittently

- Loose drive pulley.
- Back lash in drive gears or drive coupling.
- Worn or burnt out bearings.
- Excessive carbon deposits in compressor cylinder head.

14.) Safety Valve "Blows Off"

- Safety valve out of adjustment.
- Air pressure in the air brake system above normal due to faulty unloader mechanism or faulty governor.

15.) Excessive Oil or Water in the Brake System

- Reservoirs not being drained often enough.
- Compressor passing excessive oil.
- Compressor air strainer restricted.
- Excessive engine oil pressure.
- Back pressure from engine crankcase.
- Excessive oil (flooding) in compressor crankcase.

AIR BRAKE SYSTEM TROUBLESHOOTING

- 1.) Before replacing any valve with a new or remanufactured valve, be sure to blow the air lines out either using the vehicle's own air supply or shop air. Dirt is the greatest cause of premature air valve failure.
- 2.) If pipe dope is used on fittings, use it sparingly. This can also get into the unit and cause a failure.
- 3.) When installing fittings into a remanufactured valve, do not over tighten or it will crack the casting.
- 4.) With the introduction of spring brakes, anti-compounding and 121 air brake systems, because a valve is leaking air out of its exhaust, does not mean the valve is at fault. If a spring brake is leaking from the the spring brake to the service brake side, that air will travel back up the service line and out the exhaust of the next valve back. Before replacing a valve that has air leaking from its exhaust, disconnect the delivery lines from that valve to determine if air is being fed back from some other valve or unit.

TRAILERS

** The air brake system of a trailer is entirely dependent upon the air brake system of the towing vehicle for its air supply and control. Therefore, the air air brake system of the towing vehicle must be in good condition; otherwise it will be impossible to obtain a good brake performance on the trailer. Before condemning the air brake system on a trailer, always be sure the air brake system on the towing vehicle is functioning properly. The following is based on on the assumption the tractor air brake system is functioning properly.

1.) Insufficient Brakes

- Brakes need adjusting, lubricating or relining.
- Tractor protection valve not in "normal" position.
- Faulty relay emergency valve.
- No trailer air supply - clogged emergency line.
- Low air pressure in the brake system (below 80 psi).
- Brake valve delivery pressure in towing vehicle below normal.
- Restricted tubing or hose.
- Wrong size actuators.

2.) Brakes Apply Too Slowly

- Brakes need adjusting or lubricating.
- Low air pressure in the brake system (below 80 psi).
- Brake valve delivery pressure in towing vehicle below normal.
- Restricted tubing, hose, or line filter.
- Excessive leakage with brakes applied.
- Faulty relay emergency valve.

3.) Brakes Release Too Slowly

- Brakes need adjusting or lubricating.
- Brake rigging binding.
- Exhaust port of relay emergency valve restricted or plugged.
- Restricted tubing or hose.

4.) Brakes Do Not Apply

- Connecting hoses to trailer crossed.
- Faulty relay emergency valve.
- Tractor protection valve not functioning properly or not in normal position (see operating instructions).
- No air pressure in air brake system.
- Restricted tubing or hose.
- Hoses between tractor and trailer not connected.

5.) Brakes Do Not Release

- Connecting hoses to trailer crossed.
- Brake valve on towing vehicle in applied position.
- Brake rigging binding.
- Relay emergency valve in emergency position.
- Faulty relay emergency valve.
- Restricted tubing or hose.
- Tractor protection valve not functioning properly or not placed in "normal" position.

6.) Brakes Grab

- Grease on brake lining - reline brakes.
- Brake rigging binding.
- Faulty relay emergency valve.
- Faulty brake valve on towing vehicle.
- No trailer load.

7.) Uneven Brakes

- Brakes need adjusting, lubricating or relining.
- Grease on brake lining - reline brakes.
- Brake shoe return spring broken.
- Brake drum out of round.
- Leaking brake chamber or actuator diaphragm.
- Restricted tubing or hose.
- Broken slack adjuster or foundation brake parts.

8.) Excessive Leakage With Brakes Released

- Relay emergency valve or drain valve leaking.
- Leaking tubing or hose.
- Hose uncoupled or leaking hose coupling.

9.) Excessive Leakage With Brakes Fully Applied

- Faulty relay emergency valve.
- Leaking brake chamber diaphragm.
- Leaking tubing or hose.
- Hose uncoupled or leaking hose coupling.

10.) Excessive Leakage with Relay Emergency Valve in Emergency Position

- Faulty relay emergency valve.

11.) Excessive Oil and Water Present in the Air Brake System.

- Reservoirs not drained often enough.

AIR BRAKE SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	REMEDY
1) Dryer is constantly cycling or purging.	<ul style="list-style-type: none"> a. Excessive system leak. b. Defective governor. c. Defective one way valve between air dryer and wet tank. d. Kinked or plugged discharge line. 	<ul style="list-style-type: none"> a. Repair air leak. b. Check governor for proper "cut-in," "cut-out" pressure and excessive leakage. Repair or replace governor. c. Check to see if air is passing through check valve. d. Check to see if air passes through discharge line. Check for kinks, bends, excessive carbon deposits. Clean or replace discharge line.
2) Water and sludge appear in wet tank.	<ul style="list-style-type: none"> a. Plugged desiccant cartridge or filter. b. Improper length or material of discharge line. c. Restricted purge orifice. d. No purge cycle. e. Compressor passing excessive oil. 	<ul style="list-style-type: none"> a. Replace desiccant cartridge filter. b. Use minimum of six-foot tubing for two-cylinder compressor; ten-foot for one cylinder compressor. Flex hose can be substituted at a ratio of 1- 1/2' of flex hose for each 1' of metal. c. Clean orifice with small drill bit or wire. d. See cause and remedy for problem #5. e. Check for proper compressor installation. Replace compressor if necessary.
3) Safety valve on air dryer opens during operation.	<ul style="list-style-type: none"> a. Plugged or saturated desiccant cartridge or filter. b. Defective one way check valve. c. Restricted discharge line. 	<ul style="list-style-type: none"> a. See remedy 2E, replace desiccant cartridge/ filter. b. Check to see if air is passing through check valve. Repair or replace check valve. c. Clean or replace air discharge line.
4) Constant leak of air from purge valve.	<ul style="list-style-type: none"> a. Purge control line connected to reservoir or exhaust port of governor. b. Inlet and outlet air connections reversed. c. Purge valve frozen open. d. Restricted discharge line. e. Faulty governor. 	<ul style="list-style-type: none"> a. Purge control line must be connected to unloader port of governor. b. Compressor discharge line must be connected to dryer inlet port. c. Repair or replace thermostat/heater. d. Check to see if air passes through discharge line. Check for kinks, bends or excessive carbon deposits. e. Check governor for proper "cut-in," "cut-out" pressure and excessive leakage. Repair or replace governor.
5) Air dryer does not purge or exhaust air.	<ul style="list-style-type: none"> a. Line between governor and dryer kinked, plugged, broken or frozen. b. Faulty heater or thermostat. c. Faulty purge valve. 	<ul style="list-style-type: none"> a. Check to make sure air flows through purge control line when compressor is unloaded. Clean or replace purge control line. b. Repair or replace thermostat/heater. c. After determining air reaches purge valve, repair purge valve.
6) Slow air pressure build up.	<ul style="list-style-type: none"> a. Restricted line. b. Plugged desiccant or filter. 	<ul style="list-style-type: none"> a. Check to see if air passes through discharge line. Check for kinks, bends or excessive carbon deposits. Clean or replace discharge line. b. Replace desiccant cartridge.
7) Heater inoperative.	<ul style="list-style-type: none"> a. Broken wire or bad connection. b. Blown fuse. c. Defective thermostat. 	<ul style="list-style-type: none"> a. Repair or replace wiring to heater. b. Check fuse and replace if necessary. c. Repair or replace thermostat.