

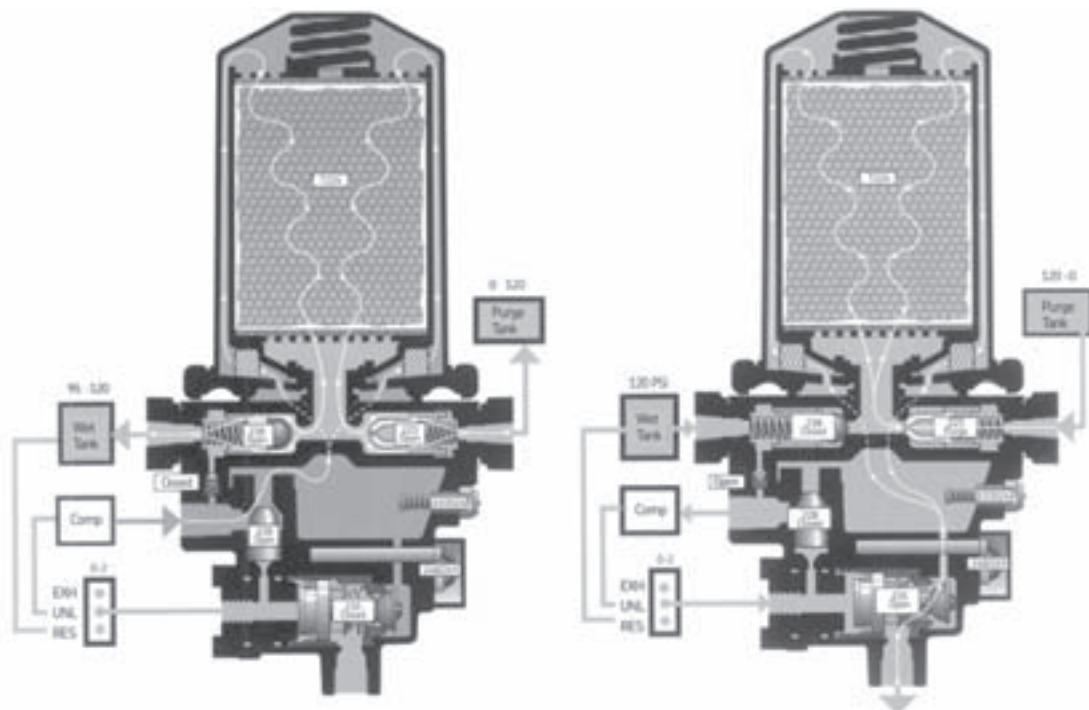
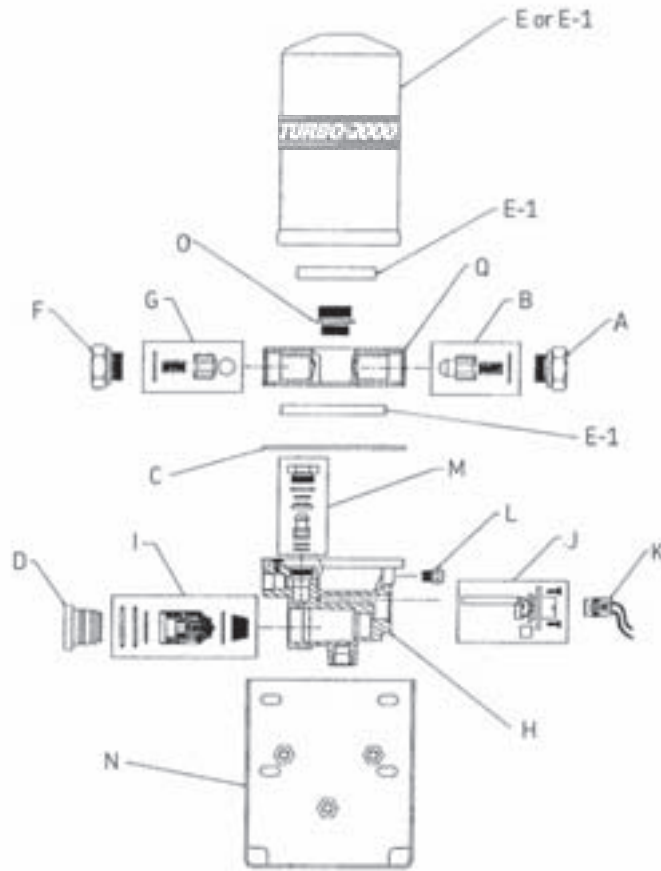
## Turbo-2000 parts list

Component identification		
A	610237	Regeneration valve nut
B	223	Regeneration valve kit
<b>C</b>	<b>610077</b>	<b>Body gasket</b>
D	610069	Seal retainer
<b>E</b>	<b>T224</b>	<b>Desiccant cartridge</b>
<b>E-1</b>	<b>T224-P</b>	<b>Desiccant cartridge filtration plus</b>
F	610236	Check valve nut
<b>G</b>	<b>238</b>	<b>Check valve kit</b>
<b>H</b>	<b>619086</b>	<b>Bottom cap assy 12v STD</b>
	<b>619112</b>	<b>Bottom cap assy 12v E-type</b>
<b>H</b>	<b>619087</b>	<b>Bottom cap assy 24v STD</b>
	<b>619113</b>	<b>Bottom cap assy 24v E-type</b>
<b>I</b>	<b>235</b>	<b>Purge valve kit</b>
<b>J</b>	<b>248 12V- 75W</b>	<b>Heater kit early model</b>
	<b>249 24V- 75W</b>	<b>(Orange and blue wires)</b>
<b>J</b>	<b>619110 12V 75W</b>	<b>Heater kit late model</b>
	<b>619111 24V 75W</b>	<b>Plug style connection</b>
K	619900	Wire harness
L	610024	Safety valve 175 psi
M	228	Turbo valve kit
<b>N</b>	<b>619115</b>	<b>Mounting bracket</b>
<b>O</b>	<b>619140</b>	<b>Cartridge stud</b>
<b>Q</b>	<b>619091</b>	<b>Mid-section w/valves STD</b>
	<b>619093</b>	<b>Mid-section w/valves E-type</b>
	<b>619340</b>	<b>Service kit contains T224, 228, 235, 238</b>
	<b>619360</b>	<b>Service kit contains T224-P, 228, 235, 238</b>
<b>Bold part numbers represent suggested stock service components</b>		

Dryer part number description			
STD	E-type*	STD-w/filtration plus option	Description
<b>620600</b>	620500	620300	Dryer/tank 12v
<b>620604</b>	620504	620304	Dryer/tank 24v
<b>620602</b>	620502	620302	Air dryer 12v
<b>620606</b>	620506	620306	Air dryer 24v
<b>221</b>	221	221	Purge tank
<b>*Holset SS E-type or QE compressor compatible</b>			

# Turbo-2000 service schematic

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■ Clean/dry air ■ Atmospheric pressure ■ Dirty/wet charged air ■ Dirty/wet purged air

Note: Approx. 95PSI gov cut in, 120PSI gov cut out

# Trouble-shooting Turbo-2000

<b>Problem: air continually leaks from the exhaust port during compressor standby mode</b>	
<b>Possible cause</b>	<b>Remedy</b>
Worn check valve	Clean cavity and replace check valve assembly #238
Worn Turbo valve	Clean cavity and replace Turbo valve assembly #228
Worn purge valve seal	Clean cavity and replace purge valve assembly #235

<b>Problem: system air pressure drops rapidly</b>	
<b>Possible cause</b>	<b>Remedy</b>
Fittings are loose or damaged	Tighten and/or replace as necessary
Air reservoir, tubing, or hoses are damaged	Repair or replace as necessary
Worn check valve	Clean cavity and replace check valve assembly #238
Worn Turbo valve	Clean cavity and replace Turbo valve assembly #228
Worn purge valve seal	Clean cavity and replace purge valve assembly #235

<b>Problem: air compressor moves into the standby mode but cycles rapidly</b>	
<b>Possible cause</b>	<b>Remedy</b>
Fittings are loose or damaged	Tighten and/or replace as necessary
Air reservoir, tubing, or hoses are damaged	Repair or replace as necessary
Worn check valve	Clean cavity and replace check valve assembly #238
Worn Turbo valve	Clean cavity and replace Turbo valve assembly #228
D2 governor malfunctioning	Replace governor
Worn purge valve seal	Clean cavity and replace purge valve assembly #235

<b>Problem: air leaks from the exhaust port during compressor charge mode</b>	
<b>Possible cause</b>	<b>Remedy</b>
Worn purge valve	Clean cavities and replace purge valve assembly #235
Dirt/foreign material is stuck in the purge valve	Clean cavity and replace valve assembly #235
D2 governor malfunctioning	Replace D2 governor
Heater assembly malfunctioning (>32 degrees)	Replace heater assembly #246(12V), 247(24V), 248(12V, 249(24v), 619110(12v) or 61911(24V)

<b>Problem: air compressor runs continuously (system pressure will not build)</b>	
<b>Possible cause</b>	<b>Remedy</b>
Fittings are loose or damaged	Tighten or replace loose or damaged fittings
Air reservoir, tubing, or hoses are damaged	Repair or replace damaged items
The air compressor needs to be serviced or replaced	Rebuild or replace the air compressor
Worn purge valve	Clean cavity and replace the purge valve assembly #235
The air compressor capacity is too low for vehicle	Install larger air compressor
Line between governor and air compressor is blocked	Replace the line or remove the blockage
The safety valve is malfunctioning	Replace the safety valve #610024
Ice has formed in the purge valve	Replace heater assembly #246(12V), 247(24V), 248(12V), 249(24V), 619110(12V) or 619111(24V)
D2 governor malfunctioning	Replace D2 governor

<b>Problem: air dryer does not exhaust during compressor standby mode</b>	
<b>Possible cause</b>	<b>Remedy</b>
The line between the air governor and the air dryer control port is missing, leaking, or damaged	Install or replace the air line, or tighten the fittings
Worn purge valve	Clean cavity and replace purge valve assembly #235
Ice has formed in the purge valve	Replace heater assembly #246(12V), 247(24V), 248(12V), 249(24V), 619110(12V) or 619111(24V)
Heater is malfunctioning	Replace heater assembly #246(12V), 247(24V), 248(12V), 249(24V), 619110(12V) or 619111(24V)
Purge valve sleeve is misaligned	Align purge valve sleeve

<b>Problem: safety valve opens</b>	
<b>Possible cause</b>	<b>Remedy</b>
Air dryer check valve is blocked	Clean cavity and replace check valve assembly #238
Air brake system is blocked down stream of air dryer	Remove blockage or replace the necessary components
Air compressor governor malfunctioning	Replace compressor D2 governor
Blocked desiccant cartridge	Replace cartridge #T224 and upgrade to filtration plus option T224-P*
The safety valve is malfunctioning	Replace the safety valve #610024

\*Air compressor service may be required to address excessive oil blow-by.

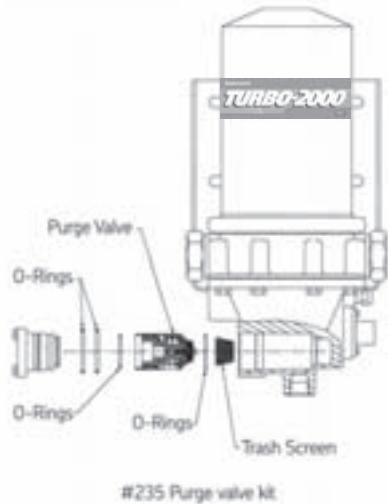
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<b>Problem: water accumulation in air system (tanks)</b>	
<b>Possible cause</b>	<b>Remedy</b>
Desiccant is contaminated	Replace desiccant cartridge #T224 or upgrade to T224-P for optimal filtration performance
The air compressor capacity is too low for vehicle	Install larger air compressor and replace desiccant cartridge #T224
Malfunctioning regeneration valve	Clean cavity and replace regeneration valve assembly #223
The line between the purge tank and the air dryer control port is missing, leaking, or damaged	Install or replace the air line, or tighten the fittings
Line between the compressor and air dryer too short	Fit new line with a minimum length of 6 feet copper line or (insufficient pre-cool) 12 feet of steel braided Teflon®*

**Refer to vehicle manufacturer for specific test procedures for non related air dryer components.**

**\* Teflon® is a registered trademark of E.I. DuPont.**

# Service procedures Turbo-2000



## Purge Valve Service Kit #235

Warning: Read and follow safety precautions found on page 12 before proceeding

### Symptom

1. Dryer won't exhaust
2. Air leak at exhaust port during the:
  - a) Charge mode
  - b) Stand-by mode
3. Pressure slow or no build
4. Compressor cycles rapidly

### Operational check

#### Symptom #1:

Start engine and build to cutout pressure. If dryer does not exhaust proceed as follows:

1. Check for air pressure in line connecting D2 governor to control port of air dryer. If no pressure is present in line, service D2 governor.
2. Check for blockage at exhaust port of air dryer.
3. If items 1 and 2 are OK, replace purge valve #235.

#### Symptom #2A & #3:

Start engine and build air pressure. During the charge cycle, check for air leaking at exhaust port of dryer. If air is leaking from exhaust port proceed as follows:

1. No air pressure should be present in line connecting D2 governor and dryer purge valve during charge cycle. If there is, service D2 governor.
2. If item 1 is OK, replace purge valve #235

#### Symptom #2B & #4:

Start engine and build to cut out pressure. Stop engine. Allow one minute for purge air to discharge dryer. If air continues to discharge from exhaust port of dryer, replace purge valve #235.

**Note: Air discharge could also be due to worn check valve or Turbo valve. Refer to pages 21 and 22 for service procedures on these valves.**

### Purge valve replacement

1. Disconnect air line at control port.
2. Remove the two fasteners that attach the purge valve retainer. Remove the retainer.
3. Remove the purge valve assembly from the purge cavity and discard.

**Note: If there is excessive oil in the cavity, compressor may require servicing.**

## Purge Valve Service Kit #235

4. Clean the cavity thoroughly.
5. Remove the three (3) o-rings from retainer and discard.
6. Using lubricant supplied, lightly grease the new o-rings.
7. Install on the retainer the two- (2) thickest o-rings then install the third (thinner) o-ring.
8. Install the new filter screen in the purge cavity open end out.

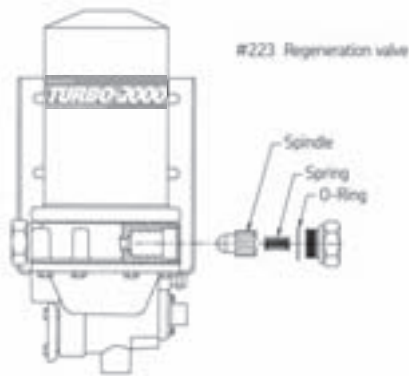
**Note: If air dryer is equipped with oil separator  
DO NOT install filter screen.**

9. Apply a light coating of grease around the o-ring seat on valve assembly. Install the thin o-ring on the purge valve seat.
10. Aligning the valve exhaust port with the air dryer exhaust port, install the purge valve assembly. Use care not to dislodge the o-ring from its seat.

**Warning: If the air dryer purge valve port does not align  
with air dryer exhaust port, air dryer will not exhaust!**

11. Install retainer.
12. Apply a light coating of grease on the threads of the two retainer bolts.
13. Install two retainer bolts. Tighten to 10-15 ft. lb.
14. Reconnect the control line to air dryer control port.

# Service procedures Turbo-2000



## Regeneration Valve Service Kit #223

Warning: Read and follow safety precautions found on page 12 before proceeding

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### Symptom

1. Water in tanks.
2. No purge air flow.

### Operational check

#### Symptom #1 & #2:

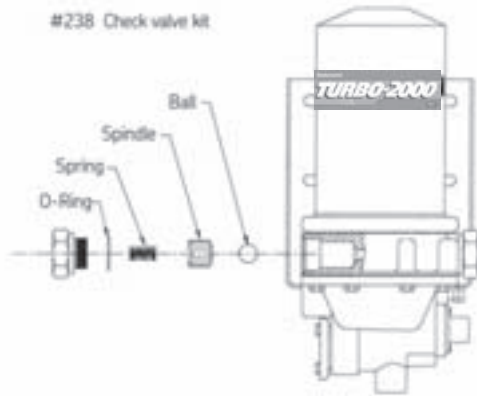
Start engine and build to cut-out pressure. Stop engine. After initial exhaust, air should flow with decreasing intensity out the exhaust port for approximately 45 seconds. If air fails to flow, replace regeneration valve kit #223.

#### Regeneration valve replacement

1. Drain the air system.
2. Disconnect the air line at air dryer purge tank port.
3. Remove regeneration valve nut.
4. Remove and discard o-ring, spring and spindle.
5. Clean nut and cavity.
6. Position new spindle in the cavity with spring pocket side out. Install spring.
7. Using grease supplied, apply a light coating on o-ring. Install o-ring on nut.
8. Apply light coating of grease on nut threads. Install nut and tighten to 60 ft. lb.
9. Re-connect air line to air dryer purge tank port.



## Service procedures Turbo-2000



### Check Valve Service Kit #238

**Warning:** Read and follow safety precautions found on page 12 before proceeding

#### Symptom

1. Dryer frequently exhausts.
2. Air continually flows from exhaust port when compressor is in standby mode.
3. Wet tank pressure drops rapidly.

**Note:** The above symptoms could also lead to Turbo valve replacement. A malfunctioning Turbo valve will tend to allow pressure to drop to cut-in pressure within seconds on E-Type dryers.

#### Operational check

##### Symptom #1, #2, & #3:

Disconnect line at control port and plug. Start engine and build to cutout pressure. Stop engine. Apply soapy solution around exhaust port. If soap bubbles exist, replace check valve #238.

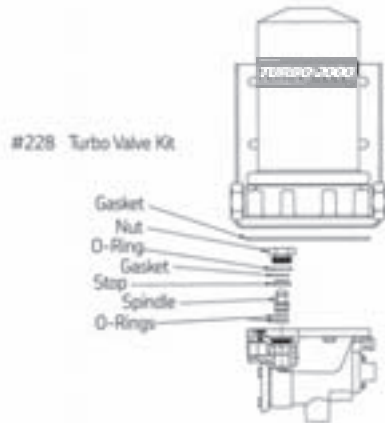
##### Check valve replacement

1. Drain air system.
2. Disconnect air line from outlet port.
3. Remove check valve nut.
4. Remove and discard o-ring, spring, spindle, and ball.

**Note:** If there is excessive oil in the check valve cavity, compressor may require servicing.

5. Clean nut and cavity area.
6. Install new ball in cavity. Next, position spindle with spring pocket facing out. Install spring.
7. Using grease supplied, apply a light coating on o-ring. Install o-ring on nut.
8. Apply a light coating of grease to threads of nut. Install nut and tighten to 60 ft. lb.
9. Re-connect air line to air dryer outlet port.

# Service procedures Turbo-2000



## Turbo Valve Service Kit #228

**Warning:** Read and follow safety precautions found on page 12 before proceeding

### Symptom

1. Dryer frequently exhausts.
2. Air continually flows from exhaust port when compressor is in standby mode.
3. System pressure drops very rapidly.

**Note:** The above symptoms could also lead to Check valve replacement.

### Operational check

#### Symptom #1, #2, & #3:

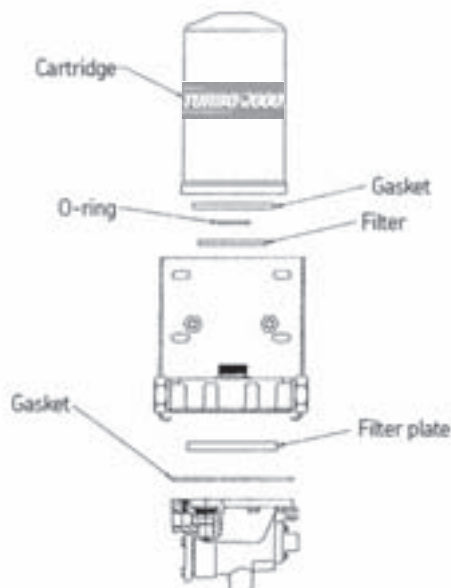
Disconnect line at control port and plug. Start engine and build to cut-out pressure. Stop engine. Apply soapy solution around exhaust port. If soap bubbles exist, replace Turbo valve #228.

#### Turbo valve replacement

1. Drain the air system.
2. Disconnect the heater wiring.
3. Disconnect the inlet and control lines from their respective ports.
4. Remove 8 bolts from bottom cap and set aside. Discard gasket.
5. Remove Turbo nut, valve stop and valve and discard.
6. Clean cavity area thoroughly.
7. Lightly coat the 2 (small) o-ring surfaces and install on piston. Carefully install valve in cavity with tapered side up.
8. Place valve stop on top of valve concave side down.
9. Lightly lube (large) o-ring and place on nut. Install flat seal into nut.
10. Install nut and tighten to 40-45 ft. lb.
11. Place gasket on bottom cap aligning all holes. Locate bottom cap so that inlet port is directly below outlet port. Install the 8 bolts. Tighten bolts to 20-25 ft. lb. or 25-30 ft. lb. if equipped with oil separator.
12. Re-connect inlet and control lines to their respective ports.
13. Re-connect heater wiring.

## Service procedures Turbo-2000

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### **Desiccant Cartridge Service Kit #T224 & #T224-P**

#### **Symptom**

1. Regular service interval.
2. Water or contamination in tanks.

#### **Operational check**

Warning: Read and follow safety precautions found on page 12 before proceeding

#### **Symptom #1 & #2**

Desiccant cartridge requires regular servicing at intervals determined by compressor duty cycle or type of driving conditions. Typical service intervals are:

Line haul	3 years
Inner city	2 years
Refuse/transit	1 year
Off highway	1 year

The above is a guideline only. Drain tanks on regular basis. If moisture exists, replace cartridge.

#### **Desiccant cartridge replacement**

\* Steps required for service kit T224-P only.

1. Relieve all system air pressure.
2. \* Disconnect heater lead wire from air dryer.
3. \* Disconnect inlet and control lines from their respective ports.
4. Using a strap wrench, turn the desiccant cartridge counterclockwise and remove. Discard.
5. Remove and discard o-ring from adapter plate stud and filter element (if present).
6. \* Remove eight (8) 3/8" hex head bolts from bottom cap and set aside.
7. \* Remove bottom cap assembly.

8. \* Remove filter plate (if present) and gasket(s) from bottom cap and discard.
9. \* Clean bottom cap sump cavity, gasket surface and inside of adapter plate castings of oil and contaminants.
10. \* Service of Turbo valve is recommended at this time also. Refer to service procedures on page 22.
11. \* Place new gasket on bottom cap bolt flange.
12. \* Place new filter plate into bottom cap cavity. Position filter plate cavity, as shown in Fig. 1, with arrow pointed toward inlet port of bottom cap.
13. \* Re-install bottom cap assembly to adapter plate casting.
14. \* Torque (8) bolts to 25-50 ft. lbs.
15. Clean top surface of adapter plate and threaded stud.
16. \* Position a new filter element around cartridge stud and onto adapter plate.
17. Using grease supplied, apply a light coating of grease onto o-ring. Install o-ring onto threaded stud.
18. Apply a generous coat of grease on the new desiccant cartridge gasket surface.
19. Thread new cartridge onto stud turning clockwise. When gasket contacts adapter plate, tighten cartridge  $\frac{1}{2}$  turn. **Do not overtighten!**
20. \* Re-connect airlines to air dryer inlet and control ports.
21. \* Re-connect heater lead wire.

**Note: Cartridge Stud Kit #619140 available if stud needs replacing.**

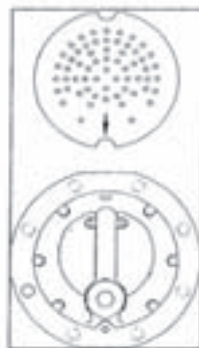
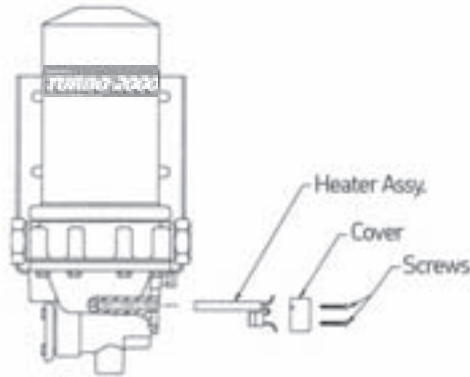


Fig. 1  
Kit #T224-P

# Service procedures Turbo-2000



#24B (12V) & 249 (24V) Heater kits

## Heater Service Kit #248, #249, #619110, #619111

Warning: Read and follow safety precautions found on page 12 before proceeding.

### Symptom

1. Dryer won't exhausts
2. Exhaust port leak.
3. Cannot build pressure.

### Operational Check

**NOTE: Thermostat must be cooled to at least 35 degrees F to check.**

1. Closed ohmmeter circuit indicates heater is functioning.
2. Open ohmmeter circuit indicates faulty heater assembly.

### Heater Assembly Replacement

1. Disconnect heater leads.
2. Remove set screw (if present) holding heater element in casting.
3. Remove two screws attaching heater cover and/or thermostat to casting.
4. Remove heater/thermostat assembly and discard.
5. Thoroughly clean entire heater/thermostat area.
6. Apply a light coating of anti-seize to the heater element and thermostat cavity.
7. Insert heater element into hole and twist slightly to spread anti-seize.

#### 7.1 Early Models (#248 or #249; orange and blue wires)

- 7.1.1 Install new set screw (if required) until snug **(DO NOT OVER TIGHTEN)** Screw will protrude from bottom cap about 1/8".
- 7.1.2 Insert thermostat into position in thermostat cavity.
- 7.1.3 Coil lead wires around heater cover posts allowing wires to protrude through slots in cover.
- 7.1.4 Place two (2) 6-32 x 1-1/8 screws in heater cover and attach the thermostat.

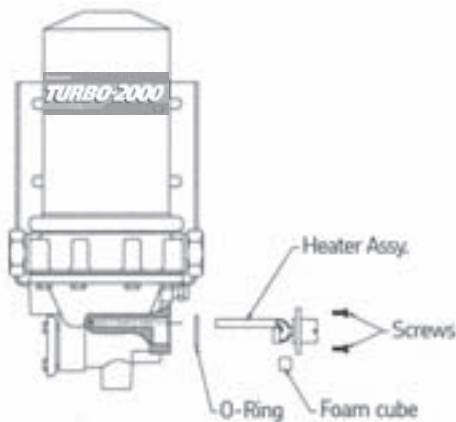
**NOTE: If heater cover is not used, use short screws and wire clamps to secure thermostat and wires.**

- 7..1.5 Fill heater cover through 1/4" hole with non-corrosive RTV.
- 7..1.6 Connect blue heater wire to a good chassis ground.
- 7..1.7 Connect orange wire to ignition switch.
- 7..1.8 Seal and route heater wires carefully.

#### 7.2.11 Late Models (#619110 or #619111); plug style connection

- 7.1.2.1. Slide o-ring over heater and thermostat into position around connector flange.
- 7.1.2.2. Slide heater and thermostat into position in cavity.
- 7.1.2.3. Ensure thermostat sits flat in cavity.
- 7.1.2.4. Place foam cube on top of thermostat and bring heater connector into position over heater.
- 7.1.2.5. Secure heater assembly using the (2) 8-32 x1/2" screws.
- 7.1.2.6. Reconnect Metri-Pak connector to male plug.

**NOTE: If heater lead wire with male plug needs to be replaced or is not in vehicle wire harness it is available in Kit #619900.**



# 619119 (12V) & 61911 (24V) Heater kits