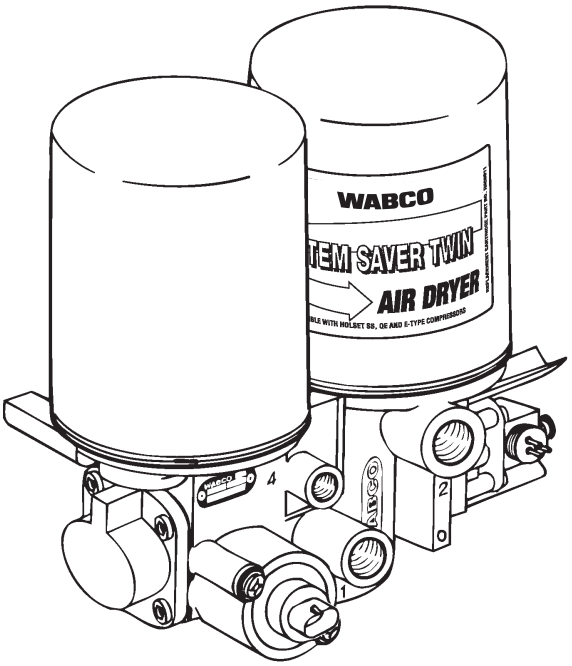
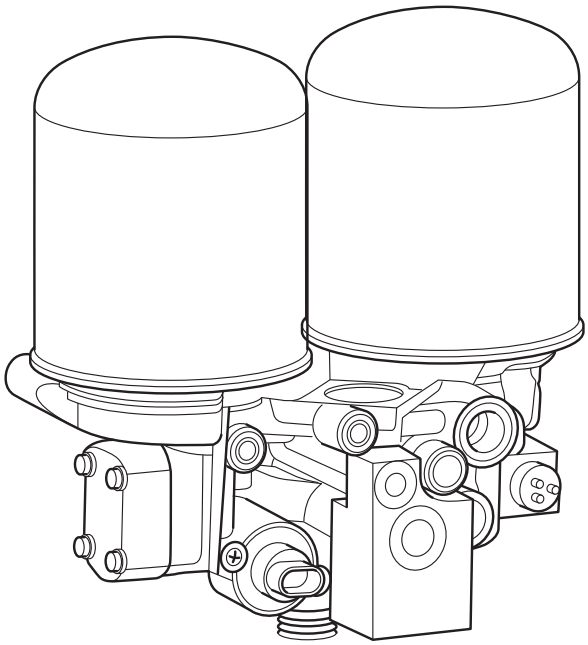
SYSTEM SAVER TWIN AIR DRYER

MAINTENANCE MANUAL





MM35

WABCO

Mobilizing Vehicle Intelligence

About This Manual

This manual provides maintenance and service procedures for WABCO System Saver Twin air dryers.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

Hazard Alert Messages and Torque Symbols

⚠ WARNING

A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

⚠ CAUTION

A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

This symbol alerts you to tighten fasteners to a specified torque value.

How to Obtain Additional Maintenance, Service and Product Information

Visit our Literature Center at wabco-na.com/literature to access and order additional information.

Contact WABCO North America Customer Care at 855-228-3203 (United States and Canada); 001-800-889-1834 (Mexico); or email wnacustomercare@wabco-auto.com.

If Tools and Supplies are Specified in This Manual

Contact the WABCO Customer Care Center at 855-228-3203.

⚠ WARNING

This product can expose you to chemicals including Nickel, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Contents

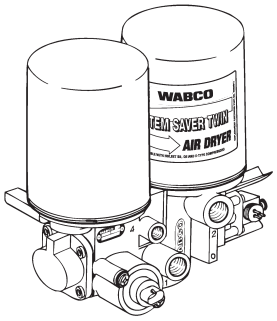
Notes

Overview

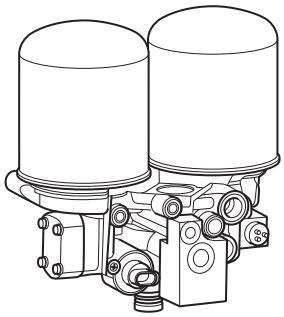
This manual provides maintenance and service procedures for WABCO System Saver Twin air dryers.

This manual cover two designs of WABCO System Saver Twin air dryers: Original models which were produced 2009 and before, and New models which were produced 2010 and after. Both models use similar procedures except where noted in this manual. Figure 1.1.

If you are servicing a WABCO System Saver Series single air dryer, refer to Maintenance Manual MM34, System Saver Series Single Cartridge Air Dryers.



ORIGINAL SYSTEM SAVER TWIN AIR DRYER PRODUCED 2009 AND BEFORE



NEW SYSTEM SAVER TWIN AIR DRYER PRODUCED 2010 AND AFTER
Model shown has turbo cut-off valve attached.

4012543a

Figure 1.1

Typical System

A typical WABCO System Saver Twin air dryer installation is illustrated in Figure 1.2.

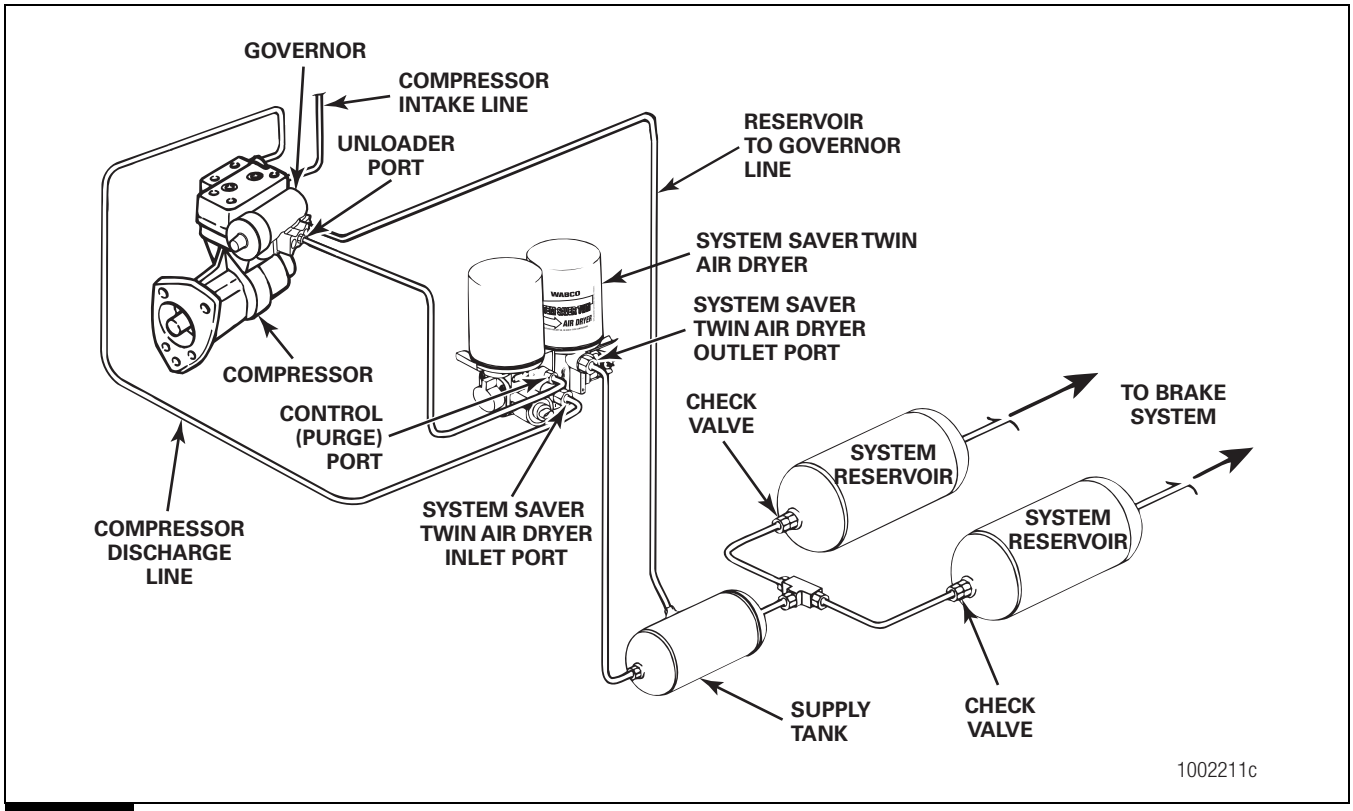


Figure 1.2

System Saver Twin Air Dryer Support Documentation

PB19028 contains a complete listing of System Saver Twin air dryer replacement parts.

TP97100 is a troubleshooting guide. It also illustrates the various components that make up the System Saver Twin air dryer.

TP9672, Air Dryer Application Guide, provides an in-depth look at System Saver Twin air dryer applications and installation requirements.

Visit the WABCO Literature Center at www.wabco-na.com/literature to download and order.

How the System Saver Twin Air Dryer Works

Original System Saver Twin air dryers contain standard desiccant cartridges. This cartridge filters and dries compressed air. New System Saver Twin air dryers have standard coalescing cartridges with additional filtering for oil and aerosol particles. The process begins when the supply tank pressure drops below cut-in pressure (approximately 100 psi). When this occurs, the governor turns the compressor on. The compressor sends air to the supply port of the System Saver Twin air dryer and the air drying/filtering cycle begins.

System Saver Twin Air Dryer Cycle

- The air drying cycle begins as air enters the System Saver Twin air dryer at the supply port (Port 1). Figure 1.3.
- Air flows past the piston or the diaphragm into the first (right) cartridge.
- Air flows through the cartridge where it is dried; moisture and contaminants are filtered out through the desiccant material in the cartridge.
- Dry, clean air flows to the delivery port (Port 2) of the System Saver Twin air dryer for delivery to the supply tank.
  - — Some air is diverted to the second cartridge where it moves upward through the desiccant. This cleans and dries (regenerates) the desiccant.

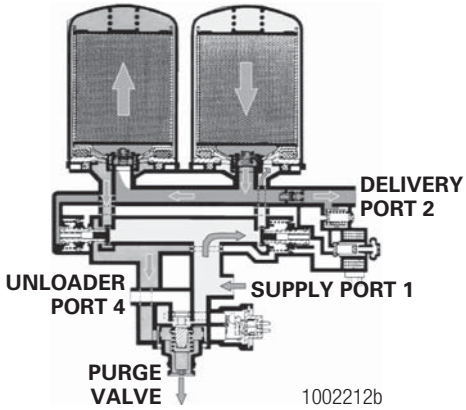


Figure 1.3

- While the compressor is running, a mild flow of air will vent to atmosphere through the purge valve. Figure 1.4.

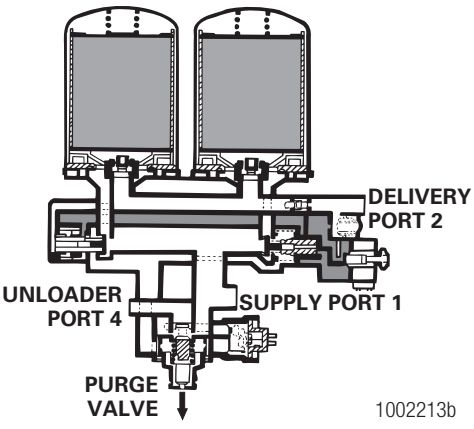


Figure 1.4

- At 60 psi (413 kPa) or greater, the System Saver Twin air dryer switches air flow from the other cartridge every 60 seconds.
- The switching of air is controlled by a timer/solenoid located on the System Saver Twin air dryer.
- Pistons shift from right to left, reversing the airflow pattern.
- A mild purge, or puff of air, can be heard at the purge valve at the time of shift.
- The air drying cycle continues as the cartridge functions are reversed. Figure 1.5.
- Incoming air enters the second (left) cartridge for drying and then flows to the delivery port.
- A small amount of dried air flows into the first (right) cartridge to regenerate desiccant.
- Alternating air drying cycles continue, one cartridge to the other, every 60 seconds as long as the vehicle is running.

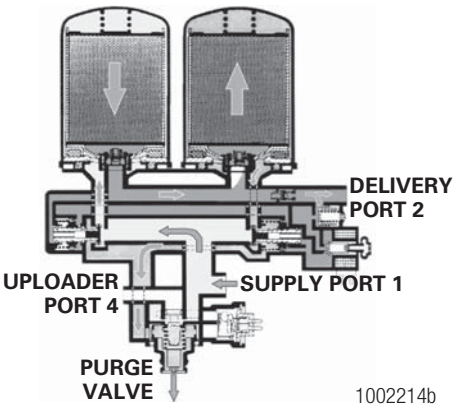


Figure 1.5

- Supply tank reaches cutout pressure. Governor unloads compressor.
- Governor supplies air to unloader port (Port 4) of the System Saver Twin air dryer.
- The System Saver Twin air dryer purges. Figure 1.6.

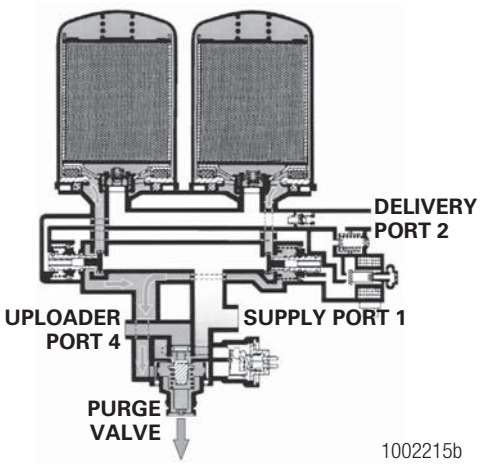


Figure 1.6

- Moisture and contaminants pass through the purge valve and out of the System Saver Twin air dryer.
- A burst of air occurs when the System Saver Twin air dryer purges; airflow from purge valve ceases for duration of unloaded cycle.

Components

System Saver Twin Air Dryer Parts

System Saver Twin Air Dryer Base: The aluminum casting to which all System Saver Twin air dryer components are assembled. The base contains threaded mounting holes. Figure 1.7 and Figure 1.8.

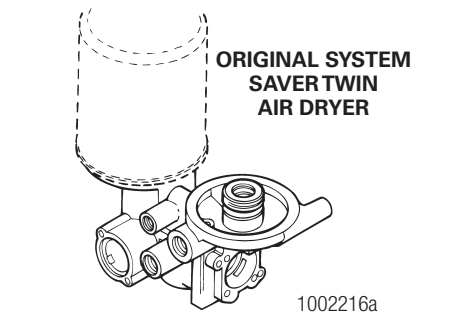


Figure 1.7

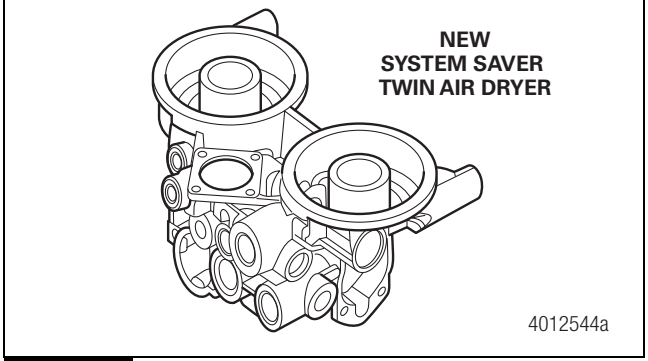


Figure 1.8

Desiccant Cartridge: A cylindrical steel housing that contains the filter element and desiccant necessary to filter and dry the air that passes through it. For easy maintenance, all WABCO System Saver Twin air dryer cartridges are of spin-on/spin-off design. Figure 1.9.

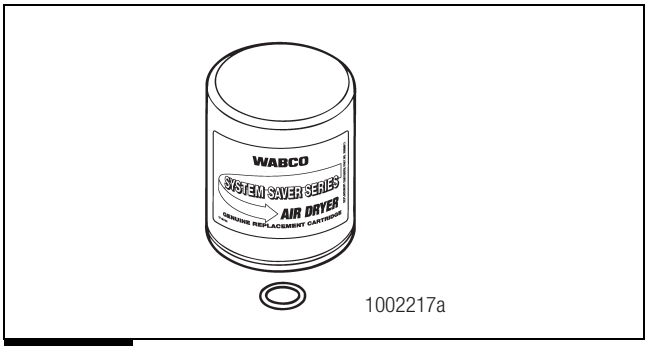


Figure 1.9

Coalescing Cartridge: Utilizes a filter element added to the standard desiccant to remove aerosol and oil particles.

Heater Assembly: Located in the System Saver Twin air dryer base. The heater keeps the water that collects in the System Saver Twin air dryer from freezing. The assembly consists of a cylindrical resistive-type heating element and a small circular thermostat. The thermostat turns the heater on at 44°F (7°C) and turns it off at 86°F (30°C). Figure 1.10.

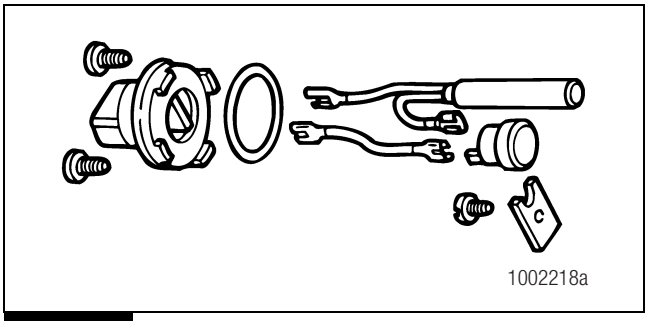


Figure 1.10

Orifice and Check Valve Assembly: Controls the flow of air for regeneration. There are three sizes: 0.8 mm for systems with compressor ratings less than 21 CFM, 1.0 mm for compressor ratings between 21 and 35 CFM, and 1.3 mm for compressor ratings greater than 35 CFM. Figure 1.11 and Figure 1.12 (refer to Figure 1.25 for details).

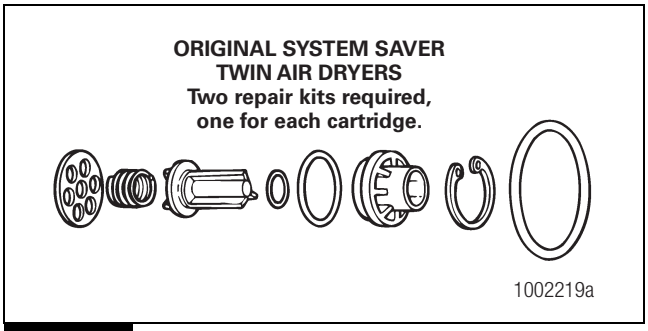


Figure 1.11

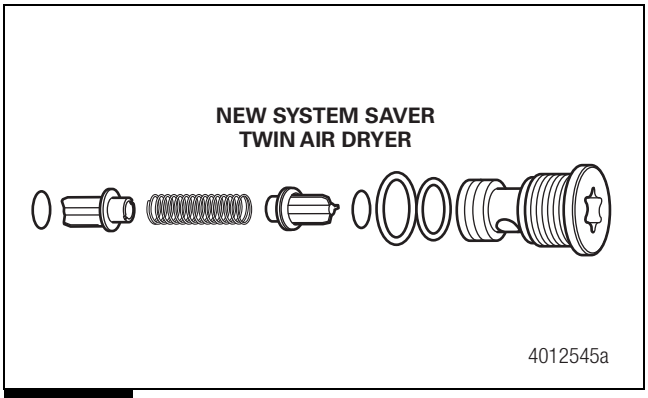


Figure 1.12

Charging Valve: Keeps the control valves from shuttling while the system is filling and pressure is too low to ensure correct operation. Figure 1.13.

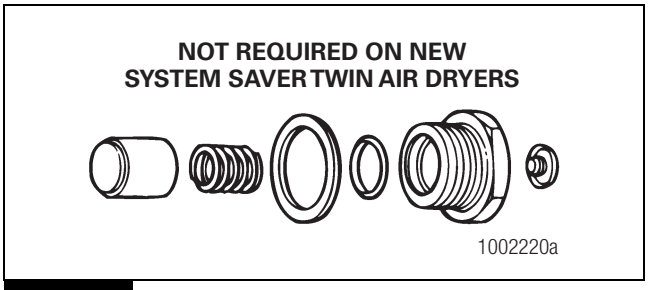


Figure 1.13

Outlet Check Valve: Prevents air from flowing back through the System Saver Twin air dryer and escaping out of the purge valve during the compressor unload cycle, or while the vehicle is shut off. It is located in the outlet port of the System Saver Twin air dryer. Figure 1.14 (refer to Section 5 for more details).

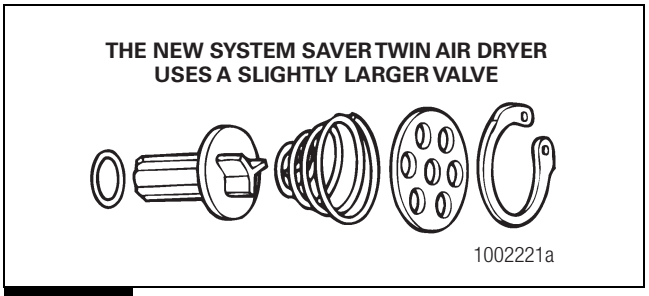


Figure 1.14

Purge Valve: Allows the collected moisture and contaminants to be expelled from the System Saver Twin air dryer during the unloaded cycle. The purge valve remains open for the entire compressor unload cycle. Figure 1.15.

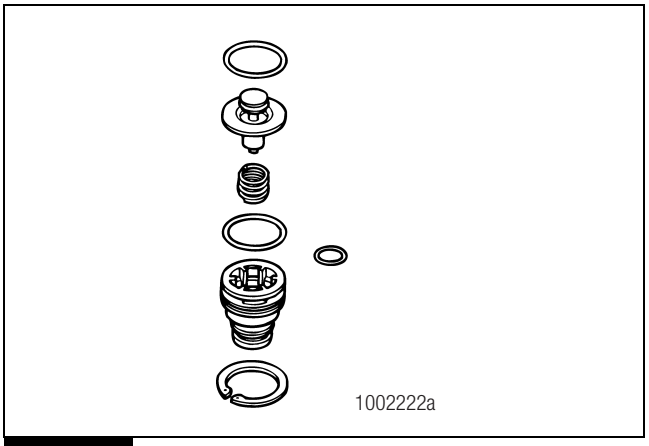


Figure 1.15

NOTE: While the compressor is running, a mild flow of air will vent to atmosphere through the purge valve. This is a normal condition.

Solenoid and Armature Assembly: Controls timing and operation of the right and the left piston assemblies by the switching of air. This determines which cartridge dries and which one regenerates. Figure 1.16.

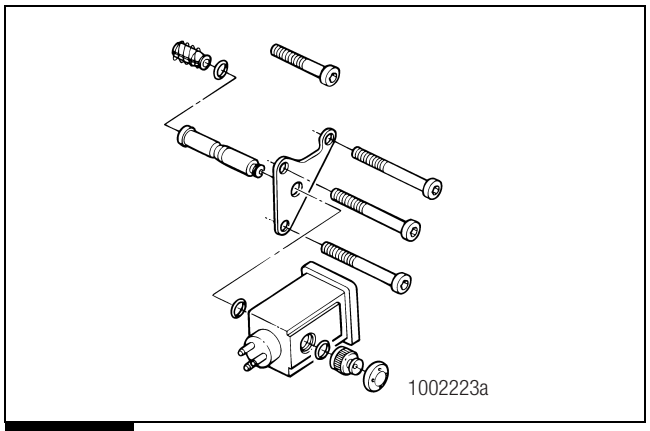


Figure 1.16

Turbo Cut-Off Valve: Prevents leakage of turbo boost through the air compressor and out of the purge valve of the System Saver Twin air dryer when the compressor is operating in the unload mode. Figure 1.17.

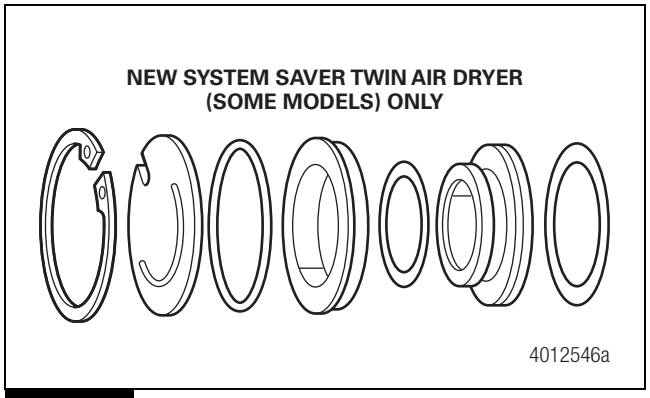


Figure 1.17

Pressure Relief Valve: Protects the System Saver Twin air dryer from over-pressurization. May be installed using a street-Tee fitting, as shown in Figure 1.18, or directly into the System Saver Twin air dryers with the appropriate relief port (Port 31). Figure 2.2.

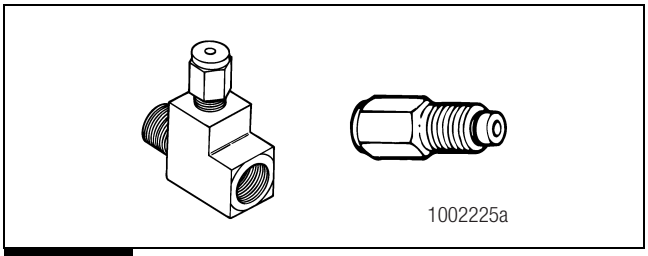


Figure 1.18

Piston Assemblies (Left and Right): Control air flow direction between System Saver Twin air dryer cartridges. Both piston assemblies have their own covers. Figure 1.19.

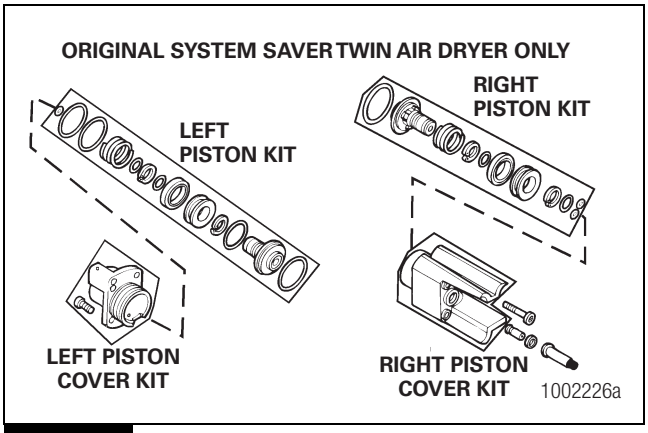


Figure 1.19

O-Ring and Diaphragm: Control air flow between cartridges for the New System Saver Twin air dryers. Figure 1.20.

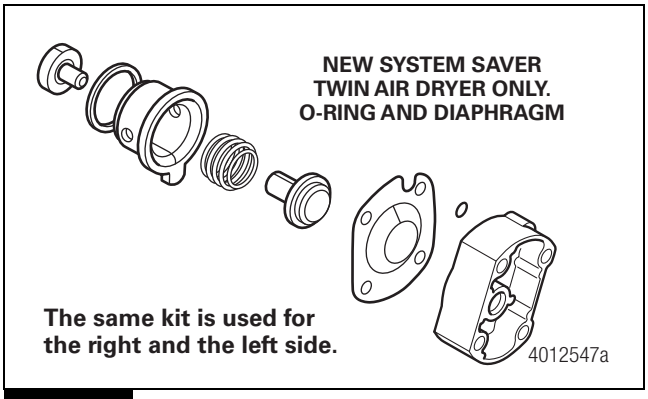


Figure 1.20

Purge Silencer: Optional equipment. Used to reduce the noise level of System Saver Twin air dryer purge. Figure 1.21.

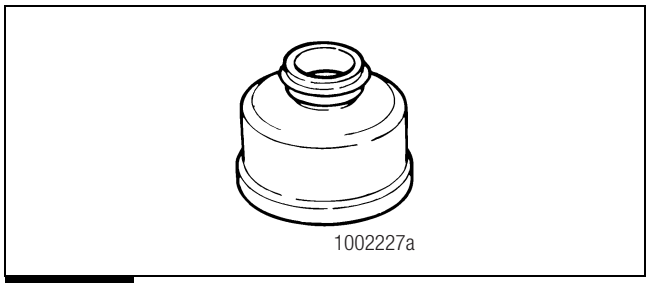


Figure 1.21

Wiring Harness Options

Two types of power harnesses are used with the System Saver Twin air dryer; the Standard Wiring Harness and the E-Type Wiring Harness. The wiring harness is included with the original installation. For part numbers and other ordering information, refer to PB-8857AS, the System Saver Twin air dryer parts book.

Standard Wiring Harness

The System Saver Twin air dryer uses a standard two-circuit power harness for the heater and for the timer/solenoid in most applications (for the non-Holset compressors). Figure 1.22.

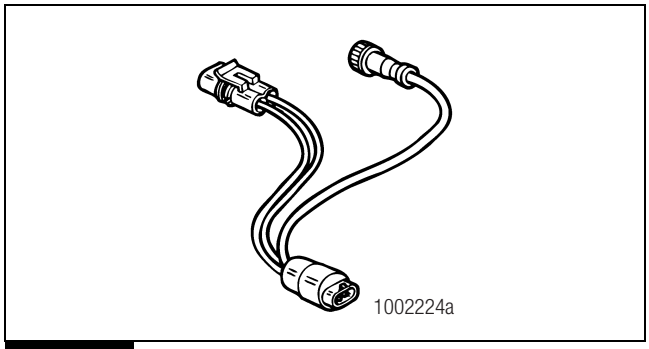


Figure 1.22

Wiring/Plumbing Kit for E-Type Compressor

A three-circuit power harness must be used with Holset E-Type compressors. An Econ valve and check valve assembly, as well as a special solenoid valve, are also required. Figure 1.23.

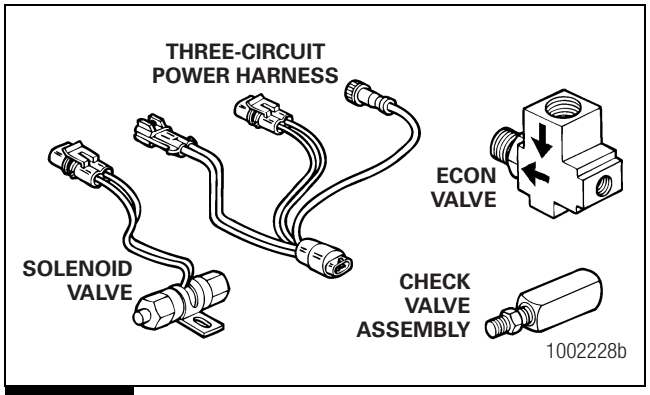


Figure 1.23

The following illustration is an exploded view of the Original System Saver Twin air dryer component parts. Figure 1.24.

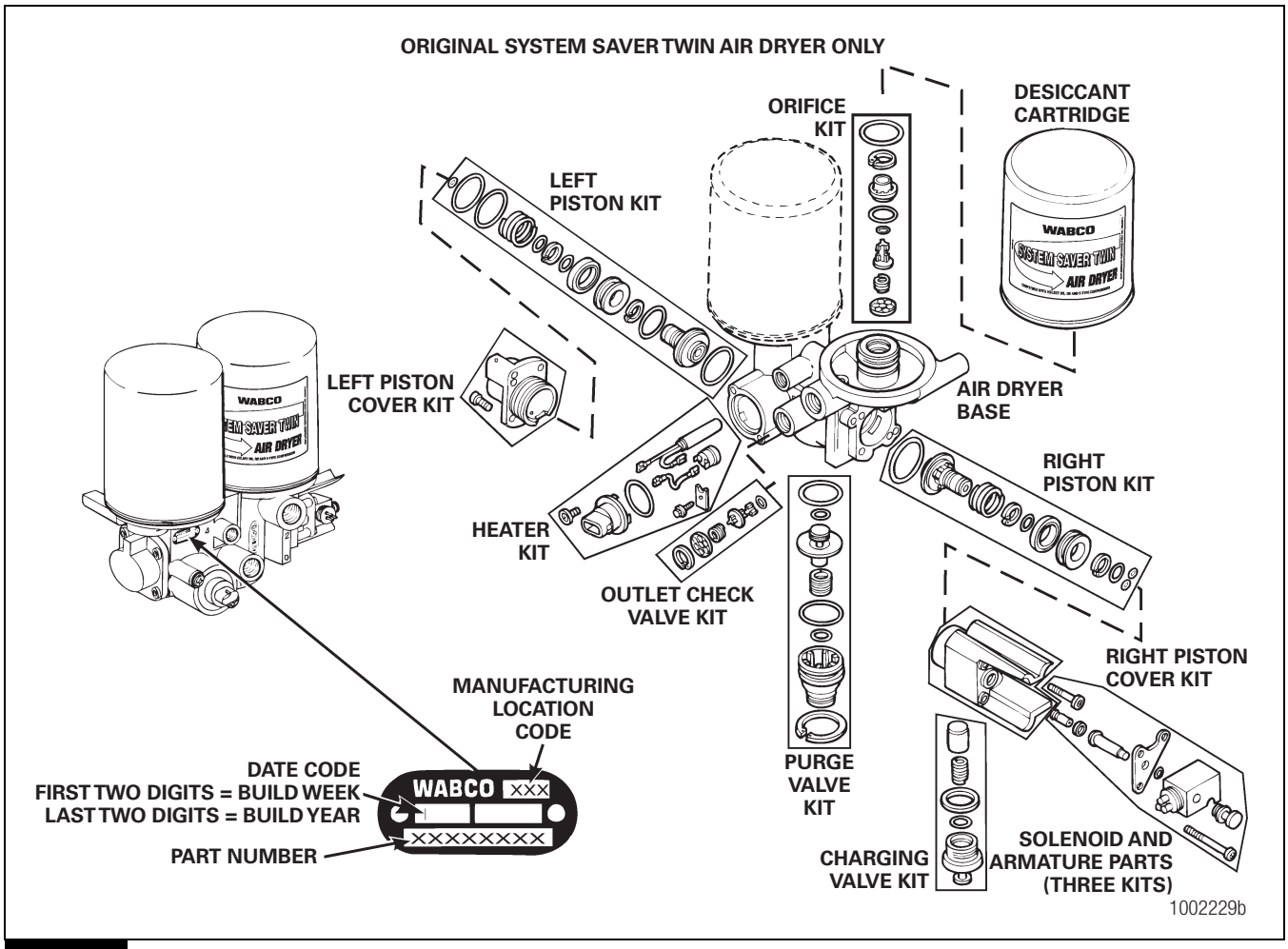


Figure 1.24

The following illustration is an exploded view of the New System Saver Twin air dryer component parts. Figure 1.25.

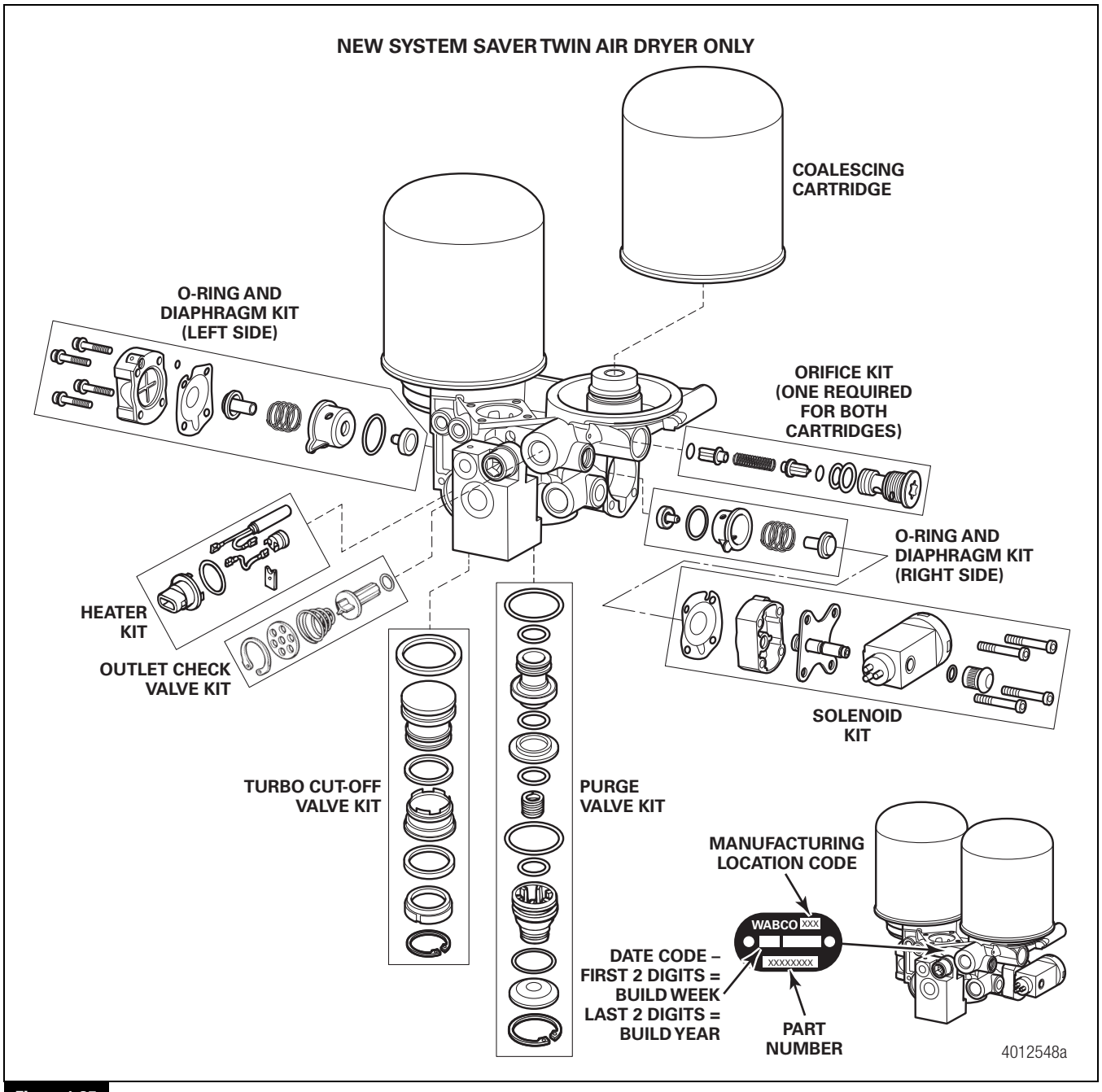


Figure 1.25

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Engage the parking brake to prevent the vehicle from moving before you begin maintenance or service procedures that require you to be under the vehicle. Serious personal injury can result.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Remove all air from the air system before servicing any component in the air system. Pressurized air can cause serious personal injury.

Maintenance

To keep your WABCO System Saver Twin air dryer operating efficiently, the following routine maintenance is recommended. Table A.

Table A: Routine Maintenance

Interval	Required Action
Weekly.	Check the exhaust from the System Saver Twin air dryer. If the exhaust (purge valve) is leaking water/oil or has a large amount of continuous air flow, refer to the troubleshooting information in Table B for the possible cause and corrections.
Weekly, or as recommended by the vehicle OEM, whichever is most frequent.	Check for moisture in the system by opening the drain valve briefly to drain water. Close the drain valve quickly when water stops draining. (Maintain tank pressure.)
Every 1-2 years or more often depending on usage, vocation and condition of compressor.	Replace the desiccant or coalescing cartridges with new cartridges.
Whenever compressor is rebuilt.	Replace the desiccant or coalescing cartridges with new cartridges.

Pressure Relief Valve

Check the build date on the part identification tag to determine whether or not it has an integral pressure relief valve. Figure 2.1. If the build date is November 1996, or later, it has an integral pressure relief valve which can be seen at the back of the System Saver Twin air dryer. Figure 2.2. System Saver Twin air dryers without integral relief valves must use a pressure relief valve and street-Tee fitting. All new System Saver Twin air dryers have the integral pressure relief valve.

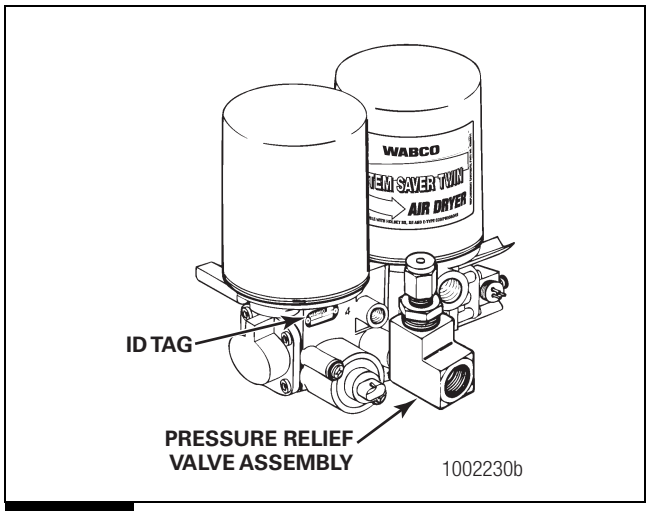


Figure 2.1

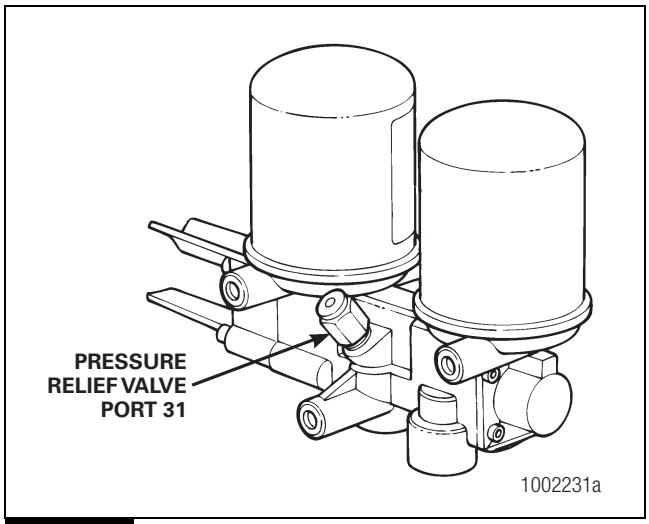


Figure 2.2

WABCO System Saver Twin Air Dryer Troubleshooting Guide

Table B

Condition	Possible Causes	Actions Required
System Saver Twin air dryer does not work correctly.	System Saver Twin air dryer mounted too close to heat source, such as engine exhaust stack or muffler.	Verify correct installation.
	Air delivered to System Saver Twin air dryer exceeds 175°F (79°C).	Extend length of compressor discharge line as required, or install cooling coil.
	Lines blocked with dirt.	Clear or replace lines.
	Loose fittings.	Tighten or seal fittings.
	System Saver Twin air dryer not switching every 50 to 60 seconds during compressor loaded cycle.	Verify that the solenoid valve is operating correctly. See System Test Section III.
Water in air system.	Desiccant saturated.	Check timer (solenoid) and make necessary repairs. **NOTE:** If timer is working correctly but System Saver Twin air dryer does not switch, check for sludge on valves. Clean the System Saver Twin air dryer. If condition is not corrected: • Check pistons or diaphragm and make necessary repairs. • Replace cartridge(s).
System Saver Twin air dryer leaks heavily from purge valve every other 60-second timer cycle.	Incorrect air pressure maintained at System Saver Twin air dryer; 35-75 psi (241-517 kPa) allows partial switching but does not seal valves for a second cycle.	Install back-pressure control valve in system between the outlet of System Saver Twin air dryer and source of air take-off.
System Saver Twin air dryer frozen (water in System Saver Twin air dryer is freezing).	Problem with heater assembly.	Replace heater assembly.
	Power supply to heater interrupted or short-circuited.	Repair or replace power supply circuit. Replace fuse if needed.
	Low voltage to heater unit.	Ensure voltage is at least 10.5 volts (12-volt system) or 20 volts (24-volt system).
	Wrong voltage System Saver Twin air dryer used (e.g., 24-volt in 12-volt system).	Replace with correct System Saver Twin air dryer.
Excessive amount of oil released from exhaust of System Saver Twin air dryer.	Problem with air compressor.	Repair or replace compressor. Replace desiccant cartridge(s).

Condition	Possible Causes	Actions Required
OR **Sludge build-up on System Saver Twin air dryer base.**	Worn turbocharger oil seals (turbocharged compressors only.)	Repair or replace turbocharger.
System Saver Twin air dryer does not purge when compressor unloads.	Wrong air line or no air line connected to System Saver Twin air dryer Port 4.	Connect air lines correctly.
	Control line from governor unloader port to System Saver Twin air dryer leaking.	Repair any leaks.
	Purge valve stuck closed.	Replace purge valve.
	Problem with governor.	Repair or replace governor.
	Cutout pressure never reached by air compressor.	Check air system for leaks. **If condition is not corrected:** Check/repair compressor.
Air pressure does not build in brake system.	Leak in air system.	Tighten all air line connections, test system for leaks, make necessary repairs.
	Problem with compressor.	Repair or replace the compressor. Repair or replace problem air system components.
	System Saver Twin air dryer control port (Port 4) plumbed wrong.	Verify correct installation.
	Obstruction in air compressor discharge line or System Saver Twin air dryer outlet line. Outlet check valve or turbo cut-off valve stuck in closed position.	Check lines for crimps or blockages. Make necessary repairs.
	Air compressor discharge line plumbed to System Saver Twin air dryer outlet port (Port 2).	Verify correct installation. Make necessary repairs.
	CTI Applications: Back-pressure control valve installed incorrectly.	Verify installation of back-pressure control valve.
	Faulty compressor discharge hose.	Check for pinhole leaks along length of compressor discharge line from compressor to System Saver Twin air dryer. If found, replace hose. Make sure replacement hose is capable of sustained high temperature use.
Air continues to flow from purge valve after air compressor unloads. **NOTE:** This could be accompanied by a loss of engine power.	Compressor intake is turbocharged and there is no turbo cut-off valve in system.	Install a New Generation System Saver Twin turbo cut-off air dryer.
	The turbo cut-off valve is not working.	Install a turbo cut-off valve repair kit.
	Outlet check valve leaking accompanied by loss of pressure in supply reservoir.	Check outlet check valve. Repair or replace as needed.

Condition	Possible Causes	Actions Required
Internal valves not switching. Excessive air leaking from the purge valve.	Orifice blocked, internal passages blocked, valve components covered with sludge.	Clean as needed and replace worn parts.
	O-rings, diaphragm or piston seats in bad condition (cut, worn).	Make sure rubber components are correctly installed and in good condition. Replace if needed.

Tests

I. Heater Resistance

To avoid damaging components, WABCO recommends performing this resistance check with the heater in place.

1. Set volt-ohmmeter to ohms.
2. Disconnect the vehicle harness at the heater. Place the leads on the pins on the connector at the System Saver Twin air dryer. Figure 2.3.

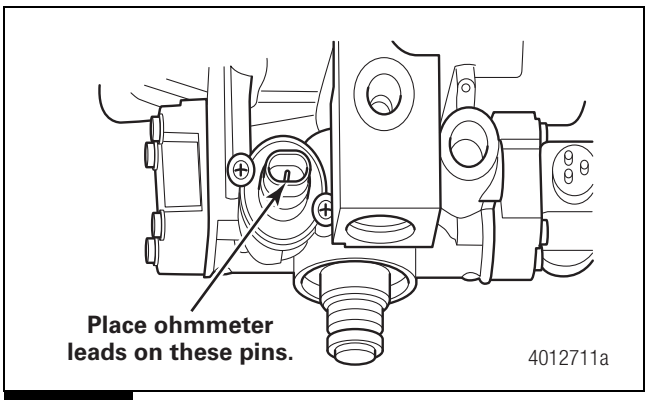


Figure 2.3

3. Measure the resistance.

   12-volt system: If 1.0-2.0 ohms, resistance is acceptable.

   If the resistance is less than 1.0 ohm or more than 2.0 ohms, replace heater.

   24-volt system: If 5.0-7.0 ohms, resistance is acceptable.

   If the resistance is less than 5.0 ohms or more than 7.0 ohms, replace heater.

4. Reinstall the vehicle harness.

II. Leak Test

1. Drain the air from all of the system tanks.
2. Close the drain valves on all of the reservoirs.
3. Start the vehicle.
4. Allow the air system pressure to build up while the engine idles.
5. There will be a light airflow from the purge valve. **This is normal and will continue until the air compressor unloads.**

   After 50-60 seconds, and if the system pressure has built to at least 60 psi, there will be a mild purge, or exhaust of air, as the System Saver Twin air dryer switches cartridges. If there is no purge, the solenoid may be bad. Perform the Solenoid Check to test the solenoid.

   When the air system reaches cutout pressure, the System Saver Twin air dryer will purge completely.
6. Shut off the engine.
7. Apply a soap solution to each connection that contains pressurized air. Check the connections to see if the soap solution bubbles. Table C.
8. Repeat the leak test until all connections are sealed.

Table C: Check for Leaks

No Soap Bubbles	Connections are Sealed Correctly
Soap bubbles appear.	Connections not sealed correctly. To repair: 1. Drain all reservoirs. 2. Remove leaking connection. 3. Inspect the connectors and ports for damaged threads or cracks. Replace if necessary. 4. Apply pipe sealant or Teflon tape to connection.

III. Solenoid Check

1. Turn ignition on. Do not start engine.
2. To ensure power to the solenoid, check at the cable with a volt-ohmmeter or a test light. Figure 2.4.

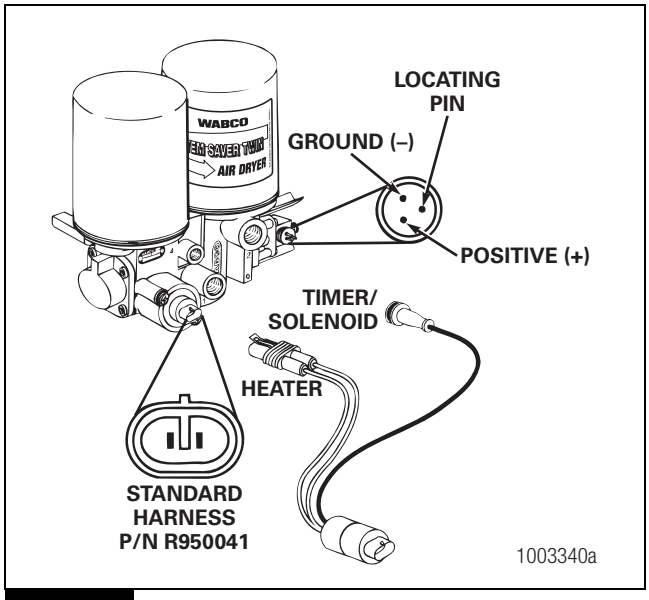


Figure 2.4

3. Go to the System Saver Twin air dryer and listen for the solenoid to click. There should be one switch of air flow that makes a clicking sound every 50-60 seconds. If not, the solenoid is defective.

IV. Turbo Cut-Off Valve Test

1. Close the drain valves on all of the reservoirs.
2. Start the vehicle. Wait for the braking system to pressurize.
3. Listen for the purge cycle, which is when you will hear the System Saver Twin air dryer exhaust a puff of air from the purge valve at the compressor unload.
   - **If large amounts of air are continuing to flow after the purge cycle and the flow is noticeably stronger at high engine RPM, especially under load:** The turbo cut-off valve is leaking or stuck open.

V. Outlet Check Valve Test

1. Close the drain valves on all of the reservoirs.
2. Start the vehicle. Wait for the braking system to pressurize.
3. Listen for the purge cycle, which is when you will hear the System Saver Twin air dryer exhaust a puff of air from the purge valve at the compressor unload.
   - **If air is continuing to flow from the purge valve after the purge cycle, but stops flowing when the compressor load cycle begins:** The outlet check valve is leaking or stuck open.

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Remove all pressure from the air system before you disconnect any component including the desiccant cartridge. Pressurized air can cause serious personal injury.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Component Replacement

Standard Desiccant or Coalescing Cartridge

NOTE: All standard and coalescing cartridges are identical regardless of model year.

NOTE: You may replace one or both cartridges on the System Saver Twin air dryer.

1. Replacement kit contains one cartridge and one O-ring. Figure 3.1.

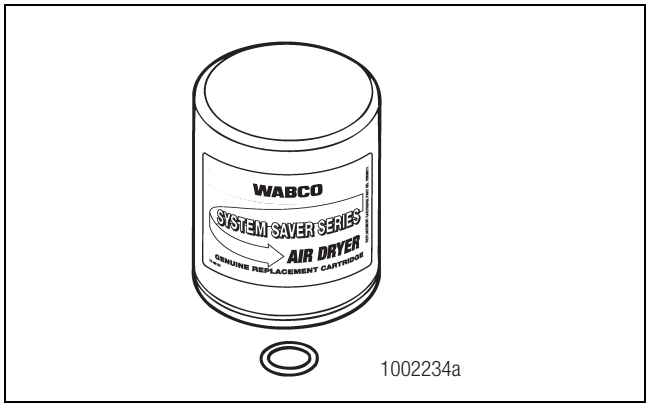


Figure 3.1

2. Loosen and remove the old cartridge. Use a strap wrench if necessary.
3. Remove and discard O-ring from System Saver Twin air dryer base.
4. Inspect and clean seal seats.

   NOTE: If seats are damaged so badly that a tight seal cannot be maintained, replace the System Saver Twin air dryer.

5. Lubricate and install new O-ring on stem.
6. Thread replacement cartridge onto the base until the seal touches the base. Then, tighten the cartridge one-half (1/2) additional turn. **Do Not Overtighten.** Figure 3.2.

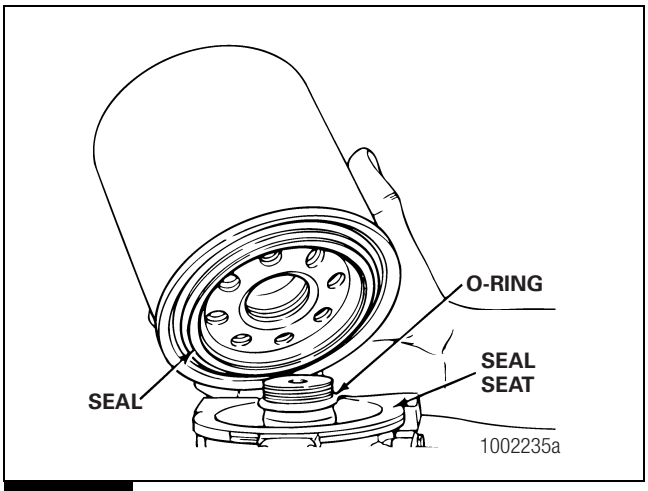


Figure 3.2

Left Piston Cover (Original System Saver Twin Air Dryers)

1. Remove the old cover. Use a 5 mm Allen wrench to loosen the mounting bolts. Remove bolts. Lift cover off of the System Saver Twin air dryer. Figure 3.3.

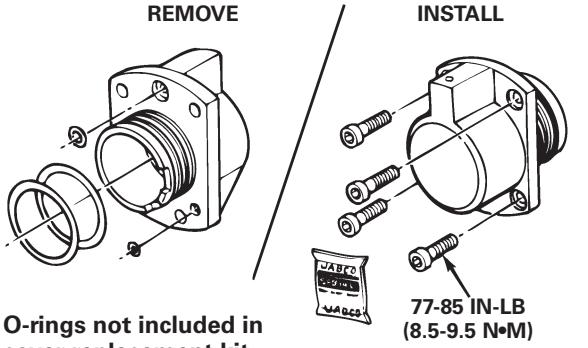


Figure 3.3

NOTE: If you are replacing the left piston assembly, refer to the following instructions.

2. If you are replacing the cover only:

   The two small O-rings that fit in the breather holes and the two large O-rings that fit in the grooves in the outer diameter of the cover guide are not included in the cover replacement kit. There is a separate kit that includes the O-rings, if needed. Remove the O-rings from the old cover, clean, apply the WABCO-recommended lubricant, and install them in the new cover.

3. Install the replacement cover. Tighten bolts to 77-85 in-lb (8.5-9.5 N•m). T

Left Piston Assembly (Original System Saver Twin Air Dryers)

1. Review Figure 3.4 to make sure you have all of the parts required to replace the left piston assembly. Use the grease included with the replacement kit to lubricate O-rings and seals. To replace all components, a piston head kit and a piston seal kit are required.

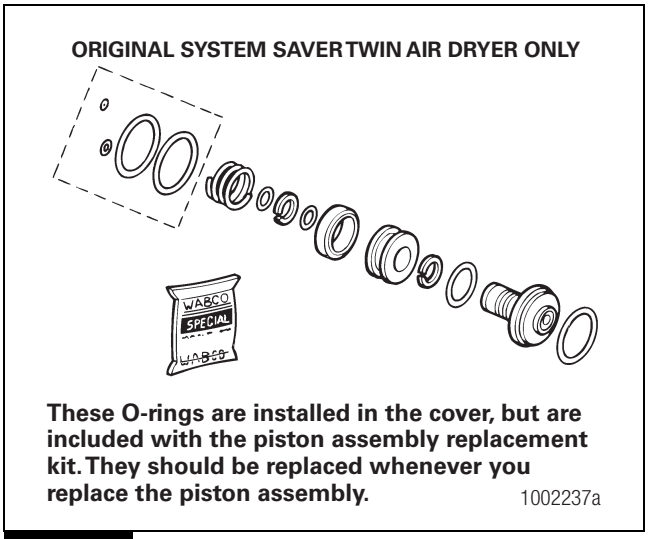


Figure 3.4

2. Remove the left piston cover (refer to the instructions, above). Remove the two small O-rings from the breather holes and the two large O-rings from the grooves in the outer diameter of the cover guide.

   A. These O-rings are installed in the cover, but are included with the piston assembly replacement kit. They should be replaced whenever you replace the piston assembly.

   B. Clean the cover. Save cover and mounting bolts for reassembly.

   NOTE: Seals, O-rings and springs are included in a separate replacement kit from the hard parts (piston, spool and lip seal). Refer to PB-8857AS, WABCO's replacement part book for additional information.

3. Remove the left piston and spring assembly from the piston bore.

   Inspect and clean the bore area. Figure 3.5.

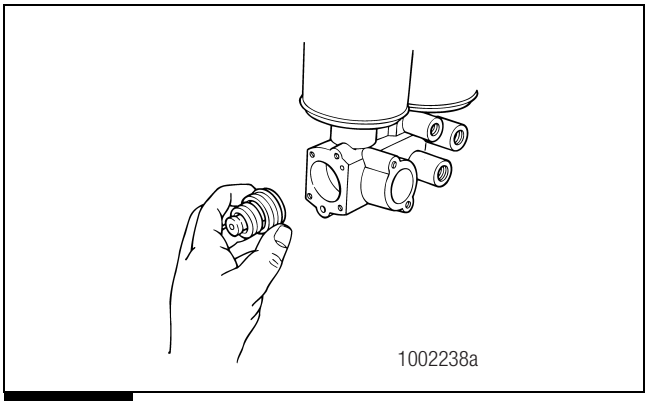


Figure 3.5

4. Lubricate and install the large replacement O-ring in the groove on the head of the piston guide. Figure 3.6.

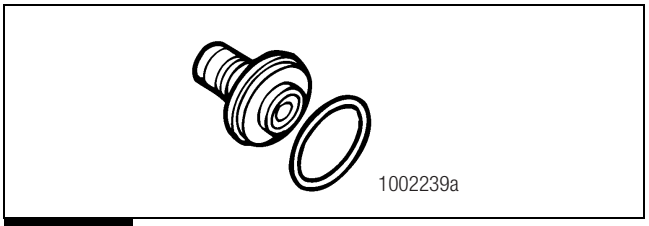


Figure 3.6

5. If the O-ring and spool are already installed on the piston, lubricate the rubber parts, then go to Step 6. If not:
   A. Install the lubricated O-ring in the first groove of the piston guide.
   B. Use snap ring pliers to install the snap ring in the snap ring groove on the shaft of the piston.
   C. Install the lubricated lip seal in the groove of the spool with the lip seal onto the piston. The lip seal must face away from the System Saver Twin air dryer.
   D. Install the lubricated O-ring in the groove on the piston shaft.
   E. Use the snap ring pliers to install the snap ring in the snap ring groove under the spool.
   F. Install the lubricated O-ring in the groove on the piston shaft. Figure 3.7.

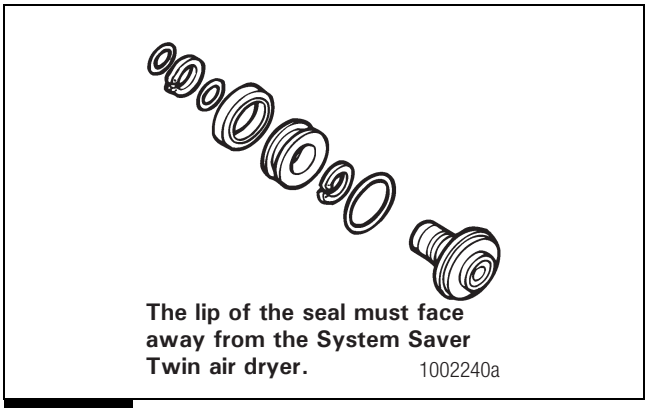


Figure 3.7

6. Install the two large, lubricated O-rings in the grooves in the outer diameter of the cover guide. Install the small lubricated O-ring in the breather hole on the cover. Figure 3.8.

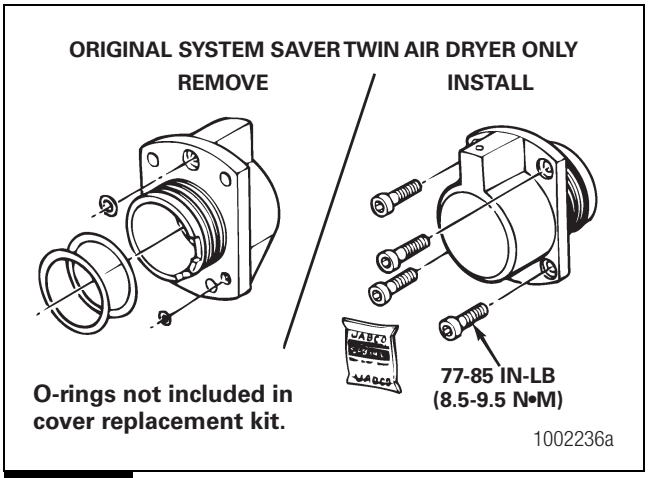


Figure 3.8

7. Install the spring in the left piston cover. Insert the piston assembly into the left piston cover. The stem of the piston will face away from the System Saver Twin air dryer. Figure 3.9.

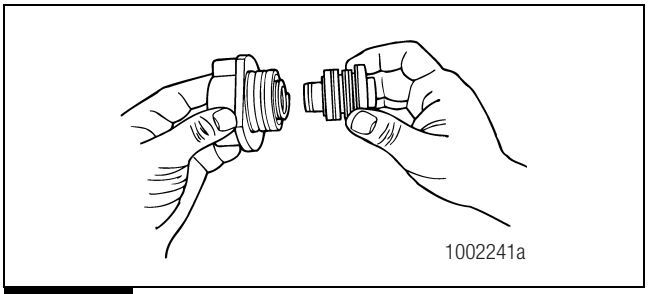


Figure 3.9

8. Replace the left piston cover. Refer to the procedure in this section.

Right Piston Cover (Original System Saver Twin Air Dryers)

The right piston cover replacement kit contains **only** the cover. When you remove the old cover, retain the mounting bolts for reassembly. Also, remove and save the two small, breather passage O-rings. Figure 3.10.

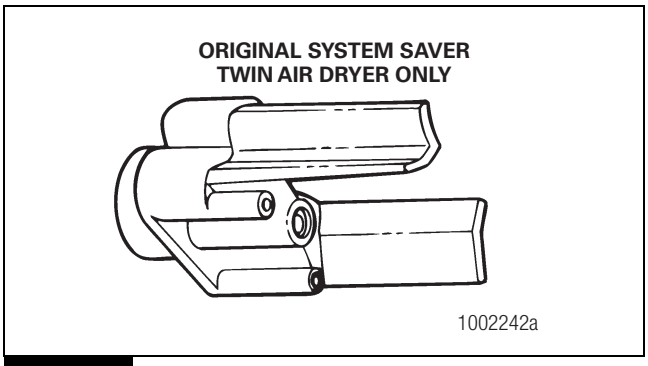


Figure 3.10

NOTE: The right piston cover houses the solenoid/armature and charging valve assemblies. Carefully remove and save these assemblies. Clean and inspect them before reinstalling them in the new cover. You must also remove the right piston assembly when replacing the cover.

If you are replacing any of these assemblies, you should follow the instructions that appear in this manual:

- Right Piston Assembly (in this section)
- Charging Valve Assembly (in this section)
- Solenoid and Armature Assembly (in this section)

1. Unscrew the power harness and disconnect it from the solenoid. Remove and save the solenoid. Figure 3.11.

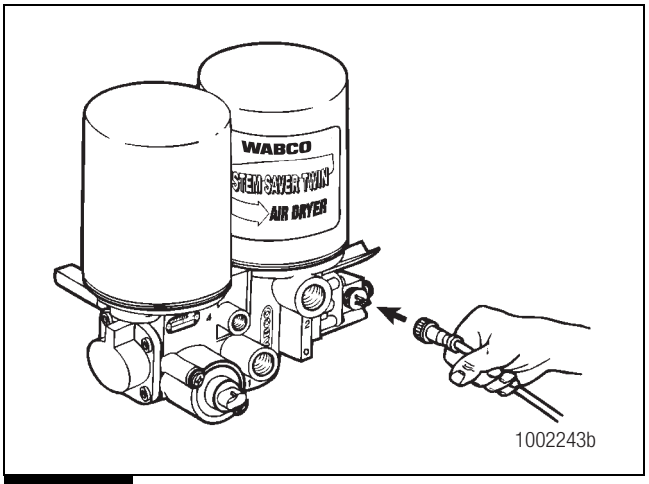


Figure 3.11

2. Carefully remove the armature assembly end cap and O-ring from the solenoid. Save these for reassembly.
3. Use a 5 mm Allen wrench to loosen and remove the three long piston cover bolts from the armature plate.

   Remove the armature assembly. Lift the cover off of the System Saver Twin air dryer. Save parts for reassembly.
4. Loosen and remove the short piston cover bolt. Save the bolt for reassembly.
5. Remove the right piston cover. Remove and save the two small O-rings from the cover breather holes.
6. Loosen and remove the charging valve nut — ***remove carefully, this is a spring-loaded valve.*** Remove the charging valve assembly from the right piston cover. Figure 3.12.

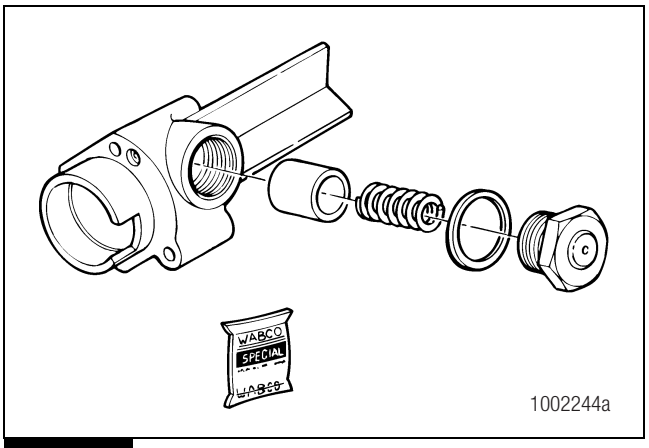


Figure 3.12

7. Carefully remove the right piston assembly from the System Saver Twin air dryer cavity. This will help avoid damage to the assembly when the new cover is installed.
8. Clean and lubricate the two small O-rings removed from the old cover. Install them in the breather holes in the replacement cover.
9. Replace the charging valve assembly in the right piston cover.
10. Insert the piston assembly into the piston cover cavity. Do not damage the lip seal during this procedure. Use the flat side of a small, flat screwdriver to tuck the assembly into the cover. Figure 3.13.

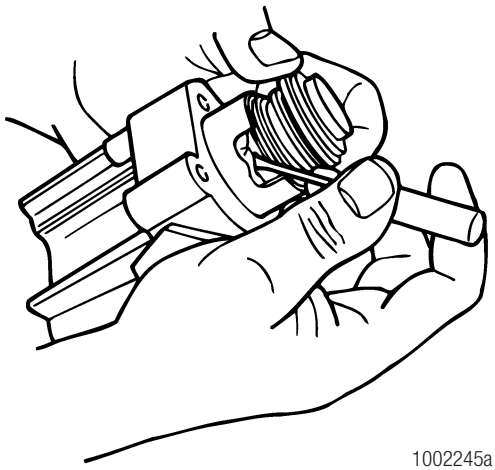


Figure 3.13

11. Install the cover, charging valve down, over the piston assembly.
12. Replace the short mounting bolt. Finger tighten only.
13. Replace the solenoid and the armature assembly. Refer to the procedure in this section.
14. Connect the power harness to the solenoid. Make sure the connection is tight.
15. Test the installation.

Right Piston Assembly (Original System Saver Twin Air Dryers)

1. Review Figure 3.14 to make sure you have all of the parts required to replace the right piston assembly. Use the grease that is included with the replacement kit to lubricate the O-rings.

ORIGINAL SYSTEM SAVER TWIN AIR DRYER ONLY

These O-rings are installed in the cover, but are included with the piston assembly replacement kit. They should be replaced whenever you replace the piston assembly.

1002246a

Figure 3.14

NOTE: Seals, O-rings and springs are included in a separate replacement kit from hard parts (piston, spool and lip seal). Refer to PB-8857AS, WABCO's replacement part book, for additional information.

NOTE: You do not have to remove the charging valve when replacing only the right piston assembly.

2. Disconnect the power harness. Remove the solenoid and the armature assembly. Remove the right piston cover.
3. Remove the right piston assembly. Clean the piston bore thoroughly.
4. Install the large lubricated O-ring in the groove on the head of the piston.
5. If the O-ring and the spool are already installed on the replacement piston, lubricate the rubber parts. Then, go to Step 6. If not:
   A. Use snap ring pliers to install the snap ring into the snap ring groove closest to the piston head.
   B. Insert the lubricated lip seal in the groove of the spool.
   C. Install the lubricated O-ring in the groove on the piston shaft.
   D. Install the spring over the piston shaft.
   E. Install the spool with the lip seal into the piston shaft. The lip of the seal will face away from the System Saver Twin air dryer.
   F. Install the snap ring in the groove on the piston shaft to hold the spool in place.
   G. Install the O-ring into the groove on the piston shaft.

6. Insert the piston and the spring assembly into the right piston cover.

   Remove the two small O-rings from the piston cover. Lubricate the two new O-rings included in the right piston assembly replacement kit and install them into the piston cover.

7. Replace the right piston cover, the armature and spring assembly, and the solenoid. For detailed instructions:

   - **Right Piston Cover (in this section)**
   - **Solenoid and Armature Assembly (in this section)**

O-Rings and Diaphragm (New System Saver Twin Air Dryers)

1. Review Figure 3.15 and Figure 3.16 to make sure you have all of the parts required to replace the diaphragm assembly.
2. Remove the bolts and covers from the System Saver Twin air dryer.
3. Remove the old O-ring and the diaphragm parts. Figure 3.15.

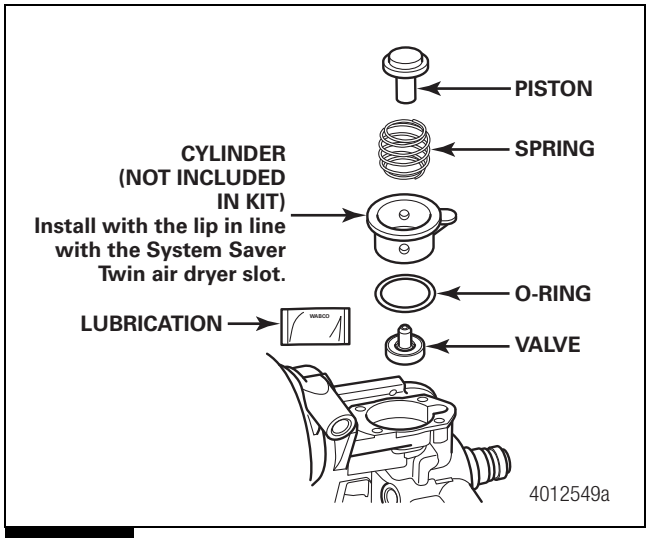


Figure 3.15

4. Inspect and clean the System Saver Twin air dryer bores.
5. Lubricate the valve outer surface and O-ring using the grease that is included in the replacement kit.
6. Install the valve in the System Saver Twin air dryer bore with the stem facing out.
7. Install the O-ring on the cylinder step.
8. Install the cylinder with the O-ring in the System Saver Twin air dryer bore.
9. Install the spring and the piston.
10. Install the bolts on the cover. Figure 3.16.

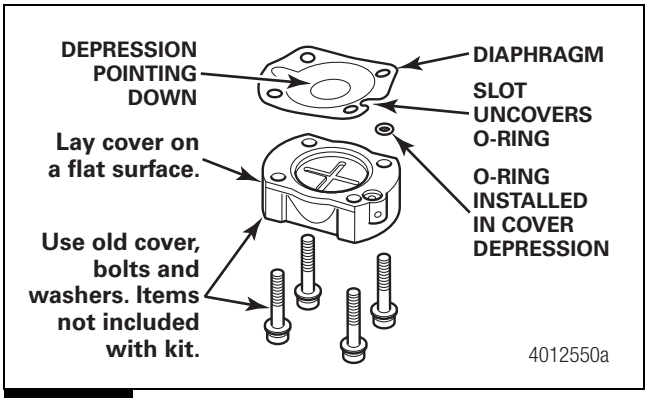


Figure 3.16

11. Install the O-ring in the cover depression.
12. Install the diaphragm on the cover.
13. Hold the piston in place and install the cover assembly on the System Saver Twin air dryer bore. Figure 3.17.

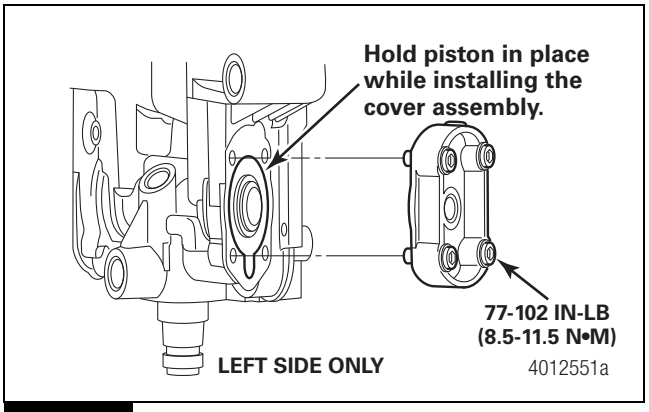


Figure 3.17

14. For the right-side cover, install the solenoid and the bracket on the cover assembly. Figure 3.18.

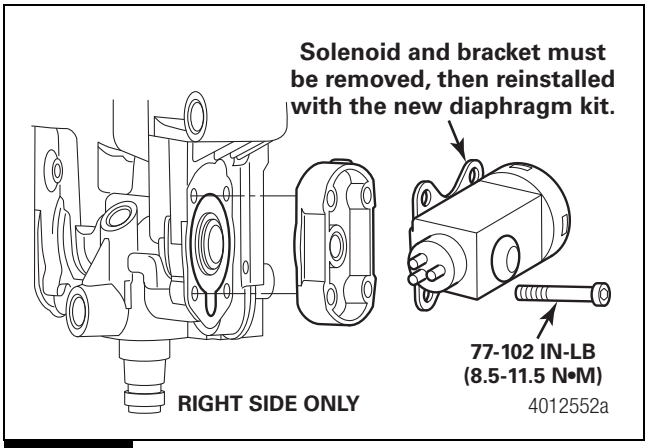


Figure 3.18

15. Install the cover bolts and tighten to 7.38 ± 1.1 ft-lb (10 ± 1.5 N•m).

Charging Valve Assembly (Original System Saver Twin Air Dryers)

NOTE: You do not have to remove the right piston cover or solenoid when replacing the charging valve assembly.

1. Review Figure 3.19 to make sure you have all of the parts needed to replace the charging valve assembly.

   Use the grease that is included in the replacement kit to lubricate the O-ring and spring.

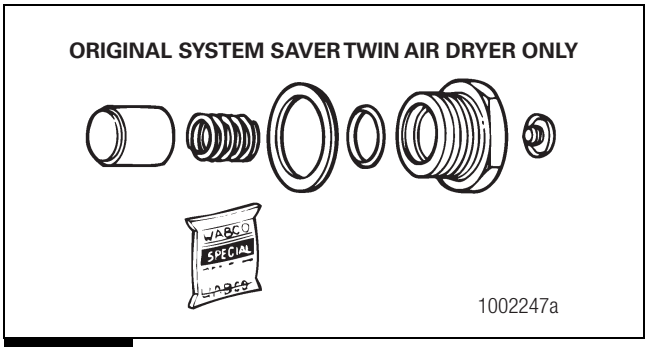


Figure 3.19

2. Remove the dust cap from the charging valve nut. Then, loosen and remove the nut —***remove nut carefully, this is a spring-loaded valve.***

   Remove the old charging valve from the right piston cover. Figure 3.20.

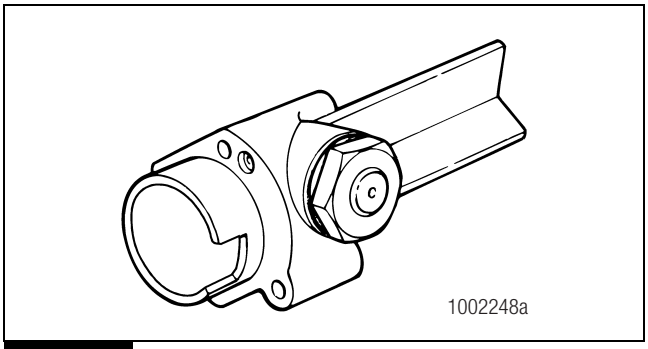


Figure 3.20

3. Clean the charging valve bore and seat. Use the grease that is included in the replacement kit to lube the area.
4. Install the piston and the spring in the cover bore. Figure 3.21.

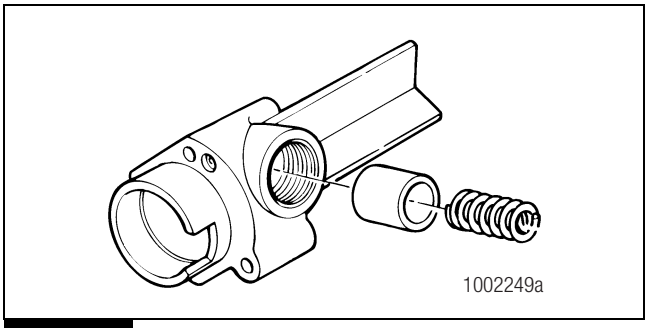


Figure 3.21

5. Install the lubricated O-ring in the bore groove of the special nut.
6. Install the washer on the nut. Insert the nut into the cover bore. Carefully guide the piston into the bore in the nut.
7. Install the lubricated rubber dust plug at the end of the nut. Figure 3.22.

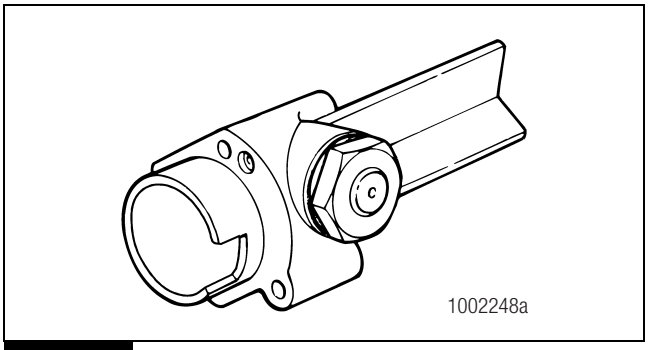


Figure 3.22

Solenoid and Armature Assembly (Original System Saver Twin Air Dryers)

This assembly requires two replacement kits: Solenoid and Mounting Sleeve and Other Solenoid Parts. You will need both kits to complete the installation. (Refer to PB-8857AS, the WABCO replacement parts book.)

⚠ CAUTION

To avoid damaging the solenoid, make sure you install the correct solenoid, 12-volt or 24-volt. Solenoid voltage is determined by the vehicle's electrical system.

NOTE: Solenoid and armature assembly is installed on the right piston cover.

1. Review Figure 3.23 to make sure you have all of the parts needed to replace the solenoid and armature assembly.

   Use the grease that is included in the replacement kit to lubricate all O-rings.

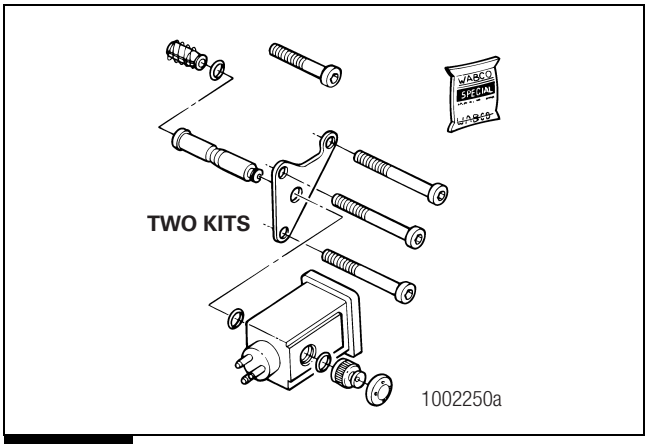


Figure 3.23

2. Remove the old solenoid and armature assembly:
   A. Disconnect power harness.
   B. Lift the solenoid off of the cover. Figure 3.24.

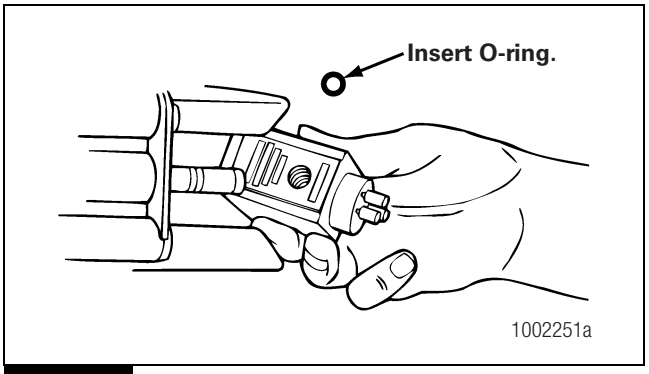


Figure 3.24

   C. Remove the three piston cover mounting bolts that hold the solenoid mounting plate in place. **Retain bolts for use in reassembly.**
   D. Remove the breather from the end of the nut.
   E. Unscrew the nut and remove from the solenoid.
   F. Remove the O-rings, one from each side, from the solenoid.
   G. Remove the armature retaining plate.
   H. Remove the armature and spring assembly.
3. Inspect and clean the solenoid bore. Do not lube this area — apply lube to O-rings only.
4. Install the lubricated O-ring into the groove on the solenoid sleeve.
5. Insert the open end of the sleeve through the hole in the retaining plate. Figure 3.25.

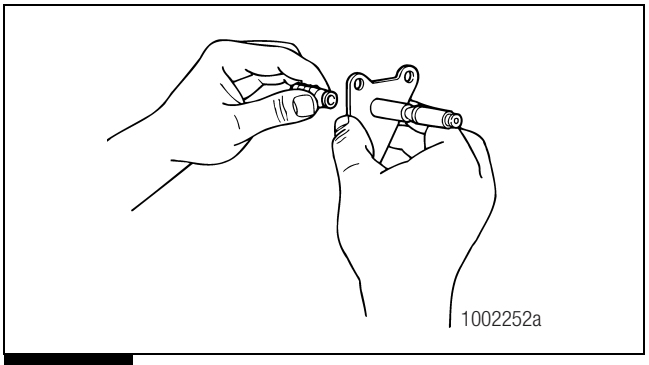


Figure 3.25

6. Insert the sleeve with the armature and spring into the cavity.

7. Position the armature retainer plate on the cover, lining up the holes on the plate with the holes in the cover.
8. Install the three long bolts through the armature retainer plate. Tighten all four of the bolts to 77-85 in-lbs (8.5-9.5 N•m).
9. Install the lubricated O-ring on the sleeve and position against the mounting plate.
10. Position the solenoid over the sleeve writing side facing the System Saver Twin air dryer. Install the lubricated O-ring in the bore on the System Saver Twin air dryer side of the solenoid. Figure 3.26.

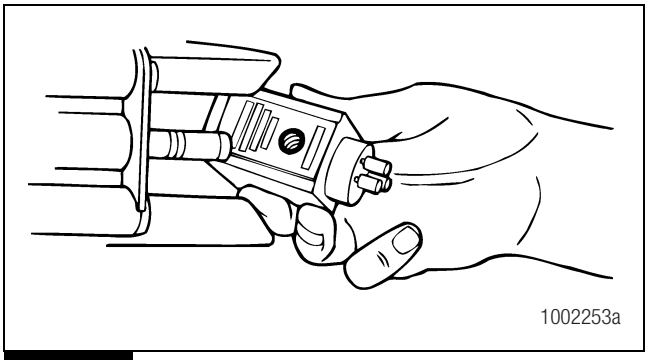


Figure 3.26

11. Install the lubricated O-ring over the end of the sleeve.
12. Install the nut at the end of the sleeve. Screw the breather onto the nut. Finger tighten only.
13. Connect the power harness to the solenoid. Follow these steps to **test** the solenoid.
    - Turn the ignition on. Ensure power to the solenoid.
    - Listen for System Saver Twin air dryer **click** to sound after 50-60 seconds.

      Click occurs: Solenoid OK.

      No click: Voltage is not sufficient or the solenoid is damaged or incorrectly installed.

Solenoid and Armature Assembly (New System Saver Twin Air Dryers)

Replacing the Solenoid

1. Disconnect the power harness.
2. Unscrew the nut with the breather from the side of the solenoid.
3. Slide the solenoid off of the armature; take care not to lose the two small O-rings from each side of the solenoid to be reused upon assembly.
4. Clean the armature.
5. Install one of the small O-rings over the armature.
6. Install the solenoid over the armature.
7. Install the second O-ring over the armature.
8. Install the nut with breather, tightening to 7 lb-in (0.8 N•m).

Replacing the Armature and Seals

1. Remove the solenoid per the instructions, discarding the small O-rings.
2. Remove the four screws attaching the armature plate on the System Saver Twin air dryer end cap.
3. Remove the armature from the mounting plate; the mounting plate will be reused.
4. Clean the mounting plate.
5. Install a small O-ring into the groove on the armature.
6. Install the new armature into the original mounting plate.
7. If the System Saver Twin air dryer end cap did not stay in place, position the end cap in place, ensuring the diaphragm and any O-rings are in place per the instructions provided for replacing the diaphragm and piston assemblies.
8. Insert the plunger into the armature and position the armature mounting plate assembly in place. Figure 3.27.

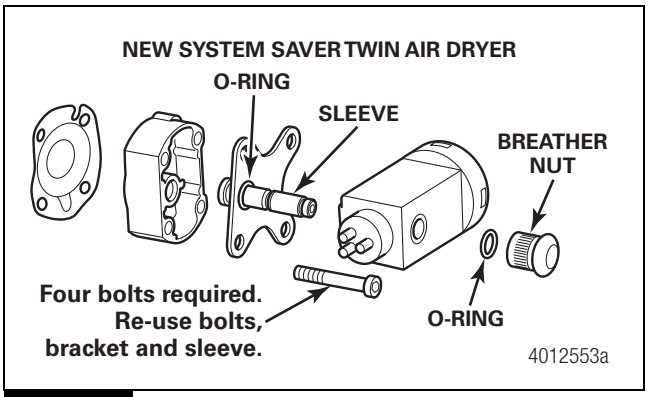


Figure 3.27

9. Install the four mounting bolts and tighten each to 80±4 lb-in (9±0.5 N•m).

10. Reinstall the solenoid using the new O-rings per the solenoid replacement instructions.

Heater Assembly

NOTE: All heater assemblies are identical, regardless of model year.

NOTE: Select 12- or 24-volt replacement kit, depending upon vehicle voltage.

1. Review Figure 3.28 to make sure you have all of the parts required to replace the heater assembly.

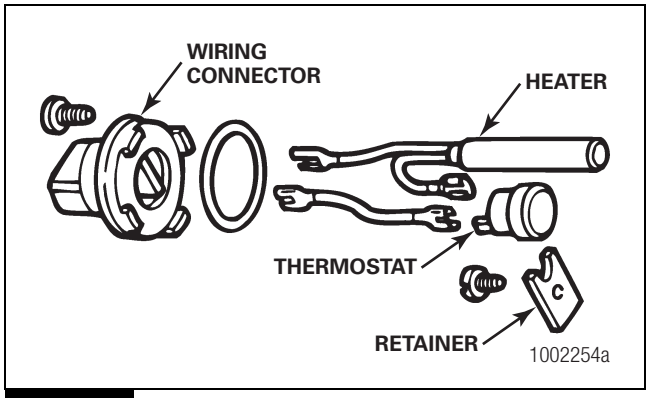


Figure 3.28

2. Disconnect the power harness.
3. Remove the two screws holding the wiring connector in place.
4. Remove the wiring harness and O-ring to access the retainer screw. Figure 3.29.

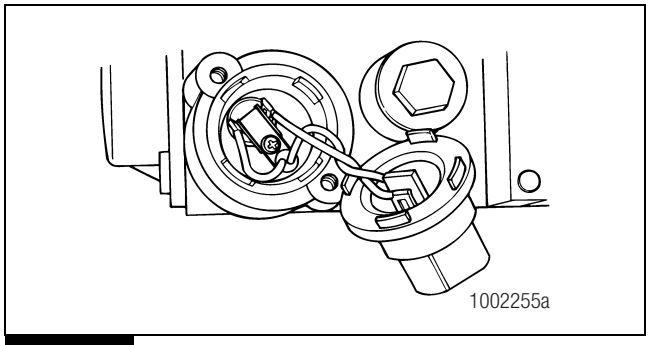


Figure 3.29

5. Remove the retainer screw.
6. Remove the thermostat retainer.
7. Remove and discard the old heater assembly.
8. Inspect and clean the heater cavity. Area must be free of dust and oil.
9. If not assembled, attach power leads to the thermostat and wiring connector. Insert the heater and thermostat with the power leads into the heater cavity. Figure 3.30.

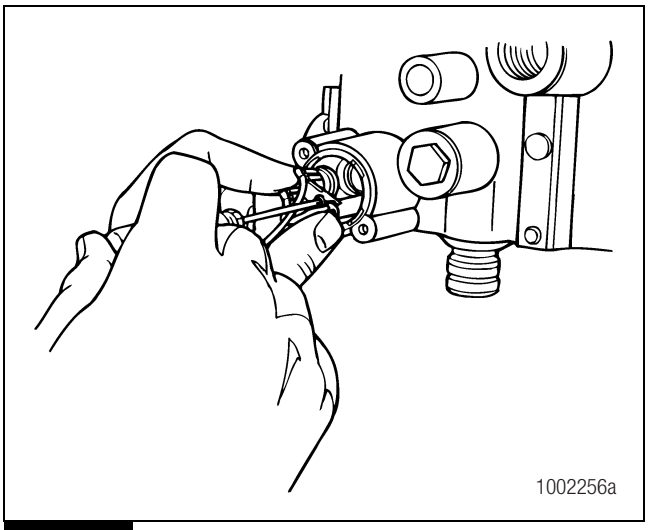


Figure 3.30

10. Install the retainer and tighten the screw that holds the element and thermostat in place.
11. Install the lubricated O-ring in the base of the wire connector.
12. Gently press the wire connector into place in the heater cavity. Tighten down the two mounting screws. Figure 3.31.

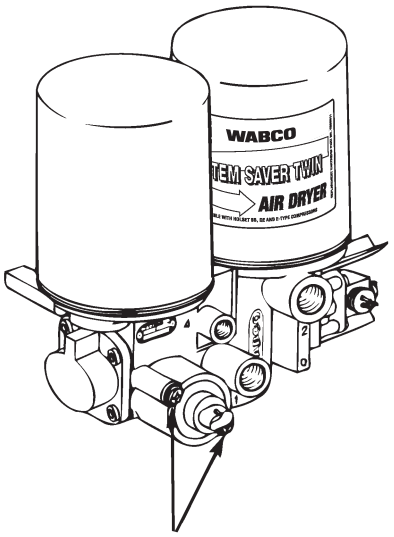


Figure 3.31

Purge Valve Assembly

NOTE: All purge valve assemblies are identical, regardless of model year.

1. Review Figure 3.32 to make sure you have all of the parts required to replace the purge valve assembly.

   Use the grease that is included with the replacement kit to lubricate the O-rings.

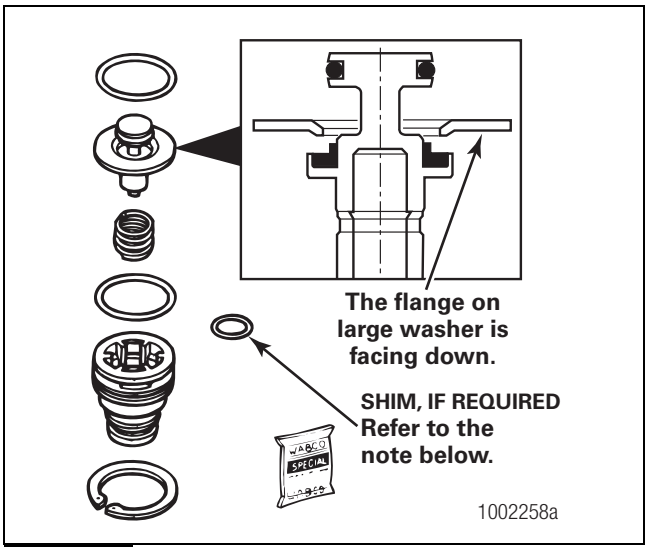


Figure 3.32

   NOTE: The shim may not be included with the kit. If it is not included, it is not required. If it is included, install it between the spring and valve head.

2. Remove the old purge valve assembly from the bottom of the System Saver Twin air dryer. Figure 3.33.
   - Remove the snap ring, the valve body and the spring.
   - Pull the valve assembly out of the System Saver Twin air dryer base.
   - Remove the O-ring.

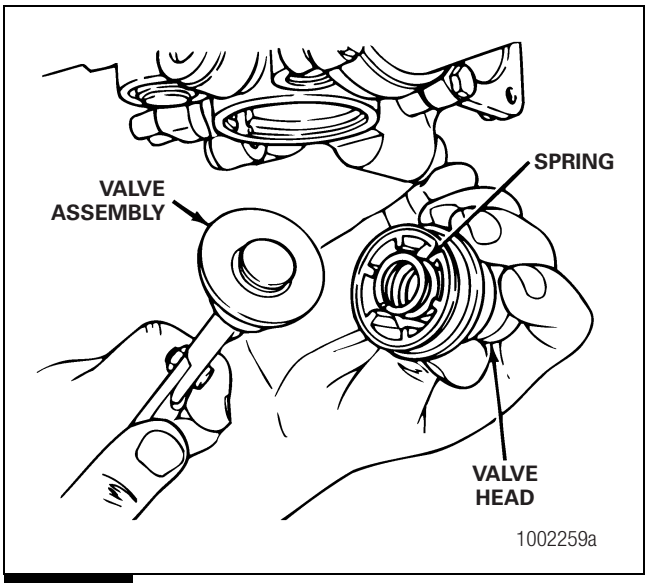


Figure 3.33

3. Inspect and clean the valve bore.
4. Apply a thin layer of grease to the valve bore (use grease that is included in replacement kit).
5. Install the lubricated O-rings: one in the System Saver Twin air dryer base, one on the valve head.
6. Install the spring in the valve head.
7. Insert the valve body, wide end toward the System Saver Twin air dryer, onto the piston shaft.

   NOTE: If a shim is included in the kit, install it between the spring and the valve head.

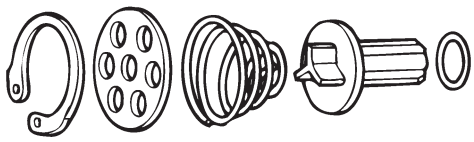
8. Install the retainer ring.

Outlet Check Valve Assembly

New System Saver Twin air dryers use a different outlet check valve. Verify the service kit used is correct for the model of System Saver Twin air dryer.

1. Review Figure 3.34 to make sure you have all of the parts required to replace the outlet check valve assembly.

   Use the grease that is included in the replacement kit to lubricate O-rings and seals.



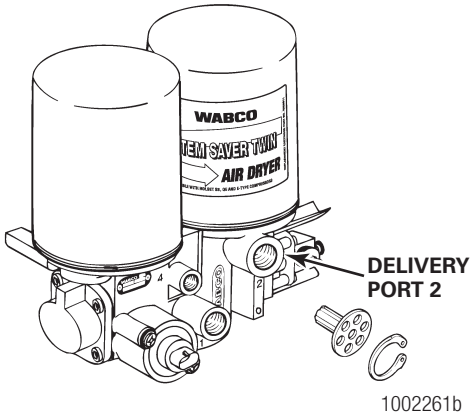
The diameter of the new outlet check valve assembly is the only difference. The larger diameter improves the flow of air.

1002260a

Figure 3.34

2. Remove the snap ring from System Saver Twin air dryer Port 2.

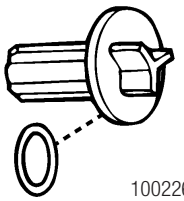
   Then, remove the old check valve assembly. Figure 3.35.



1002261b

Figure 3.35

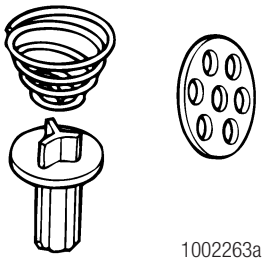
3. Inspect and clean the valve bore. Remove any excess debris.
4. Install the lubricated O-ring in the groove on the underside of the check valve. Figure 3.36.



1002262a

Figure 3.36

5. Install the check valve in the bore with the shaft facing the System Saver Twin air dryer.
6. Install the perforated washer over the top of the spring. Figure 3.37.



1002263a

Figure 3.37

7. While holding the spring and washer in place, install the snap ring in the bore groove.

Turbo Cut-off Valve (New System Saver Twin Air Dryers)

1. Review Figure 3.38 to make sure you have all of the parts required to replace the turbo cut-off valve assembly.
2. Remove the snap ring.
3. Remove the cover.
4. Remove the piston and sleeve.
5. Clean and inspect the valve bore.
   - **If the valve bore is damaged so that a tight seal cannot be maintained:** Replace the System Saver Twin air dryer.
6. Install the new O-rings and lubricate them as shown in Figure 3.38.

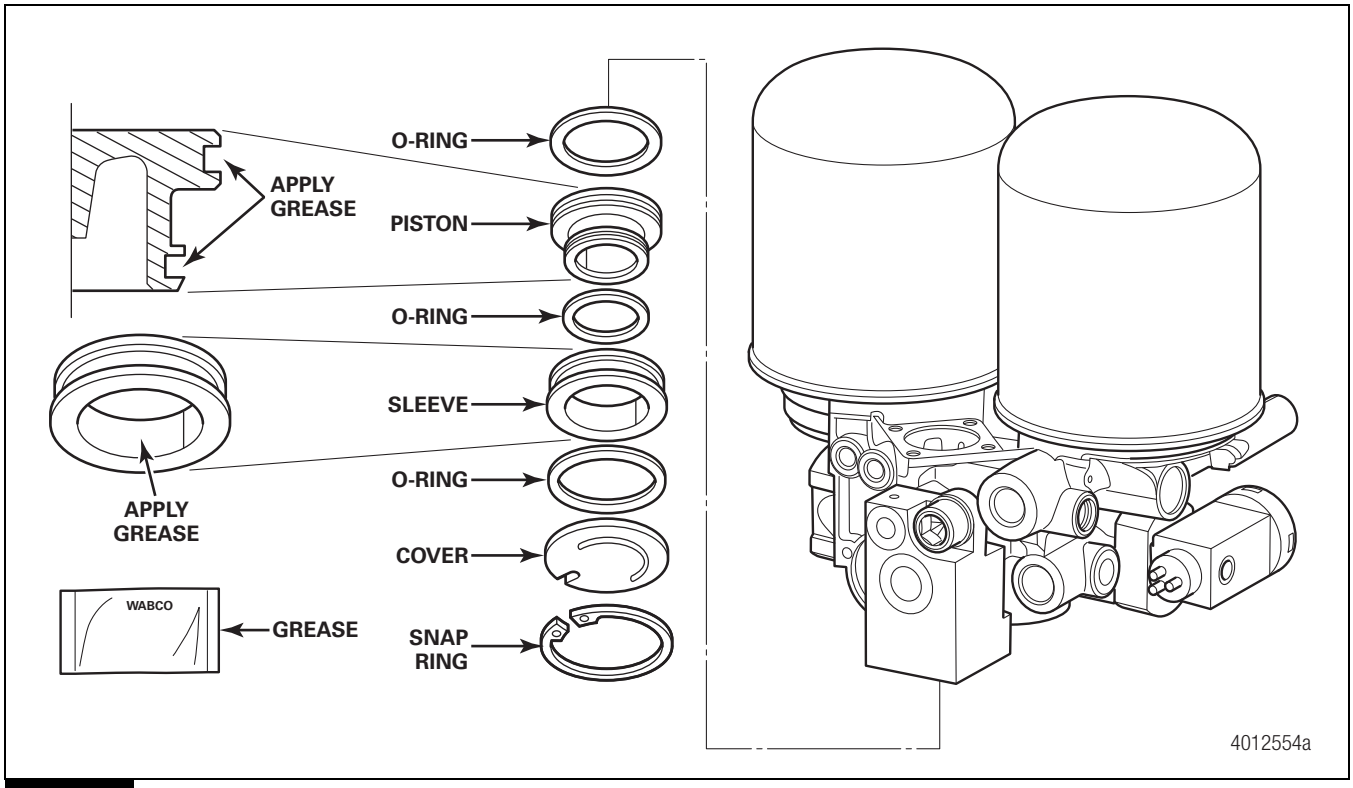


Figure 3.38

7. Press the piston into the sleeve.
8. Press the piston and sleeve assembly into the System Saver Twin air dryer bore.
9. Install the cover and snap ring.
10. Replace the standard or coalescing cartridges using the procedure in this section.

Orifice Assembly (Original System Saver Twin Air Dryers)

NOTE: Select 0.8 mm, 1.0 mm or 1.3 mm orifice replacement kit. Check the part number of the System Saver Twin air dryer to determine orifice size.

1. Review Figure 3.39 to make sure you have all of the parts required to replace the orifice assembly.

   Use the grease that is included with the replacement kit to lubricate O-rings and seals.

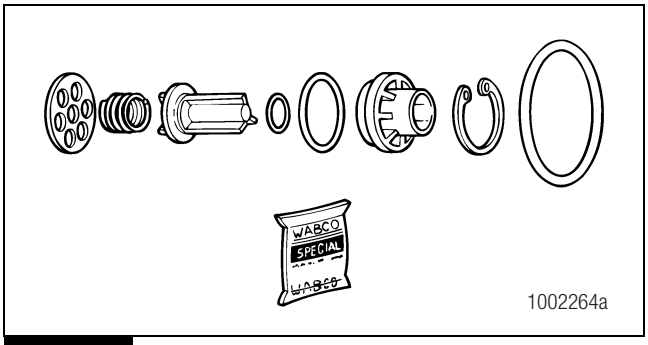


Figure 3.39

2. To access the orifice assembly, unscrew and remove the standard or coalescing cartridge from the System Saver Twin air dryer base. Refer to the procedure in this section. Remove the O-ring. Save the cartridge and O-ring for reassembly.
3. Remove the old snap ring and orifice assembly from the base of the System Saver Twin air dryer. Figure 3.40.

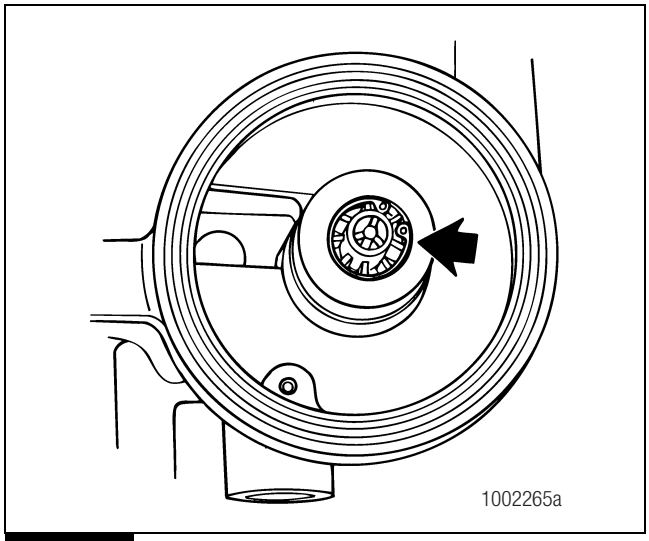


Figure 3.40

4. Inspect and clean the orifice bore.
5. Install the perforated washer in the System Saver Twin air dryer bore.
6. Install the spring on top of the perforated washer. Figure 3.41.

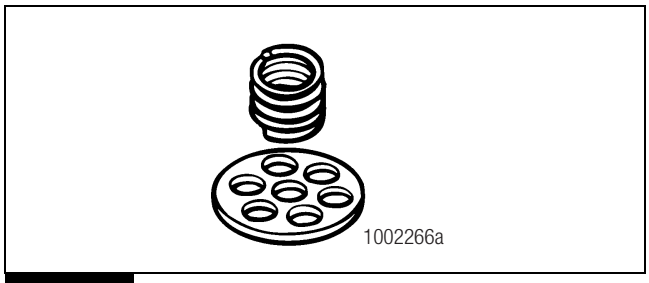


Figure 3.41

7. Install the lubricated O-ring in the groove on the check valve stem.
8. Insert the check valve into the bore with the stem facing **away** from the System Saver Twin air dryer.
9. Install the lubricated O-ring in the groove on the orifice part.
10. Install the plastic orifice in the bore. Carefully guide the check valve into the center hole. Figure 3.42.

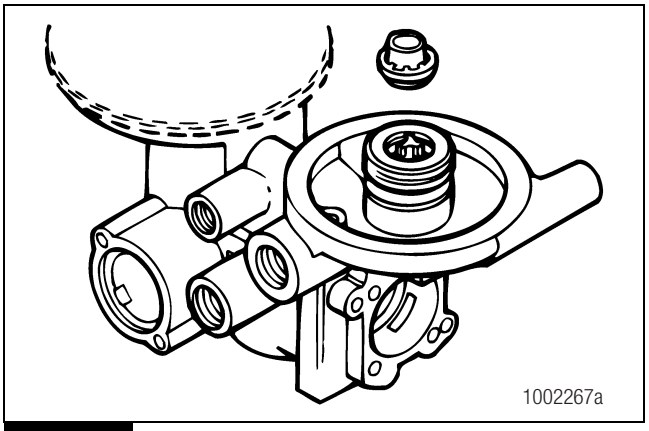


Figure 3.42

NOTE: Molded ribs on the orifice must face away from the System Saver Twin air dryer.

11. Install the snap ring to hold the orifice assembly in place.
12. Install the large lubricated O-ring over the System Saver Twin air dryer base where the cartridge screws on.
13. Install the desiccant cartridge. Refer to the procedure in this section.

Orifice Assembly (New System Saver Twin Air Dryers)

NOTE: Select an 0.8 mm, 1.0 mm or 1.3 mm orifice replacement kit. Check the part number of the System Saver Twin air dryer to determine the orifice size.

1. Make sure you have all the parts shown. Figure 3.43.

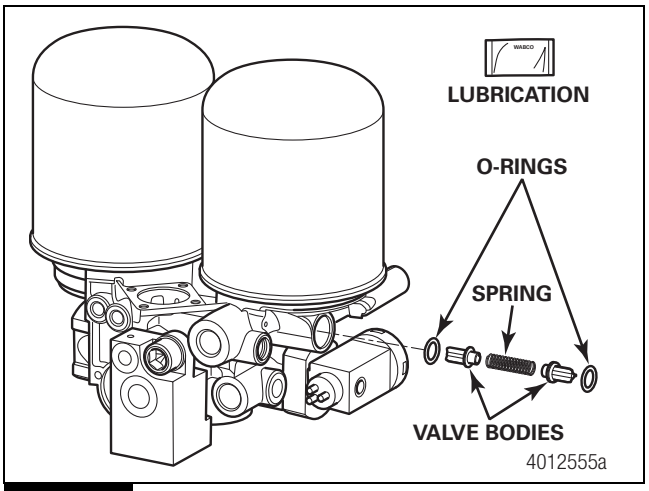


Figure 3.43

2. Loosen the valve seat and remove all of the old parts.
3. Inspect and clean the System Saver Twin air dryer bore.
4. Lubricate the O-rings and install them on the valve bodies.
5. Install the valve bodies on the spring.
6. Install the valve bodies and spring into the System Saver Twin air dryer bore.
7. Lubricate the O-rings and install them on the valve seat. Figure 3.44.

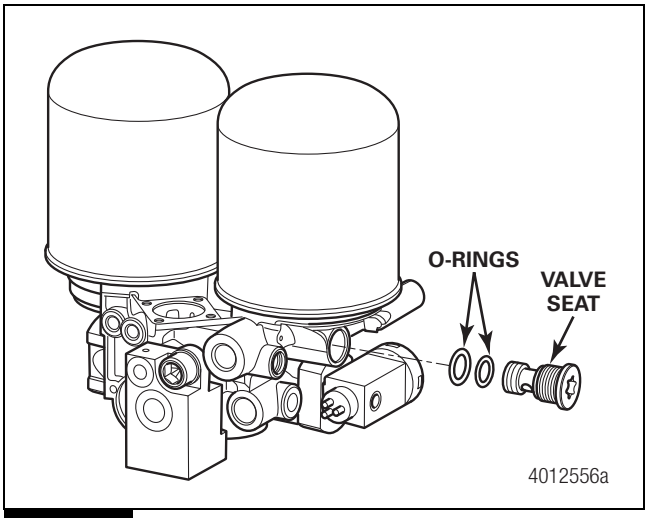


Figure 3.44

8. Install the valve seat into the System Saver Twin air dryer bore.
9. Tighten the valve seat to 7.38 ± 1.48 lb-ft (10 ± 2 N•m).

Purge Silencer (Muffler)

NOTE: This is an optional part designed to reduce the System Saver Twin air dryer purge noise level.

1. Remove the snap ring. Remove the old silencer from the purge valve head. Do not damage the purge valve head.
2. Clean the purge valve head.
3. Insert the replacement silencer into the purge valve head. Secure it with a snap ring. Figure 3.45.

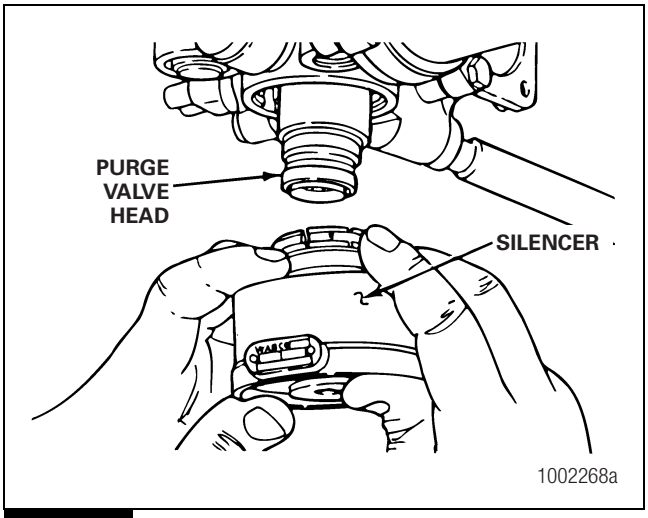


Figure 3.45

System Saver Twin Air Dryer Assembly

NOTE: This procedure is for removing and replacing a unit. For instructions on an initial installation, refer to TP-9672, Air Dryer Application Guide. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

1. Drain all of the pressure from the air system. Disconnect all air lines.

   Use markers to label the lines for correct reinstallation. Figure 3.46.

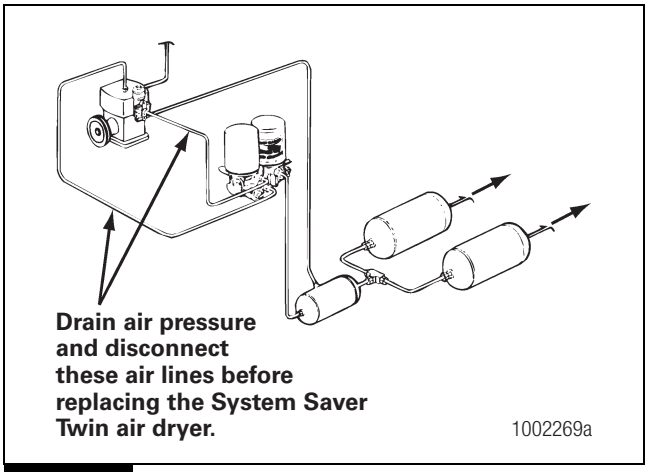


Figure 3.46

2. Disconnect the heater electrical plug from the heater receptacle and the solenoid connector from the solenoid/timer.

3. Remove the System Saver Twin air dryer mounting bolts. Remove the System Saver Twin air dryer from its mounting bracket. Figure 3.47.

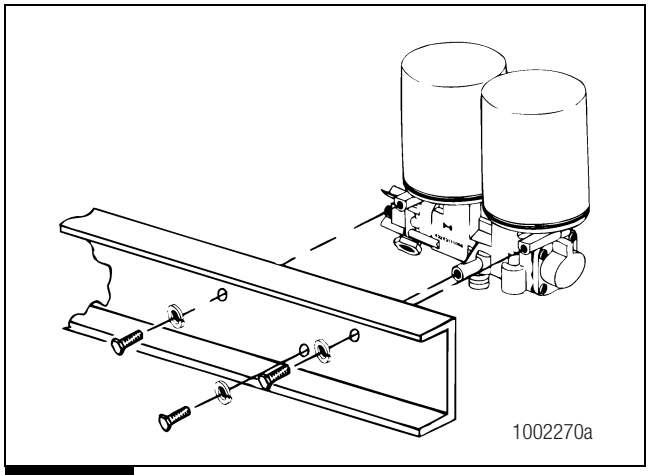


Figure 3.47

4. Attach the new unit to the frame or to the mounting bracket with new mounting capscrews and washers. Tighten the capscrews to 22-30 lb-ft (30-40 N•m). Figure 3.48. **T**

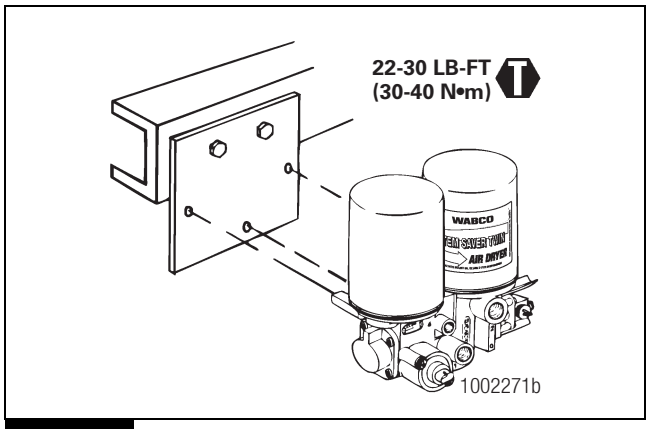


Figure 3.48

5. Connect the heater electrical plug to the heater receptacle. Connect the solenoid cable to the solenoid/timer.
6. Reconnect all of the system air lines.
7. Test the installation.

Definitions

Basic Air System/System Saver Twin Air Dryer Terms

Table D: Glossary of Terms

Air Compressor	A device that pumps air to and builds air pressure in an air system.
System Saver Twin Air Dryer	A device that cools, filters, and dries the air delivered by an air compressor.
Air Governor	A device that controls the operation of the air compressor by constantly monitoring air pressure in the supply tank of the air system. The air governor initiates the compressor unload cycle when the cutout pressure is reached. It also controls the System Saver Twin air dryer by sending an air signal — at the beginning of the compressor unload cycle — to the control port of the System Saver Twin air dryer. This initiates the purge cycle. When the signal is stopped, the purge valve closes and the drying cycle begins.
Compressor Load Cycle	The time during which the air compressor is building air pressure in an air system.
Compressor Unload Cycle	The time during which the air compressor is idling and is not building air pressure in an air system.
Cut-in Pressure	The pressure level in the air system supply tank that triggers the compressor load cycle.
Cut-out Pressure	The pressure level in the air system supply tank that triggers the compressor unload cycle.
Desiccant	A granular substance that has a high affinity for water. It catches and retains moisture from the air stream.
Drying Cycle	The time during which the System Saver Twin air dryer cools, filters and removes moisture from the air delivered by the air compressor.
Purge	The initial blast of air (decompression) from the System Saver Twin air dryer purge valve at the beginning of the compressor unload cycle.
Purge Cycle	The time during which the System Saver Twin air dryer is undergoing purge and regeneration. It begins at the start of the compressor unload cycle and normally ends well before the beginning of the compressor load cycle.
Regeneration	The mild backflow of air through the non-loaded System Saver Twin air dryer cartridge and out the purge valve. A small amount of air from one cartridge is used to remove moisture from the other cartridge. This readies the cartridge for the next cycle. The cycle lasts 50-60 seconds, then the timer switches it to the other cartridge.

Requirements

Compressor discharge line should have a continual downhill turn to the System Saver Twin air dryer. There should be no water traps (low points or kinks) in the line before or after the System Saver Twin air dryer.

Mount the System Saver Twin air dryer so that there is no direct splash or spray from a wheel.

Keep the System Saver Twin air dryer at least 12 inches from any heat-producing sources like exhaust manifolds or pipes, transmissions, etc.

Make sure there are no valves or other devices in the dryer-to-supply-tank line to prohibit or restrict the flow of air back from the supply tank to the System Saver Twin air dryer.

The purge valve must be fed by a direct line from the air governor.

For applications where the working pressure in the system could be lower than 85 psi (for example, bulk unloading or central tire inflation), install a back-pressure control valve.

Table E: Part Number Selection Guide for Original System Saver Twin Air Dryers

Compressor Rating	Orifice Size	Cartridge	Volvo Heater Harness	WABCO System Saver Twin Air Dryer Part Number	Part Tag Number and Base Part Number	WABCO System Saver Twin Air Dryer Replacement Part Number
Less than 25 CFM	0.8 mm	Standard		432 431 016 0	432 431 006 0	432 431 016 0
Less than 25 CFM	0.8 mm	Standard		432 431 017 0	432 431 007 0	432 431 017 0
Less than 25 CFM	0.8 mm	Standard	Yes	432 431 022 0	432 431 020 0	432 433 043 0
25-40 CFM	1.0 mm	Standard		432 431 014 0	432 431 002 0	432 431 012 0
25-40 CFM	1.0 mm	Standard		432 431 021 0	432 431 004 0	432 431 014 0
25-40 CFM	1.0 mm	Standard	Yes	432 431 021 0	432 431 019 0	432 431 021 0
Greater than 40 CFM	1.3 mm	Standard		432 431 013 0	432 431 003 0	432 431 013 0
Greater than 40 CFM	1.3 mm	Standard		432 431 015 0	432 431 005 0	432 431 015 0
Less than 25 CFM	0.8 mm	Coalescing		432 431 029 0	432 431 027 0	432 433 040 0
25-40 CFM	1.0 mm	Coalescing	Yes	432 431 028 0	432 431 025 0	432 433 042 0

5 Appendix II — Application Information

Table F: Service Kits for Original System Saver Twin Air Dryers

Description	Part Number
Pressure Relief Valve	2206-D-1226
Purge Valve Kit	432 431 924 2
Outlet Check Valve Kit	432 431 925 2
Orifice Kit 1.0 mm	432 431 927 2
Charging Valve Kit	432 431 930 2
Right Piston Seals and Springs	432 431 931 2
Left Piston Seals and Springs	432 431 932 2
Solenoid and Armature (24V)	432 431 933 2*
Right Piston Hard Parts	432 421 934 2
Left Piston Hard Parts	432 431 935 2
Solenoid and Armature 12V	432 431 938 2*
Orifice Kit 0.8 mm	432 431 940 2
Solenoid Valve (for ECON apps)	472 990 001 0
Solenoid Valve (for ECON apps)	
Back Pressure Control Valve	RWABCO17
Orifice Kit 1.3 mm	
Wiring Harness, Std. 2-Connector	894 607 432 0
Wiring Harness, ECON 3-Connector	894 607 433 0
Heater (12V)	432 413 923 2*
Heater (24V)	432 413 924 2*
Parts marked * are used in the New System Saver Twin air dryers also.	

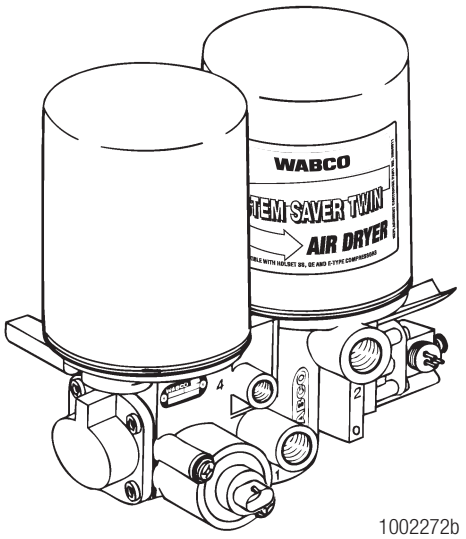
Table G: Part Number Selection Guide for New System Saver Twin Air Dryers

Compressor Rating	Orifice Size	WABCO System Saver Twin Air Dryer Voltage	Volvo Heater Harness	Turbo Cut-off Valve	WABCO System Saver Twin Air Dryer Part Number	Part Tag Number and Base Part Number	WABCO System Saver Twin Air Dryer Replacement Part Number
Less than 25 CFM	0.8 mm	12V		No	432 433 040 0	432 433 010 0	432 433 040 0
Less than 25 CFM	0.8 mm	24V		No	432 433 041 0	432 433 011 0	432 433 041 0
Less than 25 CFM	0.8 mm	12V	Yes	No	432 433 043 0	432 433 013 0	432 433 043 0
25-40 CFM	1.0 mm	12V		No	432 433 036 0	432 433 006 0	432 433 036 0
25-40 CFM	1.0 mm	24V		No	432 433 038 0	432 433 008 0	432 433 038 0
25-40 CFM	1.0 mm	12V	Yes	No	432 433 042 0	432 433 012 0	432 433 042 0
Greater than 40 CFM	1.3 mm	12V		No	432 433 037 0	432 433 007 0	432 433 037 0
Greater than 40 CFM	1.3 mm	24V		No	432 433 039 0	432 433 009 0	432 433 039 0
Less than 25 CFM	0.8 mm	12V		Yes	432 433 052 0	432 433 022 0	432 433 052 0
Less than 25 CFM	0.8 mm	24V		Yes	432 433 053 0	432 433 023 0	432 433 053 0
25-40 CFM	1.0 mm	12V		Yes	432 433 048 0	432 433 018 0	432 433 048 0
25-40 CFM	1.0 mm	24V		Yes	432 433 050 0	432 433 020 0	432 433 050 0

Table H: Service Kits for New System Saver Twin Air Dryers

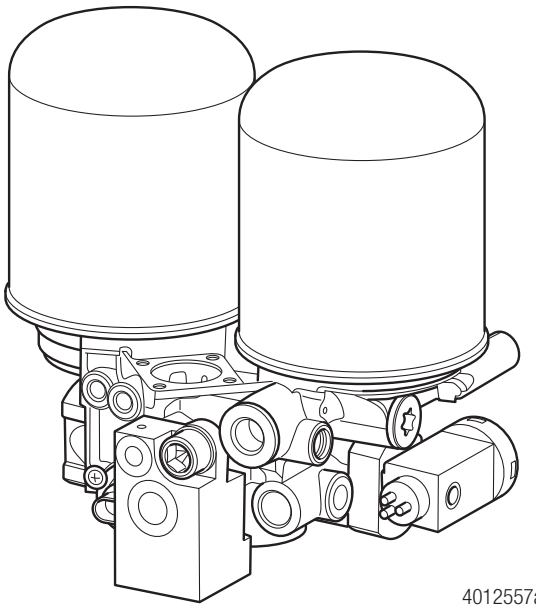
Description	Part Number
Heater 12V	432 413 923 2
Heater 24V	432 413 924 2
Purge Valve Kit	432 431 924 2
1.0 mm Orifice Kit	432 433 920 2
0.8 mm Orifice Kit	432 433 922 2
Outlet Check Valve Kit	432 470 922 2
O-ring and Diaphragm Kit	432 433 921 2
Turbo Cutoff Valve Kit	432 470 921 2
1.3 Orifice Kit	432 433 923 2

Operating Environment Requirements



ORIGINAL SYSTEM SAVER TWIN AIR DRYER

Figure 5.1



NEW SYSTEM SAVER TWIN AIR DRYER WITH TURBO CUT-OFF VALVE

Figure 5.2

Table I:

Operating Parameter	Requirement
Temperature (ambient operating range)	–40°F to 175°F (–40°C to 80°C)
Electrical Power (for heater and solenoid/timer power)	12 or 24 volts available
Thermostat Range (On/Off temp)	45°F, 86°F (7°C, 30°C)

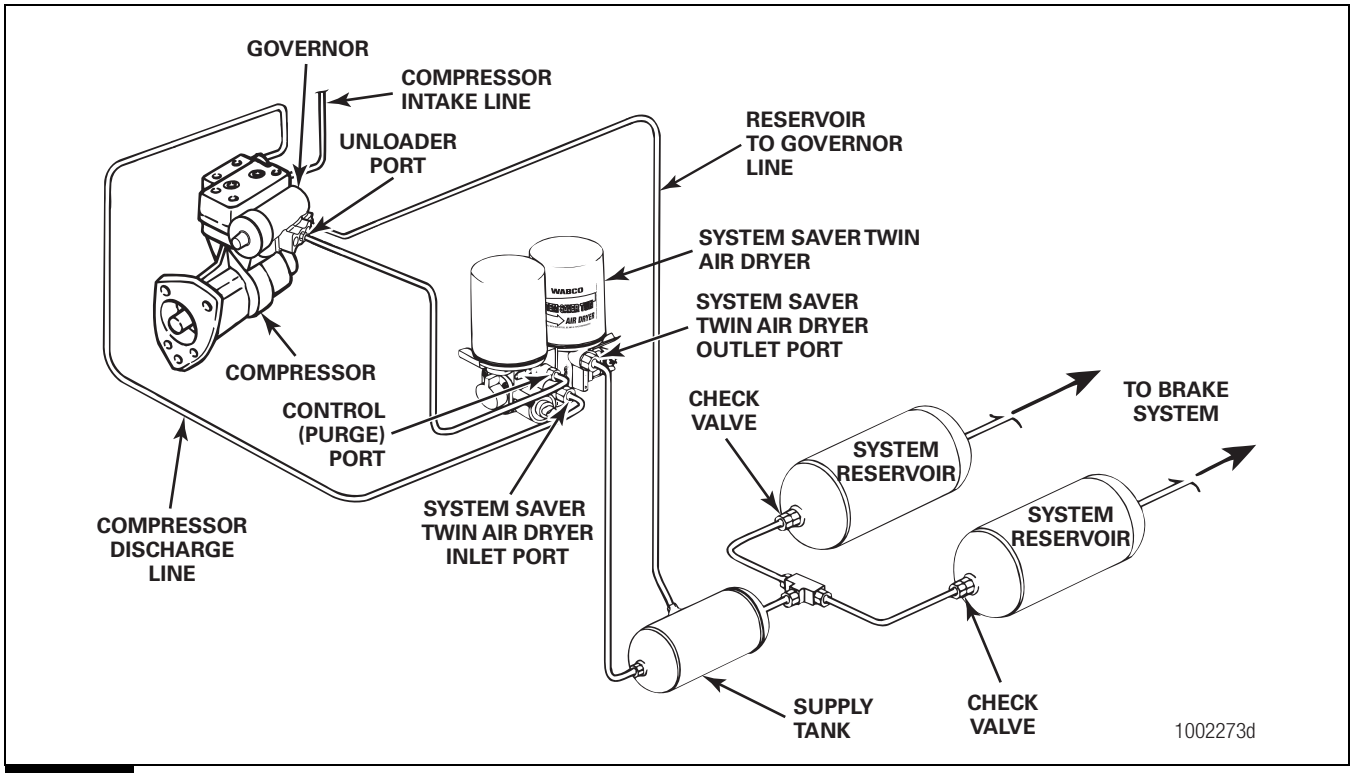


Figure 5.3

Discharge Line:

- Diameter from compressor to System Saver Twin air dryer

  5/8" ID minimum preferred by WABCO for single cylinder compressor applications. 3/4" ID minimum preferred by WABCO for twin cylinder compressor applications.

- Length from compressor to System Saver Twin air dryer

  Determined by temperature of air at the inlet port of the System Saver Twin air dryer. At normal vehicle operating temperature, length must be sufficient to keep temperature below 175°F (80°C).

Recommendations for Minimum/maximum Length:

— **Under 21 cfm:** 8 ft. min./20 ft. max. Use copper-pipe stainless-steel braided-Teflon tubing for the first 10 feet (minimum). Any line over 10 feet should be insulated.

— **Over 21 cfm:** 10 ft. min./20 ft. max. Use copper-pipe stainless-steel braided-Teflon tubing for the first 10 feet (minimum). Any line over 10 feet should be insulated.

Rated Compressor Size:

Refer to Table E and Table G.

- Less than 25 cfm

  System Saver Twin air dryer with 0.8 mm orifice

- Between 25 and 35 cfm

  System Saver Twin air dryer with 1.0 mm orifice

Pressure Requirements:

- Maximum

  140 psi (965 kPa)

- Minimum

  85 psi (586 kPa)

Flow Capacity:

Compressor rating 50 cfm maximum

Compressor On-Time (normal running):

Unlimited

Maximum Duty Cycle:

100%

Installation Instructions for Special Applications

Bulk-Unloading or Central Tire Inflation (CTI) Air Systems

Bulk-unloading or CTI air systems require a back-pressure control valve. Figure 5.4.

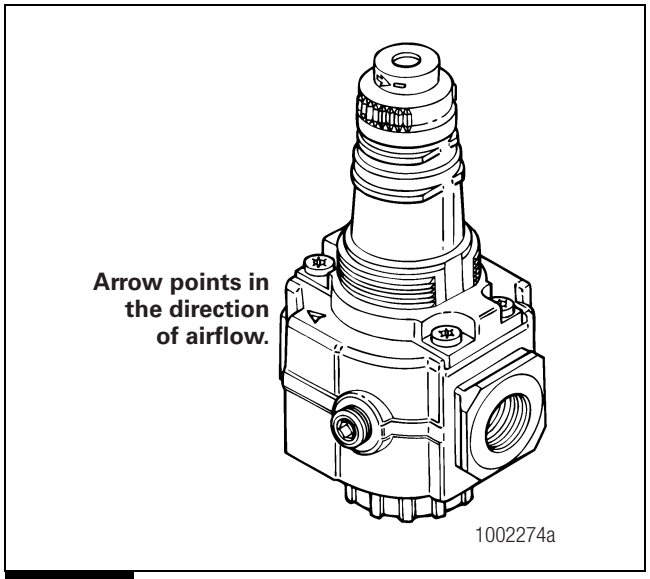
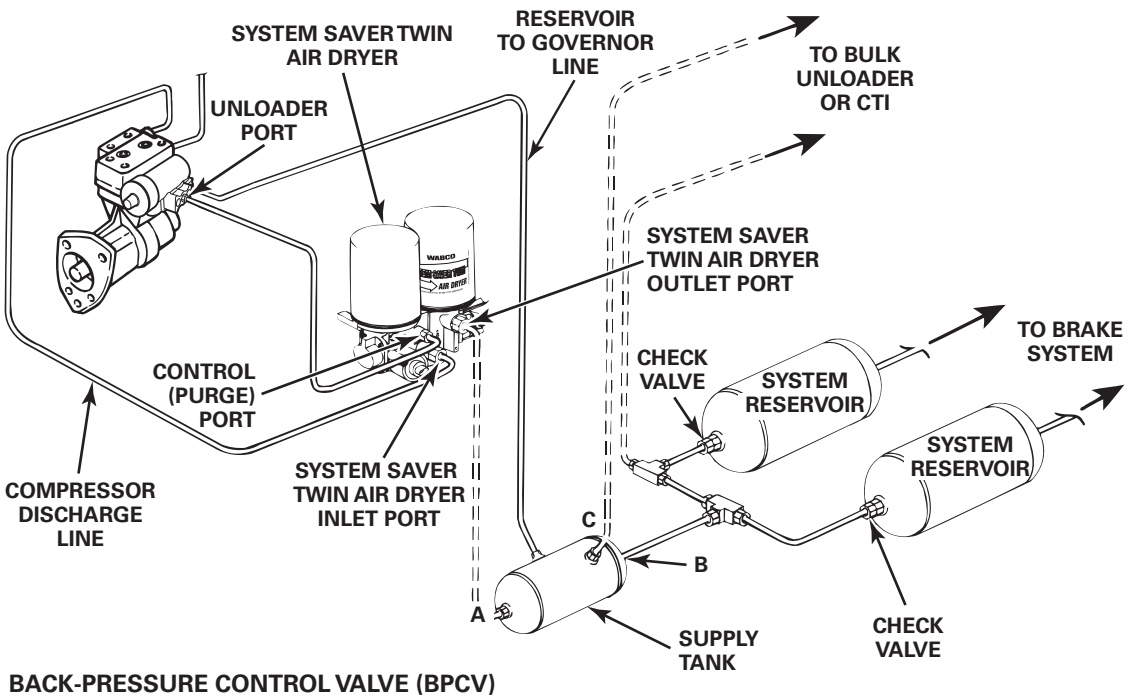


Figure 5.4

The back-pressure control valve maintains adequate pressure at the outlet of the System Saver Twin air dryer to ensure correct operation in high air usage applications.

It is installed **between** the System Saver Twin air dryer and the air distribution system, a minimum of five feet from the System Saver Twin air dryer. The arrow on the valve must point in the direction of the airflow. Figure 5.5.



BACK-PRESSURE CONTROL VALVE (BPCV)

NOTE: Locate the BPCV anywhere BETWEEN the System Saver Twin air dryer and the air distribution system. Points A, B and C show several possible locations for the BPCV. If you select location C, air supply cannot be taken from Line B. Arrow on BPCV must point in direction of airflow.

1002275d

Figure 5.5

NOTE: These instructions are for adding a back-pressure control valve to an existing System Saver Twin air dryer application. For new applications, refer to TP-9672.

NOTE: Back-pressure control valve not required for Eaton CTI.

Installing a Back-Pressure Control Valve

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Remove all air from the air system before servicing any component in the air system. Pressurized air can cause serious personal injury.

⚠ CAUTION

The System Saver Twin air dryer is designed and engineered to minimize moisture and contaminants in truck air brake systems. It is not designed to provide moisture-free or contaminant-free air in a bulk unloading application. The System Saver Twin air dryer should not be used in bulk unloading applications if contaminants could cause load spoilage. The System Saver Twin air dryer is not to be used in food-grade bulk unloading applications.

NOTE: The end user must provide bulk tank overpressure protection either in the system or on the trailer.

1. Drain all air from the system.

2. Determine where the back-pressure control valve will be installed. It must be at least 5 feet from the System Saver Twin air dryer. Do not nipple mount the back-pressure control valve to the System Saver Twin air dryer. Refer to Figure 5.5 for suggested mounting locations.
3. Find the directional arrow on the replacement valve.
   - Install the valve so that the arrow points in the **direction of airflow**.
   - Installation orientation is not important.

     It does not matter which end faces up or down.
4. Test the installation for leaks.

   For part number and order information, refer to PB-8857AS. If you need assistance determining the necessity of a back-pressure control valve in your application, contact WABCO North America Customer Care at 855-228-3203.

Holset E-Type Compressor Systems

Function

WABCO offers a special Holset E-Type wiring harness for systems using a Holset E-type compressor. This harness is shown in Figure 1.23. In addition, an Econ valve, check valve and solenoid valve assembly are also required. Figure 5.6.

- E-type compressors can be identified by the serial number tag on the compressor. Tag will indicate: “This is an E-Type compressor.”
- For correct operation, the discharge line must be kept at reservoir pressure when the governor is in the unloaded position (compressor not pumping). If this is not done, the compressor will pass excessive oil into the air system.

NOTE: Normally-closed solenoid valve installed such that when ignition is on, solenoid is energized and solenoid valve is open, allowing air to flow from supply tank to compressor discharge line.

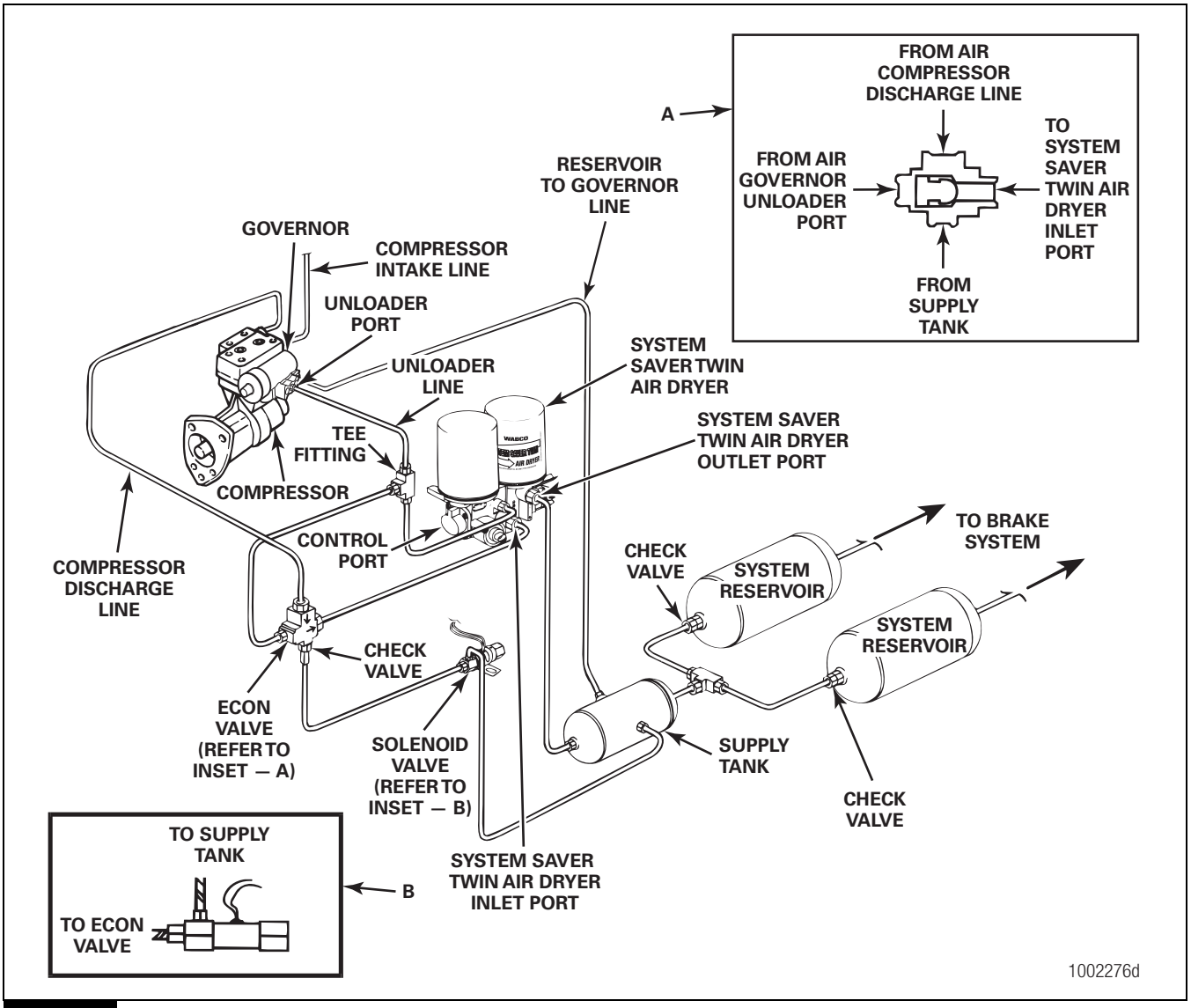


Figure 5.6

Econ Valve

Econ Valve Operation

The Econ valve allows supply tank pressure to reach the compressor discharge line during compressor idle. When the compressor is pumping, the Econ valve lets compressor air flow into the System Saver Twin air dryer, then on to the supply tank. When cutout pressure is reached, the governor unloads the compressor, and pressurizes the control port of the System Saver Twin air dryer. This opens the purge valve in the System Saver Twin air dryer and expels moisture and contaminants.

At the same time, the piston in the Econ valve shifts position and blocks the flow of air into the System Saver Twin air dryer. This also allows air to flow from the supply tank into the compressor discharge line. When the compressor starts pumping again, the cycle is repeated.

A check valve at the supply tank prevents air from bypassing the System Saver Twin air dryer and going directly to the supply tank during the pumping cycle. Refer to Figure 5.6 for an illustration of this system.

Replacing the Econ and Check Valves on a Holset E-Type Compressor System

NOTE: When the OEM installed the Holset E-type compressor system, a one-way check valve, Econ valve and solenoid valve were plumbed into the system between the System Saver Twin air dryer and the supply tank. The Econ valve must be located two to seven feet from the compressor.

Econ Valve Ports

- Inlet Port (1/2"-14 NPTF, female)
- Outlet Port (1/2"-14 NPTF, male)
- Unloader Port (1/8" NPTF, marked "UNL" on valve)
- Make-up Air Port (1/8" NPTF)

1. Remove the air from all of the system tanks and disconnect the air lines from the Econ and check valves. To ensure correct replacement, use markers to identify the lines. Econ valve ports are identified below. Figure 5.7.

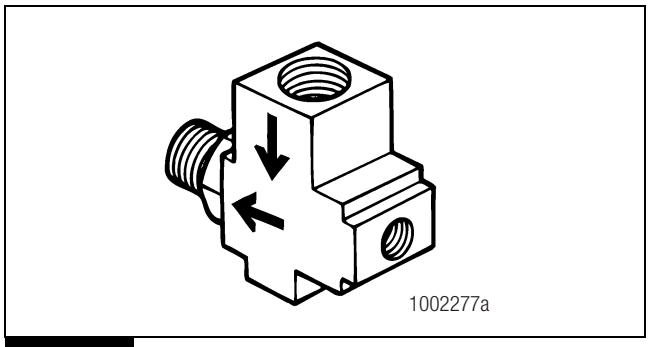


Figure 5.7

2. Attach the check valve to the ECON valve or the supply tank.
3. Reconnect all of the air lines. Test the system for leaks.

Replacing the Solenoid Valve

The solenoid valve can be mounted anywhere in the line between the Econ valve and the supply tank. Figure 5.6.

1. Remove the air from all of the system tanks. Disconnect the air line from the solenoid valve.
2. Unplug the solenoid valve from the wiring harness.
3. Look at the existing installation and remember how the old solenoid valve is installed. The replacement valve will be installed the same way.
4. Remove the old solenoid valve.
5. Install the replacement solenoid valve exactly the way the old valve was installed:
   - The **normally-closed** solenoid must be installed so that when the ignition is **on**, the solenoid is energized and the solenoid valve is **open.**
6. Reconnect the solenoid valve to the wiring harness.
   - Insert the plug until the latch snaps over the tab on the mating connector.
7. Test the system for leaks.

Installing a Turbo Cut-off Valve

If your vehicle has a turbocharged engine and the air compressor draws its intake air from the pressurized side of the turbocharger (at the intake manifold or aftercooler), you may want to install a turbo cut-off valve on your System Saver Twin air dryer. Some New System Saver Twin air dryers have a turbo cut-off valve included.

This installation will prevent leakage of turbo boost through the air compressor and out of the purge valve of the System Saver Twin air dryer when the compressor is operating in the unloaded mode.

Contact WABCO North America Customer Care at 855-228-3203.

Installation Instructions

⚠ CAUTION

Make sure there are no kinks or sags in the lines connected to the turbo cut-off valve. Moisture and dirt can build up and block the lines. The turbo cut-off valve and the System Saver Twin air dryer will not work when these lines are blocked.

1. Park the vehicle on a level surface.
2. Stop the engine.
3. Drain pressurized air from all of the reservoirs to 0 psi (0 bar).
4. Disconnect the delivery line at port 1 on the System Saver Twin air dryer.

   NOTE: If there is not enough room to install the turbo cut-off valve to port 1, connect a 90° fitting to port 1. Then connect the threaded end of the turbo cut-off valve to the fitting.

5. Install the threaded end of the turbo cut-off to port 1. Make sure the arrow on the turbo cut-off valve points toward port 1.

6. Connect the delivery line from the compressor to the 1/2-14 NPT port marked with an arrow (↓) on the turbo cut-off valve.

Installing the T-Fitting

1. Remove the unloader line from port 4 on the System Saver Twin air dryer.
2. Install a standard braking system T-fitting that has three 1/8-inch NPTF ports on the unloader line.
3. Connect a line from the T-fitting to port 4. Use 1/4-inch (6.3-mm) standard braking-system nylon tubing.
4. Connect a line from the remaining port on the T-fitting to the 1/8-inch MPT port marked “UNL” on the turbo cut-off valve. Use 1/4-inch (6.3-mm) standard braking-system nylon tubing. Figure 5.8.

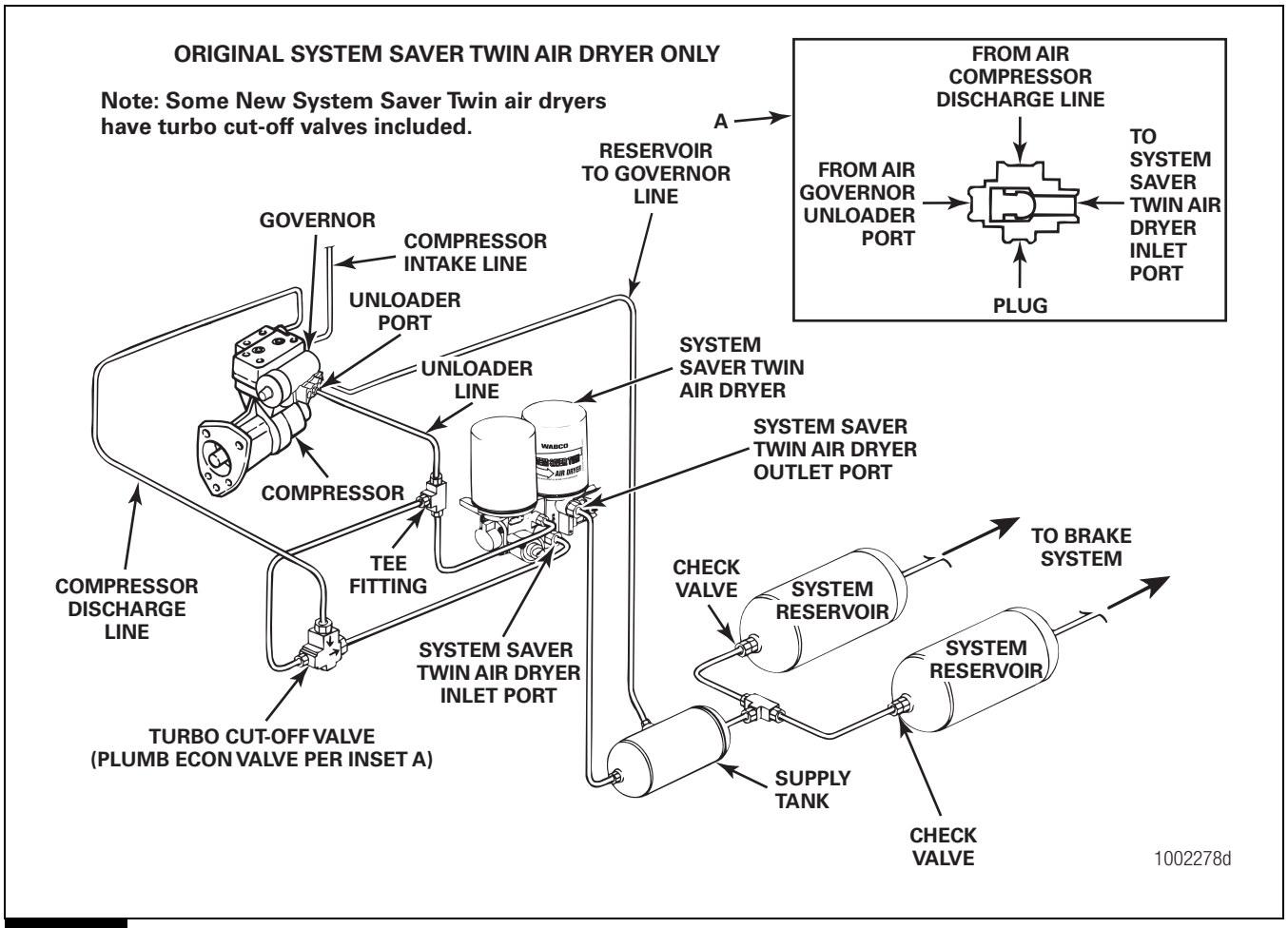


Figure 5.8

Vehicle Air System E

This layout is similar to the Cummins "System E" air system arrangement.

Application

Used with high volume air compressors (WABCO, Holset, Bendix, Knorr, etc.). This air system arrangement may also be found on vehicles with other engine makes. Figure 5.9.

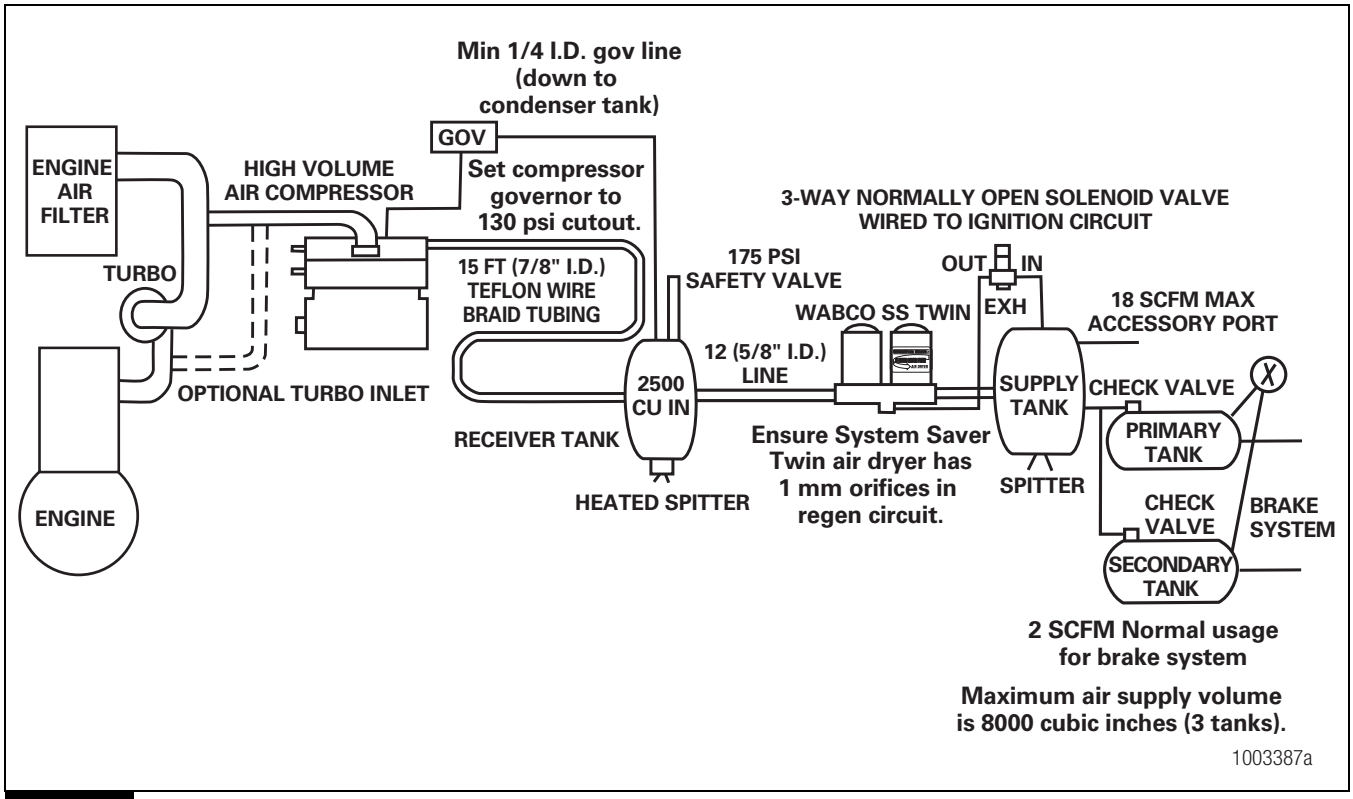


Figure 5.9

Component Replacement Guide

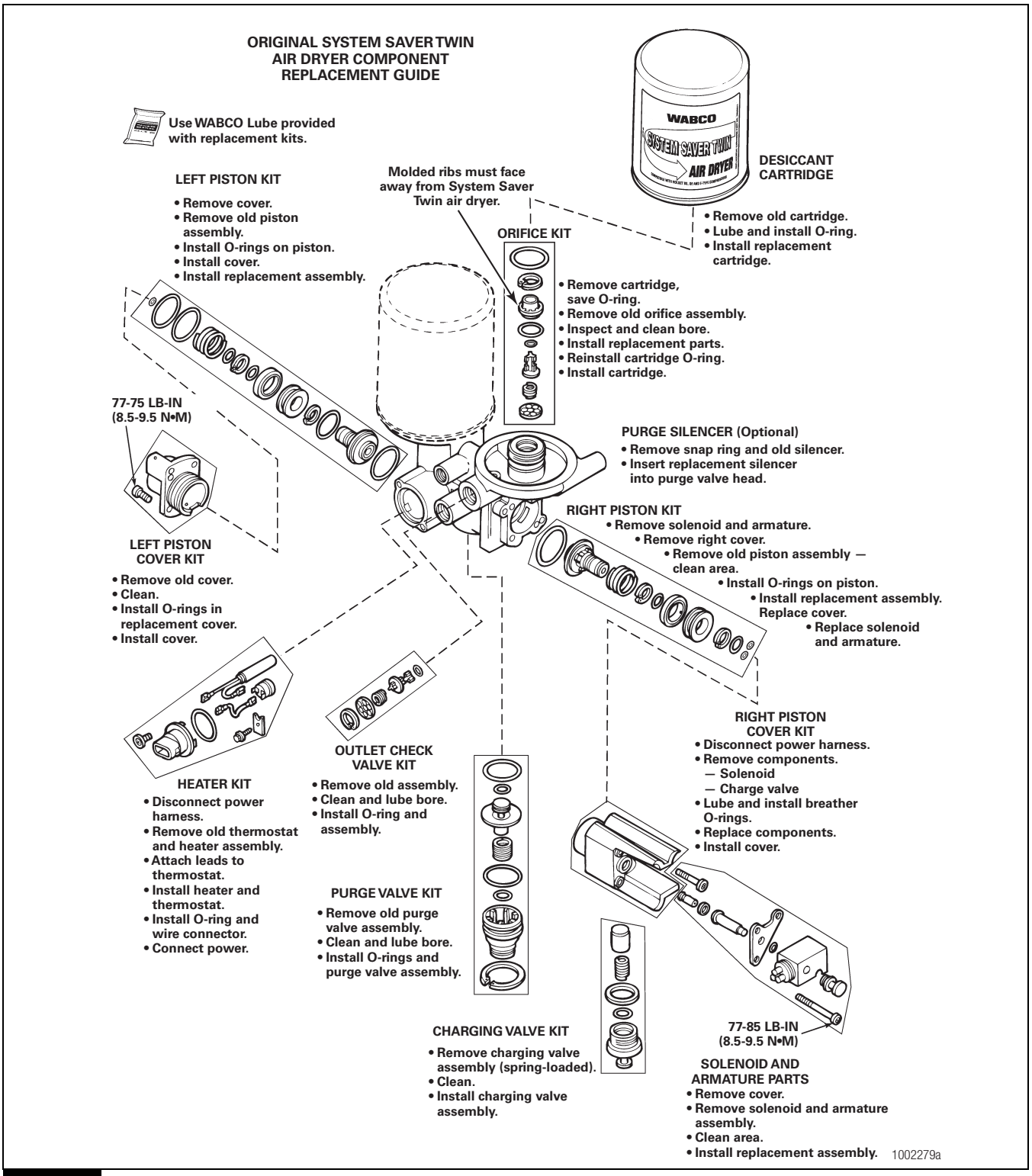


Figure 5.10

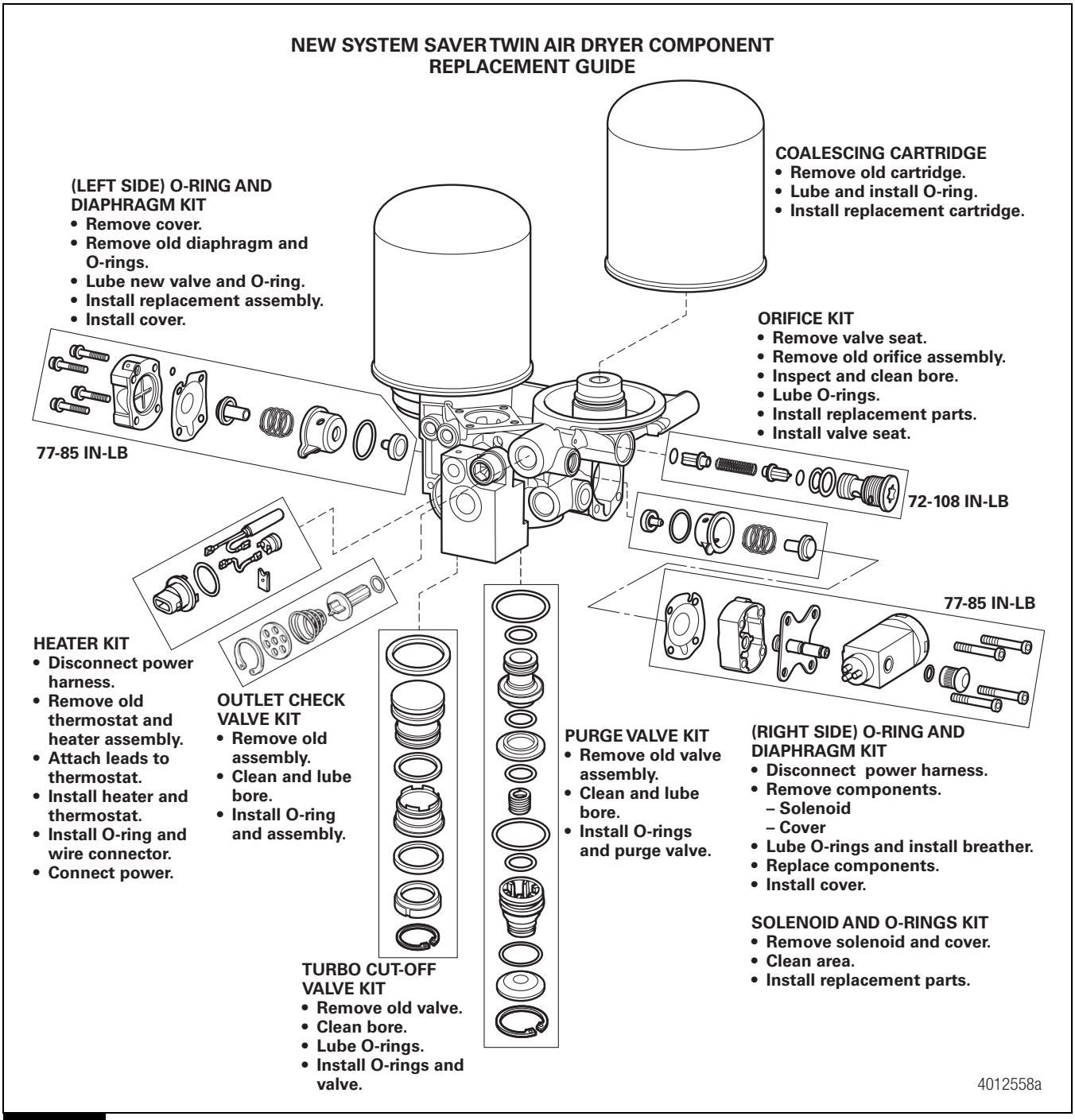

NEW SYSTEM SAVER TWIN AIR DRYER COMPONENT REPLACEMENT GUIDE
COALESCING CARTRIDGE
• Remove old cartridge.
• Lube and install O-ring.
• Install replacement cartridge.
(LEFT SIDE) O-RING AND DIAPHRAGM KIT
• Remove cover.
• Remove old diaphragm and O-rings.
• Lube new valve and O-ring.
• Install replacement assembly.
• Install cover.
ORIFICE KIT
• Remove valve seat.
• Remove old orifice assembly.
• Inspect and clean bore.
• Lube O-rings.
• Install replacement parts.
• Install valve seat.
77-85 IN-LB
72-108 IN-LB
77-85 IN-LB
HEATER KIT
• Disconnect power harness.
• Remove old thermostat and heater assembly.
• Attach leads to thermostat.
• Install heater and thermostat.
• Install O-ring and wire connector.
• Connect power.
OUTLET CHECK VALVE KIT
• Remove old assembly.
• Clean and lube bore.
• Install O-ring and assembly.
PURGE VALVE KIT
• Remove old valve assembly.
• Clean and lube bore.
• Install O-rings and purge valve.
(RIGHT SIDE) O-RING AND DIAPHRAGM KIT
• Disconnect power harness.
• Remove components.
– Solenoid
– Cover
• Lube O-rings and install breather.
• Replace components.
• Install cover.
SOLENOID AND O-RINGS KIT
• Remove solenoid and cover.
• Clean area.
• Install replacement parts.
TURBO CUT-OFF VALVE KIT
• Remove old valve.
• Clean bore.
• Lube O-rings.
• Install O-rings and valve.
4012558a

Figure 5.11

For further product details contact your distributor or the WABCO Customer Care Center at 855-228-3203.

About ZF Friedrichshafen AG

ZF is a global technology company and supplies systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifiesdifferentkindsofvehicles.Withitsproducts,thecompany contributes to reducing emissions and protecting the climate.

ZF, which acquired WABCO Holdings Inc. on May 29, 2020, now has 162,000 employees worldwide with approximately 260 locations in 41 countries. In 2019, the two then-independent companies achieved sales of €36.5 billion (ZF) and $3.4 billion (WABCO). For more information, visit **www.wabco-na.com**.

WABCO
Mobilizing Vehicle Intelligence