



Electronically Controlled Air Dryer (ECAD) Diagnostic Procedures And Information



> Internal Content

Refer to the PDF files below to assist in diagnosing an Electronically Controlled Air Dryer (ECAD) system.

Need to look at transferring the diagnostic guide directly into solution and properly formatting the steps.

	ECAD Diagnostic Guide
	Meritor Wabco Technical Bulletin
	Meritor Wabco System Saver Series Single Cartridge Air Dryers



Tags [mack](#) [volvo](#) [k43204335](#)

Related links and attachments

- [Meritor Wabco System Saver Series Single Cartridge](#)
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- [ECAD Diagnostic Guide](#)



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MERITOR WABCO

Technical Bulletin

Testing Electronically Controlled Air Dryers (ECAD) Independent of Other Vehicle Systems

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.

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.

Release all air from the air systems before you remove any components. Pressurized air can cause serious personal injury. Refer to the vehicle manufacturer's service manual for instructions.

How to Obtain Additional Maintenance, Service and Product Information

If you have any questions regarding the material covered in this bulletin, or for information about the Meritor WABCO product line, please contact the Meritor OnTrac™ Customer Call Center at 866-OnTrac1 (668-7221) or visit our website:

meritorwabco.com

Tools and Supplies Required

- Air gauge — 200 psi (13.8 bar) minimum
- Power supply — 12 volt
- Air supply — 120-140 psi (8.27-9.7 bar) with shut-off valve
- Air tank — one gallon (3.8 l) minimum
- Multimeter (Volt/Ohm meter)

Testing the Electronically Controlled Air Dryer

This technical bulletin provides a procedure for testing the electronically controlled air dryer (ECAD), part number 4324252000, independently of other vehicle systems. It is not intended to replace existing service diagnostic and repair procedures.

If the air dryer does not pass any of the tests described in the following procedure, you must record the result and contact the Meritor OnTrac™ Customer Call Center at 866-OnTrac1 (668-7221).

1. Disconnect the ECAD solenoid electrical 4-way connector from the air dryer. Figure 1.

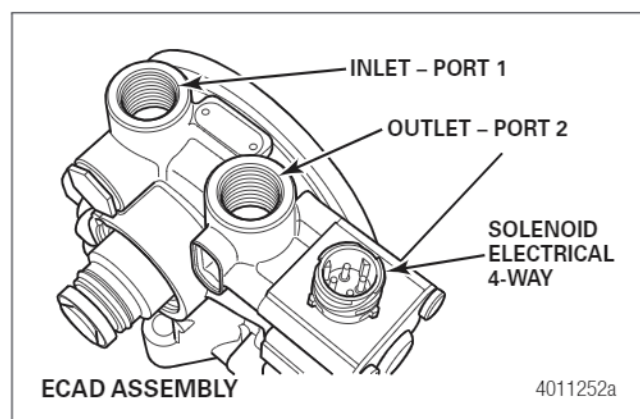


Figure 1

2. Check for water contamination and physical damage to the electrical pins on both the ECAD solenoid electrical 4-way and on the vehicle's wiring harness 4-way connector.
3. Connect the Test Wire Harness 4-way connector to the ECAD solenoid electrical 4-way.
4. Use a volt/ohm meter to test solenoid resistance as follows. Select electrical resistance (Ω Ohm), and set the scale according to the range values measured in the following steps. Figure 2 and Figure 3.

- A. Test between brown test lead Pin 1 and red test lead Pin 4. The measured resistance should be within the range of 12.5-14.3 Ohms.
 - B. Test between green test lead Pin 3 and red test lead Pin 4. The measured resistance should be within the range of 18.2-20.2 Ohms.
 - C. Test between red test lead Pin 4 and ECAD valve body for ground. The measured resistance should be open (OL).
- **If the resistance in any of the tests is not within specification:** Stop further testing and call the Meritor OnTrac™ Customer Call Center at 866-OnTrac1 (668-7221).

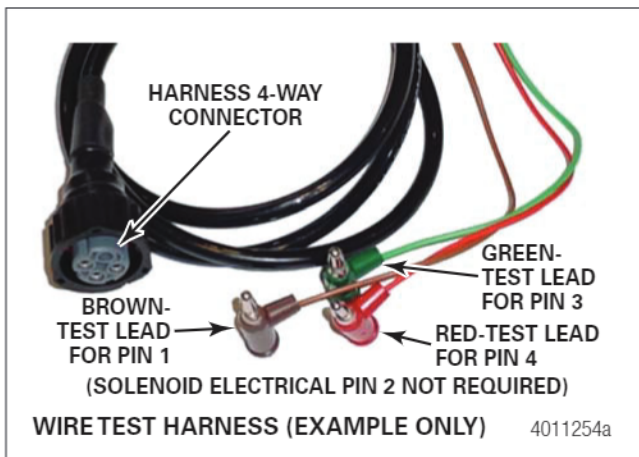


Figure 2

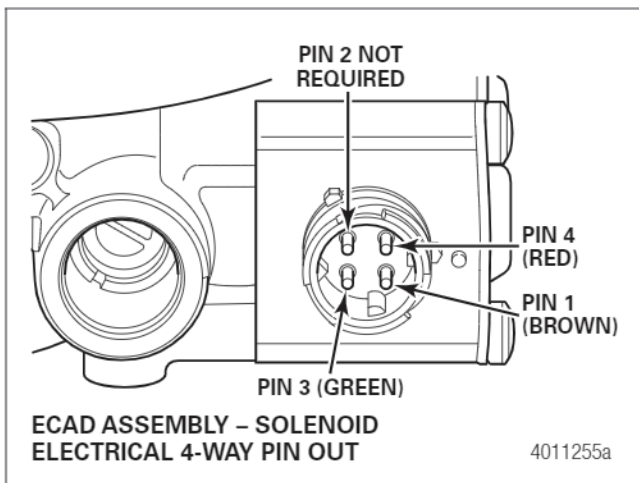


Figure 3

5. Disconnect the air dryer inlet (port 1), signal (port 4) and outlet (port 2) lines. Figure 1 and Figure 4.

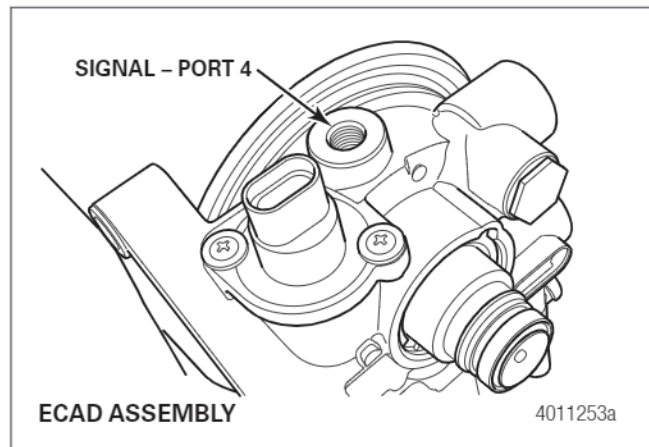


Figure 4

6. Connect shop air with a closed shut-off valve to the inlet (port 1). The shut-off valve should be mounted between the air supply and ECAD inlet (port 1).
7. Connect an air gauge to signal (port 4).
8. Connect a one-gallon (3.8 l) or larger air tank to the dryer outlet (port 2).
9. Open the inlet valve supplying shop air to the dryer and verify the following.
 - There are no air leaks from the dryer.
 - The air tank fills with air.
 - The signal gauge does not move.
10. Close the inlet valve and supply 12 volts to red test lead Pin 4 of the solenoid and ground test lead Pin 3, then verify the following.
 - The dryer purges, then stops leaking.
 - The signal gauge rises to the tank pressure.
11. Remove the ground from green test lead Pin 3, then verify that the signal gauge falls to 0 psi.
12. Ground green test lead Pin 3 and brown test lead Pin 1 of the solenoid connector (with 12 volts on red test lead Pin 4 still in place) and verify the following.
 - The tank drains through the purge valve slowly (desiccant regeneration). The purge valve will close at its minimum setting, retaining some pressure on the air gauges, generally around 35-70 psi (2.41-4.8 bar). This is normal.
13. If the dryer passes the above tests, the dryer is functioning correctly. Replace the connections to the air dryer and return to service.

If the air dryer did not pass any of the tests, record the results and call the Meritor OnTrac™ Customer Call Center at (866) OnTrac1 (668-7221).

MERITOR WABCO

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Maintenance Manual 34

System Saver Series Single Cartridge Air Dryers

System Saver Series

- **1200E, P, U**
- **1800E, P, U**
- **1200 Plus**

Revised 04-10

About This Manual

This manual contains maintenance procedures for Meritor WABCO's System Saver Series single cartridge 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 and Service Information

On the Web

Visit Literature on Demand at arvinmeritor.com to access and order product, service, aftermarket, and warranty literature for ArvinMeritor's truck, trailer and specialty vehicle components. Meritor WABCO publications are also available on our website: www.meritorwabco.com

Literature on Demand DVD (LODonDVD)

The LODOndVD contains product, service and warranty information for ArvinMeritor and Meritor WABCO products. To order the DVD, visit Literature on Demand at arvinmeritor.com and specify TP-0742.

How to Obtain Tools and Supplies Specified in This Manual

Call ArvinMeritor's Commercial Vehicle Aftermarket at 888-725-9355 to obtain Meritor tools and supplies.

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Overview

Maintenance Manual 34 contains troubleshooting steps and service information for the Meritor WABCO System Saver Series (1200 and 1800) single cartridge air dryers.

NOTE: If you have a System Saver TWIN air dryer, use Maintenance Manual 35, Meritor WABCO System Saver TWIN Air Dryer. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Other Publications Related to Meritor WABCO System Saver Series Single Cartridge Air Dryers

TP-92116, Installing the Meritor WABCO System Saver Series Air Dryer, provides complete installation instructions.

PB-8857AS contains a complete listing of air dryer replacement parts.

TP-97101 is a troubleshooting guide. There is also a poster-sized troubleshooting guide, TP-9772, available.

TP-9672, Air Dryer Application Guide, provides an in-depth look at System Saver Series air dryer applications.

T-20102V, Air System Troubleshooting video Stopping With Air and T-97105V, System Saver 1200 videotapes are also available.

To order literature, contact ArvinMeritor's Customer Service Center, 800-535-5560.

Air Dryer Identification

Alphabetical designations of the System Saver Series family of air dryers have specific meanings:

P Indicates an external purge tank is used for desiccant regeneration

U Indicates discharge line — unloaded compressor

E Indicates a Holset style compressor function

G Indicates integral governor for air compressor control

UP Indicates discharge line — unloaded compressor (with external purge tank)

System Saver 1200/1800: System regeneration valve assembly on side of dryer

System Saver 1200E: Tubing and banjo fitting at front of dryer

System Saver 1200P/1800P: Uses dedicated purge tank. Port 22 drilled and tapped

System Saver 1200U/1800U: Small regeneration hole visible in back of Port 1 when fitting is removed. No spring in turbo cut-off valve assembly.

System Saver 1200UP/1800UP: Port 22 drilled and tapped. Small regeneration hole visible at back of Port 1 when fitting is removed. No spring in turbo cut-off valve assembly. Dedicated purge tank.

The air dryer base is the same for both the 1200 and 1800 Series air dryers, however the 1800 Series canister is 3.2 inches taller than the 1200. This larger canister contains 50% more desiccant, which makes the 1800 ideal for applications calling for frequent starts, stops and long compressor cycles. System Saver 1200 and System Saver 1800 Series air dryers are illustrated in Figure 1.1. System Saver 1200P and System Saver 1800P, which are used with a dedicated purge tank, are illustrated in Figure 1.2.

System Saver 1200 Plus: Has the purge volume integrated into the body of the air dryer and also has an integrated governor. Figure 1.3.

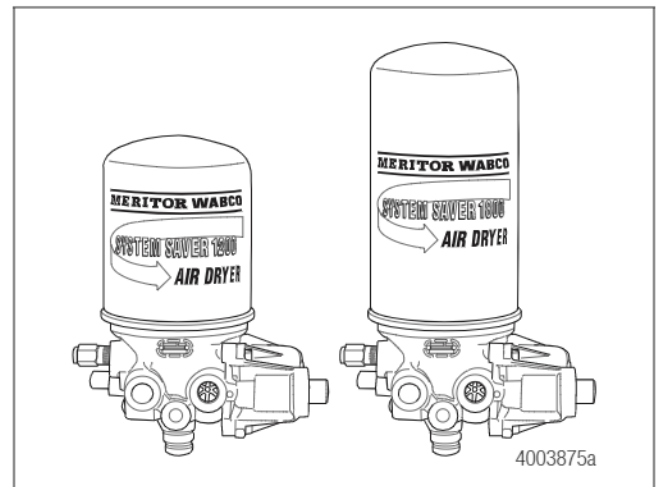


Figure 1.1

1 Introduction

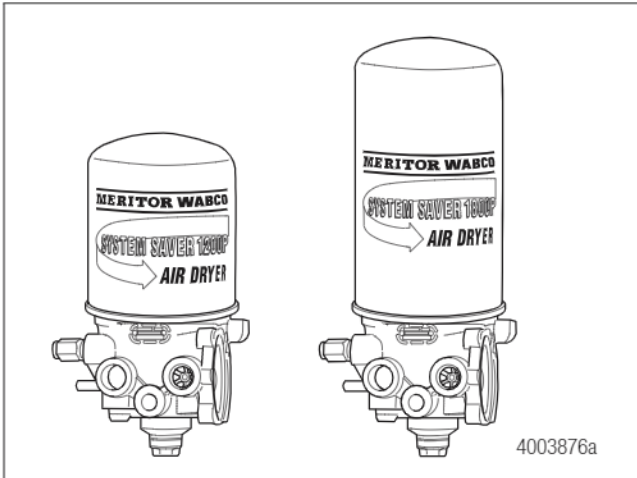


Figure 1.2

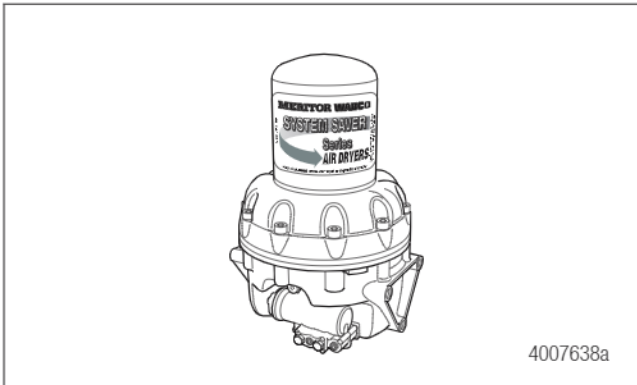


Figure 1.3

How the Air Dryer Works

During system pressure build-up, compressed air passes into the air dryer where the filter system removes contaminants and passes the air into the drying stage.

Moisture-laden air passes through the desiccant bed in the air dryer cartridge and moisture is retained by the desiccant. Moisture that condenses out also collects in the base of the dryer. When the compressor unloads, the water is expelled and dried air flows back through the dryer, drying the desiccant for the next cycle.

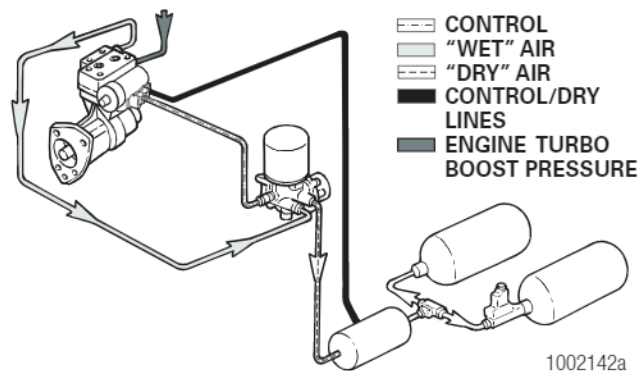
NOTE: For further information about System Saver E air dryers and components, refer to Section 4 and Section 5. For special applications, refer to Section 6.

Air Dryer Cycle

A single cartridge air dryer cycle is illustrated in Table A.

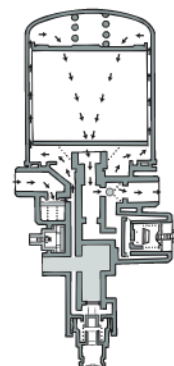
Table A

The governor turns the compressor on when supply tank pressure drops below cut-in pressure, between 100 psi and 110 psi (689-758 kPa) depending on governor settings.

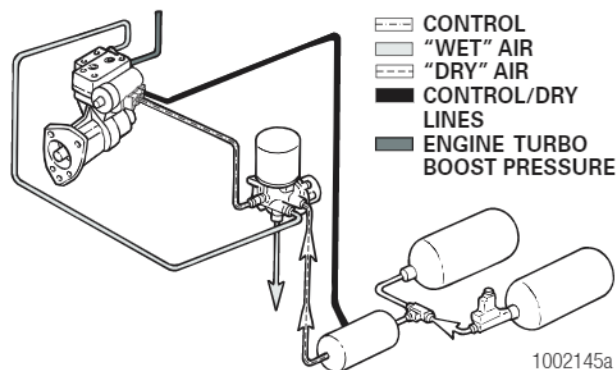


Compressed air passes into the air dryer at the inlet port:

- Moisture-laden air and contaminants pass through the desiccant.
- Moisture is retained by desiccant; moisture also collects in the base of the dryer.
- Contaminants are removed as air passes through the desiccant bed.



The governor turns the compressor off when system reaches cut-out pressure, between 120 psi and 130 psi (827-896 kPa) depending on governor settings.

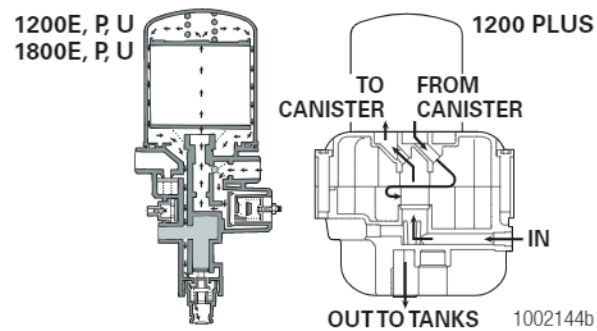


1 Introduction

Table A

When the compressor unloads, the purge valve opens:

- On 1200E, P, U, 1800E, P, U, the dryer purges the desiccant cartridge and expels any water collected in the dryer base.
 - Regeneration valve opens.
- On 1200 regeneration models, when the regeneration valve opens.
 - Dry system air flows back through the dryer at 10 psi (69 kPa) taken from supply and secondary tanks.
 - Back flow dries desiccant, preparing it for the next cycle.
- On 1200 P, UP, 1800 P and UP:
 - Dry air flows from the separate purge tank back through the air dryer.
- On 1200 Plus:
 - Dry air flows from the integrated purge tank back through the air dryer. Air can be felt and heard flowing from the purge valve for an extended period of time.
 - Dry system air flows back through the air dryer to regenerate the desiccant. 10 psi (69 kPa) is taken from the supply and secondary tanks for the regeneration.



Typical System

A typical Meritor WABCO System Saver 1200 or 1800 Series air dryer installation is illustrated in Figure 1.4. Illustrations for Combo Tank installations appear in Section 6.

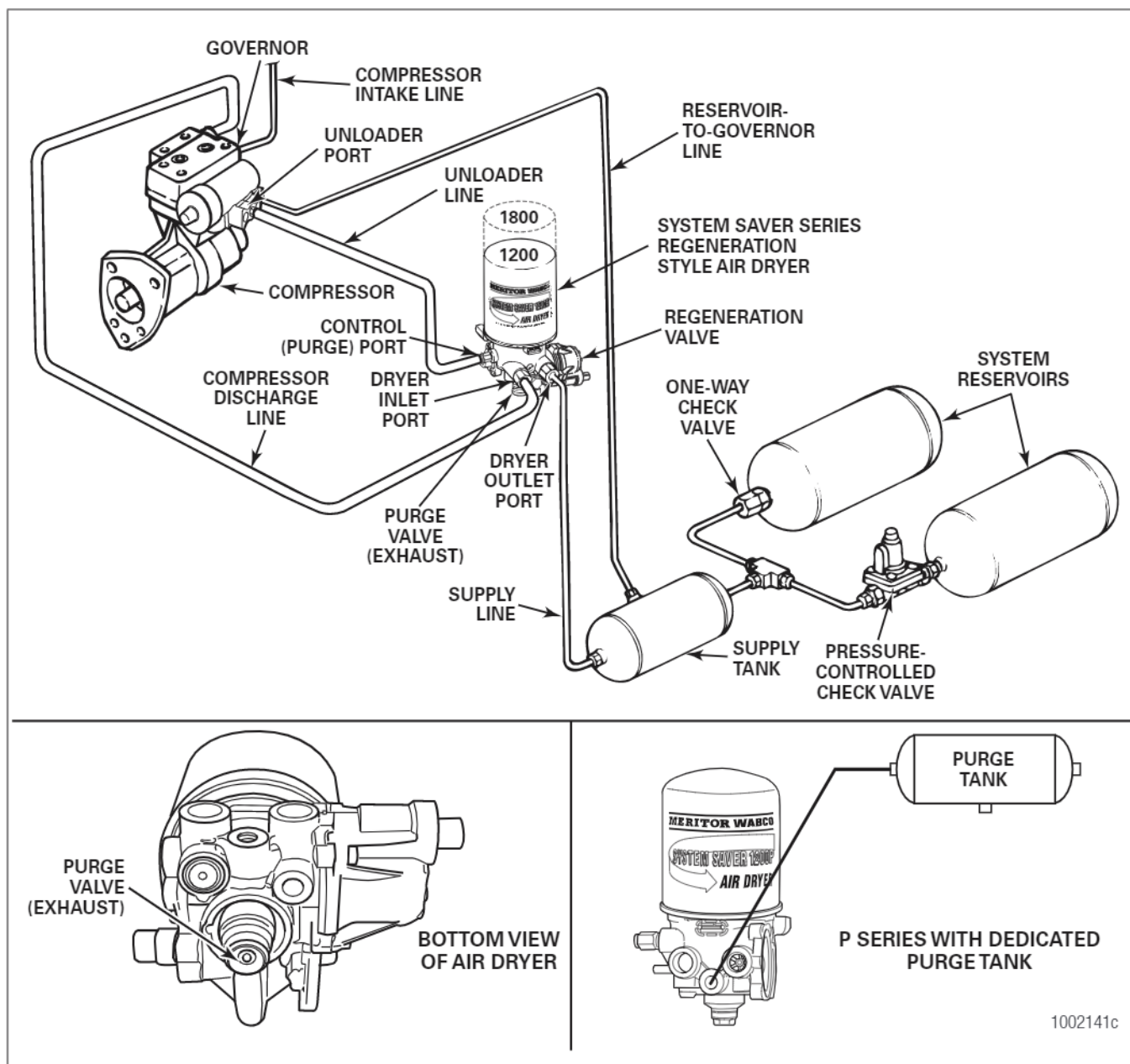


Figure 1.4

1 Introduction

Air Dryer Components

Meritor WABCO single cartridge air dryers contain replaceable component parts. Air dryer components are illustrated in Figure 1.5. Refer to Section 3 for instructions for removal of old parts and installation of new parts.

NOTE: For 1200 Plus Series air dryers, refer to Figure 7.1.

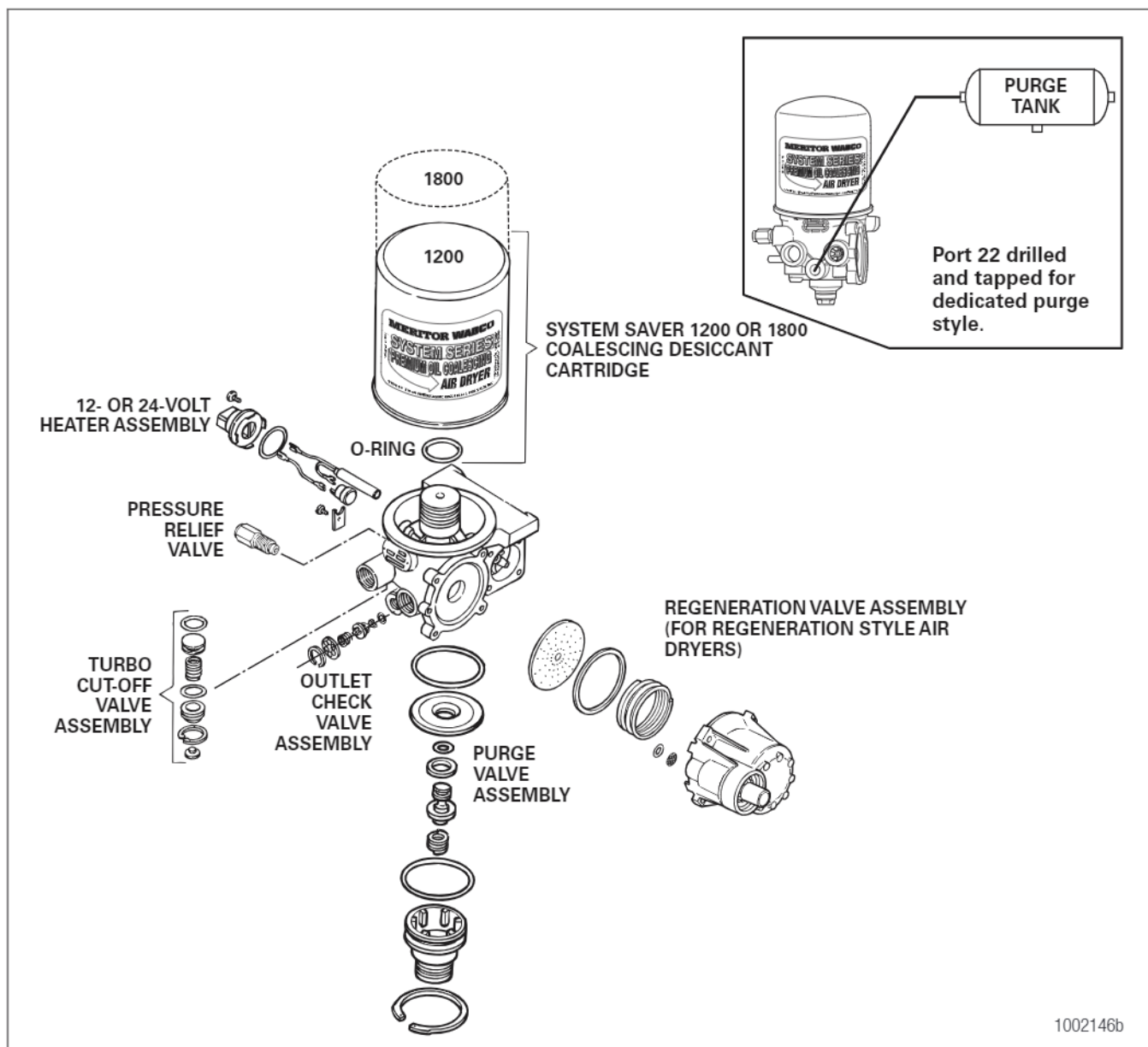


Figure 1.5

Dryer Identification

The identification tag on the face of the dryer provides important information about the air dryer — information you will need when servicing or replacing components. Figure 1.6.

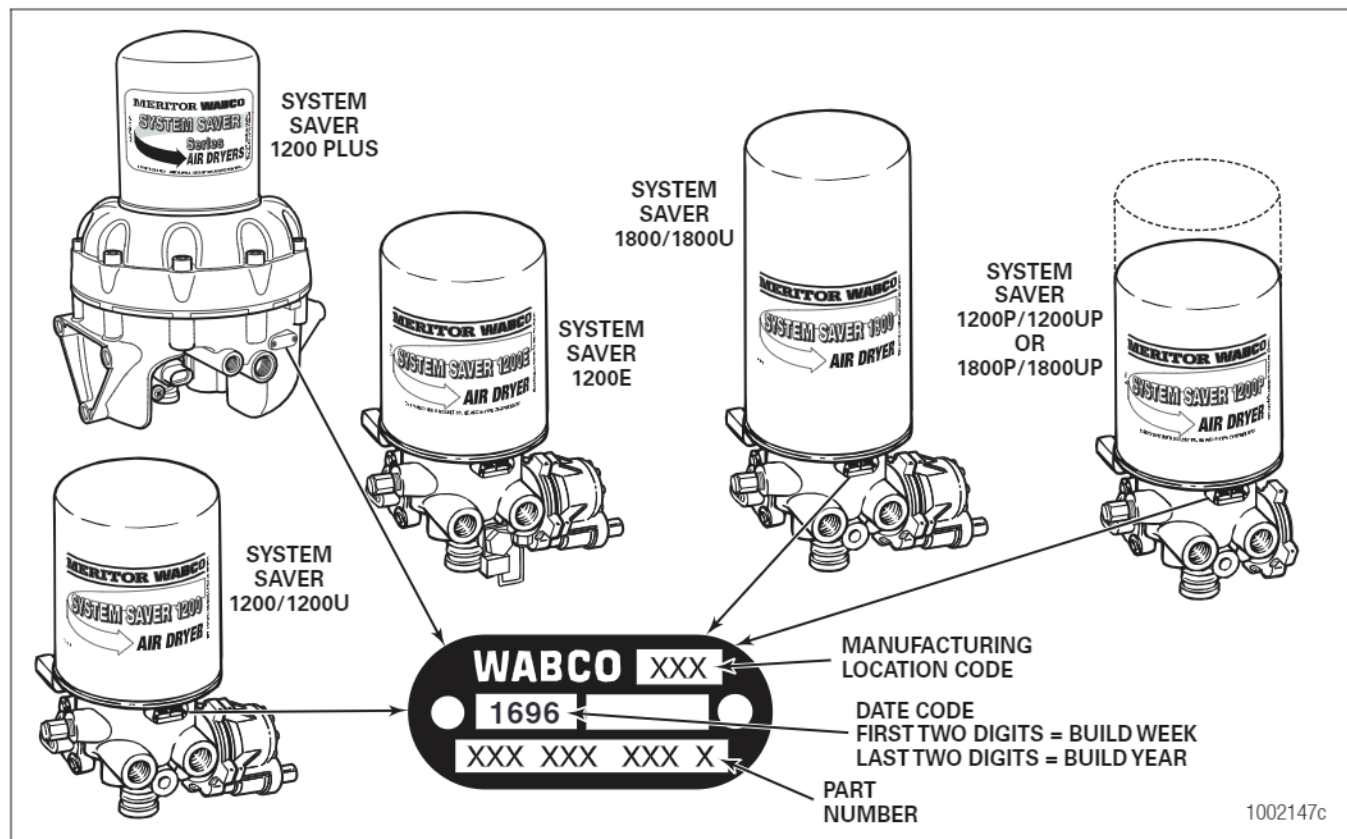


Figure 1.6

Description of Components

Replacement components for single canister air dryers are described below.

Desiccant Cartridge: A cylindrical steel housing containing the filter elements and desiccant needed to filter and dry system air.

Spin-on/spin-off design allows quick and easy maintenance. The System Saver 1800 Series cartridge is 3.2-inches (81 mm) taller than the 1200 Series cartridge. Figure 1.7.

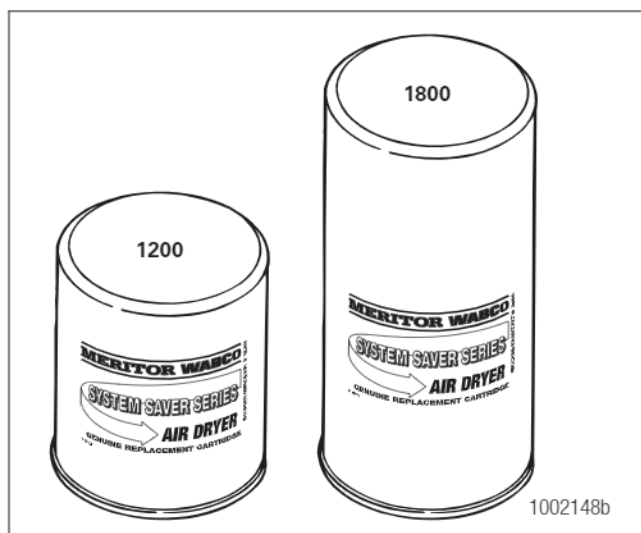


Figure 1.7

1 Introduction

Heater: Located in the air dryer base, the heater prevents water that collects in the air dryer from freezing. It consists of a cylindrical resistive-type heating element and a small circular thermostat. Heater is available for 12- and 24-volt air dryers. Figure 1.8.

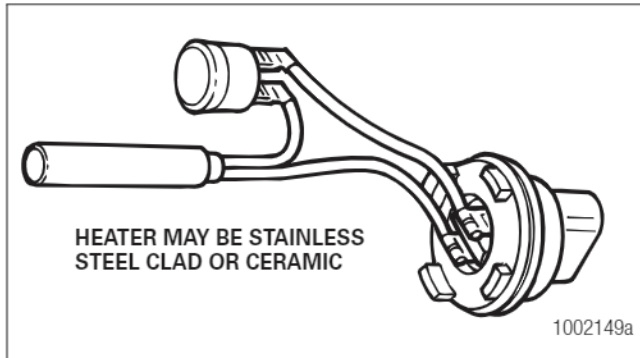


Figure 1.8

Bypass Valve: A valve located between the inlet and outlet ports of the dryer. It allows air to flow into the dryer and go directly to the outlet port, bypassing the desiccant cartridge. The 1200 and 1200E Series with date codes later than 0894 do not use a bypass valve. Figure 1.9.

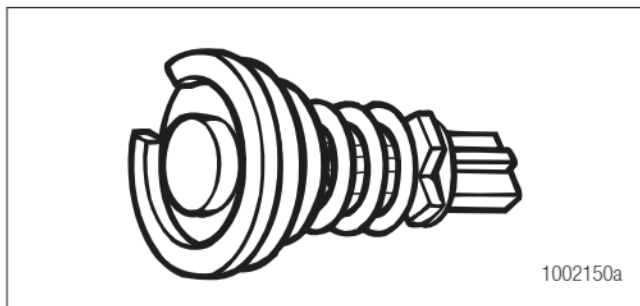


Figure 1.9

Outlet Check Valve: A valve located in the outlet port (port 21) of the air dryer. It prevents air from flowing back through the air dryer and escaping out the purge valve during a compressor unload cycle. Figure 1.10.

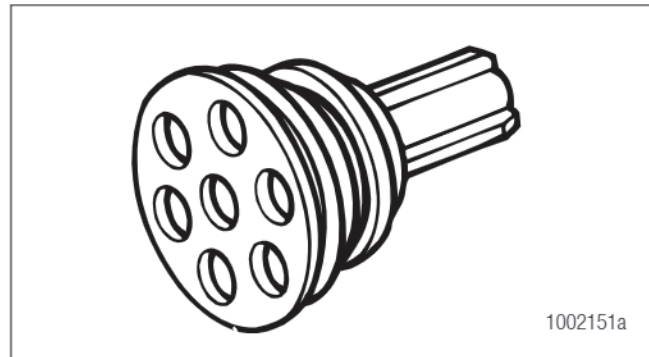


Figure 1.10

Pressure-Controlled Check Valve (PCCV): Used with System Saver Series regeneration style air dryers. The PCCV is usually mounted on the secondary air tank in place of an inlet check valve. It lets air backflow from the secondary tank to the supply tank as long as system pressure remains between the normal cut-in and cut-out range of the governor. It allows additional air volume for generation during the air dryer purge cycle. Not used with "P" style air dryers. Figure 1.11.

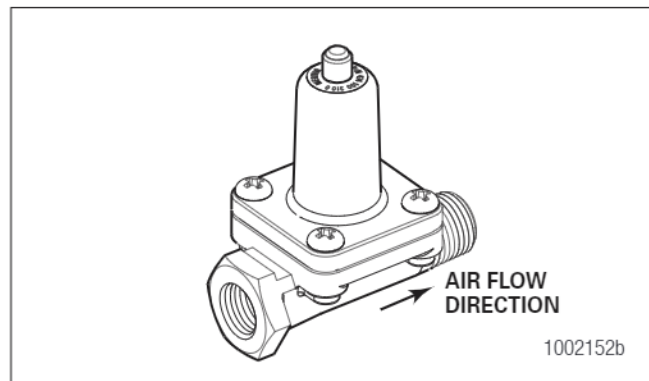


Figure 1.11

Pressure Relief Valve: A valve that protects the air dryer from over-pressurization. On dryers with date codes earlier than 2295, it is installed in the inlet port of the dryer (port 1) using a Street-Tee fitting. On dryers with date codes later than 2295, the pressure relief valve is attached directly to the air dryer. Figure 1.12.

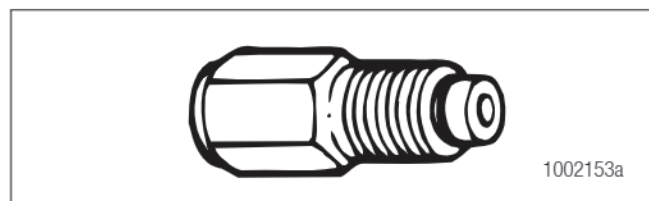


Figure 1.12

Purge Valve: A valve located on the bottom of the air dryer base that remains open during a compressor unload cycle. It allows collected moisture, condensation, and contamination to be expelled from the air dryer during a purge cycle. Figure 1.13.

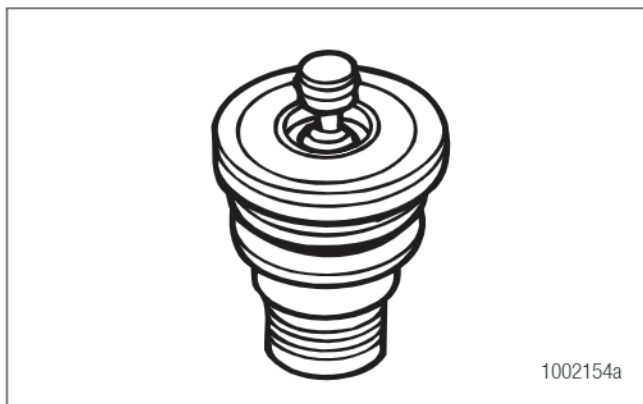


Figure 1.13

Regeneration Valve: The valve that controls regeneration of the desiccant. It allows air from the supply and secondary tanks to bypass the outlet check valve. The air expands and backflushes moisture off of the desiccant, then out through the dryer's purge valve. Figure 1.14.

Not used with "P" style dryers.

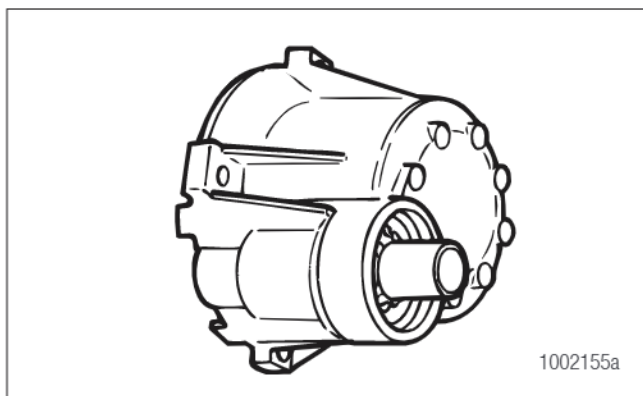


Figure 1.14

ECON Valve Replacement Part: This valve is used on System Saver Series 1200E single cartridge air dryers used with Holset E-type compressors. Figure 1.15.

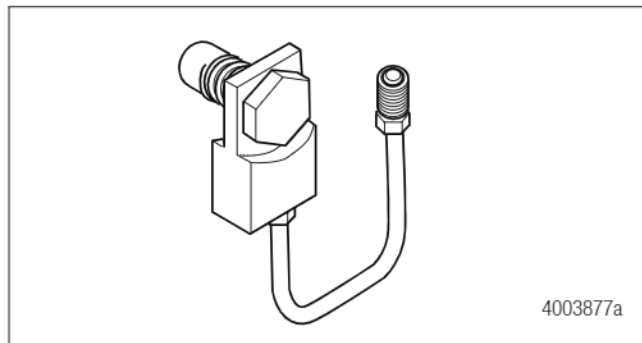


Figure 1.15

ECON Valve: This valve must be installed if System Saver 1200 Series air dryers NOT DESIGNATED E are used with Holset E-type compressors. This valve is not required on System Saver 1200 E air dryers. Figure 1.16.

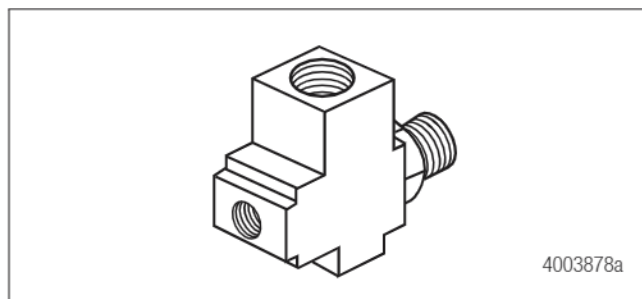


Figure 1.16

1 Introduction

Turbo Cut-off Valve: A valve located in the inlet port of the air dryer. It closes the path between the air compressor and the air dryer purge valve during compressor unload. This prevents a loss of turbocharger boost pressure during a compressor unload cycle, thereby maintaining boost pressure for maximum engine horsepower. Figure 1.17 and Figure 1.18 (used exclusively on the 1200 Plus model).

There is no spring in the turbo cut-off valve assemblies used on U Series air dryers.

The System Saver E Series air dryers use a special turbo cut-off valve. Refer to the air dryer parts book PB-96134 for part number information.

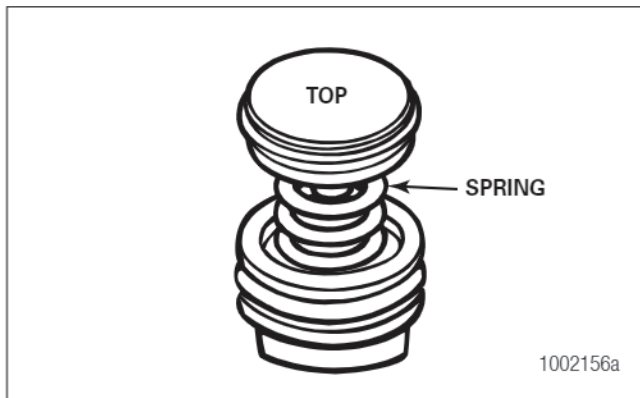


Figure 1.17

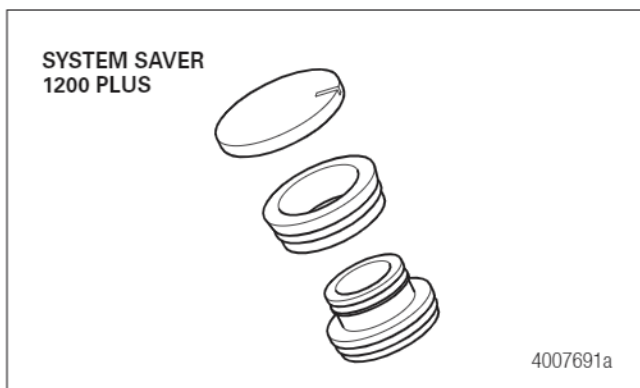


Figure 1.18

Heater Power Harness: Twelve-inch cable with Metri-Pack plug provides electrical connection to air dryer heating unit. Figure 1.19.

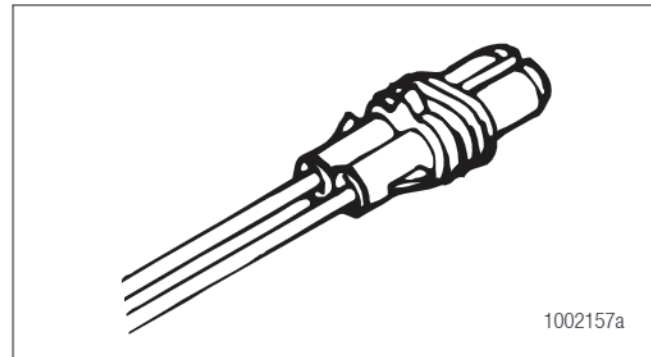


Figure 1.19

Purge Silencer: Optional part for all Meritor WABCO air dryers. It is used to reduce the noise level of an air dryer purge. Figure 1.20.

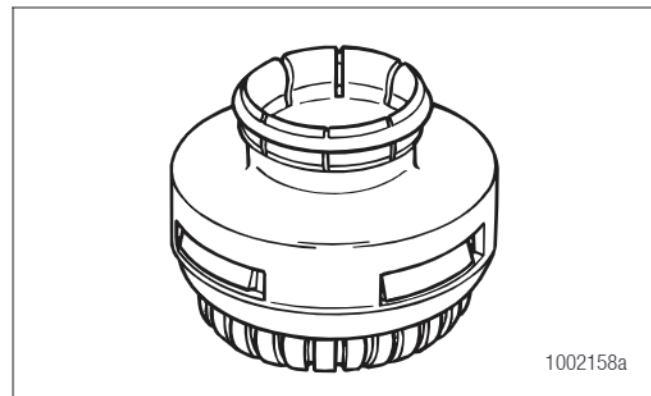


Figure 1.20

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.

Maintenance

To keep your Meritor WABCO air dryer operating efficiently, the routine maintenance in Table B is recommended.

Table B

Action	Interval
Ensure the dryer purges when compressor unloads.	Weekly.
Drain the purge tank (dedicated purge tank dryers).	Weekly, or as recommended by the manufacturer.
Check for moisture in the system by opening the drain cock on vehicle system reservoirs slowly.	Weekly, or as recommended by the manufacturer, whichever is most frequent.
Replace the desiccant cartridge.	Every two to three years, or more often depending on usage, vocation, and condition of compressor.
	Whenever compressor is rebuilt.
Replace the coalescing cartridge.	Every one to two years.

Maintenance Tips

With proper maintenance, the Meritor WABCO air dryer will provide years of reliable service, even under adverse operating conditions. To provide additional protection against the harmful effects of extreme heat or cold, here are a few helpful tips.

Dedicated Purge Tank

Optimum mounting location for the dedicated purge tank is above the air dryer.

Extreme Heat

Make sure the compressor discharge line is long enough to keep inlet air below 175°F (80°C). Figure 2.1. (Refer to Section 5.)

2 Troubleshooting and Testing

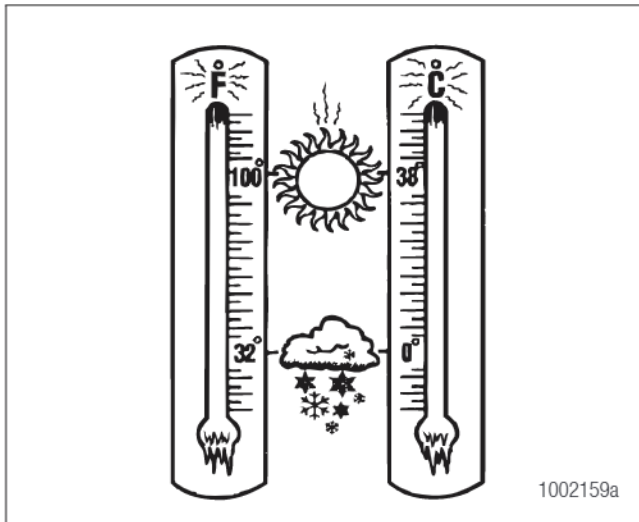


Figure 2.1

Extreme Cold

Make sure the air dryer heater is in good working order by running a heater resistance test. Refer to the procedure in this section.

Check the line from the governor to port 4 of the dryer for oil and/or water. Keep this line clean to help prevent freezing.

Meritor WABCO air dryer components are installed in the air dryer at the factory and are designed to last for the life of the dryer. Under some operating conditions, however, a replacement may be required. Refer to Section 3 for replacement guide instructions.

Troubleshooting

Conditions you may experience, and suggested solutions, appear in Table C.

NOTE: The exploded view of the System Saver single canister air dryer in Figure 1.5 illustrates the location of components in the dryer.

Table C: System Saver Series Air Dryer Troubleshooting

Condition	Possible Cause	Conditions May Occur In:		Solution
		Regeneration Style Air Dryers	Dedicated Purge Tank Air Dryers	
Dryer leaks from purge valve during compressor loaded cycle. The leak may cause excessive compressor cycling or prevent the system from building air pressure.	Purge valve frozen open (cold weather operation).	Yes	Yes	Check heater. Repair/replace if necessary. Make sure governor to dryer port 4 line is free of water/oil. Remove and inspect purge valve and clean water/oil from top of piston.
	Debris under purge valve seat, such as particles from fittings or air inlet line.	Yes	Yes	Disassemble and clean purge valve. Remove cartridge and clean dryer sump area.
	Purge valve washer installed upside-down.	Yes	Yes	Ensure lip on aluminum washer faces DOWN , away from dryer.
	Wrong air line connected to dryer port 4 (unloader port).	Yes	Yes	Verify correct air line installation and correct as needed.
	Purge valve snap ring not fully seated in groove.	Yes	Yes	Seat snap ring fully into groove.
Regeneration cycle too long (more than 30 seconds), accompanied by loss of pressure in the supply tank.	Outlet check valve not seating.	Yes	Yes	Inspect and replace outlet check valve as needed.
	Regeneration valve not shutting off regeneration airflow.	Yes	No	Replace regeneration valve.
Regeneration cycle too short (less than 10 seconds).	High air system demands during compressor unloaded cycle.	Yes	Yes	Increase air system capacity or reduce air demands.
	Pressure-controlled check valve not installed in system or not working properly.	Yes	Yes	Check and replace pressure-controlled check valve as needed.
	One-way check valve installed in system reservoir instead of, or with, pressure-controlled check valve.	Yes	No	Remove one-way check valve. Make sure pressure-controlled check valve is installed correctly.
	Regeneration valve not working.	Yes	No	Remove regeneration valve and clean oil from diaphragm. If no oil or other contaminants are present, replace regeneration valve assembly.
	Air governor not working properly.	Yes	Yes	Inspect air governor. Repair/replace per manufacturer's instructions.
Water in purge tank.	Block in purge tank line.	N/A	Yes	Clear blockage. Replace desiccant cartridge.

2 Troubleshooting and Testing

Table C: System Saver Series Air Dryer Troubleshooting

Condition	Possible Cause	Conditions May Occur In:		Solution
		Regeneration Style Air Dryers	Dedicated Purge Tank Air Dryers	
No regeneration cycle. No airflow from purge valve after initial purge blast (dryer decompression).	Air dryer not connected to supply tank or connections reversed at dryer.	Yes	No	Verify proper dryer installation per system diagram.
	Regeneration valve not working.	Yes	No	Replace regeneration valve.
	One-way check valve installed in supply tank.	Yes	No	Remove one-way check valve.
	Alcohol evaporator installed between dryer and supply tank.	Yes	No	Install bypass line around evaporator or remove evaporator from system.
	Blocked line/pinched line from purge tank.	No	Yes	Clear/repair line.
Air dryer does not purge when compressor unloads (no blast of air from purge valve).	Air line between governor and air dryer port 4 kinked or plugged.	Yes	Yes	Repair air line.
	Purge valve stuck closed.	Yes	Yes	Replace purge valve.
	Air governor not working properly.	Yes	Yes	Inspect air governor. Repair/replace per manufacturer's instructions.
	Cut-out pressure never achieved by air compressor.	Yes	Yes	Check for air leaks in system and repair as needed. If no leaks in system, check compressor output. Repair/replace per manufacturer's instructions.
Air dryer purges too often, perhaps as frequently as every 15 seconds, accompanied by excessive cycling of the compressor.	Leak in line between governor and dryer port 4.	Yes	No	Repair air line.
	Leak in line between supply tank and governor.	Yes	Yes	Repair air line.
	Leaks in the air system.	Yes	Yes	Repair leaks.
	Excessive air system demands.	Yes	Yes	Increase air system capacity or reduce air demand.
	Outlet check valve not seating.	Yes	Yes	Inspect and replace outlet check valve as needed.
	Regeneration valve not shutting off properly.	Yes	No	Replace regeneration valve.
	Air governor has less than 16 psi (110 kPa) range.	Yes	Yes	Replace air governor.
	Leaking air compressor unloader(s).	Yes	Yes	Inspect compressor. Repair/replace per manufacturer's instructions.

Table C: System Saver Series Air Dryer Troubleshooting

Condition	Possible Cause	Conditions May Occur In:		Solution
		Regeneration Style Air Dryers	Dedicated Purge Tank Air Dryers	
Air flows out of purge valve entire time compressor is unloaded.	Turbo cut-off valve not sealing.	Yes	Yes	Replace turbo cut-off valve.
	Outlet check valve not seating.	Yes	Yes	Replace outlet check valve.
NOTE: With U Series air dryers, the compressor unloads through the dryer, so a steady flow of air is normal.				
Rapid “spitting” of air from purge valve in small amounts. Frequency varies with engine speed.	Holset E-type compressor used, but no Econ valve installed.	Yes	Yes	Install Econ valve to provide make-up air to compressor.
	Compressor not completely unloading when cut-out pressure is reached.	Yes	Yes	Inspect compressor. Repair/replace per manufacturer's instructions.
NOTE: With U Series air dryers, the compressor unloads through the dryer, so a steady flow of air is normal.				
Air leak at turbo cut-off valve vent. Rubber seal damaged or missing.	Temperature of air coming into dryer is too high — not enough cooling takes place before dryer inlet.	Yes	Yes	Move dryer farther from compressor. Add additional compressor discharge line before air dryer. Add cooling coil or heat exchanger before air dryer.
NOTE: As of Nov. 2009, the turbo cut-off valve will have an O-ring instead of a lip seal.	Lip seal installed upside-down on piston. Lip must face UP (towards dryer).	Yes	Yes	NOTE: Inlet air temperature must not exceed 175°F (80°C). Install lip seal correctly.
	Valve bore worn excessively.	Yes	Yes	Inspect valve bore for wear. If a new turbo cut-off valve does not seal in a clean, lubricated bore, replace the air dryer.
	Piston is broken.	Yes	Yes	Replace the turbo cut-off valve.

2 Troubleshooting and Testing

Table C: System Saver Series Air Dryer Troubleshooting

Condition	Possible Cause	Conditions May Occur In:		Solution
		Regeneration Style Air Dryers	Dedicated Purge Tank Air Dryers	
Air dryer frozen (water collecting in base of dryer is freezing).	No electrical power to heater connector.	Yes	Yes	Check for a blown fuse. Repair heater circuit.
	Low voltage to heater connector.	Yes	Yes	Repair cause of low voltage, such as poor electrical ground, bad connections, corroded wire splices, etc.
	Heater assembly not working.	Yes	Yes	Replace heater assembly.
	Wrong voltage air dryer used; i.e., 12-volt air dryer used in a 24-volt system.	Yes	Yes	Replace with correct voltage air dryer.
No air pressure build-up in system.	Air dryer not plumbed correctly (connections reversed).	Yes	Yes	Ensure compressor discharge line is plumbed to air dryer port 1, and air dryer port 21 is connected to vehicle's supply tank.
	Wrong air line connected to dryer port 4.	Yes	Yes	Ensure dryer port 4 line is connected to the "UNL" port of the air governor.
	Air governor not working properly.	Yes	Yes	Inspect governor per manufacturer's instructions. Repair or replace as needed.
	Air system leaks, such as compressor discharge line, air dryer, reservoirs, brake or suspension valves, etc.	Yes	Yes	Locate leak(s) and repair.
	Air dryer leaks from purge valve.	Yes	Yes	Refer to purge valve conditions listed in this chart.
Water in tanks; often following aftermarket installation or when dryer is a replacement for a competitive brand.	Pressure-controlled check valve not installed in correct tank or not installed at all.	Yes	No	Install pressure-controlled check valve in secondary tank.
	Pressure-controlled check valve properly installed, but one-way check valve not removed.	Yes	No	Remove one-way check valve so that only the pressure-controlled check valve is installed between the secondary tank and supply tank.
Water, oil, or sludge in air system tanks.	Desiccant contaminated with oil.	Yes	Yes	Replace desiccant. Inspect compressor per manufacturer's instructions.

Table C: System Saver Series Air Dryer Troubleshooting

Condition	Possible Cause	Conditions May Occur In:		Solution
		Regeneration Style Air Dryers	Dedicated Purge Tank Air Dryers	
Water in system tanks.	Dessicant saturated. Maintenance interval not followed.	Yes	Yes	Replace dessicant cartridge.
Water in system tanks, everything else checks out okay.	Dryer not suitable for application.	Yes	Yes	Review application guidelines. For assistance, call ArvinMeritor's Customer Service Center at 800-535-5560.

Tests

Heater Resistance

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

NOTE: The dryer temperature must be in thermostat closed range (below 45°F) in order to check heater resistance.

1. Set volt-ohmmeter to ohms.
2. Disconnect vehicle harness at the heater.
3. Remove the two screws holding the heater body in place.
4. With wires connected and correctly secured, touch one probe to each heater element lead. Figure 2.2.

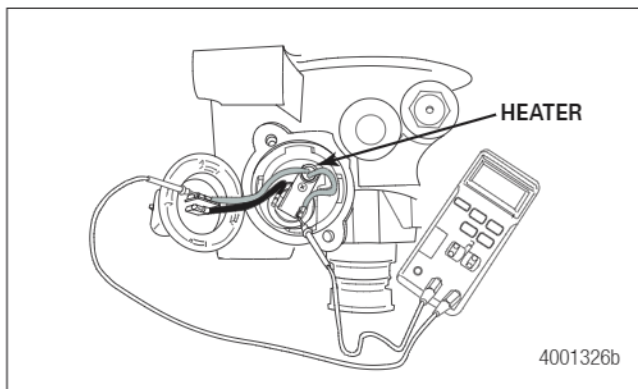


Figure 2.2

5. Measure the resistance. Acceptable resistance is:
 - 12 Volt: 1.0-2.0 ohms
 - 24 Volt: 5.0-7.0 ohms

If resistance is less than 1.0 ohm for a 12-volt or 5.0 ohms for a 24-volt system, replace the heater.

6. Reinstall components and vehicle harness.

Leak Test

1. Drain air from all system tanks.
2. Close reservoir draincocks.
3. Start the vehicle. Allow air system pressure to build while engine idles.
4. When the system reaches cut-out pressure there will be a purge, or strong blast of air, followed by a mild flow which will last 10-25 seconds.
5. Shut off the engine.
6. Apply a soap solution to each connection that contains pressurized air. Check the connections to see if soap solution bubbles.

No Soap Bubbles: Connections are sealed properly.

Soap Bubbles Appear: Connections are NOT sealed properly.

To Repair Incorrectly Sealed Connections

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 to the connection.
5. Repeat leak test until all connections are sealed.

2 Troubleshooting and Testing

Air Pressure Checks

NOTE: When checking air pressure during these tests, do not rely on cab air gauges for accurate readings. Install a calibrated air gauge, accurate to within one psi (7 kPa), in the secondary air tank to determine if air pressure is within the required ranges.

Operational Test for System Saver Series Air Dryers — Regeneration and Purge Style

1. Check compressor loaded and unloaded cycle. Figure 2.3.

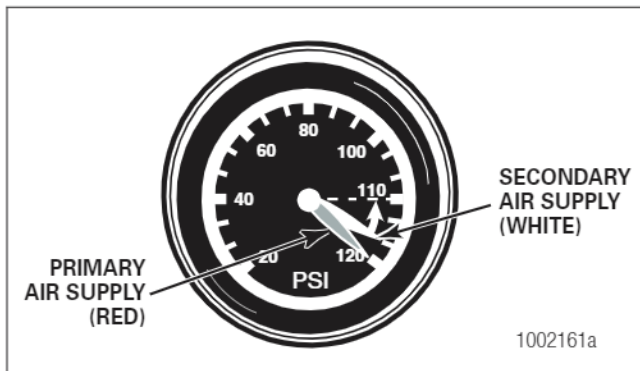


Figure 2.3

When the compressor is in the **loaded cycle**, air pressure will build to approximately 120 psi (827 kPa) (cut-out pressure). When the compressor reaches the **unloaded cycle**, the air dryer will purge, initiating regeneration of the air dryer.

2. During the regeneration cycle, which lasts from 10-25 seconds on regeneration style air dryers, the supply and secondary tanks will drop approximately 10 psi (69 kPa) in pressure. Check the secondary air gauge on the vehicle dash panel to **verify this drop**.

NOTE: A 10 psi (69 kPa) drop in pressure in the secondary air system is normal for Meritor WABCO System Saver Series regeneration style air dryers.

NOTE: On purge-tank style air dryers, the regeneration cycle time is dependant on the size of the tank. There should be no visible pressure drop during regeneration. If there is a visible pressure drop, perform a check valve leak test on the system check valves.

3. **Step 3 applies to regeneration style air dryers only.** If there is no drop in pressure, one of the following conditions may apply:

- Pressure-controlled check valve not installed, or installed on wrong air tank.
 - Pressure-controlled check valve installed to a one-way check valve, instead of **in place of** a one-way check valve.
 - There is another check valve located between the air dryer and the secondary air tank, usually at the supply tank.
 - Secondary air gauge not plumbed to the secondary air system. Use a calibrated air gauge in the secondary tank to check air pressure.
- Make the necessary installation changes or repairs and repeat the operational test.
 - If the secondary pressure drops 25 psi (172 kPa) or more during the regeneration cycle — and there are no other air-operated components using air during this cycle — there are air leaks or other air system problems, or the pressure-controlled check valve is not operating correctly.
 - Identify and repair all air leaks and air system problems.
 - Clean the Regeneration and Outlet Check valves.
 - Disconnect the compressor line from the air dryer (Dryer Port 4). Check the compressor and governor per the manufacturer's recommendation.

Pressure-Controlled Check Valve Test — Regeneration Style Only

1. Turn off the engine after the air system reaches cut-out pressure, approximately 120 psi (827 kPa), and the air compressor has unloaded.
2. Drain the supply tank down to 80 psi (552 kPa) or lower.

NOTE: A drop from 120 to 95 ± 5 psi (827 to 655 kPa) during this test is normal for vehicles equipped with the System Saver Series air dryer and a pressure-controlled check valve.

3. Check the secondary tank air gauge. It should read 95 ± 5 psi (655 kPa). Figure 2.4.

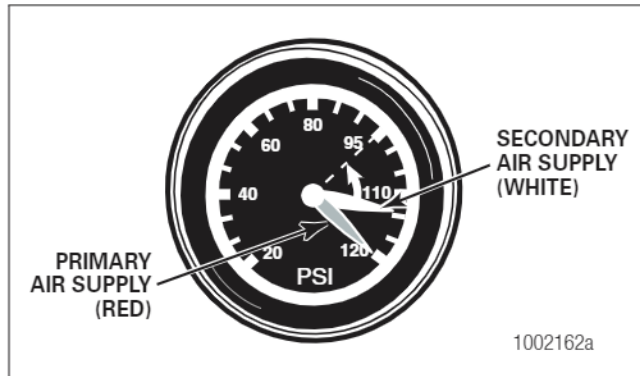


Figure 2.4

4. If the secondary tank air gauge reading is less than 90 psi (62 kPa):
 - Pressure-controlled check valve may be installed backwards (arrow on valve must point toward host reservoir). Make necessary corrections and retest.
 - Check for leaks in the secondary air system. Identify and repair any leaks.
 - Pressure-controlled check valve may not be set correctly or is not operating correctly. Replace the valve.
5. If the secondary tank air gauge reading does not change — or the reading does not drop below 100 psi (689 kPa), one of the following conditions may apply:
 - Pressure-controlled check valve not installed, or installed on wrong air tank.
 - Pressure-controlled check valve installed **TO** a one-way check valve, rather than **IN PLACE OF** a one-way check valve.
 - There is another check valve located between the air dryer and the secondary air tank, usually at the supply tank.
 - Secondary air gauge not plumbed to the secondary air system. Use a calibrated air gauge in the secondary tank to check air pressure.
 - Make the necessary installation changes or repairs and repeat the operational test.

3 Component Removal and Installation

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

Requirements

Refer to Table D for component replacement requirements. If necessary, you may also refer to Table C for System Saver Series air dryer troubleshooting. Before replacing any air dryer component, verify that the air compressor and air governor are working correctly, then drain the air tanks. Repair or replace these parts, if necessary. Check the entire air system for leaks, and repair as necessary. When draining air tanks before servicing the air dryer, check for water and/or oil that may have accumulated in the tanks. Water and/or oil in the air tanks could indicate a problem with the dryer or compressor.

Table D

Replacement Requirements

Component	When to Replace	Why
Desiccant Cartridge	Every two to three years.	Preventative maintenance.
	When compressor is replaced.	Contaminated cartridge.
	Water in supply tank.	Saturated or contaminated cartridge, high duty cycle (wrong application of air dryer).
Coalescing Cartridge	Every one to two years.	Preventative maintenance.
Bypass Valve (dryers with date codes earlier than 0894)	Valve leaking, inlet to outlet.	Cut O-ring, bad seat.
Heater Assembly	Water collecting in air dryer is freezing — electrical power to dryer is O.K.	Heater assembly not working (internal short or open circuit).
Outlet Check Valve	Air continues to flow from purge valve after purge cycle, but stops flowing when the compressor load cycle begins.	Valve is stuck in the open position, or not functioning properly.
	No pressure build-up in system, everything else is O.K.	Valve is stuck in closed position.
Purge Valve	No purge cycle when compressor unloads — normal pressure at dryer control port 4 (governor port).	Valve is stuck in the closed position, or not functioning properly.
	Air flows from purge valve during compressor's load cycle — no pressure at dryer control port.	Valve is stuck in the open position, or not functioning properly.

Table D

Replacement Requirements

Component	When to Replace	Why
Turbo Cut-Off Valve	Air flows from purge valve during compressor unload cycle after purge cycle, and flow is noticeably stronger at high engine RPM, especially under load.	Turbo cut-off valve leaking.
	No pressure build-up in system — high compressor discharge line pressure.	Valve stuck in closed position.
Regeneration Valve	Regeneration cycle continues after compressor begins, and secondary tank pressure drops 15 psi (103 kPa) or more.	Regeneration valve allowing too much air to come back into cartridge.
	Purge cycle is too short (five seconds or less) — pressure-controlled check valve is O.K., no leak in governor control line.	Regeneration valve not allowing enough air to come back into cartridge.
	Air dryer purges — but no regeneration, no check valve between air dryer and supply tank, and purge valve has not closed.	Regeneration valve not allowing any air to come back into cartridge.
Pressure-Controlled Check Valve	Regeneration cycle too short; may result in water in tank.	Valve checks (stops airflow) too high.

NOTE: When replacing air dryer components, use only Meritor WABCO replacement parts.

The exploded view of the air dryer in Section 1 shows the location of the various air dryer components.

Component Removal and Installation

Desiccant Cartridge

NOTE: Replacement cartridges are marked “System Saver Series.”

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

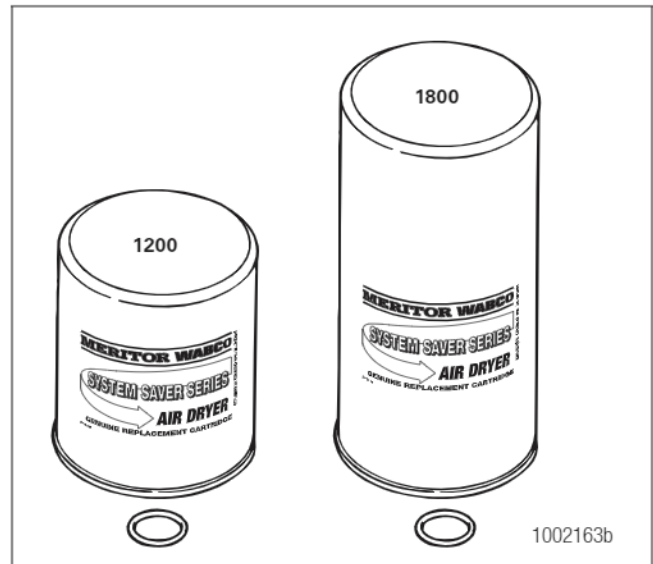


Figure 3.1

2. Loosen and remove the old cartridge. Use strap wrench if necessary.
3. Remove and discard O-ring from dryer base.

3 Component Removal and Installation

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

4. Inspect and clean seal seat. Repair any minor damage.
5. Lubricate and install new O-ring on stem.
6. Lubricate cartridge seal.
7. Thread replacement cartridge onto the base until the seal touches the base. Then, tighten the cartridge **ONE** additional turn. **DO NOT OVERTIGHTEN.** Figure 3.2.

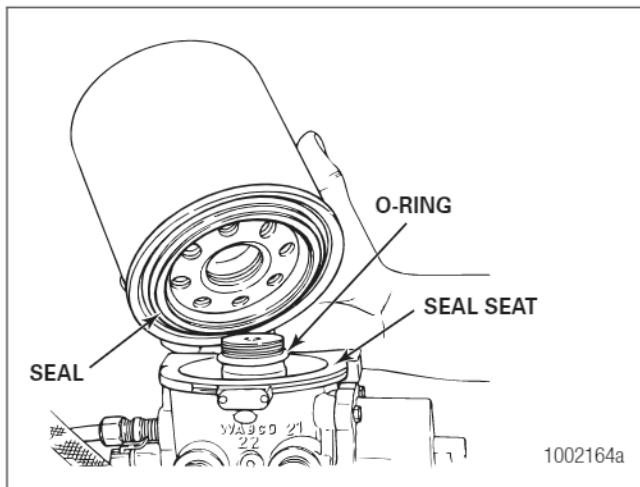


Figure 3.2

Outlet Check Valve Assembly

1. Review Figure 3.3 to ensure you have all of the parts required to replace the outlet check valve. Use the grease included with the replacement kit to lubricate the O-ring seal.

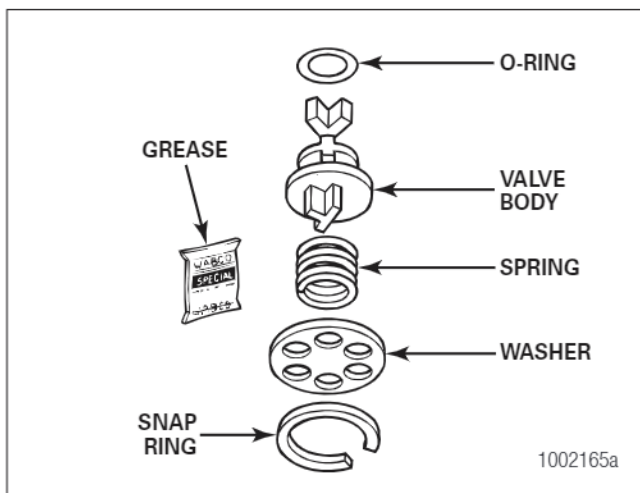


Figure 3.3

2. Remove the snap ring, washer, spring, valve body and O-ring.
3. Clean and inspect the valve bore. If the bore is damaged so that a tight seal cannot be maintained, replace the air dryer.
4. Install the new O-ring on the valve body. Figure 3.4.

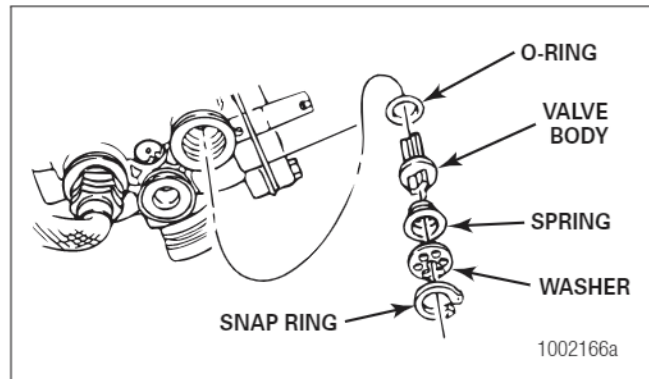


Figure 3.4

5. Apply a thin layer of grease to the valve bore and the O-ring.
6. Install the new valve body with its long end in the bore.
7. Install the new spring with its small end around the "Y"-shaped fins on the valve body.
8. Install the new washer and the new snap ring to hold the components in place.

Heater Assembly

1. Review Figure 3.5 to ensure you have all of the parts required to replace the heater assembly.

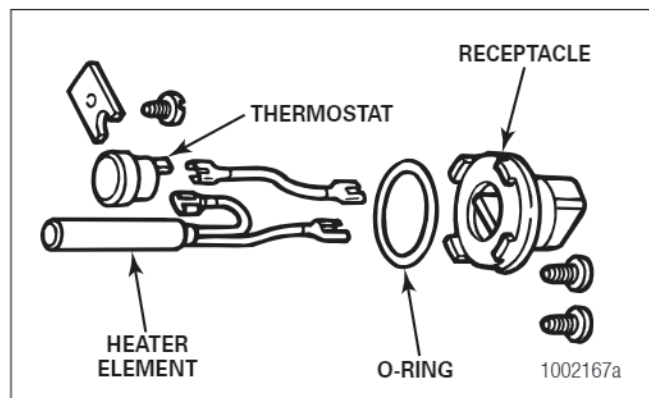


Figure 3.5

2. Disconnect the plug.

3 Component Removal and Installation

3. Remove the screws, receptacle and O-ring from the base to access the retainer screw.
4. Remove the retainer screw and then remove the entire heater assembly.
5. Install the O-ring to heater connector housing.
6. Install the new element and thermostat in their cavities.

NOTE: For dryers with date codes of 0894 or earlier, follow the special instructions in the replacement kit to complete the installation.

7. Install the new retainer and screw to hold the element and the thermostat in place.
8. Install the receptacle and fasten them in place with the screws. Figure 3.6.

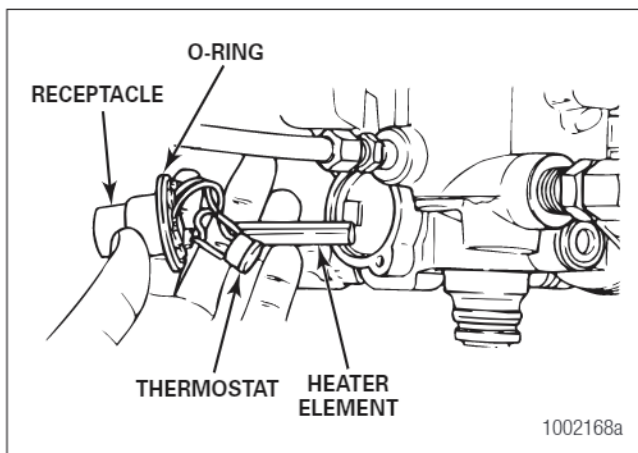


Figure 3.6

Turbo Cut-Off Valve Assembly

NOTE: E Series air dryers use a different turbo cut-off valve assembly. Refer to parts book PB-8857AS, Anti-Lock Brake Systems and Air Systems Parts. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

NOTE: For the System Saver 1200 Plus turbo cut-off valve assembly, refer to the separate procedure in this section.

1. Review Figure 3.7 to ensure you have all of the parts required to replace the turbo cut-off valve.

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

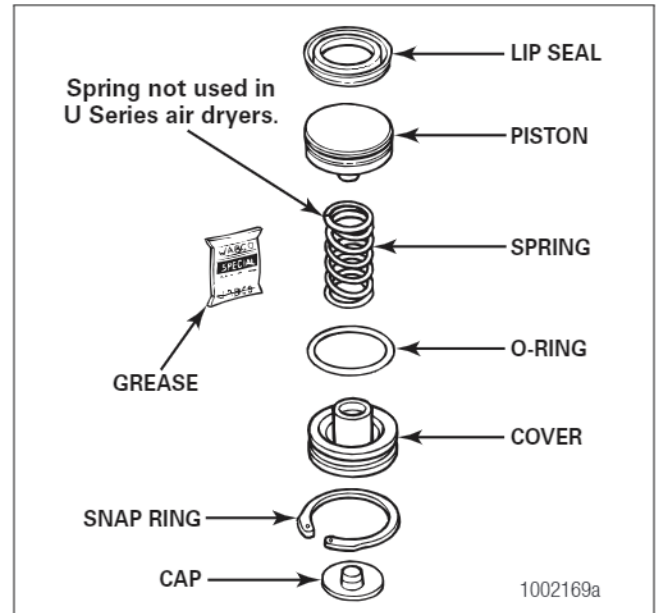


Figure 3.7

2. Remove the snap ring. The cover and spring may fall out of the bore when the snap ring is removed.
3. Use needle nose pliers to remove the piston. Figure 3.8.

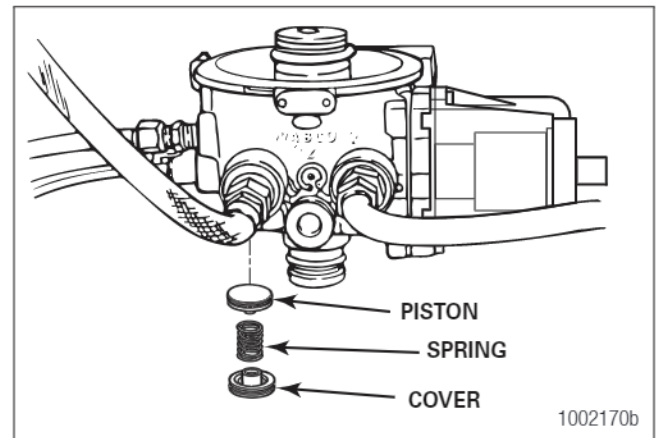


Figure 3.8

4. Clean and inspect the valve bore. If the bore is damaged so that a tight seal cannot be maintained, replace the air dryer. Figure 3.8.
5. Install new lip seal on piston. Seal lip must face up (toward top of piston).

NOTE: Kits made after 12-1-09 use an O-ring in place of a lip seal.

3 Component Removal and Installation

6. Install new O-ring on cover.
7. Apply a thin layer of grease to the valve bore and the O-rings.
8. Install the new piston with flat side toward dryer.
9. Install the new spring, cover and snap ring to hold the components in place.
10. Install the plug.
11. Replace the desiccant cartridge.

System Saver 1200 Plus Turbo Cut-Off Valve Assembly

1. Remove the snap ring. Figure 3.9.

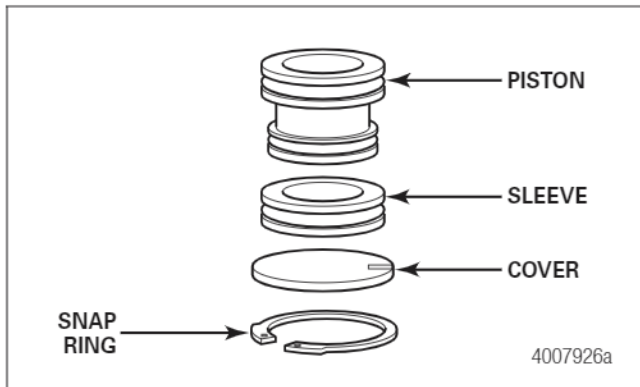


Figure 3.9

2. Remove the cover.
3. Remove the piston and sleeve.
4. Clean and inspect the valve bore. If the bore is damaged so that a tight seal cannot be maintained, replace the air dryer.
5. Install new O-rings on the piston and sleeve.
6. Press the piston into the sleeve.
7. Press the piston-sleeve assembly into the air dryer.
8. Install the cover and snap ring.
9. Replace the desiccant cartridge using the detailed instructions provided earlier in this section.

System Saver 1200 Plus Governor

Use only the Meritor WABCO governor specified for use with the System Saver 1200 Plus air dryer.

1. Remove the mounting bolts, governor and gasket. Discard the gasket. Figure 3.10.

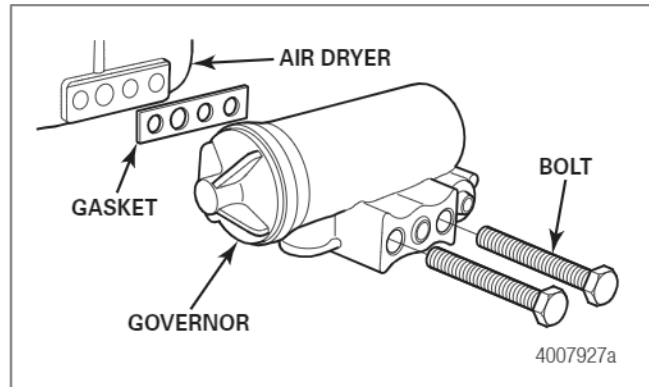


Figure 3.10

2. Place the governor and a new gasket into position on the air dryer.
3. Install the mounting bolts and tighten to 14.75 ft-lb (20 N•m).



Regeneration Valve Assembly

The regeneration valve assembly kit contains two different diaphragms to service the regeneration valve assembly for System Saver 1200 or 1800 air dryers. Use the correct diaphragm for the style of regeneration valve housing as indicated in the sketches below. Use of the incorrect part will result in unsatisfactory purging of the desiccant cartridge and may result in excess water in the air system.

1. Review Figure 3.11 to ensure you have all of the parts required to replace the regeneration valve. Use the grease included with the replacement kit to lubricate O-rings and seals.

3 Component Removal and Installation

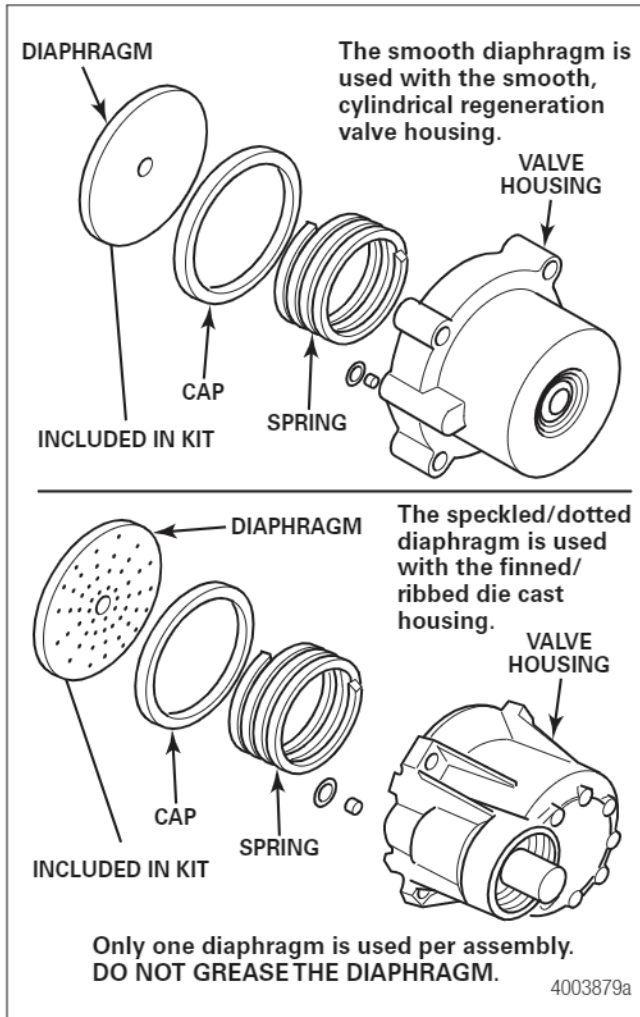


Figure 3.11

2. Remove the four mounting bolts and the valve housing assembly. When you remove the housing, the spring and cap will fall out.
3. Remove the rubber diaphragm.
4. Clean and inspect the diaphragm lip groove. If the groove is damaged so that a tight seal cannot be maintained, replace the air dryer.
5. Install the new diaphragm with its lip in the groove. **DO NOT GREASE THE DIAPHRAGM.**
6. Install the new spring and cap with the cap lip facing out. Install the valve housing assembly with the new lubricated O-ring and filter over the orifice. Install the new mounting bolts and tighten to 53 in-lb (6 N•m). Figure 3.12.

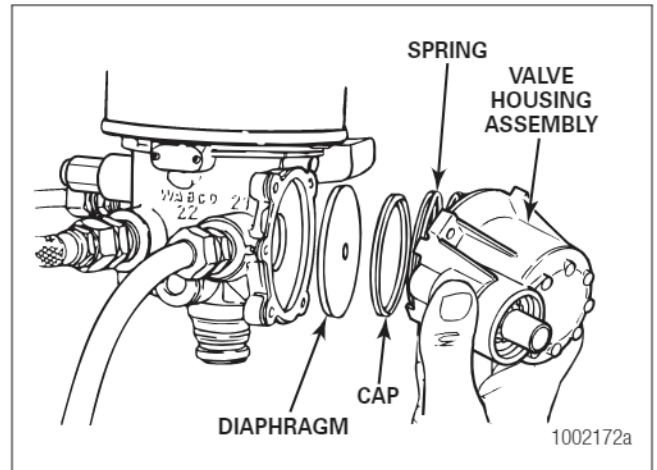


Figure 3.12

Purge Valve Assembly

1. Review Figure 3.13 to ensure you have all of the parts required to replace the purge valve.

Use the grease included with the replacement kit to lubricate O-rings and seals. **Do not grease the rubber seat.**

If shims are included in the replacement kit, they must be installed above and below the spring. If they are not included, they are not needed.

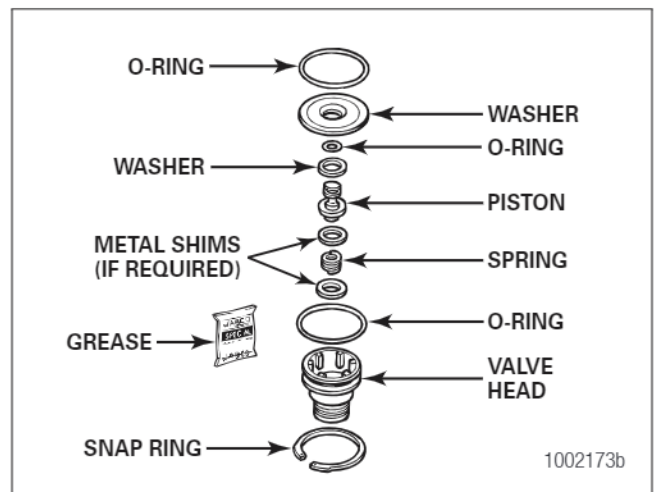


Figure 3.13

2. Remove the snap ring, valve head and spring.
3. Remove the piston assembly from the base. Figure 3.14.

3 Component Removal and Installation

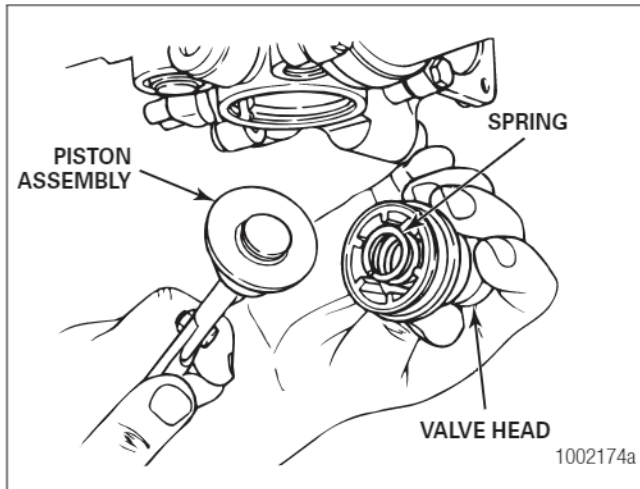


Figure 3.14

4. Remove washer and O-rings from the base.
5. Clean and inspect the valve bore. If the bore is damaged so that a tight seal cannot be maintained, replace the air dryer.
6. Apply a thin layer of grease to the valve bore and to all O-rings (use the grease included with replacement kit).
7. Install new washer and O-ring in dryer base and on valve head.

NOTE: Lip on washer must face piston seat. Figure 3.15.

8. Assemble the piston assembly,
 - Install O-ring in groove on piston head.
 - Install piston seat in groove on piston base.
 - Install washer on piston.

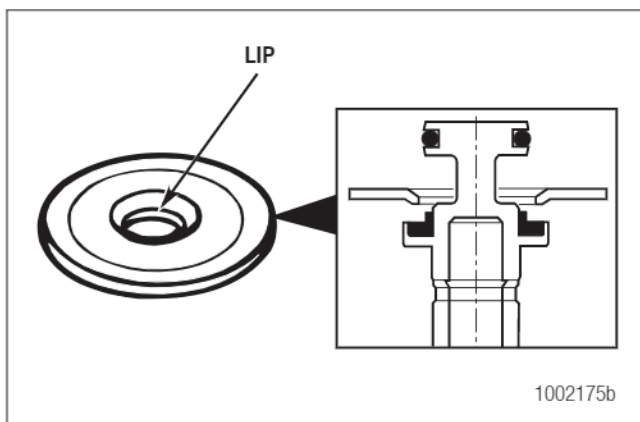


Figure 3.15

9. Install washer on piston assembly. Figure 3.16.

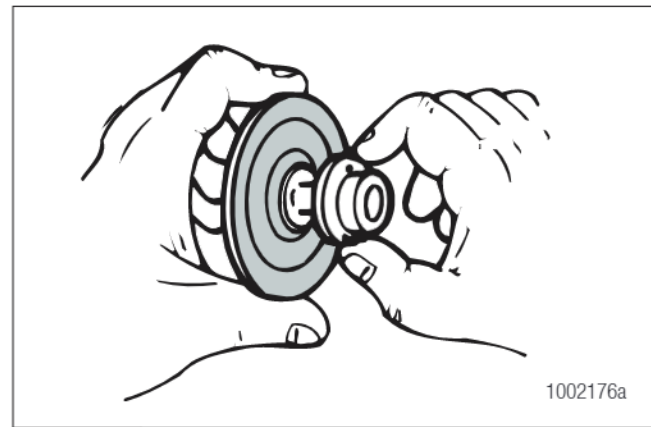


Figure 3.16

10. Install spring in valve head; fit valve head assembly into bore.

NOTE: If shims are included in the replacement kit, they must be installed above and below the spring. If they are not included, they are not needed.

11. Install snap ring to hold the valve head in place.

NOTE: Make sure the snap ring is fully seated or assembly will leak from the purge valve.

Pressure-Controlled Check Valve (PCCV)

⚠ WARNING

Remove all air pressure from the tank before you remove the pressure-controlled check valve. Pressurized air can cause serious personal injury.

NOTE: New style valves have the hex nipple pipe fitting installed.

1. Before replacing, look at the arrow on this valve. You must install the valve so that the arrow faces the tank on which it is installed. Figure 3.17.

3 Component Removal and Installation

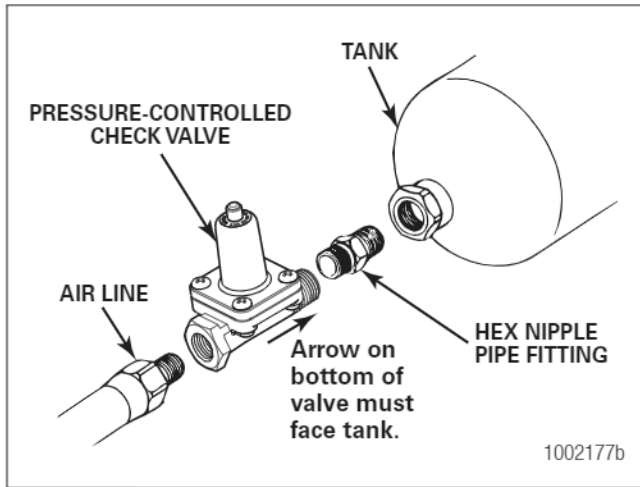


Figure 3.17

2. Disconnect the air line from the pressure-controlled check valve and remove the valve from the tank and hex nipple pipe fitting.
3. Install the new valve.
 - Whatever orientation (up or down) the valve is in when it is tight is acceptable, as long as the arrow is pointing toward the tank.
4. Apply pipe sealant to the fittings and connect the air line to the PC check valve.
5. Test the installation for proper operation. Refer to the procedure in this section.

Bypass Valve

NOTE: The bypass valve is used on dryers with date codes of 0894 or earlier. Figure 3.18.

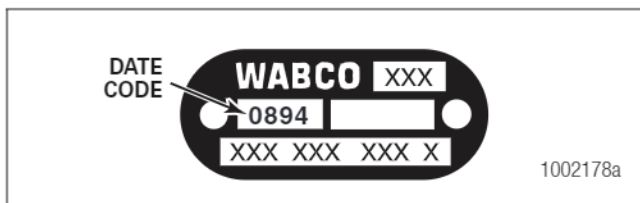


Figure 3.18

1. Review Figure 3.19 to ensure you have all of the parts required to replace the bypass valve.

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

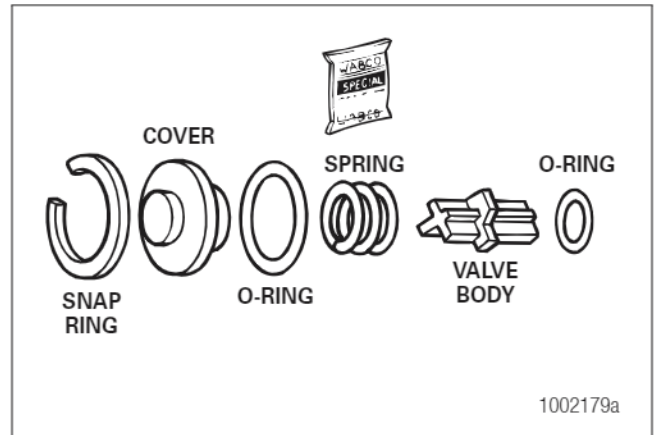


Figure 3.19

2. Remove the snap ring, cover, spring and valve body.
3. Clean and inspect the valve bore. If the bore is damaged so that a tight seal cannot be maintained, then replace the air dryer.
4. Install the new O-rings on the new valve body and cover.
5. Apply a thin layer of grease to the valve bore and the O-rings.
6. Install the new valve body with its long end in the bore.
Figure 3.20.

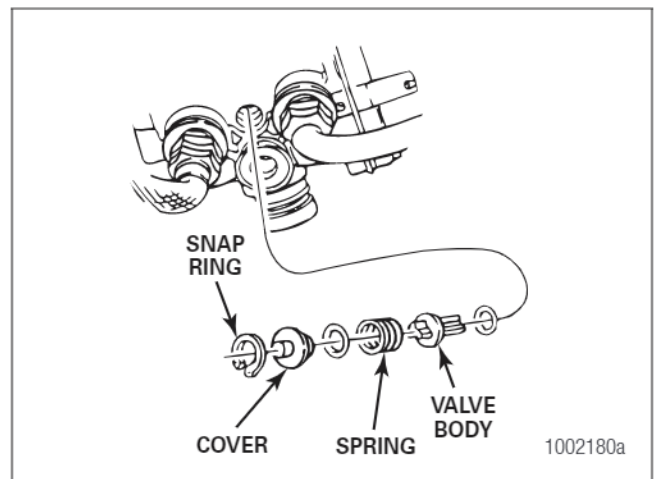


Figure 3.20

7. Install the new spring so it fits around the "Y"-shaped fins on the valve body.
8. Install the new cover and the new snap ring to hold the components in place.

3 Component Removal and Installation

Pressure Relief Valve

NOTE: If you plan to replace the Street-Tee fitting, refer to TP-9557, Pressure Relief Valve Installation, for instructions. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

1. Remove the old valve from the dryer.

If your dryer uses a bypass valve (date code of 2295 or earlier), the pressure relief valve will be installed with a Street-Tee fitting at the front (Port 1) of the dryer. On dryers with date codes later than 2295, the pressure relief valve is located at the side of the dryer (Port 31). Figure 3.21.

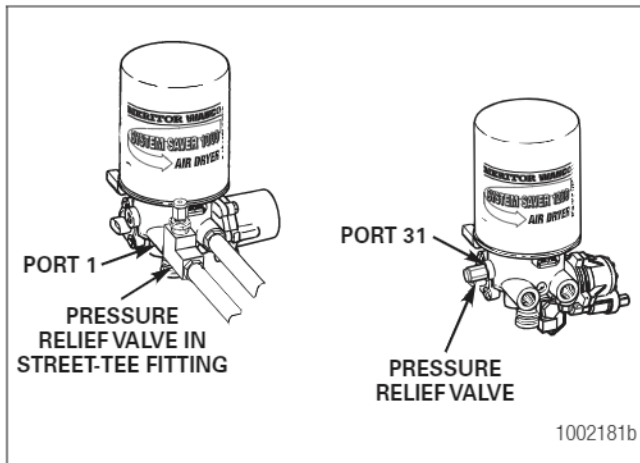


Figure 3.21

2. Unscrew and remove the old pressure relief valve. Figure 3.21.

⚠ WARNING

For Street-Tee installations, install the pressure relief valve in the UP position, or within 30° of vertical. Figure 3.22. If not installed in the correct position, serious personal injury and damage can result.

NOTE: The threads on the replacement pressure relief valve provided by Meritor WABCO are coated with sealant. They do not require any additional sealant.

3. Screw the replacement valve into the Street-Tee fitting or the dryer base, depending on the date code of the air dryer.

Do not exceed torque of 30 ft-lb (40.8 N•m) for 3/8-inch thread, or 65 ft-lb (88.4 N•m) for 1/2-inch thread. **ⓘ**

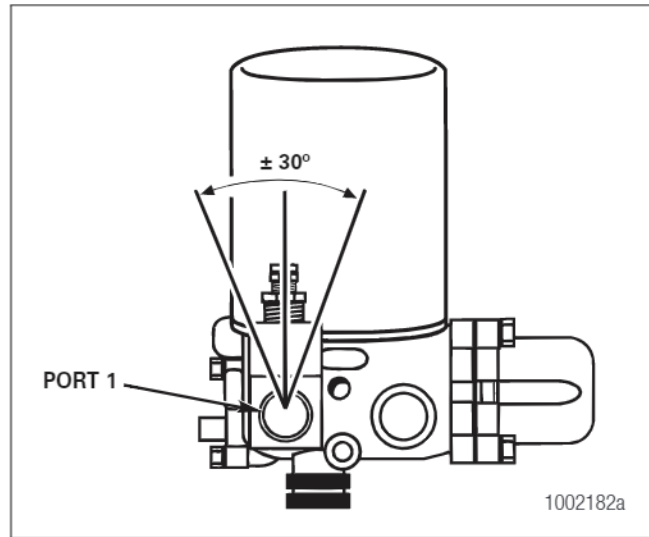


Figure 3.22

Purge Silencer (Muffler)

NOTE: This is an optional part designed to reduce dryer purge noise level.

1. Remove retainer ring. Remove old silencer from purge valve head. **Do not damage** purge valve head.
2. Clean purge valve head.
3. Install replacement silencer firmly onto purge valve head until fully seated. Secure with retainer ring. Figure 3.23.

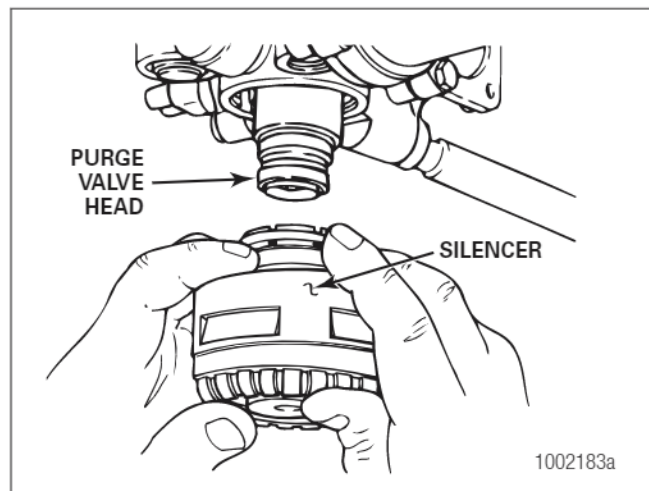


Figure 3.23

3 Component Removal and Installation

Air Dryer Assembly

NOTE: This procedure is for removing and replacing a unit. For instructions on an initial installation, refer to TP-92116, Installing the Meritor WABCO System Saver Air Dryer. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

1. Drain all pressure from the air system. Disconnect all air lines. Use markers to label the lines for proper reinstallation.
2. Disconnect the heater electrical plug from the heater receptacle.
3. Remove the three mounting bolts. Remove the air dryer from its mounting location. Figure 3.24.

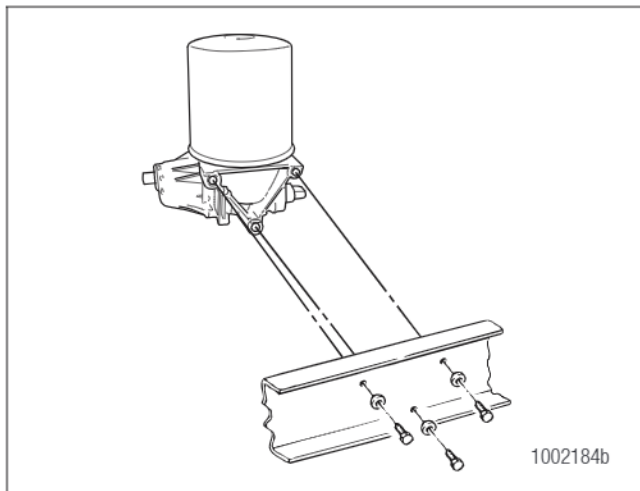


Figure 3.24

4. Attach the new unit to the frame or mounting bracket with new mounting capscrews and washers. Tighten the capscrews to 22-30 ft-lb (30-40 N•m). Figure 3.25. ①

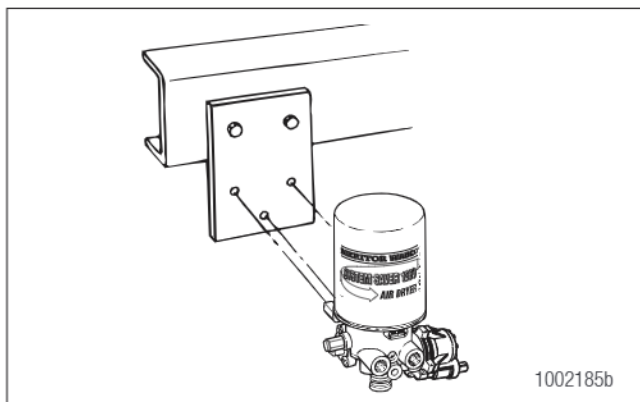


Figure 3.25

5. Connect heater electrical plug to heater receptacle.
6. Reconnect all system air lines.
7. Test the installation for correct operation. Refer to the procedure in this section.

Testing the Meritor WABCO System Saver Series Air Dryer

1. Turn off the engine after the air system reaches cut-out pressure, approximately 120 psi (827 kPa), and the air compressor has unloaded.
2. Drain the primary air tank(s) down to 80 psi (551 kPa) or lower.
3. Check the secondary tank air gauge. It should read 95 ± 5 psi (655 kPa). This drop from cut-out pressure to 95 ± 5 psi (655 kPa) for this particular test is normal for vehicles equipped with any Meritor WABCO single cartridge air dryer and the pressure-controlled check valve.
4. If the secondary tank air gauge reading is less than 90 psi (620 kPa), check to see if the pressure-controlled check valve is installed backwards. If so, install correctly and re-test. If not, check for air leaks in the secondary air system. If no significant air leaks are found, then replace the valve and re-test.
5. If the secondary tank air gauge reading does not change, or the reading does not fall below 100 psi (689 kPa), then check for one of the possibilities listed above in Step 4. If none of those possibilities is found, then the pressure-controlled check valve may be shutting off at 100 psi (689 kPa) or higher. Replace the valve and retest.

NOTE: When checking air pressures during these procedures, do not rely on cab air gauges for accurate readings. Install a calibrated air gauge, accurate to within one psi (7 kPa), in the secondary air tank for making determinations about the continued use or replacement of any equipment.

Definitions

Basic Air System/Air Dryer Terms

Air Compressor	A device that pumps air to and builds air pressure in an air system.
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 load cycle when “cut-in” pressure is realized, and initiates the compressor unload cycle when the “cut-out” pressure is reached. The air governor also controls the air dryer by sending an air signal (at the beginning of the compressor unload cycle) to the control port of the air dryer, initiating the purge cycle. When this air signal is removed by the governor (at the beginning of the compressor load cycle), 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 which triggers the compressor load cycle.
Cut-Out Pressure	The pressure level in the air system supply tank which triggers the compressor unload cycle.
Dedicated Purge Tank	A separate air tank used exclusively for holding air used in an air drying cycle. This tank eliminates the need for a regeneration valve. Optimum mounting location for the dedicated purge tank is ABOVE the air dryer.
Desiccant	A granular substance that has a high affinity for water and is used to retain moisture from the air stream flowing through the air dryer cartridge.
Discharge Line — Unloaded Compressor	An unloader or air discharge line used to dump unused air to atmosphere once system has reached cut-out pressure.
Drying Cycle	The time during which the air dryer cools, filters, and removes moisture from the air delivered by the air compressor. The drying cycle begins and ends the same as the compressor load cycle.
Purge	The initial blast of air (decompression) from the air dryer purge valve at the beginning of the unload cycle of the air compressor.
Purge Cycle	The time during which the air dryer is undergoing purge and regeneration. This cycle starts at the beginning 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 air dryer and out the purge valve that begins immediately after the purge and lasts normally 10 to 25 seconds. This backflow of air from the air system and through the air dryer removes moisture from the desiccant cartridge and readies the air dryer for the next compressor load cycle.

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.

Requirements

NOTE: For complete installation and operating requirements, refer to TP-9672, Air Dryer Application Guidelines. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

- Compressor discharge line should have a continual downhill run to the air dryer. There should be no water traps (low points or kinks) in the line before or after the dryer.
- Mount air dryer so that there is no direct splash or spray from a wheel.
- For maximum operating efficiency, mount dedicated purge tank ABOVE the air dryer.
- Keep air dryer at least 12-inches (305 mm) 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 air dryer.
- Feed purge valve by a direct line from the air governor.

Operating Environment

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)

Discharge Line:

- Diameter from compressor to air dryer
1/2-inch (12.7 mm) i.d. minimum
- Length from compressor to air dryer
Determined by temperature of air at the inlet port of the air dryer. At normal vehicle operating temperature, the combination of length or increased diameter must be sufficient to keep temperature **BELOW 175°F (80°C)**.

Recommendations for discharge lines:

- **Compression rating of 21 cfm and under:** To minimize the likelihood of a discharge line blockage during cold climate operation, it is recommended that for discharge lines exceeding nine feet (2.75 m) in length, a minimum of three feet (0.91 m) of 1/2-inch (12.7 mm) thick closed-cell polyethylene pipe insulation be used at the connection to the air dryer.
- **Compression rating over 21 cfm:** 10 feet (3.05 m)/20 feet (6.1 m) — use copper pipe or stainless steel braided teflon tubing for minimum of first 10 feet (3.05 m).

5 Appendix II — Application Information

System Saver Series Installation Criteria

Operating Parameters		Requirements
Pressure requirements	Maximum pressure	140 psi (965 kPa)
	Minimum governor cut-out pressure	115 psi (793 kPa)
	Governor range	15 to 25 psi (103 to 172 kPa) (cut-out — cut-in)
Flow capacity	Compressor rating	25 cfm maximum
Compressor on-time	Normal running	Two minutes maximum
	Occasional (three times per day maximum)	Seven minutes
Compressor unloaded time	Minimum for purge cycle	20 seconds
Maximum duty cycle	Compressor on-time total running time	30%
Discharge line	Temperature at inlet port determines required length and diameter.	To minimize the likelihood of a discharge line blockage during cold climate operation, it is recommended that for discharge lines exceeding nine feet (2.75 m) in length, a minimum of three feet (0.91 m) of 1/2-inch (127 mm) thick closed-cell polyethylene pipe insulation be used at the connection to the air dryer.

Description

Holset E-Type Compressor Systems

When a System Saver Series air dryer is used with a Holset E-type compressor system, an external Econ valve is used. Figure 6.1.

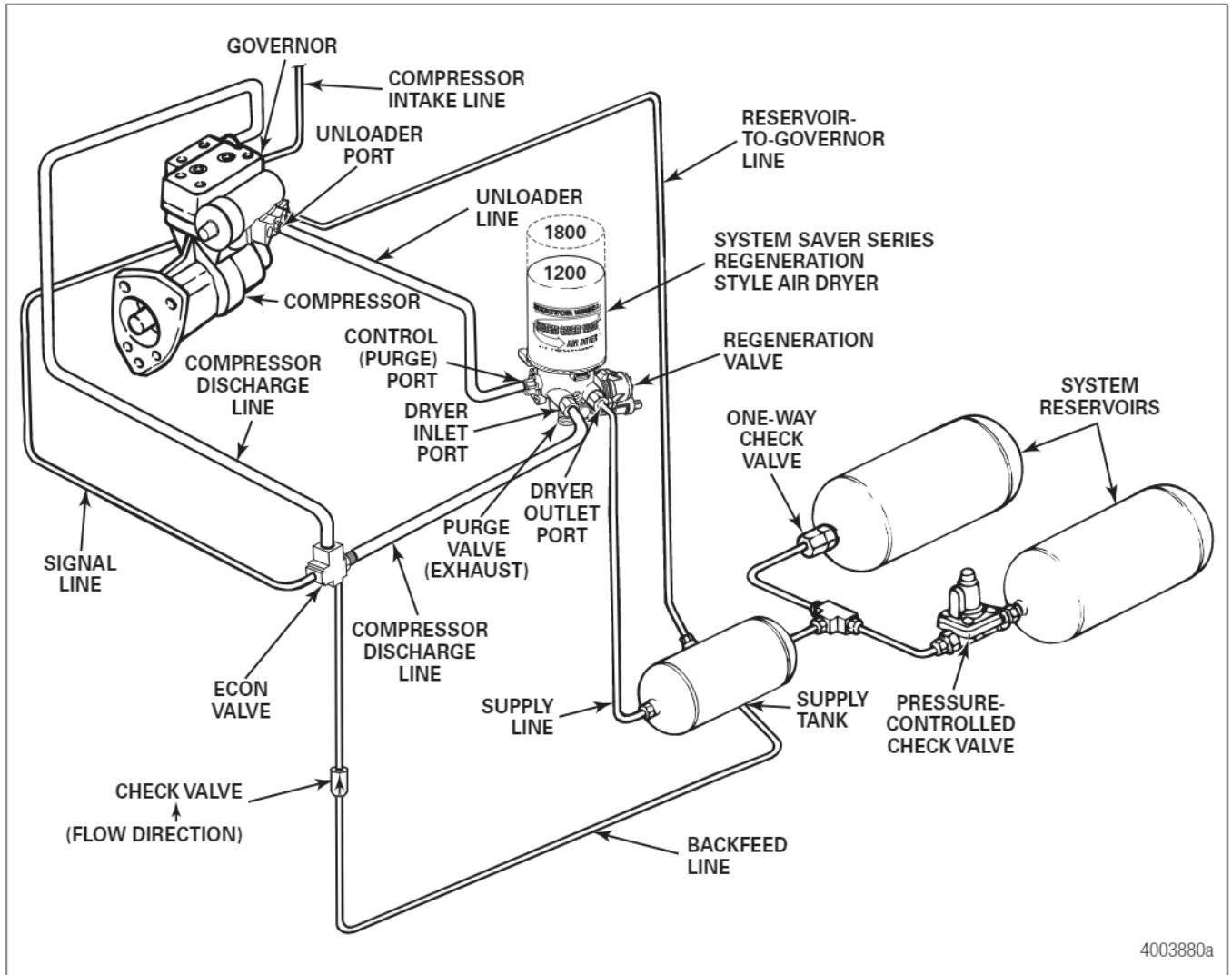


Figure 6.1

On the 1200E Series, an integral Econ valve eliminates the need for the external Econ valve. Figure 6.2.

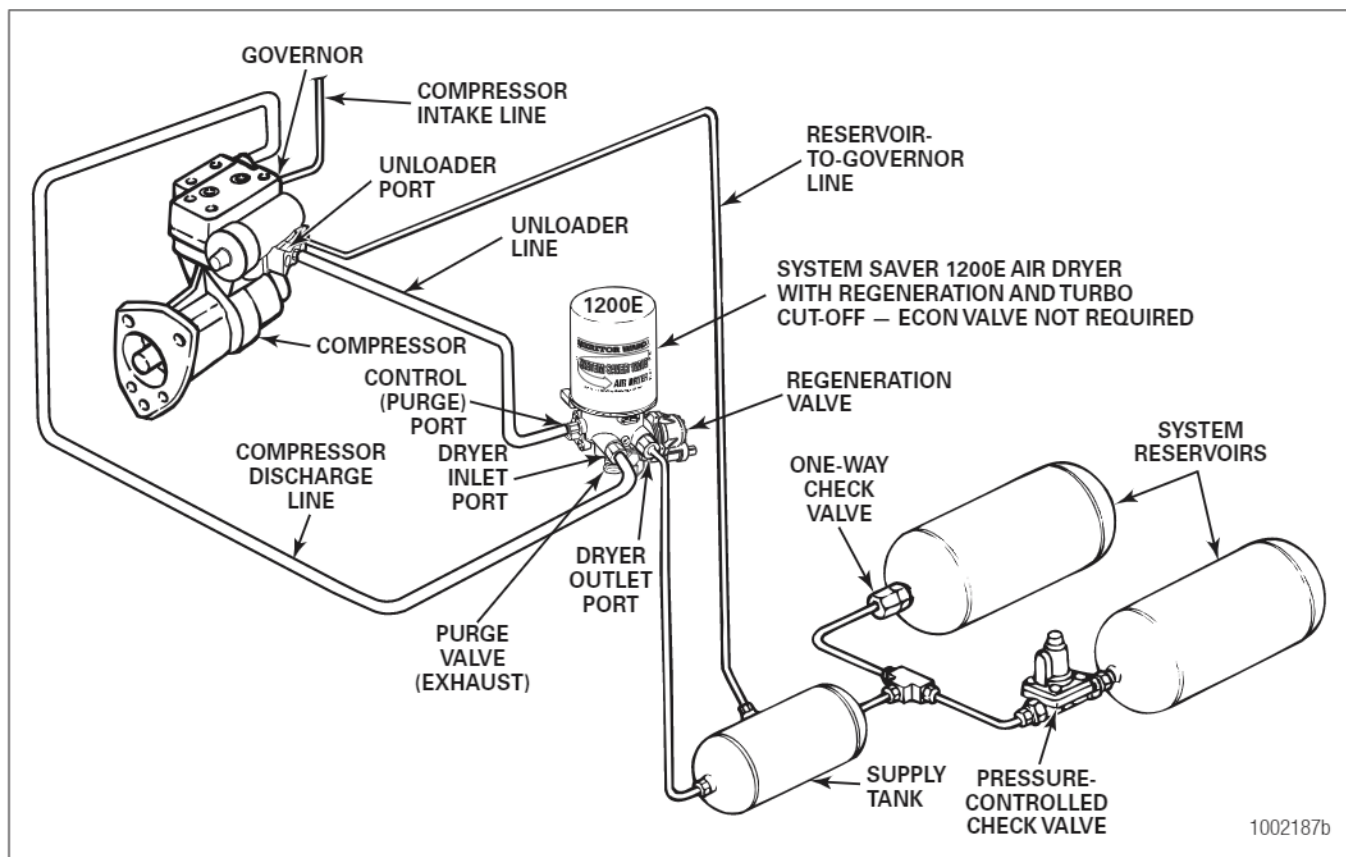


Figure 6.2

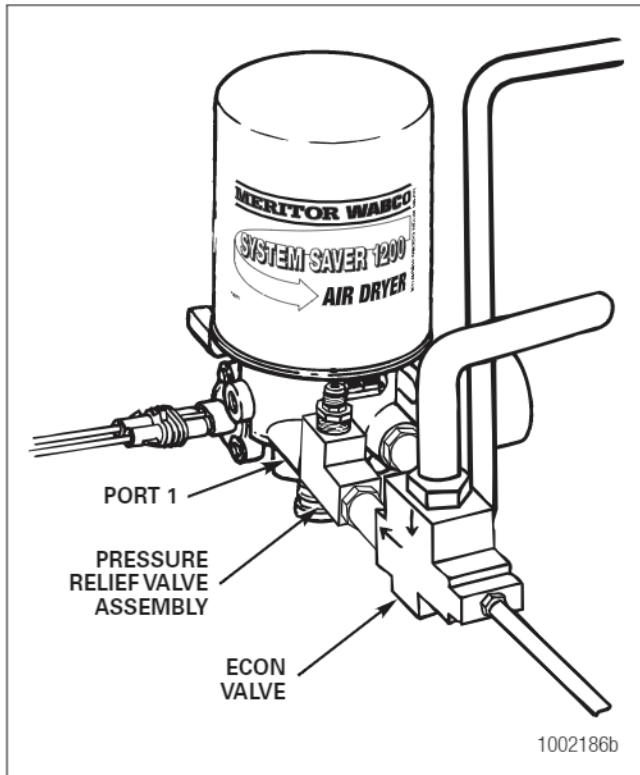
If you are currently using a System Saver Series air dryer WITHOUT an Econ valve, and your application requires one, Meritor WABCO recommends installing the System Saver 1200E.

ECON Valve

Meritor WABCO recommends the ECON valve be mounted in the air system away from the dryer. This helps prevent dryer freeze-up. Refer to the vehicle manufacturer's manual for installation instructions.

To replace an ECON valve that is mounted directly to the air dryer, follow these instructions.

1. Unscrew and remove all of the lines from the Econ valve at the air dryer inlet port. Figure 6.3.

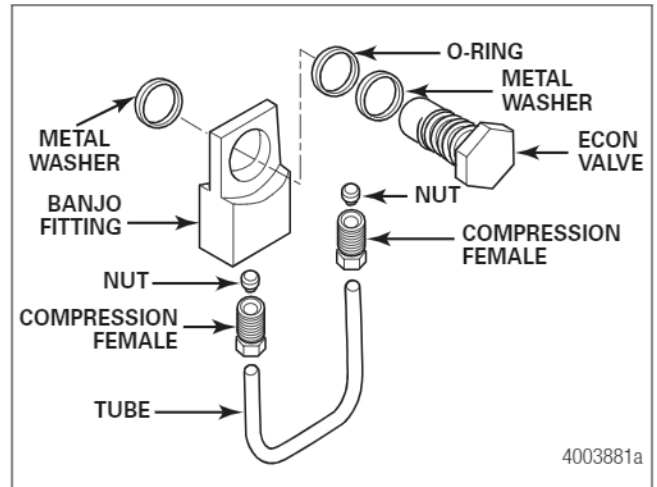
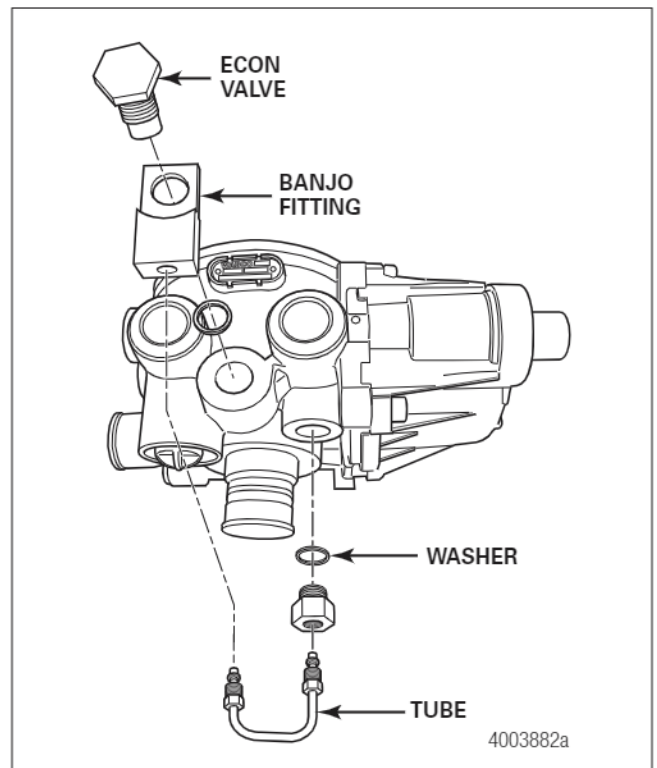

Figure 6.3

2. Unscrew and remove the Econ valve from the air dryer inlet port 1. Save fitting for reinstallation.
3. Install the replacement Econ valve.
 - Apply a good quality teflon paste pipe sealant, like Loctite® PST 567, on male threads of the replacement Econ valve.
4. Reconnect the lines to the Econ valve at air dryer inlet port (Port 1).

ECON Valve Replacement on System Saver 1200E Air Dryers

To replace the Econ valve assembly on Meritor WABCO System Saver 1200E air dryers, follow these instructions.

1. Remove the Econ valve assembly.
 - A. Using a flare wrench, loosen the compression nuts on each end of the U-shaped tube. Figure 6.4 and Figure 6.5.


Figure 6.4

Figure 6.5

- B. Loosen and remove the restricted-flow nut on the air dryer.
- C. Remove the metal washer.
- D. Using a wrench, loosen and remove the Econ valve from the banjo fitting.

6 Appendix III — Special Applications

- E. Remove the banjo fitting and metal washer.
- F. Clean the valve surface area thoroughly before replacement.
2. Install the replacement Econ valve assembly.
 - A. Install the metal washer on the restricted-flow nut.
 - B. Install the restricted-flow nut on the air dryer.
 - C. Position the metal washer and banjo fitting on the Econ valve port.
 - D. Loosely fit the U-shaped tube into the banjo fitting and restricted-flow nut. Make sure the tube is fully seated.
 - E. Install and hand-tighten the compression nuts on each end of the U-shaped tube.
 - F. Lubricate and install the O-ring on the Econ valve.
 - G. Install the Econ valve into the banjo fitting.
 - H. Torque the Econ valve and all nuts to specifications following the torque instructions in the kit.

Alcohol Evaporator

Check the vehicle's air system for an alcohol evaporator.

NOTE: Typically, an alcohol evaporator will be installed in the line between the air dryer and the supply (wet) tank. Common installations are on the truck's firewall, on a frame rail and behind the cab. However, an alcohol evaporator can also be found at other locations.

1. Check the vehicle's air system to determine if an alcohol evaporator is installed.
2. If an alcohol evaporator is installed in the air system, check for a bypass line connected to the evaporator. Figure 6.6.

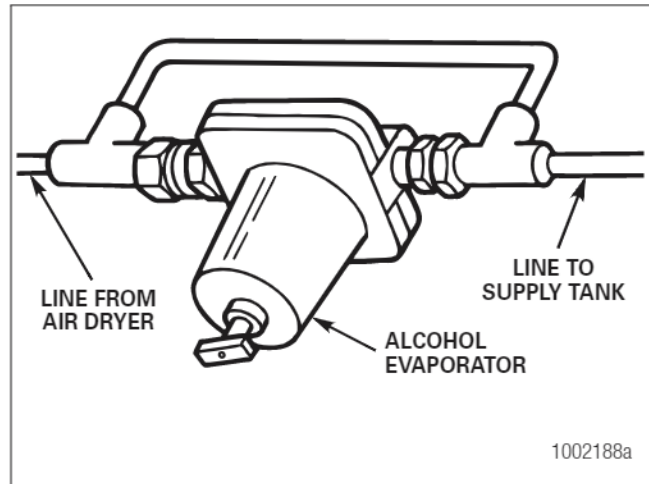


Figure 6.6

3. If a bypass line is connected to the evaporator, check to see if a check valve is installed in the bypass line. If check valve is installed:
 - Remove the check valve from the bypass line,
 - Remove the bypass line and
 - Replace the bypass line with 1/4-inch (6.35 mm) nylon line.

Combo Tank Installation for Regeneration-Style Air Dryers

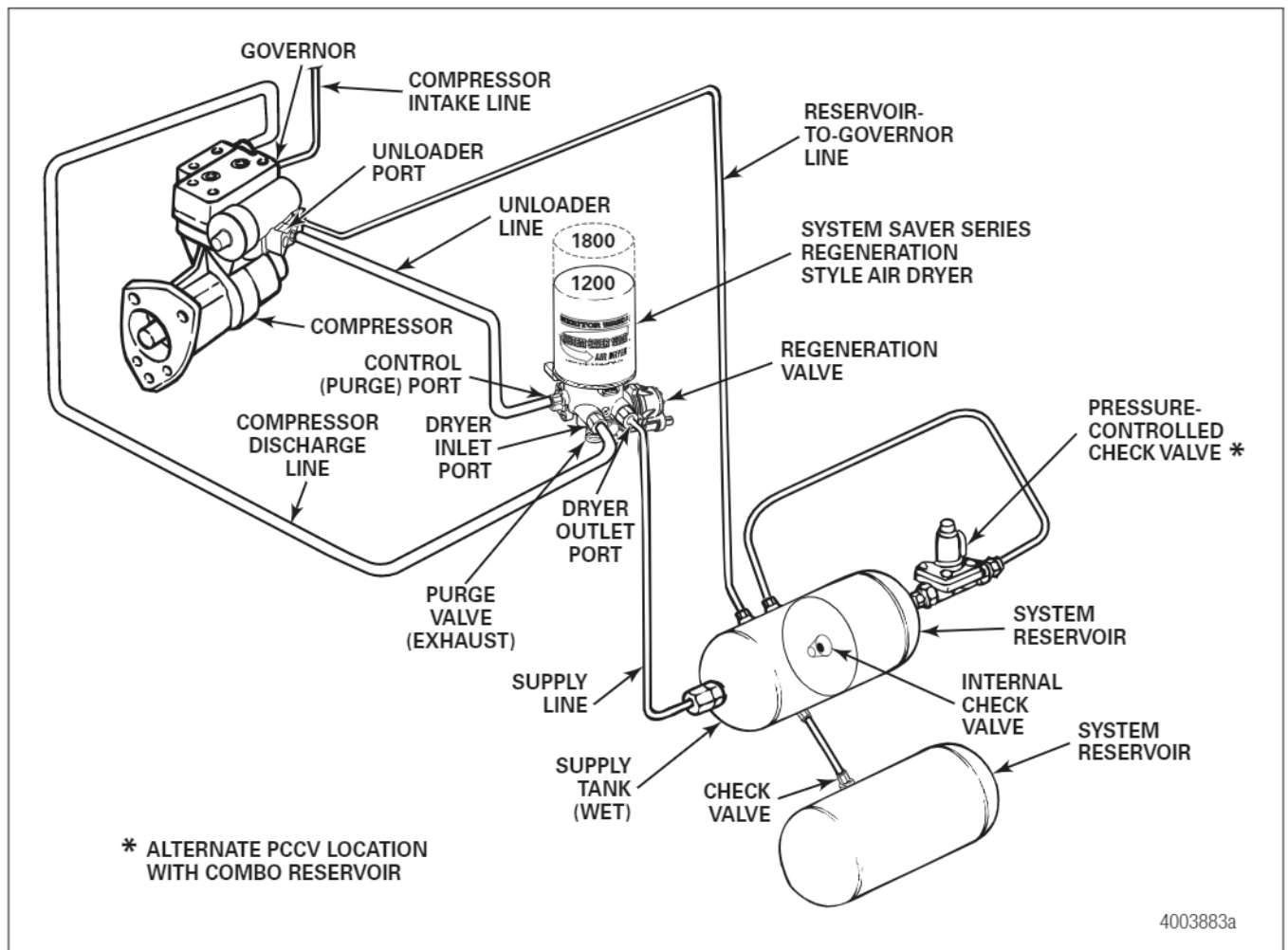


Figure 6.7

Combo Tank Installation for Regeneration-Style Air Dryers

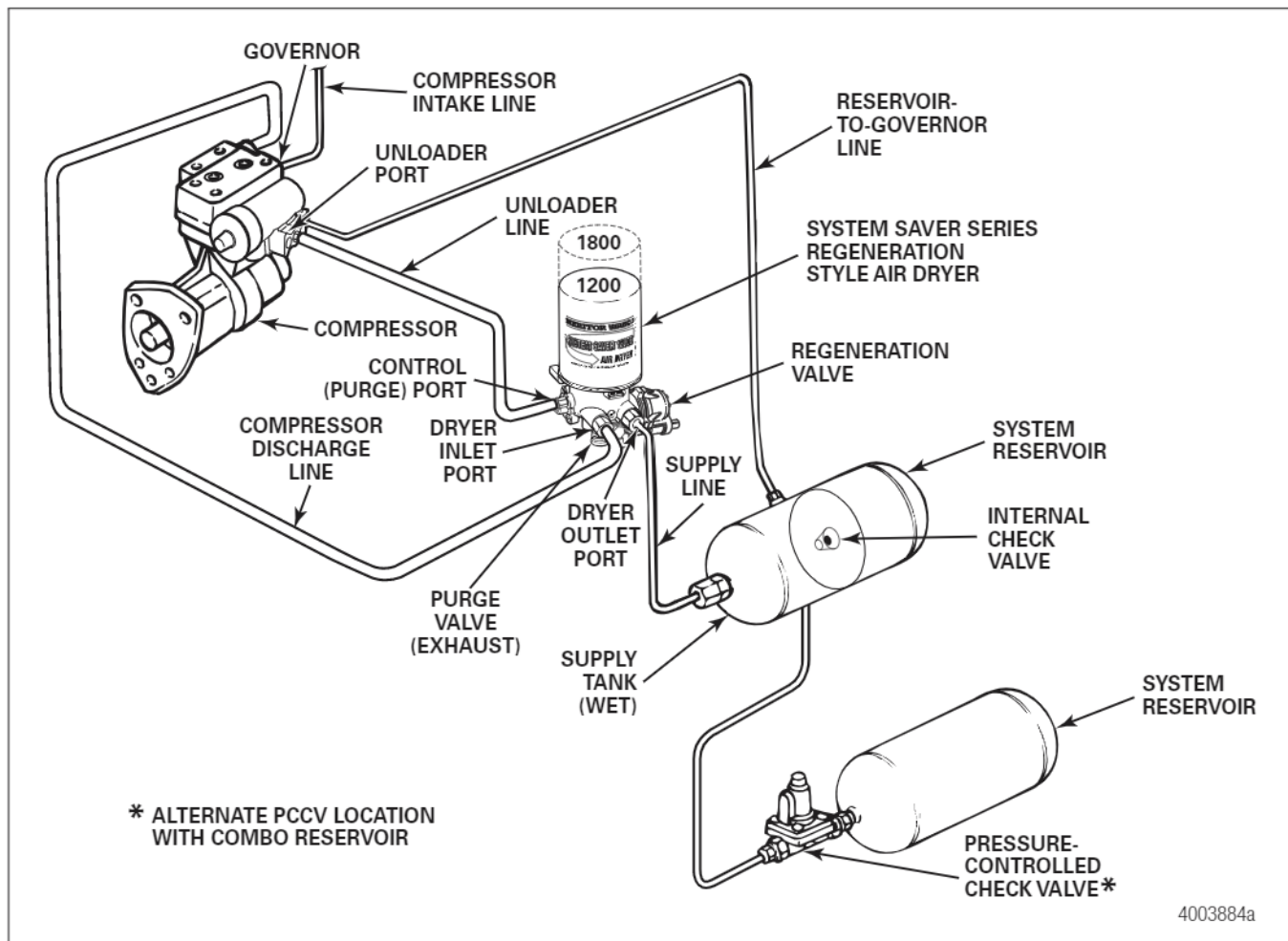


Figure 6.8

Meritor WABCO System Saver Series Single Cartridge Air Dryer Component Replacement Guide — Dedicated Purge

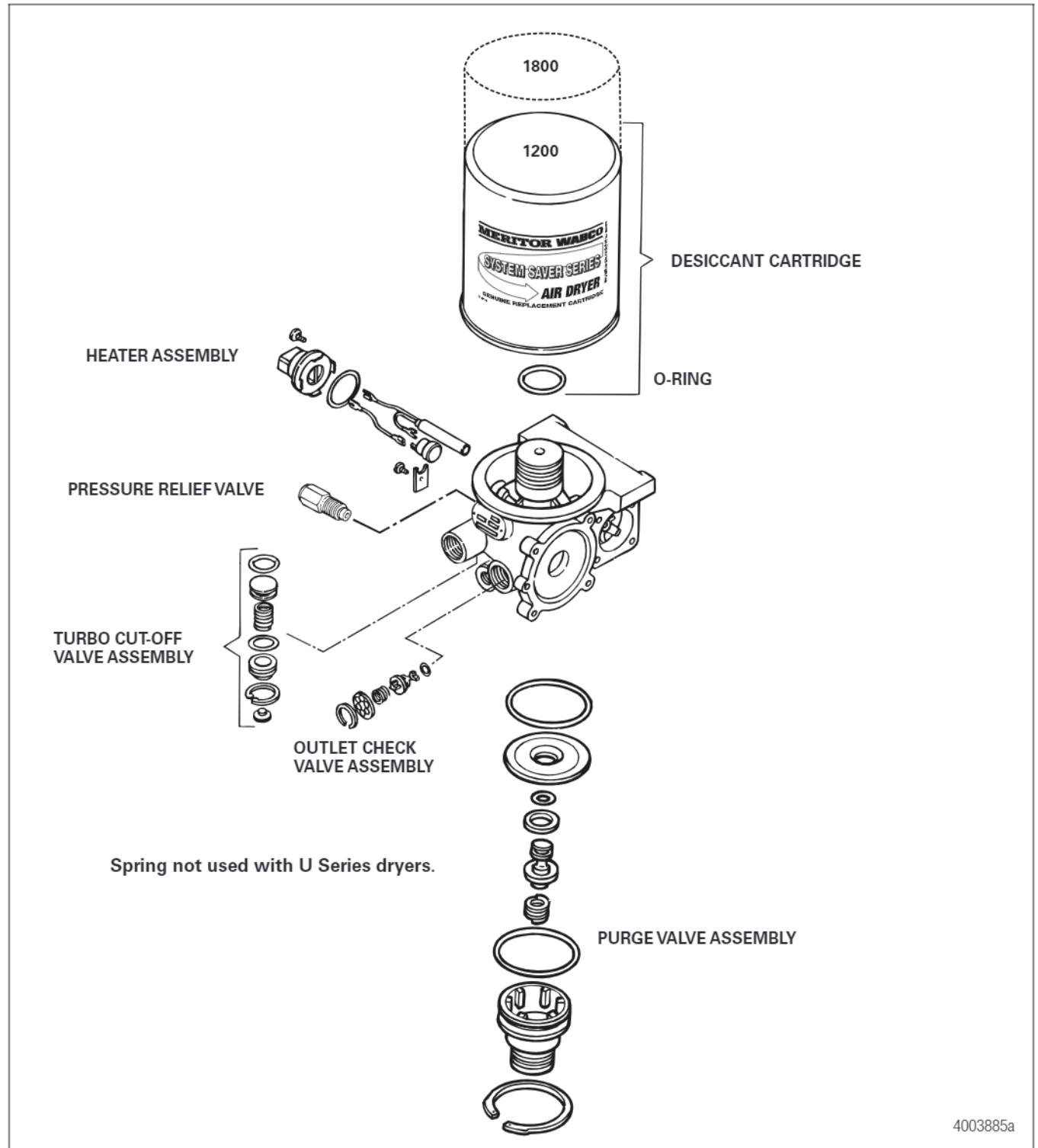


Figure 6.9

Meritor WABCO System Saver Series Single Cartridge Air Dryer Component Replacement Guide

NOTE: Whenever an assembly is replaced due to seal damage from oil contamination, it is recommended that you find and correct the source of the oil contamination and replace the desiccant cartridge.

Refer to Section 3 for more detailed instructions.

HEATER ASSEMBLY

- Disconnect plug.
- Remove old assembly.
- Install replacement element and thermostat.
 - Install retainer and screw to secure.
- Install replacement O-ring and receptacle.
 - Fasten in place with screws.

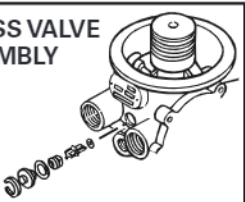
PRESSURE RELIEF VALVE

- Unscrew and remove old valve.
- Screw replacement valve into dryer or Street-Tee fitting.
- Do not exceed recommended torque. Refer to Pressure Relief Valve in Section 3. **T**

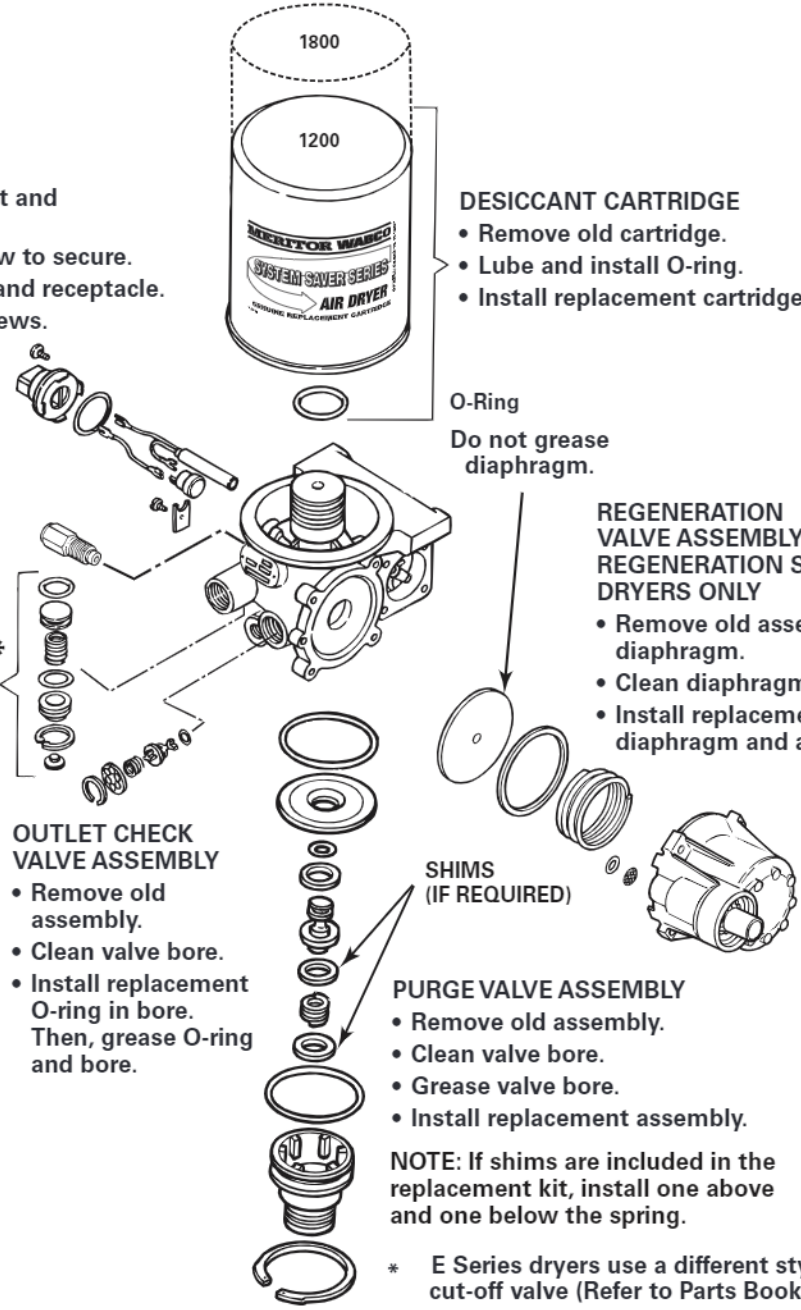
TURBO CUT-OFF VALVE ASSEMBLY*

- Remove snap ring.
- Use needle nose pliers to remove the piston.
- Clean bore (if bore is badly damaged, replace the air dryer).
- Install replacement assembly.

BYPASS VALVE ASSEMBLY



Bypass valve is used on dryers with date codes earlier than 0894. 1200 Series air dryers do not use bypass valve.



DESICCANT CARTRIDGE

- Remove old cartridge.
- Lube and install O-ring.
- Install replacement cartridge.

O-Ring
Do not grease diaphragm.

REGENERATION VALVE ASSEMBLY — REGENERATION STYLE DRYERS ONLY

- Remove old assembly and diaphragm.
- Clean diaphragm lip groove.
- Install replacement diaphragm and assembly.

OUTLET CHECK VALVE ASSEMBLY

- Remove old assembly.
- Clean valve bore.
- Install replacement O-ring in bore. Then, grease O-ring and bore.

SHIMS (IF REQUIRED)

PURGE VALVE ASSEMBLY

- Remove old assembly.
- Clean valve bore.
- Grease valve bore.
- Install replacement assembly.

NOTE: If shims are included in the replacement kit, install one above and one below the spring.

* E Series dryers use a different style turbo cut-off valve (Refer to Parts Book PB-96134).

** Spring not used with U Series dryers.

1002189a

Figure 6.10

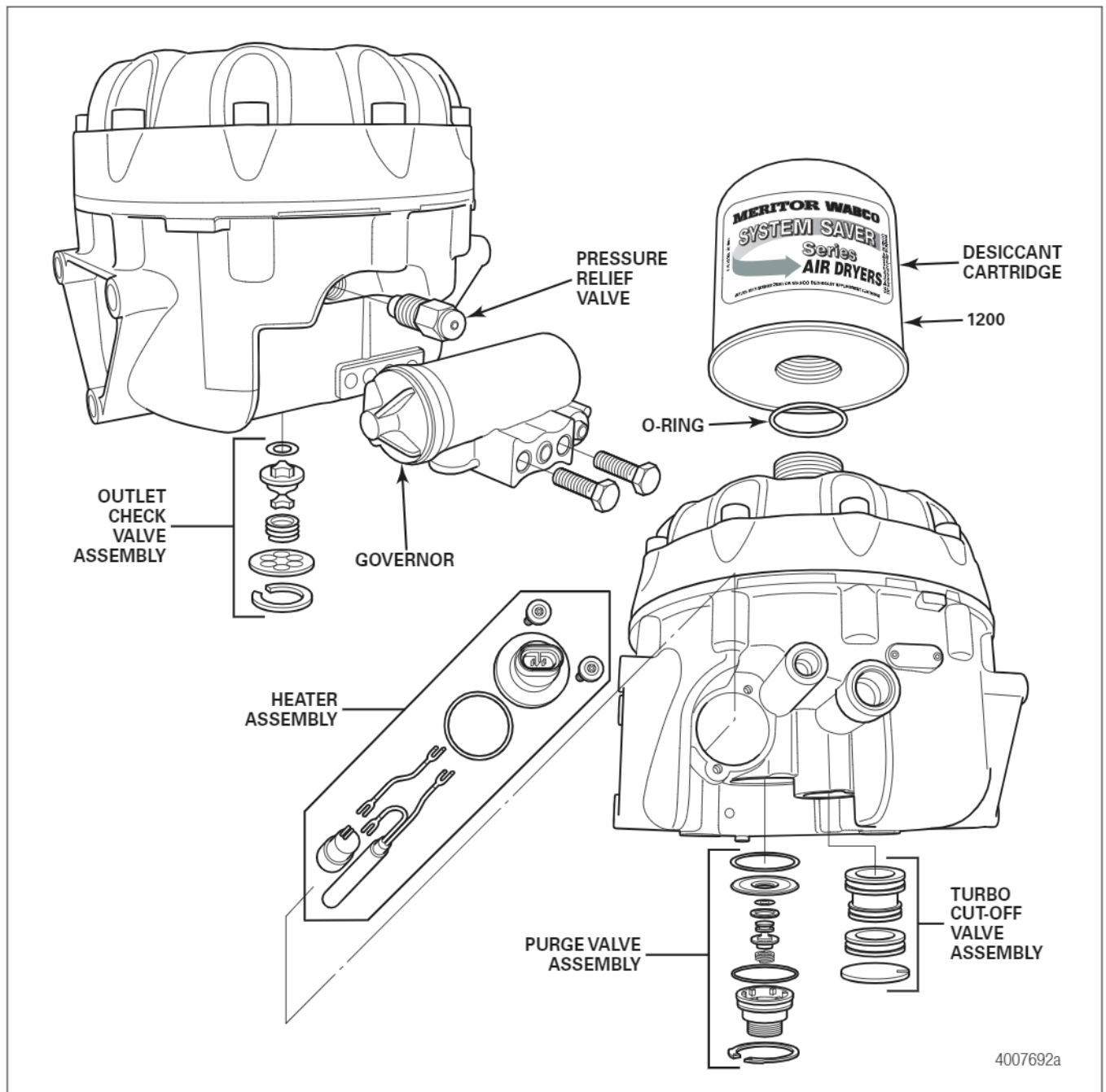


Figure 7.1

Meritor WABCO Vehicle Control Systems

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Troy, MI 48084-7121
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MERITOR WABCO

ECAD Diagnostic Guide

The dryer has an inlet port an outlet port and an unloader port (which send air to the compressor unloader).

The spin on cartridge appears the same (part number not verified by me)

The purge valve looks the same as other dryers (from the outside)

The heater looks the same (from the outside) and has the same function and spec.

The outlet check valve looks the same (from the outside)

There is no turbo cut-off valve

Purge unload and regeneration are all controlled by the solenoid pack on the side of the dryer using the following pins
Round connector with the following pin locations:

2 4

3 1

Pin 4 = Ignition power for both solenoids

Pin 3 = Ground control solenoid that opens the purge valve and sends system air to port 4 for compressor unload

Pin 1 = Ground control solenoid then opens the regeneration valve allowing controlled outlet check valve bypass

Pin 2 = Not Used

Resistance Specs.

Pin 1 to Pin 4: 11-16 ohms

Pin 3 to Pin 4: 15-23 ohms

ECAD trouble shooting:

- 1) Disconnect the dryer inlet (port 1), signal (port 4), and outlet (port 2) lines.
- 2) Disconnect the solenoid electrical connector.
- 3) Connect shop air with a closed valve to the inlet.
- 4) Connect an air gauge on the signal line.
- 5) Connect a 1 gallon or larger air tank to the Dryer outlet.
- 6) Open the inlet valve supplying shop air to the dryer, and verify:
 - a. There are no air leaks from the dryer
 - b. The air tank fills with air
 - c. The signal gauge does not move
- 7) Close the inlet valve and supply 12 volts to pin 4 of the solenoid and ground pin 3 then verify:
 - a. The dryer purges then stops leaking
 - b. The signal gauge rises to the tank pressure
- 8) Remove the ground from pin 3 then verify:
 - a. The signal gauge falls to 0 PSI
- 9) Ground pin 3 and pin 1 of the solenoid connector (12 volts on pin 4 still in place) and verify:
 - a. The tank drains through the purge valve slowly (desiccant regeneration)
- 10) If the dryer passes the above tests then the dryer is functioning correctly. If the dryer fails any of the above tests then record results and call OnTrac at (866) 668-7221.