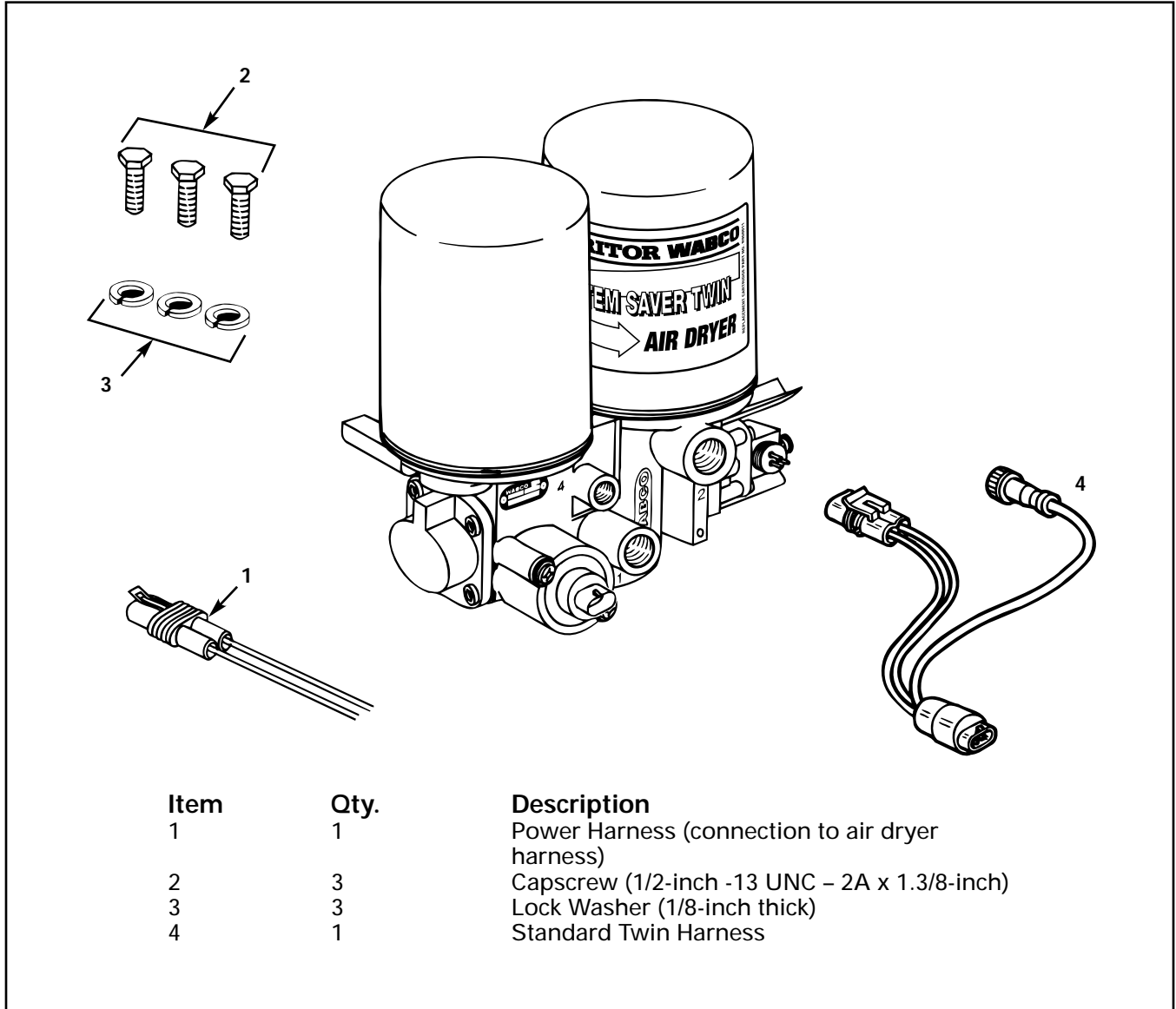


# MERITOR WABCO

## INSTALLATION GUIDE

### Installing the Meritor WABCO System Saver TWIN™ Air Dryer For Use on Tractors, Trucks and Buses with Air Brakes

#### Air Dryer Components



## Service Notes


You must follow your company safety procedures when you install the System Saver TWIN™ air dryer. Meritor WABCO uses the following types of notes to give warning of possible safety problems and to give information that will prevent damage to the air dryer.

### **WARNING**

*A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.*

### **CAUTION**

*A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur. Serious personal injury can also occur in addition to damaged or malfunctioning equipment or components.*

 *This symbol is used to indicate fasteners that must be tightened to a specific torque value.*

### **NOTE**

*A note indicates an operation, procedure or instruction that is important for correct installation. A note can also give information that will make installation quicker and easier.*

Meritor WABCO TWIN Air Dryer Part Number Selection Guide				
Compressor Rating	Orifice Size	Dryer Voltage	Replacement Kit Part Number	Air Dryer Replacement Part Number
Less than 21 CFM	0.8 mm	12-volt	R955065	S432 431 016 0
Less than 21 CFM	0.8 mm	24-volt	R955066	S432 431 017 0
21–35 CFM	1.0 mm	12-volt	R955010	S432 431 012 0
21–35 CFM	1.0 mm	24-volt	R955029	S432 431 014 0
Greater than 35 CFM	1.3 mm	12-volt	R955028	S432 431 013 0
Greater than 35 CFM	1.3 mm	24-volt	R955030	S432 431 015 0

## Meritor WABCO System Saver TWIN™ Publications

- MM35 Maintenance Manual
- PB-96135 Parts Book
- TP-9672 Air Dryer Application Guidelines
- TP-9773 26" x 40" Troubleshooting Guide Wall Chart
- TP-97100 Troubleshooting Guide (laminated card)
- T-97106V Troubleshooting and Repair Video (30 min.)

To order literature contact the Meritor Customer Support Center at 800-535-5560.

# Introduction

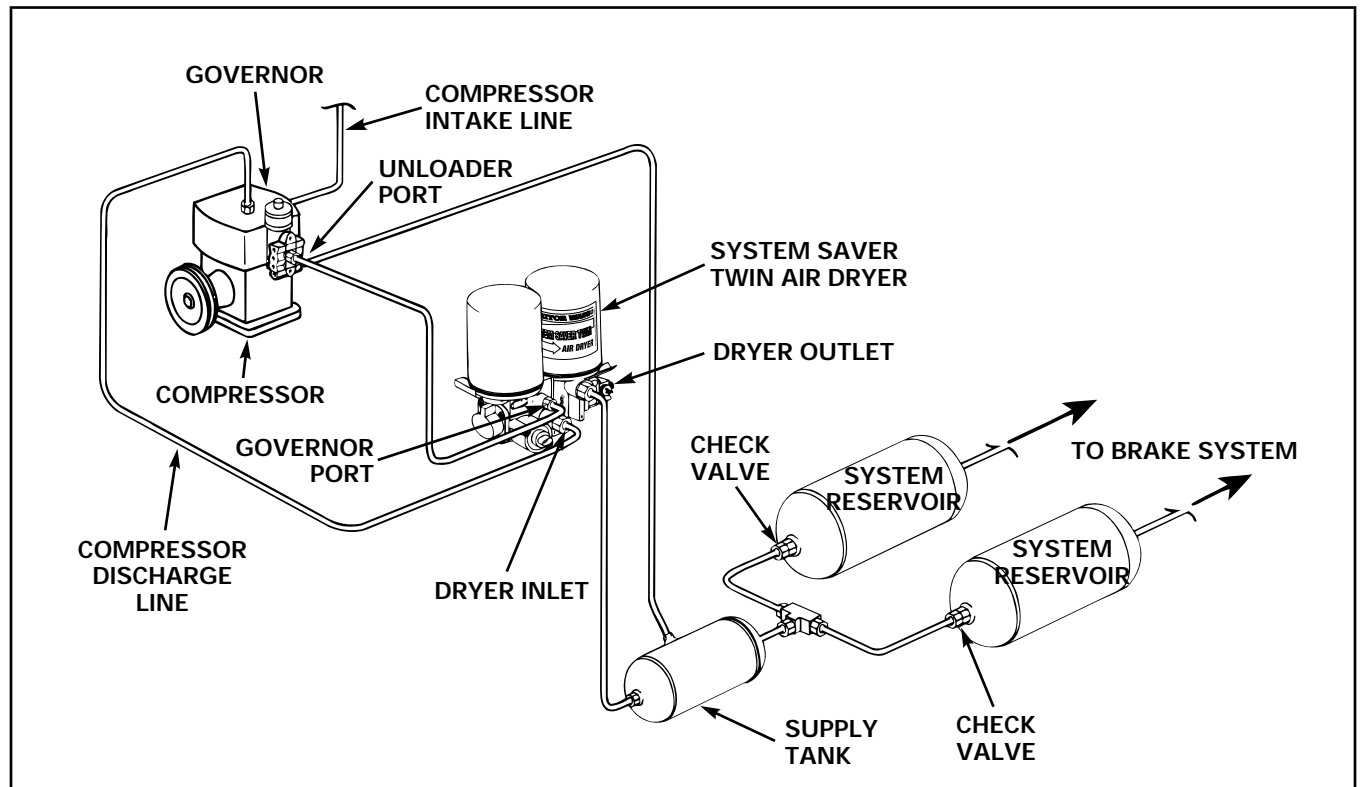
This installation manual contains four sections. **Section 1** covers basic installation instructions for standard air systems. **Section 2** includes special instructions for bulk unloading or central tire inflation (CTI) systems. **Section 3** includes special instructions for installation with a Holset E-type compressor. **Section 4** includes air dryer diagnostics. Read all applicable sections before proceeding with your installation.

## WARNINGS

- ⚠ *To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.*
- ⚠ *Do not work around or under the vehicle unless it is parked on a level surface. Use blocks to keep the vehicle from moving. A moving vehicle can cause serious personal injury and damage.*
- ⚠ *Remove all air from the air system before servicing any component in the air system. Pressurized air can cause serious personal injury.*

## Section 1

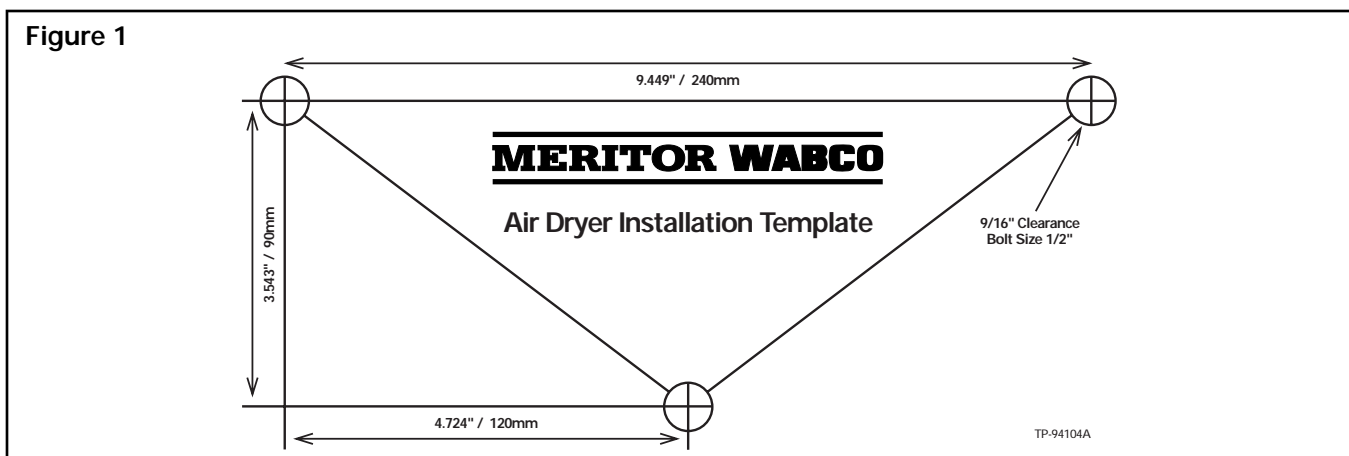
### Basic Installation Instructions



TYPICAL INSTALLATION FOR SYSTEM SAVER TWIN™ AIR DRYER

## Mounting the Air Dryer

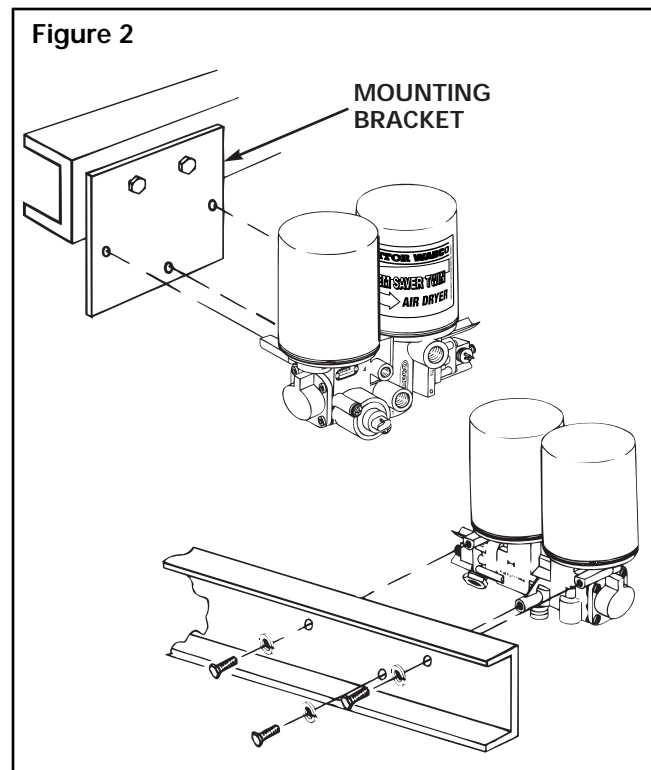
1. Park the vehicle on a level surface, stop the engine, set the parking brake and block the wheels.
2. Drain pressurized air from **all reservoirs** to 0 psi (0 bar). Open **all** draincocks to expel collected water.
3. Inspect the vehicle for a suitable mounting location that meets the following criteria. The air dryer will operate most efficiently when you follow these guidelines.
  - a. Mount the air dryer where cool air can flow around it, at least 12 inches away from any heat source.
  - b. Mount the air dryer **LOWER** than the compressor, so that any water that condenses in the delivery line flows into the air dryer. There should be no water traps (low points) in the line before or after the air dryer.
  - c. Mount the air dryer in a vertical position or within 10° of vertical, with the desiccant cartridges at the top.
  - d. Allow at least two inches (51 mm) of clearance above the top of the air dryer for servicing the desiccant cartridges.
  - e. Mount the air dryer in a location where it is not subject to direct splash or spray from a wheel.
4. Apply the adhesive-backed template to the selected location. **Figure 1**.



### NOTE

**Check the vehicle manufacturer's specifications before drilling into the frame member.**

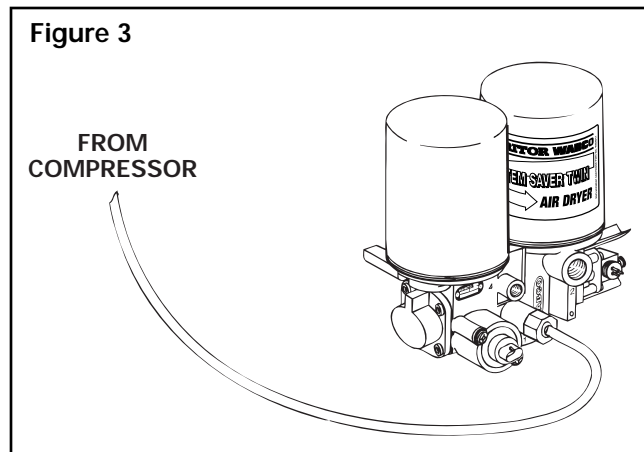
5. Drill 9/16-inch holes at each cross mark. Use a mounting bracket, if necessary. **Figure 2**.
6. Mount the air dryer using the capscrews and lock washers provided. The kit includes two sets of capscrews. Select the correct length and discard the other capscrews.
7. Tighten each capscrew to 22-30 lb-ft (30-40 N•m). **T**



## Connecting the Air Lines

### NOTES

- Use pipe sealant or teflon tape on all air fittings.
  - The reference to nylon tubing throughout this manual refers to SAE J844 air brake nylon tubing.
1. Connect the delivery port from the compressor to the air dryer inlet port (1/2-inch NPTF, port marked "1") with 5/8-inch-ID minimum stainless-steel braided teflon hose. If compressor output is greater than 21 CFM, use 3/4-inch-ID minimum stainless-steel braided teflon hose.
    - a. The delivery line should follow a **DOWNHILL** route to the inlet port. The delivery line must be free of kinks and sags, which cause water traps. **Figure 3.**



- b. Air temperature entering the dryer must be less than 175 °F (80 °C). The delivery line should be at least 6.0 feet (1.8 m), but most vehicles require a greater length to achieve this temperature condition.
- c. The delivery line should not exceed 20 feet (6.1 m), or moisture within the line can freeze in cold temperatures, blocking the air passage.
- d. Insulate a delivery line with a length of over 9 feet (2.7 m).

2. Connect the air dryer outlet port (1/2-inch NPTF, port marked "2") to the inlet of the supply (wet) tank with 1/2-inch or 5/8-inch nylon tubing. **Figure 4.** If the air compressor output is greater than 21 CFM, use 3/4-inch nylon tubing from air dryer to supply (wet) tank.
3. Connect the air governor unloader port to the air dryer control port (1/4-inch NPTF, port marked "4") with 1/4-inch or 3/8-inch nylon tubing. **Figure 5.**
4. Check all fittings for leaks.

Figure 4

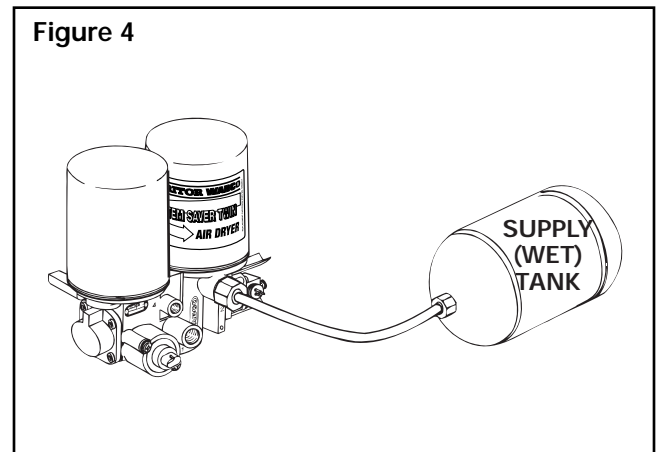
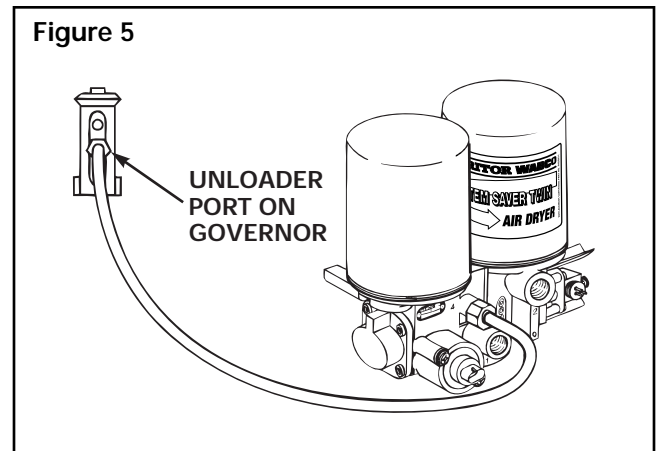


Figure 5



## Connecting the Heater and Timer/Solenoid

The basic dryer installation requires a standard two-circuit harness for powering the heater and timer/solenoid on the dryer.

### NOTE

*If you have a Holset E-type compressor, refer to Section 3, "Installing the System Saver TWIN™ with a Holset E-type Compressor." This section includes installation instructions for plumbing and electrical connection of the additional solenoid valve in the system.*

1. The Meritor WABCO System Saver TWIN™ uses an industry standard Metri-Pack® connector. If your vehicle already has this air dryer electrical connection installed, then skip to Step 2. If not, install the supplied connector using the following instructions.

### NOTE

*The "A" and "B" identification is molded into the connector where the wire enters the connector.*

- a. The electrical source must be 12V or 24V positive, depending on the electrical system and the model of air dryer. The line must be fused at a minimum of 15 amps for 12V and 7.5 amps for 24V.
  - b. Connect the "A" wire of the connector to an electrical lead that is powered when the ignition is ON and not powered when the ignition is OFF.
  - c. Connect the "B" wire to a good vehicle ground.
  - d. Insulate and seal all electrical splices.
  - e. Properly secure the harness.
  - f. Proceed to step 3.
2. Check the vehicle's electrical connector polarity.

### NOTE

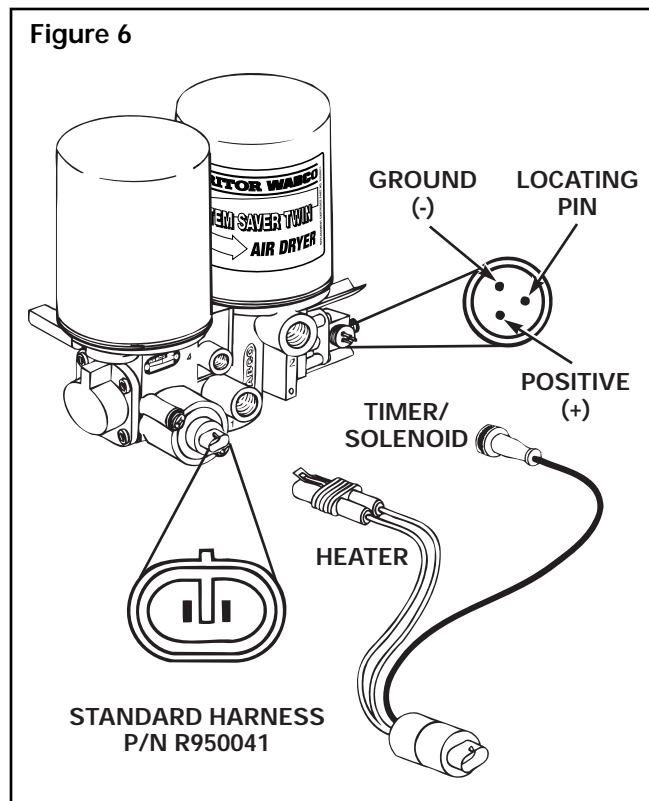
*Rewire the connector (switch the leads) if the connector does not comply with the wiring instructions below.*

3. Wire the connector.
  - a. The "A" terminal must connect to POSITIVE and
  - b. the "B" terminal must connect to NEGATIVE or GROUND.
4. Press the male connector you just installed, or one that is already in the vehicle, into the receptacle (large connector) of either the two-circuit harness or the three-circuit (for Holset E-type) harness provided in the installation kit. **Figure 12.**
5. Press the male plug on the end of the power cable into the heater receptacle on the front side of the dryer. The plug must be inserted until the latch snaps over the tab on the mating connector. **Figure 6.**

### NOTE

*Do not cross-thread the collar and the three-pin timer receptacle.*

6. Press the threaded collar onto the three-pin timer receptacle that is located on the front of the dryer. **Figure 6.** Slowly hand-tighten the knurled brass collar to the plastic fine-threaded receptacle.



## Testing the System Saver TWIN™

1. Check that all air reservoirs are completely drained to 0 psi (0 bar).
2. Close the draincocks on all reservoirs.
3. Start the vehicle. Allow the air system pressure to build while the engine idles.

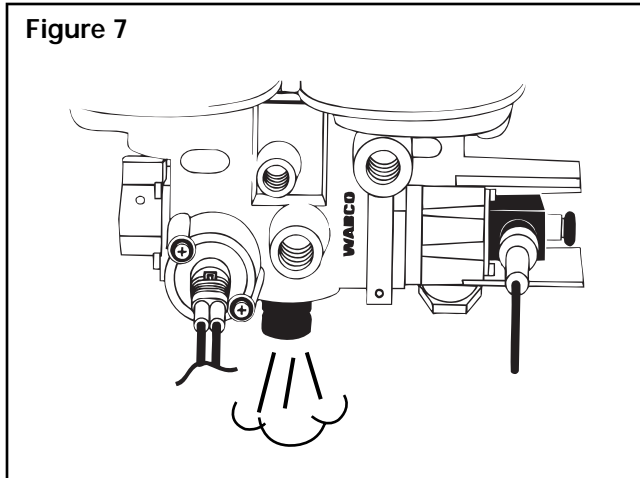
### NOTE

*Some compressors may need to run above idle to build system air pressure in a reasonable time. If air pressure build-up is extremely slow after 2-3 minutes, raise engine RPM to 1000-1200 RPM.*

4. Check bottom of dryer to ensure there is a light airflow from the purge valve.
5. After 50-60 seconds there will be a "mini purge," or exhaust of air, as the dryer switches cartridges. This is normal and will recur every 50-60 seconds as long as the compressor is running.
6. When the air system reaches "cut-out" pressure, the dryer will purge completely. After this, the dryer will not exhaust any air until the compressor starts up again. **Figure 7.**

7. Shut the engine OFF. Apply a soap solution to each connection that contains pressurized air and check for the following conditions.
  - a. If soap bubbles do not appear, connections are sealed properly.
  - b. If soap bubbles appear, a connection leaks. Do the following procedures.
    - Drain all reservoirs.
    - Remove the leaking connection.
    - Inspect for damaged threads or cracks. Replace as necessary.
    - Apply pipe sealant or teflon tape to the connection.
    - Repeat this process until all connections are properly sealed.
  - c. Refer to Maintenance Manual No. 35, *System Saver TWIN™ Air Dryers*, for more information.

Figure 7



## Installing a Turbo Cutoff 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 cutoff valve on your Meritor WABCO air dryer. **Figure 8.**

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

Contact the Meritor Customer Support Center for part number information (1-800-535-5560).

### Installation Instructions



#### **CAUTION**

***Make sure there are no kinks or sags in the lines connected to the turbo cutoff valve. Moisture and contamination can build up and block the lines. The turbo cutoff valve and the 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 reservoirs to 0 psi (0 bar).
4. Disconnect the delivery line at port 1 on the air dryer.

### **NOTE**

***If there is not enough room to install the turbo cutoff valve to port 1 on the air dryer, connect a 90 ° fitting to port 1 of the air dryer. Then connect the threaded end of the turbo cutoff valve to the fitting.***

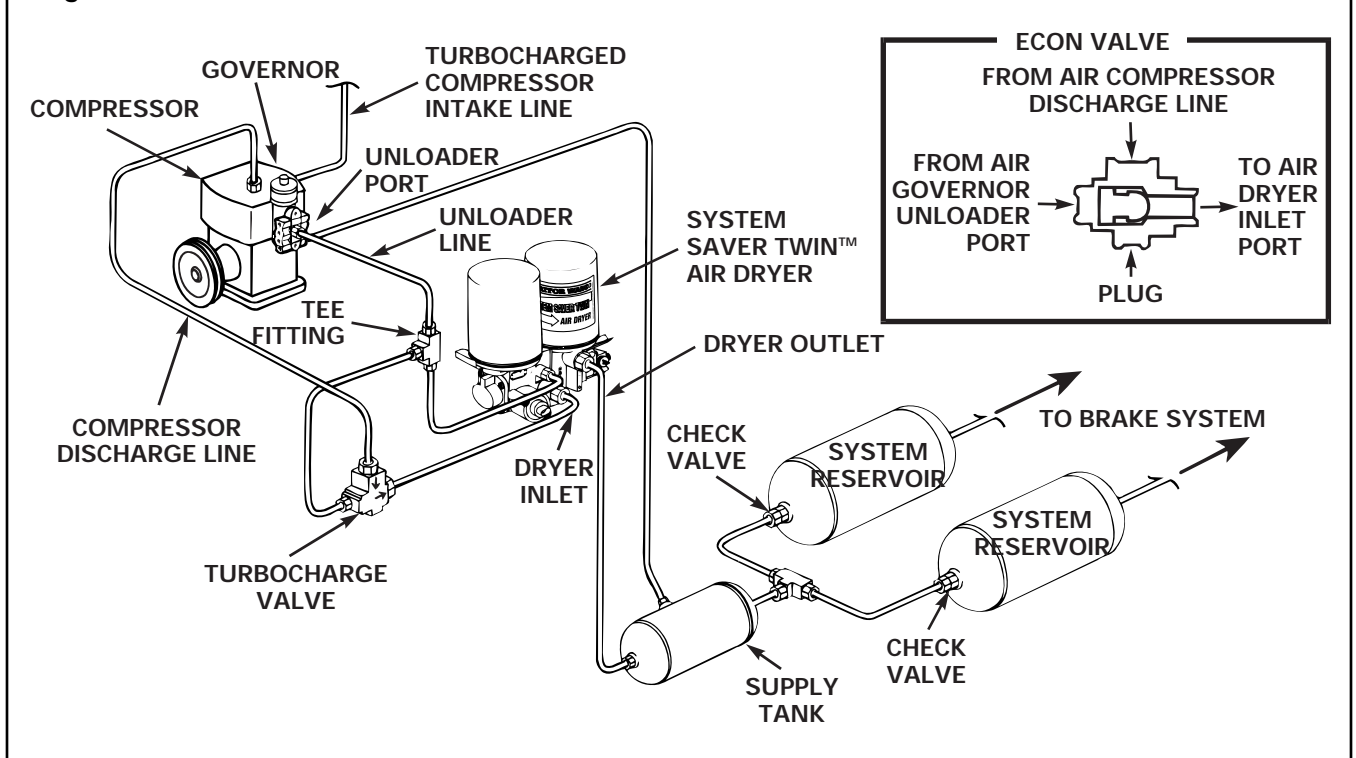
5. Install the threaded end of the turbo cutoff to port 1 on the air dryer. Make sure the arrow on the turbo cutoff valve points toward port 1.
6. Connect the delivery line from the compressor to the 1/2-14 NPT port marked with an arrow (↓) on the turbo cutoff valve.

### Installing the T-Fitting

1. Remove the unloader line from port 4 on the 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 on the air dryer. 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 cutoff valve. Use 1/4-inch (6.3-mm) standard braking-system nylon tubing.



Figure 8



### Testing the Turbo Cutoff Valve

1. Close the draincocks on all reservoirs.
2. Start the vehicle. Wait for the braking system to pressurize.
3. If you hear the air dryer exhaust air after the compressor cuts out, the air dryer is working correctly.

You can also use the following test:

1. Apply the brakes of the vehicle several times to reduce pressure in the air system below the cut-in pressure of the governor.
2. If the air dryer exhausts air after the compressor cuts out, the air dryer is working correctly.

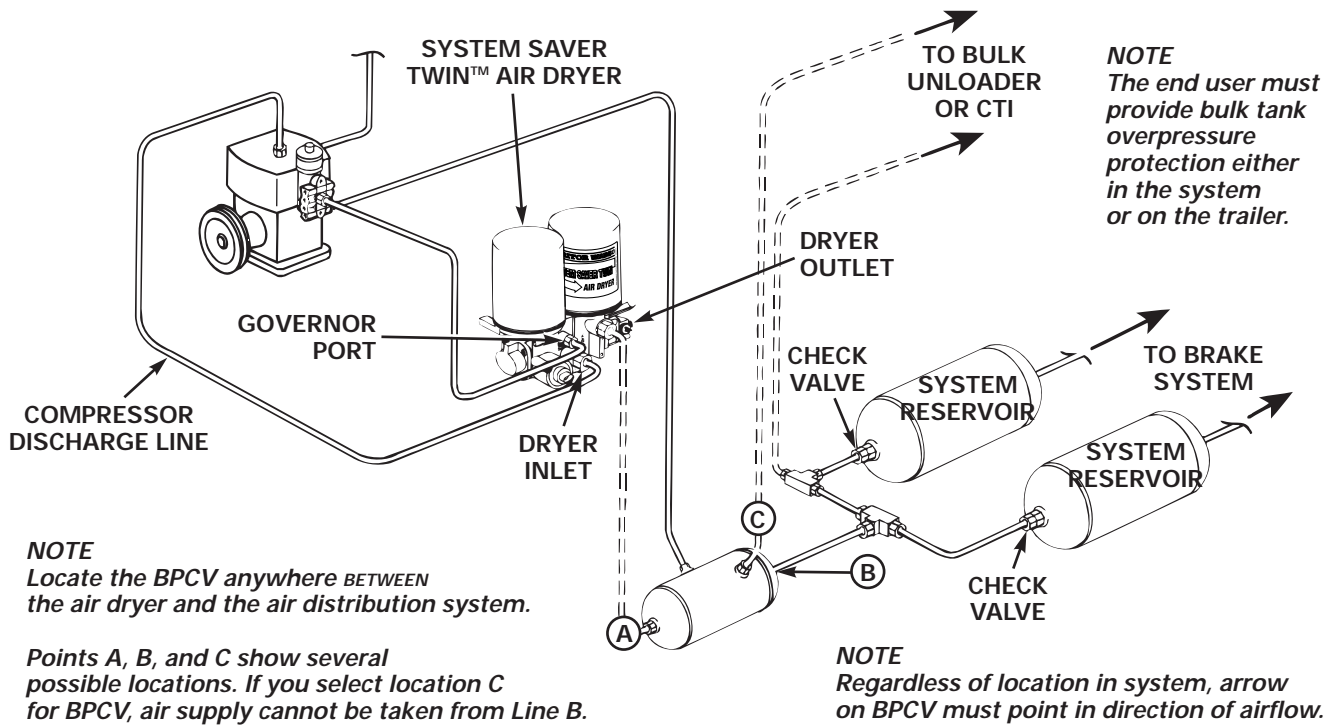
### Final Checks

1. Start the vehicle. Wait for the air system of the vehicle to reach maximum normal pressure.
2. Apply a soap solution to each connection that contains pressurized air.
  - a. If soap bubbles do not appear, you correctly sealed the connections.
  - b. If soap bubbles appear:
    - Turn off the ignition.
    - Depressurize all air tanks.
    - Remove the leaking connection.
    - Apply pipe sealant to the connection.
    - Repeat steps 1 and 2.

## Section 2

### Installing the System Saver TWIN™ in a Bulk-Unloading or Central Tire Inflation (CTI) Air System

Figure 9



#### NOTE

Due to the inherent operating characteristics of the air dryer, there will be a slight decrease in airflow to the brake system. This may result in a minor increase in bulk unloading time or fill time for the tires on a CTI system.



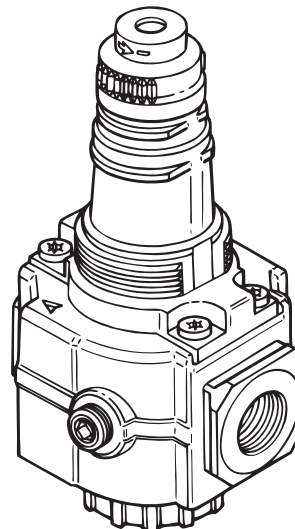
#### CAUTION

The System Saver TWIN™ air dryer is not designed to be used for bulk unloading applications where contaminants will cause load spoilage. The TWIN air dryer minimizes moisture and contaminants in truck air brake systems and will not provide moisture-free or contaminant-free air in bulk unloading applications.

Installing the System Saver TWIN™ in a bulk-unloading or Central Tire Inflation (CTI) air system is exactly the same as the basic installations. However, a back pressure control valve (BPCV) must also be installed for the system to work properly. This is not required for Eaton CTI. Figures 9 and 10.

Figure 10

BULK UNLOADING / CTI KIT  
(NOT REQUIRED FOR EATON CTI)  
P/N R955039



BACK PRESSURE CONTROL VALVE (BPCV)

**CAUTION**

System air must pass through the BPCV before it enters the bulk unloader or CTI air distribution system or the air dryer will not operate correctly.

1. Follow the basic plumbing, heater and timer/solenoid installation procedures outlined in this manual.
2. Install the BPCV between the air dryer outlet and the bulk unloader or CTI inlet. (Possible locations are shown in **Figure 9**.) Be sure to install the valve so that the arrow on the valve points in the direction of airflow.

**NOTE**

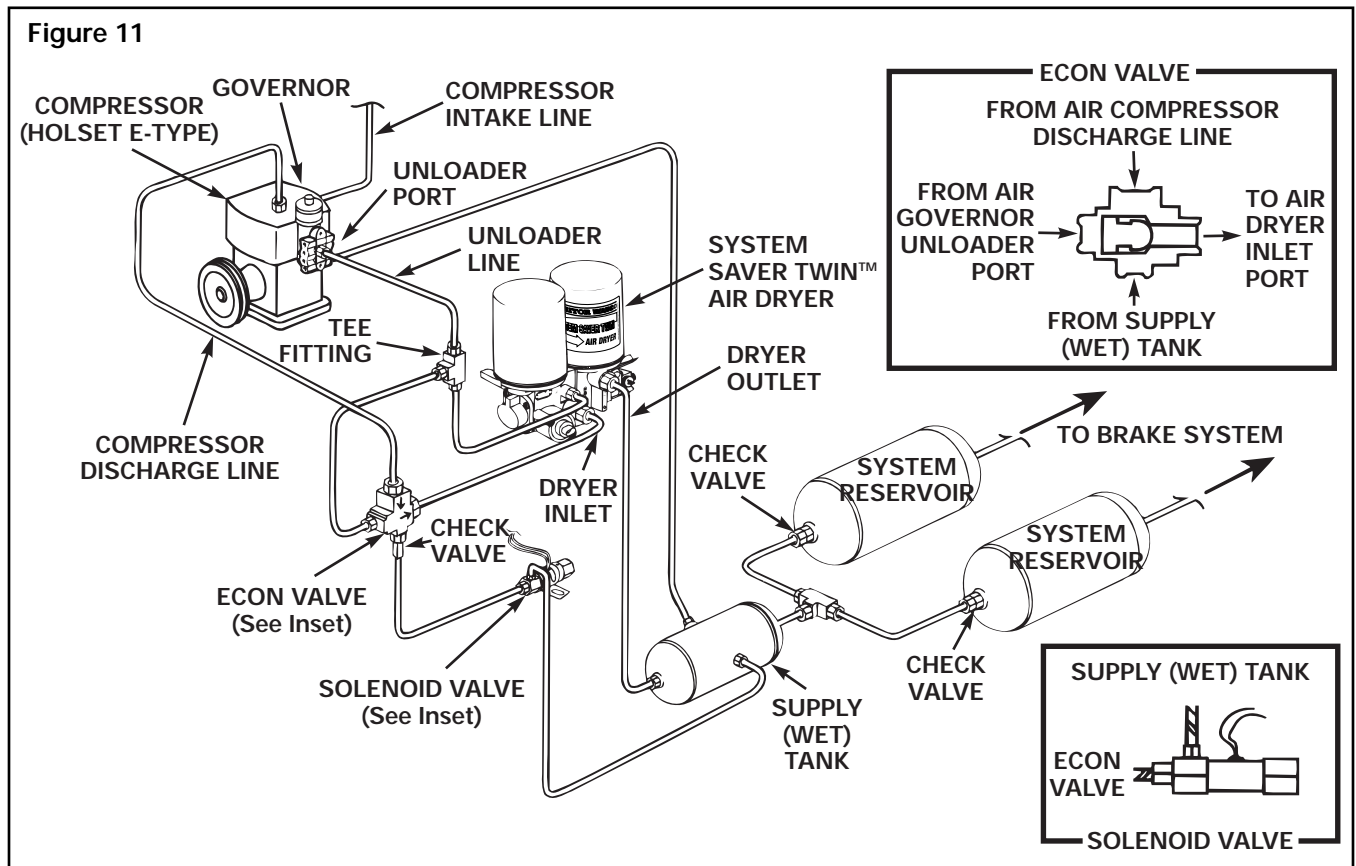
Locate the BPCV anywhere *BETWEEN* the air dryer and the air distribution system.

Points A, B, and C show several possible locations. If you select location C for BPCV, air supply cannot be taken from Line B. Refer to **Figure 9**.

3. Refer to "Testing the System Saver TWIN™" on page 7.

## Section 3

### Installing the System Saver TWIN™ with a Holset E-type Compressor



**CAUTION**

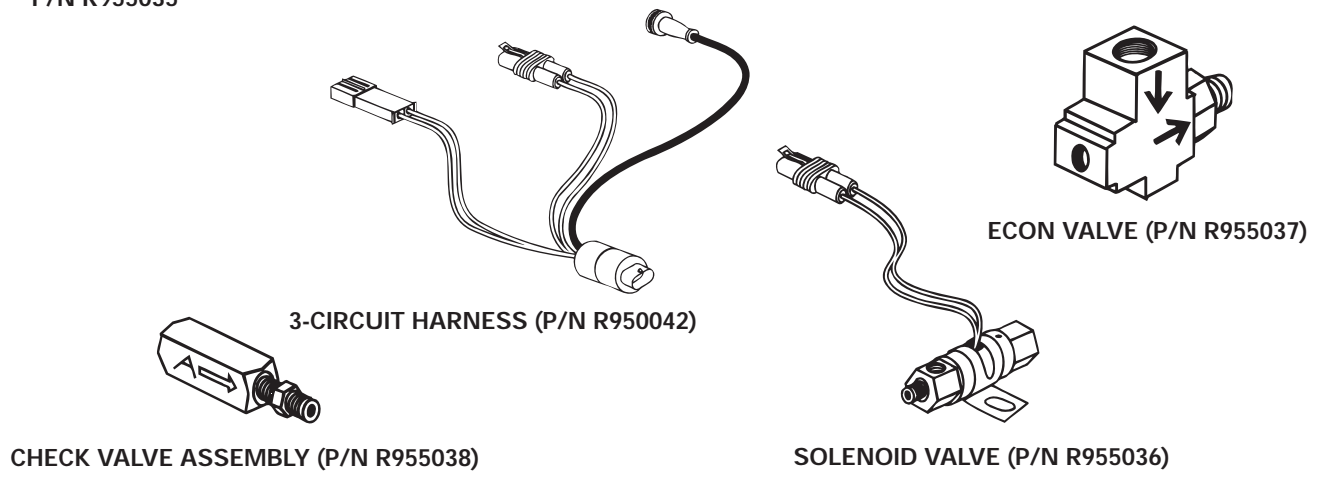
Install the Holset E-type compressor kit only on 12-volt vehicle systems with 12-volt System Saver TWIN™ air dryers.

Installing the System Saver TWIN™ with a Holset E-type compressor is the same as a standard compressor installation, except you must plumb a one-way check valve, isolation valve (Econ valve) and solenoid valve into the system between the air dryer and the supply (wet) tank. **Figures 11 and 12.**

1. Follow the basic installation procedures outlined in this manual.
  2. Find a suitable location, near the air dryer, to install the Econ valve. Allow enough room to connect air lines.
  3. Connect a delivery line from the Econ valve outlet (1/2-inch NPTF male) to the air dryer inlet port (1/2-inch NPTF, port marked "1") with 1/2-inch or 5/8-inch braided fabric hose. This valve can also be mounted directly into the air dryer inlet port marked "1".
  4. Connect the delivery line from the compressor discharge port to the Econ valve inlet port (1/2-inch-14 NPTF female) with #10 (5/8-inch OD) or #12 (3/4-inch OD) stainless steel braided teflon hose.
  5. Install a tee fitting in the unloader line from the governor to the air dryer control port marked "4".
  6. Connect a line using 1/4-inch or 3/8-inch nylon tubing from the tee fitting to the Econ valve unloader (1/8-inch NPTF port marked "UNL"). This port is directly across from the male port. **Figure 11.**
- Step 6 Alternate Method:** Instead of using a tee fitting, connect one of the other air governor unloader ports to the Econ valve unloader port (1/8-inch NPTF marked "UNL"). **Figure 11.**
7. Mount the one-way check valve directly to the Econ valve's remaining 1/8-inch NPTF port to allow free flow into the valve.
  8. Remove the pipe plug, if present, from this Econ valve port.
  9. Connect an air line using 1/4-inch or 3/8-inch nylon tubing from the check valve you just installed to the male port on the solenoid valve. The solenoid valve can be mounted anywhere on the line between the check valve and the supply (wet) tank.
  10. Complete the circuit by running a line from the female port on the solenoid valve to a spare port on the supply (wet) tank. Refer to the inset in **Figure 11.**
- NOTE**  
*The solenoid valve is normally closed. You must install the valve so that ignition on energizes the solenoid and opens the solenoid valve.*
11. Install the check valve so that air flows from the supply (wet) tank to the Econ valve.
- Step 11 Alternate Method:** Supply air for the Econ valve can be taken from other locations only when there is pressure in the supply (wet) tank. For example, you can install a tee fitting in the line between the air dryer and the supply (wet) tank. You can also install a street-tee to a supply (wet) tank port that has an air line already attached.
12. Connect the heater and timer/solenoid harnesses. Refer to instructions in "Testing the System Saver TWIN™" in this manual.
  13. Press the remaining connector onto the mating connector on the solenoid valve lead.
  14. Refer to "Testing the System Saver TWIN™" on page 7.

**Figure 12**

HOLSET E-TYPE COMPRESSOR KIT  
 P/N R955035



## Section 4

### System Saver TWIN™ Air Dryer Diagnostic

Condition	Possible Cause	Suggested Repair
Air dryer does not work properly.	Air dryer mounted too close to heat source, such as engine exhaust stack or muffler.	Verify proper installation.
	Air delivered to 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.
	Air dryer not switching every 50 to 60 seconds during compressor loaded cycle.	Verify solenoid operating properly.
Water in air system	Desiccant saturated.	Check timer (solenoid) and make necessary repairs.  <b>NOTE:</b> <b>If timer is working properly but dryer does not switch, check for sludge on valves. Clean the dryer.</b>  If condition is not corrected:  Check pistons and make necessary repairs.  Replace desiccant cartridge(s).
Dryer leaks heavily from purge valve every other 60-second timer cycle.	Improper air pressure maintained at dryer; 35-75 psi allows partial switching but does not seal valves for a second cycle.	Install back-pressure control valve in system between outlet of dryer and source of air take-off.
Dryer frozen (water in 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 air dryer used (e.g., 24-volt in 12-volt system).	Replace with proper air dryer.
Excessive amount of oil released from exhaust of air dryer.  or  Sludge build-up on air dryer base.	Problem with air compressor.	Repair or replace compressor.  Replace desiccant cartridge(s).
	Worn turbocharger oil seals (turbocharged compressors only).	Repair or replace turbocharger.

## System Saver TWIN™ Air Dryer Diagnostic (Continued)

Condition	Possible Cause	Suggested Repair
Dryer does not purge when compressor unloads.	Wrong air line or no air line connected to dryer Port 4.	Connect air lines properly.
	Control line from governor unloader port to 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. <b>If condition is not corrected:</b> 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.
	Air dryer control port (Port 4) plumbed wrong.	Verify proper installation.
	Obstruction in air compressor discharge line or air dryer outlet line.	Check lines for crimps or blockages. Make necessary repairs.
	Air compressor discharge line plumbed to air dryer outlet port (Port 2).	Verify proper installation. Make necessary repairs.
	<b>CTI Applications:</b> 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 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.  <b>NOTE: This could be accompanied by a loss of engine power.</b>	Compressor intake is turbocharged and there is no turbo cutoff valve in system.	Install a turbo cutoff valve.
Internal valves not switching.	Orifice blocked, internal passages blocked, valve components covered with sludge.	Clean as needed, replace worn parts.
	O-rings in bad condition (cut, worn).	Make sure O-rings are properly installed and in good condition.

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# **MERITOR WABCO**

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16579/Meritor