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MERITOR WABCO

Technical Bulletin

Meritor WABCO Inversion Relay Valve (IR-2)

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.

Do not attempt to open or disassemble the inversion relay valve. This valve has an internal spring that may be damaged by opening the valve. In addition, internal spring forces may cause serious personal injury.

Overview

Access Product and Service Information

For additional information about Meritor WABCO's inversion relay valve, please contact the ArvinMeritor Customer Service Center at 800-535-5560. Literature covering the complete Meritor WABCO product line is posted on our website, www.meritorwabco.com.

Inversion Relay Valve (IR-2)

The inversion relay valve (IR-2) combines the functions of two air brake system valves:

- A relay valve
- An inversion valve with anti-compounding protection

Under normal conditions, the IR-2 responds to a control signal from a dash-mounted parking brake control valve to supply or exhaust air from the spring brake chambers, thereby applying the spring brakes. In the event of a primary air system failure, the IR-2 makes a modulated application of the spring brakes by means of the foot valve. A typical IR-2 valve installation is shown in Figure 1.

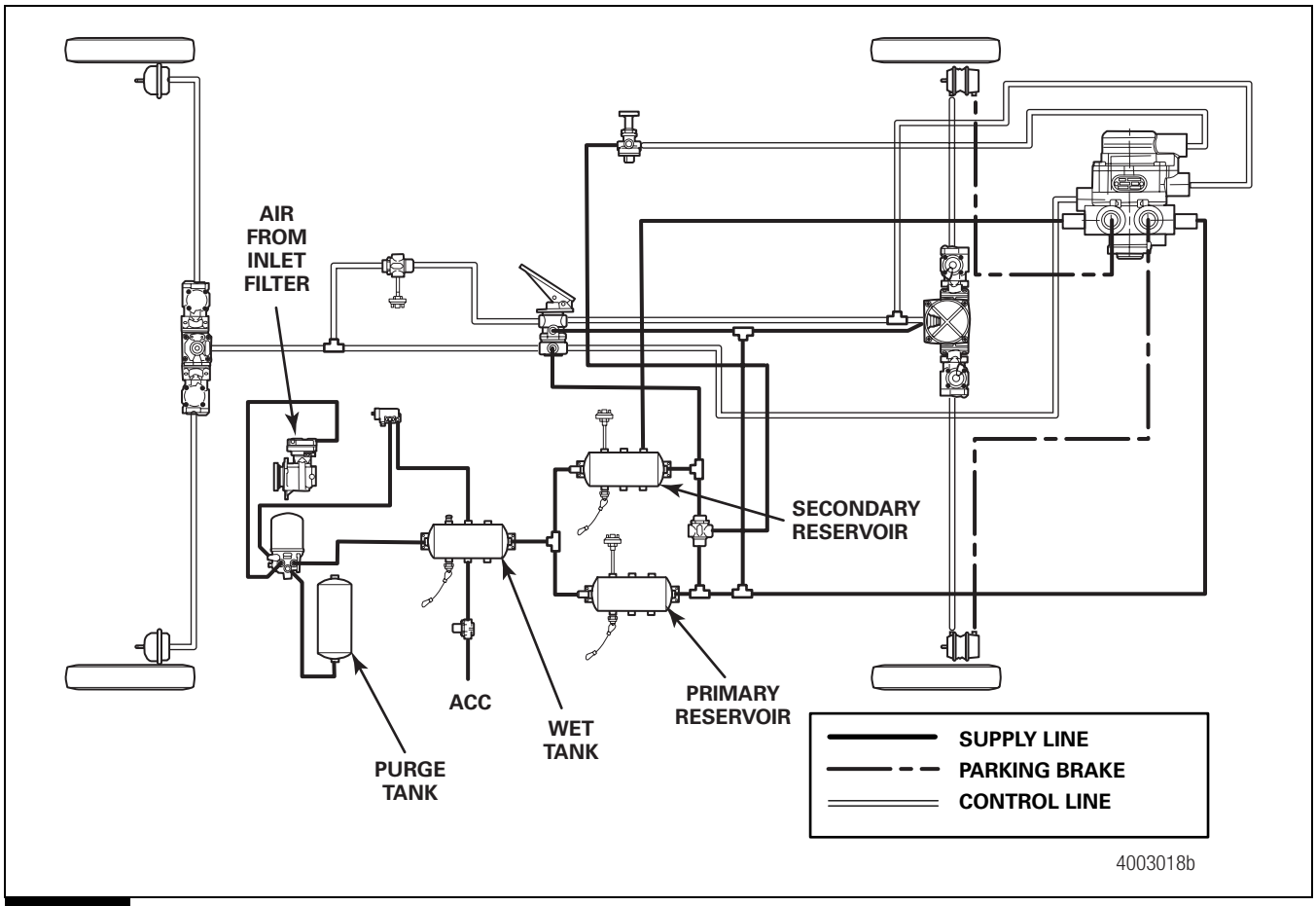

Figure 1

Installation

Guidelines

NOTE: If you are installing the inversion relay valve on an existing installation, you must first remove the old valve. Refer to the valve replacement procedure in this bulletin for instructions.

1. Mount the valve.
   - Refer to the vehicle manufacturer's specifications for specific mounting requirements.
   - Select a flat mounting surface. The mounting surface must be within 0.010-inch (0.25 mm) of flat.
   - For best timing results, mount the valve near the spring brakes it will serve.
   - Mount the valve with the exhaust port facing down within 30° of vertical.
   - Use 8 mm mounting hardware to attach the valve to the mounting surface. Tighten to 15 ±2 lb-ft (20 ±3 N•m). Figure 2.

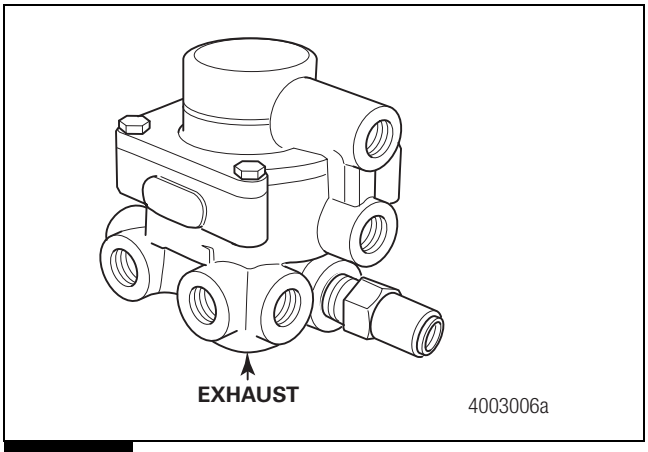

Figure 2

2. Connect the air lines as indicated in Table A. Valve ports are identified in Figure 3.

   - Make sure all unused supply and delivery ports are plugged.
   - Look at the air line installation to make sure all air lines are correctly installed and that all connections are secure.

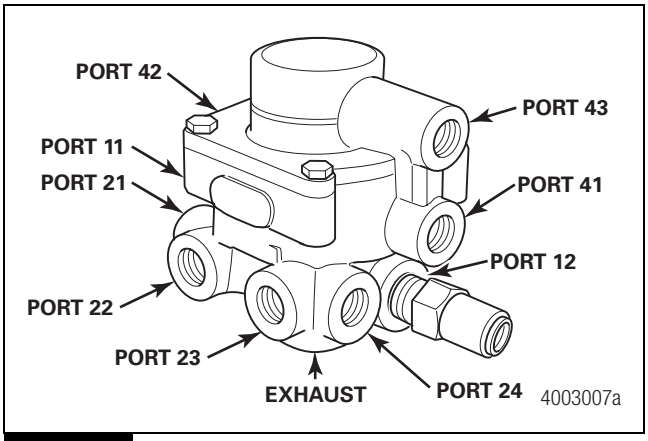

Figure 3

Table A: IR-2 Valve Port Identification

IR-2 Valve Port Assignments

Port	Function	Typical Line Size
11	Reservoir ports **NOTE:** If the system includes a line with blended air from both tanks through a double check valve, only one supply line is connected to the valve. Plug the remaining port.	1/2" O.D. Tube
12		
21	Delivery ports to spring brake chambers. If the vehicle has only two spring brakes, plug the remaining two ports.	3/8" I.D. Hose
22		
23		
24		
41	Control port to primary brake circuit	3/8" O.D. Tube or Push-to-Connect
42	Control port to secondary brake circuit	3/8" O.D. Tube or Push-to-Connect
43	Control port to park brake valve	3/8" O.D. Tube or Push-to-Connect

Troubleshooting

Function Tests

Non-Failure Mode

When the vehicle's primary air system is functioning correctly, the IR-2 valve passes reservoir air to the spring brake chambers as directed by the park brake valve. To test this operation:

1. Park the vehicle and apply the parking brakes. Place blocks under the tires to prevent the vehicle from moving.
2. Follow standard shop procedures to install a test gauge in the delivery line of the valve or at the spring brake chamber.
3. Fully charge the air brake system to 105-130 psi (724-896 kPa).
4. Release the parking brakes by pushing in the dash-mounted park brake knob.
5. Check the pressure reading. The test gauge pressure reading should be 90-105 psi (621-724 kPa).
6. Apply the parking brakes by pulling out the dash-mounted park brake knob. The IR-2 will exhaust all air in the spring brake chambers, applying the spring brakes.

   If the IR-2 valve does not function as described, check the installation. Make sure all air lines are correctly routed. Check the connections for leaks. Make the necessary repairs and retest. If the problem persists, it may be necessary to replace the valve. If you have any questions or need additional assistance, contact the ArvinMeritor Customer Service Center at 800-535-5560.

Anti-Compounding

The anti-compounding feature occurs if the service brakes are applied while the spring brakes are already applied. If this occurs, the valve will deliver air to the spring brake chambers to release the spring brakes. To test this function:

1. Park the vehicle. Do not apply the parking brakes. Place blocks under the tires to prevent the vehicle from moving.
2. Follow standard shop procedures to install a test gauge in the delivery line of the valve or at the spring brake chamber.
3. Fully charge the air brake system to 105-130 psi (724-896 kPa).
4. Apply the parking brakes by pulling out the dash-mounted park brake knob. The IR-2 will exhaust all air in the spring brake chambers, applying the spring brakes.

5. Make a service brake application by stepping on the foot valve. This will send reservoir service brake air to the spring brakes.

6. Check the pressure gauge to ensure reservoir pressure is delivered to the spring brakes, thus indicating the anti-compounding feature is functional.

   If the IR-2 valve does not function as described, check the installation. Make sure all air lines are correctly routed. Check the connections for leaks. Make the necessary repairs and retest. If the problem persists, it may be necessary to replace the valve. If you have any questions or need additional assistance, contact the ArvinMeritor Customer Service Center at 800-535-5560.

Failed Primary System Function

If there is a loss of the primary system air, the valve will respond to the remaining signal from the secondary brake system. When secondary pressure increases to 10 psi (69 kPa), the valve will begin to exhaust air from the spring brake chambers. The spring brake chambers will be exhausted, fully applying the brakes, before the secondary service pressure exceeds 75 psi (517 kPa). To test this function:

1. Place blocks under the tires to prevent the vehicle from moving.

2. Follow standard shop procedures to install a test gauge in the delivery line of the valve or at the spring brake chamber.

3. Fully charge the air brake system to 105-130 psi (724-896 kPa).

4. Drain the air from the primary reservoir.

5. Make a service brake application by stepping on the foot valve. This exhausts air from the spring brakes.

6. Check the pressure reading. The test gauge should read 0 when the secondary service pressure exceeds 70 psi (483 kPa).

   If the IR-2 valve does not function as described, check the installation. Make sure all air lines are correctly routed. Check the connections for leaks. Make the necessary repairs and retest. If the problem persists, it may be necessary to replace the valve. If you have any questions or need additional assistance, contact the ArvinMeritor Customer Service Center at 800-535-5560.

Air Leakage

Replace the IR-2 valve if leakage exceeds 175 sccm.

NOTE: If accurate measurement equipment is not available, replace any valve that has a clearly audible air leak.

Leak Test

Perform a leak test to check for air leakage at the air line connections.

1. Place blocks under the tires to prevent the vehicle from moving.

2. Drain air from all system tanks.

3. Close the reservoir drain cocks.

4. Start the vehicle. Allow air system pressure to build to cut-out pressure while the engine idles.

   - **If the vehicle is equipped with an air dryer:** There will be a purge or strong blast of air from the air dryer, followed by a mild flow which will last 10-25 seconds when cut-out pressure is reached.

5. Apply a soap solution to each connection that contains pressurized air. Check the connections for soap solution bubbles.

   - **No soap bubbles:** Connections are sealed.
   - **Soap bubbles:** Connections are not sealed.

Connection Seal Repair

To repair connection seals:

1. Drain all reservoirs.

2. Remove the leaking connection.

3. Inspect the connections and ports for damaged threads or cracks. Replace if necessary.

4. Apply pipe sealant to the pipe thread connection.

   NOTE: Repeat the leak test until all connections are sealed.

Ensure that tubes are cut squarely to avoid damage to seals during insertion into push-to-connect fittings.

Procedures

Valve Replacement

1. Place blocks under the tires to prevent the vehicle from moving
2. Identify, mark and disconnect all air lines from the valve.
3. Remove the mounting hardware that holds the valve to the vehicle.
4. Remove the old valve from the vehicle.
5. Install the replacement IR-2 valve. Refer to the installation guidelines in this bulletin for installation instructions.
6. Reconnect the pneumatic lines. Refer to Table A for more information.

   NOTE: All lines must be reinstalled in the same location they were in before they were removed. Refer to the vehicle manufacturer's service manual for complete instructions.

7. Apply 105-130 psi (724-896 kPa) minimum air system pressure. Test the installation, following the function tests procedures in this bulletin.

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