

Bendix® QR-1C® Double Check and Quick Release Valve

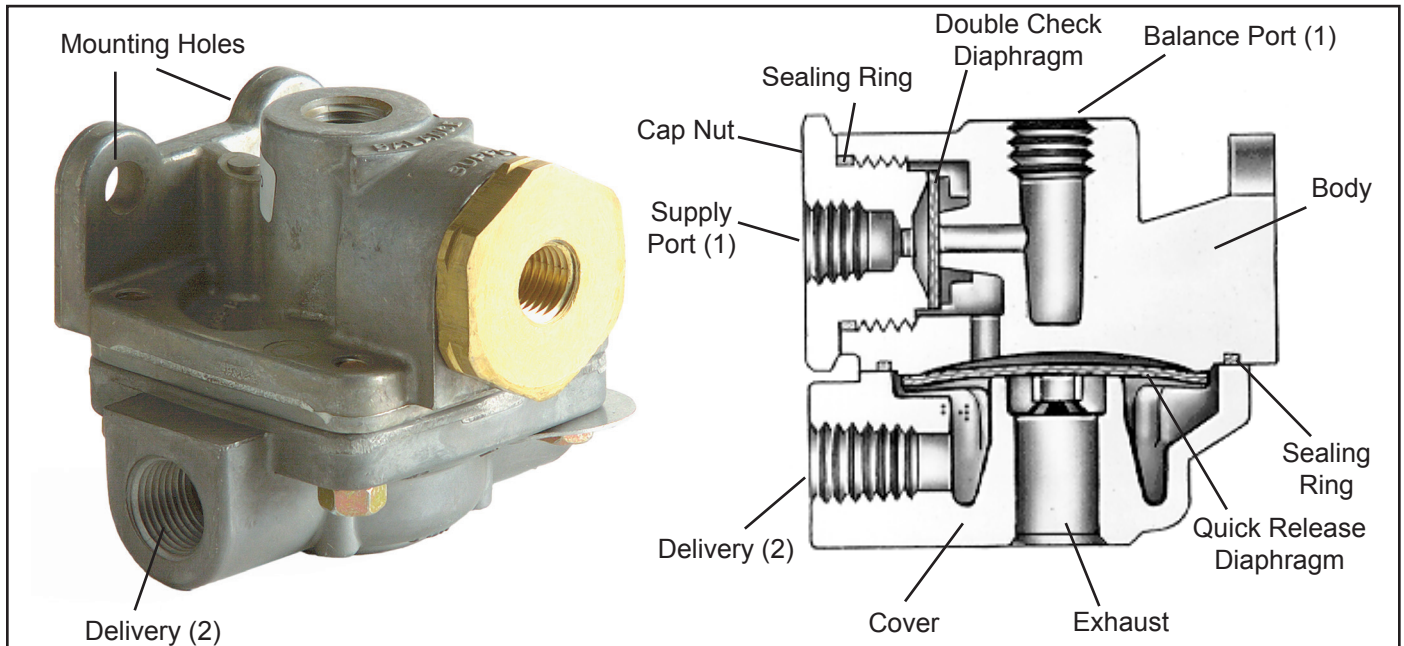


Figure 1 - Port Designations and Sectional View

DESCRIPTION

The Bendix® QR-1C® is a dual function valve. The valve's primary function is to serve the emergency side of a spring brake actuator as a quick release valve. In addition, it functions as an anti-compound device. The double check valve prevents a service and emergency brake application from occurring simultaneously.

The QR-1C valve is generally mounted on the axle and serves two spring brake actuators. The air connections to the QR-1C valve are as follows:

1. Valve delivery port (2) connected to emergency port of spring brake.
2. Valve balance port (1) connected to delivery of brake valve or relay valve. NOTE: If relay valve is installed on vehicle, it should be connected to the delivery side (not service or signal side).
3. Valve supply port (1) connected to delivery of park control valve.

In its standard configuration the valve is designed to deliver within 1 psi of control pressure. However, for special applications the valve is available with greater differential pressure or zero hysteresis. QR-1C valves also come with optional noise reducing foam crosses or silencers. Some QR-1C valves can also come with biased double check valves. These double check valves contain a beaded seat cap nut (See Figure 2). The bias design minimizes low differential leakage.

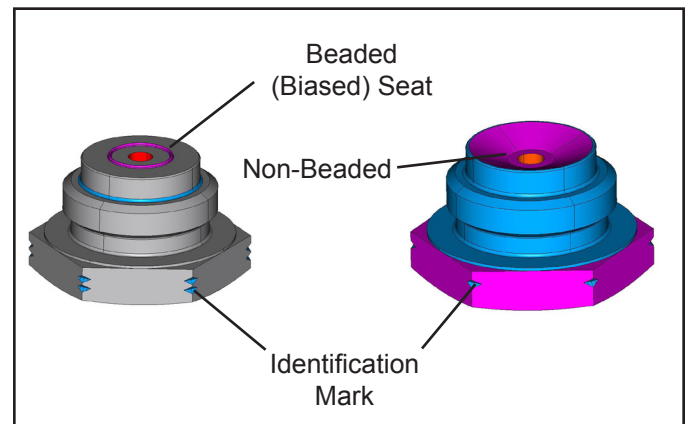


Figure 2 - Cap Nut

GENERAL SAFETY GUIDELINES



**WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS
TO AVOID PERSONAL INJURY OR DEATH:**



When working on or around a vehicle, the following guidelines should be observed **AT ALL TIMES**:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si® air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.

OPERATION

SPRING BRAKES RELEASED

When the spring brakes are released, air from the park control valve flows through the Bendix® QR-1C® valve, causing the double check valve and quick release diaphragms to flex and seal the balance and exhaust ports. Air flows into the emergency port of the spring brakes from the QR-1C valve delivery ports.

SPRING BRAKES APPLIED

When the spring brakes are applied, supply line air pressure to the valve is exhausted through the park control valve. As air pressure is removed from one side of the double check valve and quick release diaphragms, they flex in the opposite direction opening the balance and exhaust ports. Spring brake emergency pressure is released at the exhaust port of the valve while the small amount of air trapped between the two diaphragms is released through the relay valve or brake valve exhaust.

ANTI-COMPOUNDING

When a service brake application is made with the spring brakes applied, service air enters the balance port and flows through the valve into the emergency ports of the spring brakes. This prevents the compounding of a service and spring brake application. Service air passing through the valve flexes the double check and quick release diaphragms, sealing the supply and exhaust ports. When the service application is released, air is exhausted from the spring brakes.

PREVENTIVE MAINTENANCE

Important: Review the Bendix Warranty Policy before performing any intrusive maintenance procedures. A warranty may be voided if intrusive maintenance is performed during the warranty period.

No two vehicles operate under identical conditions, as a result, maintenance intervals may vary. Experience is a valuable guide in determining the best maintenance interval for air brake system components. At a minimum, the QR-1C valve should be inspected every 12 months or 3,600 operating hours, whichever comes first, for proper operation. Should the QR-1C valve not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

REMOVAL

1. Block vehicle wheels and/or hold vehicle by means other than air brakes.
2. Drain all air brake system reservoirs.
3. Identify and disconnect air lines from valve.
4. Remove mounting bolts, then valve.

DISASSEMBLY

Mark the relationship of the body and cover before disassembly.

1. Remove cap nut.
2. Remove sealing ring from cap nut.
3. Remove double check valve diaphragm.
4. Remove four Phillips head screws.
5. Separate the body and cover and remove the sealing ring and quick release diaphragm.

CLEANING AND INSPECTION

Clean all metal parts in mineral spirits. Wipe all rubber parts clean. It is recommended that all rubber parts and any other part showing signs of wear or deterioration be replaced with genuine Bendix® parts.

ASSEMBLY

1. Install sealing ring on cap nut.
2. Install double check valve diaphragm in body.
3. Install cap nut and torque to 150-400 in-lbs.
4. Install sealing ring in valve body.
5. Install the quick release diaphragm in the cover.
6. Install the cover and diaphragm on body, aligning the marks made during disassembly. Secure together using the four Phillips head screws and torque to 30-60 in-lbs.
7. Re-install the QR-1C valve and before putting the vehicle in service, perform the "Operation and Leakage Tests."

OPERATION AND LEAKAGE TESTS

Before performing these tests, park the vehicle on a level surface and hold the vehicle by means other than the brakes.

1. With the park control valve in the released position, note that the spring brakes are released.
2. Remove the air line connected to the QR-1C valve balance port and apply a soap solution to the exhaust and balance port. A one inch bubble in 5 seconds is permissible at either location.
3. Reconnect the valve balance line; and using the park control valve, park the vehicle. NOTE: A prompt application of the spring brakes with an exhaust of air at the QR-1C valve exhaust port.

4. Remove the air line connected to the supply port of the Bendix® QR-1C® valve. With a service brake application hold applied, apply a soap solution to the supply port and around the seam between the body and cover. A one inch bubble in 5 seconds is permissible at the supply port. No leakage is permitted between the body and cover.
5. Reconnect the supply port air line. If the valve does not function as described, or if leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit, or repaired with genuine Bendix® parts.

INSTALLATION

Mount valve with exhaust port pointing down; securely tighten mounting bolts. Reconnect air lines as identified during removal.



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