

Bendix® LQ-2™ Limiting & Quick Release Valve and TW-1™ Control Valve

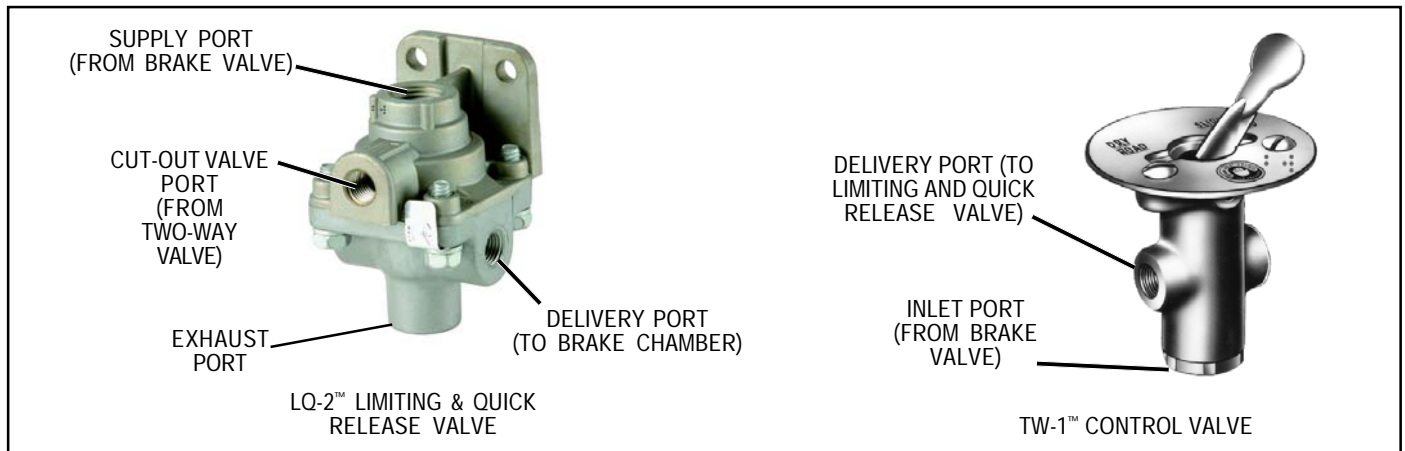


FIGURE 1

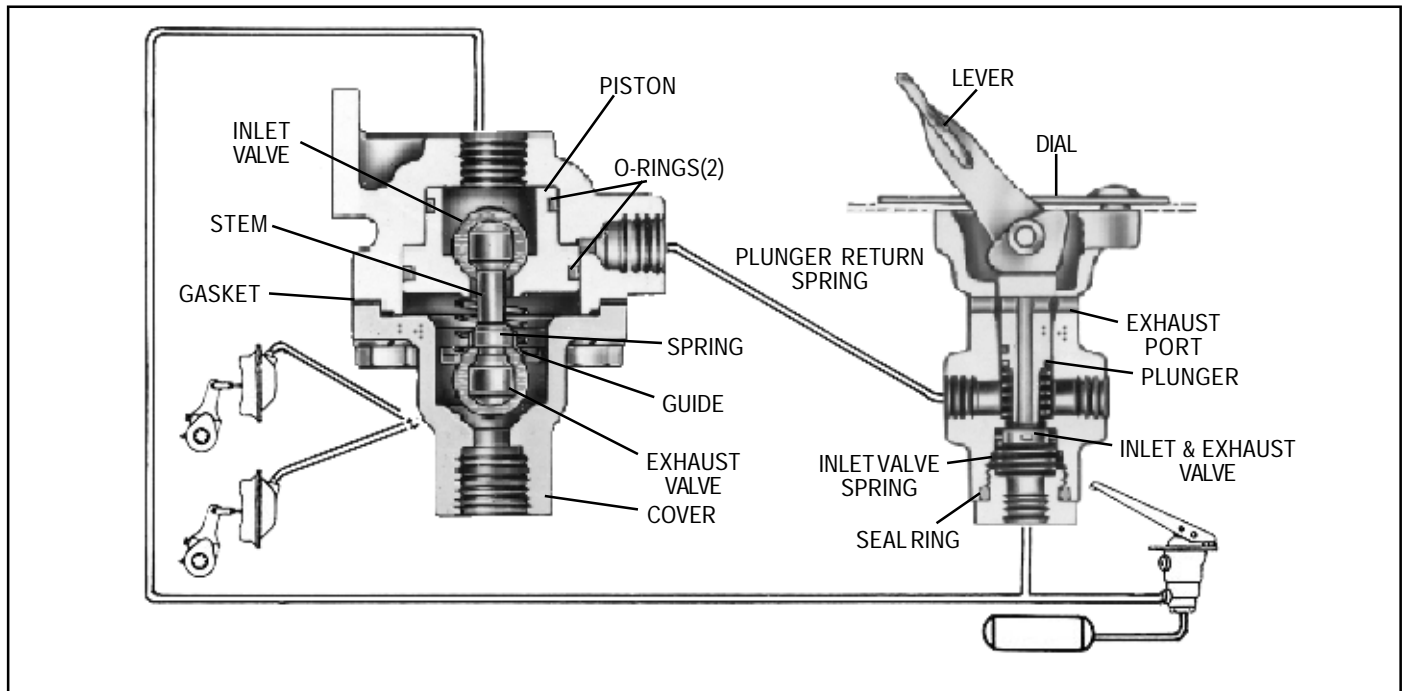


FIGURE 2

DESCRIPTION

LQ-2™ LIMITING & QUICK RELEASE VALVE

The Bendix® LQ-2™ limiting and quick release valve is a dual function valve; the valve serves to limit brake applications and is generally used on the front or steering axle of a vehicle.

The LQ-2™ valve is controlled by a TW-1™ control valve, (see Figure 2) which is mounted in the vehicle cab within reach of the driver. Placing the control valve in the “Slippery Road” position will reduce front axle service application pressure by 50%. With the control valve in the “Dry Road” position, there is no reduction of service application pressure. In addition, the LQ-2™ valve serves a quick release function, releasing air directly from the front axle chambers.

OPERATION

Reference Figure 2, the LQ-2™ limiting and quick release valve and the TW-1™ control valve are connected to a service application line: one connection is to the supply (top) port of the limiting and quick release valve; the other is to the inlet port of the two-way control valve. The delivery line from the two-way control valve is connected to the cut-out valve (side) port of the limiting and quick release valve.

DRY ROAD POSITION

With the handle of the TW-1™ control valve in the “Dry Road” position, the valve is in the “on” position and air is permitted to pass through the valve.

When a foot brake valve application is made, air flows through the TW-1™ control valve and enters the side port of the limiting and quick release valve. At the same time, air also enters the top inlet port; thus pressure acts upon the top and side areas of the piston, moving the piston down, seating the exhaust valve, closing the exhaust port. At the same time the inlet valve opens and air is delivered out the delivery ports, to the chambers.

When the air pressure beneath the piston (and in the delivery lines) equals the air pressure being delivered by the foot valve, the piston raises slightly and closes the inlet valve. When the foot valve application is released, the air on the top and side areas of the piston is exhausted back through the foot valve; air pressure beneath the piston raises it, and the exhaust valve opens allowing the air in the delivery lines to exhaust out the exhaust port.

SLIPPERY ROAD POSITION

With the handle of the TW-1™ control valve in the “Slippery Road” position, the valve is in the “off” position; the inlet valve is seated and the exhaust is open. In this position air is not permitted to pass through the valve.

When a foot brake application is made, air enters only the top inlet port. (Air does not enter the side inlet port because the TW-1™ control valve is “off”.) Air pressure is effective only on the upper inner area of the piston; the piston moves down and the exhaust valve seats and the inlet valve opens. Air pressure in the delivery line acts on the lower area of the piston, which is about twice the size of the upper inner area of the piston. Thus, when the pressure acting upon the lower area is about half of the brake valve delivered pressure, the piston lifts and closes the inlet valve. In this position, the air pressure in the brake chambers is approximately 50% of brake valve application pressure.

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

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.
2. Stop the engine and remove 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.
3. 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.
4. 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 an AD-IS™ air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.
5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. 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.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.

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 limiting, quick release, and TW-1™ valves should be inspected every 12 months or 3600 operating hours, whichever comes first, for proper operation. Should the limiting, quick release, and TW-1™ valves not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

OPERATING AND LEAKAGE TESTS

OPERATING TEST

For this check, two accurate test gauges will be needed. Install one gauge in a brake chamber delivery line, and the other in the foot valve delivery line.

1. Place the control valve in the “Dry Road” position and make a foot valve application. Readings on both gauges should be the same.

Release the application and note that air is exhausted promptly from the exhaust port of the limiting and quick release valve.

2. Place the control valve in the “Slippery Road” position and apply the foot valve. The pressure reading on the gauge in the brake chamber line should be 50% of the reading of the gauge in the foot valve delivery line.

LEAKAGE TEST

1. Place the control valve in the “Dry Road” position. Make and hold a foot valve application. Coat the exhaust of the limiting and quick release valve with soap suds; leakage should not exceed a 1" bubble in 3 seconds.
2. Place the control valve in the “Slippery Road” position. Make and hold a foot valve application. Coat the exhaust of the TW-1™ control valve; leakage should not exceed a 1" bubble in 3 seconds.

If the valve does not function as described above, or if leakage is excessive, it is recommended that the valve be replaced with a new or remanufactured unit, or repaired with genuine Bendix parts.

REMOVING AND INSTALLING

Block and hold vehicle by means other than air brakes.

LIMITING & QUICK RELEASE VALVE

Identify all lines to facilitate installation; disconnect lines and remove valve.

TW-1™ CONTROL VALVE

1. Identify lines to facilitate installation.
2. Disconnect lines.
3. Remove two screws on valve dial plate.
4. Remove dial plate
5. Remove valve.

INSTALLING

LIMITING AND QUICK RELEASE VALVE

1. Locate valve near front axle in close proximity to the chambers it serves.
2. Install valve with exhaust port, pointing down. Use two mounting bolts and tighten securely.
3. Connect brake chamber lines to delivery ports.
4. Connect brake valve delivery line to top inlet port and line from control valve to side inlet port.

TW-1™ CONTROL VALVE

1. Place valve handle through mounting hole.
2. Install dial plate; tighten screws.
3. Connect air lines:
 - (a) from brake valve to inlet port.
 - (b) to limiting and quick release valve from delivery port.

DISASSEMBLY

LIMITING AND QUICK RELEASE VALVE

1. Remove four (4) cap screws and lockwashers; separate cover, sealing ring and body.
2. Push piston from body.
3. Remove piston o-rings.
4. Remove exhaust valve, valve guide and spring.
5. Pull the valve stem through the piston; remove inlet valve from stem.

TW-1™ CONTROL VALVE

1. Remove inlet valve cap nut, spring and inlet/exhaust valve. Remove cap nut seal ring.
2. Drive out lever pin and remove lever.
3. Remove plunger and plunger spring.
4. Remove plunger o-ring.

CLEANING AND INSPECTION

Wash all metal parts in mineral spirits; wipe rubber parts dry.

Inspect all parts for signs of wear and/or deterioration. Inspect springs for cracks, distortion or corrosion and inspect all metal valve seats for nicks or scratches.

It is recommended that all rubber parts be replaced, and that any part showing signs of wear or deterioration be replaced.

ASSEMBLY

LIMITING AND QUICK RELEASE VALVE

1. Install inlet valve on stem (note: lubricating the valve with silicone will aid installation).
2. Insert stem through pistons, position spring and valve guide over stem and press exhaust valve boot on stem.
3. Lubricate body and cover bores, o-rings and o-ring grooves with Dow Corning 55M pneumatic grease (Bendix piece no. 291126).
4. Install o-rings on piston assembly.

5. Install piston assembly in body. Be careful not to damage o-rings.
6. Install sealing ring in body; install cover to body.
7. Install four (4) cap screws/lockwashers; torque to approximately 100 inch pounds.

TW-1™ CONTROL VALVE

Prior to assembly, lubricate body bores, plunger and o-rings with Dow Corning 55-M pneumatic grease (Bendix piece no. 291126).

1. Install inlet/exhaust valve and spring in body.
2. Install cap nut and sealing ring.
3. Install plunger o-ring, plunger spring and plunger into body.
4. Position lever in body slot, line up lever hole and install pin.
5. Test valves as outlined in "Operating and Leakage" test section.

