



**NEW YORK
AIR BRAKE
CORPORATION**
A KNORR BRAKE
COMPANY

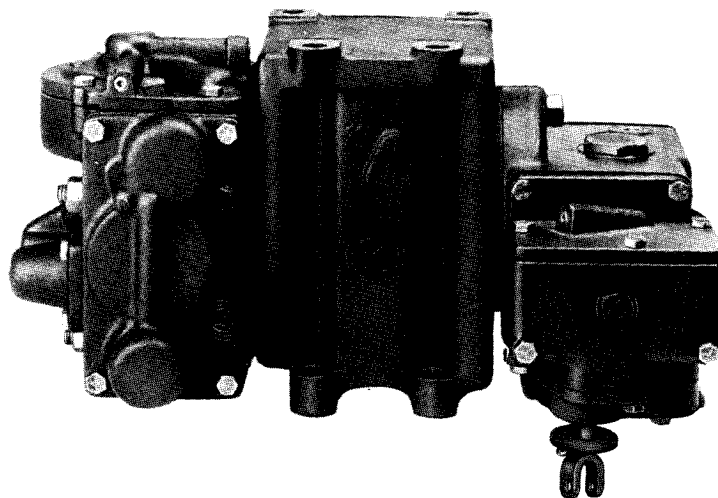
**TECHNICAL
DATA**

DB-60 Control Valve

- DB-10 Service Portion
- DB-20 Emergency Portion
- DB-30 Pipe Bracket

P/N 769144

FOR FREIGHT BRAKE EQUIPMENT



DB-60 DIRECT RELEASE CONTROL VALVE

The AAR approved Knorr DB-60 Direct Release Control Valve consists of the DB-10 Service Portion, the DB-20 Emergency Portion, and the DB-30 Pipe Bracket and features the following performance advantages:

- Exceptionally reliable performance under all brake pipe operating conditions, proven both in our test labs and in a variety of field applications, greatly reduces the possibility of any undesirable control valve responses and train reactions.
- Faster service brake transmission time reduces stopping distance up to 10% without increasing in-train forces.
- Diaphragm operated pistons and soft-seated poppet valves to control air flow, combined with unique K-rings for dynamic seals, provide positive sealing, zero leakage, and assures desired response throughout the life of the valve, even under adverse environmental or train operating conditions.
- Durable 20 year service life, by design, through the use of long-lasting stainless steel springs, rugged cast iron construction, filter protected chokes, controlled soft-seat poppet valves, and a centralized protected common exhaust port for each portion.
- Improved maintainability through the use of single size cover bolts, valve portions and covers that are power-tool-accessible, and a maximized use of interchangeable parts within and between service and emergency portions.
- DB-60 complies with all AAR specifications for direct release control valves and has received the AAR's unconditional approval.
- The DB-60 weighs only 168 lbs., and requires the least installation clearance. The portions are directly interchangeable, either by separate portion or complete valve, with those of other AAR-approved control valves, including identical location of release valve stems and vent valve exhausts.

NEW YORK AIR BRAKE CORPORATION

A KNORR BRAKE COMPANY

748 Starbuck Avenue, Watertown, New York 13601

Telephone: 315-786-5200

FAX: 315-786-5676 (Administrative)

KNORR BRAKE LIMITED

675 Development Drive

Kingston, Ontario, Canada K7M 4W6

Telephone: 613-389-4660

FAX: 613-389-8703 (Main Office)

613-389-8770 (Railroad Sales)

OPERATION AND FUNCTIONS OF THE KNORR DB-60 DIRECT RELEASE CONTROL VALVE

DB-10—SERVICE PORTION

The DB-10 service portion consists of the service valve with the attached release valve and has the following main elements:

(1) Service Main Piston System

The service main diaphragm piston compares brake pipe and auxiliary reservoir pressure acting on equal piston areas. The auxiliary reservoir charging, emergency reservoir charging, and balancing valves, which are spaced equidistantly around the same diameter, are mechanically operated by the bottom side of the main piston. The coaxially arranged balancing piston is pressurized with auxiliary reservoir air by the balancing valve, and acts on the balancing spring which stabilizes the main piston system in the service lap position. The main piston operates the quick service inlet valve, which allows brake pipe air to flow to the quick service chamber. The auxiliary reservoir/brake cylinder inlet and cylinder/retainer outlet valves are also mechanically operated by the main piston. Stability of the main piston system in the release position is provided by means of the sensitivity choke; stability in the service lap position is provided by means of the stability port choke. A separate emergency reservoir charging check valve/choke arrangement prevents uncontrolled return flow of emergency reservoir air into auxiliary reservoir when releasing the brakes from a service application. Thus undesired reapplication of the brakes during release will not occur, even without service accelerated release valve activity.

(2) Service Accelerated Release Valve

The service accelerated release valve's diaphragm, independently of the service main piston system, also compares brake pipe and auxiliary reservoir pressures acting on equal areas. When service accelerated release activity is triggered, emergency reservoir air passes by the high sensitivity back flow check valve on to the brake pipe.

(3) Quick Service Limiting Valve

The quick service limiting valve's diaphragm is pressurized by brake cylinder air and allows restricted flow of brake pipe/quick service air to the brake cylinder up to 8 to 12 psi. The quick service limiting check valve prevents return flow of brake cylinder air to atmosphere during emergency applications, and in the event a re-

tainer is set in the high pressure position with the service main piston system in the release position.

(4) Emergency Release Auxiliary Reservoir Reduction Valve

The emergency release auxiliary reservoir reduction valve's diaphragm is pressurized by brake pipe and brake cylinder air on opposite sides. After manual release of brake cylinder pressure subsequent to an emergency application, increasing brake pipe pressure operates the valve during recharging. This allows auxiliary reservoir air to flow past the emergency release auxiliary reservoir reduction check valve into brake pipe, thus assisting brake pipe recharging. The retaining check valve, by means of a choke, allows reduction of retainer held brake cylinder air to a pressure which permits the brake cylinder piston to move to the release position.

(5) Quick Service Valve

The quick service valve piston is pressurized by auxiliary reservoir air on one side, and controls the flow of quick service air to atmosphere until the service main piston system allows the balancing valve to pressurize the larger opposite piston area with auxiliary reservoir pressure, thus interrupting venting of quick service/brake pipe air.

(6) Release Valve

The release valve piston is pressurized on both sides with brake cylinder air, and seals the connection from brake cylinder to atmosphere. Upon manual activation of the release valve handle, the upper side of the piston is vented, through the release exhaust valve, and allows the piston to open the connection from brake cylinder to atmosphere. The piston remains in that position until brake cylinder lock-up air pressure below the piston is released by the service main piston system upon its release. The auxiliary reservoir exhaust valve and the emergency reservoir exhaust valve are mechanically operated by the release valve lifter, and allow high capacity flow of both auxiliary reservoir air and emergency reservoir air to atmosphere.

OPERATION AND FUNCTIONS OF THE KNORR DB-60 DIRECT RELEASE CONTROL VALVE

DB-20—EMERGENCY PORTION

The DB-20 emergency portion consists of the emergency valve with an integrated accelerated application function (continuous quick service), and has the following main elements:

(7) Emergency Main Piston System

The emergency main diaphragm piston compares brake pipe and quick action pressures acting on equal piston areas. The piston is designed to mechanically operate the quick action pressure discharging valve in order to stabilize the system against an emergency application during a service application. A lost motion arrangement provides piston travel to independently operate the accelerated application sensor valve located on the upper side of the piston. The spill over check valve allows quick action overcharge pressure reduction into emergency reservoir, and additional emergency reservoir charging through the brake pipe/quick action charging choke.

(8) Emergency Accelerated Release Valve

The emergency accelerated release valve's diaphragm is pressurized by brake pipe and quick action pressures on opposite sides, and, independently of the emergency main piston system, allows brake cylinder assistance for brake pipe pressure buildup during recharging of the valve subsequent to an emergency application. The emergency accelerated release check valve prevents return flow of brake pipe air into brake cylinder during (initial) charging of the system.

(9) Accelerated Application Valve

The brake pipe discharging valve diaphragm and the

pulsating valve diaphragm are each pressurized on only one side by quick action air supplied by the accelerated application sensor valve. A choke provides the stability margin of the valve, by permanently bleeding quick action air to atmosphere. Quick action pressure buildup at the brake pipe discharging valve opens the valve seat at a predetermined value, and allows brake pipe air to flow to the pulsating valve and further on to atmosphere.

(10) Inshot Valve

The inshot valve piston is pressurized by brake cylinder air on both sides during service applications. During emergency application, the piston switches to restricted brake cylinder flow position to time a two-stage pressure buildup.

(11) High Pressure/Vent Valve

The vent valve piston, on different piston areas, compares quick action chamber pressure and quick action pressure controlled by the main piston system. Upon emergency applications, the pressure differential overcomes the spring setting and opens the vent valve. The mechanically coupled high pressure valve switches to open the emergency reservoir/brake cylinder connection, and increases final brake cylinder pressure. The quick action blow down choke prohibits premature charging of brake pipe by holding the vent valve in the open position for a predetermined time.

DB-30—PIPE BRACKET

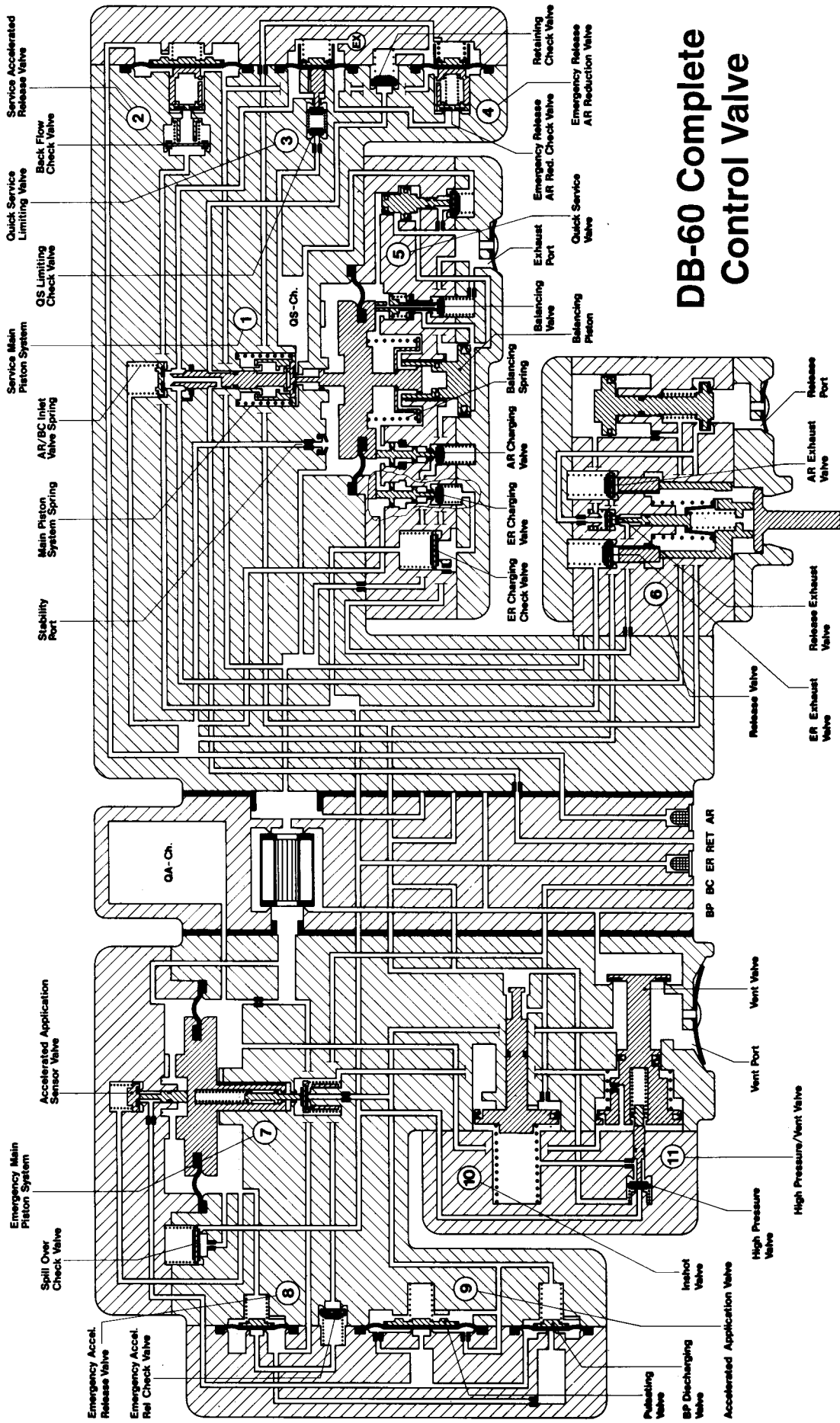
The DB-30 pipe bracket supports and aligns both the service and the emergency portions, and supplies external air connections to the valvular components. It contains the following main elements:

- quick action chamber;
- high capacity pleated paper strainer to filter brake pipe air; and
- connections for brake pipe, brake cylinder, emergency reservoir, auxiliary reservoir, and retaining valve air.

KNORR DB-60 DIRECT RELEASE CONTROL VALVE DOCUMENTATION

- **MU-21 Instruction Manual**—Description of DB-60 and DB-60L control valves
- **S-4014 Instruction Manual**—Repair track maintenance, DB-60 and DB-60L control valves
- **S-4015 Instruction Manual**—Shop maintenance, freight brake equipment, DB-60 and DB-60L control valves
- **S-4016 Instruction Manual**—"AB" test rack code of tests, DB-60 and DB-60L control valves

DB-20 Emergency Portion + DB-30 (Pipe Bracket) + DB-10 Service Portion = DB-60 Complete Control Valve



DB-60 Complete Control Valve



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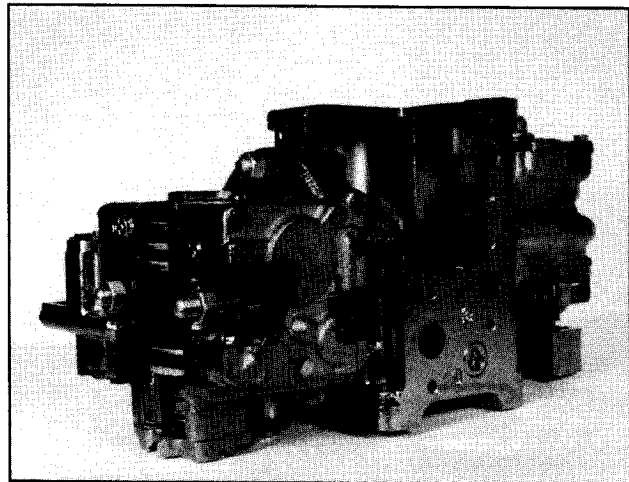
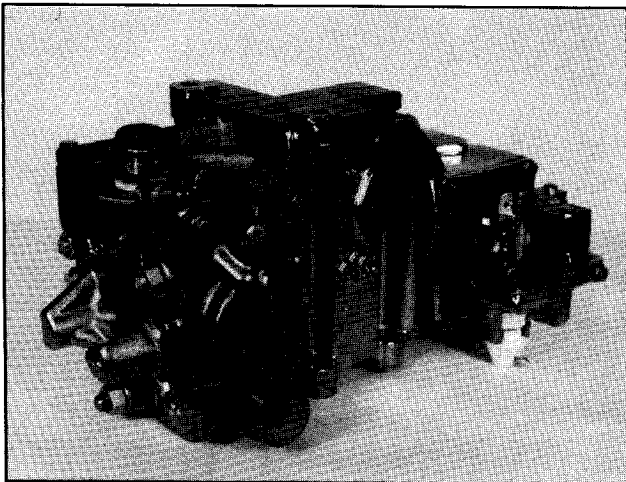
SALIENT FUNCTIONS AND FEATURES OF THE KNORR DB-60 CONTROL VALVE

The DB-60 Control Valve incorporates the following functions:

- Direct release control valve designed for use on AAR equipped freight cars
- Quick service feature accelerates propagation on initial application
- Accelerated application feature assists all brake pipe reductions
- Minimum brake cylinder pressure maintaining feature
- Service accelerated release feature
- High propagation rate during emergency applications
- Emergency brake cylinder pressure 15-20% higher than full service level
- Two stage emergency brake cylinder pressure build-up
- Operates with standard range of brake pipe pressures from 70 to 110 psi
- Supports brake system recharge, also after manual brake cylinder release

The DB-60 Control Valve design incorporates the following features:

- Stable, repeatable, predictable performance under all brake pipe conditions and all environmental conditions including minus 40 to plus 150 degrees F
- Improved performance, including faster service brake transmission times
- Zero leakage design provides positive pass/fail test results and significantly reduced train leakage rates for energy savings.
- Soft-seated, low compression, controlled permanent set poppet valves eliminate slide valve and spool valve inherent design problems.
- Textile reinforced diaphragms in either conical long-stroke rubber or flat metal reinforced short-stroke rubber, and exclusive K-ring sealing
- Centralized protected single exhaust port for each valve portion
- Designed for 20 year C.O.T. & S. service life, and featuring:
 - Open power tool access to all pipe bracket 5/8" stud nuts for portions
 - Open power tool access to common single size bolts for all covers
 - Durable cast iron body and cover design, phosphated and hot wax dipped
 - Exclusive use of stainless steel preset springs for improved life
 - Maximum interchangeable internal components, even between portions
 - Chokes designed to prevent incorrect installation and easy identification
 - Only replacement of rubber parts and filters required; no tuning/repair
 - Vital chokes are brass, mostly bushing mounted, and filter protected
 - Shorter, more positive, testing and rack trouble shooting time required
 - Most interior parts are made of brass, thus no special cleaning required
- Directly interchangeable by separate portion and complete valve with AAR approved control valves, including identical location of release valve stem and vent valve exhaust, and requires less installation clearance space



SECTIONAL CUT VIEWS OF DB-60 CONTROL VALVE

