DESCRIPTIVE PUBLICATION C45.

SECTION 8
LIST 1

WESTINGHOUSE

TRADE MARK

REGISTERED

Type E Relay Valve

WESTINGHOUSE BRAKE (AUSTRALASIA) PTY. LTD.
Head Office and Works: Concord West, N.S.W.
Postal Address: Box 21, P.O., Burwood, N.S.W.

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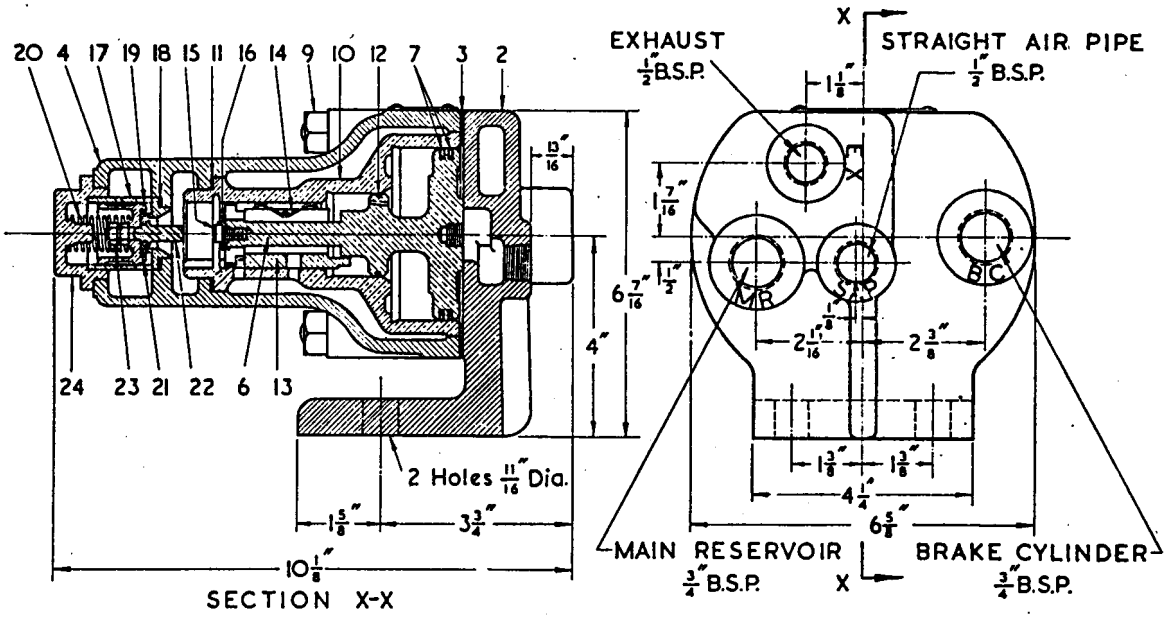
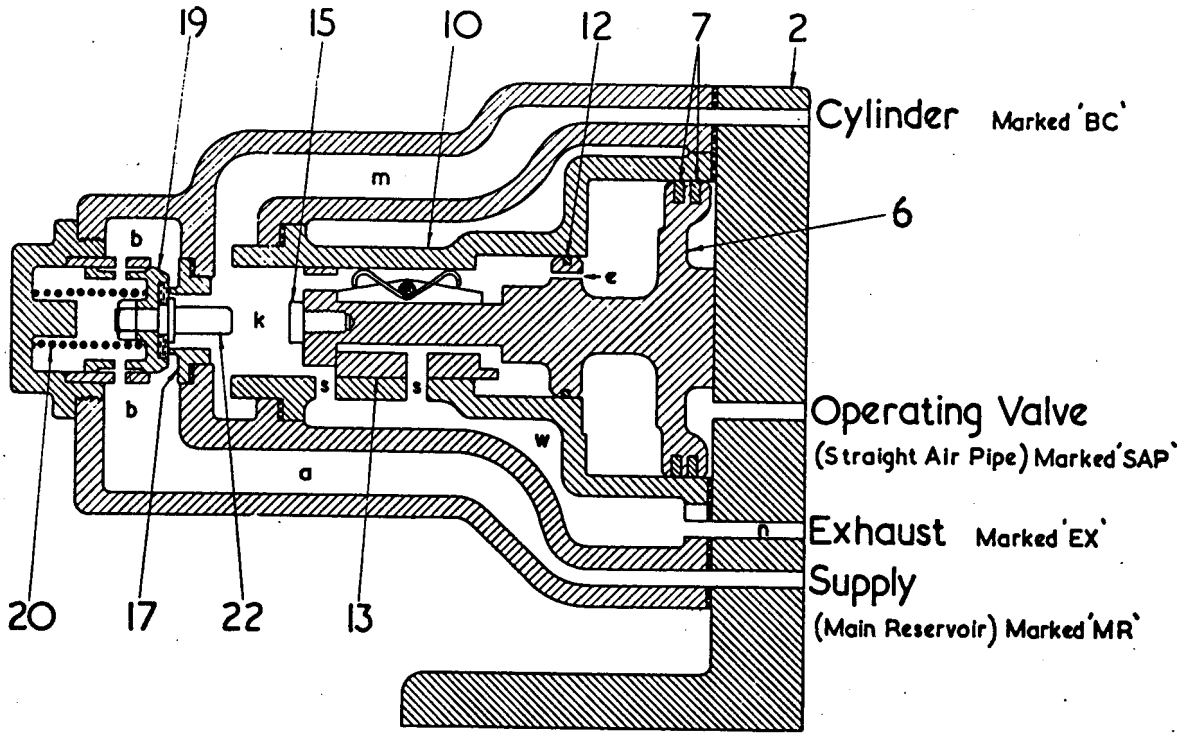
Type E Relay Valve





DIAGRAM

The Type E Relay Valve performs three main functions, viz:—

Supplying air to a cylinder or volume in response to the charging of the operating valve pipe. Releasing air from the cylinder or volume in response to the release of air from the operating valve pipe.

Maintaining substantially constant pressure in the cylinder or volume (provided that the operating valve pipe pressure remains constant) by replenishing any slight leakage which may be present on the cylinder side of the system.

The Type E Relay Valve is used to allow given control or operating valves to control much larger volumes of air than they could do alone; thus small readily operable valves may be used to control comparatively large volumes of air without delay. Such devices as quick release valves may generally be dispensed with when the relay valve is used.

CONSTRUCTION. The device is of the pipe bracket type, i.e all pipe connections are made to the pipe bracket 2: thus dismantling the valve for examination or repair is achieved by removing four nuts 9, without breaking any pipe joints, when the whole of the working portion of the device may be easily and quickly removed. The combined piston and slide valve bush 10, and the application valve seat 17, being of the "Slip" type, may be readily withdrawn for inspection, cleaning, or replacement when necessary. The large diameter of the application piston 6 has two piston rings 7 to provide maximum protection against leakage, and the small dashpot piston has a ring 12, to protect against undue wear of the piston. For the piston ring 7, Westinghouse "Lap Joint" rings are used, and these are for practical purposes free from leakage, whilst a range of repair size rings provides for wear of the cage bush 10.

The hardened steel piston screw 15 is readily renewable.

The gaskets 3, 11, 18 and 21 are highly resistant to moisture and oil.

The device may be mounted either horizontally or vertically as preferred, but in the latter case the pipe bracket 2 must be at the bottom, to ensure correct operation.

OPERATION. The diagrammatic view shows the valve in release position with supply pressure entering through passage a and present in chamber b surrounding the application valve 19. The cylinder is open to atmosphere through passage m, chamber k, ports s and passages w and n, and the left hand face of Piston 6 is likewise vented to atmosphere through the small hole e in the dashpot piston. The right hand face of piston 6 is also open to atmosphere through the operating or control valve.

When the operating valve admits pressure to the right hand side of the piston 6, the latter moves to the left, carrying with it the slide valve 13, first blanking the exhaust ports s and thus closing communication between the cylinder and exhaust, then when piston screw 15 contacts the application valve stem 22, the application valve 19 is unseated, allowing supply pressure to enter chamber k from chamber b and flow thence to the cylinder via passage m. When cylinder pressure equals operating valve pressure the forces on opposite sides of piston 6 are equal and the application valve spring 20 moves the application valve 19 and piston 6 sufficiently to the right to close valve 19, but no further, and this is known as the "Lap" position. Since ports s are still blanked by slide valve 13, the cylinder pressure will be retained. If cylinder leakage is present the piston will again move to the left, under the influence of superior pressure on its right hand face, allowing the application valve 19 to replenish the loss and the piston will then again move to the right to Lap position. Increase of operating valve pressure will have the same result.

If now the operating valve pressure on the right hand side of the piston is reduced, the piston will move further to the right and slightly open the ports s, allowing cylinder pressure to escape to exhaust until it is very slightly lower than operating valve pressure, when the superior force on the right hand side of the piston will cause it to move to the left to Lap position and close the exhaust ports s. If the operating valve pressure is completely released, the piston 6 will assume the full release position as shown under the superior force of cylinder pressure on its left hand face, and the cylinder pressure will then rapidly escape through passage m, chamber k, ports s and passages w and n

It will be seen therefore that any pressure between zero and full supply pressure established on the right hand side of the piston 6, will be very rapidly duplicated in the cylinder and on the left hand side of piston 6.

MAINTENANCE, LUBRICATION AND CLEANING. At regular intervals the operating portion should be removed from its pipe bracket for inspection and cleaning. This should preferably be done at a bench by a competent man, where the liability of damage to the internal parts is least. The slide valve 13, and its seat, should be thoroughly cleaned with a suitable solvent to remove all traces of grease, gum and foreign matter. After thoroughly drying the parts, clean dry graphite should be rubbed into the faces until they show a dark copper colour. To apply the graphite use a stick in the shape of a paddle about 8" long and having a small piece of chamois glued to one end. Put a small amount of graphite on the chamois and rub into the surfaces leaving no free graphite. The piston 6 and rings should be immersed in clean solvent and then thoroughly blown off with air and wiped dry with a clean cloth. The cage bush should be cleaned with a cloth saturated with a good grade of lubricating oil, filling the pores of the metal with oil and then wipe out the surplus with a clean cloth. Before the cleaned piston is replaced in the bush, three drops only of approved oil should be placed in each ring groove and the ring moved about to distribute the oil. Lubricate the bush sparingly and move the piston back and forth several times, after which remove the surplus oil from the outer edge of the bush. The rubber gaskets and seal should be inspected and replaced if cracked or worn.

Type E Relay Valve

Piece No. C748.	Type E Relay Valve Complete (Cast Iron)	Weight: 33 lbs.
Piece No. C3781.	Type E Relay Valve Complete (Aluminium)	Weight: 23 lbs.
Piece No. C2240.	Type E Relay Valve Portion less Pipe Bracket and Gasket (Cast Iron)	Weight: 21½ lbs.
Piece No. C3925.	Type E Relay Valve Portion less Pipe Bracket and Gasket (Aluminium)	Weight: 11½ lbs.

Piece No.	Ref. No.	Description.
C601	2	Pipe Bracket Complete (includes four of 9).
C1821	3	Body Gasket.
C629	4	Body (Cast Iron).
C3926	4	Body (Aluminium).
C581	6	Piston.
C1765	7	No. 1 Piston Ring for Bushings 3.372" to 3.375" dia. (New Work), (two required).
C1766	7	No. 2 Piston Ring for Bushings 3.375" to 3.379" dia. (two required).
C1767	7	No. 3 Piston Ring for Bushings 3.379" to 3.383" dia. (two required).
C1768	7	No. 4 Piston Ring for Bushings 3.383" to 3.387" dia. (two required).
C1769	7	No. 5 Piston Ring for Bushings 3.387" to 3.391" dia. (two required).
C1770	7	No. 6 Piston Ring for Bushings 3.391" to 3.395" dia. (two required).
C600	9	½" B.S.W. Stud and Nut (four required).
C596	10	Cage Bush.
C1822	11	Cage Bush Seal.
C598	12	Small Piston Ring for Bushings 1.625" dia. (New Work).
C2238	12	Small Piston Ring for Bushings 1.656" dia.
C2239	12	Small Piston Ring for Bushings 1.687" dia.
C543	13	Slide Valve.
C428	14	Slide Valve Spring.
C551	15	Piston Screw.
C547	16	Piston Screw Lock Washer.
C583	17	Application Valve Seat.
C1823	18	Application Valve Seat Seal.
C2242		Application Valve Complete (includes 19, 21, 22 and two of 23).
C585	19	Application Valve.
C561	20	Application Valve Spring.
C2241	21	Application Valve Seal.
C584	22	Application Valve Stem.
C594	23	Application Valve Stem Nut (two required).
C544	24	Cap Nut.

Orders should state PIECE NUMBER and NAME of Part

Donald F. Pettigrew Pty. Limited, Printers, The Broadway, Enfield.