

FIGURE 1 - "KP" MAIN VALVE & PLOT (Water)

INLET PRESSURE
 LOADING PRESSURE
 CONTROL PRESSURE
 DOWNSTREAM PRESSURE



Type KP PILOT OPERATED BACK PRESSURE VALVE

This Page No.	TS-KP
Date Of This Issue	APRIL 1999
Supersedes Page No.	TS-KP
Dated	MAY 1998

DESCRIPTION

The Type KP is a pilot operated back pressure valve that offers high capacity and extremely accurate control. The Type KP automatically maintains the desired maximum pressure in a vessel or system by relieving pressure in excess of the valve setting into a lower pressure return line or to atmosphere. Type KP valves are not emergency relief devices but are continuous operating valves for water or air systems that offer dependable protection against over pressure conditions.

SPECIFICATION RATA

Service: Water or air

Sizes: 1", 1-1/4", 1-1/2", and 2"

Connections: Threaded female inlet and outlet

Body: Brass

Maximum Temperature: 2005

Pressure Control Range: 15-65 psi or 50-200 psi

Maximum Overpressure:

Low pressure valves - 100 psi.

high pressure valves - 300 psi

Capacity and Flow Information: Refer to Bulletin BPV-KP

NOTE: The Type KP is available with factory modifications for systems with high temperatures (to 400°F), high pressure (to 400 psi). Consult factory for details.

OPERATION

Initially, both the main valve plug (A) and the pilot valve seat disc (B) are in a closed position. Both will remain closed until the inlet pressure approaches the pressure setting of the valve.

When pressure is introduced at the inlet of the main valve it is also directed through the copper tube (C) to the pilot valve diaphragm chamber (D). The pressure required to open the pilot valve seat disc (B) is determined by the pressure setting of the pilot spring (E). When the inlet pressure in the diaphragm chamber (D) is greater than the pressure setting, the seat disc (B) opens. Pressure then passes from the pilot valve diaphragm chamber (D) through the seat ring and into the main valve diaphragm chamber (F). Pressure also passes through the seat orifice (K)

into the pilot valve spring chamber (G) where it is vented downstream through the pilot valve orifice (H) and the copper tube (I). (or to

atmosphere in air service where normally no tube is required). When pressure in the main valve diaphragm chamber (F) exceeds the upward force of the main valve piston spring (J), the main valve plug (A) opens and allows flow through the valve.

When the inlet pressure drops below the pressure setting of the valve, the pilot spring (E) forces the seat disc (B) to close. Pressure in the main valve diaphragm chamber (F) now bleeds through the seat disc orifice (K) into the spring chamber (G) and then downstream on water valves or into the atmosphere on air models. As pressure drops in the main valve diaphragm chamber (F), the piston spring (J) forces the main valve plug (A) to close. Since the seat is a rubber material, the valve is now tightly shut off.

GENERAL INSTALLATION INSTRUCTIONS

Type KP regulators should be installed in the horizontal position with the spring chamber upright. For other installation requirements consult the factory. For ease of operation and maintenance, it is suggested that manual

INSTALLATION, MAINTENANCE & REPAIR PARTS INFORMATION

shut-off valves be installed upstream and downstream from the valve. If it is desired to have continuous operation when inspecting or replacing any regulator parts, also install a bypass line with shut-off valve around the regulator. It is suggested that a Cash-Acme strainer be installed in the line ahead of the regulator to protect the inner parts of the valve. It is also recommended that a pressure gauge be placed in the control line.

Before installing the valve, all pipe lines should be thoroughly cleaned and blown out. Also, remove any foreign matter that may have collected in the regulator during shipment. Install the valve with the inlet pipe fitted to the connection on the valve so that the flow is in the

direction of the arrow cast on the valve body. Use a compatible sealant on the male pipe threads and do not over tighten the valve connections.

Typical Recommended Installations

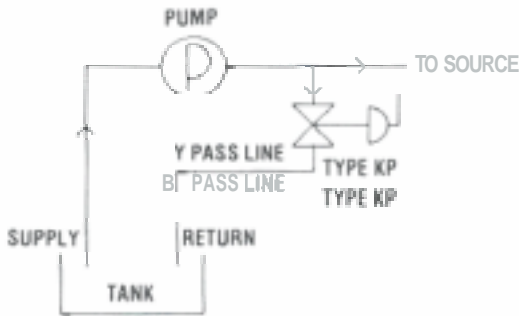
The KP water valve has an inlet pressure connection to the pilot valve as well as a connection from the pilot valve's upper spring chamber to the valve outlet or downstream line. A fixed bleed orifice in the pilot valve spring chamber allows water pressure from the upper spring chamber to bleed downstream. Downstream pressure in excess of 5 psi could, however, affect valve performance. If the downstream pressure exceeds 5 psi, the pilot bleed line should be piped to an open drain rather than into the downstream line,

The KP air model is similar to the water valve with the exception that the pressure in the spring chamber bleeds directly to atmosphere rather than to the downstream line.

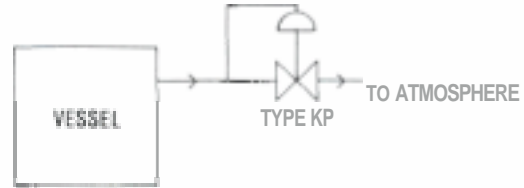
Type KP valves are designed to be installed in any system where back pressure valves are required and accurate control must be maintained, especially when high capacity flows are required. Four typical applications are illustrated below.

In each of these installations, the Type KP will continually maintain the required pressure within extremely close limits while providing high capacity flows when required.

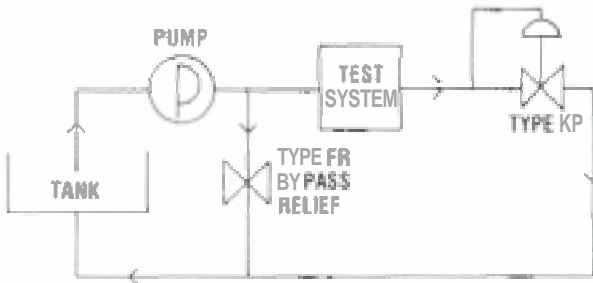
TYPICAL INSTALLATIONS



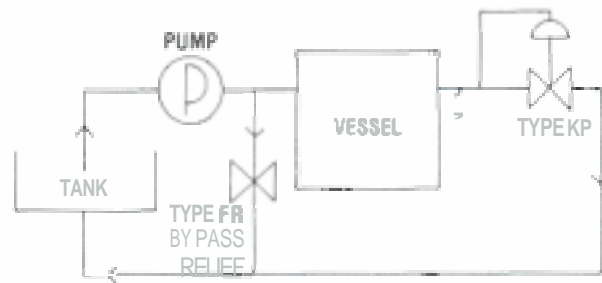
Pump Bypass - Type KP will serve as a highly accurate, high capacity pump bypass valve.



Back Pressure Relief - The KP can be used as in-line back pressure relief valve when both accuracy and high capacity are required.



Test System Bypass - An FR or similar Cash-Acme bypass valve would function as a bypass pressure control while the KP would be used as an in-line back pressure control to maintain the discharge pressure of a system.



Pressure Vessel Control - In this example, a standard Cash-Acme back pressure valve would serve as a bypass pressure valve and the KP would control the outlet pressure from a vessel or container.

OPERATING INSTRUCTIONS

Refer to Figures 2 and 3 for part identification.
Placing The Main Valve and Pilot in Service

When the main valve and pilot are completely installed and ready for service, with the pilot mounted onto the main valve and all of the copper tubing hooked up, the following steps should be taken to place the Type KP in operation.

1. Remove the adjusting screw cap (1) on the pilot valve and loosen the locknut (3). Back out the pilot adjusting screw (2) until all loading pressure on the pressure spring (7) is relieved.
2. Open the downstream gate valve.
3. Slowly open the upstream gate valve and close the bypass valve if open.
4. Slowly turn the adjusting screw on the pilot valve down and into the spring chamber (5) until the upstream pressure reaches the desired setting as shown by the pressure gauge in the control line.
5. Lock the adjusting screw (2) with the lock nut (3) and install the adjusting screw cap (1).

Removing the Main Valve **and/or** Pilot Valve From Service

1. Shut off the inlet gate valve and the downstream gate valve. Open the bypass valve if manual service is desired for the downstream side.
2. When servicing either the main valve or the pilot valve, remove the copper tubes from their respective fittings on the pilot valve and main valve.

NOTE: The pilot valve can be removed from the diaphragm chamber (25) by unscrewing it, with or without the close nipple (18).

Adjusting the Back Pressure

The regulator's back pressure setting is adjusted by means of the adjusting screw (2) at the top of the pilot valve spring chamber after removing the cap (1) and loosening the adjusting screw lock nut (3). To increase the back pressure, turn the adjusting screw clockwise (into the spring chamber). To decrease the back pressure turn the adjusting screw counter-clockwise (out of the spring chamber). Tighten the adjusting screw lock nut after the adjustment has been made and install the cap.

MAINTENANCE INSTRUCTIONS

PILOT VALVE (Water Service)

Refer to Figure 2 for part identification.

Servicing the Pressure Spring (7), Diaphragm (11), Ball Seat (15), and Seat Ring (16)

1. Remove the adjusting screw cap (1). Inspect and if necessary replace the cap gasket (4).
2. Loosen the lock nut (3) 1/4 turn and turn the adjusting screw (2) counter-clockwise until the pressure spring (7) is no longer under tension.

NOTE: When installing the adjusting screw during reassembly, turn the screw clockwise until the lock nut just touches the spring chamber. When the valve is placed in service the pressure setting should be very close to the original setting.

3. Loosen the coupling nut (14) securing the spring chamber (5) to the valve body (17) and remove the nut. During reassembly, tighten the coupling nut securely.
4. Lift the spring chamber (5) from the valve body. Then remove the spring button (6) and the pressure spring (7).

- i. The diaphragm assembly, consisting of the diaphragm plate nut (8), diaphragm stop (10), diaphragm (11), pressure plate (13) and ball seat (15) can now be lifted off the body (17). Disassemble the parts by unscrewing the diaphragm plate nut (8) from the ball seat (15). Inspect all parts and replace if necessary. The diaphragm gaskets (12) should be replaced when a new diaphragm (11) is installed.

IMPORTANT: Exercise care to ensure that the surface of the ball seat (15) is not scratched, marred or damaged during disassembly and reassembly.

6. Once the diaphragm assembly has been removed, the seat ring (16) which is sitting loosely in the recess of the valve body (17) can be lifted from the valve.

IMPORTANT: Handle the seat ring carefully to avoid damage to the seat ring surface which contacts the ball seat (15).

7. Inspect all parts and replace if necessary. Reassemble in reverse order. Return the main valve to service as described under Operating Instructions.

PILOT VALVE (Air Service)

Refer to Figure 3 for part identification.

Servicing the Pressure Spring (47), Diaphragm (53), Ball Seat (56) and Seat Ring (57)

1. Loosen the lock nut (44) and turn the adjusting screw (43) counter-clockwise until the pressure spring (47) is no longer under tension.

NOTE: When installing the adjusting screw during reassembly, turn the screw clockwise until the locknut just touches the spring chamber. When the valve is placed in service the pressure setting should be very close to the original setting.

2. Unscrew the spring chamber (45) from the valve body (58) and remove the chamber, spring seat (46) and pressure spring (47).

3. The diaphragm assembly can now be lifted off the valve body. The diaphragm assembly consists of the pressure plate nut (48), lock washer (49), diaphragm stop (50), pressure plate (51), upper and lower diaphragm gaskets (52 and 54), diaphragm (53), seat disc gasket (55), and the ball seat (56).

4. Disassemble the diaphragm assembly by unscrewing the pressure plate nut (48) from the ball seat (56). Carefully inspect all parts including the seat disc gasket (55) and replace any worn or damaged parts. Install new diaphragm gaskets whenever a new diaphragm is installed. During reassembly be certain to position the brass upper diaphragm gasket (52) on top of the diaphragm (53) and the Durable lower diaphragm gasket (54) under the diaphragm.

IMPORTANT: Use care to ensure that the ball seat (56) is not scratched, marred or damaged during valve disassembly and reassembly.

5. Remove the seat ring (57), which is sitting loosely in the recess of the valve body, from the valve.

6. Reassemble the valve in reverse order and return the valve to service.

MAIN VALVE (Water and Air Service)

Refer to Figure 2 for part identification.

Servicing the Main Valve Diaphragm (27) and Related Parts

1. Take the main valve and pilot out of service as described under Operating Instructions.
2. Partially loosen all the assembly bolts and nuts (26) from around the main valve diaphragm chamber (20) then remove the bolts and nuts. During assembly tighten the bolts and nuts evenly and in an alternate diagonal pattern.
3. Lift the diaphragm chamber from the valve body (34) and remove the diaphragm (27). Carefully examine the diaphragm and replace if necessary.
4. Once the diaphragm has been removed the diaphragm plate (28) can be lifted from the pressure plate guide (29).
5. Remove the pressure plate guide (29) from the valve plug stem (33).
6. Inspect all parts and replace if necessary. Reassemble the parts in reverse order, then place the valve back in service as detailed under Operating Instructions.

Servicing the Seal Ring (35), Seat Disc (36), Valve Plug (37), Valve Plug and Valve Plug Stem O-Rings (32), Piston Spring (39), and Diaphragm Base and Bottom Cap O-Rings (31)

1. Remove the diaphragm chamber and related parts as described above.
2. Remove the four screws (6) securing the bottom plug cap (40) to the valve body (34). The cap is under slight tension as a result of the valve plug spring (39) acting against the cap. Also remove the bottom cap O-Ring (31) and replace if necessary.
3. Once the bottom cap is removed, the valve plug spring (39) can be removed from the valve body.
4. Using an appropriate thin wall hex socket remove the screw (38) securing the valve plug (37) to the valve plug stem (33). Remove the valve plug through the bottom of the valve then push the valve stem plug upward and out through the top of the valve body.
5. Examine the Buna-N seat disc (36) in the recess of the valve plug and replace if abnormal wear or damage is present. Also examine the O-rings (32) on both the valve plug and valve plug stem for wear or damage and replace if necessary. Coat all O-rings with a high quality lubricant prior to installation.

6. Using an appropriate size piece of hex stock, remove the seat ring (35) through the bottom of the valve body being careful not to damage or distort the seat during removal.
7. If it is necessary to separate the diaphragm base (41) from the valve body (34) remove the four assembly screws (30) and lift the diaphragm base from the body. Inspect the diaphragm base to body O-ring (31) and replace if necessary.
8. Reassemble the valve in reverse order being certain to assemble the lower section first. Carefully tighten all threaded parts, especially the seat ring (35) to prevent distortion. After the lower section of the valve has been completely assembled, test the valve parts for smooth, free movement by pushing down on the diaphragm plate (28) with the heel of your hand.
9. Return the main valve and pilot to service as described under Operating Instructions.

REPAIR PARTS INFORMATION

Convenient, pre-packaged repair kits are available for all Type KP back pressure regulating valves. Individual kits for either the main valve or the pilot valve may be ordered by number. Consult the table below.

REPAIR KITS

MAIN VALVE		
SIZE	AIR KIT NO.	WATER KIT NO.
1" & 1-1/4"	12287	14168
1-1/2" & 2"	15324	15324
PILOT VALVE		
All Sizes	15136	14171

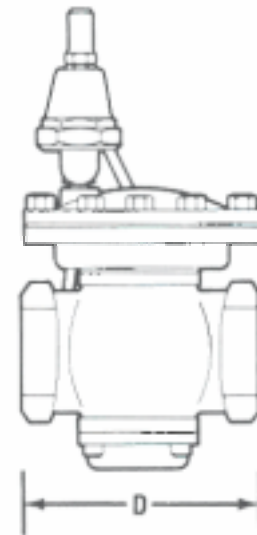
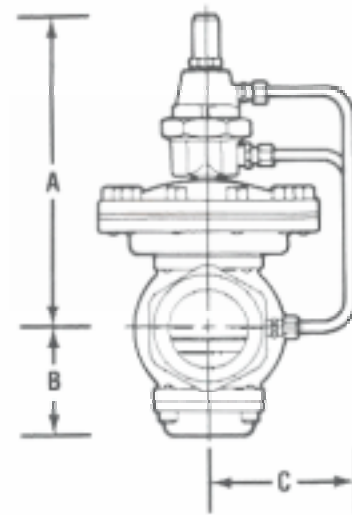
SPECIFICATIONS

SPRING RANGES

VALVE SIZE	SPRING NUMBER	RANGE OF ADJUSTMENT (psi)
All Sizes	4765	15-65
	7337	50-200

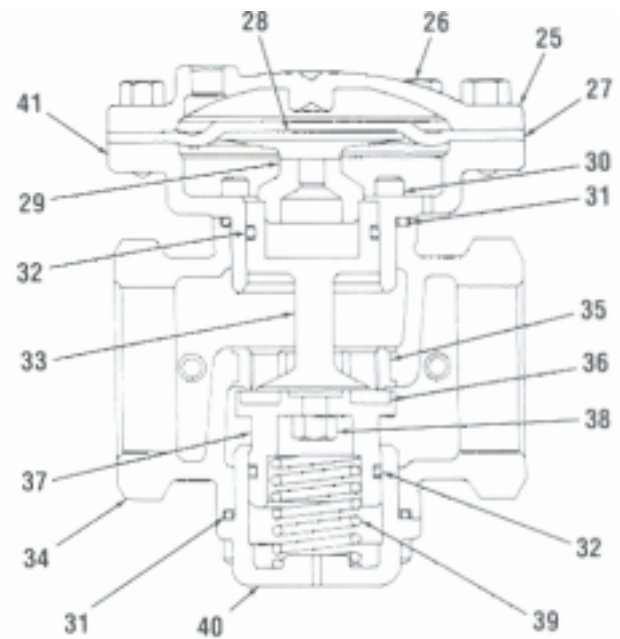
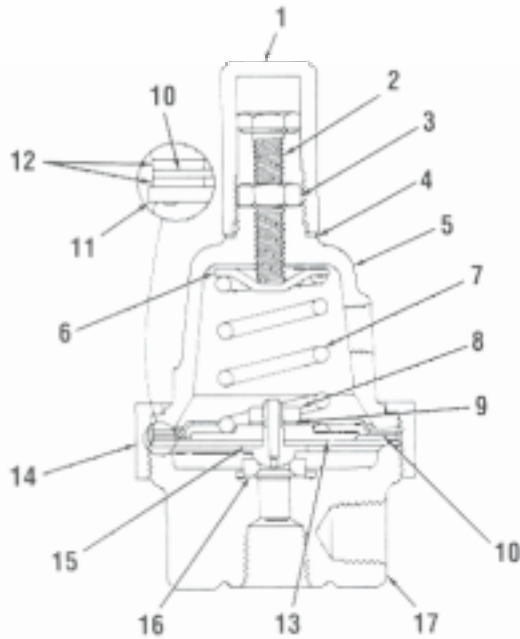
DIMENSIONS

SIZE	SERVICE	DIMENSIONS				SHIPPING WEIGHT (lbs.)
		A	B	C	D	
1"	Air	6-3/4"	2-7/8"	3-1/8"	4-1/2"	8-1/4
	Water	7-7/8"	2-7/8"	3-1/2"	4-1/2"	8-3/4
1-1/4"	Air	6-3/4"	2-7/8"	3-1/8"	4-1/2"	8-1/4
	Water	7-7/8"	2-7/8"	3-1/2"	4-1/2"	8-3/4
1-1/2"	Air	7-1/4"	2-15/16"	3-15/16"	5-3/4"	20-1/4
	Water	8-3/8"	2-15/16"	3-15/16"	5-3/4"	20-3/4
2"	Air	7-1/4"	2-15/16"	3-15/16"	5-3/4"	20-1/4
	Water	8-3/8"	2-15/16"	3-15/16"	5-3/4"	20-3/4



PARTS INFORMATION

FIGURE 2 - " K P PILOT (Water) AND MAIN VALVE (Water & Air)



PILOT VALVE (Water)			
ITEM NO.	DESCRIPTION	QTY.	MATERIAL
1	Adjusting Screw Cap	1	Brass
2	Adjusting Screw	1	Bronze
3	Lock Nut	1	Brass
4	Gasket	1	Aramid Fiber
5	Spring Chamber	1	Bronze
6	Spring Button	1	Brass
7	Pressure Spring	1	Stainless Steel
8	Nut	1	Brass
9	Washer	1	Stainless Steel
10	Diaphragm Stop	1	Brass
11	Diaphragm	1	Neoprene
12	Gasket	2	Aramid Fiber
13	Pressure Plate	1	Brass
14	Coupling Nut	1	Brass
15	Ball Seat	1	303 Stainless Steel
16	Seat Ring	1	303 Stainless Steel
17	Body	1	Brass
18*	Close Nipple	1	Brass
19*	Driftee	1	Stainless Steel
20*	Male Connector	1	Brass
21*	Tubing	1	Copper
22*	Male Connector	1	Brass
23*	Tubing	1	Copper
24*	Male Connector	1	Brass

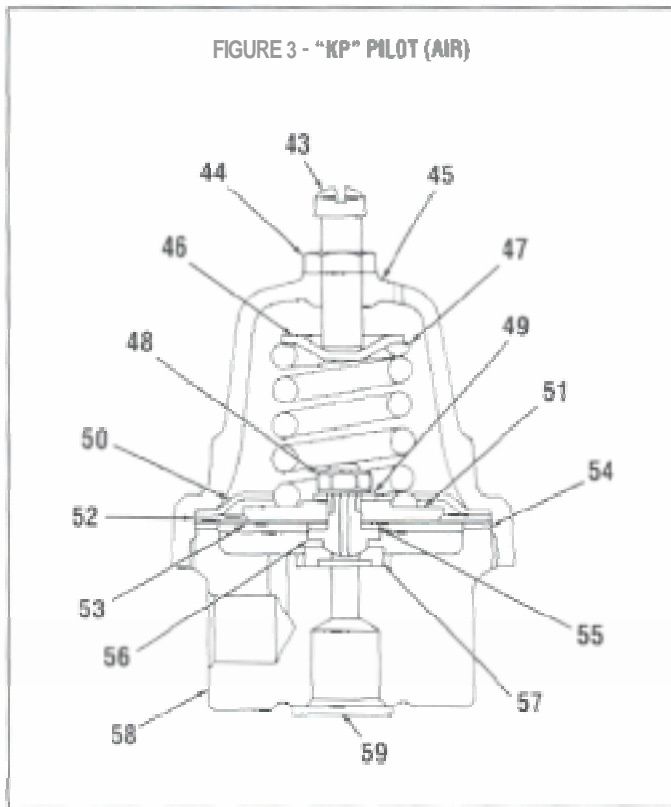
MAIN VALVE (WATER & AIR)			
ITEM NO.	DESCRIPTION	QTY.	MATERIAL
25	Diaphragm Chamber	1	Brass
26	Assembly Screw	10	Steel
27	Diaphragm	1	Buna-N
28	Diaphragm Plate	1	Brass
29	Diaphragm Plate Guide	1	Brass
30	Screw	8	Bronze
31	O-Ring	2	Buna-N
32	O-Ring	2	Buna-N
33	Valve Plug Stem	1	Brass
34	Body	1	Brass
35	Seat Ring	1	303 Stainless Steel
36	Seat Disc	1	Buna-N
37	Valve Plug	1	Brass
38	Screw	1	Bronze
39	Spring	1	302 Stainless Steel
40	Bottom Cap	1	Brass
41	Diaphragm Base	1	Brass
42*	Name Tag	1	Aluminum

*Not shown

CONTINUED ON FOLLOWING PAGE ➤

PARTS INFORMATION (Continued)

FIGURE 3 - "KP" PILOT (AIR)



PILOT VALVE (Water)			
ITEM NO.	DESCRIPTION	QTY.	MATERIAL
43	Pressure Screw	1	Brass
44	Lock Nut	1	Brass
45	Spring Chamber	1	Brass
46	Spring Seat	1	Brass
47	Pressure Spring	1	302 Stainless Steel
48	Pressure Plate Nut	1	Brass
49	Lock Washer	1	302 Stainless Steel
50	Diaphragm Stop	1	Brass
51	Pressure Plate	1	Brass
52	Diaphragm Gasket (Upper)	1	Brass
53	Diaphragm	3	Bronze
54	Diaphragm Gasket (Lower)	1	Durabla
55	Seat Disc Gasket	1	Durabla
56	Ball Seat	1	303 Stainless Steel
57	Seat Ring	1	303 Stainless Steel
58	Ball	1	Brass
59	Protective Closure	2	Plastic
60*	Male Connector	1	Brass
61*	Close Nipple	1	Brass
62*	Male Connector	1	Brass
63"	Tubing	1	Copper
64'	Name Tag	1	Aluminum

*Not shown

HOW TO ORDER

To order repair parts, refer to the cut away view of the Type KP valve to identify the part required. When ordering, please use the part names listed and provide the valve serial number stated on the identification tag. Also state the following:

"Repair Parts for Type KP Back Pressure Regulating Valve" and provide:

1. Valve size
2. Service (air or water)
3. Inlet pressure range

4. Part description
5. Quantity of each part
6. Valve assembly or serial number stated on the metal identification tag attached to the valve.



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