RAPHAEL
VALVES INDUSTRIES (1975) LTD.

A tyco INTERNATIONAL LTD. COMPANY

PISTON ACTUATED
Control Valve

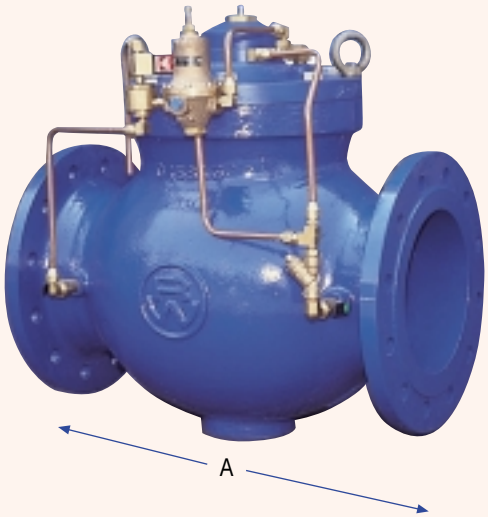
G

Piston Actuated Valve Type G

Hydraulic Control Valve is the most efficient valve for automatic operation of industrial and municipal distribution systems or any other system that requires adjustable working conditions.
The valve operates by pipeline water pressure and does not require any other external energy source. The valve is a completely independent device and can be installed at any location in the pipeline, provided there is just a minimum water pressure allowing its operation. An operating piston surface double the size of the sealing surface enables the control chamber movement towards opening or closing with no external force or energy required.

The G type is a piston actuated valve, which varies from 2" to 32" in a pressure ranging from PN-16 to PN-64.
Raphael G type, globe pattern, piston actuated control valves are a heavy duty, high pressure and large diameters throttling valves.
As a piston actuated valve it is specially designed to withstand high restriction levels at a wide range of flow and diameters.

The metal construction of the piston enables a smooth operation, with no vibrations. Bronze and Stainless steel internal parts provide a cavitation resistance at very low flows keeping metal and iron parts of valves from being damaged. Low corrosion rates are obtainable due to high quality bronze and stainless steel internal parts and high quality epoxy or enamel coating (Potable water approved).
Regulation in high restriction rates is obtainable by a half restricted plug that combine a cost effective protection to seat and seal, keeping sensitive parts in the valve from high velocity water passage.
Globe pattern body construction gives equal wear for the control unit, thus prolonging its lifespan.



Size inch	Size mm.	A	B	C	Weight Kg.
2	50	210	100	410	15
21/2	65	310	120	240	54
3	80	310	120	240	54
4	100	356	150	300	62
6	150	458	200	350	104
8	200	510	187	413	167
10	250	660	250	400	250
12	300	860	290	400	280
14	350	980	395	525	400
16	400	1100	400	580	790
18	450	1250	430	650	1150
20	500	1250	430	650	1370
24	600	1450	500	800	1690
28	700	1570	620	930	2300
30	750	1620	700	1050	2900
32	800	1710	750	1090	3460

Main features

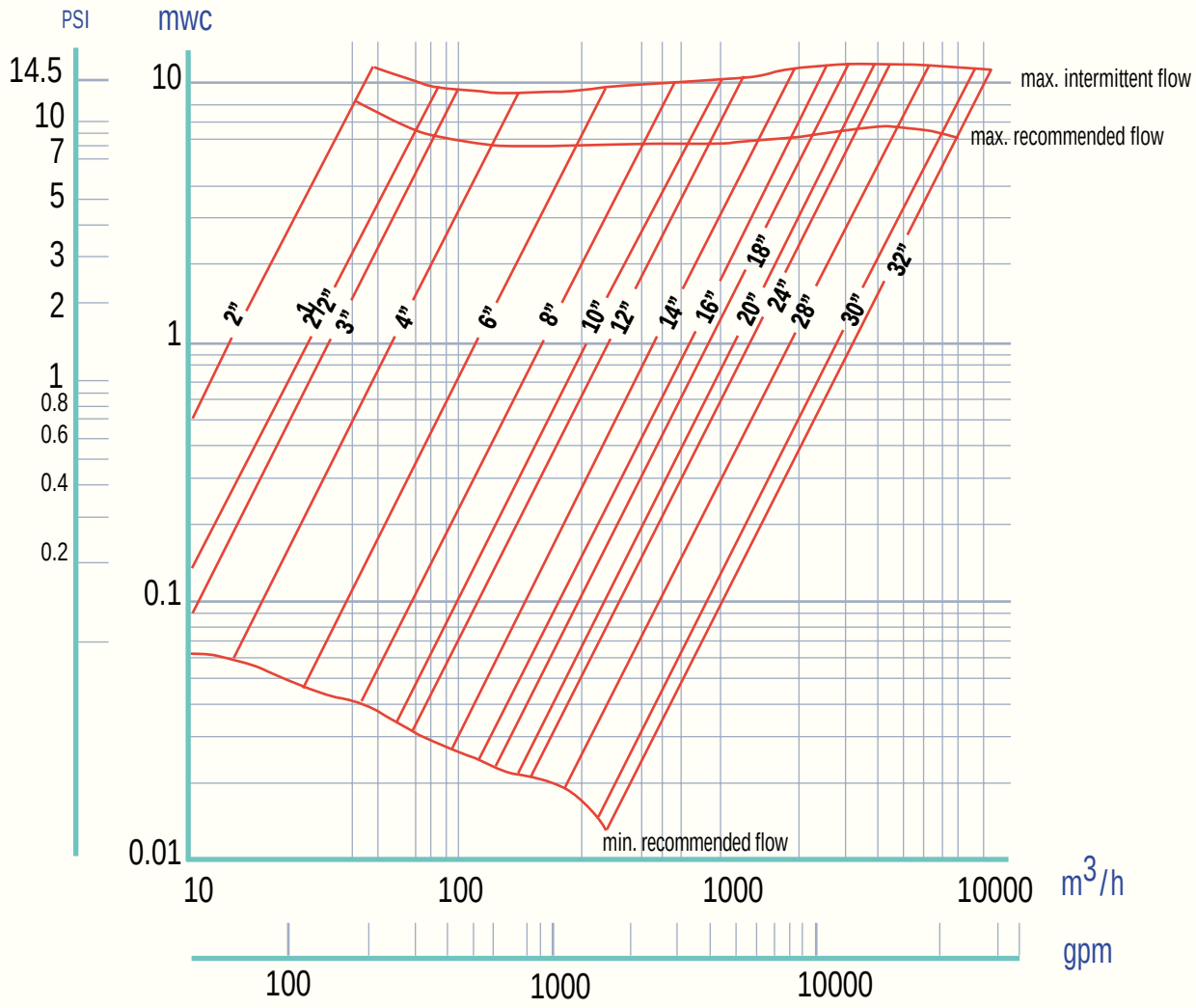
- Sensitive response to slight changes
- Long life system
- Internal coating baked epoxy or enamel
- Pilot controlled
- Drop tight closing
- In-line maintenance
- Simple adjustment
- Sizes 2"-32"
- Pressure rating PN-16 to PN-64
- Temp. range 15˚c to 85˚c

Standards:

Body Construction:	ISO 5751
Leakage Test:	DIN 3230BN rate 1
Flange facing:	DIN2526
Flange Drilling:	According to customer's demand
Pressure - Temperature Rating:	DIN2401

Performance Charts

Head loss for fully opened valve with regular plug



Cv/Kv Rate for fully opened valve with regular plug

Size		Cv	Kv
inch	mm.		
2	50	52	45
2 1/2	65	100	87
3	80	120	105
4	100	208	180
6	150	440	380
8	200	770	670
10	250	1160	1010
12	300	1390	1200

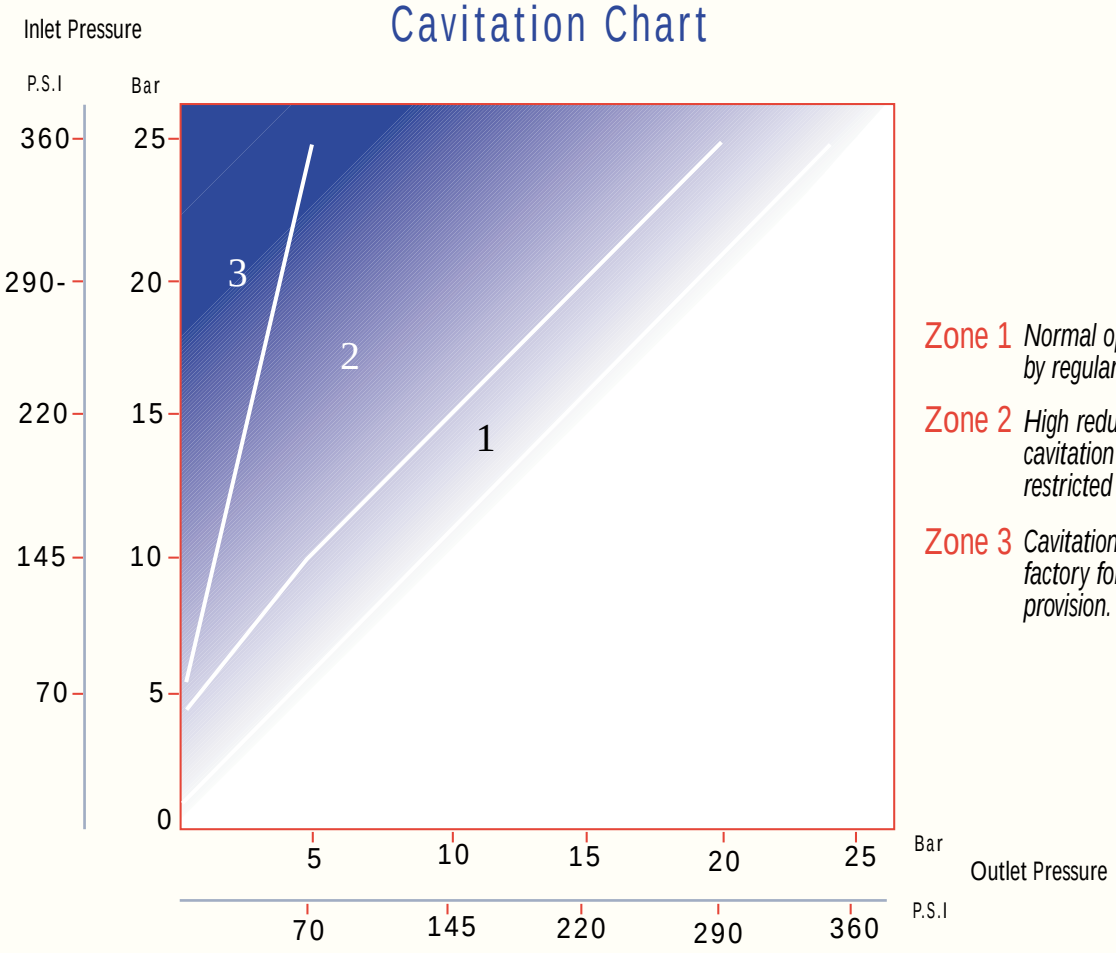
Size		Cv	Kv
inch	mm.		
14	350	2100	1820
16	400	2770	2400
18	450	4170	3600
20	500	4740	4100
24	600	6700	5800
28	700	10300	8900
30	750	10750	9300
32	800	11600	10100

$Q(Gpm) = Cv\sqrt{\Delta p(psi)}$ $Q(m^3/h) = Kv\sqrt{\Delta p(bar)}$

To achieve flow rate values for fully opened valves with half restricted plug multiply by 0.7

Regulation Ranges

Cavitation Chart



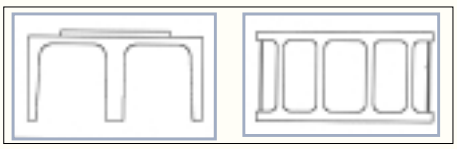
Zone 1 *Normal operation zone, obtained by regular plug.*

Zone 2 *High reduction rates, suggested to cavitation risk, obtained by a half restricted plug.*

Zone 3 *Cavitation zone, please contact factory for valve sizing and solution provision.*

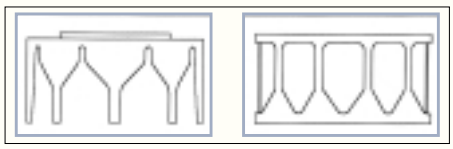
Optional Plugs Charcteristics

REGULAR



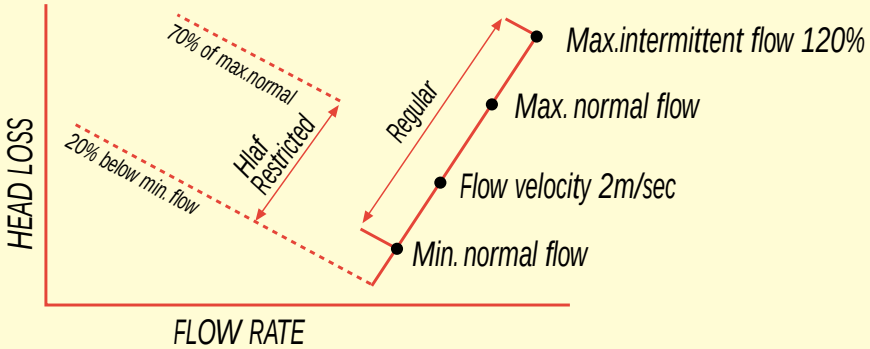
2”-12” 14”-32”

HALF RESTRICTED

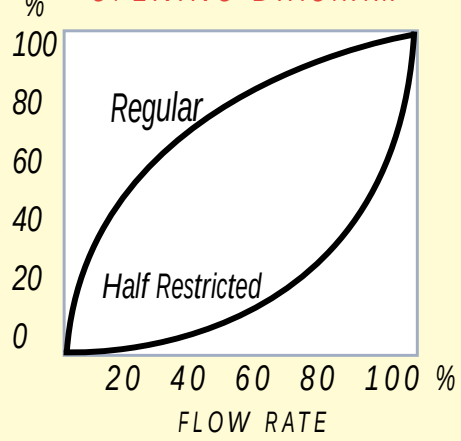


2”-12” 14”-32”

RANGE OF FLOWS FOR THE DIFFERENT PLUG FORMS



OPENING DIAGRAM



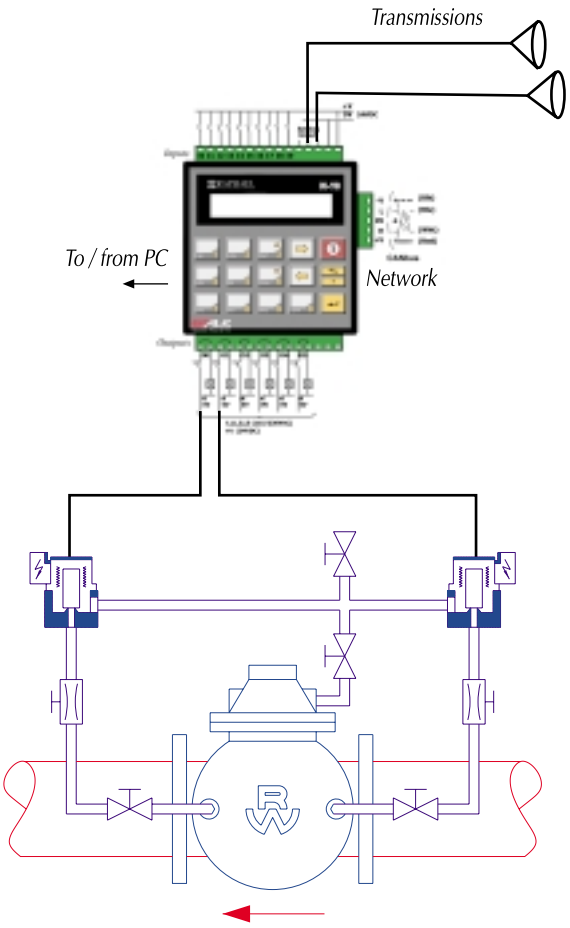
U C V

Universal Control Valve

RAPHAEL'S UCV - Universal Control Valve, is the perfect solution for today's and tomorrow's needs for variable, quick response, multi task applications of system management in waterworks infrastructure.

RAPHAEL's UCV (Universal Control Valve) is specially designed to perform all control duties. The UCV's parameters can be easily changed by a simple controller access. Just by pushbotton one can set different values transmitted as Analog inputs (Pressure, Flow, Level, Temp., humidity, etc.), digital inputs (Maximum level, temp., overflow, saturation, etc.) or time related.

Starting Future Today



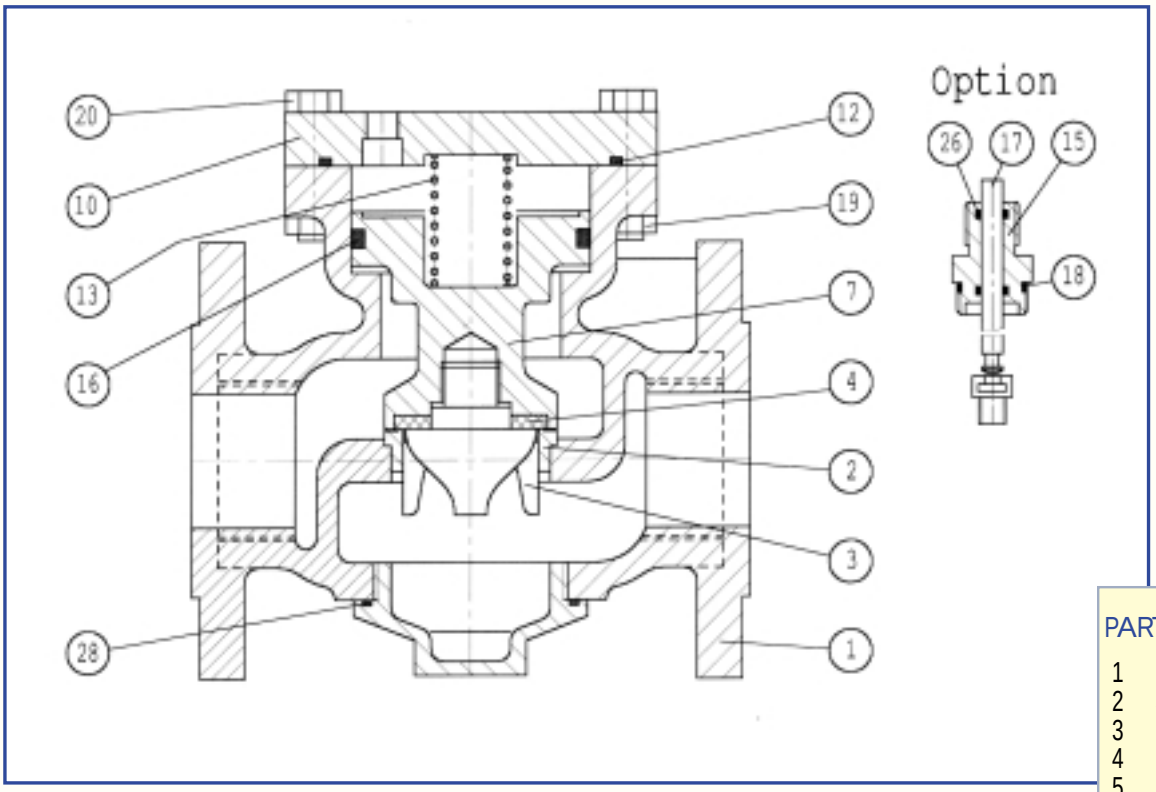
No component changes are required in order to change valve's application.

A local display keeps operating team up-to-date with system's condition and performance. Local keypad allows instant changes in set points and parameters providing dynamic and adjustable on-line operating and system management.

Valve programming can be made by any computer regardless of its physical location, and uploaded into the local control unit (installed on the Universal Control Valve) through the Controller's Network Ports. By pressing a botton the Universal Control Valve can perform a complete different set of control features.

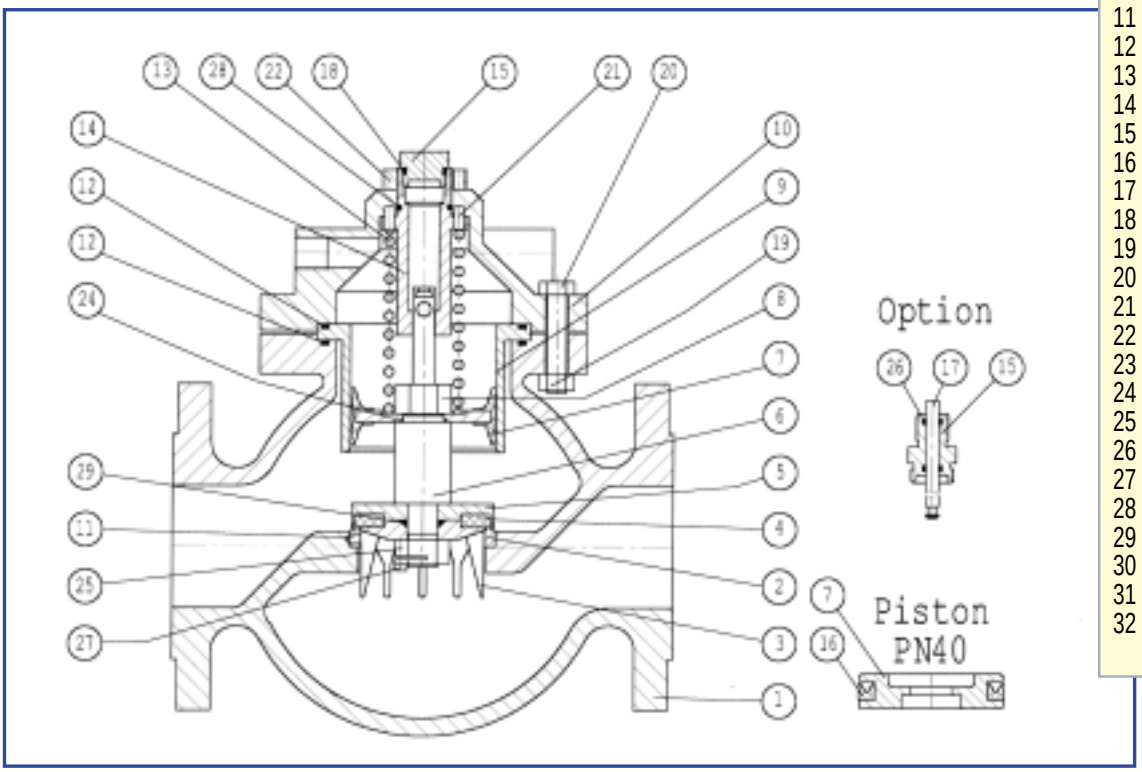
To avoid tamper and unauthorized changes in system's variants a password entry can be activated for different levels of interference (Operator's, Technician's or Programmer's level).

2”



Material
Gray Cast Iron (CI)
Ductile Cast Iron (DI)
Cast steel (CS)
Steel
Bronze
Brass
Stainless Steel (SS)
Rubber (NBR,EPDM)
Coating
Internal coating option
Enamel (En)

3” - 4”



PARTS LIST		2”
1	Body	Bronze
2	Seat	SS304
3	Plug	Bronze
4	Rubber seal	NBR/EPDM
5	Disc	-
6	Stem	-
7	Piston	Brass
8	Nut	-
9	Cylinder	-
10	Cover	Steel (R)
11	Bolt	-
12	"O"-ring	NBR
13	Spring	SS302
14	Bushing	-
15	Plug	Brass
16	Piston seat	NBR
17	Indicator	SS303
18	“O”-ring	NBR
19	Nut	Steel (ZP)
20	Bolt	Steel (ZP)
21	Pin	-
22	Nut	-
23	Bearing	-
24	“O” -ring	NBR
25	Nut	-
26	“O” -ring	NBR
27	Bolt	-
28	“O” -ring	NBR
29	"O"-ring	-
30	Piston lead	-
31	Piston cover	-
32	Bolt	-

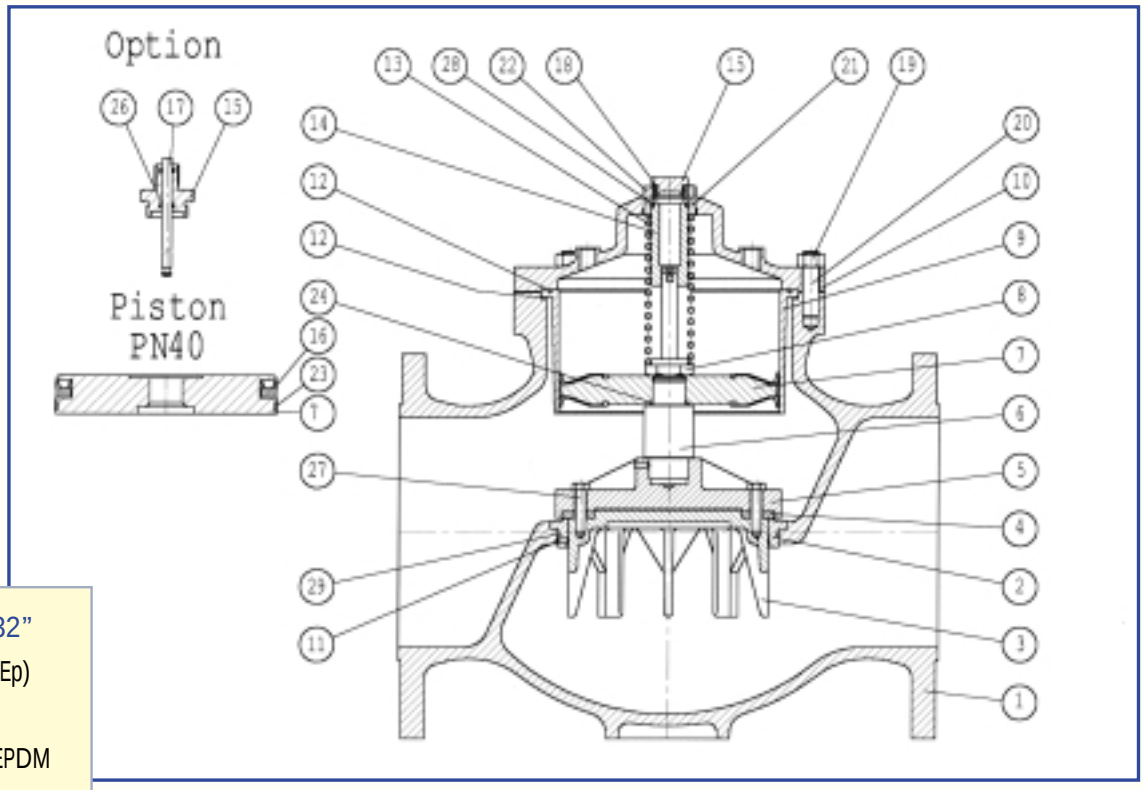
The materials as per PN25

* PN16: Body and cover CI
* PN40: Body and cover 8”-12” CS
  Seat, plug, disc and cylinder SS

List

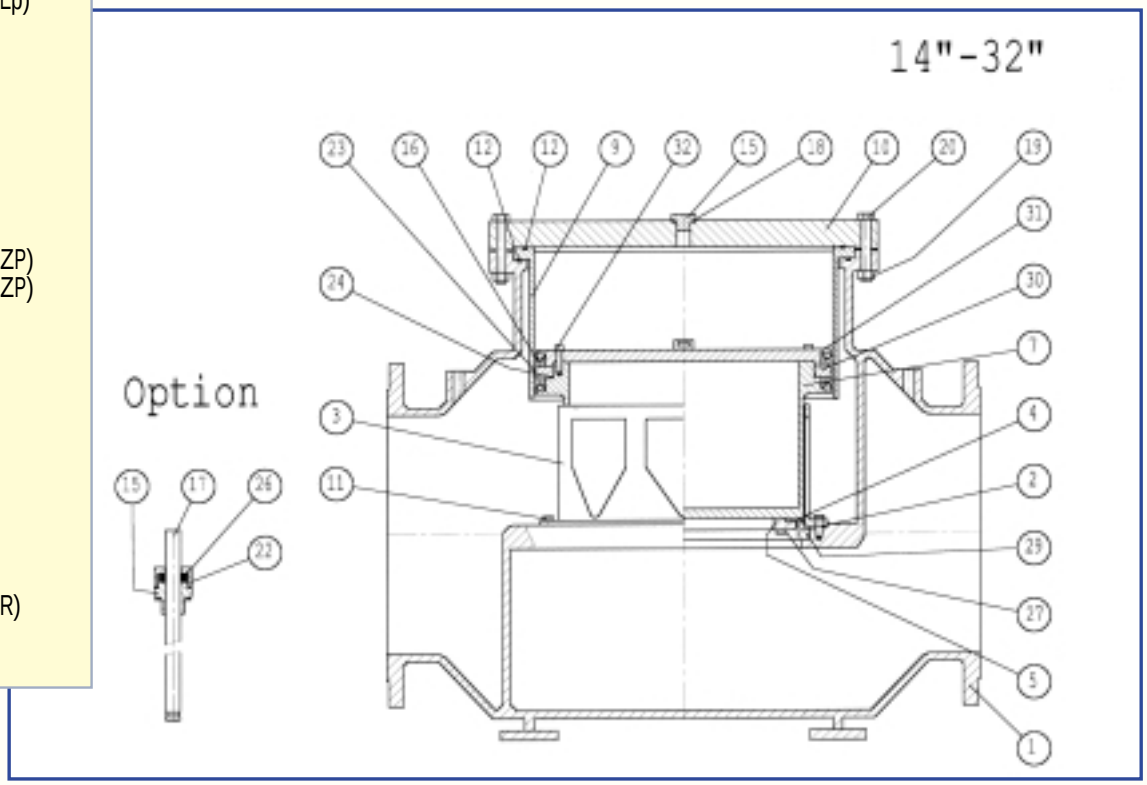
Standard
ASTM A48
ASTM A536
ASTM A216 WCB
ASTM A36
ASTM B62
ASTM B16
ASTM A276
ASTM D2000
Rilsan (R)
Epoxy (Ep)
Zinc Plated(ZP)

6”-12”



3”-4”	6”-12”	14”-32”
DI (Ep)*	DI (Ep)*	Steel (Ep)
Bronze*	Bronze*	SS316
Bronze*	Bronze*	SS304
NBR/EPDM	NBR/EPDM	NBR/EPDM
SS304*	Steel (R)*	SS304
Brass	Brass	-
SS304/NBR	SS304/NBR	SS304/Steel (Ep)
Brass	Brass	-
Bronze	Bronze	SS304
DI(Ep)*	DI (Ep)*	Steel (Ep)
SS304*	SS304*	SS304
NBR	NBR	NBR
SS302	SS302	-
Brass	Brass	-
Brass	Brass	Brass
NBR	NBR	NBR
SS303	SS303	SS303
NBR	NBR	NBR
Steel (ZP)	Steel (ZP)	Steel (ZP)
Steel (ZP)	Steel (ZP)	Steel (ZP)
SS304	SS304	-
Brass	Brass	Brass
-	Teflon	Teflon
NBR	NBR	NBR
Brass	-	-
Nbr	NBR	NBR
SS304	SS304	SS304
NBR	NBR	-
NBR	NBR	NBR
-	-	SS304
-	-	Steel (R)
-	-	SS304

14” - 32”

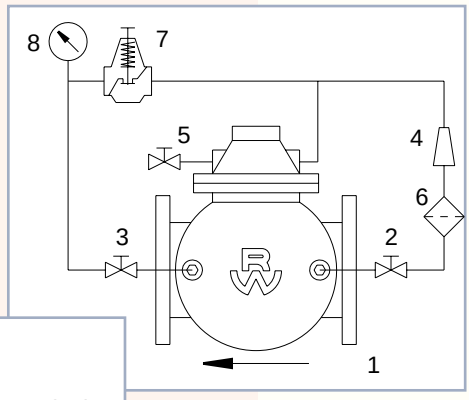


For PN64 standards please consult factory.
Other materials and standards are available upon customer’s request.

Application for type G

Pressure Reducing Valve Type G 60

The valve automatically reduces a greater upstream pressure to a steady lower downstream pressure. The downstream pressure is governed by a pilot and can be adjusted. Downstream pressure is maintained at a steady set pressure regardless of changes in inlet pressure or flow rate. Minor changes in downstream pressure will immediately cause the valve to open or close accordingly, returning the system to a preset.

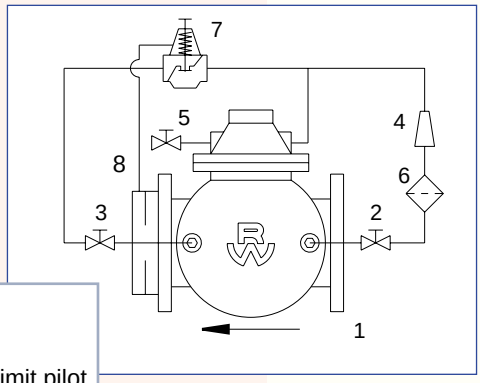


PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Pressure reducing pilot
8.Pressure gauge

Flow Control Valve Type G 70

The valve maintains a steady flow rate at any working conditions. Regardless of pressure changes or demand, the valve will keep flow constant. The flow is controlled by a pilot and a calibrated orifice plate, and can be adjusted within a range of 20%. The orifice plate size is determined by the required flow range and is specific for each project.

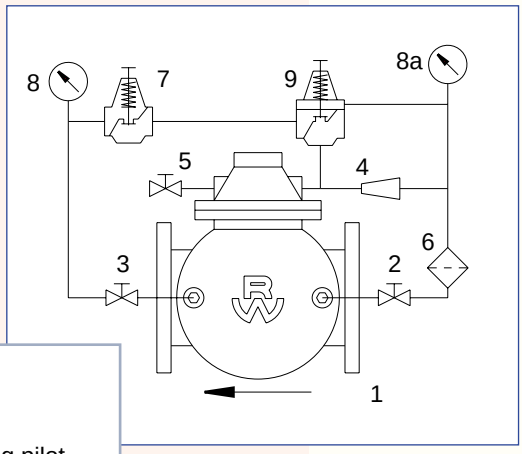


PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Flow limit pilot
8.Orifice plate

Pressure Sustaining and Reducing Valve Type G 68

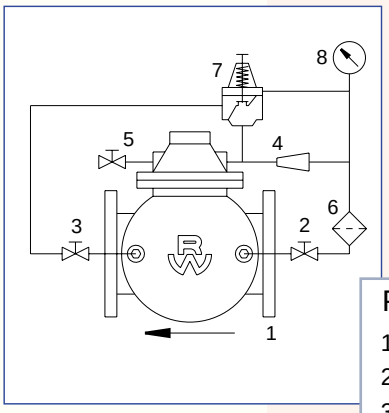
The valve performs both pressure reducing and pressure sustaining features. It maintains a constant upstream pressure to an adjusted value as a pressure sustaining valve, and reduces greater upstream pressure to a steady lower downstream pressure as a pressure reducing valve. Both functions occur independently, and the valve constantly modulates accordingly.



PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Pressure reducing pilot
8.8a.Pressure gauge
9.Pressure relief/ sustaining pilot

Pressure Sustaing/Relief Valve Type G 80

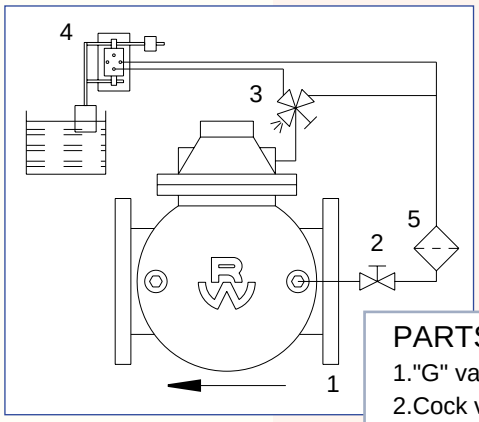


The pressure sustaining valve automatically controls the preset upstream pressure. The inlet pressure will be maintained steady regardless of changes in flow rate or downstream pressure. The pressure sustaining valve is commonly used as a pressure relief valve, installed in a T configuration. At any condition, the valve will open only after the preset pressure is achieved.

PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Pressure relief/ sustaining pilot
8.Pressure gauge

Differential Level Control Valve Type G 13

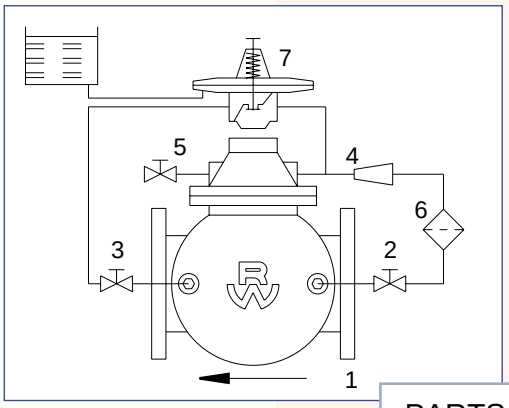


Bi level control valve maintains liquid level in water tanks, reservoirs and water storages. The valve will fully close at a high preset point when water reaches its maximum level , and fully opens at a different, adjustable preset point, allowing water flow in. The bi level control valve is an on/off, non modulating control valve.

PARTS LIST

1."G" valve
2.Cock valve
3.3-way cock valve
4.Bi-level 3-way float pilot
5.Filter

Altitude Control Valve Type G 40

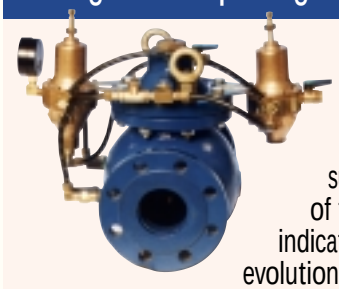


The altitude control valve automatically maintains liquid level in water tanks, reservoirs and storages at its maximum preset point. The valve is pilot controlled, and operates by comparing the water column pressure to the spring adjustment. The valve will be fully closed when the water reaches its preset level. The opening level is determined by the spring selection and varies from 30 to 100 cm.

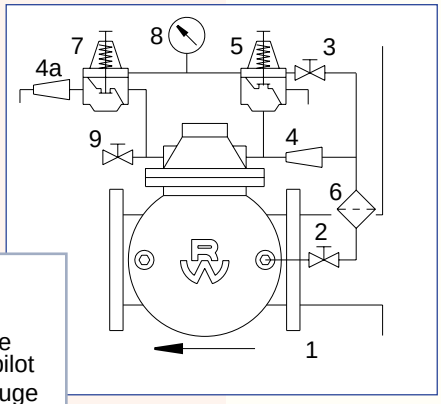
PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Altitude pilot

Surge Anticipating Control Valve Type G 88



The Surge anticipating control valve protects pipeline systems and its accessories from damages caused by water hammers. The valve is built to anticipate the dangerous energy accumulation that occurs during a surge and relieves it out of the pipeline. With the beginning of the pressure drop, that indicates the water hammer evolution, the valve will open, relieving the necessary amount of fluid to the atmosphere, and prevents the continuance of the surge. In case pressure rises the valve will re-open, relieving excess pressure as a Pressure relief valve.

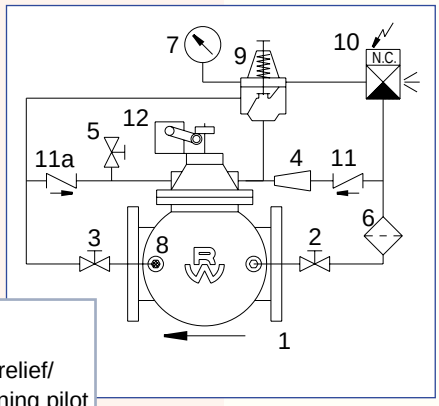


PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
4a.Needle valve
5.High pressure surge relief pilot
6.Filter
7.Low pressure surge relief pilot
8.Pressure gauge
9.Cock valve

Pressure Sustaining and Booster Pump Control Valve Type G 80 20

The pump control valve is made to protect pumps from possible damages caused by powerful start-ups and shut-downs of centrifugal pumps. The valve's purpose, is primarily minimizing the formation of surges during on/off operation of the pump, and protect pump from backflow. The valve is electrically interlocked with pump's control panel. Opening and closing speed can be adjusted, offering a smooth start-up and shut-downs. By the action of a pilot The Pump control valve is also used to regulate maximum flow

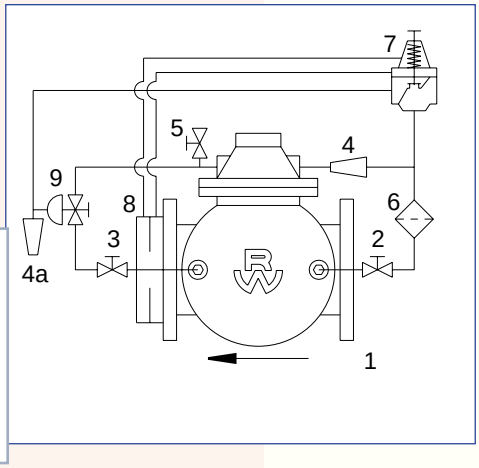


PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
5.Cock valve
6.Filter
7.Pressure gauge
8.Finger filter
9.Pressure relief/ sustaining pilot
10.3-way N.C. solenoid valve
11.11a.Check valve
12.Limit switch assembly

Anti - Burst Control Valve Type G 90

The purpose of the anti burst valve is to prevent water flow in pipes and systems that have been physically damaged from any reason. A high sensitivity flow pilot and an orifice plate, that indicates the current flow in the pipeline, control the valve. When a preset flow ("Burst" condition) is reached the valve will tight close. The valve can only be re-opened manually by turning the manual override cock valve in its control loop.



PARTS LIST

1."G" valve
2.Cock valve
3.Cock valve
4.Needle valve
4a.Needle valve
5.Cock valve
6.Filter
7.Anti-burst pilot
8.Orifice plate
9.Manually override locking valve