RAPHAEL
BY TALIS

Hydraulic Control valves by RAPHAEL

RAPHAEL was founded in 1949. It is the first Israeli company to develop and manufacture control valves for water supply systems.
Today, RAPHAEL is the main supplier of pipeline valves in Israel's domestic market and a well-known international brand worldwide.

RAPHAEL is part of the international TALIS GROUP.
RAPHAEL'S professional management and highly qualified technical staff, along with its extended experience in the industry, are one of the company's major assets. RAPHAEL'S engineering department constantly works on new technical solutions and products to improve quality and service life.

The company's products are protected by many patents. RAPHAEL'S is certified for quality management system ISO-9001, and its products meets a variety of national and international certificates of compliance and standards.

The company focuses on the production of hydraulic valves for automation of water supply, reclaimed water, fire suppression and irrigation.

Hydraulic valves are used to control, reduce and stabilise pressure, reduce leakage, protect pipelines against excessive pressure, prevent water hammer and pro-tect pumping equipment.
Proper use of control valves contributes significantly to reducing leaks or unreported water losses, bringing down the number of accidents and facilitate the distribution of water supply systems.

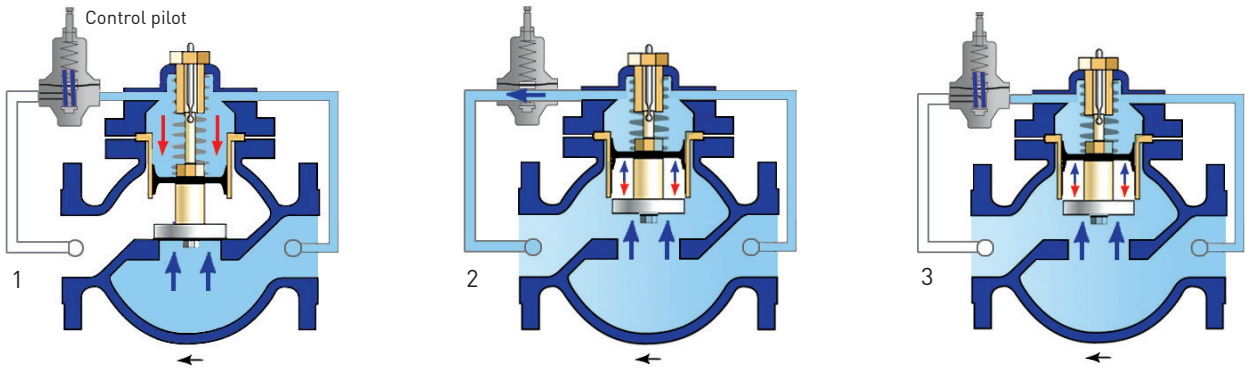
RAPHAEL– G Piston actuated control valve DN 50-900 PN 16-64

Description

- Type G – Piston Actuated Hydraulic Control Valve for use in waterworks for pressure reducing, pressure sustaining, pressure relief, flow control, surge anticipation, level control and other control applications.
- Excellent for use in large diameter pipe mains, operation at wide flow range, cavitation conditions and high pressure.
- Piston actuation design ensures exceptional valve reliability with long term maintenance free operationand vertical serviceability. Solid piston design ensures stable and vibration-free valve operation.
- V shaped throttling plug provides precise control capability with wide rangeability that allows stable operation at high and as well low flow rates. Internal components made of resistant materials; –stainless steel and bronze.
- Resistant to cavitation at both high and low flows.
- Body made of high-strength, with fusion-bonded epoxide coating or vitreous enamel, providing enhanced corrosion resistance.
- Complieswith ISO, DIN, EN and GOST-R standards.

The hydraulic control valve is the most effective device for automation of industrial and municipal water supply systems or for any other system that requires control over changing operating conditions.
The hydraulic valve is actuated by pipeline pressureand does not require any outside energy source.

Principle of operation of hydraulic control valve



The body of the hydraulic valve is divided into a main valve and a control chamber.
When via the control pilot the pipeline pressure connected to the control chamber, the force acting on the piston from above is greater than the force acting on the throttling plug (due to the larger surface area) and the piston valve will stay in a closed position.

When the pressure in the control chamber is directed by the control pilot to the atmosphere or to the pipeline outlet, the valve is opened by the force acting upon the throttling plug from below.

When the pilot throttleis and pressurizing of the control chamber is repeated, closing of the valve takes place due to the force acting upon the piston from above, which is greater than the force acting on the throttling plug from below.

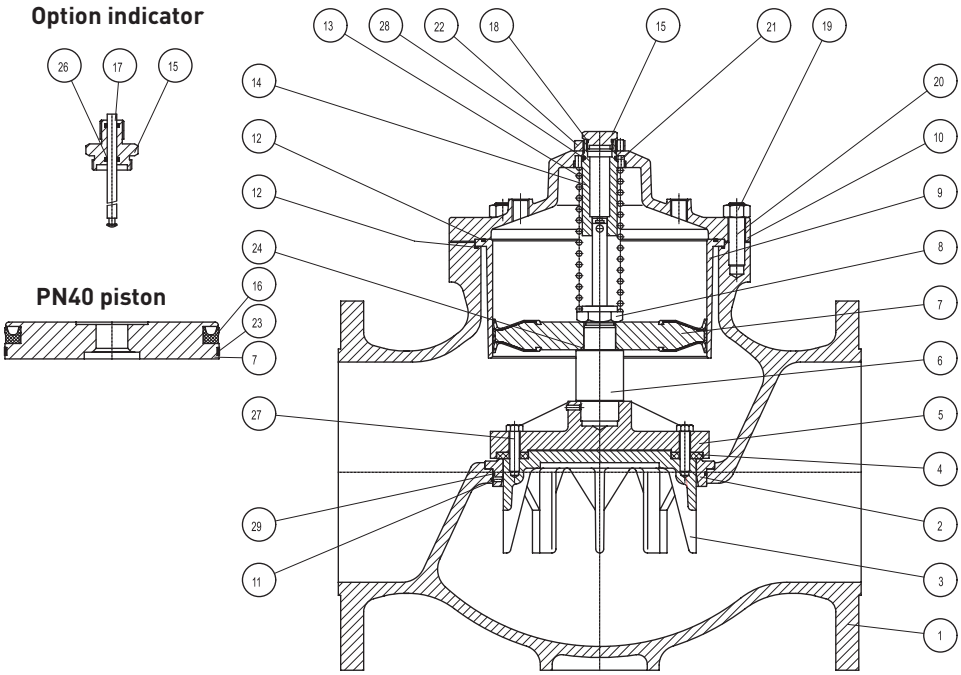
Areas of application

- Water supply and waterworks mains
- Pumping stations, water treatment stations, water reservoirs
- Firefighting systems

Characteristics

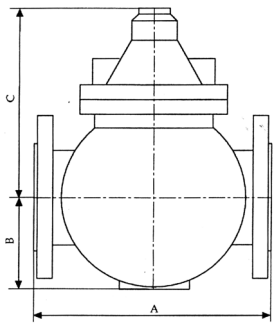
- DN 50 - 900
- PN 16-64
- Operational temperature: -29°C – +90°C
- Impermeability: Class A according to the ISO 5208 standard.
- Flange bores drilling in accordance with EN 1092-2 and ISO 7005-2

Construction of materials



	Name	DN 50	DN 80 - 100	DN 150 - 600	DN 600 - 900
1	Body	Bronze	High-strength cast iron with spherical graphite	High-strength cast iron with spherical graphite	Steel
2	Saddle	Stainless steel	Bronze/stainless steel	Bronze/stainless steel	Stainless steel
3	Plug	Bronze	Bronze/stainless steel	Bronze/stainless steel	Stainless steel
4	Disk	NBR/EPDM	Stainless steel	Steel	Stainless steel
5	Stem	-	Brass	Brass	-
6	Piston	-	Stainless steel	Stainless steel	Steel / Stainless steel
7	Nut	Brass	Brass	Brass	-
8	Cylinder	-	Bronze	Bronze	Stainless steel
9	Top cover	-	High-strength cast iron with spherical graphite	High-strength cast iron with spherical graphite	steel
10	Screw	Steel	Stainless steel	Stainless steel	Stainless steel
11	Liner	-	NBR/EPDM	NBR/EPDM	NBR/EPDM
12	Spring	NBR/EPDM	Stainless steel	Stainless steel	-
13	Plug	Stainless steel	Brass	Brass	-
14	Stopper plug	-	Brass	Brass	Brass
15	Liner of the piston	Brass	NBR/EPDM	NBR/EPDM	NBR/EPDM
16	Indicator	NBR/EPDM	Stainless steel	Stainless steel	Stainless steel
17	Indicator	Stainless steel	NBR/EPDM	NBR/EPDM	NBR/EPDM
18	Liner	NBR/EPDM	Steel	Steel	Steel
19	Nut	Steel	Steel	Steel	Steel
20	Screw	Steel	-	Stainless steel	-
21	Stub	-	-	Brass	Brass
22	Nut	-	-	Teflon	Teflon
23	Plug	-	NBR/EPDM	NBR/EPDM	NBR/EPDM
24	Liner	NBR/EPDM	NBR/EPDM	NBR/EPDM	NBR/EPDM
26	Liner	NBR/EPDM	-	Stainless steel	NBR/EPDM
27	Screw	-	Stainless steel	Stainless steel	
28	Liner	NBR/EPDM	NBR/EPDM	NBR/EPDM	

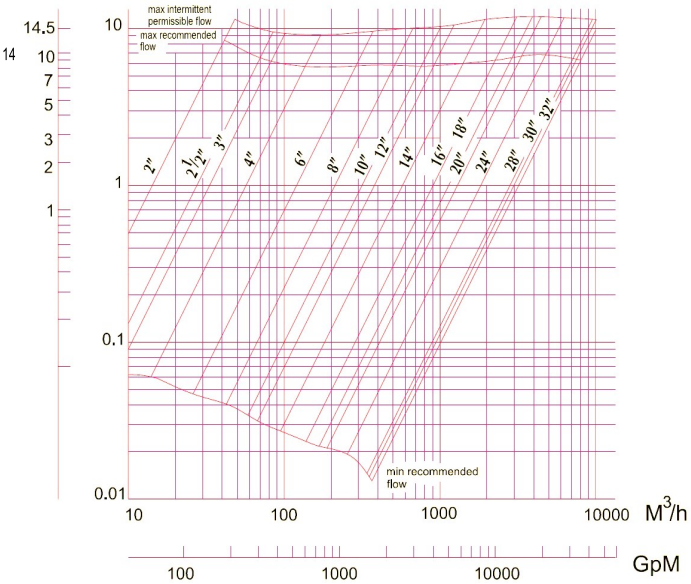
Overall dimensions



Weight in kg*

DN	DN	A	B	C	Weight
2"	50	210	100	410	15
2.5"	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
36"	900	1930	850	1190	4050

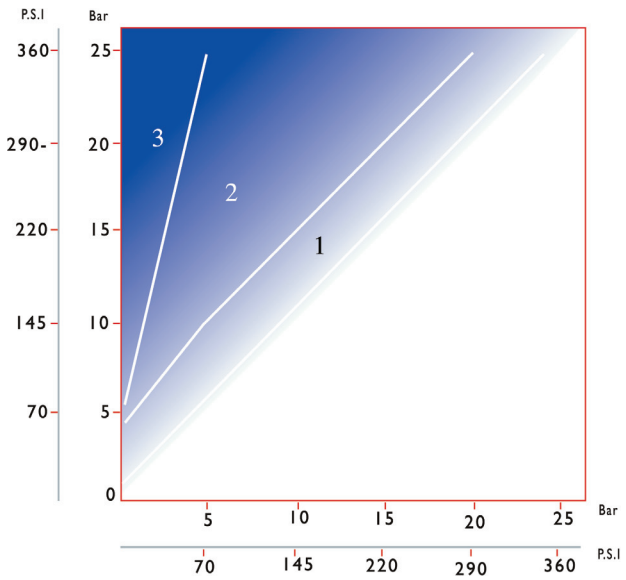
Pressure losses at maximum opening



Flow rate Kv*

DN	DN	Kv
2"	50	45
2.5"	65	87
3"	80	105
4"	100	180
6"	150	380
8"	200	670
10"	250	1010
12"	300	1200
14"	350	2100
16"	400	2770
18"	450	4170
20"	500	4740
24"	600	6700
28"	700	10300
30"	750	10750
32"	800	11600
36"	900	12900

Recommended mode of operation



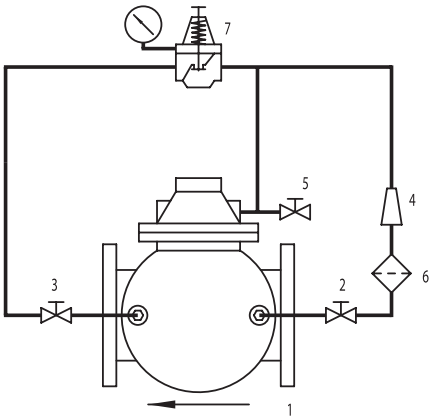
Zone 1: Zone of valve normal operation with a standard plug
Zone 2: Large pressure drop with cavitation risk; it is recommended to use a valve with lower passagerestricted plug
Zone 3: Cavitation. Valve use only upon recommendation by the manufacturer

$$Q = Kv\sqrt{\Delta P/RD}$$

ΔP = (Pupstream – Pdownstream) in kg/cm^2
Q – Flow in m^3/hour
Kv – Flow rate in m^3/hour specified for PN10/16 locks
RD – Relative Density, (water = 1)

G-60 pressure reducing valve

G 60/62 and G 63, hydraulic pressure reducing valves.
The main valve is controlled by an adjustable pilot valve preset to the required downstream set pressure.
The valve maintains constant downstream pressure at varying pipeline inlet pressure or downstream flow demand.
The operation of the valve does not require additional power source; it is actuated by pipeline pressure.



(1) Main valvee of type G, (2) Stop Isolating valve,
(3) IsolatingStop valve, (4) Control valve,
(5) IsolatingStop valve, (6) Filter, (7) Reducing pilot.

Principle of operatio

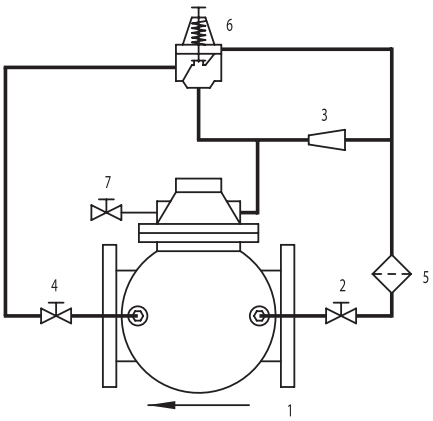
When the pressure falls below the value set by the pilot spring (7) due to increasing flow demand, the pilot is activated and releases the pressure from the main valve (1) control chamber. The main valve opens, thus increasing the outletput pressure.

When the outletput pressure becomes higher than the pilot spring's preset value (7), the pilot is activated, which causes higher pressure in the main valve's control chamber (1). The main valve closes, thus decreasing the outlet input pressure back to set pressure.

The G-60 type pressure reducing valve is used for controlling pressure in distribution pipelines as in, municipal and main water supply lines and heating main lines.

G-80 (80Q) pressure sustaining/relief valve

G 80/82 hydraulic control valves used for upsteam pressure sustaining or relief.
The valve is controlled by adjustable pilot , which is set to the required pressure.
The valve controlls regardless of flow demand.



(1) Main valve type of G type, (2) IsolatingStop valve,
(3) Filter, (4) IsolatingControl valve, (5) Control pilot,
(7) Manometer.

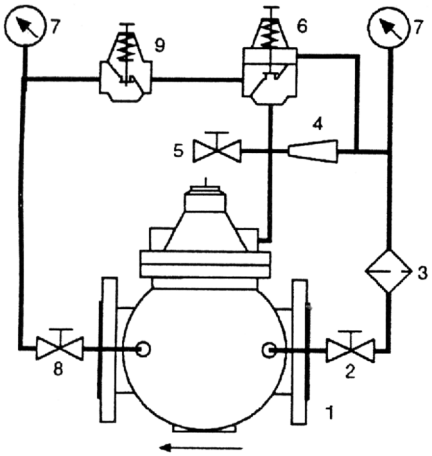
Principle of operation

When the inlet pressure becomes higher than the preset value, the pilot (5) is activated to open and releases the pressure from the main valve's control chamber. The main valve opens, thus reducing the inlet pressure. When the inlet output pressure falls below preset the value. the pilot is activated to close, which causes higher pressure in the main valve's control chamber. The main valve closes, thus increasing the inlet pressure.

The G type sustaining relief pressure control is used for pressure control in pipelines, municipal and main water supply lines and heating main lines, as well as for protection of pumping equipment and the pipelines against low or high pressure.

G-68 pressure reducing & sustaining valve

G-68 is controlled by two pilots for regulating the upstream and downstream pressure.
As a result of the serial operation of the two pilots, maximum constant downstream set pressure is maintained, while at the same time mantianing minimum set pressure the valve inlet



(1) Main valve type G, (2) Isolating valve, (3) Filter,
(4) Control valve, (5) Isolating valve,
(6) Control pilot, (upstream), (7) Manometer,
(8) Isolating valve, (9) Control pilot (downstream)

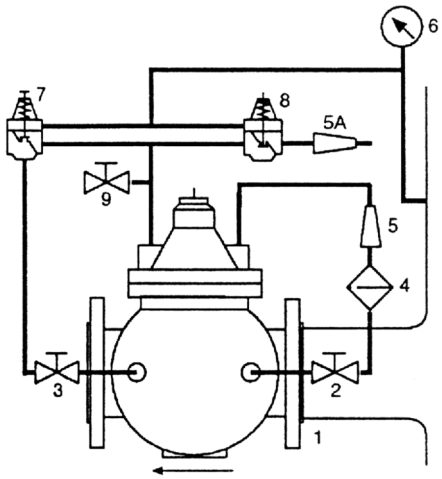
Principle of operation

When the outlet pressure becomes lower than the pilot spring's preset value (9), the pilot is activated and releases the pressure from the main valve's control chamber. The main valve opens, thus increasing the outlet pressure.
When the outlet pressure becomes higher than the pilot springs's preset value (9), the pilot is activated, which leads to higher pressure in the main valve's control chamber. The main valve closes, thus decreasing the outlet pressure.
When the inlet pressure in the pipeline falls to a level that is lower than the pilot springs preset value (6), the pilot (6) is activated, which leads to higher pressure in the main valve's control chamber.
The main valve closes, thus sustaning the upstream pressure in the pipeline to the set value.

The G-68 valve is used for pressure control in pipelines of municipal and main water supply.

G-88 Hydraulic surge anticipating valve

The G 88 is intended for protecting the pipeline against hydraulic shock from water hammer. Hydraulic shock can be caused by emergency shutdown of the pump due to power outage or by abrupt closure of the stop valve alog the main line.thereby rapid pressure drop front is followed by a reverse wave with extremely high pressure.
The low and high-pressure waves alternate within a short time interval. The G 88 is controlled by two pilots – for high and low-pressure. Under normal conditions the G 88 is closed. When the pressure in the line increases or drops outside of the preset limits, the valve opens a quick pressure relief to discharge into atmosphere.



(1) Main valve type G, (2) Isolating valve, (3) Isolating valve,
(4) Filter, (5) Needle valve, (6) Manometer,
(7) High pressure control pilot,
(8) Low pressure control pilot, (9) Isolating valve,

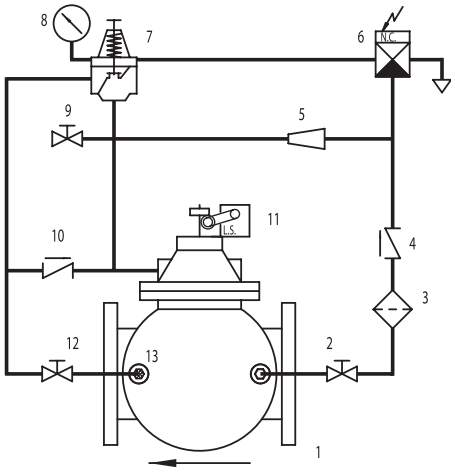
Principle of operation

When line pressure rises above preset value, the pilot (7) is activated and releases extra pressure from the main valve's control chamber. The main valve opens, thus eliminating the overpressure.
If hydraulic shock wave develops, the pressure in the pipeline falls sharply.
The low-pressure pilot (8) is actuated releasing pressure from the main valve's control chamber. The main valve opens in anticipation of the high surge to follow.
The high surge will find a fully open valve capable of discharging the full flow into atmosphere and prevent the high surge development. As the pressure drops back to normal, both pilots closes and the main valve closes as a result.

The G type surge anticipating is used for protection of pipelines, municipal and main water supply lines as well as for protection of pumping equipment against possible damage in locations of pressure surge.

G-20 Pump control valve

The G-20 hydraulic valve is intended for gradual pump startup and shutdown, as well as hydraulic check valve for protection of pumping equipment and pipeline networks against damage due to excessive operation blow intended pump curve as well as preventing backflow.
The G-20 valves can be used with any pump type. The valve is linked to the pump's electric control panel.



(1) Main valve type, (2) Isolating valve, (3) Filter,
(4) Non return valve, (5) Needle valve, (6) Solenoid valve,
(7) pressure sustainin pilot – option, (8) Manometer,
(9) Isolating valve, (10) Non return valve, valve,
(11) Limit switch, (12) Isolating valve.

Principle of operation with a booster pump

Prior to startup, the valve is closed. When the pump is energized, the solenid valve (6) is activated and gradually relieves the pressure of the control chamber, leading to a gradual opening of the main valve (1). The flow and the pressure gradually increase to the nominal value of the main line. When the pump shuts down, the solenid valve (6) is inactivated, leadings to a gradual closing of the main valve. The pump's power supply is turned off via the limit switch (11) only after the complete closure of the valve.
In the event of an emergency shutdown of the pump or in a sudden power outage, the valve is hydraulically closed, performing the function of a check valve to prevent returning flow.

Principle of operation with submerged vertical pump

The valve is installed in the pump discharge pipe by-pass, thus ensuring the start at low-head and gradually closing. When the pump is shut down, the valve opens gradually, thus gradually reducing the pressure in the pipeline.
The inletput pressure sustaining/pilot relief pilot (7) is set to perform, a safety valve if pressure surges above set performed

The use of G-20 type valves for optimizing pumping stations operation leads to more effective exploitation of the equipment, lower costs and preventing damage

TALIS is the leadingchoice in the world of shut off and control valves. At TALIS, we have the best solutions for the sustainable use of water and energygeneration, industry and municipalities. With a wide range of products, TALIS offers an extensive line of solutions for the entire water control, hydrants, rotary butterfly valves, knife gate valves or needle valves.

Our experience, innovative technology, global knowledge and individual approach lay a foundation for the development of sustainable solutions for the efficient processing of such a vital resource as water.

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