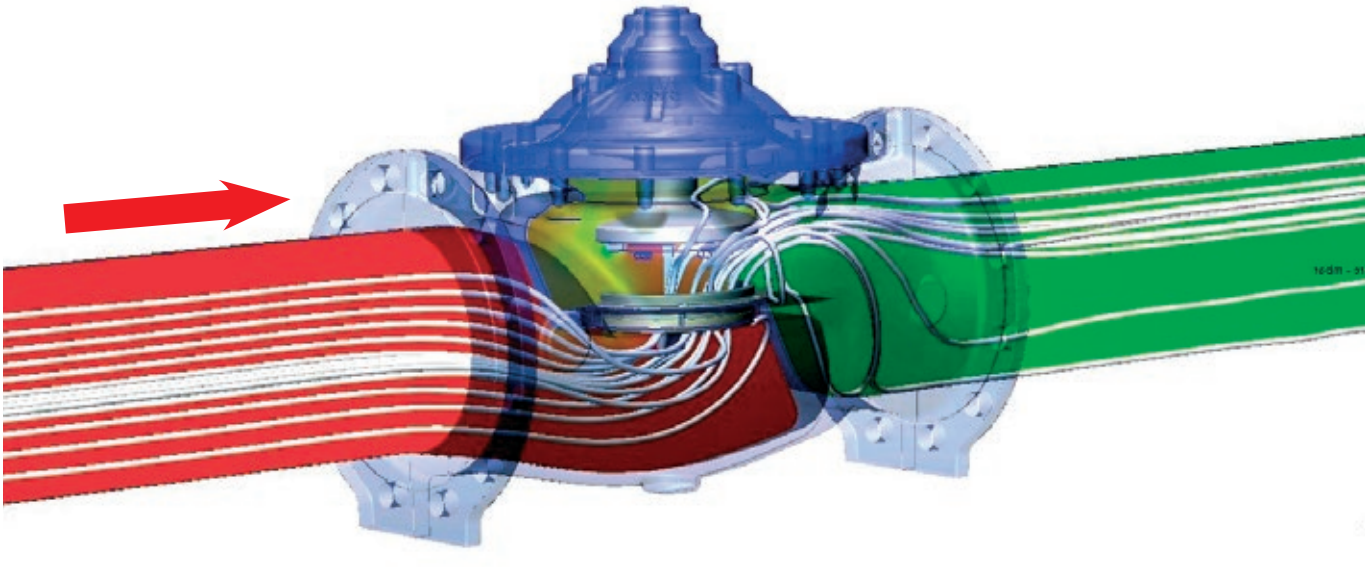
M2000 - M3000
DIAPHRAGM ACTUATED AUTOMATIC CONTROL VALVE



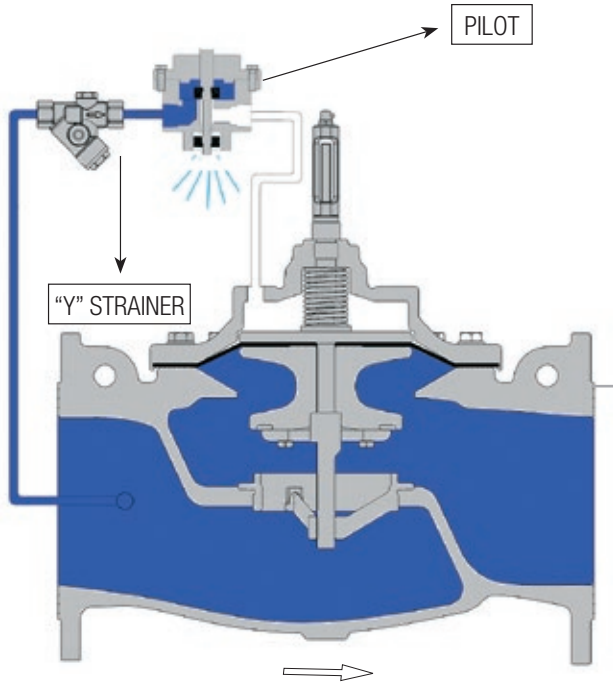
Automatic control valves, as defined by EN1074-5 standard: "have the integral capacity to control the function using energy from the conveyed water by adjusting the position of the shutter. They can be directly operated, i.e. the force is applied (via a spring or diaphragm) directly to the shutter." Alternatively, "They can be pilot operated i.e. the force is applied through an adjustable pilot valve".

This type of T-pattern flow valve is the result of years of study, design, and development by T.I.S. Nuoval. These valves are available in sizes from DN50 to DN1000 flanged according to EN 1092-2, with nominal pressures of PN10 - PN16 - PN25. The valves are hydraulically actuated, with a metal shutter released by the action of pressure on a diaphragm. The use of a particularly high-performance sealing gasket developed by T.I.S. Nuoval ensures an excellent seal and extended duration even under very demanding operating conditions.

The M3000 series valves are standard passage (seat size smaller than the nominal diameter of the valve). This offers intrinsically superior regulation and dissipation capacity. The M2000 series valves are full passage (seat size equal to the nominal diameter of the valve). This generates a very limited pressure drop with the shutter fully open.

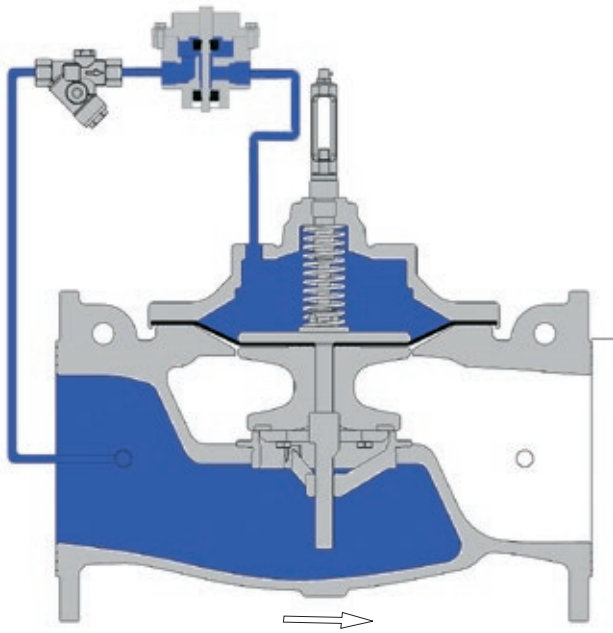
OPERATING PRINCIPLE

ON-OFF VALVE CONFIGURATION



"VALVE OPEN" POSITION

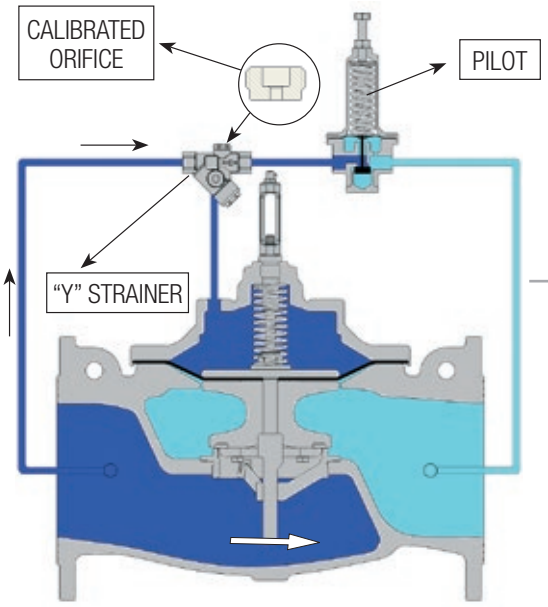
The release of pressure from the control chamber enables the line pressure, which acts on the lower surface of the diaphragm, to move the valve shutter to the open position.



"VALVE CLOSED" POSITION

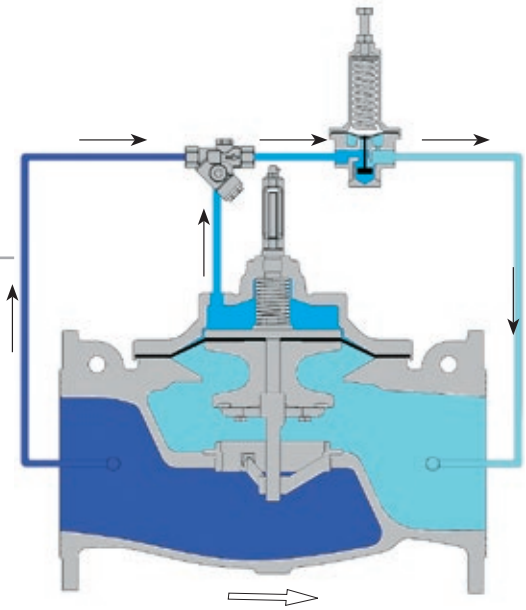
The line pressure acts on the upper surface of the diaphragm and moves the valve shutter to the closed position.

CONTROL VALVE CONFIGURATION (E.G. DOWNSTREAM PRESSURE REDUCER)



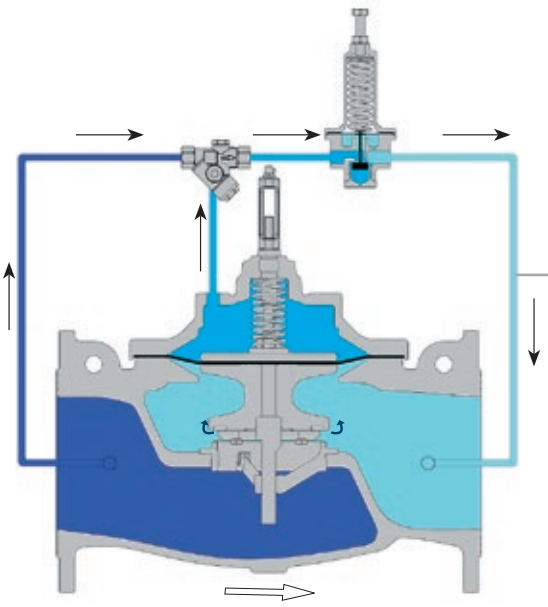
CLOSED POSITION

The pilot deviates upstream pressure into valve control chamber. The resulting pressure on the diaphragm moves the shutter to the closed position.



OPEN POSITION

The pilot opens, increasing the pressure drop of the orifice and so releasing the pressure in the control chamber. The resulting force on the diaphragm moves the shutter to the open position.

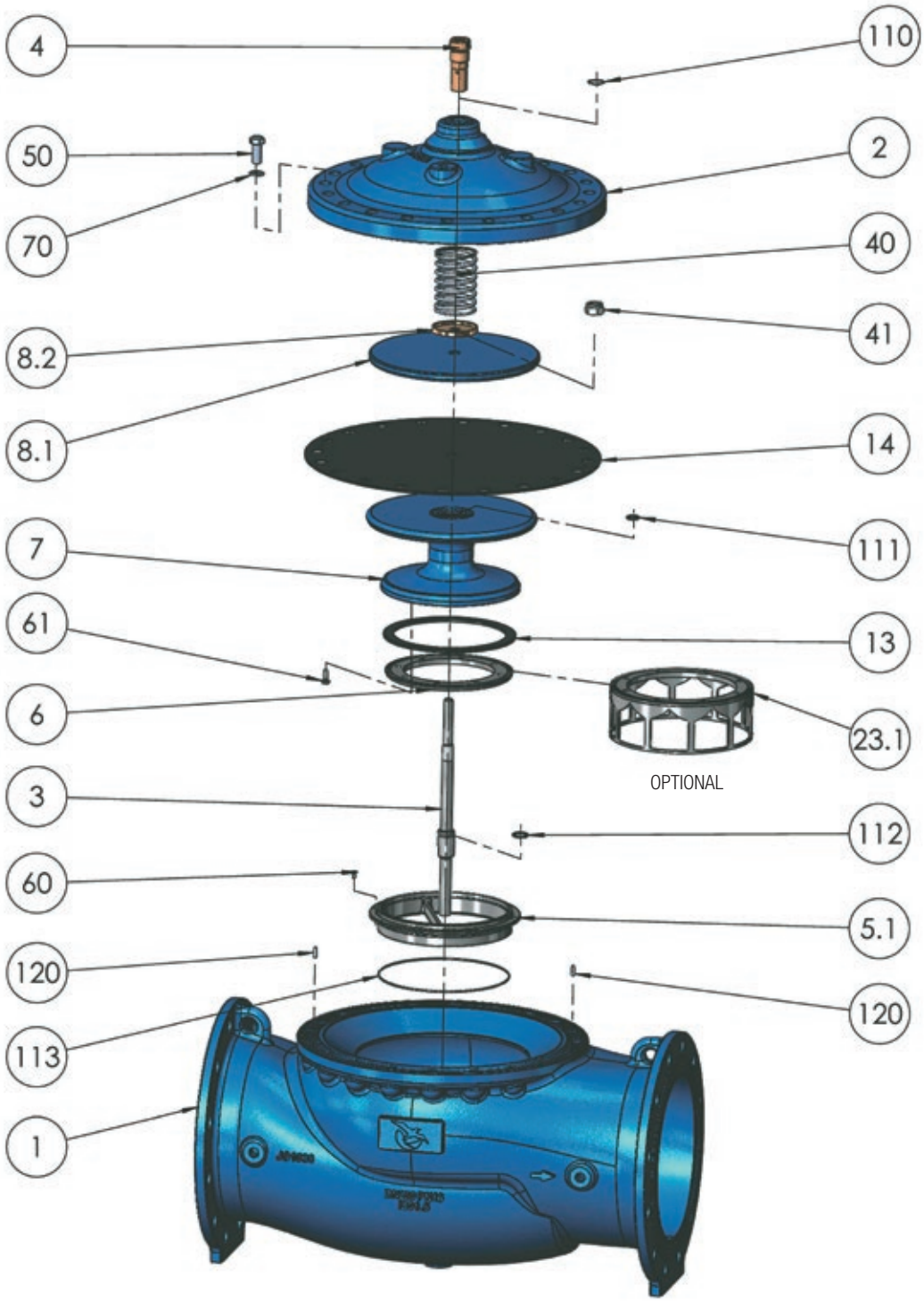


REGULATION

The state of balance between the flow capacity of the calibrated orifice (located in the "Y" filter) and the flow rate controlled by the pilot, keeps the valve shutter in the position it has reached.

NUOVAL LINE

COMPONENTS



M3000

ITEM	DESCRIPTION	DN	PN	MATERIALS	NOTE
1	Body			Ductile cast iron	EN-GJS 400-15 EN1563 (GS400)
2	Cover			Ductile cast iron	EN-GJS 400-15 EN1563 (GS400)
3	Stem			Stainless steel	1.4301 EN10088-3 (AISI304)
4	Cover bearing			Marine Bronze	CuAl10Fe5Ni5-C (CC333C)
5.1	Seat Ring			Stainless steel	1.4408 EN10283 (AISI316)
-	V-Port Seat Ring			Stainless steel	1.4301 EN10088-3 (AISI304)
6	Seal Retaining Ring			Stainless steel	1.4301 EN10088-3 (AISI304)
7	Obturator	From 50 to 150	10 - 16 - 25	Stainless steel	1.4401 EN10088-3 (AISI316)
		From 200 to 1000	10 - 16 - 25	Ductile cast iron	EN-GJS 400-15 EN1563 (GS400)
		From 500 to 800	25	Steel	S275JR EN10025-2 (FE430B)
8.1	Diaphragm disc	From 50 to 100	10 - 16 - 25	Stainless steel	1.4401 EN10088-3 (AISI316)
		From 125 to 1000	10 - 16 - 25	Steel	S275JR EN10025-2 (FE430B)
8.2	Spring Washer			Brass	CW614N EN 12164 (OT58)
13	Main Seal			Elastomer	EPDM (85SH A)
14	Diaphragm			Reinforced Elastomer	NBR reinforced in NYLON
23.1	V-Port			Stainless steel	1.4301 EN10088-3 (AISI304)
40	Spring	50 - 600	10 - 16 - 25	Stainless steel	1.4310 EN10270-3 (AISI302)
41	Self-Locking nut			Stainless steel	A2-70
50	Cover Bolts			Stainless steel	A2-70
60	Seat Ring Bolts	200 - 1000	10 - 16 - 25	Stainless steel	A2-70
61	Retaining ring bolts			Stainless steel	A2-70
70	Cover washers			Stainless steel	A2-70
110 - 111 112 - 113	O-ring			Elastomer	EPDM110 -
120	Pin	100 - 600	10 - 16	Stainless steel	A2-70
		150 - 200	25		

All parts subject to corrosion are protected with epoxy powder coating with a minimum thickness of 250 micron

M2000

ITEM	DESCRIPTION	DN	PN	MATERIALS	NOTE
1	Body			Ductile cast iron	EN-GJS 400-15 EN1563 (GS400)
2	Cover			Ductile cast iron	EN-GJS 400-15 EN1563 (GS400)
3	Stem			Stainless steel	1.4301 EN10088-3 (AISI304)
4	Cover bearing			Marine Bronze	CuAl10Fe5Ni5-C (CC333C)
5.1	Seat Ring			Stainless steel	1.4408 EN10283 (AISI316)
-	V-Port Seat Ring			Stainless steel	1.4301 EN10088-3 (AISI304)
6	Seal Retaining Ring			Stainless steel	1.4301 EN10088-3 (AISI304)
7	Obturator	From 50 to 100	10 - 16 - 25	Stainless steel	1.4301 EN10088-3 (AISI304)
		From 150 to 200	10 - 16 - 25	Steel	S275JR EN10025-2 (FE430B)
8.1	Diaphragm disc	From 50 to 100	10 - 16 - 25	Stainless steel	1.4408 EN10283 (AISI316)
		From 150 to 200	10 - 16 - 25	Steel	S275JR EN10025-2 (FE430B)
8.2	Spring Washer			Brass	CW614N EN 12164 (OT58)
13	Main Seal			Elastomer	EPDM (85SH A)
14	Diaphragm			Reinforced Elastomer	NBR reinforced in NYLON
23.1	V-Port			Stainless steel	1.4301 EN10088-3 (AISI304)
40	Spring			Stainless steel	1.4310 EN10270-3 (AISI302)
41	Self-Locking nut			Stainless steel	A2-70
50	Cover Bolts			Stainless steel	A2-70
60	Seat Ring Bolts	150 - 200	10 - 16 - 25	Stainless steel	A2-70
61	Retaining ring bolts			Stainless steel	A2-70
70	Cover washers			Stainless steel	A2-70
110 - 111 112 - 113	O-Ring			Elastomer	EPDM

All parts subject to corrosion are protected with epoxy powder coating with a minimum thickness of 250 micron

DESIGN FEATURES

- Hydraulic testing according to EN1074-5;
- Compliance with EN 1074-5 and EN 1074-1;
- Parts in contact with the water comply with DM 174 of 6/04/2004 and KTW, DVGW W270, WRAS standards;
- One-piece body in ductile cast iron EN GJS 400-15 EN 1563 (GS 400-15);
- Face to face according to EN 558 Series 1;
- Flanges dimensioned and drilled according to EN 1092-2;
- Stem in 1.4301 EN10088-3 (AISI304) and guided at both ends;
- Seat ring in 1.4408 EN10283 (AISI316);
- Seal retaining ring in 1.4301 EN10088-3 (AISI304);
- Main seal in EPDM;
- Spring in 1.4310 EN10270-3 (AISI302);
- Obturator in 1.4401 EN10088-3 (AISI316) stainless steel, ductile cast iron EN GJS 400-15 and coated steel (according to DN and PN of the valve);
- Diaphragm in NBR with nylon reinforcement;
- All screws, washers and nuts in stainless steel A2-70 EN ISO3506-1 (inside);
- Internal/external FBE coating protection (Fusion Bonded Epoxy), blue RAL5015, 250 µm thickness.

MAIN VALVE ACCESSORIES

- Depending on the operating conditions, a V-PORT (page 94) can be supplied in 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L);
- Depending on the operating conditions, a DOUBLE SLOTTED CYLINDER (page 95) can be supplied in 1.4301 EN10088-3 (AISI304) and 1.4401 EN10088-3 (AISI316).

PILOT CIRCUIT ACCESSORIES

- Pipes in 1.4401 EN10088-3 (AISI316), fittings in 1.4401 EN10088-3 (AISI316);
- Compression fittings in brass / 1.4401 EN10088-3 (AISI316);
- Strainers and speed regulators in 1.4401 EN10088-3 (AISI316) and brass;
- Isolating ball valves in Nickel-plated brass;
- Pilots in 1.4401 EN10088-3 (AISI316) and brass;
- Position indicator in hardened glass and brass;
- Pressure gauges in 1.4301 EN10088-3 (AISI304) and glycerin;
- Pressure gauge holder with drainage in Nickel-plated brass;
- Floaters in 1.4306 EN10088-3 (AISI304L).

HIGH CORROSION RESISTANCE MATERIALS

On request, some components can be produced with high corrosion-resistant materials, for example:

- Stem, seal retaining ring and obturator from DN50 to DN125 in 1.4401 EN10088-3 (AISI316) stainless steel;
- Screws, washers and nuts in A4-70 EN ISO3506-1 stainless steel;
- V-PORT in 1.4401 EN10088-3 (AISI316) stainless steel;
- DOUBLE SLOTTED CYLINDER in 1.4401 EN10088-3 (AISI316) stainless steel;

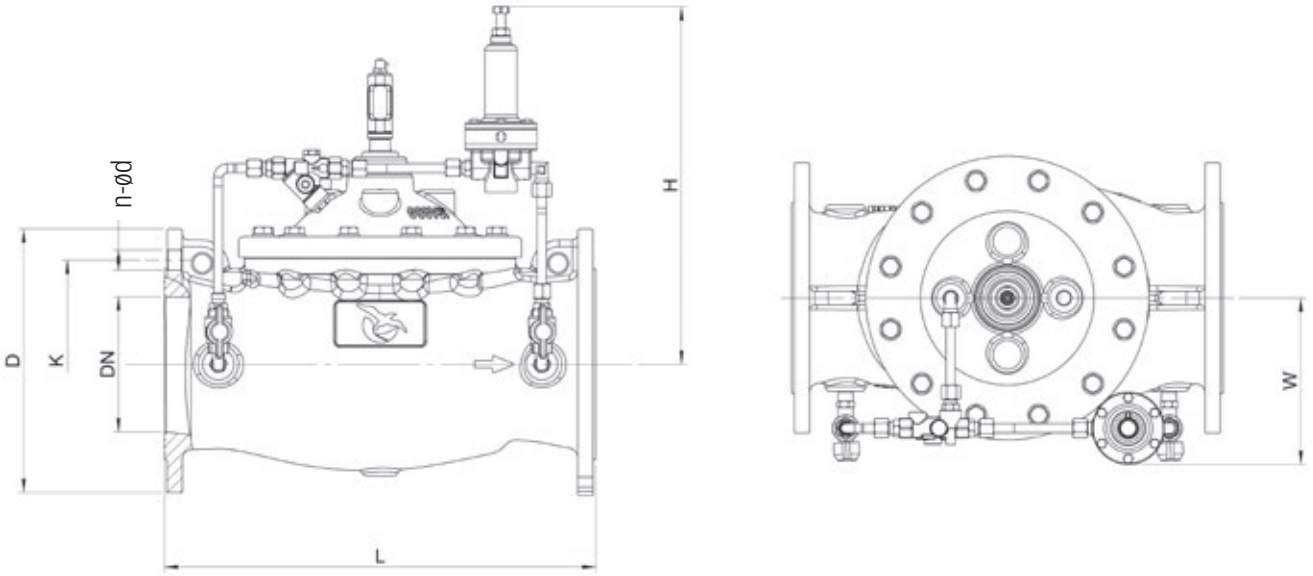
PILOT CIRCUIT ACCESSORIES

- Strainers, speed regulators, ball valves and pressure gauge holders in 1.4401 EN10088-3 (AISI316) stainless steel;
- Pilots in 1.4401 EN10088-3 (AISI316) stainless steel;
- Screws, washers and nuts in A4-70 EN ISO3506-1 stainless steel.

OPERATIVE LIMITS

Valves are designed and manufactured to operate with drinking or industrial water without suspended solids. For any other use, please contact the manufacturer.

- Working temperature: (water temp.) min.+0°C (excluding frost) max. + 70°C (on request up to 90°C).
- Storage temperature: (air temp.) min. - 20°C max. + 70°C.



M2000

DN	K			D			n-ød						WEIGHT (KG*)
	PN10	PN16	PN25	PN10	PN16	PN25	PN10	PN16	PN25	L	H	W	
50	125	125	125	165	165	165	4-19	4-19	4-19	230	220	170	20
65	145	145	145	185	185	185	4-19	4-19	8-19	290	250	180	24
80	160	160	160	200	200	200	8-19	8-19	8-19	310	280	200	30
100	180	180	190	220	220	235	8-19	8-19	8-23	350	310	210	43
150	240	240	250	285	285	300	8-23	8-23	8-28	480	420	250	90
200	295	295	310	340	340	360	8-23	12-23	12-28	600	520	280	142

M3000

DN	K			D			n-ød						WEIGHT (KG*)
	PN10	PN16	PN25	PN10	PN16	PN25	PN10	PN16	PN25	L	H	W	
50	125	125	125	165	165	165	4-19	4-19	4-19	230	220	170	20
65	145	145	145	185	185	185	4-19	4-19	8-19	290	250	180	24
80	160	160	160	200	200	200	8-19	8-19	8-19	310	280	200	30
100	180	180	190	220	220	235	8-19	8-19	8-23	350	310	210	43
125	210	210	220	250	250	270	8-19	8-19	8-28	400	380	230	48
150	240	240	250	285	285	300	8-23	8-23	8-28	480	420	250	70
200	295	295	310	340	340	360	8-23	12-23	12-28	600	520	280	118
250	350	355	370	405	405	425	12-23	12-28	12-31	730	600	300	173
300	400	410	430	460	460	485	12-23	12-28	16-31	850	740	340	280
350	515	470	490	520	520	555	16-23	16-28	16-34	980	800	380	510
400	515	525	550	565	580	620	16-28	16-31	16-37	1100	810	390	550
500	620	650	660	670	715	730	20-28	20-34	20-37	1250	890	460	873
600	725	770	770	780	840	845	20-31	20-37	20-41	1450	970	540	1400
700	840	840	875	895	910	960	24-31	24-37	24-44	1650	1250	730	2400
800	950	950	/	1015	1025	/	24-34	24-41	/	1850	1250	730	2600
900	1050	1050	/	1115	1125	/	28-34	28-41	/	2050	1250	730	2900
1000	1160	1170	/	1230	1255	/	28-37	28-44	/	2250	1360	820	4500
1200	1380	1390	/	1455	1485	/	32-41	32-44	/	2250	1360	820	4600

*indicative weight related to PN25 up to DN600 and to PN16 for larger sizes

M3000 PRESSURE DROP

Pressure drop of automatic control valves can be evaluated by using below equation:

$$\Delta P = (Q / Kvs)^2 \text{ [bar]}$$

Where:

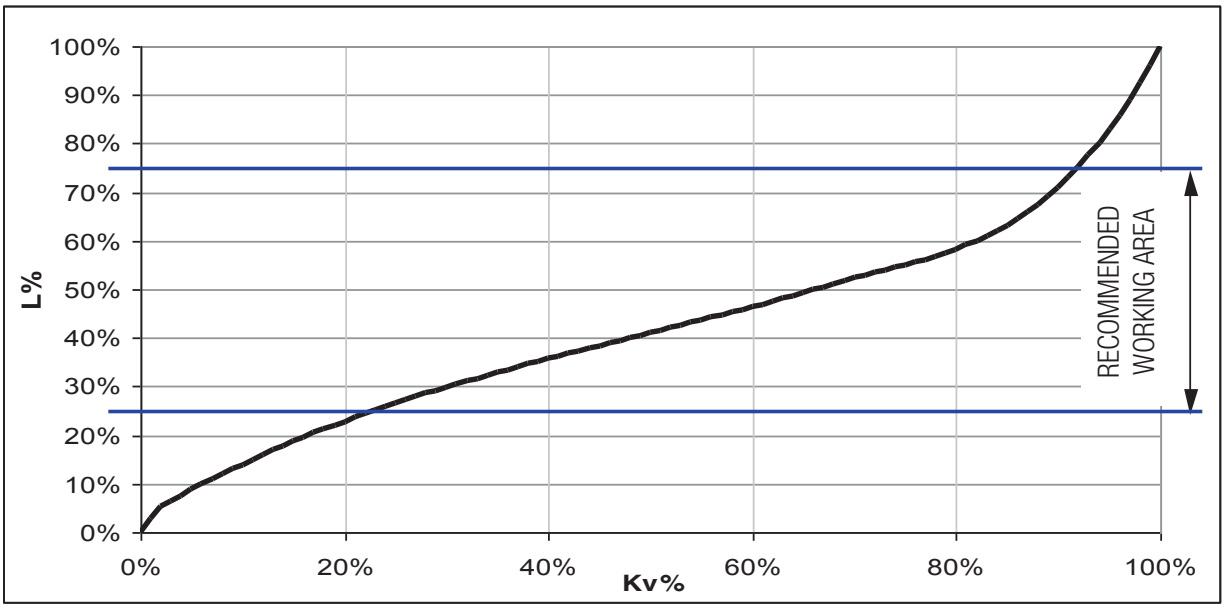
- ΔP = pressure drop [bar]
- Kvs = flow coefficient [m³/h]
- Q = flow rate [m³/h]

Kvs flow coefficient indicates 20°C water flow rate [m³/h], through the fully open valve, that induces 1bar pressure drop.

M3000 HYDRAULIC SPECIFICATIONS

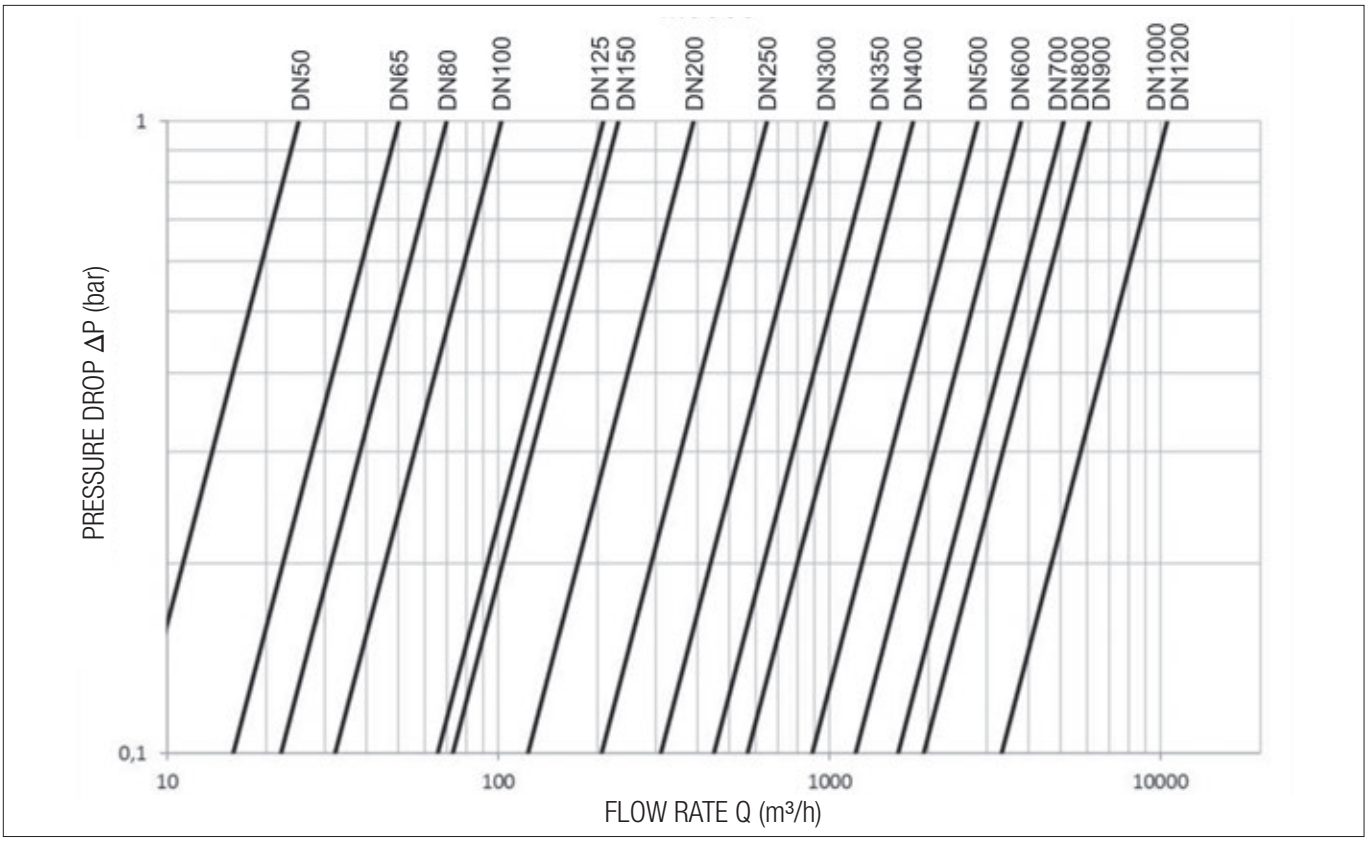
DN	50	65	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	1200
Kvs [m³/h]	25	50	70	102	208	230	390	650	980	1420	1790	2800	3800	5800	6500	6500	9800	9800
Lift [mm]	12	19,5	20,5	23,5	38	38	45	58	63	73	87	102	124	150	160	160	195	195

LIFT-KV DIAGRAM



Flow coefficient at L% opening	Kv = Kv% * Kvs
Flow coefficient at 100% open valve	Kvs
Kv%	From the above diagram: Kv% - L%

M3000 PRESSURE DROP DIAGRAM (VALVE 100% OPEN)



M3000 RECOMMENDED FLOW RATE

DN	ADVISABLE		IRRIGATION FIRE PROTECTION		ALLOWED MAX	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
50	4,4	15,8	5,6	20,4	8,8	31,7
65	10,5	37,6	13,4	48,4	20,9	75,3
80	11,6	41,8	14,9	53,8	23,2	83,6
100	17,6	63,3	22,6	81,4	35,2	126,7
125	35	128,6	45,9	165	71,4	257
150	43	155	55,2	199	86	309
200	62	223	80	286	125	445
250	172	619	220	795	345	1237
300	247	891	318	1145	495	1781
350	340	1212	433	1559	675	2425
400	440	1583	565	2036	880	3167
500	687	2474	885	3181	1374	4948
600	990	3563	1272	4580	1979	7125
700	1347	4849	1730	6250	2700	9700
800 - 900	1759	6333	2260	8143	3520	12667
1000 - 1200	2750	9900	3534	12723	5498	19792

The tables can be used for preliminary selection of the nominal valve diameter. The appropriate DN will be calculated using the sizing software developed by T.I.S Nuoval. Please contact us with the required operating conditions of the valve. Above data are valid for valves with standard plug (without V-port).

M2000 PRESSURE DROP

Pressure drop of automatic control valves can be evaluated by using below equation:

$$\Delta P = (Q / Kvs)^2 \text{ [bar]}$$

Where:

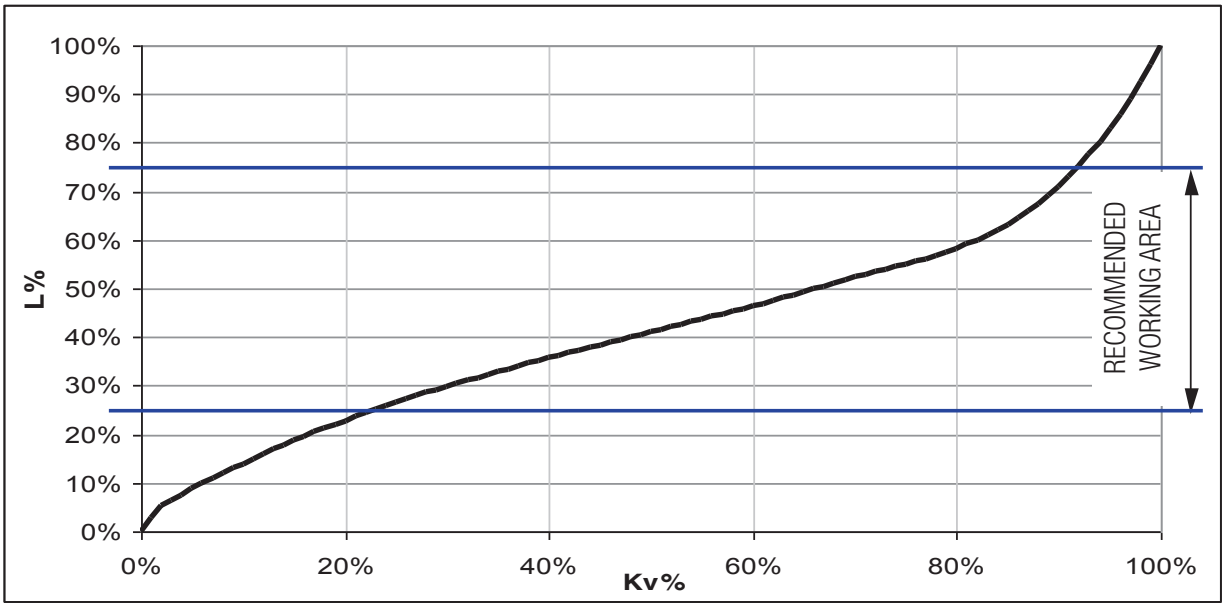
- ΔP = pressure drop [bar]
- Kvs = flow coefficient [m³/h]
- Q = flow rate [m³/h]

Kvs flow coefficient indicates 20°C water flow rate [m³/h], through the fully open valve, that induces 1bar pressure drop.

M2000 HYDRAULIC SPECIFICATIONS

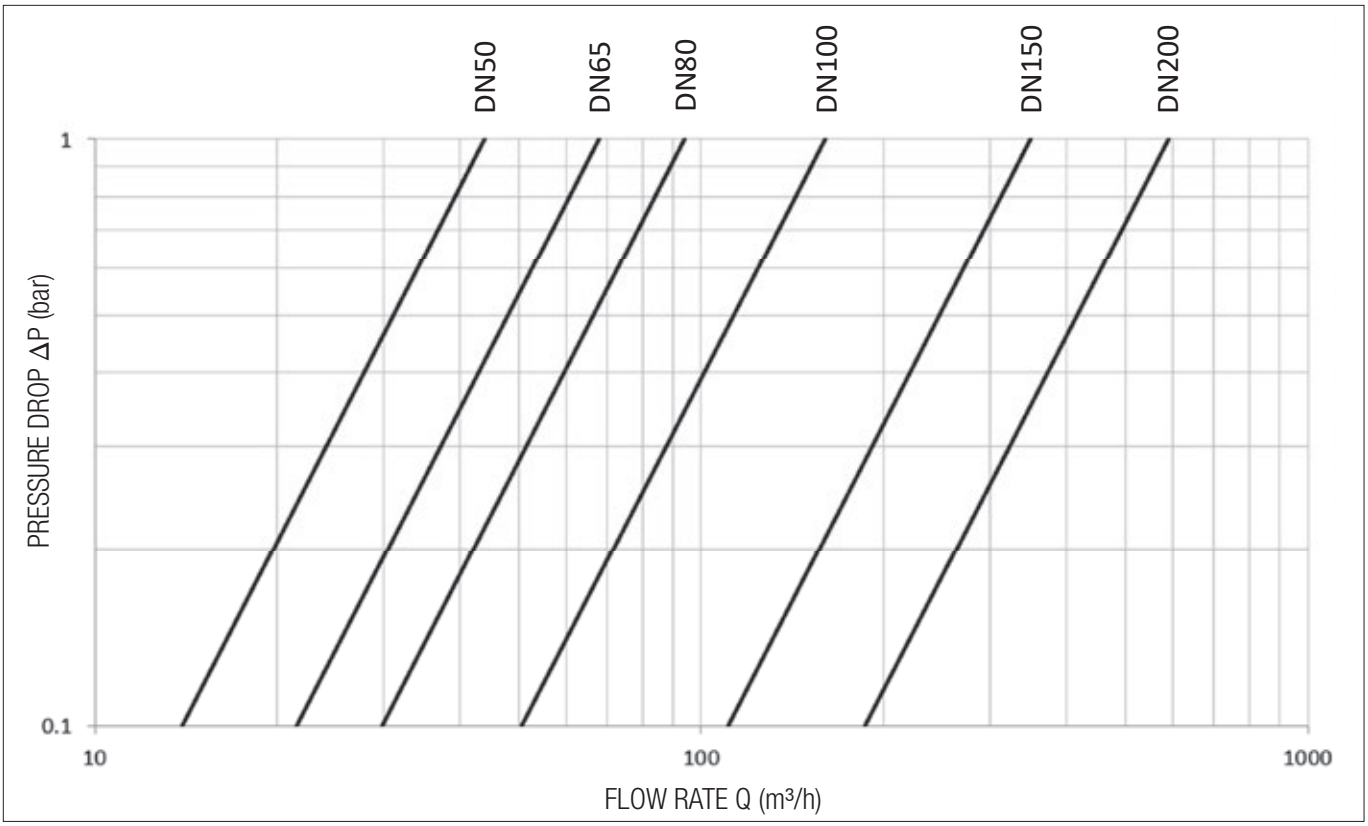
DN	50	65	80	100	150	200
Kvs [m³/h]	44	68	94	160	350	590
Lift [mm]	15	18	20	25	39	50

LIFT-KV DIAGRAM



Flow coefficient at L% opening	Kv = Kv% * Kvs
Flow coefficient at 100% open valve	Kvs
Kv%	From the above diagram: Kv% - L%

M2000 PRESSURE DROP DIAGRAM (VALVE 100% OPEN)



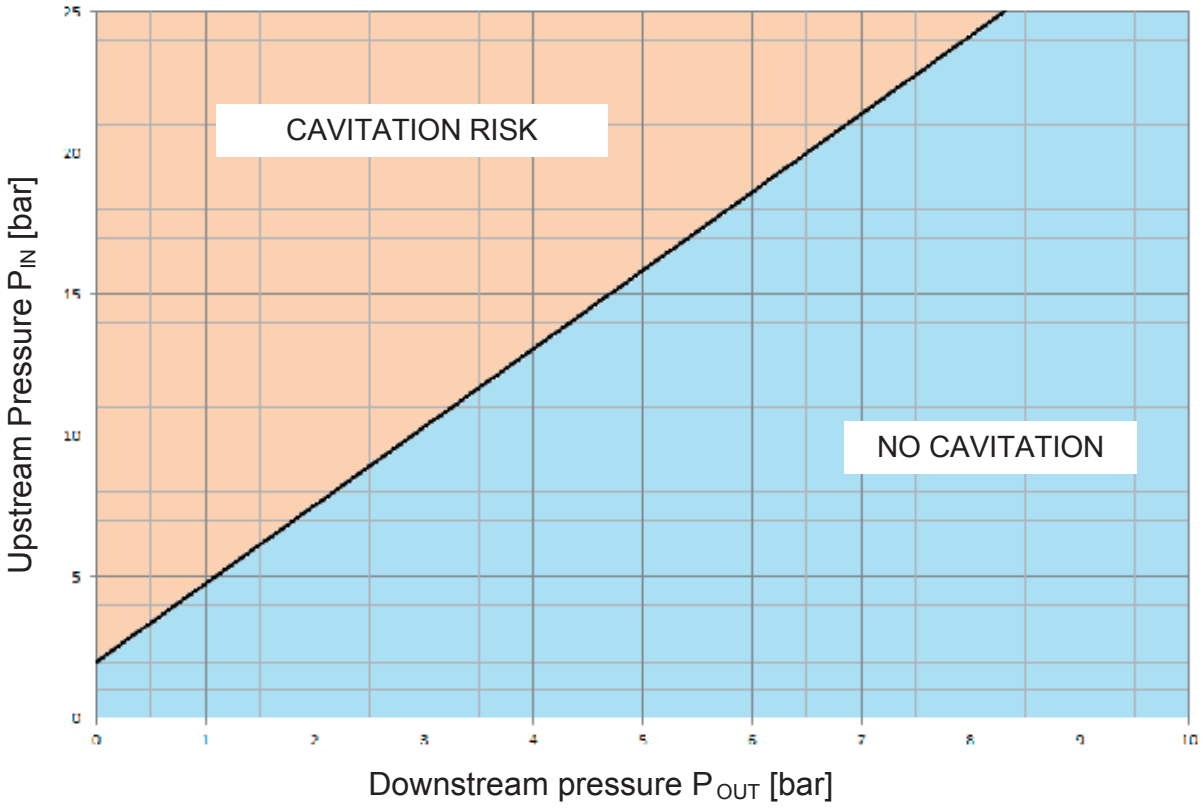
M2000 RECOMMENDED FLOW RATE

DN	ADVISABLE		IRRIGATION / FIRE PROTECTION		ALLOWED MAX	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
50	6,9	24,7	8,8	31,8	13,7	49,5
65	11,6	41,8	14,9	53,8	23,2	83,6
80	17,6	63,3	22,6	81,4	35,2	126,7
100	27,5	99,0	35,3	127	55,0	198
150	61,9	223	79,5	286	123,7	445
200	110,0	396	141,4	509	219,9	792

The tables can be used for preliminary selection of the nominal valve diameter. The appropriate DN will be calculated using the sizing software developed by T.I.S Nuoval. Please contact us with the required operating conditions of the valve. Above data are valid for valves with standard plug (without V-port).

CAVITATION

The stream velocity is not constant through the valve and reaches the higher values close to the valve seat (vena contracta). This produces a significant local reduction of the pressure. The higher the valve pressure drop ΔP, the higher the local stream velocity, the lower the local pressure. If, due to high valve pressure drop, the pressure in the vena contracta pressure is reduced down to the vapor pressure, small bubbles of vapour develop. Downstream the vena contracta, the pressure increases again and the steam bubbles rapidly implode, dissipating high rates of energy and generating strong pressure waves. Pressure waves produce intense surficial stress on the valve. Pressure drop must therefore be contained in order to avoid noise and erosion of the valve.
The valve operating conditions can be preliminary checked by using the cavitation diagram below. The valve shall not continuously operate under cavitation risk.
It can be accepted that the valve operates under light cavitation conditions for short periods.



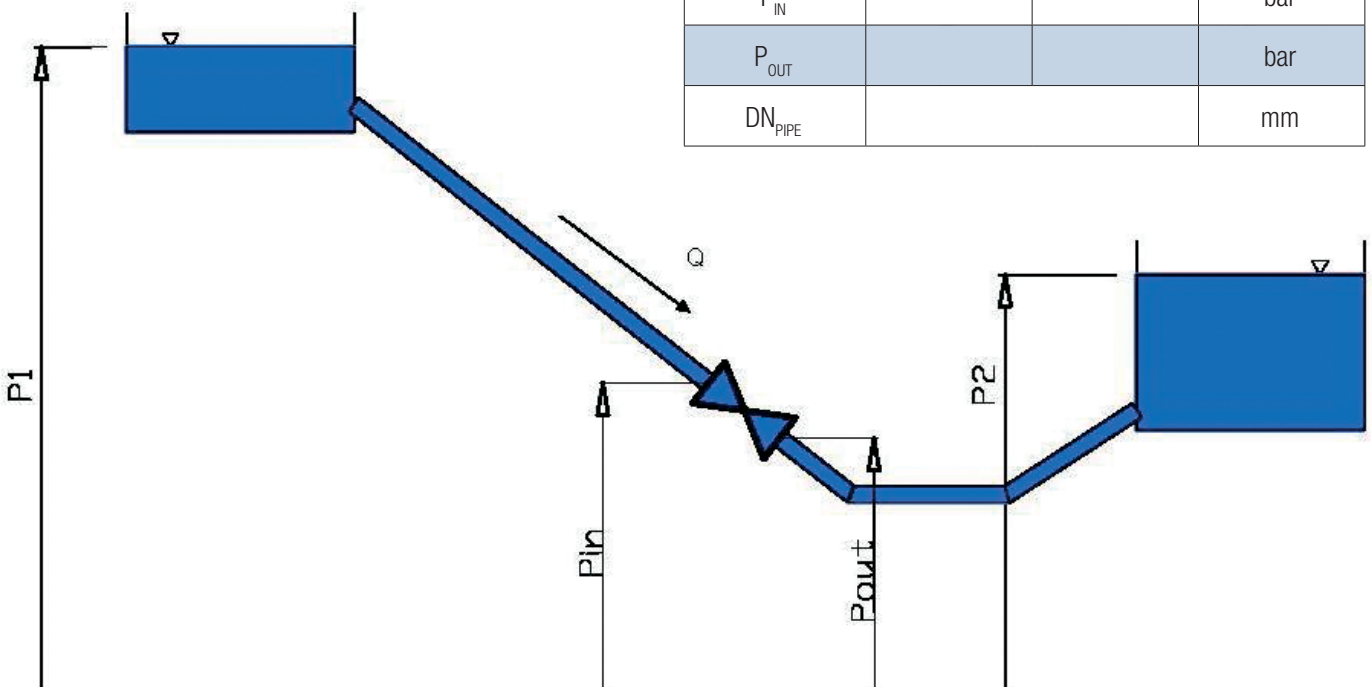
Cavitation diagram refers to 40% open valves. When the opening degrees of the valve significantly differs from this value, we recommend to verify the actual cavitation conditions by using the software specifically developed by T.I.S Nuoval. Please contact us providing valve's required operating conditions.

M3000 and M2000 automatic control valves shall operate within the following limits. Should deviations occur, please, contact the manufacturer.

Valve min pressure drop	0.3 bar
Valve max pressure drop	See above cavitation diagram
Min inlet pressure	0.5 bar
Recommended opening degree	Modulating valves: L% = 25% ÷ 75% On-off valves: L% = 0-100%

VALVE SIZING DATA

DATA TABLE FOR VALVE SIZING			
	Qmax	Qmin	
Q			m^3/h
P_{IN}			bar
P_{OUT}			bar
DN_{PIPE}			mm



Q = Flow rate (maximum & minimum).
P_{IN} = The pressure at minimum / maximum flow measured at the valve upstream flange.
P_{OUT} = The pressure at minimum / maximum flow measured at the valve downstream flange.

For adequate valve analysis, T.I.S. Nuoval use a special sizing software developed in our hydraulic laboratory (see example on pag. 88). For this purpose, please contact us and provide the operating conditions of the valve. See the sizing data table above.

AUTOMATIC CONTROL VALVE SIZING EXAMPLE

Fill in “DATA TABLE FOR VALVE SIZING” (pag. 85):

DATA TABLE FOR VALVE SIZING			
	Qmax	Qmin	
Q	65	36	m^3/h
P_{IN}	6	8	bar
P_{OUT}	3	3	bar
DN_{PIPE}	100		mm

EXAMPLE

Red data are an example of sizing.

WATERWORKS APPLICATION

Preliminary selection of the valve DN.

From the table “M3000 RECOMMENDED FLOW RATE” (page 81), in correspondence of the advisable flow column, can be seen that the appropriate diameter for the maximum flow rate of 65 m3/h is DN100.

M3000 RECOMMENDED FLOW RATE

DN	ADVISABLE		IRRIGATION FIRE PROTECTION	
	l/s	m^3/h	l/s	m^3/h
50	4,4	15,8	5,6	20,4
65	10,5	37,6	13,4	48,4
80	11,6	41,8	14,9	53,8
100	17,6	63,3	22,6	81,4
125	35,7	128,6	45,9	165

From the table M3000 “HYDRAULIC SPECIFICATIONS” (page 80) can be seen that this valve has a flow coefficient, with fully open obturator, Kvs=102 m^3/h.

M3000 HYDRAULIC SPECIFICATIONS

DN	50	65	80	100	125	150	200	250	300	350
Kvs [m^3/h]	28	50	70	102	208	230	390	650	980	1420
Lift [mm]	12	19,5	20,5	23,5	38	38	45	58	63	73

Minimum and maximum opening degree calculation.

Kv = Q / √(PIN-POUT)

Kv_{Qmax} = 65 / √(6-3) = 37.5 m^3/h (at MAX flow rate “Q_{max}”) which corresponds to

Kv% = K_v/K_{vs} = 37.5 / 102 = 0.36 (36%)

Kv_{Qmin} = 36 / √(8-3) = 16 m^3/h (at MIN flow rate “Q_{min}”) which corresponds to

Kv% = K_v/K_{vs} = 16 / 102 = 0.15 (15%)

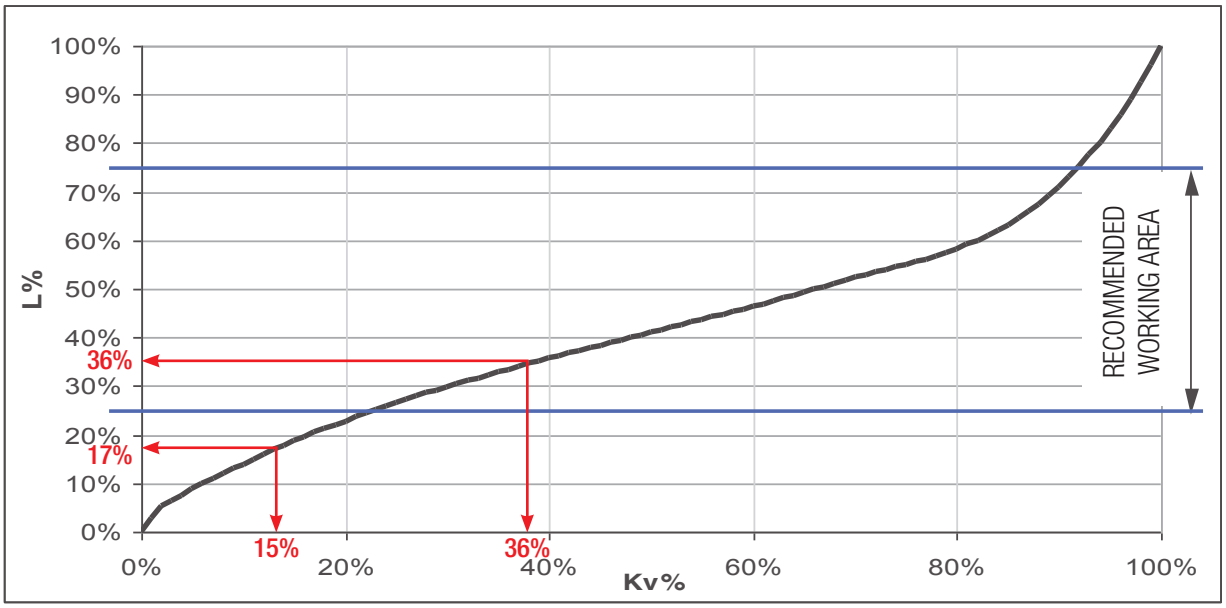
VALVE OPERATING LIMITS

From “LIFT-KV DIAGRAM” at page 80 it can be seen that the degree of shutter opening at maximum and minimum flow rate is respectively:

$L\%(Q_{MAX}) = 36\%$

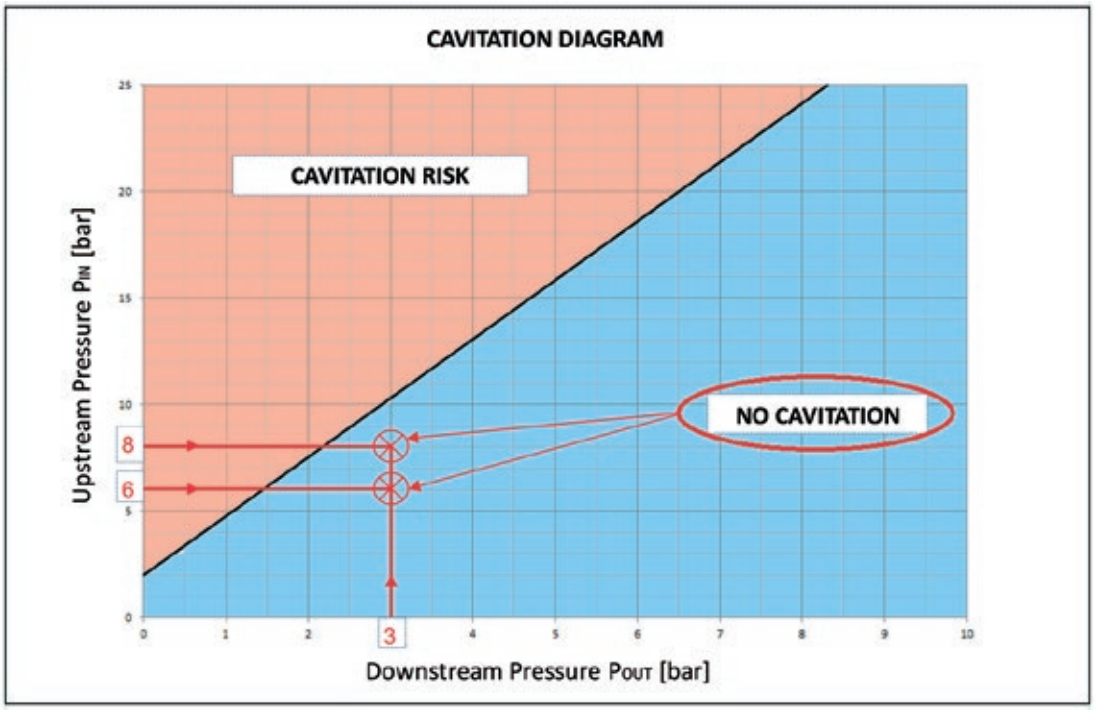
$L\%(Q_{MIN}) = 17\%$

The valve operates between 17% and 36% of opening degree.



CAVITATION CHECK

The “CAVITATION DIAGRAM” shows that the valve operates outside the cavitation zone.



NUOVAL LINE

AUTOMATIC CONTROL VALVES SIZING SOFTWARE

A dedicated software provides accurate sizing of automatic valves according to the relevant conditions.
The cavitation analysis is calculated according the real range opening of the valve's shutter.
Before the order, please provide operating conditions to carry out specific analysis of valve performance.

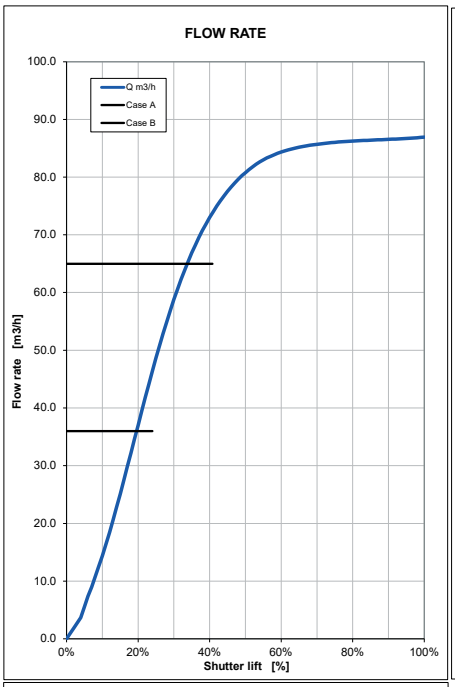
AUTOMATIC CONTROL VALVE serie 2000 - 3000: flow analysis and cavitation control
MODULATING VALVE
Upstream-downstream reservoirs at constant level

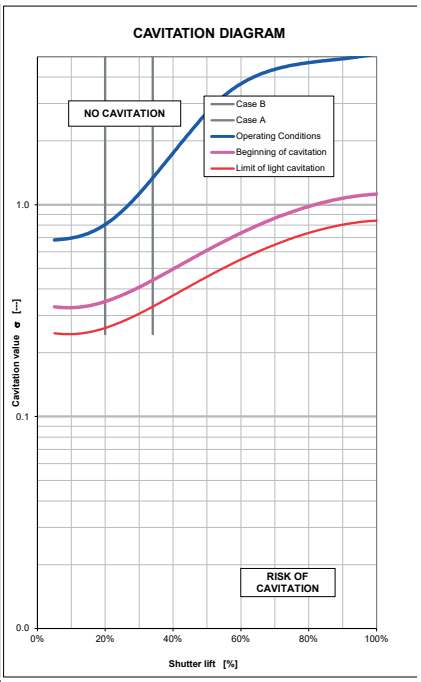
Rev 3.6

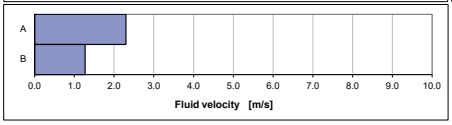
Description		SIZING		
Valve specifications		M3000		
Valve size		300		(C)
Obturator		Standard		
Shutter max stroke	L100%	23.6	[mm]	
PN		16	OK	
Valve description		PRESSURE REDUCING V. STANDARD DISK		
Static pressures		A	B	
Flow rate	Q	65.0	36.0	m3/h
		65.0	36.0	[m3/h]
Upstream press. (dynamic)	Pin	60.0	80.00	[m]
Downstream press. (dynamic)	Pout	30.0	30.00	[m]
Flow velocity	v	2.30	1.27	[m/s]
Flow coefficient (%)	Kv%	36%	15%	[%]
Approx. valve opening	L%	**36%**	**17%**	[%]
	L	8.0	4.7	[mm]
Valve pressure drops (valve 100% open)				
Flow coeff.	Kvs	102.0		[m3/h]
P drop coeff. (100% open)	ξ_v100%	15.08		[---]
Valve P. drop (100% open)	ΔP100%	4.06	1.25	[m]
Upstream pipe	ζin	107.1	OK	[--]
Downstream pipe	ζout	0.0	OK	[--]

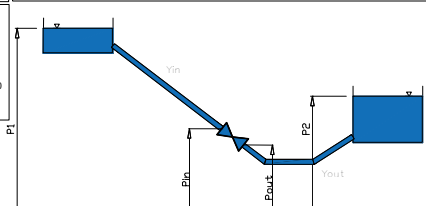
Calibrated orifice (ISO 5167)	-->	***NO***		
Internal valve diameter	D	100.0	[mm]	
Orifice diameter	d	78.0	[mm]	
Diameter ratio	b = d/D	0.780	[---]	OK
Reynolds	Re	1.53E+05	8.49E+04	[---]
Flow rate factor	C	0.00	0.000	[---]
Orifice pressure head	DH	0.000	0.000	[bar]
Flow coefficient	Cq	0.00	0.00	[---]
Orifice Pdrop coeff.	Csi_or	0.00		[---]

Drilled plate	-->	NO	
Internal valve diameter	D	100.0	[mm]
Number of holes	Nh	1	[mm]
Hole diameter	d	43.0	[mm]
Area ratio	f	0.185	[---]
Drilled plate Pdrop coeff.	csi_dr	0.00	
Drilled plate Pressure drops	DP_dr	0.00	0.00 [m]







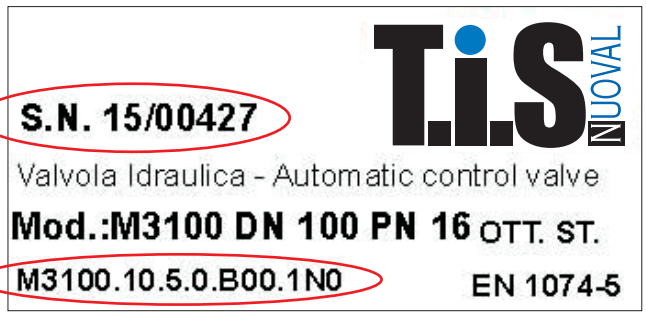


Note:
Pressure drop ΔP = (Q/Kvs)^2
Pressure drop in bar; Flow rate in m3/h

PRODUCT TRACKING

SERIAL NUMBER

PRODUCT CODE



M	X	XXX	.XX	.X	....

.... : ACCESSORIES

.X : PRESSURE RATING IDENTIFICATION CODE

.XX : NOMINAL DIAMETER IDENTIFICATION CODE

XXX : FUNCTIONS

100	PRESSURE REDUCING VALVE
120	PRESSURE REDUCING AND SUSTAINING CONTROL VALVE
200	PRESSURE SUSTAINING / RELIEF VALVE
400	FLOW CONTROL VALVE
500	FLOAT CONTROLLED MODULATING CONSTANT LEVEL VALVE
600	FLOAT CONTROLLED ON-OFF VALVE
700	HYDRAULIC ON-OFF VALVE WITH ELECTRICAL REMOTE CONTROL (FROM DN300 TO DN1000)
800	ON/OFF ALTITUDE LEVEL CONTROL VALVE
900	EXCESS FLOW GATE VALVE

X : SERIES

2	M2000 SERIES (FULL PORT)
3	M3000 SERIES (STANDARD PORT)

M : DIAPHRAGM ACTUATED AUTOMATIC CONTROL VALVE

HYDRAULIC LABORATORY

The T.I.S. Nuoval hydraulic laboratory is divided into two areas:

- the first (figure above) is used for teaching/training purposes (training customers, public and private companies, engineerings companies, operators, and T.I.S. Group staff);
- the second (figure below) is used to measure the fluodynamic behaviour of valves (e.g. pressure drop), to verify valve's functionality and its components under extreme conditions (e.g. endurance test), or using glass pipes (DN100) to simulate and observe the cavitation phenomenon.

During the development of control valves, the laboratory test results are combined with three-dimensional modelling, structural testing, fluodynamic modelling. This ensures a process of continuous improvement of T.I.S. Nuoval brand products.

MAIN FUNCTIONS

M3100
PRESSURE REDUCING VALVE

M3200
PRESSURE SUSTAINING / RELIEF VALVE

M3400
FLOW CONTROL VALVE

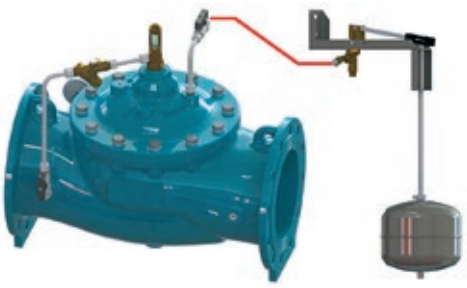
MAIN VALVE

M3219
SURGE ANICIPATOR / PRESSURE RELIEF VALVE

M3410
FLOW CONTROL / PRESSURE REDUCING VALVE

M3120
PRESSURE REDUCING / SUSTAINING

NUOVAL LINE



M3500
MODULATING FLOAT CONTROLLED
CONSTANT LEVEL VALVE

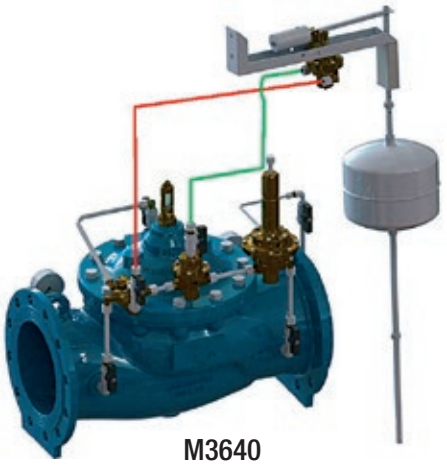
M3600
ON-OFF FLOAT CONTROLLED VALVE

M3800
ALTITUDE VALVE ONE-WAY FLOW

MAIN VALVE

M3620
ON-OFF FLOAT CONTROLLED VALVE
WITH PRESSURE SUSTAINING

M3805
MODULATING ALTITUDE VALVE



M3640
ON-OFF FLOAT CONTROLLED VALVE
WITH RATE OF FLOW CONTROL FUNCTION

M3520
MODULATING FLOAT CONTROLLED
CONSTANT LEVEL VALVE
WITH PRESSURE SUSTAINING

M3170
PRESSURE REDUCING VALVE WITH SOLENOID CONTROL

M3771 *[DN50 to DN250]*
SOLENOID CONTROLLED / ELECTRICALLY OPERATED "STEP BY STEP"

M3701 *[DN50 to DN250]*
SOLENOID CONTROLLED ON-OFF VALVE

MAIN VALVE

M3770 *[DN300 to DN1000]*
SOLENOID CONTROLLED / ELECTRICALLY OPERATED "STEP BY STEP"

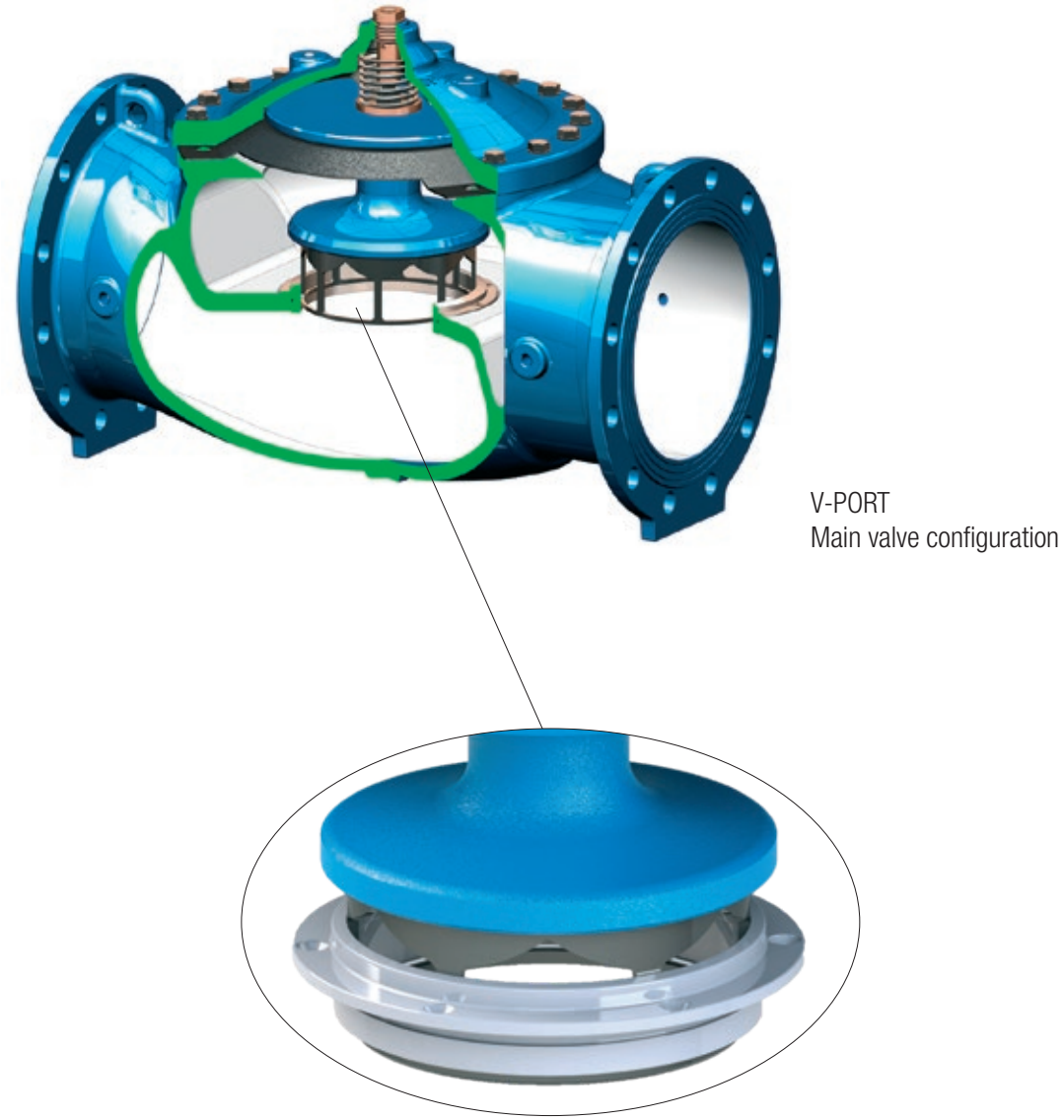
M3700 *[DN300 to DN1000]*
SOLENOID CONTROLLED ON-OFF VALVE

M3900
EXCESS FLOW VALVE

ACCESSORIES

V-PORT

Many applications of automatic control valves are used in distribution networks, or in tourist facilities (e.g. camping, hotels, resorts), where an high range of flow rate is required due to the presence of elevated number of guests. In cases like this, the valve can be equipped with a V-PORT device, avoiding the use of a bypass valve to manage low flow rate demands.

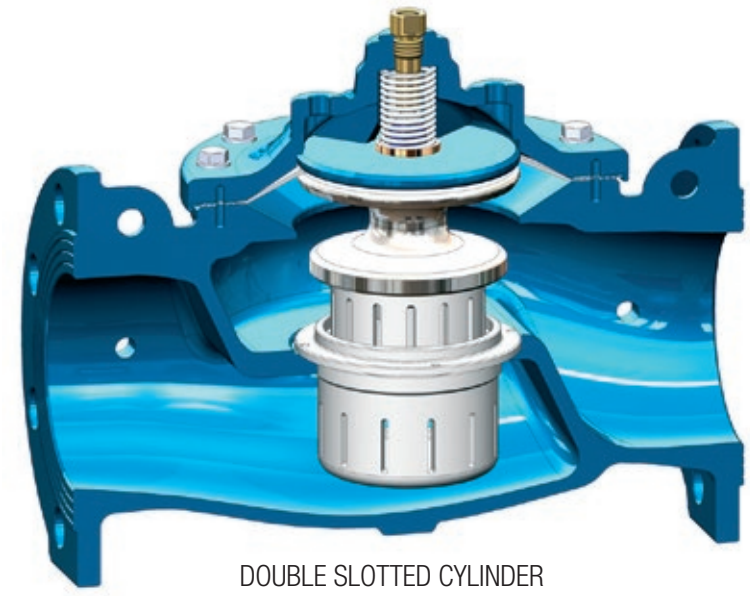


V-PORT
Main valve configuration

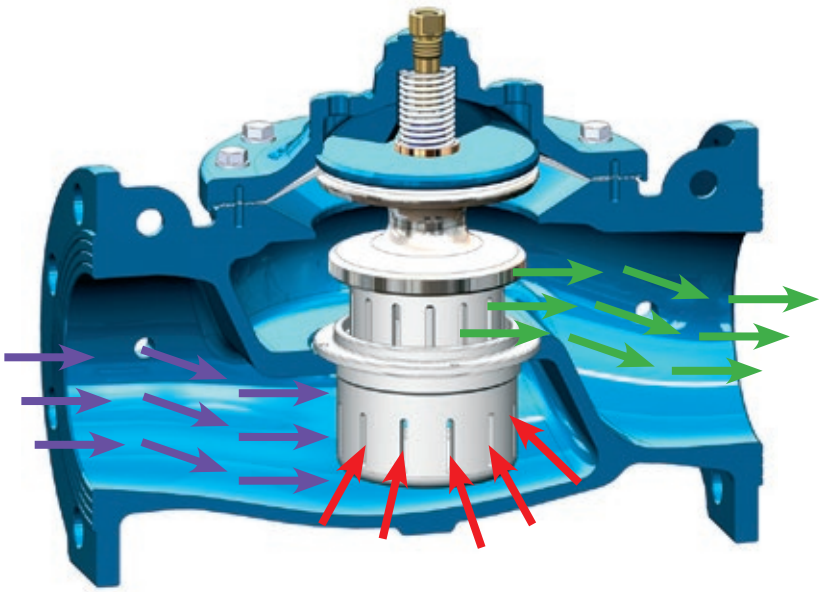
DOUBLE SLOTTED CYLINDER (DSC)

In the presence of high loads to be dissipated and in situations where the main valve with standard parabolic obturator is subjected to cavitation, it is possible to equip the valve itself, in its interior, with a double stain-less steel slotted cylinder where, through the specially designed slots, the flow is divided into radial flow jets, colliding with each other at the center of the valve, thus allowing to dissipate this energy. This accessory allows to obtain a curve of dissipation of energy which is adjusted to the actual working conditions of the val-ve, according to the actual needs of plant. This accessory allows to achieve an energy dissipation curve which is adjusted to the real working conditions of the valve, according to the plant's effective requirements.

A significant noise reduction is achieved with the use of the DSC.

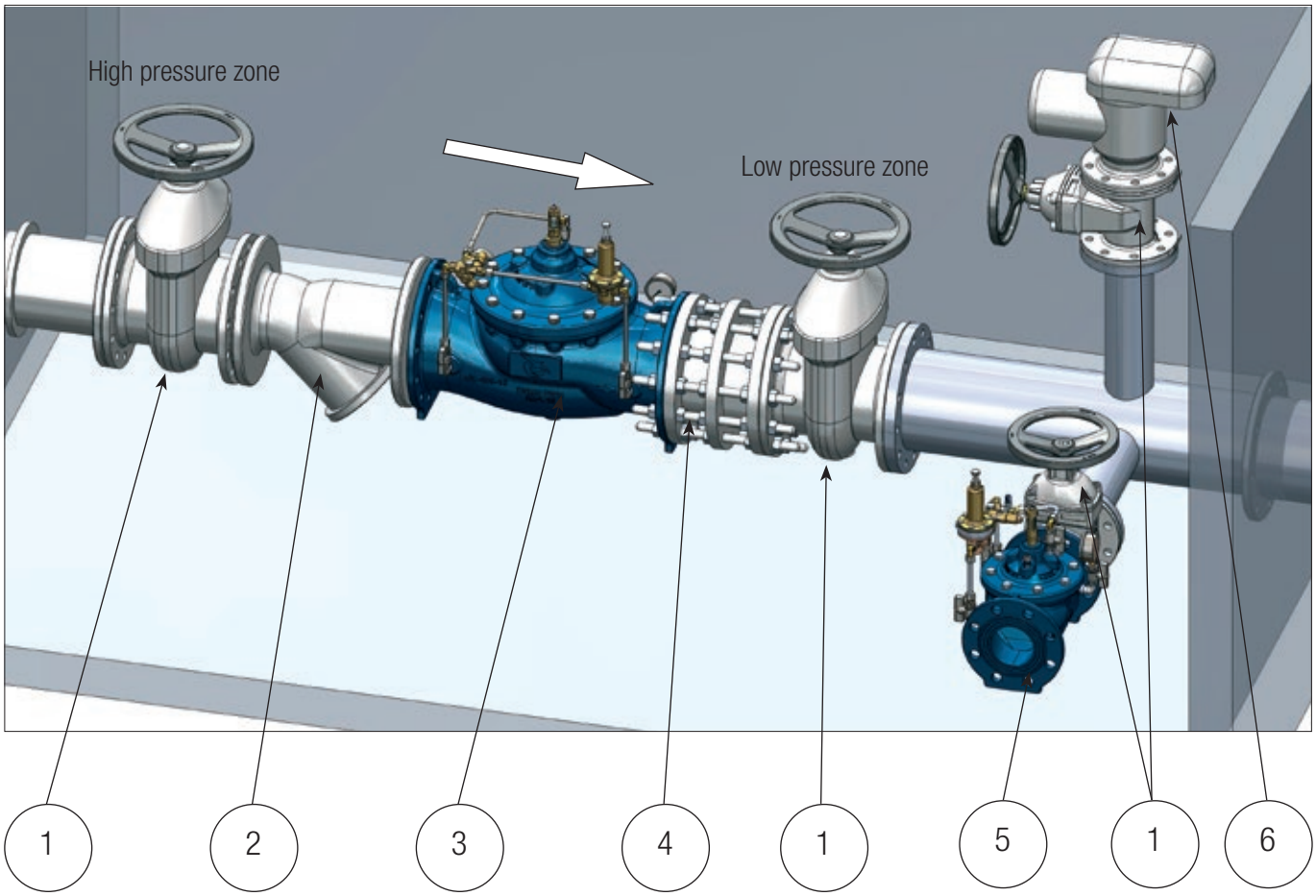


DOUBLE SLOTTED CYLINDER
Main valve configuration



INSTALLATION EXAMPLE

Below an example of installation with a control valve. This ensures extended operating life and correct operation of the valve, reducing the probability of damage or operating faults.



1 ISOLATING GATE VALVE;

2 “Y” STRAINER;

3 AUTOMATIC CONTROL VALVE (PRESSURE REDUCING VALVE);

4 DISMANTLING JOINT;

5 AUTOMATIC CONTROL VALVE (PRESSURE RELIEF VALVE);

6 AIR RELEASE VALVE (TRIPLE FUNCTIONS)

It remains at the customer’s discretion to create a by-pass line to the valve to ensure water service even in the event of maintenance or failure of the main line valve. By-pass installation is strongly recommended.