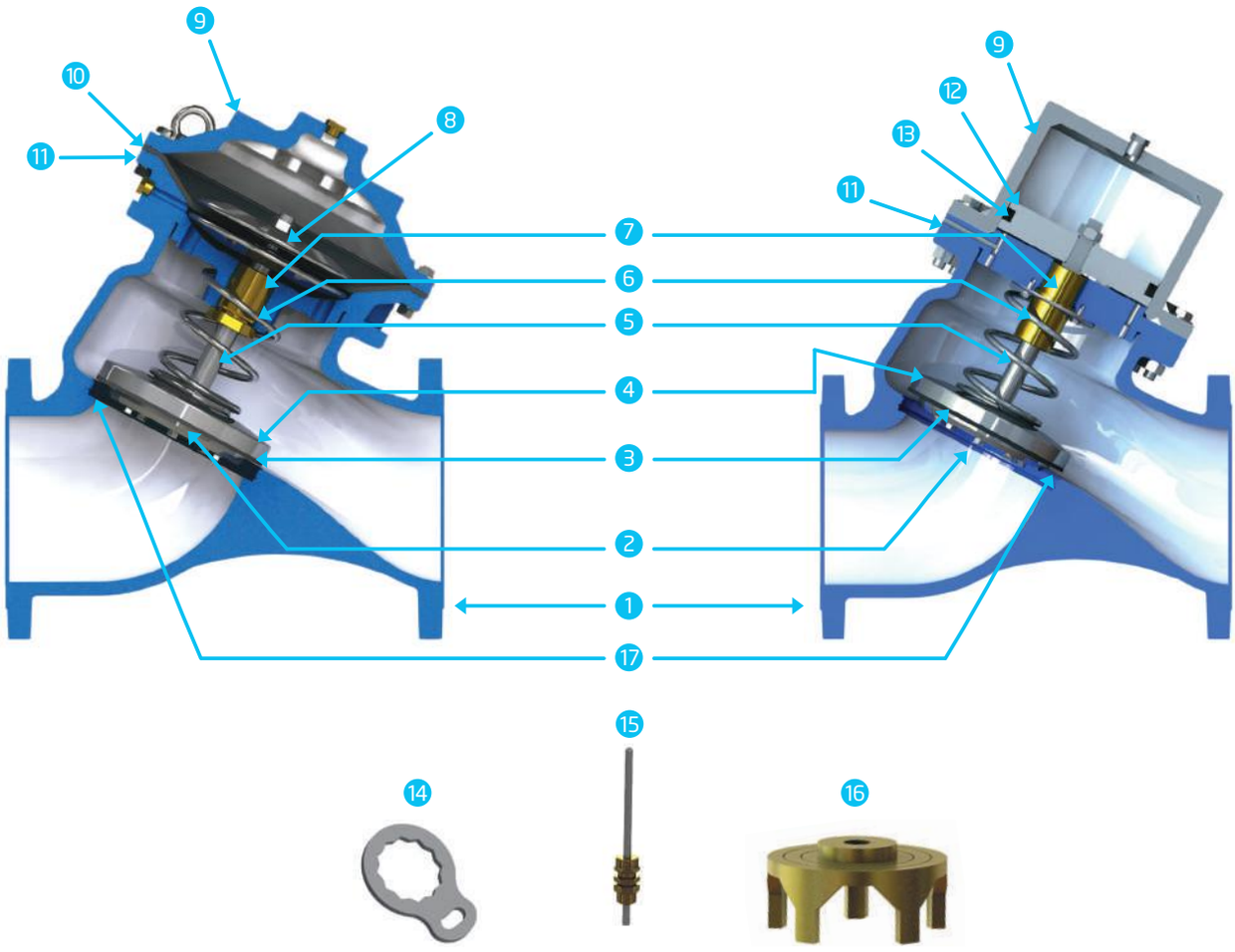


	NO	PART NAME	MATERIAL	
			87 Model	88 Model
MAIN PARTS	1	Body	GGG50 (Ductile Iron)	GGG50 (Ductile Iron)
	2	Disc Washer	AISI 304 (2"-6") GGG50-Ductile Iron (8"-16")	AISI 304 (2"-6") GGG50-Ductile Iron (8")
	3	Rubber Seal	Standard: Buna-N Optional: NBR"	Standard: Buna-N Optional: NBR"
	4	Disc	AISI 304 (2"-6") GGG50-Ductile Iron (8"-16")	AISI 304 (2"-6") GGG50-Ductile Iron (8")
	5	Stem	AISI304	AISI304
	6	Spring	AISI302	AISI302
	7	Stem Bearing	Ms58	Ms58
	8	Diaphragm Disc	AISI 304 (2"-6") GGG50-Ductile Iron (8"-16")	---
	9	Upper Bonnet	GGG50 (Ductile Iron)	AISI304
	10	Diaphragm	Standard: Neoprene Optional: EPDM, Natural Rubber	---
	11	Middle Bonnet	GGG50 (Ductile Iron)	AISI304
	12	Piston	---	AISI304
	13	Gasket	---	NBR
	14	Locking Plate	AISI304	---
	15	Position Indicator Stem (Optional)	AISI304	AISI304
	16	A Port (Optional)	Ms58	Ms58
	17	Seat	AISI304	AISI304

TECHNICAL SPECIFICATIONS				
	PRESSURE RATING	Standard	0.5 - 16 bar (7.5 - 240 psi)	
		High Pressure Range	87 model: 0.5 bar - 25 bar (7.5 - 360 psi)	88 model: 0.5 bar - 40 bar (7.5 - 580 psi)
	TEMPERATURE	Min. Operating Temperature	- 10 °C (14 °F) DIN 2401 / 2	
		Max. Operating Temperature	80 °C (176 °F) DIN 2401 / 2	
	CONNECTION	Flanged	Standard: EN 1092/2	Optional: ANSI, BS 10-E
	COATING	Standard	Epoxy	
		Optional	Polyester	
	HYDRAULIC CONNECTIONS	Standard	Copper	
		Optional	SST, Reinforced Nylon · Hydraulic Pipe · SAEJ 844	
	ACTUATOR TYPE	87 Model	Double Chamber, Diaphragm Actuated, Disc Closed Type	
		88 Model	Double Chamber, Piston Actuated, Disc Closed Type	

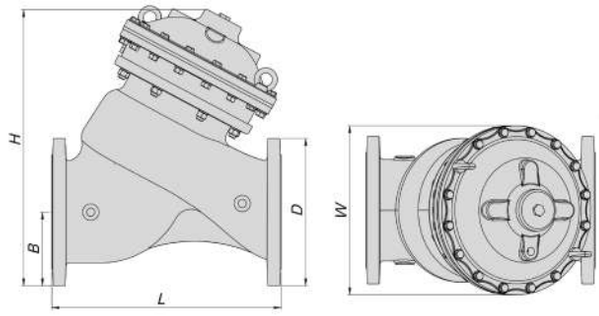
AVAILABLE MODELS

87 MODEL

88 MODEL

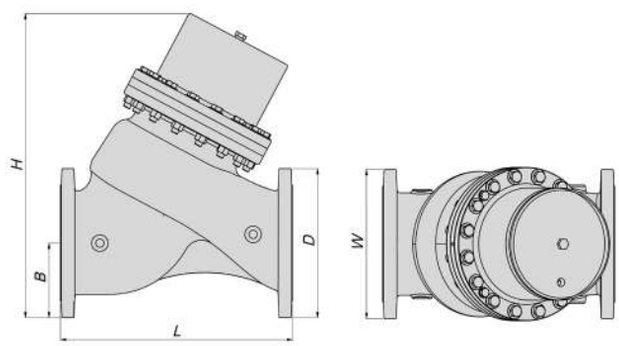
MODEL	87		88	
Connection	Flanged		Flanged	
Material	Ductile Iron (GGG50)		Ductile Iron (GGG50)	
Body Pattern	Y Type		Y Type	
Operating Pressure	16 bar (240 psi) - 25 bar (360 psi)		40 bar (580 psi)	
Available Sizes	**INCH**	**MM**	**INCH**	**MM**
	2	50	2	50
	2½	65	2½	65
	3	80	3	80
	4	100	4	100
	5	125	5	125
	6	150	6	150
	8	200	8	200
	10	250		
	12	300		
	14	350		
	16	400		

MODEL 87



DN		H		B		L		D		W		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	Lbs.	kg.
2	50	10,4	264	3,3	83	8,3	210	6,5	165	5,5	139	28,7	13
2½	65	11,2	284	3,7	93	8,7	222	7,3	185	5,5	139	35,3	16
3	80	12,8	324	4	100	10,6	270	7,9	200	6,7	170	55,1	25
4	100	15,6	395	4,4	111	13	330	8,7	220	7,9	201	81,6	37
5	125	16,1	406	5,1	130	13	330	9,8	250	7,9	201	86	39
6	150	20,8	529	5,7	145	16,8	427	11,2	285	12,6	320	172	78
8	200	25,9	658	6,7	170	20,9	530	13,4	340	15,4	390	308,6	140
10	250	30,4	771	8	203	24,4	620	15,9	405	19,3	490	507,1	230
12	300	36,5	927	9,2	233	28,5	725	18,1	460	21,3	540	815,7	370
14	350	39	991	10,6	270	28,5	725	20,5	520	21,3	540	848,8	385
16	400	45,5	1155	12	305	39	990	22,8	580	29,1	740	1830	830

MODEL 88



DN		H		B		L		D		W		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	Lbs.	kg.
2	50	11,3	287	3,3	83	8,3	210	6,5	165	6,5	165	33,1	15
2½	65	12,1	307	3,7	93	8,7	222	7,3	185	7,3	185	37,5	17
3	80	14,3	362	4	100	10,6	270	7,9	200	7,9	200	59,5	27
4	100	16,8	426	4,4	111	13	330	8,7	220	8,7	220	93,0	42
5	125	17,8	453	5,1	130	13	330	9,8	250	9,8	250	99,9	45
6	150	21,8	554	5,7	145	16,8	427	11,2	285	11,2	285	200,6	91
8	200	27,3	693	6,7	170	20,9	530	13,4	340	13,4	340	381,0	173

HYDRAULIC PERFORMANCE

FLAT DISC	Valve Size	mm	50	65	80	100	125	150	200	250	300	350	400
		inch	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"
	Kv	m³/h @ 1 bar	50	65	115	200	310	460	815	1250	1850	1990	3300
	Cv	gpm @ 1 psi	60	75	135	230	360	530	945	1445	2135	2300	3810
	K	dimensionless	3,9	6,6	4,9	3,9	4	3,8	3,8	3,9	3,7	5,9	3,7
	Maximum Flow Continuance	m³/h	39	66	100	156	243	350	622	972	1400	1905	2488
		gpm	171	289	438	685	1070	1541	2739	4279	6162	8388	10955
	Maximum Flow Intermittent	m³/h	78	131	199	311	486	573	848	1325	1909	2598	3393
		gpm	342	579	876	1369	2140	2521	3735	5836	8403	11438	14939
	Vol. Control Chamber	lt	0,185	0,185	0,403	0,629	0,629	2,542	5,536	11,215	13,560	13,560	39,241

A PORT	Valve Size	mm	50	65	80	100	125	150	200	250	300	350	400
		inch	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"
	Kv	m³/h @ 1 bar	40	55	100	170	260	390	695	1065	1575	1695	2800
	Cv	gpm @ 1 psi	47	64	115	196	300	450	805	1230	1820	1960	3240
	K	dimensionless	6,1	9,3	6,4	5,4	5,7	5,2	5,2	5,4	5,1	8,2	5,1
	Maximum Flow Continuance	m³/h	31	56	87	132	204	297	530	828	1192	1623	2108
		gpm	137	245	381	582	897	1306	2336	3646	5246	7144	9280
	Maximum Flow Intermittent	m³/h	62	111	173	264	408	485	723	1129	1625	2213	2874
		gpm	274	490	762	1164	1795	2137	3185	4972	7154	9742	12655
	Vol. Control Chamber	lt	0,185	0,185	0,403	0,629	0,629	2,542	5,536	11,215	13,560	13,560	39,241

Valve Flow Coefficient (Kv, Cv)

Kv :Valve flow coefficient (flow in m^3/h at 1bar Diff. Press.)
Cv :Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q :Flow rate (m^3/h ; gpm)
ΔP :Differential pressure (bar ; psi)
G :Liquid specific gravity (Water = 1.0)

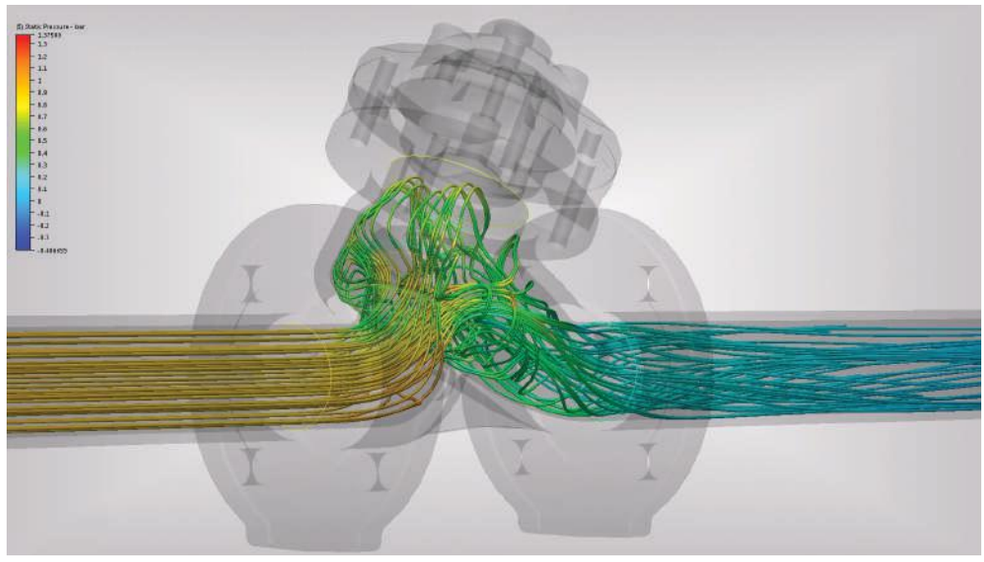
$$Kv, (Cv) = Q.\sqrt{\frac{G}{\Delta P}} \qquad Cv = 1{,}155\ Kv$$

Flow Resistance - Head Loss Coefficient

K :Flow resistance or Head loss coefficient (dimensionless)
ΔH :Head loss (m ; feet)
V :Nominal size flow velocity (m/s ; feet/s)
g :Acceleration of gravity (9.81 m/s^2 ; 32.18 $feet/s^2$)

$$K = \Delta H \frac{2g}{V^2}$$

Flow Rate Analysis



CAVITATION

Cavitation occurs in hydraulic control valves when they are not used under proper pressure values. When fluid passes through the closing area of the hydraulic valve, its value will increase due to extreme choking and its static pressure will drop under the evaporation pressure of the fluid. The fluid evaporates and steam bubbles occur in the fluid. Such steam bubbles explode in the outlet side of the valve under the downstream pressure. Such sudden expositions produce intensive shock waves and temperature increases. Extreme reduction in the valve causes water jets. Shock waves and water jets break particles from valve body material and cause the valve to be worn out, to be pierced and to decrease its life due to such a use. Cavitation causes also damage to installation and thus noise and vibration.

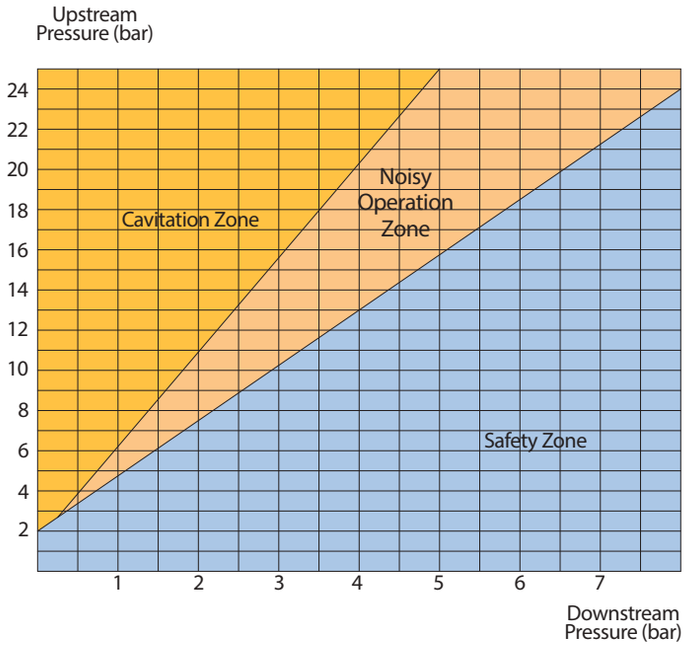
PREVENTING CAVITATION

- Increase the downstream pressure if the system allows to do so.
- If downstream pressure can not be handled, increase valve diameter and thus decrease water speed, if possible.
- Increase the number of pressure decrease points using multiple valves or use multiple valves at the same point to decrease pressure. Besides, decrease the pressure proportionally including the ARMAŞ 800 series proportional pressure reducing control valve in the system at certain points.

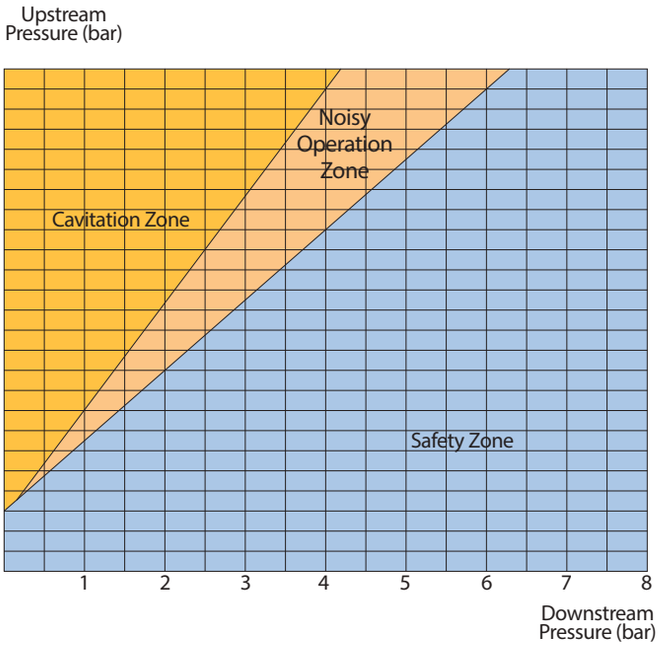
CAVITATION CHART

For the purpose of using cavitation charts:
- Determine the valve upstream pressure specified in the system on the charts.
- Make the required downstream pressure intersect the determined downstream pressure.
- Determine the cavitation condition of the valve based on 3 areas whose intersections are shown on the charts.

FLAT DISC



A PORT

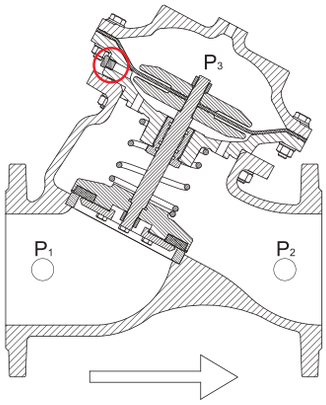


USING WITH SINGLE/DOUBLE CHAMBER ACTUATOR

Armaş 800 series automatic hydraulic control valves are designed with double-chamber actuator as a standard. Valve can be easily used with single or double-chamber actuator without need for any additional parts.

USING WITH SINGLE CHAMBER ACTUATOR

When using the valve with single-chamber actuator, the plugs under the middle bonnet are removed and a plug is in started into the middle bonnet inlet port and thus, the valve actuator is made with single chamber. In such a case, the pressures to be compared are P1, P2, P3.



Using With Single Chamber Actuator

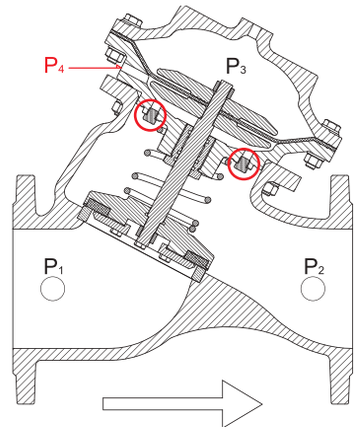
P_1 : Upstream Pressure
P_2 : Downstream Pressure
P_3 : Actuator Pressure

USING WITH DOUBLE CHAMBER ACTUATOR

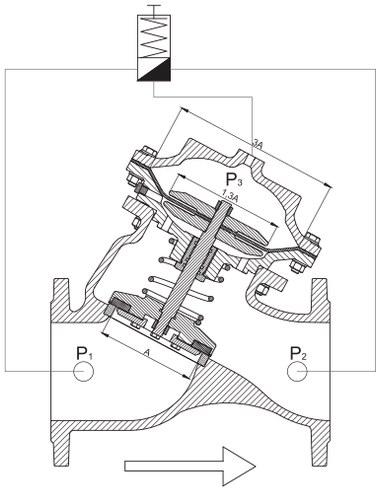
When using the valve with double-chamber actuator, the port holes under the middle bonnet for an extra P4 comparison pressure are closed with plugs and the P4 comparison pressure is given through the middle bonnet port. With P4 comparison pressure, valve controls may be further arranged with the aid of an extra pressure.

Using With Double Chamber Actuator

P_1 : Upstream Pressure
P_2 : Downstream Pressure
P_3 : Actuator Pressure
P_4 : External Effect Pressure



WORKING PRINCIPLES



Armaş 800 series automatic hydraulic control valves are designed with double-chamber actuator as a standard. Valve can be easily used with single or double-chamber actuator without need for any additional parts.

Valve Impact Pressures and Impact Areas

P_1 : Upstream Pressure
P_2 : Downstream Pressure
P_3 : Actuator Pressure
P_{spring} : Spring Force
A : Disc Impact Area