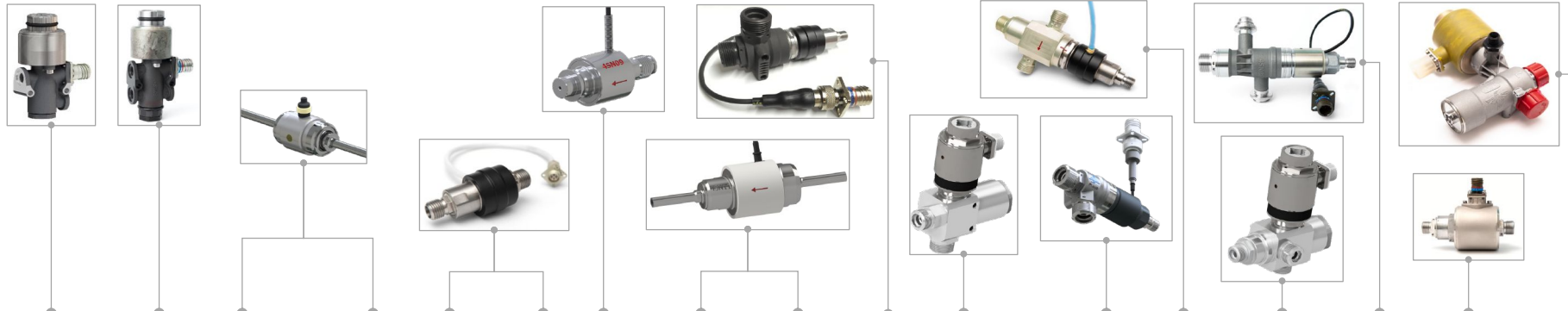


SOLENOID VALVES



Parameter / Valve Designation	4SV03	4SW03	4SN00	4SN00-1	4SN05	4SN05-2	4SN09	4SN11	4SN11-1	4SN02	4SN04	4SN10	4SN01	4SN03	4SN08	4SC02	4SC01	
	MULTI-PURPOSE SOLENOID VALVES SERIES		FLIGHT CONTROL CUSTOM SOLENOID VALVES															
Type	2/2 NC	3/2 NC	2/2 NC									3/2 NC			2/2 NC			
	Direct action, balanced		Direct Action						Pilot Operated						Direct Action CRYOGENIC	Pilot Operated CRYOGENIC		
Mechanical interface	AND 10050-4 (shortened port depth)		Tube ends: $\varnothing 3.2 \times \varnothing 1.75$ (for welding)			SUATP (additional data can be provided on demand)		Custom	Tube ends: $\varnothing 6 \times \varnothing 4$ (for welding)			SUATP (additional data can be provided on demand)						
Electrical interface	D38999 / 20FA35PN		Loose wires (connector can be installed on demand)															
Working medium (WM)	G, L		G, L		G, L, H ₂ O ₂						G	NTO, MON3, L	G		NTO, MON3, L	LOX, LN ₂ , LNG		
Operating temperature range, K (C)	223...323 (-50...+50)		223...323 (-50...+50)															
Operating pressure range, MPa (kgf/cm ²)	0 - 42.2 (430)		0...9.8 (0...100)	0...4.9 (0...50)	0...14.7 (0...150)	0...2.5 (0...25)	0...4.9 (0...50)	0...14.7 (0...150)	0...2.5 (0...25)	1.5...14.7 (15...150)	1.5...22.6 (15...230)	1.5...14.7 (15...150)	1.5...22.6 (15...230)	1.5...14.7 (15...150)	0...4.9 (0...50)	2...22.5 (20...230)		
Proof pressure, MPa (kgf/cm ²)	63.8 (650)		14.7 (150)		22.1 (225)		7.4 (75)	22.1 (225)		22.1 (225)	34.3 (350)	22.1 (225)		34.3 (350)	22.1 (225)	7.4 (75)	34.3 (350)	
Burst pressure, MPa (kgf/cm ²)	105.5 (1075)		24.5 (250)		36.9 (375)		12.3 (125)	36.9 (375)		36.9 (375)	56.4 (575)	36.9 (375)		56.4 (575)	36.9 (375)	12.3 (125)	56.4 (575)	
3D printed parts (materials)	Body (Aluminum alloy AISI10Mg)		N/A						Body (Aluminum alloy AISI10Mg)		Body (Inconel 718)	Body (Aluminum alloy AISI10Mg)		Body (Inconel 718)	N/A	Body (Inconel 718)		
Seat materials	Polyamide		PTFE						Polyamide, PTFE	Polyamide, rubber	PTFE	Polyamide, PTFE	Polyamide, rubber	PTFE	PCTFE			
Voltage, Vdc	28±4		28±4															
Max power consumption, (@20 °C), W	40 (TBR)		16.7		37.5		24.1	37.5			43.6	37.5		43.6	37.5	36.6		
Conventional passage diameter, mm	3.5	3.5	0.5	0.7	1.6	3	1.5	1.5	3	12	10	12	6	8	12	4	12	
Cv, gpm/PSI ^{0.5}	TBD		0.007	0.008	0.08	0.23	0.06	0.08	0.25	1	3.6	3.1	0.88	1.2	2.7	0.44	3.9	
Max response time, s	0.07	0.07	0.005		0.03		0.02	0.03			0.1	0.15	0.1	0.1	0.08	0.08	0.15	
Overall dimensions, mm	104x65x $\varnothing 41$ (TBR)	115x65x $\varnothing 41$ (TBR)	25x $\varnothing 15.5$ (not including inlet and outlet tubes)			81x $\varnothing 35$	60x $\varnothing 26$	55x $\varnothing 33$ (not including inlet and outlet tubes)			131x58x44	152x115x44	133x41x57	155x76x38	140x120x55	163x90x57	120x90x $\varnothing 60$	113x76x165
Mass, kg	0.5 (TBR)	0.5 (TBR)	0.025		0.24		0.09	0.23			0.42	1.2	0.6	0.5	1.3	0.65	1.2	1.9
TRL	4	3	5	5	6	6	3	5	5	5	5	4	5	5	6	5	6	

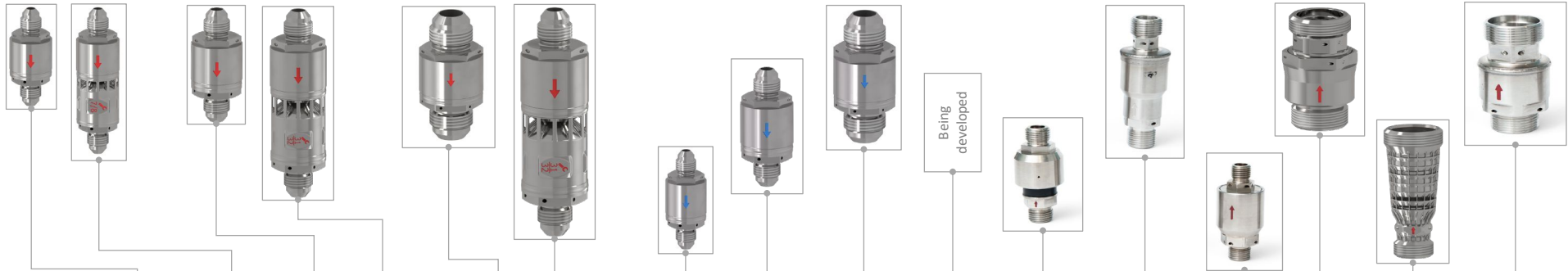
Notes:

"G" means "gases" and should be understood as commonly used gases in aerospace industry (N₂, O₂, He, Air, etc.)

"L" means "liquids" and should be understood as commonly used noncorrosive noncryogenic liquids in aerospace industry (kerosene, UDMH, MMH, water, etc.)

"SUATP" means Standard Ukrainian Aerospace Threaded Ports. These ports are made under Ukrainian Aerospace industry standards. They are sealed with flat metal (aluminum or copper) gasket and tighten with a coupling nut

CHECK VALVES



Parameter / Valve Designation	MULTI-PURPOSE CHECK VALVES SERIES									FLIGHT CONTROL CUSTOM CHECK VALVES												
Type	2/2 NC									2/2 NC												
Mechanical interface	Check Valve			CRYO Check Valve			Check Valve						CRYO Check Valve									
4CV04	4CW04	4CV06	4CW06	4CV12	4CW12	4CC04	4CC06	4CC12	4CN00	4CN01	4CN02	4CN03	4CN04	4CN07	4CC01							
Mechanical interface	AS4395 E 04			AS4395 E 05			AS4395 E 10			AS4395 E 04		AS4395 E 05		AS4395 E 10		Tube ends: Ø3.2xØ1.75 (for welding)	SUATP (additional data can be provided on demand)					
Working medium (WM)	G, L, H ₂ O ₂ , UDMH, NTO, MON3									LOX, LN ₂ , LNG						G, L, H ₂ O ₂	G, L	G, L, H ₂ O ₂	G	G, L	G, L	LOX, LN ₂ , LNG
Operating temperature range, K (C)	223...323 (-50...+50)									77...323 (-196...+50)						223...323 (-50...+50)						77...323 (-196...+50)
Cracking pressure, MPa (kgf/cm ²)	0.0343 (0.35)			0.0333 (0.34)			0.0284 (0.29)			0.0186 (0.19)	0.0137 (0.14)	0.0117 (0.12)	TBD	0.085 (0.87)	0.025 (0.25)	0.079 (0.81)	0.077 (0.79)	0.0177 (0.18)	0.054 (0.55)			
Max operating pressure, MPa (kg/cm ²)	42.2 (430)									0...9.8 (0...100)						IN: 22.6 (230) OUT: 34.3 (350)	23.5 (240)	24.5 (250)	23.5 (240)	49.1 (500)	23.5 (240)	
Proof pressure, MPa (kgf/cm ²)	63.8 (650)									14.7 (150)						IN: 34.3 (350) OUT: 51.5 (525)	35.3 (360)	36.8 (375)	35.3 (360)	73.6 (750)	35.3 (360)	
Burst pressure, MPa (kgf/cm ²)	105.5 (1075)									24.5 (250)						IN: 56.4 (575) OUT: 85.8 (875)	58.9 (600)	61.3 (625)	58.9 (600)	122.6 (1250)	58.9 (600)	
3D printed parts (materials)	Body parts (Inconel 718)									N/A			Body part (Inconel 718)	N/A	Body parts (Inconel 718)							
Seat materials	PTFE						Me (Special)			PTFE	Me	PTFE	Rubber	PTFE	Me	Me (Special)						
Equivalent sharp edge orifice diameter, mm	1.9...4.2	1.5...3.7	5.9	TBD	8...12.1	TBD	1.9...4.2	5.9	8...12.1	0.7	1.3	4.4	2.5	16.1	8.5	14.2						
C _v , gpm/PSI ^{0.5}	0.1...0.5	0.06...0.39	1.0	TBD	1.8...4.1	TBD	0.1...0.5	1.0	1.8...4.1	TBD	0.05	0.53	0.2	7.2	2.0	5.6						
Overall dimensions, mm	57.7xØ22.5	84.4xØ22.5	59.7xØ25	91.9xØ25	72.2xØ33	TBD	59.7xØ22.5	72.2xØ33	75.2xØ33	TBD	65.5xØ31	88.5xØ32	72xØ33	64.5xØ40	78xØ33	65xØ41						
Mass, kg	0.075	0.13	0.1	0.18	0.22	TBD	0.075	0.1	0.22	TBD	0.19	0.22	0.23	0.3	0.17	0.29						
TRL	3	3	3	2	2	2	3	3	2	1	4	6	4	5	3	4						

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"Me" means "Metallic" and should be understood as a metal-to-metal valve seat sealing