



...perfectly switched!



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Introduction

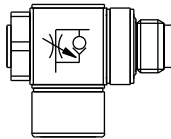
The Function Fitting product line represents a series of valves that perform specific pneumatic functions, while also having a method of connecting the pneumatic tubing to the valve. The products are: Flow Controls (metered-in and metered-out), Pressure Regulators (relieving and non-relieving), Soft Start Valves, Pilot Operated Check Valves, and Exhaust Restrictors. These multipurpose valves have port threads and tube connections that allow for use in any part of the world. Each valve function is available in multiple sizes so the proper size can be chosen to meet the customer's specific application requirements.



Function Fittings

General Information

Right Angle Flow Control



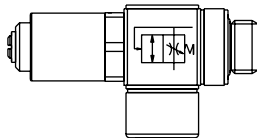
Flow Control Valves — Metered-Out

Typically threaded into the ports of an air cylinder or other pneumatic motion devices to control the speed at the moving device. A slot or knob adjustment is used for speed control setting.

Flow Control Valves — Metered-In

Typically threaded into the output ports of an air valve to control the speed of a cylinder or other pneumatic motion devices. The metered-in flow controls are often mounted in the output ports of the control valve, providing a more convenient location for adjustment.

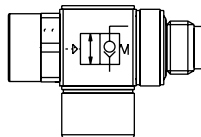
Soft Start Valve



Soft Start Valves

Allows air pressure to build slowly to “softly” reset pneumatic motion devices. Usually, the Soft Start valve is threaded into the control valve’s supply port.

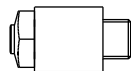
Pilot Operated Check Valve



Pilot Operated Check Valves

The Pilot Operated Check Valves allow unchecked, free air flow when a pressure is present at the pilot port. When pilot pressure is removed, the Pilot Operated Check valve blocks air flow in both directions. Typically, PO Check Valves are used at inlet ports of the air cylinder or other pneumatic motion devices.

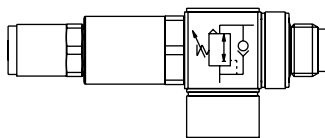
Exhaust Restrictor



Exhaust Restrictors

Typically threaded into the exhaust ports of the control valve to restrict the speed of the exhausting air. This restriction controls the speed of an air cylinder or other pneumatic motion device.

Pressure Regulator



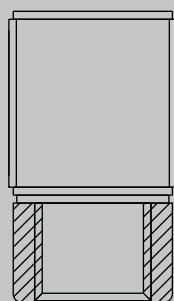
Pressure Regulator

Typically threaded into the pressure port of a control valve for the pressure regulation of a small pneumatic circuit. The regulators are available in relieving or non-relieving function.

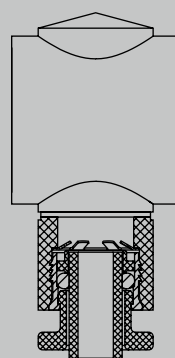
Standard materials

Sealing elements	NBR
Internal turned parts	Brass
External turned parts	Zinc plated brass
Plating	Galvanized zinc
Springs	Stainless steel
Stamped parts	Stainless steel
Plastic parts	PA

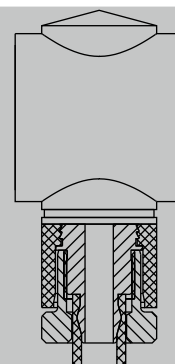
Cartridge



with threaded banjo



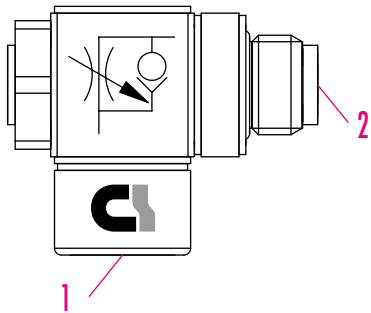
with push-in fitting
(max. pressure 10 bar)



with compression fitting

	M5	G1/8	G1/4	G3/8	G1/2	4.0	6.0	8.0	10	4.3/3.0	6.0/4.0	8.0/6.0	10/8.0
M5	x					x	x			x	x		
G1/8		x					x	x			x	x	
G1/4			x				x	x	x		x	x	
G3/8				x				x	x			x	x
G1/2					x								
	10-32UNF	1/8NPTF	1/4NPTF	3/8NPTF	1/2NPTF	5/32"	1/4"	3/8"					
10-32UNF	x					x							
1/8NPTF		x				x	x						
1/4NPTF			x				x	x					
3/8NPTF				x				x					
1/2NPTF					x								

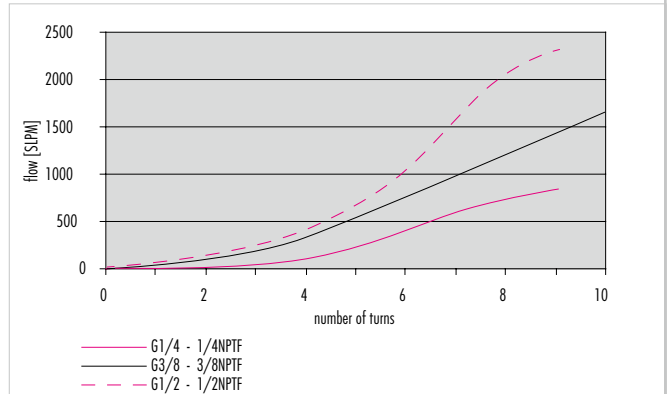
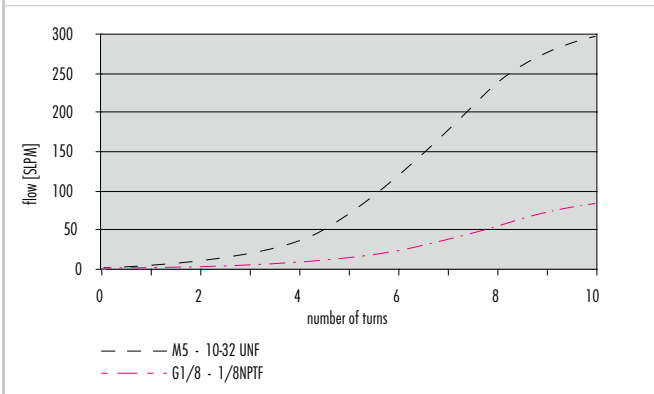
x = Suitable fluids: compressed air, lubricated or non-lubricated



Right Angle Flow Control metered-out

Temperature range: -10°C up to +70°C
 Operating pressure: 1 bar up to 10 bar

Flow characteristics / from 2 to 1

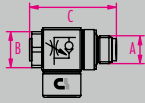


Flow from 1 to 2 with throttle closed [SLPM]

M5 10-32UNF	G1/8 1/8NPTF	G1/4 1/4NPTF	G3/8 3/8NPTF	G1/2 1/2NPTF
31	185	340	978	1423

$p_1 = 6 \text{ bar}$; $p_2 = 5 \text{ bar}$

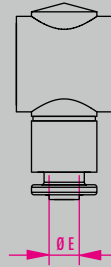
Cartridge



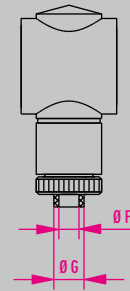
with slot adjustment



with threaded banjo
D Part No.



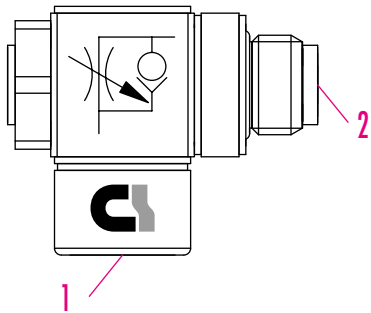
with push-in fitting
E Part No.



with compression fitting
F G Part No.

A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
M5	SW8	21.0	1.5 Nm	1.1 lbs/ft	M5	913 12 51	4.0 6.0	913 12 71 913 12 72	3.0 4.0	4.3 6.0	913 12 35 913 12 36
G1/8	SW13	32.0	10 Nm	7.3 lbs/ft	G1/8	914 12 51	4.0 6.0 8.0	914 12 71 914 12 72 914 12 73	4.0 6.0	6.0 8.0	914 12 36 914 12 37
G1/4	SW17	41.0	12 Nm	8.8 lbs/ft	G1/4	915 12 51	6.0 8.0 10.0	915 12 72 915 12 73 915 12 74	4.0 6.0	6.0 8.0	915 12 36 915 12 37
G3/8	SW22	47.0	20 Nm	14.7 lbs/ft	G3/8	916 12 51	8.0 10.0	916 12 73 916 12 74	6.0 8.0	8.0 10.0	916 12 37 916 12 38
G1/2	SW27	58.0	30 Nm	22.1 lbs/ft	G1/2	917 12 51					
10-32UNF	SW8	21.0	1.5 Nm	1.1 lbs/ft	10-32UNF	913 22 51	5/32"	913 22 71	printed with valve symbol. (NTPF)		
1/8NPTF	SW13	32.0	15 Nm	11.0 lbs/ft	1/8NPTF	914 22 51	5/32" 1/4"	914 22 71 914 22 72			
1/4NPTF	SW17	41.0	20 Nm	14.7 lbs/ft	1/4NPTF	915 22 51	1/4" 3/8"	915 22 72 915 22 73			
3/8NPTF	SW22	47.0	30 Nm	22.1 lbs/ft	3/8NPTF	916 22 51	3/8"	916 22 73			
1/2NPTF	SW27	58.0	40 Nm	29.5 lbs/ft	1/2NPTF	917 22 51					
<p>with knob adjustment</p>											
A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
G1/8	SW13	max. 47.5	10 Nm	7.3 lbs/ft	G1/8	914 18 51	4.0 6.0 8.0	914 18 71 914 18 72 914 18 73	4.0 6.0	6.0 8.0	914 18 36 914 18 37
G1/4	SW17	max. 58.0	12 Nm	8.8 lbs/ft	G1/4	915 18 51	6.0 8.0 10.0	915 18 72 915 18 73 915 18 74	4.0 6.0	6.0 8.0	915 18 36 915 18 37
G3/8	SW22	max. 66.5	20 Nm	14.7 lbs/ft	G3/8	916 18 51	8.0 10.0	916 18 73 916 18 74	6.0 8.0	8.0 10.0	916 18 37 916 18 38
G1/2	SW27	max. 51.0	30 Nm	22.1 lbs/ft	G1/2	917 12 51					
1/8NPTF	SW13	max. 47.5	15 Nm	11.0 lbs/ft	1/8NPTF	914 28 51	5/32" 1/4"	914 28 71 914 28 72	printed with valve symbol. (NTPF)		
1/4NPTF	SW17	max. 58.0	20 Nm	14.7 lbs/ft	1/4NPTF	915 28 51	1/4" 3/8"	915 28 72 915 28 73			
3/8NPTF	SW22	max. 66.5	30 Nm	22.1 lbs/ft	3/8NPTF	916 28 51	3/8"	916 28 73			
1/2NPTF	SW27	max. 51.0	40 Nm	29.5 lbs/ft	1/2NPTF	917 28 51					

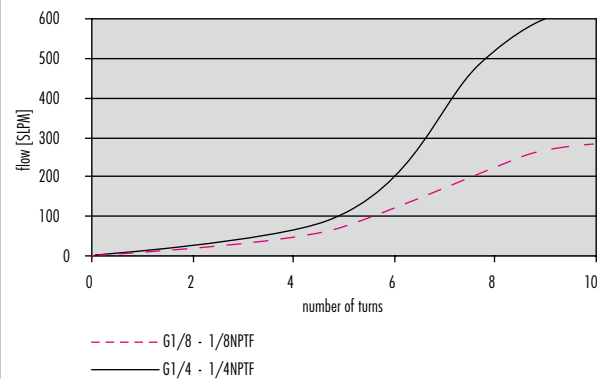
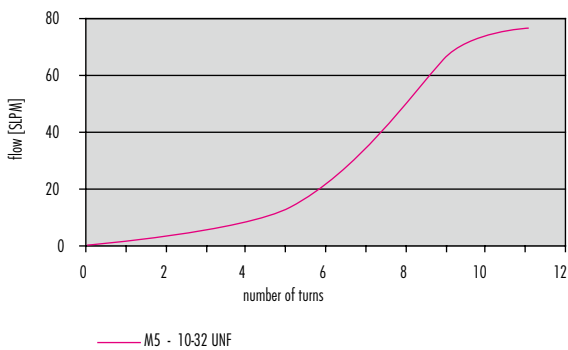
All dimensions in mm. Tightening torques are valid without using thread sealant.



Right Angle Flow Control metered-in

Temperature range: -10°C up to +70°C
Operating pressure: 1 bar up to 10 bar

Flow characteristics / from 1 to 2

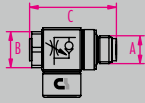


Flow from 2 to 1 with throttle closed [SLPM]

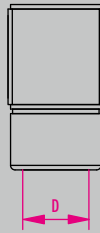
M5 10-32UNF	G1/8 1/8NPTF	G1/4 1/4NPTF
31	170	367

$p_1 = 6 \text{ bar}$; $p_2 = 5 \text{ bar}$

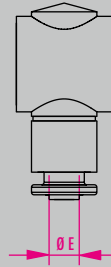
Cartridge



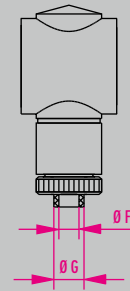
with slot adjustment



with threaded banjo
D Part No.



with push-in fitting
E Part No.



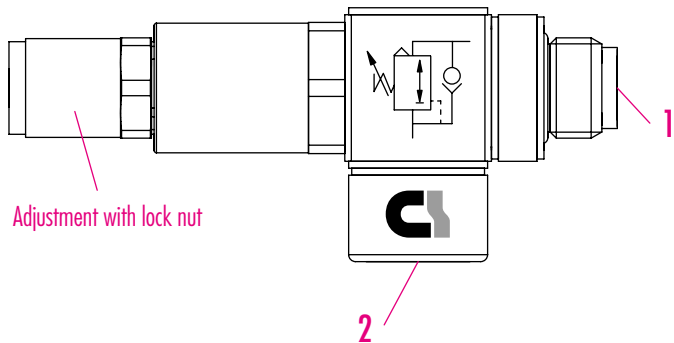
with compression fitting
F G Part No.

A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
M5	SW8	21.0	1.5 Nm	1.1 lbs/ft	M5	913 62 51	4.0 6.0	913 62 71 913 62 72	3.0 4.0	4.3 6.0	913 62 35 913 62 36
G1/8	SW13	32.0	10 Nm	7.3 lbs/ft	G1/8	914 62 51	4.0 6.0 8.0	914 62 71 914 62 72 914 62 73	4.0 6.0	6.0 8.0	914 62 36 914 62 37
G1/4	SW17	41.0	12 Nm	8.8 lbs/ft	G1/4	915 62 51	6.0 8.0 10.0	915 62 72 915 62 73 915 62 74	4.0 6.0	6.0 8.0	915 62 36 915 62 37
10-32UNF	SW8	21v	1.5 Nm	1.1 lbs/ft	10-32UNF	913 72 51	5/32"	913 22 71	printed with valve symbol. (NTPF)		
1/8NPTF	SW13	32.0	15 Nm	11.0 lbs/ft	1/8NPTF	914 72 51	5/32" 1/4"	914 72 71 914 72 72			
1/4NPTF	SW17	41.0	20 Nm	14.7 lbs/ft	1/4NPTF	915 72 51	1/4" 3/8"	915 72 72 915 72 73			

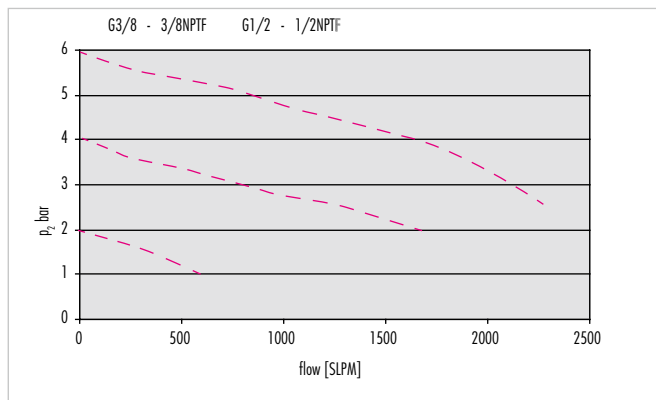
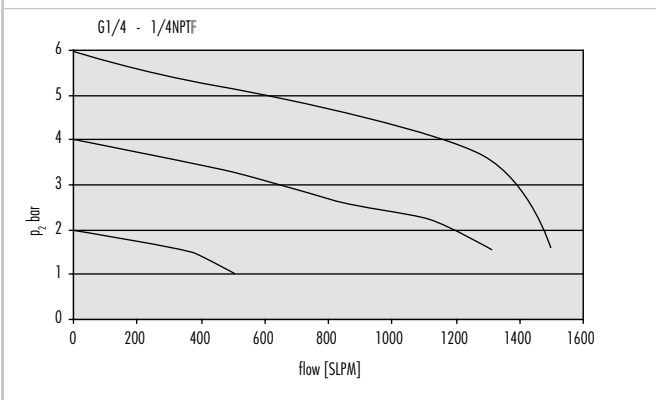
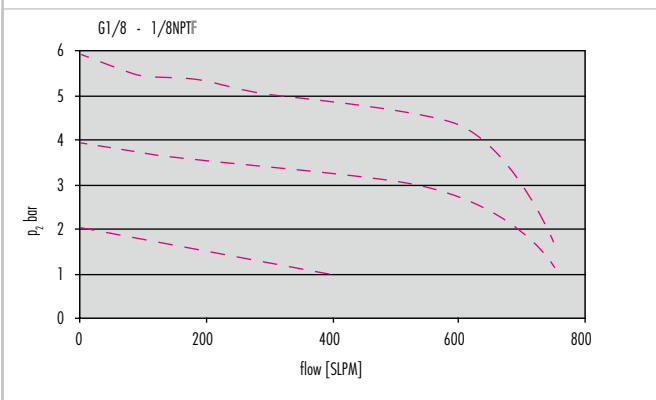
All dimensions in mm. Tightening torques are valid without using thread sealant.

Pressure Regulator

Temperature range: -10°C up to +70°C
 Primary pressure: 1 bar up to 16 bar
 Secondary pressure: 1 bar up to 8 bar*

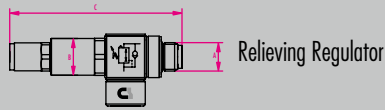


Flow characteristics / from 1 to 2, $p_1 = 7$ bar



* Pressure Regulator with optional secondary pressure available on request

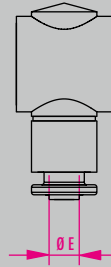
Cartridge



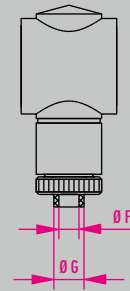
Relieving Regulator



with threaded banjo
D Part No.

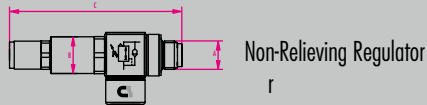


with push-in fitting
E Part No.



with compression fitting
F G Part No.

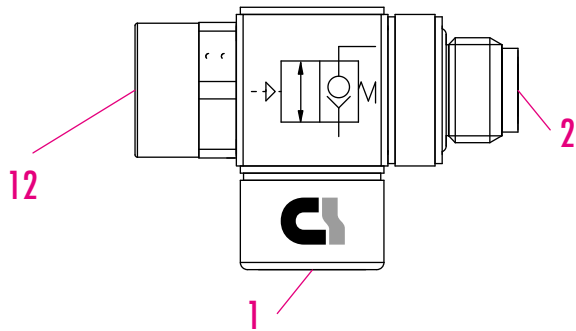
A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
G1/8	SW17	max. 73.0	10 Nm	7.3 lbs/ft	G1/8	934 12 51	4.0 6.0 8.0	934 12 71 934 12 72 934 12 73	4.0 6.0	6.0 8.0	934 12 36 934 12 37
G1/4	SW17	max. 81.0	12 Nm	8.8 lbs/ft	G1/4	935 12 51	6.0 8.0 10.0	935 12 72 935 12 73 935 12 74	4.0 6.0	6.0 8.0	935 12 36 935 12 37
G3/8	SW22	max. 88.0	20 Nm	14.7 lbs/ft	G3/8	936 12 51	8.0 10.0	936 12 73 936 12 74	6.0 8.0	8.0 10.0	936 12 37 936 12 38
G1/2	SW27	max. 89.0	30 Nm	22.1 lbs/ft	G1/2	937 12 51					
1/8NPTF	SW17	max. 73.0	7 Nm	11.0 lbs/ft	1/8NPTF	934 22 51	5/32" 1/4"	934 22 71 934 22 72	printed with valve symbol. (NTPF)		
1/4NPTF	SW17	max. 81.0	15 Nm	14.7 lbs/ft	1/4NPTF	935 22 51	1/4" 3/8"	935 22 72 935 22 73			
3/8NPTF	SW22	max. 88.0	20 Nm	22.1 lbs/ft	3/8NPTF	936 22 51	3/8"	936 22 73			
1/2NPTF	SW27	max. 90.0	20 Nm	29.5 lbs/ft	1/2NPTF	937 22 51					



Non-Relieving Regulator

A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
G1/8	SW17	max. 73.0	10 Nm	7.3 lbs/ft	G1/8	934 82 51	4.0 6.0 8.0	934 82 71 934 82 72 934 82 73	4.0 6.0	6.0 8.0	934 82 36 934 82 37
G1/4	SW17	max. 81.0	12 Nm	8.8 lbs/ft	G1/4	935 82 51	6.0 8.0 10.0	935 82 72 935 82 73 935 82 74	4.0 6.0	6.0 8.0	935 82 36 935 82 37
G3/8	SW22	max. 88.0	20 Nm	14.7 lbs/ft	G3/8	936 82 51	8.0 10.0	936 82 73 936 82 74	6.0 8.0	8.0 10.0	936 82 37 936 82 38
G1/2	SW27	max. 89.0	30 Nm	22.1 lbs/ft	G1/2	937 82 51					
1/8NPTF	SW17	max. 73.0	7 Nm	5.1 lbs/ft	1/8NPTF	934 92 51	5/32" 1/4"	934 92 71 934 92 72	printed with valve symbol. (NTPF)		
1/4NPTF	SW17	max. 81.0	15 Nm	11.0 lbs/ft	1/4NPTF	935 92 51	1/4" 3/8"	935 92 72 935 92 73			
3/8NPTF	SW22	max. 88.0	20 Nm	14.7 lbs/ft	3/8NPTF	936 92 51	3/8"	936 92 73			
1/2NPTF	SW27	max. 90.0	20 Nm	14.7 lbs/ft	1/2NPTF	937 92 51					

All dimensions in mm. Tightening torques are valid without using thread sealant.

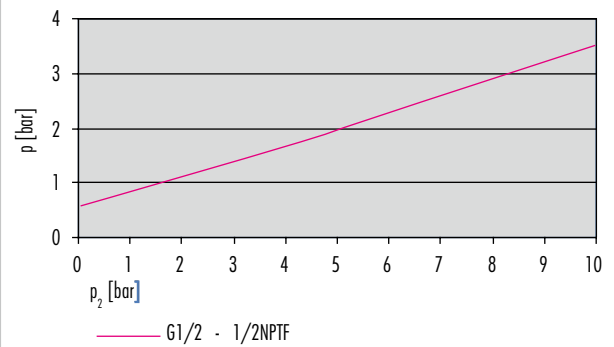
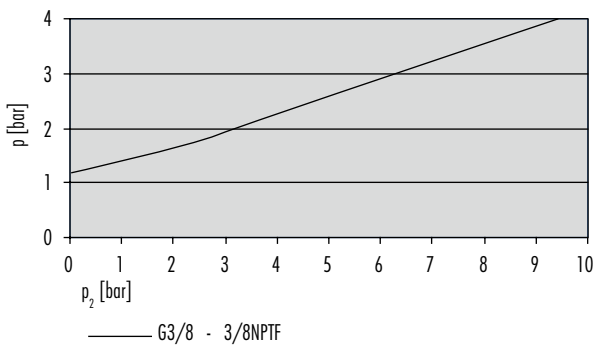
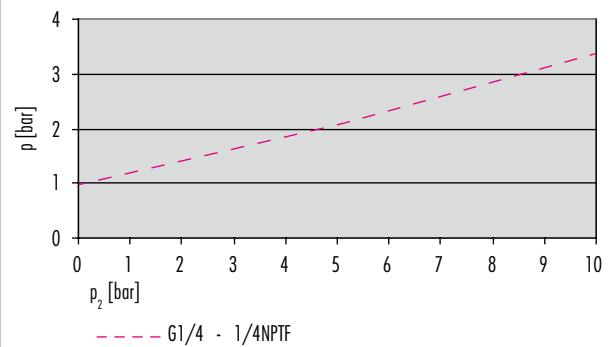
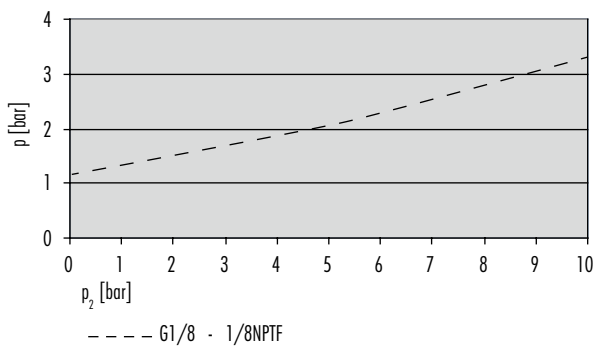


Pilot Operated Check Valve

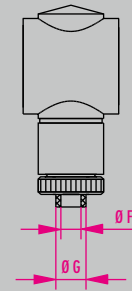
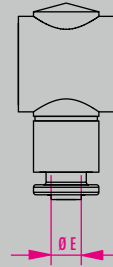
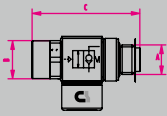
Temperature range: -10°C up to $+70^{\circ}\text{C}$

Operating pressure: 1 bar up to 10 bar

Signal pressure characteristics / min. signal pressure p_{12} to open the valve



Cartridge



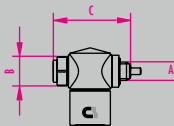
A	B	C	Max. Tightening Torque		with threaded banjo		with push-in fitting		with compression fitting					
					D	Part No.	E	Part No.	F	G	Part No.			
G1/8	SW13	41.0	10 Nm	7.3 lbs/ft	G1/8	944 12 51	4.0	944 12 71	4.0	6.0	944 12 36			
							6.0	944 12 72				6.0	8.0	944 12 37
							8.0	944 12 73						
G1/4	SW17	48.0	12 Nm	8.8 lbs/ft	G1/4	945 12 51	6.0	945 12 72	4.0	6.0	945 12 36			
							8.0	945 12 73				6.0	8.0	945 12 37
							10.0	945 12 74						
G3/8	SW22	55.0	20 Nm	14.7 lbs/ft	G3/8	946 12 51	8.0	946 12 73	6.0	8.0	946 12 37			
G1/2	SW27	65.5	30 Nm	22.1 lbs/ft	G1/2	947 12 51	10.0	946 12 74	8.0	10.0	946 12 38			
1/8NPTF	SW13	41.0	7 Nm	5.1 lbs/ft	1/8NPTF	944 22 51	5/32"	944 22 71	printed with valve symbol. (NPTF)					
1/4NPTF	SW17	48.0	15 Nm	11.0 lbs/ft	1/4NPTF	945 22 51	1/4"	945 22 72						
							3/8"	945 22 73						
							3/8"	946 22 73						
3/8NPTF	SW22	55.0	20 Nm	14.7 lbs/ft	3/8NPTF	946 22 51	3/8"	946 22 73						
1/2NPTF	SW27	65.5	20 Nm	14.7 lbs/ft	1/2NPTF	947 22 51								

Flow from 2 to 1 with throttle closed [SLPM] / p₁ = 5 bar; p₂ = 6 bar; p₃ = 6 bar

G1/8 1/8NPTF	G1/4 1/4NPTF	G3/8 3/8NPTF	G1/2 1/2NPTF
289	676	1156	1910

Flow from 1 to 2 [SLPM] / p₂ = 5 bar; p₁ = 6 bar; p₃ = 0 bar

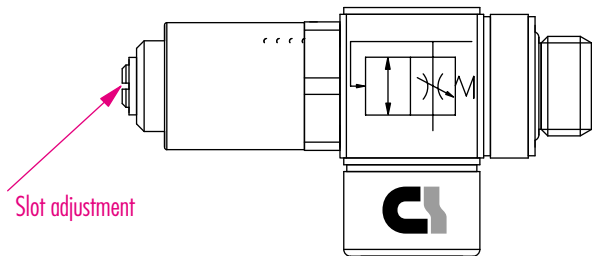
G1/8 1/8NPTF	G1/4 1/4NPTF	G3/8 3/8NPTF	G1/2 1/2NPTF
128	617	1168	1888



Manual Override
for Pilot Operated Check Valve

A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.
M5	SW8	21.0	1.5 Nm	1.1 lbs/ft	M5	993 61 52	4.0	993 61 71	3.0	4.3	993 61 35
							6.0	993 61 72			
10-32UNF	SW8	21.0	1.5 Nm	1.1 lbs/ft	10-32UNF	993 62 51	5/32"	993 62 71			
							1/4"	993 62 72			

All dimensions in mm. Tightening torques are valid without using thread sealant.

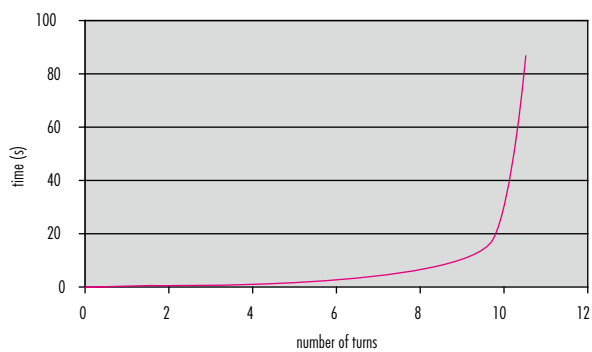


Soft Start Valve

Temperature range: -10°C up to +70°C

Primary pressure: 3 bar up to 10 bar

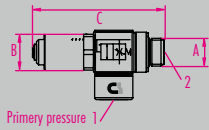
Flow characteristics / time according to CETOP RP111P / volume 2L



Flow from 1 to 2 [SLPM] / $p_2 = 5$ bar; $p_1 = 6$ bar

G1/8 1/8NPTF	G1/4 1/4NPTF	G3/8 3/8NPTF	G1/2 1/2NPTF
620	1040	1750	1750

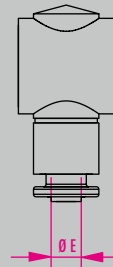
Cartridge



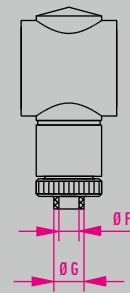
Soft Start Valve AS
primary pressure at banjo



with threaded banjo
D Part No.



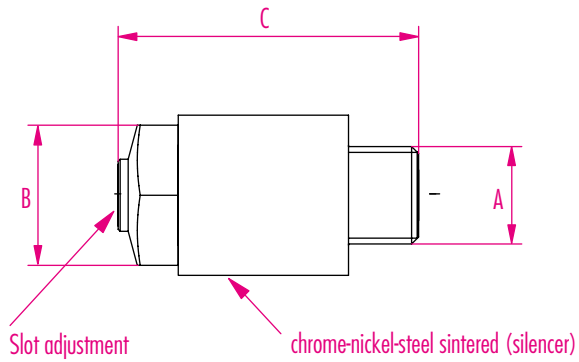
with push-in fitting
E Part No.



with compression fitting
F G Part No.

A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.			
G1/8	SW13	56.5	10 Nm	7.3 lbs/ft	G1/8	954 12 51	4.0	954 12 75	4.0	6.0	954 12 36			
							6.0	954 12 76				6.0	8.0	954 12 37
							8.0	954 12 77						
G1/4	SW17	61.0	12 Nm	8.8 lbs/ft	G1/4	955 12 51	6.0	955 12 76	4.0	6.0	955 12 36			
							8.0	955 12 77				6.0	8.0	955 12 37
							10.0	955 12 78						
G3/8	SW22	67.0	20 Nm	14.7 lbs/ft	G3/8	956 12 51	8.0	956 12 77	6.0	8.0	956 12 37			
G1/2	SW27	71.5	30 Nm	22.1 lbs/ft	G1/2	957 12 51	10.0	956 12 78	8.0	10.0	956 12 38			
1/8NPTF	SW13	56.0	15 Nm	11.0 lbs/ft	1/8NPTF	954 22 51	5/32"	954 22 71	printed with valve symbol. (NTPF)					
1/4NPTF	SW17	63.0	20 Nm	14.7 lbs/ft	1/4NPTF	955 22 51	1/4"	955 22 72						
							3/8"	955 22 73						
3/8NPTF	SW22	69.0	30 Nm	22.1 lbs/ft	3/8NPTF	956 22 51	3/8"	956 22 73						
1/2NPTF	SW27	73.5	40 Nm	29.5 lbs/ft	1/2NPTF	957 22 51								
						<p>Soft Start Valve VS Primary pressure at cartridge</p>								
A	B	C	Max. Tightening Torque		D	Part No.	E	Part No.	F	G	Part No.			
G1/8	SW13	56.5	10 Nm	7.3 lbs/ft	G1/8	954 62 51	4.0	954 62 75	4.0	6.0	954 62 36			
							6.0	954 62 76				6.0	8.0	954 62 37
							8.0	954 62 77						
G1/4	SW17	61.0	12 Nm	8.8 lbs/ft	G1/4	955 62 51	6.0	955 62 76	4.0	6.0	955 62 36			
							8.0	955 62 77				6.0	8.0	955 62 37
							10.0	955 62 78						
G3/8	SW22	67.0	20 Nm	14.7 lbs/ft	G3/8	956 62 51	8.0	956 62 77	6.0	8.0	956 62 37			
G1/2	SW27	71.5	30 Nm	22.1 lbs/ft	G1/2	957 62 51	10.0	956 62 78	8.0	10.0	956 62 38			
1/8NPTF	SW13	56.5	15 Nm	11.0 lbs/ft	1/8NPTF	954 72 51	5/32"	954 72 71	printed with valve symbol. (NTPF)					
1/4NPTF	SW17	63.0	20 Nm	14.7 lbs/ft	1/4NPTF	955 72 51	1/4"	955 72 72						
							3/8"	955 72 73						
3/8NPTF	SW22	69.0	30 Nm	22.1 lbs/ft	3/8NPTF	956 72 51	3/8"	956 72 73						
1/2NPTF	SW27	73.5	40 Nm	29.5 lbs/ft	1/2NPTF	957 72 51								

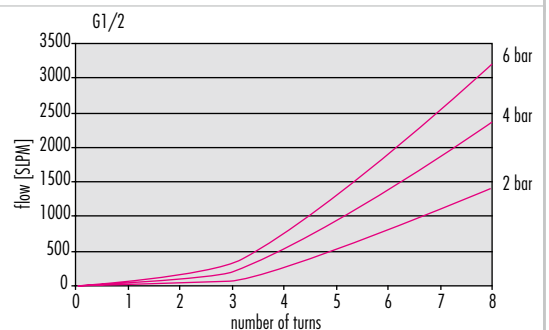
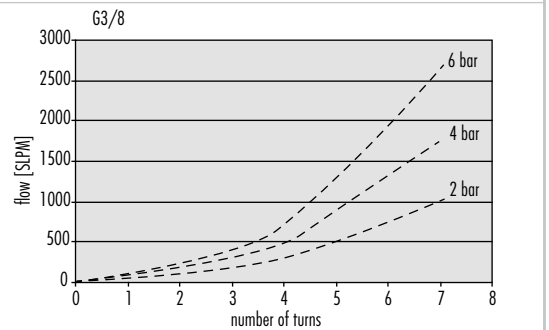
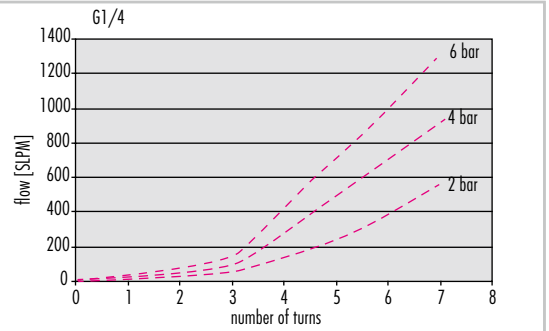
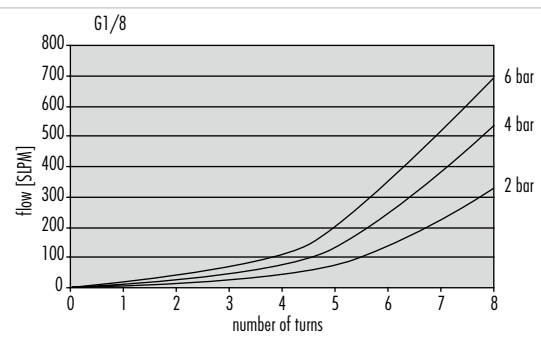
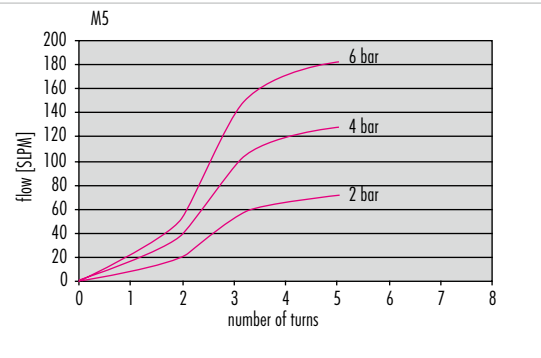
All dimensions in mm. Tightening torques are valid without using thread sealant.



Exhaust Restrictor

Temperature range: -10°C up to $+70^{\circ}\text{C}$
 Primary pressure: 1 bar up to 10 bar

Flow characteristics



Cartridge			
A	B	C	Part No.
M5	SW8	15.0	923 71 13
G1/8	SW13	30.0	924 71 13
G1/4	SW17	36.0	925 71 13
G3/8	SW22	42.5	926 71 13
G1/2	SW27	49.5	927 71 13

All dimensions in mm. Tightening torques are valid without using thread sealant.

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