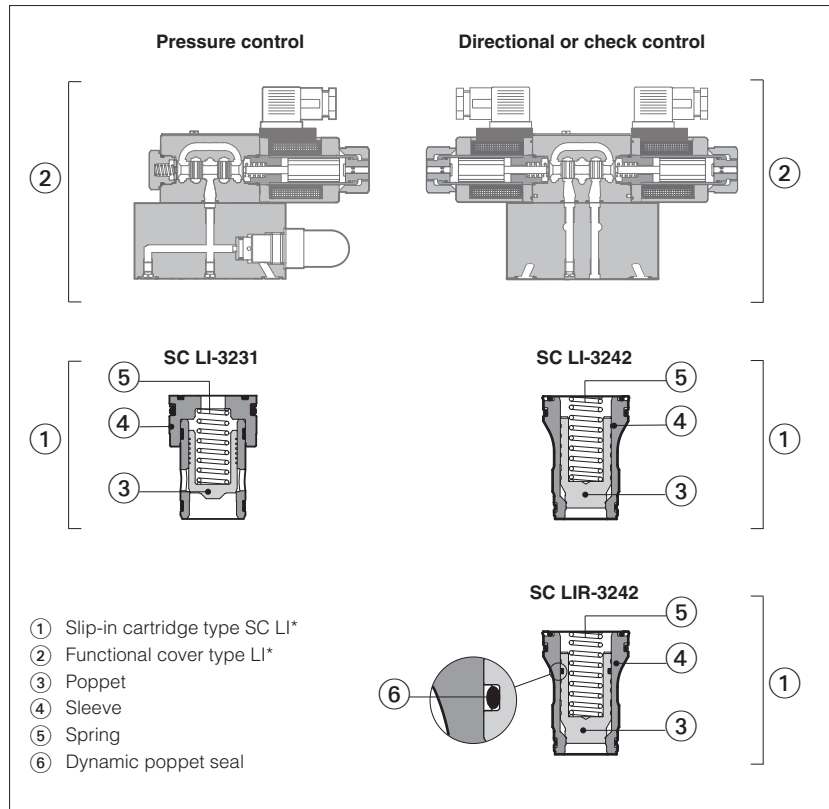


ISO cartridges type **SC LI, SC LIR**

2 way slip-in, directional, pressure, flow, check controls



2way slip-in cartridges conforming with ISO 7368 standard cavities for installation in compact manifolds. They are available in several versions to perform directional, pressure, flow and check controls in combination with relevant functional covers.

They permit to control very high flow rates at low pressure drops, reducing the manifold dimensions respect to subplate valves.

The slip-in cartridge ① is made by a poppet ③ sliding into a sleeve ④ and kept in closed position by a spring ⑤ available with different cracking pressure valves.

Optional version **SC LIR** with sealed poppet execution is available for applications requiring improved leak-free features as hydraulic circuits with accumulators or with vertical loads.

Sizes: **16 to 100** ISO 7368
Max flow up to **9000 l/min** at Δp 5 bar
Max pressure **420 bar**

1 MODEL CODE

SC LI	R	-	16	43	1	*	/	*
Cartridge according to ISO 7368								Seals material: - = NBR PE = FKM BT = NBR low temp.
- = standard execution R = sealed poppet execution (only for poppet type 32, 33, 42, 43) poppet type 32 not available for size 100 - see section 6						Series number		
								</

2 GENERAL CHARACTERISTICS

Assembly position	Any position
MTTFd valves according to EN ISO 13849	150 years, see technical table P007
Ambient temperature range	Standard = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +70°C
Storage temperature range	Standard = -30°C ÷ +80°C /PE option = -20°C ÷ +80°C /BT option = -40°C ÷ +80°C
Compliance	RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

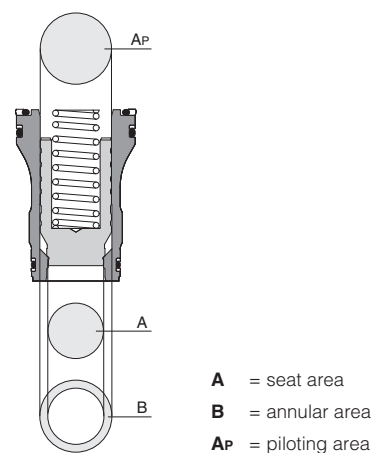
3 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = $-20^{\circ}\text{C} \div +80^{\circ}\text{C}$, with HFC hydraulic fluids = $-20^{\circ}\text{C} \div +50^{\circ}\text{C}$ FKM seals (/PE option) = $-20^{\circ}\text{C} \div +80^{\circ}\text{C}$ NBR low temp. seals (/BT option) = $-40^{\circ}\text{C} \div +60^{\circ}\text{C}$, with HFC hydraulic fluids = $-40^{\circ}\text{C} \div +50^{\circ}\text{C}$		
Recommended viscosity	20 ÷ 100 mm ² /s - max allowed range 15 ÷ 380 mm ² /s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, NBR low temp.	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFUD, HFDR	ISO 12922
Flame resistant with water	NBR, NBR low temp.	HFC	

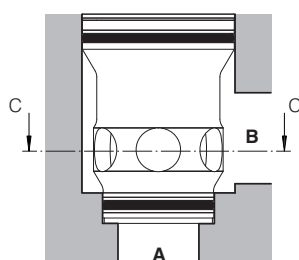
4 SC LI CARTRIDGE AREAS

Area ratio	A	B (% of A)	Ap (% of A)
1:1	100%	0	100%
1:1,1	100%	10%	110%
1:1,5	100%	50%	150%
1:1,6	100%	60%	160%

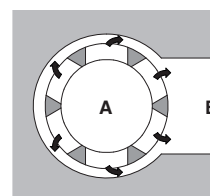
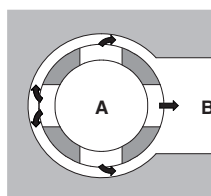
Pressure applied to areas A and B acts to open the poppet.
Pressure applied to area Ap plus the spring force act to close the poppet



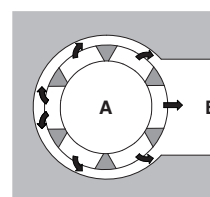
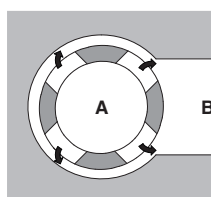
5 INSTALLATION - for cavity dimensions, see table P006



Correct cartridge orientation
(section C-C)



Mounting position with reduced power density
(section C-C)



6 SLIP-IN CARTRIDGES MAX FLOW AND AVAILABILITY

6.1 Cartridges type SC LI, nominal flow at Δp 5 bar (l/min)

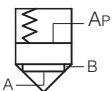
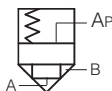
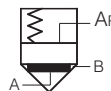
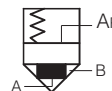
Poppet type	Size							
	16	25	32	40	50	63	80	100
31	180	370	630	110	1900	3100	1900	
32	270	550	1000	1700	2500	4000	5500	9000
33	270	550	1000	1700	2500	4000	5500	9000
34	180							
35	180	370	630	1100	1900			
36	180	370	630	1100	1900	3100		
37	140	250	500	750				
42	240	500	800	1400	2200	3300	4000	
43	240	500	800	1400	2200	3300	4000	6300
52	160	400	600	1200	1800			
62	160	400	600	1200	1800			
63	160	400	600	1200	1800			
69	160	400	600	1200	1800			
Mass [Kg]	0,2	0,5	0,9	1,7	3	7	13	22

6.2 Cartridges type SC LIR, nominal flow at Δp 5 bar (l/min)

Poppet type	Size							
	16	25	32	40	50	63	80	100
32	270	550	1000	1700	2500	4000	5500	
33	270	550	1000	1700	2500	4000	5500	9000
42	240	500	800	1400	2200	3300	4000	
43	240	500	800	1400	2200	3300	4000	6300
Mass [Kg]	0,2	0,5	0,9	1,7	3	7	13	22

7 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50°C

7.1 Type of poppets for directional and check controls SC LI and SC LIR

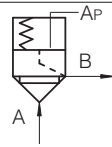
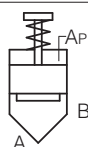
Type of poppet	32				33				42				43				
Functional sketch (Hydraulic symbol)																	
Area ratio A:Ap	1:1,1				1:1,5				1:1,1				1:1,5				
Operating pressure	420 bar max																
Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 8																	
Size 16	270				270				240				240				
Size 25	550				550				500				500				
Size 32	1000				1000				800				800				
Size 40	1700				1700				1400				1400				
Size 50	2500				2500				2200				2200				
Size 63	4000				4000				3300				3300				
Size 80	5500				5500				4000				4000				
Size 100	9000				9000				-				6300				
Cracking pressure (bar)																	
Spring (1)	1	2	3	6	1	2	3	6	1	2	3	6	1	2	3	6	
Size 16	A→B	0.3	1.5	3	5.3	0.6	1.6	2.9	5.1	0.3	1.7	3.3	6.1	0.7	1.9	3.3	5.7
	B→A	3.2	16	30.5	50.3	1.2	3.2	5.8	10	3.6	17.7	34.5	63.4	1.3	3.7	6.5	11.2
Size 25 (2)	A→B	0.3	1.5	3	5	0.6	1.4	3	5	0.3	1.7	3.3	6.1	0.7	1.5	3.3	5.8
	B→A	3.1	15.1	30.5	50.3	1.2	2.8	5.9	9.9	3.5	17.1	33.3	61.4	1.3	3	6.5	11.3
Size 32 (3)	A→B	0.3	1.5	3	5	0.6	1.6	3	5.4	0.3	1.7	3.7	6.3	0.7	1.8	3.4	6.3
	B→A	3.5	17	34.2	56.7	1.2	3.2	6	10.7	3.9	18.8	41.6	71.1	1.4	3.6	6.9	12.7
Size 40	A→B	0.3	1.5	3	5	0.6	1.5	3	5.5	0.4	1.8	3.5	6.4	0.7	1.8	3.6	7.3
	B→A	2.9	14.7	29.4	48.3	1.2	3	6	11	3.5	17.2	34	62	1.3	3.6	7.2	14.6
Size 50	A→B	0.3	1.5	3	4.3	0.6	1.6	3	4.8	0.4	1.7	3.4	5.2	0.7	1.9	3.4	5.7
	B→A	3.6	16.9	33.8	48.4	1.4	3.6	6.7	10.8	4.2	18.9	38.1	58.9	1.5	4.4	7.7	12.9
Size 63	A→B	0.3	1.5	2.9	4.2	0.6	1.5	2.9	5.8	0.4	1.7	3.4	4.7	0.7	1.8	3.3	6.5
	B→A	3.1	15	29.2	42	1.3	3.3	6.4	12.5	3.6	16.6	33.8	47.2	1.5	4	7.2	14.1
Size 80	A→B	0.3	1.5	3	4.6	0.6	1.5	3	5.3	0.3	1.7	3.3	4.9	0.7	1.8	3.3	5.9
	B→A	3	14.8	29.2	45.2	1.3	3.1	6.3	11.2	3.4	16.6	32.9	48.8	1.4	3.8	7	12.4
Size 100	A→B	0.3	1.5	3		0.6	1.5	3.1	6					0.7	1.9	3.8	7.4
	B→A	3	15	30.5		1.2	3	6.3	12.2					1.5	3.9	7.8	14.9

(1) Spring type 1 is not available for SC-LIR size 16 to 40

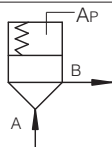
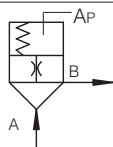
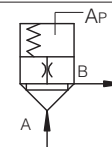
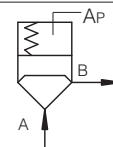
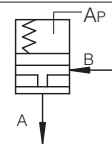
(2) Cracking pressure for SC LIR-25 (A-B / B-A): SC LIR-25332 = 2.1 bar / 4.1 bar
SC LIR-25432 = 2.3 bar / 4.5 bar

(3) Cracking pressure for SC LIR-32 (A-B / B-A): SC LIR-32332 = 2.1 bar / 4.2 bar
SC LIR-32432 = 2.3 bar / 4.6 bar

7.2 Type of poppets for check controls SC LI

Type of poppet	52				62				63			
Functional sketch (Hydraulic symbol)												
Area ratio A:Ap	1:1,1				1:1,1				1:1,1			
Operating pressure	420 bar max											
Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 8												
Size 16	160				160				160			
Size 25	400				400				400			
Size 32	600				600				600			
Size 40	1200				1200				1200			
Size 50	1800				1800				1800			
Cracking pressure (bar)												
Spring	1	2	3	6	3				6			
Size 16 A→B	0.3	1.5	3	6	Normally open				Normally open			
Size 25 A→B	0.3	1.5	3	6								
Size 32 A→B	0.3	1.5	3	6								
Size 40 A→B	0.3	1.5	3	6								
Size 50 A→B	0.3	1.5	3	6								

7.3 Type of poppets for pressure controls SC LI

Type of poppet	31			34			35			36			37		
Functional sketch (Hydraulic symbol)															
Area ratio A:Ap	1:1			1:1			1:1,1			1:1			1:1		
Operating pressure	420 bar max														
Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 8															
Size 16	180			180			180			180			140		
Size 25	370			-			370			370			250		
Size 32	630			-			630			630			500		
Size 40	1100			-			1100			1100			750		
Size 50	1900			-			1900			1900			-		
Size 63	3100			-			-			3100			-		
Size 80	4900			-			-			4900			-		
Cracking pressure (bar)															
Spring	2	3	6	2	3	6	1	2	3	6	6	6	4	7	
Size 16 A→B	1.2	3	6	1.2	3	6	0.3	1.2	3	6	6	6	4	7	
B→A													4	7	
Size 25 A→B	1.2	3	6				0.3	1.2	3	6	6	6	4	7	
B→A													4	7	
Size 32 A→B	1.2	3	6				0.3	1.2	3	6	6	6	4	7	
B→A													4	7	
Size 40 A→B	1.2	3	6				0.3	1.2	3	6	6	6	4	7	
B→A													4	7	
Size 50 A→B	1.2	3	6				0.3	1.2	3	6	6	6			
B→A															
Size 63 A→B	1.2	3	6								6	6			
B→A															
Size 80 A→B	1.2	3	6								6	6			
B→A															

7.4 Poppet area SC LI and SC LIR

Area (cm ²)	Poppet type	Size (1)							
		16	25	32	40	50	63	80	100
A	31, 34	2.32	4.68	7.55	11.95	18.10	33.18	47.78	69.40
	36	2.27	4.52	8.04	12.57	19.63	20.43	-	-
	37	2.54	4.91	8.04	12.57	-	-	-	-
	32, 35, 42, 52, 63	2.87	5.60	9.35	15.07	25.97	40.15	51.53	86.43
	33, 43	2.09	4.08	6.79	11.04	19.63	30.19	38.48	63.62
B	31, 34	0.22	0.23	0.49	0.62	1.54	3.13	2.48	9.14
	36	0	0	0	0	0	0	-	-
	37	0	0	0	0	-	-	-	-
	32, 35, 42, 52, 63	0.28	0.56	0.83	1.55	2.31	4.03	5.22	8.61
	33, 43	1.05	2.07	3.39	5.57	8.64	13.99	18.26	31.42
Ap	31, 34	2.54	4.91	8.04	12.57	19.63	36.32	50.27	78.54
	36	2.54	4.91	8.04	12.57	19.63	20.43	-	-
	37	2.54	4.91	8.04	12.57	-	-	-	-
	32, 35, 42, 52, 63	3.14	6.16	10.18	16.62	28.27	44.18	56.75	95.03
	33, 43	3.14	6.16	10.18	16.62	28.27	44.18	56.75	95.03

7.5 Poppet stroke and pilot volume SC LI and SC LIR

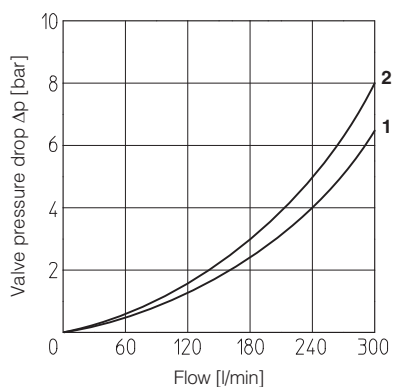
	Poppet type	Size (1)							
		16	25	32	40	50	63	80	100
Stroke (cm)	31, 34	0.5	0.71	1.11	1.31	1.52	1.85	2.19	3.00
	36	0.52	0.82	1.15	1.30	1.52	1.27	-	-
	37	0.60	0.67	0.92	1.05	-	-	-	-
	32, 35, 42, 52, 63	0.80	1.00	1.31	1.70	2.10	2.61	2.80	3.80
	33, 43	0.90	1.11	1.40	1.90	2.30	2.80	3.00	3.87
Pilot volume (cm ³)	31, 34	1.27	3.49	8.93	16.46	29.85	67.19	110.08	235.62
	36	1.32	4.03	9.25	16.34	29.85	25.94	-	-
	37	1.53	3.29	7.40	13.19	-	-	-	-
	32, 35, 42, 52, 63	2.51	6.16	13.28	28.25	59.38	115.89	159.89	361.13
	33, 43	2.83	6.83	14.25	31.49	65.03	123.70	170.24	367.78
Theoretical pilot flow (2) (l/min)	31, 34	7.63	20.91	53.56	98.77	179.07	403.12	660.49	1413.72
	36	7.94	24.15	55.49	98.02	179.07	155.66	-	-
	37	9.16	19.73	44.39	79.17	-	-	-	-
	32, 35, 42, 52, 63	15.08	36.95	79.70	169.51	356.26	690.51	953.32	2166.76
	33, 43	16.96	41.01	85.50	188.96	390.19	742.20	1021.41	2206.67

(1) See section 6 for the availability of different sizes for each poppet type

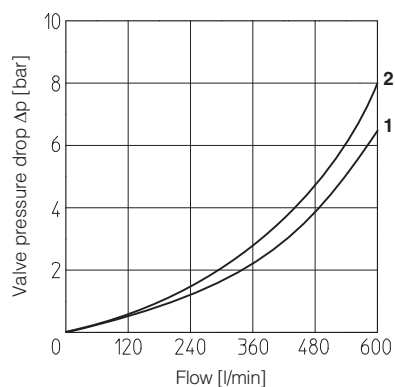
(2) Theoretical pilot flow with switching time = 10ms

8.1 Poppets type 32, 33, 42, 43 for directional, flow and check controls

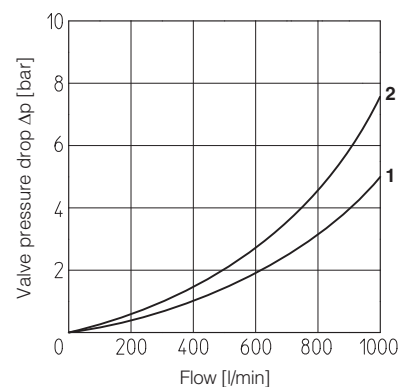
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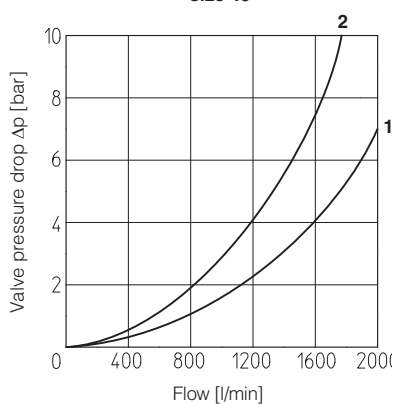
size 25



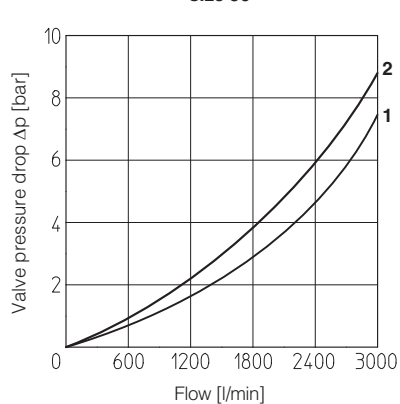
size 32



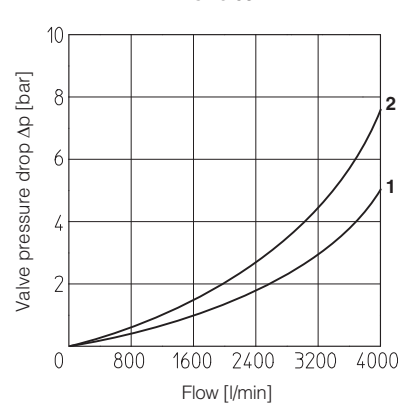
size 40



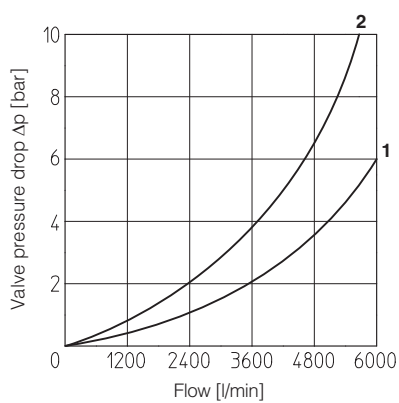
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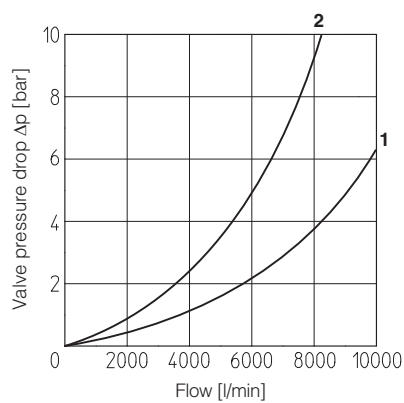
size 63



size 80

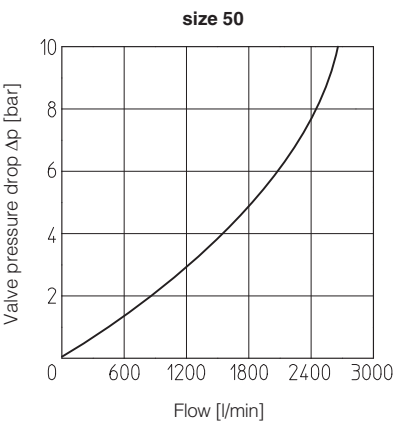
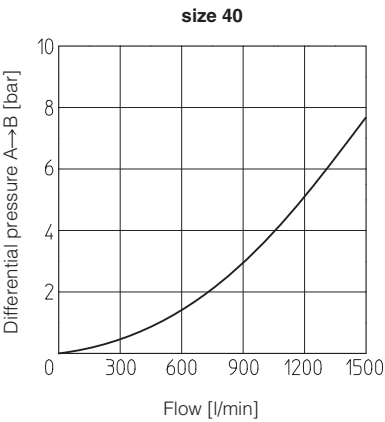
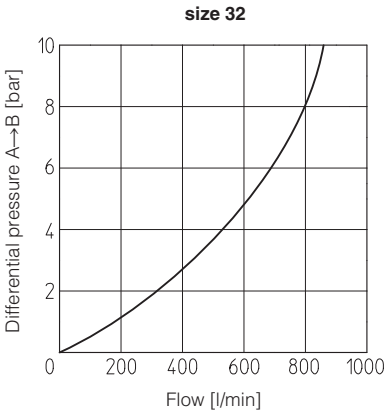
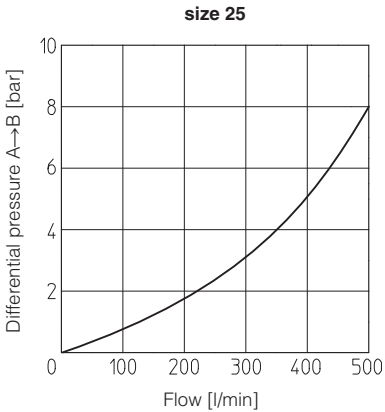
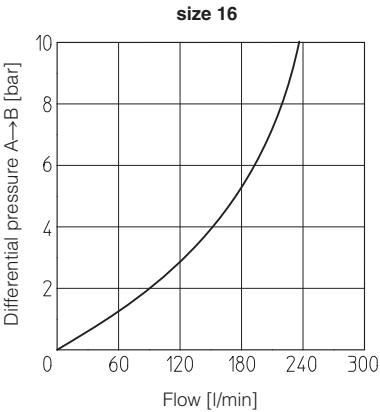


size 100

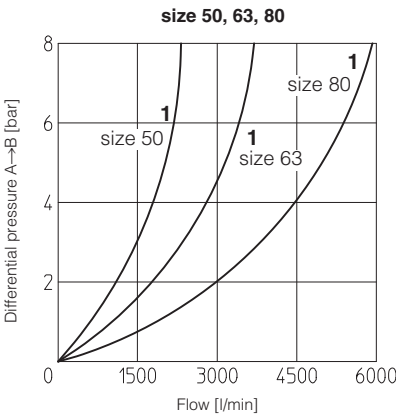
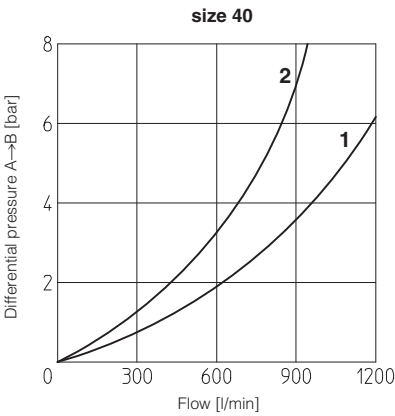
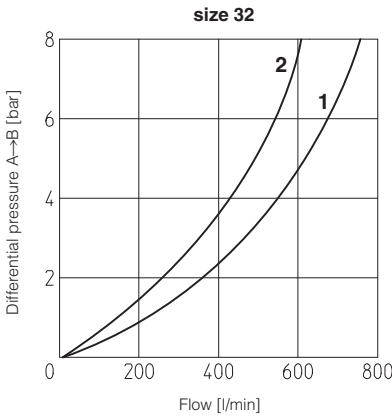
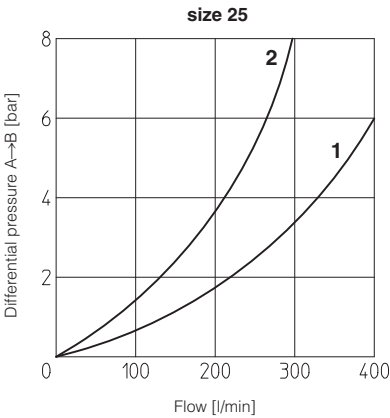
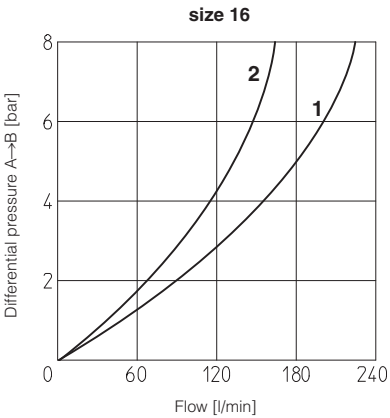


1 = poppet type 32 and 33
2 = poppet type 42 and 43

8.2 Poppets type 52, 62, 63 for check controls



8.3 Poppets type 31, 34, 35, 36, 37 for pressure controls



1 = poppet type 31, 34, 35, 36
2 = poppet type 37

Note:
poppet type 34 only for size 16
poppet type 36 for size 16 to 63
poppet type 37 for size 16 to 40

9 RELATED DOCUMENTATION

H010	ISO cartridge valves type LIM*, LIRA, LIC*
H020	ISO cartridge valves type LIDD
H030	ISO cartridge valves type LIDEW* and LIDBH*
H040	ISO cartridge valves type LID*