

Non-return valves H/HA/HB/HGL

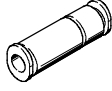
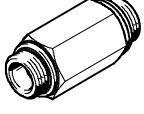
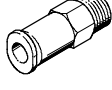

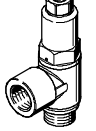
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Non-return valves H/HA/HB/HGL

Product range overview

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Version	Valve function	Version	Type	Pneumatic connection 1	Pneumatic connection 2	qnN [l/min]	→ Page/ Internet
Non-return valves	Non-return function		H	QS-4, QS-6, QS-8, QS-10, QS-12	QS-4, QS-6, QS-8, QS-10, QS-12	136 ... 1,715	4
				M5, G1/8, G1/4, G3/8, G1/2, G3/4	M5, G1/8, G1/4, G3/8, G1/2, G3/4	115 ... 5,900	5
			HA	M5, R1/8, R1/4, R3/8, R1/2	QS-4, QS-6, QS-8, QS-10, QS-12	138 ... 2,230	7
			HB	QS-4, QS-6, QS-8, QS-10, QS-12	M5, R1/8, R1/4, R3/8, R1/2	142 ... 2,206	7
Non-return valves, piloted	Piloted non-return function		HGL	QS-4, QS-6, QS-8, QS-10, QS-12	M5, G1/8, G1/4, G3/8, G1/2	130 ... 1,400	9
				M5, G1/8, G1/4, G3/8, G1/2	M5, G1/8, G1/4, G3/8, G1/2	130 ... 1,600	12

Non-return valves H/HA/HB/HGL

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Type codes

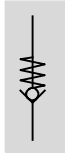
		HA	-	1/8	-	QS-6	-	
Type								
Non-return function								
H	Non-return valve							
HA	Non-return valve, flow direction: male thread → push-in connector QS							
HB	Non-return valve, flow direction: push-in connector QS → male thread							
Piloted non-return function								
HGL	Non-return valve, piloted							
Pneumatic connection 1 with H/HA, pneumatic connection 2 with HB/HGL								
H								
QS-4	Push-in connector for tubing O.D. 4 mm							
QS-6	Push-in connector for tubing O.D. 6 mm							
QS-8	Push-in connector for tubing O.D. 8 mm							
QS-10	Push-in connector for tubing O.D. 10 mm							
QS-12	Push-in connector for tubing O.D. 12 mm							
M5	Female thread M5							
1/8-A/I	Male thread/female thread G1/8							
1/4	Male thread G1/4							
3/8	Male thread G3/8							
1/2	Male thread G1/2							
3/4	Male thread G3/4							
HA/HB								
M5	Male thread M5							
1/8	Male thread R1/8							
1/4	Male thread R1/4							
3/8	Male thread R3/8							
1/2	Male thread R1/2							
HGL								
M5	Male thread M5							
1/8	Male thread G1/8							
1/4	Male thread G1/4							
3/8	Male thread G3/8							
1/2	Male thread G1/2							
Pneumatic connection 2 with H/HA, pneumatic connection 1 with HB/HGL								
H/HGL								
-	Connection size as for connection 1 or 2							
HA/HB/HGL								
QS-4	Push-in connector for tubing O.D. 4 mm							
QS-6	Push-in connector for tubing O.D. 6 mm							
QS-8	Push-in connector for tubing O.D. 8 mm							
QS-10	Push-in connector for tubing O.D. 10 mm							
QS-12	Push-in connector for tubing O.D. 12 mm							
Generation								
B	B series							

Non-return valves H

Technical data – Push-in connector QS

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Non-return function



- - Flow rate
136 ... 1,715 l/min
- - Temperature range
0 ... +60 °C
- - Operating pressure
-1 ... +10 bar

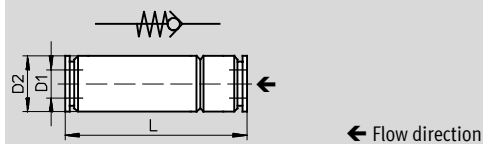


General technical data					
Valve function	Non-return function				
Pneumatic connection 1	QS-4	QS-6	QS-8	QS-10	QS-12
Pneumatic connection 2	QS-4	QS-6	QS-8	QS-10	QS-12
Type of mounting	In-line installation				
Mounting position	Any				

Operating and environmental conditions	
Operating pressure [bar]	-1 ... +10
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:-:-]
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)
Ambient temperature [°C]	0 ... +60

Materials	
Housing	Aluminium
Note on materials	Free of copper and PTFE

Dimensions Download CAD data → www.festo.com



Type	Tubing O.D. D1	D2 Ø	L
H-QS-4	4	9	34.8
H-QS-6	6	12	38.8
H-QS-8	8	15	54.9
H-QS-10	10	25	73.4
H-QS-12	12	25	78.6

Ordering data					
	Pneumatic connection		Standard nominal flow rate qnN	Weight	Part No. Type
	1	2	[l/min]	[g]	
	QS-4	QS-4	136	5.3	153462 H-QS-4
	QS-6	QS-6	282	10	153463 H-QS-6
	QS-8	QS-8	681	21	153464 H-QS-8
	QS-10	QS-10	1,480	63	153465 H-QS-10
	QS-12	QS-12	1,715	69	153466 H-QS-12

Non-return valves H

Technical data – Female/male thread

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Non-return function



- Flow rate
115 ... 5,900 l/min
- Temperature range
-10 ... +60 °C
- Operating pressure
0.4 ... 12 bar



General technical data						
Valve function		Non-return function				
Pneumatic connection 1	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Pneumatic connection 2	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Type of mounting	In-line installation		Screw-in			
Mounting position	Any					
Max. tightening torque [Nm]	–	–	11	20	40	60

- Note: This product conforms to ISO 1179-1 and to ISO 228-1

Operating and environmental conditions						
Pneumatic connection 1	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Operating pressure [bar]	0.4 ... 8		0.4 ... 12			
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:-:-]		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]			
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)					
Ambient temperature [°C]	-10 ... +60					
Temperature of medium [°C]	-10 ... +60					
Storage temperature [°C]	-		-10 ... +60			
Corrosion resistance class CRC ¹⁾	-		2			

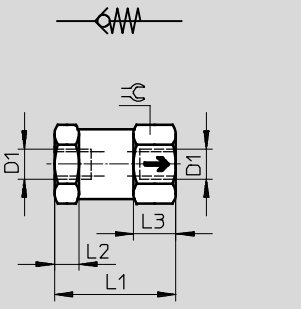
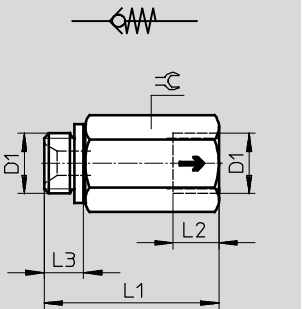
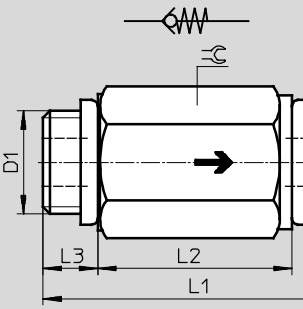
1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Materials						
Pneumatic connection 1	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Housing	Brass		Anodised wrought aluminium alloy			
Seals	NBR					
Note on materials	–		Free of copper and PTFE			

Non-return valves H



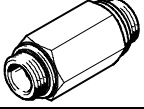
Technical data – Female/male thread

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Dimensions			Download CAD data → www.festo.com
H-M5	H-1/8-A/I	H-1/4-B ... H-3/4-B	
			
→ Flow direction	→ Flow direction	→ Flow direction	

Type	Connection D1	L1	L2	L3	≡
H-M5	M5	20	4	7	11
H-1/8-A/I	G1/8	28.5	7.5	6.5	14
H-1/4-B	G1/4	48	32	8	19
H-3/8-B	G3/8	50	32	9	22
H-1/2-B	G1/2	65	44	10.5	27
H-3/4-B	G3/4	74	50	12	32

• Note: This product conforms to ISO 1179-1 and to ISO 228-1

Ordering data						
	Pneumatic connection		Standard nominal flow rate qnN [l/min]	Weight [g]	Part No.	Type
	1	2				
	M5	M5	115	15	3671	H-M5
	G1/8	G1/8	280	21	3324	H-1/8-A/I ¹⁾
	G1/4	G1/4	1,000	25.4	11689	H-1/4-B ¹⁾
	G3/8	G3/8	2,000	34	11690	H-3/8-B ¹⁾
	G1/2	G1/2	5,500	58.3	11691	H-1/2-B ¹⁾
	G3/4	G3/4	5,900	101	11692	H-3/4-B ¹⁾

1) Sealing rings for male thread are included in the scope of delivery.

Non-return valves HA/HB

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Technical data

Non-return function



- Flow rate
138 ... 2,230 l/min
- Temperature range
0 ... +60 °C
- Operating pressure
-1 ... +10 bar



General technical data											
Valve function	Non-return function										
Type	HA					HB					
Pneumatic connection 1	M5	R $\frac{1}{8}$	R $\frac{1}{4}$	R $\frac{3}{8}$	R $\frac{1}{2}$	QS-4	QS-6	QS-8	QS-10	QS-12	
Pneumatic connection 2	QS-4	QS-4, QS-6, QS-8	QS-6, QS-8	QS-10, QS-12	QS-12	M5, R $\frac{1}{8}$	R $\frac{1}{8}$, R $\frac{1}{4}$	R $\frac{1}{8}$, R $\frac{1}{4}$	R $\frac{3}{8}$	R $\frac{3}{8}$, R $\frac{1}{2}$	
Type of mounting	Screw-in										
Mounting position	Any										

Operating and environmental conditions	
Operating pressure [bar]	-1 ... +10
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:-:-]
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)
Ambient temperature [°C]	0 ... +60

Materials	
Housing	Nickel-plated brass

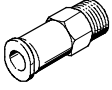
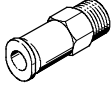
Dimensions		Download CAD data → www.festo.com
HA/HB-M5-QS		HA/HB-...-QS

Type	Connection D	Tubing O.D. D1	D2 Ø	L	L1	L2	≅
HA/HB-M5-QS-4	M5	4	8	—	25.4	3	8
HA/HB- $\frac{1}{8}$ -QS-4	R $\frac{1}{8}$	4	9	24.5	20.5	8	10
HA/HB- $\frac{1}{8}$ -QS-6		6	10	29.3	25.3	8	10
HA/HB- $\frac{1}{8}$ -QS-8		8	13.5	35.5	31.5	8	14
HA/HB- $\frac{1}{4}$ -QS-6	R $\frac{1}{4}$	6	12	29.3	23.3	11	14
HA/HB- $\frac{1}{4}$ -QS-8		8	13.5	39.2	33.2	11	14
HA/HB- $\frac{3}{8}$ -QS-10	R $\frac{3}{8}$	10	25	61.7	55.4	12	24
HA/HB- $\frac{3}{8}$ -QS-12		12	25	64.3	58	12	24
HA/HB- $\frac{1}{2}$ -QS-12	R $\frac{1}{2}$	12	28	70.8	62.6	15	27

Non-return valves HA/HB

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Technical data

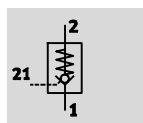
Ordering data						
	Pneumatic connection		Standard nominal flow rate qnN	Weight	Part No.	Type
	1	2				
			[l/min]	[g]		
Flow direction: male thread → push-in connector QS						
	M5	QS-4	148	7.2	153444	HA-M5-QS-4
	R1/8	QS-4	138	11	153446	HA-1/8-QS-4
		QS-6	311	11	153448	HA-1/8-QS-6
		QS-8	331	22	153452	HA-1/8-QS-8
	R1/4	QS-6	302	23	153450	HA-1/4-QS-6
		QS-8	670	24	153454	HA-1/4-QS-8
	R3/8	QS-10	1,740	47	153456	HA-3/8-QS-10
		QS-12	1,876	50	153458	HA-3/8-QS-12
	R1/2	QS-12	2,230	69	153460	HA-1/2-QS-12
Flow direction: push-in connector QS → male thread						
	QS-4	M5	144	7.2	153445	HB-M5-QS-4
		R1/8	142	11	153447	HB-1/8-QS-4
	QS-6	R1/8	335	11	153449	HB-1/8-QS-6
		R1/4	292	23	153451	HB-1/4-QS-6
	QS-8	R1/8	314	22	153453	HB-1/8-QS-8
		R1/4	696	24	153455	HB-1/4-QS-8
	QS-10	R3/8	1,700	47	153457	HB-3/8-QS-10
	QS-12	R3/8	1,886	50	153459	HB-3/8-QS-12
		R1/2	2,206	69	153461	HB-1/2-QS-12




Non-return valves HGL, piloted

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Technical data – Push-in connector QS

Function



-  - Flow rate
130 ... 1,400 l/min
-  - Temperature range
-10 ... +60 °C
-  - Operating pressure
0.5 ... 10 bar




The piloted non-return valve is suitable for short-duration positioning and braking functions in pneumatic drives.

Compressed air flows to and from the drive as long as a pilot signal is

applied to pneumatic connection 21. If no pilot signal is applied, the valve shuts off the exhaust air from the drive in flow direction 2 → 1 and the movement of the drive is stopped.

- Proven component suitable for use in safety-related systems
- Swivel connection can be swivelled after mounting
- Manual exhausting of air trapped in the cylinder with manual override
HAB → 15 as an accessory

General technical data					
Pneumatic connection 2	M5	G1/8	G1/4	G3/8	G1/2
Pneumatic connection 1	QS-4	QS-4, QS-6	QS-8, QS-10	QS-8, QS-10	QS-12
Pilot air connection 21	QS-4	M5	G1/8	G1/4	G3/8
Valve function	Piloted non-return function				
Actuation type	Pneumatic				
Type of mounting	Screw-in, via male thread				
Mounting position	Any				
Max. tightening torque [Nm]	1.5	5	12	15	18

-  - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Operating and environmental conditions					
Pneumatic connection 2	M5	G1/8	G1/4	G3/8	G1/2
Operating pressure [bar]	0.5 ... 10				
Pilot pressure [bar]	2 ... 10			1 ... 10	
Operating/pilot medium	Compressed air in accordance with ISO 8573-1:2010 [7:4:4]				
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)				
Ambient temperature [°C]	-10 ... +60				
Temperature of medium [°C]	-10 ... +60				
Storage temperature [°C]	-10 ... +60				
Corrosion resistance class CRC ¹⁾	2				

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

-  - Note

Additional measures are required for use in safety-related applications; in Europe, for example, the standards listed under the EC Machinery Directive must be observed.

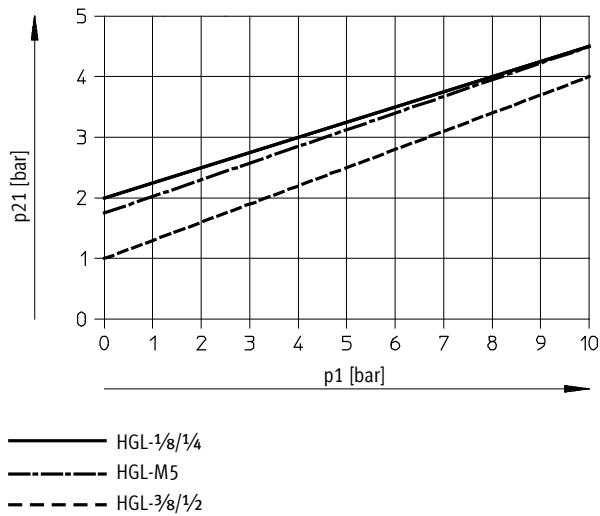
Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

Non-return valves HGL, piloted

Technical data – Push-in connector QS

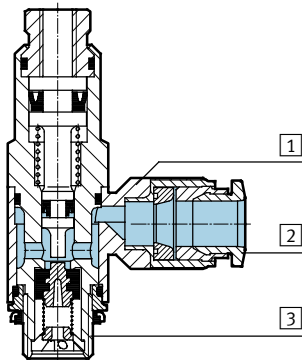
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Minimum pilot pressure p21 as a function of operating pressure p1



Materials

Sectional view

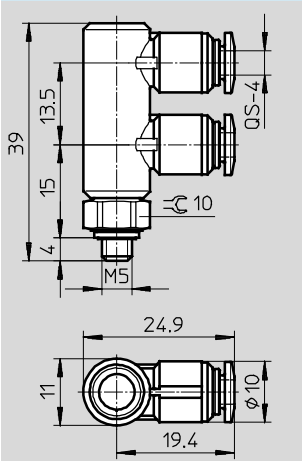
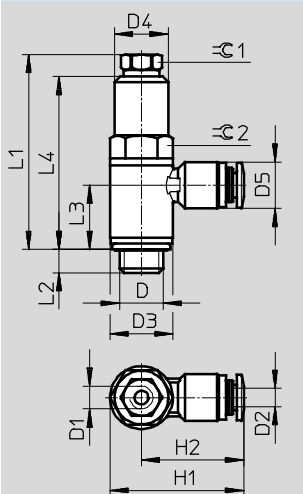
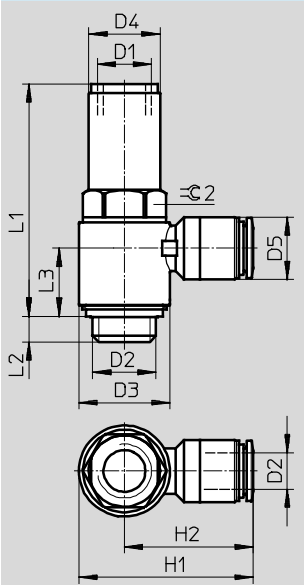


Non-return valve, piloted		
1	Swivel connection	Die-cast zinc
2	Releasing ring	POM
3	Hollow bolt	Anodised wrought aluminium alloy
-	Seals, non-return collar	NBR
Note on materials		Free of copper and PTFE

Non-return valves HGL, piloted

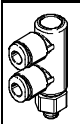
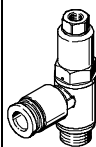
Technical data – Push-in connector QS

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Dimensions		Download CAD data → www.festo.com										
HGL-M5		HGL-1/8, HGL-1/4, HGL-3/8					HGL-1/2					
												

Type	Connection D	Tubing O.D. D2	D1	D3 Ø	D4 Ø	D5 Ø	H1	H2	L1	L2	L3	L4	≈C 1	≈C 2
HGL-1/8-QS-4	G1/8	4	M5	13.8	11.8	10.2	29.4	22.5	42.6	5.4	13.9	37.8	8	12
HGL-1/8-QS-6	G1/8	6				12.5	32.6	25.7						
HGL-1/4-QS-8	G1/4	8	G1/8	17.8	16	14.5	39.6	30.7	50.8	6.5	16.6	44.5	12	16
HGL-1/4-QS-10	G1/4	10				17.5	42	33.1			15.5			
HGL-3/8-QS-8	G3/8	8	G1/4	22.4	18.8	14.5	44.1	32.9	56.3	7	18.2	49.5	15	19
HGL-3/8-QS-10	G3/8	10				17.5	46.7	35.5			18.2			
HGL-1/2-QS-12	G1/2	12	G3/8	27.8	23.5	20.5	55.3	41.4	75.8	8.8	22.4	–	–	24

– † – Note: This product conforms to ISO 1179-1 and to ISO 228-1

Ordering data									
	Pneumatic connection		Pilot air connection	Standard nominal flow rate qnN at 6 → 5 bar [l/min]	Standard flow rate qn at 6 → 0 bar [l/min]	Weight [g]	Part No.	Type	
	2	1	21						
	M5	QS-4	QS-4	130	200	21	530038	HGL-M5-QS-4 ¹⁾	
	G1/8	QS-4	M5	200	300	18.4	530039	HGL-1/8-QS-4 ¹⁾	
		QS-6	M5	270	400	21.4	530040	HGL-1/8-QS-6 ¹⁾	
	G1/4	QS-8	G1/8	390	640	38.7	530041	HGL-1/4-QS-8 ¹⁾	
		QS-10	G1/8	400	670	45	530042	HGL-1/4-QS-10 ¹⁾	
	G3/8	QS-8	G1/4	830	1,200	54.7	530043	HGL-3/8-QS-8 ¹⁾	
		QS-10	G1/4	890	1,300	60.3	530044	HGL-3/8-QS-10 ¹⁾	
	G1/2	QS-12	G3/8	1,400	2,100	116.9	530045	HGL-1/2-QS-12 ¹⁾	

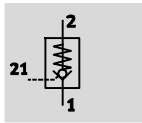
1) Sealing ring for male thread is included in the scope of delivery.

Non-return valves HGL, piloted

Technical data – Female thread

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Function



- - Flow rate
130 ... 1,600 l/min
- - Temperature range
-10 ... +60 °C
- - Operating pressure
0.5 ... 10 bar



The piloted non-return valve is suitable for short-duration positioning and braking functions in pneumatic drives. Compressed air flows to and from the drive as long as a pilot signal is

applied to pneumatic connection 21. If no pilot signal is applied, the valve shuts off the exhaust air from the drive in flow direction 2 → 1 and the movement of the drive is stopped.

- Proven component suitable for use in safety-related systems
- Swivel connection can be swivelled after mounting
- Manual exhausting of air trapped in the cylinder with manual override HAB → 15 as an accessory

General technical data					
Pneumatic connection 2	M5	G1/8	G1/4	G3/8	G1/2
Pneumatic connection 1	M5	G1/8	G1/4	G3/8	G1/2
Pilot air connection 21	M5	M5, G1/8	G1/8	G1/4	G3/8
Valve function	Piloted non-return function				
Actuation type	Pneumatic				
Type of mounting	Screw-in, via male thread				
Mounting position	Any				
Max. tightening torque [Nm]	1.5	5	12	15	18

- - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Operating and environmental conditions					
Pneumatic connection 2	M5	G1/8	G1/4	G3/8	G1/2
Operating pressure [bar]	0.5 ... 10				
Pilot pressure [bar]	2 ... 10			1 ... 10	
Operating/pilot medium	Compressed air in accordance with ISO 8573-1:2010 [7:4:4]				
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)				
Ambient temperature [°C]	−10 ... +60				
Temperature of medium [°C]	−10 ... +60				
Storage temperature [°C]	−10 ... +60				
Corrosion resistance class CRC ¹⁾	2				

- 1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

- - Note

Additional measures are required for use in safety-related applications; in Europe, for example, the standards listed under the EC Machinery Directive must be observed.

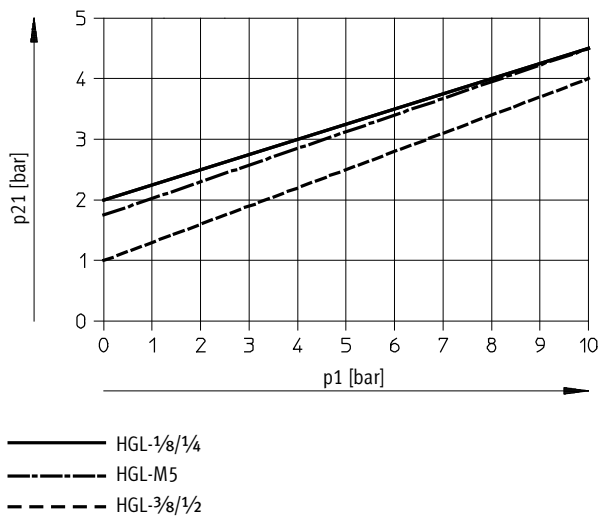
Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

Non-return valves HGL, piloted

Technical data – Female thread

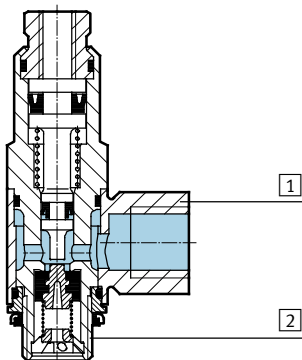
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Minimum pilot pressure p_{21} as a function of operating pressure p_1



Materials

Sectional view



Non-return valve, piloted

1	Swivel connection	Die-cast zinc
2	Hollow bolt	Anodised wrought aluminium alloy
–	Seals, non-return collar	NBR
Note on materials		Free of copper and PTFE
		RoHS-compliant (HGL-1/8-1/8-B only)

Non-return valves HGL, piloted

Technical data – Female thread

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Dimensions		Download CAD data → www.festo.com											
HGL-M5-B		HGL-1/8-B, HGL-1/4-B, HGL-3/8-B				HGL-1/8-1/8-B				HGL-1/2-B			

Type	Connection D	Connection D2	D1	D3 Ø	D4 Ø	D5 Ø	H1	H2	L1	L2	L3	L4	≈C 1	≈C 2
HGL-1/8-B	G1/8	G1/8	M5	14	11.8	14	25.1	18.1	42.6	5.4	11.2	37.8	8	12
HGL-1/8-1/8-B	G1/8	G1/8	G1/8	14	13.8	14	25.1	18.1	46.7	5.2	11.2	–	–	14
HGL-1/4-B	G1/4	G1/4	G1/8	18	16	17.5	34	25	50.8	6.5	13.5	44.5	12	16
HGL-3/8-B	G3/8	G3/8	G1/4	23.8	18.8	20	39.3	27.4	56.3	7	15.1	49.5	15	19
HGL-1/2-B	G1/2	G1/2	G3/8	30	23.5	25	47.8	32.8	75.8	8.8	17.7	–	–	24

– Note: This product conforms to ISO 1179-1 and to ISO 228-1

Ordering data								
	Pneumatic connection		Pilot air connection	Standard nominal flow rate qnN at 6 → 5 bar [l/min]	Standard flow rate qn at 6 → 0 bar [l/min]	Weight [g]	Part No.	Type
	2	1	21					
	M5	M5	M5	130	200	21	530029	HGL-M5-B ¹⁾
	G1/8	G1/8	M5	300	430	20.8	530030	HGL-1/8-B ¹⁾
			G1/8	300	430	26.2	543253	HGL-1/8-1/8-B ¹⁾
	G1/4	G1/4	G1/8	550	680	41.2	530031	HGL-1/4-B ¹⁾
	G3/8	G3/8	G1/4	1,100	1,500	62.9	530032	HGL-3/8-B ¹⁾
	G1/2	G1/2	G3/8	1,600	2,100	129.4	530033	HGL-1/2-B ¹⁾

1) Sealing ring for male thread is included in the scope of delivery.

Non-return valves HGL, piloted

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Accessories

Manual override HAB
for non-return valve HGL

- For manual exhausting of air trapped in a cylinder

Material:
Housing: Anodised wrought
aluminium alloy



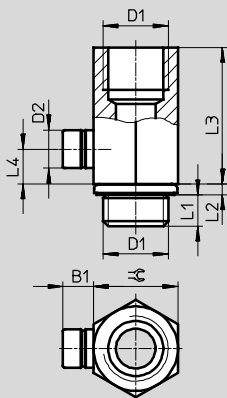
General technical data				
Pneumatic connection 2	G1/8	G1/4	G3/8	G1/2
Pneumatic connection 1	G1/8	G1/4	G3/8	G1/2
Nominal size [mm]	4.1	7	11	14
Valve function	Exhaust component			
Type of mounting	Screw-in			
Mounting position	Any			
Standard nominal flow rate, exhausting, at 6 → 0 bar [l/min]	165			
Max. tightening torque [Nm]	4	11	40	50

Operating and environmental conditions	
Operating pressure [bar]	0 ... 10
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)
Ambient temperature [°C]	-20 ... +80
Temperature of medium [°C]	-20 ... +80
Corrosion resistance class CRC ¹⁾	2

- 1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Dimensions

Download CAD data → www.festo.com



Dimensions and ordering data								
Connection D1	B1	D2 Ø	L1	L2	L3	L4	≈C	Part No. Type
G1/8	6.2	7.7	4.7	1.8	19.1	5	13	184585 HAB-1/8
G1/4	6.2	7.7	5.8	2.2	28	7	17	184586 HAB-1/4
G3/8	6.2	7.7	6.05	3.35	28.4	7	19	184587 HAB-3/8
G1/2	6.2	7.7	7.9	2.6	38.5	7	24	184588 HAB-1/2

• Note: This product conforms to ISO 1179-1 and to ISO 228-1