



- One-way flow control valves for exhaust and supply air flow control
- Flow control valves without non-return function
- For threads M3 ... G $\frac{3}{4}$ and push-in fitting
 \varnothing 3 ... 12 mm
- Functional combinations with one-way flow control valve and piloted non-return valve
- Polymer and metal designs
- Designs free of copper, PTFE and silicone
- Corrosion resistant designs

Flow control valves and one-way flow control valves

Key features



General information

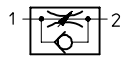
Standard nominal flow rate q_{nN}

The standard nominal flow rate q_{nN} is the flow rate based on standard conditions at an input pressure of $p_1 = 6$ bar and an output pressure of $p_2 = 5$ bar, measured at room temperature $t = 20$ °C.

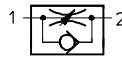
Standard flow rate q_n

The standard flow rate is measured at an input pressure of $p_1 = 6$ bar and an output pressure with respect to atmospheric pressure ($p_2 = 0$ bar).

Exhaust air flow control



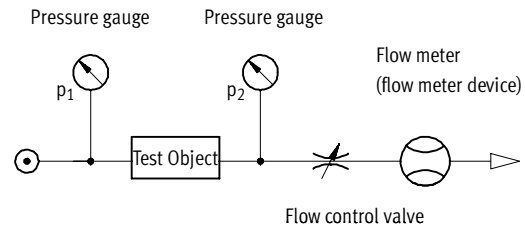
Supply air flow control



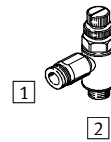
Flow control at both sides



Flow measurement circuit



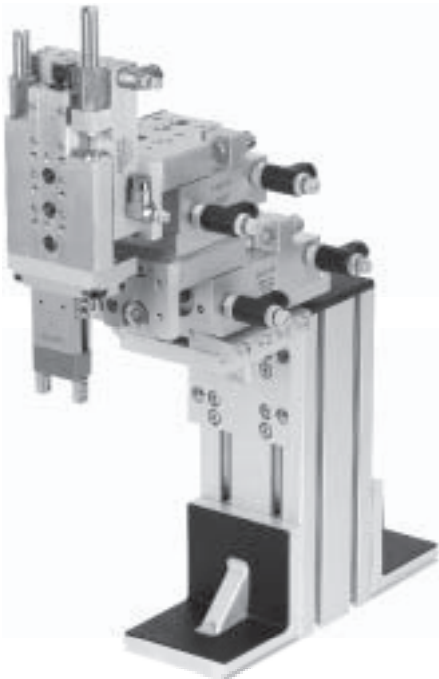
p_1 Input pressure
 p_2 Output pressure



1 Compressed air connection
2 Working connection

Typical applications

Mini slide SLT with standard flow control valves



Gripper HGW with mini flow control valves



Flat cylinder DZF with mini flow control valves



Multimount cylinder DMM with mini flow control valves







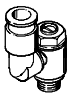
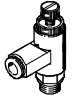
Flow control valves and one-way flow control valves

Key features

Flow control functions and range of applications			
Circuit symbol	Description	Circuit symbol	Description
Double-acting cylinder with one-way flow control valve			
Exhaust air flow control		Supply air flow control	
	<p>Speed adjustment through exhaust air flow control. Uncontrolled supply air and controlled exhaust moves the piston between air cushions (improves motion, even with load changes).</p>		<p>Adjustable speed of advance and return strokes. The air flow is identical in both directions.</p>
Single-acting cylinder with one-way flow control valve		Single-acting cylinder with flow control valve	
Exhaust and supply air flow control		Flow control acting at both sides	
	<p>Adjustable speed of advance and return strokes. The air flow can be adjusted differently for both directions.</p>		<p>Speed adjustment through flow control at both sides is often applied in the case of single-acting or small cylinders. The benefit of this application lies in its simplicity.</p>

Flow control valves and one-way flow control valves

Product range overview

Function	Design	Type	Material	Flow rate characteristic ¹⁾	One-way flow control function		
					Exhaust air	Supply air	At both ends
					A	Z	O
Standard flow control valve with QS push-in connector	Rotatable 360° around the screw-in axis after installation						
	Adjustment via slotted head screw						
		GRLA-...-QS-...-D GRLZ-...-QS-...-D	Metal	Low flow	■	■	-
					■	■	-
					■	-	-
					■	-	-
					■	-	-
	Adjustment via slotted head screw						
		GRLA-...-QS-...-MF-D	Metal	Medium flow	■	-	-
	Adjustment via knurled screw						
		GRLA-...-QS-...-RS-D	Metal	Low flow	■	-	-
					■	-	-
					■	-	-
					■	-	-
					■	-	-
	Adjustment via knurled screw						
		GRLA-...-QS-...-RS-MF-D	Metal	Medium flow	■	-	-
					■	-	-
	Adjustment via slotted head screw, swivel joint rotatable 360°						
	GRXA-...-QS-...-D	Metal	Low flow	■	-	-	
				■	-	-	
				■	-	-	
Adjustment via knurled screw							
	GRLA-...-QS-...-RS-B	Polymer	High flow	■	-	-	
				■	-	-	
				■	-	-	

1) Low flow: Precision adjustment for low speed
 Medium flow: Precision adjustment for average speed
 High flow: Precision adjustment for high speed

Flow control valves and one-way flow control valves

Product range overview





Type	Pneumatic connection							Free of copper, PTFE and silicone	→ Page	
	Thread	Tubing Ø [mm]								
		3	4	6	8	10	12			
Rotatable 360° around the screw-in axis after installation										
Adjustment via slotted head screw										
GRLA-...-QS-...-D	M5	■	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
GRLZ-...-QS-...-D	G1/8	■	■	■	■	-	-		■	
	G1/4	-	-	■	■	■	-		■	
	G3/8	-	-	■	■	■	-		■	
	G1/2	-	-	-	-	-	■		■	
Adjustment via slotted head screw										
GRLA-...-QS-...-MF-D	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
Adjustment via knurled screw										
GRLA-...-QS-...-RS-D	M5	■	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
	G1/8	■	■	■	■	-	-		■	
	G1/4	-	-	■	■	■	-		■	
	G3/8	-	-	■	■	■	-		■	
	G1/2	-	-	-	-	-	■		■	
Adjustment via knurled screw										
GRLA-...-QS-...-RS-MF-D	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
Adjustment via slotted head screw, swivel joint rotatable 360°										
GRXA-...-QS-...-D	M5	■	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
	G1/8	■	■	■	■	-	-		■	
	G1/4	-	-	■	■	■	-		■	
Adjustment via knurled screw										
GRLA-...-QS-...-RS-B	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-20
	G1/4	-	-	■	■	-	-		-	
	G3/8	-	-	■	■	-	-		-	

1) Tubing → Volume 3

Flow control valves and one-way flow control valves

Product range overview



Function	Design	Type	Material	Flow rate characteristic ¹⁾	One-way flow control function		
					Exhaust air	Supply air	At both ends
					A	Z	O
Standard flow control valve with female thread connection		Adjustment via slotted head screw					
		GRLA-...-B	Metal	Medium flow	■	■	■
		GRLZ-...-B			■	■	–
		GRL0-...-B			■	■	–
					■	–	–
					■	–	–
		■			–	–	
		Adjustment via knurled screw					
		GRLA-...-RS-B	Metal	Medium flow	■	■	–
		GRLZ-...-RS-B			■	■	–
					■	■	–
Standard flow control valve with barbed fitting connection PK		Adjustment via slotted head screw					
		GRLA-...-PK-...-B	Metal	Medium flow	■	■	■ ²⁾
		GRLZ-...-PK-...-B			■	■	–
		GRL0-...-PK-...-B			■	■	–
		Adjustment via knurled screw					
		GRLA-...-PK-...-RS-B	Metal	Medium flow	■	■	–
		GRLZ-...-PK-...-RS-B			■	■	–
					■	■	–

- 1) Low flow: Precision adjustment for low speed
 Medium flow: Precision adjustment for average speed
 High flow: Precision adjustment for high speed
- 2) Only for tubing with an internal \varnothing of 3 mm

Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

Flow control valves and one-way flow control valves

Product range overview

Type	Pneumatic connection							Free of copper, PTFE and silicone	→ Page	
	Thread	Tubing Ø [mm]								Tubing type ¹⁾
		3	4	6	8	10	12			
Adjustment via slotted head screw										
GRLA-...-B	M5	Dependent on fitting						-	2 / 5.6-28	
GRLZ-...-B	G1/8							-		
GRL0-...-B	G1/4							-		
	G3/8							-		
	G1/2							-		
	G3/4							-		
Adjustment via knurled screw										
GRLA-...-RS-B	M5	Dependent on fitting						-	2 / 5.6-28	
GRLZ-...-RS-B	G1/8							-		
	G1/4							-		
Adjustment via slotted head screw										
GRLA-...-PK-...-B	M5	■	■	-	-	-	-	PU/PL/PP (standard I.D.)	2 / 5.6-34	
GRLZ-...-PK-...-B	G1/8	■	■	■	-	-	-			
GRL0-...-PK-...-B	G1/4	-	■	■	-	-	-			
Adjustment via knurled screw										
GRLA-...-PK-...-RS-B	M5	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	2 / 5.6-34	
GRLZ-...-PK-...-RS-B	G1/8	-	■	■	-	-	-			
	G1/4	-	■	■	-	-	-			

1) Tubing → Volume 3

Flow control valves and one-way flow control valves

Product range overview



Function	Design	Type	Material	Flow rate characteristic ¹⁾	One-way flow control function		
					Exhaust air	Supply air	At both ends
					A	Z	O
Mini flow control valve with QS push-in connector	Adjustment via slotted head screw						
		GRLA-...-QS-...	Metal	Low flow	■	■	■
		GRLZ-...-QS-...			■	■	■
		GRLO-...-QS-...			■	■	■
		GRLA-...-QS-...-LF-C	Metal	Low flow	■	■	■
		GRLZ-...-QS-...-LF-C			■	■	■
GRLO-...-QS-...-LF-C		■			■	■	
Mini flow control valve with female thread connection	Adjustment via slotted head screw						
		GRLA-...	Metal	Low flow	■	■	■
		GRLZ-...			■	■	■
		GRLO-...			■	■	■
		GRLA-...-LF-C	Metal	Low flow	■	■	■
		GRLZ-...-LF-C			■	■	■
GRLO-...-LF-C		■			■	■	
Mini flow control valve with barbed fitting connection PK	Adjustment via slotted head screw						
		GRLA-...-PK-...-LF-C	Metal	Low flow	■	■	■
		GRLZ-...-PK-...-LF-C			■	■	■
		GRLO-...-PK-...-LF-C			■	■	■
		GRLA-...-PK-...-LF-C	Metal	Low flow	■	■	■
		GRLZ-...-PK-...-LF-C			■	■	■
GRLO-...-PK-...-LF-C		■			■	■	
Corrosion-resistant one-way flow control valve with female thread connection	Adjustment via slotted head screw						
		CRGRLA-...-B	Stainless steel	Medium flow	■	-	-
					■	-	-
					■	-	-
					■	-	-
		■			-	-	

1) Low flow: Precision adjustment for low speed
 Medium flow: Precision adjustment for average speed
 High flow: Precision adjustment for high speed

Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

Flow control valves and one-way flow control valves

Product range overview


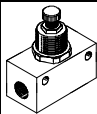




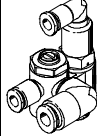


Type	Pneumatic connection							Free of copper, PTFE and silicone	→ Page	
	Thread	Tubing Ø [mm]								Tubing type ¹⁾
		3	4	6	8	10	12			
Adjustment via slotted head screw										
GRLA-...-QS-... GRLZ-...-QS-... GRLO-...-QS-...	M3	■	-	-	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-23
GRLA-...-QS-...-LF-C GRLZ-...-QS-...-LF-C GRLO-...-QS-...-LF-C	M5	■	■	-	-	-	-		-	
GRGA-...-QS-... GRGZ-...-QS-... GRGO-...-QS-...	M3	■	-	-	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	
GRGA-...-QS-...-LF-C GRGZ-...-QS-...-LF-C GRGO-...-QS-...-LF-C	M5	■	■	-	-	-	-		-	
Adjustment via slotted head screw										
GRLA-... GRLZ-... GRLO-...	M3	Dependent on fitting						-	2 / 5.6-40	
GRLA-...-LF-C GRLZ-...-LF-C GRLO-...-LF-C	M5							-		
Adjustment via slotted head screw										
GRLA-...-PK-...-LF-C GRLZ-...-PK-...-LF-C GRLO-...-PK-...-LF-C	M5	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-43
GRGA-...-PK-...-LF-C GRGZ-...-PK-...-LF-C GRGO-...-PK-...-LF-C	M5	■	-	-	-	-	-		-	
Adjustment via slotted head screw										
CRGRLA-...-B	M5	Dependent on fitting						-	2 / 5.6-46	
	G1/8							-		
	G1/4							-		
	G3/8							-		
	G1/2							-		

1) Tubing → Volume 3

Flow control valves and one-way flow control valves

Product range overview

Function	Design	Type	Material	Flow rate characteristic ¹⁾	Flow control direction		
					Exhaust air A	Supply air Z	At both ends O
Inline flow control valve with QS push-in connector		Adjustment via knurled screw					
		GR-QS-...	Polymer	Medium flow	■	■	-
		GR-QS-...-LF		Low flow	■	■	-
		GRO-QS-...		Medium flow	-	-	■
Inline flow control valve with female thread connection		Adjustment via knurled screw					
		GR-...-B	Metal	Medium flow	■	■	-
		GRA-...-B			■	■	-
					■	■	-
					■	■	-
					■	■	-
					■	■	-
	■	■			-		
Flow control/silencer combinations, threaded design		Adjustment via slotted head screw, directly screwed into valve					
		GRE-...	Metal	Medium flow	■	-	-
					■	-	-
					■	-	-
		■			-	-	
		GRU-...	Polymer	High flow	■	-	-
					■	-	-
					■	-	-
		■			-	-	
Standard flow control valve with barbed fitting connection PK, frame assembly		Adjustment via knurled screw					
		GRF-PK-3-...	Metal	Low flow	■	■	-
Precision flow control with barbed fitting connection PK		Adjustment via rotary knob					
		GRP-...-PK-...	Polymer	Low flow	■	■	■
Functional combination with one-way flow control valve and piloted non-return valve		Adjustment via slotted head screw					
		GRXA-HG-...-QS-...	Metal	High flow	■	-	-
					■	-	-

1) Low flow: Precision adjustment for low speed
Medium flow: Precision adjustment for average speed
High flow: Precision adjustment for high speed

Flow control valves and one-way flow control valves

Product range overview

Type	Pneumatic connection								Free of copper, PTFE and silicone	→ Page
	Thread	Tubing Ø [mm]						Tubing type ¹⁾		
		3	4	6	8	10	12			
Adjustment via knurled screw										
GR-QS-...	-	■	■	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-49
GR-QS-...-LF	-	-	■	■	-	-	-		-	
GRO-QS-...	-	■	■	■	-	-	-		-	
Adjustment via knurled screw										
GR-...-B	M3	Dependent on fitting							-	2 / 5.6-53
GRA-...-B	M5								-	
	G1/8								-	
	G1/4								-	
	G3/8								-	
	G1/2								-	
	G3/4								-	
Adjustment via slotted head screw, directly screwed into valve										
GRE-...	G1/8	-	-	-	-	-	-	-	-	2 / 5.6-57
	G1/4								-	
	G3/8								-	
	G1/2								-	
GRU-...	G1/8	-	-	-	-	-	-	-	-	
	G1/4								-	
	G3/8								-	
	G1/2								-	
	G3/4	-								
Adjustment via knurled screw										
GRF-PK-3-...	-	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-60
Adjustment via rotary knob										
GRP-...-PK-...	-	■	■	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-62
Adjustment via slotted head screw										
GRXA-HG-...-QS-...	G1/8	-	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-66
	G1/4	-	-	■	■	-	-		-	

1) Tubing → Volume 3

Flow control valves and one-way flow control valves

Type codes



Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

5.6

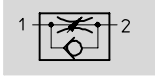
		GRGA	-	M5	-	QS	-	3	-	RS	-	LF	-	C	-	
Type																
Swivel joint, elbow outlet																
GRLA	One-way flow control valve for exhaust air															
CRGRLA	One-way flow control valve for exhaust air, corrosion-resistant															
GRLZ	One-way flow control valve for supply air															
GRLO	Flow control valve without non-return function															
Swivel joint, parallel																
GRGA	One-way flow control valve for exhaust air															
GRGZ	One-way flow control valve for supply air															
GRGO	Flow control valve without non-return function															
Swivel joint, freely rotatable																
GRXA	One-way flow control valve for exhaust air															
Front panel and inline mounting																
GR	One-way flow control valve															
GRA	One-way flow control valve															
GRO	Flow control valve without non-return function															
Screw-in and connecting thread																
M3	Metric thread M3															
M5	Metric thread M5															
1/8	Pipe thread G1/8															
1/4	Pipe thread G1/4															
3/8	Pipe thread G3/8															
1/2	Pipe thread G1/2															
3/4	Pipe thread G3/4															
Tubing connection																
Type of connection																
QS	Push-in connector for standard O.D. tubing to CETOP RP 54 P															
PK	Barbed fitting connector for standard I.D. tubing															
For tubing O.D. or tubing I.D.																
3	3 mm															
4	4 mm															
6	6 mm															
8	8 mm															
10	10 mm															
Setting component																
RS	Knurled screw															
	Slotted head screw															
Flow rate characteristic																
LF, MF	Low flow, medium flow															
Generation																
	Series A															
B	Series B															
C	Series C															
D ¹⁾	Series D															
Material note																
CT ¹⁾	Free of copper, PTFE and silicone															

1) The series D is entirely free of copper and PTFE and thus does not have an additional CT note in the type code

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

Function



One-way flow control valve for exhaust air
GRLA/GRXA



One-way flow control valve for supply air
GRLZ

- Low flow: Precision adjustment for low speed
- QS push-in connector
- Swivel joint rotatable 360° after installation

Variants:

- Adjustment with slotted head or knurled screw
- Swivel joint, elbow outlet
- Swivel joint, parallel outlet



General technical data							
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2
Valve function	GRLA/GRXA	One-way flow control function for exhaust air					
	GRLZ	One-way flow control function for supply air					
Setting component	Slotted head or knurled screw						
Type of mounting	Can be screwed in						
Assembly position	Any						
Special features	GRLA/GRLZ	Freely rotatable around the screw-in axis after installation					
	GRXA	Swivel joint, freely rotatable			–	–	
Max. tightening torque	GRL...-D	[Nm]	1.5	5.5	11	20	40

Operating and environmental conditions							
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2
Operating medium	Dried air, lubricated or unlubricated, grade of filtration 40µm						
Operating pressure	[bar]	0.2 ... 10					
	[°C]	–10 ... +40					
Ambient temperature	[°C]	–10 ... +60					
Temperature of medium	[°C]	–10 ... +60					

Weights [g]							
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2
	GRL...-D		13	22	42	60	106
	GRXA...-D		–	16	26	47	–
	GRLA...-MF-D		–	32	–	–	–
	GRLA...-RS-D		14	23	30	40	–
	GRLA...-RS-QS...D		–	24	50	72	124
	GRLA...-RS-QS...MF-D		–	40	–	–	–

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar							
Screw-in thread		M5	G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$	
One-way flow control function for exhaust air							
Flow rate characteristic		LF	MF	LF	LF	LF	LF
GRLA-/GRXA- ... -D	QS-3	D ¹⁾	0 ... 100	–	0 ... 130	–	–
		R ²⁾	60 ... 100	–	100 ... 130	–	–
	QS-4	D	0 ... 100	–	0 ... 160	–	–
		R	65 ... 110	–	120 ... 190	–	–
	QS-6	D	0 ... 115	0 ... 400	0 ... 185	0 ... 400	0 ... 495
		R	70 ... 110	290 ... 420	160 ... 240	290 ... 420	320 ... 495
	QS-8	D	–	0 ... 475	0 ... 215	0 ... 475	0 ... 820
		R	–	325 ... 500	175 ... 250	325 ... 500	450 ... 850
	QS-10	D	–	–	–	0 ... 480	0 ... 900
		R	–	–	–	345 ... 500	540 ... 975
	QS-12	D	–	–	–	–	0 ... 1,580
		R	–	–	–	–	925 ... 1,605
One-way flow control function for supply air							
GRLZ-...-D	QS-3	D	0 ... 100	–	0 ... 130	–	–
		R	60 ... 100	–	100 ... 130	–	–
	QS-4	D	0 ... 100	–	0 ... 160	–	–
		R	65 ... 110	–	120 ... 190	–	–
	QS-6	D	0 ... 115	–	0 ... 185	–	–
		R	70 ... 110	–	160 ... 240	–	–
	QS-8	D	–	–	0 ... 215	–	–
		R	–	–	175 ... 250	–	–

- 1) D: Flow control direction
2) R: Non-return direction

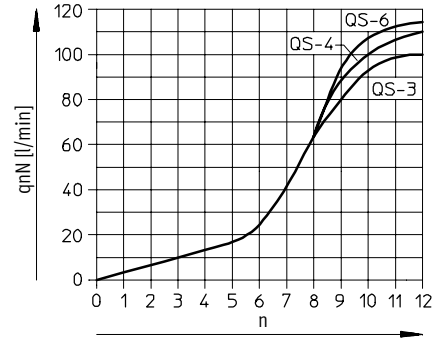
Standard flow rate q_n [l/min] at 6 bar \rightarrow 0 bar							
Screw-in thread		M5	G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$	
One-way flow control function for exhaust air							
Flow rate characteristic		LF	MF	LF	LF	LF	LF
GRLA-/GRXA- ... -D	QS-3	D ¹⁾	0 ... 145	–	0 ... 180	–	–
		R ²⁾	150 ... 170	–	200 ... 220	–	–
	QS-4	D	0 ... 165	–	0 ... 250	–	–
		R	140 ... 160	–	270 ... 300	–	–
	QS-6	D	0 ... 185	0 ... 600	0 ... 370	0 ... 600	0 ... 740
		R	145 ... 170	570 ... 680	330 ... 390	570 ... 680	840 ... 890
	QS-8	D	–	0 ... 720	0 ... 400	0 ... 720	0 ... 1,300
		R	–	610 ... 760	330 ... 410	610 ... 760	1,080 ... 1,420
	QS-10	D	–	–	–	0 ... 760	0 ... 1,400
		R	–	–	–	630 ... 790	1,160 ... 1,620
	QS-12	D	–	–	–	–	0 ... 2,220
		R	–	–	–	–	1,910 ... 2,500
One-way flow control function for supply air							
GRLZ-...-D	QS-3	D	0 ... 135	–	0 ... 200	–	–
		R	130 ... 160	–	180 ... 200	–	–
	QS-4	D	0 ... 160	–	0 ... 300	–	–
		R	150 ... 180	–	260 ... 290	–	–
	QS-6	D	0 ... 170	–	0 ... 340	–	–
		R	160 ... 200	–	390 ... 460	–	–
	QS-8	D	–	–	0 ... 370	–	–
		R	–	–	390 ... 470	–	–

- 1) D: Flow control direction
2) R: Non-return direction

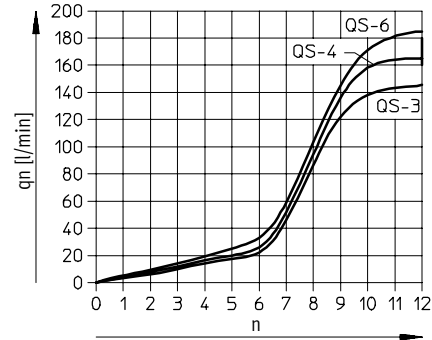
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

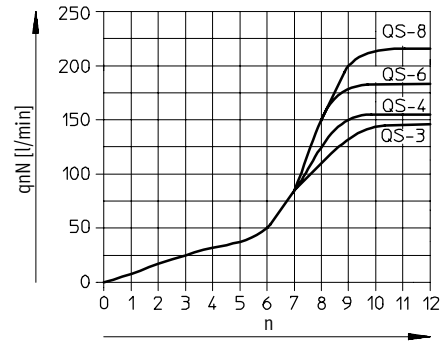
Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n
Screw-in thread M5



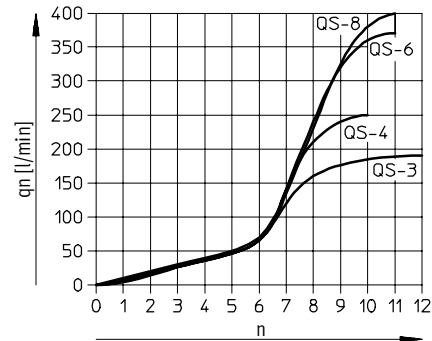
Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
Screw-in thread M5



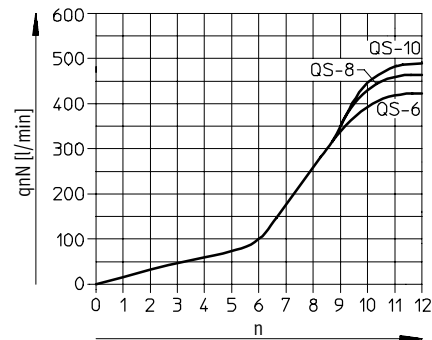
Screw-in thread $G\frac{1}{8}$



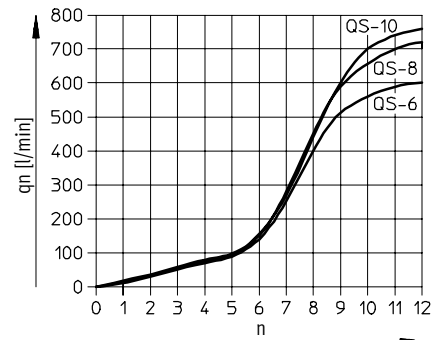
Screw-in thread $G\frac{1}{8}$



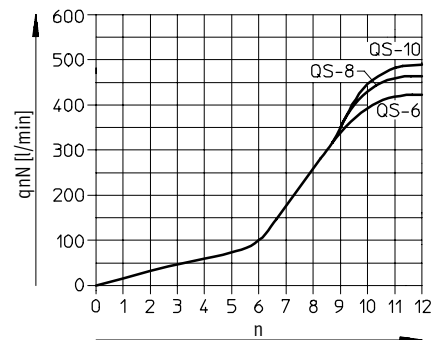
Screw-in thread $G\frac{1}{8}$ with flow rate MF



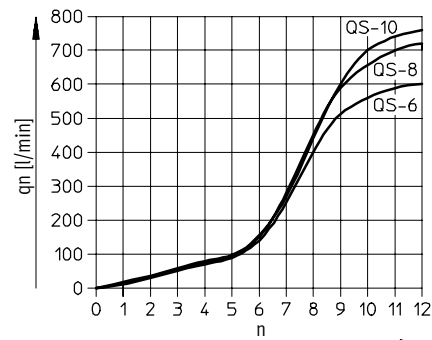
Screw-in thread $G\frac{1}{8}$ with flow rate MF



Screw-in thread $G\frac{1}{4}$



Screw-in thread $G\frac{1}{4}$



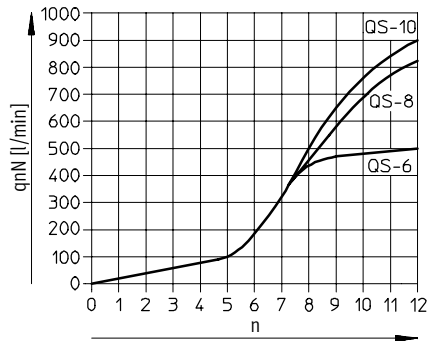
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

FESTO

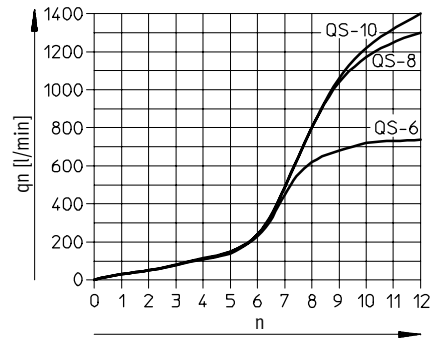
Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar
as a function of turns of the adjusting screw n

Screw-in thread G $\frac{3}{8}$

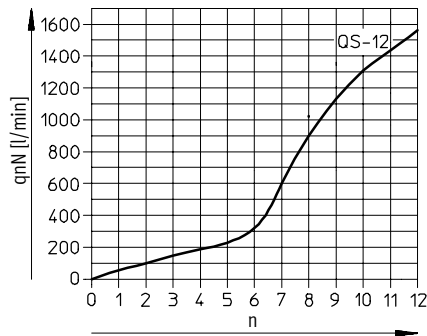


Standard flow rate q_n at 6 bar \rightarrow 0 bar
as a function of turns of the adjusting screw n

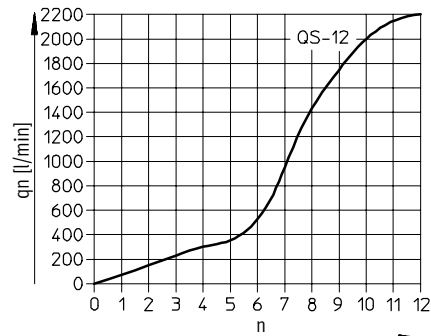
Screw-in thread G $\frac{3}{8}$



Screw-in thread G $\frac{1}{2}$

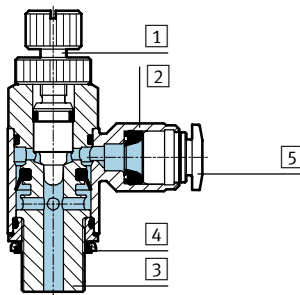


Screw-in thread G $\frac{1}{2}$



Materials

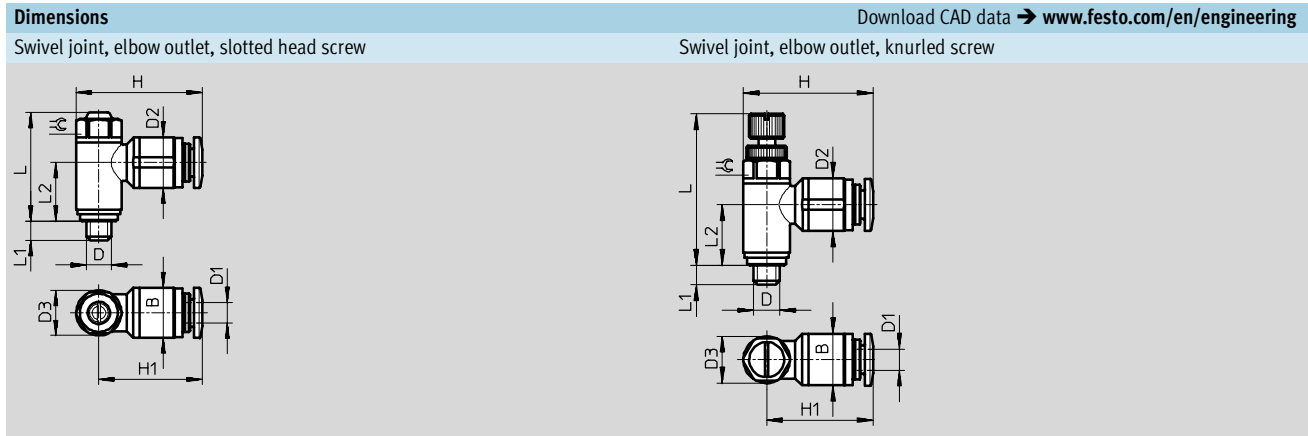
Sectional view



Flow control valve		
1	Regulating screw	Stainless steel
2	Swivel joint	Die-cast zinc
3	Threaded collar	Wrought aluminium alloy (M5: nickel-plated brass)
4	Seal	Nitrile rubber
5	Release ring	Polyacetal
Material note		Free of copper, PTFE and silicone

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D



Screw-in thread D	Tubing O.D. D1	B	D2 Ø	D3 Ø	H	H1	L max.	L1	L2	⌘
Swivel joint, elbow outlet, slotted head screw										
M5	3	8.9	8.2 +0.15	8.9 ±0.07	22.4	18	21.4	3.7 +0.17/-0.25	11.65	8
	4	9.9	10.0 ±0.2		24.7	20.3			11.65	
	6	12	12.0 ±0.2		26.5	22			10.65	
G $\frac{1}{8}$	3	13.8	10.2 ±0.2	13.8 ±0.07	31.9	25	26.9	5.1 +0.17/-0.25	14.4	12
	4				29.4	22.5			14.4	
	6				32.6	25.7			13.7	
	8				35.6	28.7			13.7	
G $\frac{1}{8}$ (MF)	6	13.8	12.5 ±0.2	13.8 ±0.07	36.6	27.7	31.5	5.9 +0.17/-0.25	17.2	15
	8				39.6	30.7			17.2	
G $\frac{1}{4}$	6	17.8	12.5 ±0.2	17.8 ±0.15	36.6	27.7	31.5	5.9 +0.17/-0.25	16.1	15
	8				42.0	30.7			16.1	
	10				42.0	33.1			16.1	
G $\frac{3}{8}$	6	22.4	12.5 ±0.2	22.4 ±0.15	39.8	28.6	36.0	6.95 +0.15/-0.3	20.3	19
	8				44.1	32.9			19.3	
	10				46.7	35.5			19.3	
G $\frac{1}{2}$	12	27.8	20.5 ±0.15	27.8 ±0.15	55.3	41.4	42.3	8.15 +0.15/-0.3	23.0	24
Swivel joint, elbow outlet, knurled screw										
M5	3	8.9	8.2 +0.15	8.9 ±0.07	22.4	18	31.3	3.7 +0.17/-0.25	11.65	8
	4	9.9	10.0 ±0.2		24.7	20.3			11.65	
	6	12	12.0 ±0.2		26.5	22			10.65	
G $\frac{1}{8}$	3	13.8	10.2 ±0.2	13.8 ±0.07	31.9	25	40.4	5.1 +0.17/-0.25	14.4	12
	4				29.4	22.5			14.4	
	6				32.6	25.7			13.7	
	8				35.6	28.7			13.7	
G $\frac{1}{8}$ (MF)	6	13.8	12.5 ±0.2	13.8 ±0.07	36.6	27.7	48	5.1 +0.17/-0.25	17.2	15
	8				39.6	30.7			17.2	
G $\frac{1}{4}$	6	17.8	12.5 ±0.2	17.8 ±0.15	36.6	27.7	48.3	5.9 +0.17/-0.25	16.1	15
	8				42.0	30.7			16.1	
	10				42.0	33.1			16.1	
G $\frac{3}{8}$	6	22.4	12.5 ±0.2	22.4 ±0.15	39.8	28.6	55.3	6.95 +0.15/-0.3	20.3	19
	8				44.1	32.9			19.3	
	10				46.7	35.5			19.3	
G $\frac{1}{2}$	12	27.8	20.5 ±0.15	27.8 ±0.15	55.3	41.4	65.7	8.15 +0.15/-0.3	23.0	24

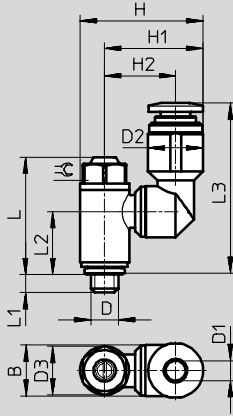
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

Dimensions

Download CAD data → www.festo.com/en/engineering




Swivel joint, outlet parallel and rotatable, slotted head screw




Screw-in thread D	Tubing O.D. D1	B	D2 Ø +0.15/-0.1	D3 Ø	H	H1	H2	L	L1	L2	L3	⊖
M5	3	8.9	8.2	8.9 ±0.07	20.7	16.25	12.15	21.4	3.6	11.5	29.6	8
	4	9.9	10		22.4	17.95	12.95	21.4	3.6	11.5	31.3	8
	6	12	12.2		24.7	20.25	14.15	21.4	3.6	11.5	33	8
G $\frac{1}{8}$	3	13.8	10.2	13.8 ±0.07	27.6	20.7	15.6	26.9	4.9	14.1	37	12
	4		10.2		27.6	20.7	15.6	26.9	4.9	14.1	34.5	12
	6		12.2		29.6	22.7	16.6	26.9	4.9	14.1	36.7	12
	8		14.2		31.6	24.7	17.6	26.9	4.9	14.1	38.9	12
G $\frac{1}{4}$	6	17.8	12.2	17.8 ±0.15	33.6	24.7	18.6	31.5	5.7	17.5	40.1	15
	8		14.2		35.6	26.7	19.6	31.5	5.7	17.5	42.3	15
	10		17.5		38.9	30	21.25	31.5	5.7	17.5	44.3	15

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series D

Ordering data							
Design	Screw-in thread	For tubing O.D. [mm]	Flow	One-way flow control function for exhaust air		One-way flow control function for supply air	
				Part No.	Type	Part No.	Type
Swivel joint, elbow outlet, slotted head screw							
	M5	3	LF	193 137	GRLA-M5-QS-3-D	193 153	GRLZ-M5-QS-3-D
		4	LF	193 138	GRLA-M5-QS-4-D	193 154	GRLZ-M5-QS-4-D
		6	LF	193 139	GRLA-M5-QS-6-D	193 155	GRLZ-M5-QS-6-D
	G1/8	3	LF	193 142	GRLA-1/8-QS-3-D	193 156	GRLZ-1/8-QS-3-D
		4	LF	193 143	GRLA-1/8-QS-4-D	193 157	GRLZ-1/8-QS-4-D
		6	LF	193 144	GRLA-1/8-QS-6-D	193 158	GRLZ-1/8-QS-6-D
		6	MF	537 075	GRLA-1/8-QS-6-MF-D	-	-
		8	LF	193 145	GRLA-1/8-QS-8-D	193 159	GRLZ-1/8-QS-8-D
		8	MF	537 076	GRLA-1/8-QS-8-MF-D	-	-
	G1/4	6	LF	193 146	GRLA-1/4-QS-6-D	-	-
		8	LF	193 147	GRLA-1/4-QS-8-D	-	-
		10	LF	193 148	GRLA-1/4-QS-10-D	-	-
	G3/8	6	LF	193 149	GRLA-3/8-QS-6-D	-	-
		8	LF	193 150	GRLA-3/8-QS-8-D	-	-
		10	LF	193 151	GRLA-3/8-QS-10-D	-	-
	G1/2	12	LF	193 152	GRLA-1/2-QS-12-D	-	-
	Swivel joint, elbow outlet, knurled screw						
		M5	3	LF	197 576	GRLA-M5-QS-3-RS-D	-
4			LF	197 577	GRLA-M5-QS-4-RS-D	-	-
6			LF	197 578	GRLA-M5-QS-6-RS-D	-	-
G1/8		3	LF	197 579	GRLA-1/8-QS-3-RS-D	-	-
		4	LF	197 580	GRLA-1/8-QS-4-RS-D	-	-
		6	LF	197 581	GRLA-1/8-QS-6-RS-D	-	-
		6	MF	537 072	GRLA-1/8-QS-6-RS-MF-D	-	-
		8	LF	534 337	GRLA-1/8-QS-8-RS-D	-	-
		8	MF	537 073	GRLA-1/8-QS-8-RS-MF-D	-	-
G1/4		6	LF	534 338	GRLA-1/4-QS-6-RS-D	-	-
		8	LF	534 339	GRLA-1/4-QS-8-RS-D	-	-
		10	LF	534 340	GRLA-1/4-QS-10-RS-D	-	-
G3/8		6	LF	534 341	GRLA-3/8-QS-6-RS-D	-	-
		8	LF	534 342	GRLA-3/8-QS-8-RS-D	-	-
		10	LF	534 343	GRLA-3/8-QS-10-RS-D	-	-
G1/2		12	LF	534 344	GRLA-3/8-QS-12-RS-D	-	-
Swivel joint, outlet parallel and rotatable, slotted head screw							
		M5	3	LF	195 806	GRXA-M5-QS-3-D	-
	4		LF	195 807	GRXA-M5-QS-4-D	-	-
	6		LF	195 808	GRXA-M5-QS-6-D	-	-
	G1/8	3	LF	195 809	GRXA-1/8-QS-3-D	-	-
		4	LF	195 810	GRXA-1/8-QS-4-D	-	-
		6	LF	195 811	GRXA-1/8-QS-6-D	-	-
		8	LF	195 812	GRXA-1/8-QS-8-D	-	-
	G1/4	6	LF	195 813	GRXA-1/4-QS-6-D	-	-
		8	LF	195 814	GRXA-1/4-QS-8-D	-	-
		10	LF	195 815	GRXA-1/4-QS-10-D	-	-

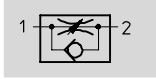
 Core Range

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series B



Function



One-way flow control valve for exhaust air
GRLA

Series B:

- High flow: Precision adjustment for high speed
- QS push-in connector
- Swivel joint rotatable 360° after installation
- Adjustment via knurled screw



General technical data					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
Valve function	One-way flow control function for exhaust air				
Setting component	Knurled screw				
Type of mounting	Can be screwed in				
Assembly position	Any				
Special features	Freely rotatable around the screw-in axis after installation				
Max. tightening torque [Nm]	–	4	11	40	–

Operating and environmental conditions					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
Operating medium	Filtered compressed air, lubricated or unlubricated, grade of filtration 40µm				
Operating pressure [bar]	0.2 ... 10				
Ambient temperature [°C]	–10 ... +60				
Temperature of medium [°C]	–10 ... +60				

Weights [g]					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
	–	25	30	40	–

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with QS push-in connector, series B

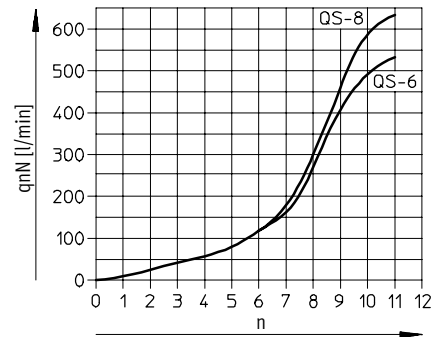
Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar				
Screw-in thread		G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$
One-way flow control function for exhaust air				
QS-6	D ¹⁾	0 ... 520	0 ... 520	0 ... 530
	R ²⁾	400 ... 550	400 ... 550	400 ... 550
QS-8	D	0 ... 650	0 ... 650	0 ... 650
	R	600 ... 750	600 ... 750	600 ... 750

- 1) D: Flow control direction
- 2) R: Non-return direction

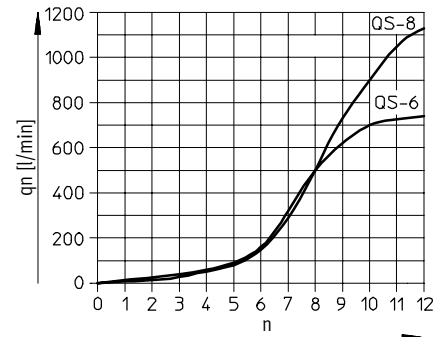
Standard flow rate q_n [l/min] at 6 bar \rightarrow 0 bar				
Screw-in thread		G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$
One-way flow control function for exhaust air				
QS-6	D ¹⁾	0 ... 720	0 ... 740	0 ... 740
	R ²⁾	600 ... 750	620 ... 760	620 ... 760
QS-8	D	0 ... 1,080	0 ... 1,130	0 ... 1,130
	R	800 ... 1,250	900 ... 1,260	900 ... 1,260

- 1) D: Flow control direction
- 2) R: Non-return direction

Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n
Screw-in thread G $\frac{1}{8}$, G $\frac{1}{4}$, G $\frac{3}{8}$

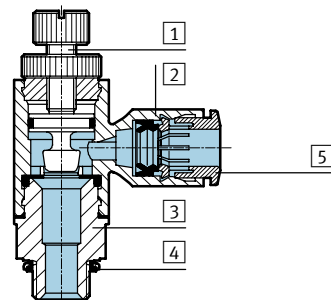


Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
Screw-in thread G $\frac{1}{8}$, G $\frac{1}{4}$, G $\frac{3}{8}$



Materials

Sectional view



Flow control valve		
1	Regulating screw	Brass
2	Swivel joint	PBT-reinforced
3	Threaded collar	Wrought aluminium alloy
4	Seal	Nitrile rubber
5	Release ring	Polyacetal

Core Range

Flow control valves and one-way flow control valves

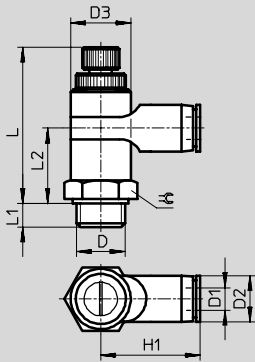
Technical data – Standard flow control valve with QS push-in connector, series B



Dimensions

Download CAD data → www.festo.com/en/engineering

Swivel joint, elbow outlet, knurled screw



Screw-in thread D	Tubing O.D. D1	D2 Ø	D3 Ø -0.2	H1	L max.	L1	L2	⊖
G ¹ / ₈	6	13	18	27.2	48.5	4.7	22.8	13
	8	17		35.4				
G ¹ / ₄	6	13	18	27.2	48	5.8	22.3	17
	8	17		35.4				
G ³ / ₈	6	13	18	27.2	48.8	6	23.1	19
	8	17		35.4				

Ordering data

Design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air	
			Part No.	Type
Swivel joint, elbow outlet, knurled screw				
	G ¹ / ₈	6	162 965	GRLA- ¹ / ₈ -QS-6-RS-B
		8	162 966	GRLA- ¹ / ₈ -QS-8-RS-B
	G ¹ / ₄	6	162 967	GRLA- ¹ / ₄ -QS-6-RS-B
		8	162 968	GRLA- ¹ / ₄ -QS-8-RS-B
	G ³ / ₈	6	162 969	GRLA- ³ / ₈ -QS-6-RS-B
		8	162 970	GRLA- ³ / ₈ -QS-8-RS-B

Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

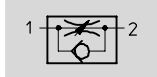
5.6

Core Range

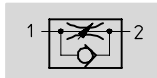
Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with QS push-in connector

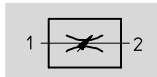
Function



One-way flow control for exhaust air
GRLA/GRGA



One-way flow control for supply air
GRLZ/GRGZ



Flow control acting at both sides
GRLO/GRGO

- Low flow: Precision adjustment for low speed
- QS push-in connector
- Adjustment with slotted head screw

Variants:

- Swivel joint, elbow outlet
- Swivel joint, parallel outlet



General technical data		
Screw-in thread		M3 M5
Valve function	GRLA/GRGA	One-way flow control function for exhaust air
	GRLZ/GRGZ	One-way flow control function for supply air
	GRLO/GRGO	Flow control function
Setting component		Slotted head screw
Type of mounting		Threaded
Mounting position		Any
Max. tightening torque	[Nm]	0.3 1.5

Operating and environmental conditions		
Screw-in thread		M3 M5
Operating medium		Compressed air, filtered (to 40µm), lubricated or unlubricated
Operating pressure	GRL.../GRG... [bar]	0.2 ... 10
	GRLO/GRGO [bar]	0 ... 10
Ambient temperature	[°C]	-10 ... +60
Temperature of medium	[°C]	-10 ... +60

Weights [g]		
Screw-in thread		M3 M5
	GRL...	7 9
	GRG...	14 14

Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with QS push-in connector



Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar				
Screw-in thread		M3	M5	
One-way flow control function for exhaust air				
GRLA/GRGA	QS-3	F ¹⁾	0 ... 41	0 ... 40
		N ²⁾	27 ... 50	46 ... 70
	QS-4	F	–	0 ... 40
		N	–	50 ... 75
One-way flow control function for supply air				
GRLZ/GRGZ	QS-3	F	0 ... 41	0 ... 48
		N	27 ... 44	36 ... 52
	QS-4	F	–	0 ... 48
		N	–	40 ... 65
Flow control function, acting at both sides				
GRLO/GRGO	QS-3	F	0 ... 18	0 ... 40
		N	0 ... 41	0 ... 48
	QS-4	F	–	0 ... 40
		N	–	0 ... 48

- 1) F: Flow control direction
2) N: Non-return direction

Standard flow rate q_n [l/min] at 6 bar \rightarrow 0 bar				
Screw-in thread		M3	M5	
One-way flow control function for exhaust air				
GRLA/GRGA	QS-3	F ¹⁾	0 ... 95	0 ... 95
		N ²⁾	75 ... 110	90 ... 130
	QS-4	F	–	0 ... 95
		N	–	95 ... 140
One-way flow control function for supply air				
GRLZ/GRGZ	QS-3	F	0 ... 95	0 ... 105
		N	75 ... 100	80 ... 110
	QS-4	F	–	0 ... 105
		N	–	85 ... 115
Flow control function, acting at both sides				
GRLO/GRGO	QS-3	F	0 ... 50	0 ... 90
		N	0 ... 95	0 ... 105
	QS-4	F	–	0 ... 90
		N	–	0 ... 105

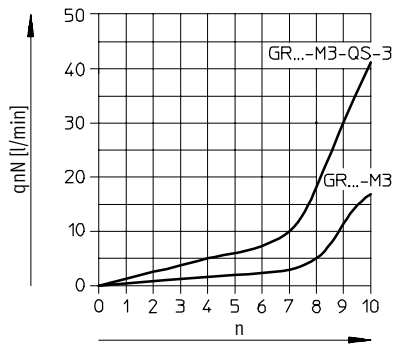
- 1) F: Flow control direction
2) N: Non-return direction

Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with QS push-in connector

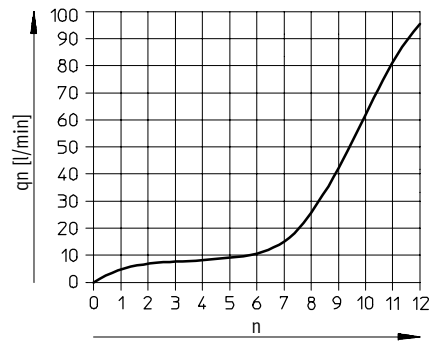
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n

Screw-in thread M3

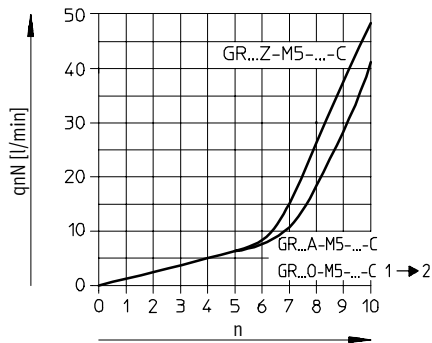


Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n

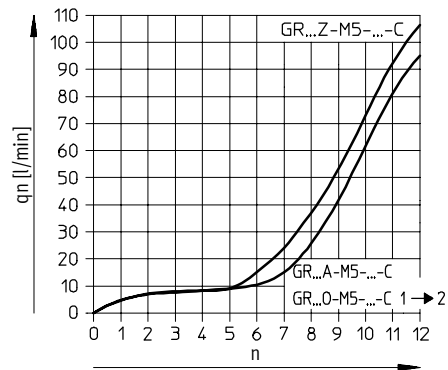
Screw-in thread M3



Screw-in thread M5



Screw-in thread M5



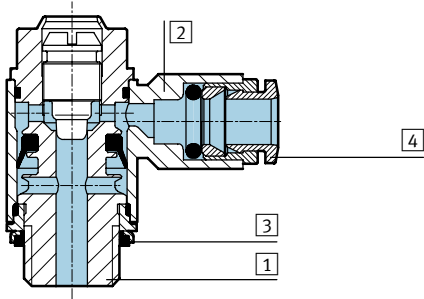
Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with QS push-in connector



Materials

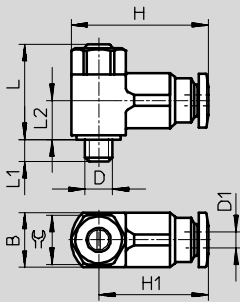
Sectional view



Flow control valve		
1	Threaded collar	Brass
2	Swivel joint	Die-cast zinc
3	Seal	Polyamide
4	Release ring	Polyacetal

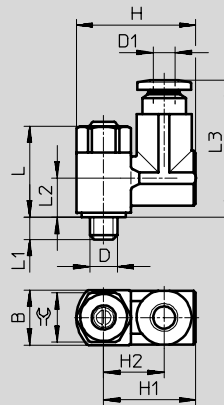
Dimensions GRL...

Swivel joint, elbow outlet, slotted head screw



Dimensions GRG...

Swivel joint, parallel outlet, slotted head screw





Screw-in thread D	Tubing O.D. D1	B -0.15	H	H1	H2	L	L1	L2	L3	⊕
Swivel joint, elbow outlet, slotted head screw										
M3	3	8	20	15.8	-	16.6	2.3 +0.15/-0.3	7	-	7
M5	3	9.8	22.4	18.4	-	17.7	3.1 +0.15/-0.35	7.3	-	7
	4	9.8	22.2	18.2	-	17.7	3.1 +0.15/-0.35	7.3	-	7
Swivel joint, parallel outlet, slotted head screw										
M3	3	8	18	14	9.25	16.6	2.3 +0.15/-0.3	7.5	22	7
M5	3	9.8	19.8	15.8	10	17.7	3.1 +0.15/-0.35	8.3	26.2	7
	4	9.8	19.8	15.8	10	17.7	3.1 +0.15/-0.35	8.3	25.7	7

Flow control valves and one-way flow control valves



Technical data – Mini flow control valve with QS push-in connector

Ordering data								
Design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
QS push-in connector, elbow outlet, slotted head screw								
	M3	3	175 041	GRLA-M3-QS-3	175 043	GRLZ-M3-QS-3	175 042	GRLO-M3-QS-3
	M5	3	175 053	GRLA-M5-QS-3-LF-C	175 055	GRLZ-M5-QS-3-LF-C	175 054	GRLO-M5-QS-3-LF-C
		4	175 056	GRLA-M5-QS-4-LF-C	175 058	GRLZ-M5-QS-4-LF-C	175 057	GRLO-M5-QS-4-LF-C
QS push-in connector, parallel outlet, slotted head screw								
	M3	3	175 044	GRGA-M3-QS-3	175 046	GRGZ-M3-QS-3	175 045	GRGO-M3-QS-3
	M5	3	175 062	GRGA-M5-QS-3-LF-C	175 064	GRGZ-M5-QS-3-LF-C	175 063	GRGO-M5-QS-3-LF-C
		4	175 065	GRGA-M5-QS-4-LF-C	175 067	GRGZ-M5-QS-4-LF-C	175 066	GRGO-M5-QS-4-LF-C

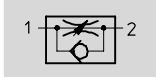
 Core Range

Flow control valves and one-way flow control valves

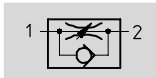
Technical data – Standard flow control valve with female thread



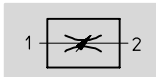
Function



One-way flow control for exhaust air
GRLA

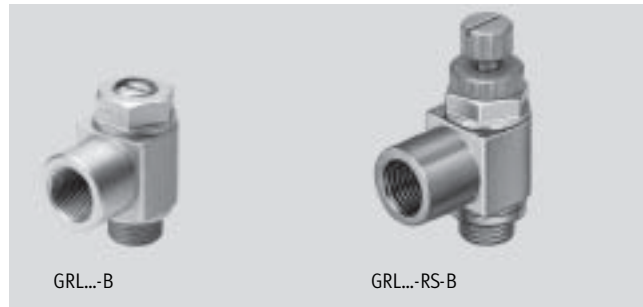


One-way flow control for supply air
GRLZ



Flow control acting at both sides
GRLO

- Mid flow:
Precision adjustment for average speed
- Adjustment with slotted head screw
- Adjustment with knurled screw



General technical data								
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2	G3/4
Valve function	GRLA	One-way flow control function for exhaust air						
	GRLZ	One-way flow control function for supply air						
	GRLO	Flow control function						
Setting component		Slotted head or knurled screw						
Type of mounting		Threaded						
Mounting position		Any						
Max. tightening torque		[Nm]	1.5	6	11	20	40	60

Operating and environmental conditions								
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2	G3/4
Operating medium		Compressed air, filtered (to 40µm), lubricated or unlubricated						
Operating pressure	GRLA/GRLZ	[bar]	0.2 ... 10		0.3 ... 10			
	GRLO	[bar]	0 ... 10		-			
Ambient temperature		[°C]	-10 ... +60					
Temperature of medium		[°C]	-10 ... +60					

Weights [g]								
Screw-in thread			M5	G1/8	G1/4	G3/8	G1/2	G3/4
	GRL...-B	[g]	11	28	60	97	204	377
	GRL...-RS-B	[g]	12	30	59	-	-	-

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

Standard nominal flow rate qnN [l/min] at 6 bar ... 5 bar							
Screw-in thread		M5	G1/8	G1/4	G3/8	G1/2	G3/4
One-way flow control function for exhaust air							
GRLA	F ¹⁾	0 ... 95	0 ... 340	0 ... 610	0 ... 1 450	0 ... 2 100	0 ... 4 320
	N ²⁾	76 ... 95	260 ... 420	450 ... 820	970 ... 1 600	1 550 ... 2 200	3 220 ... 4 720
One-way flow control function for supply air							
GRLZ	F	0 ... 95	0 ... 340	0 ... 610	–	–	–
	N	76 ... 95	260 ... 420	450 ... 820	–	–	–
Flow control function							
GRLO	F	0 ... 95	–	–	–	–	–

- 1) F: Flow control direction
- 2) N: Non-return direction

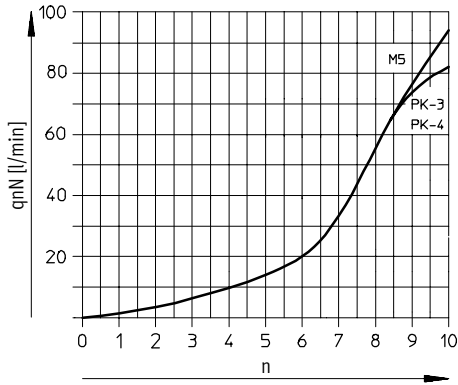
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread



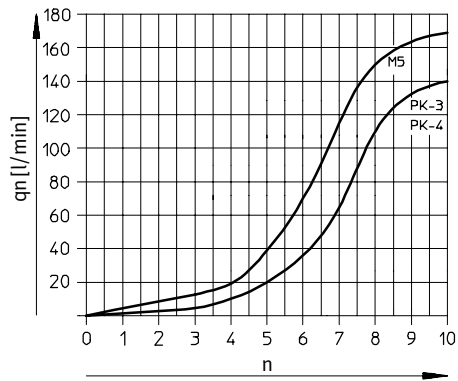
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 as a function of turns of the adjusting screw n

Screw-in thread M5

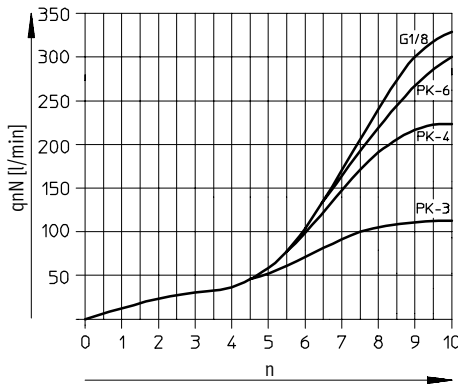


Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n

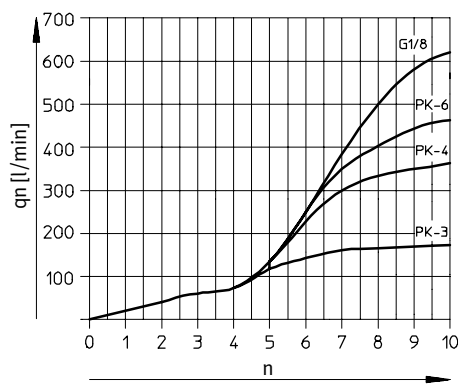
Screw-in thread M5



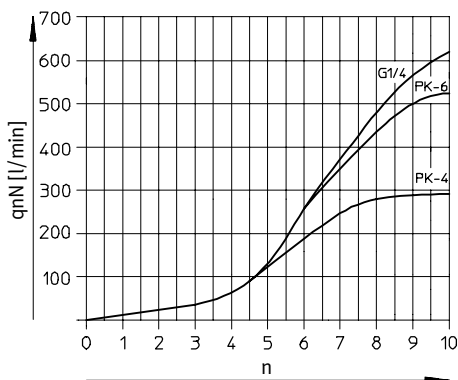
Screw-in thread G1/8



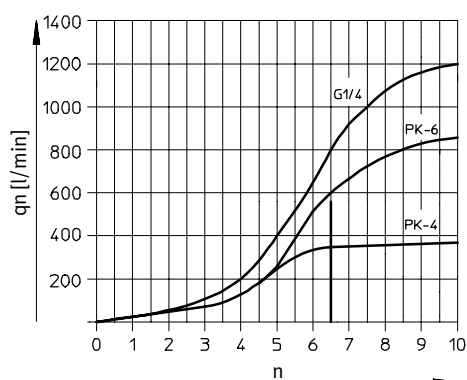
Screw-in thread G1/8



Screw-in thread G1/4



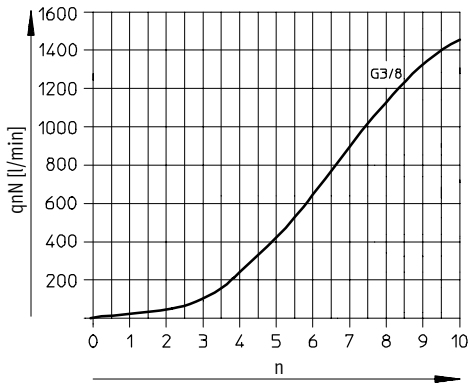
Screw-in thread G1/4



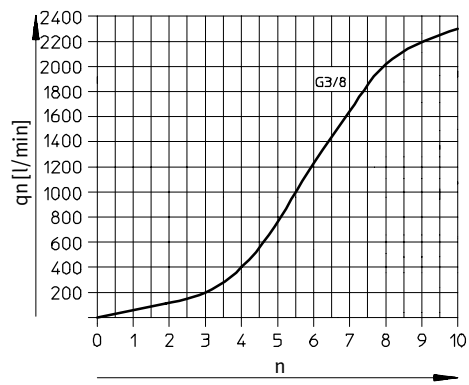
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

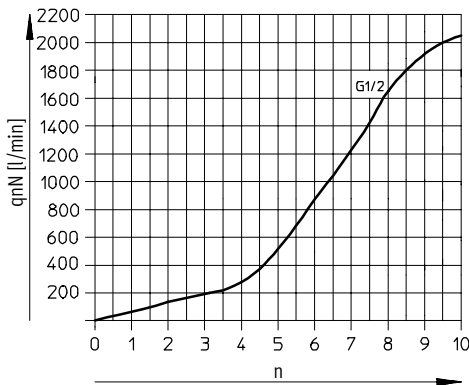
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 as a function of turns of the adjusting screw n
Screw-in thread G $\frac{3}{8}$



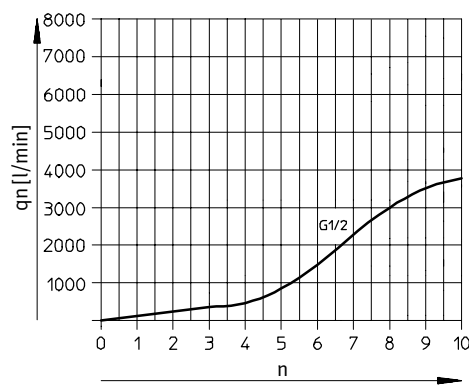
Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
Screw-in thread G $\frac{3}{8}$



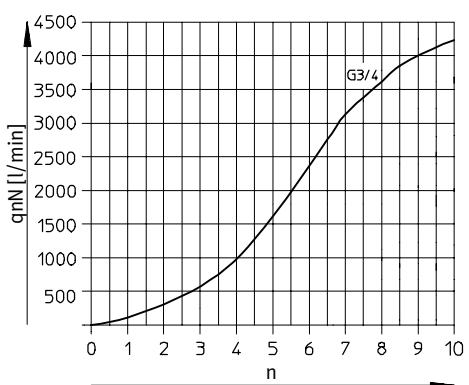
Screw-in thread G $\frac{1}{2}$



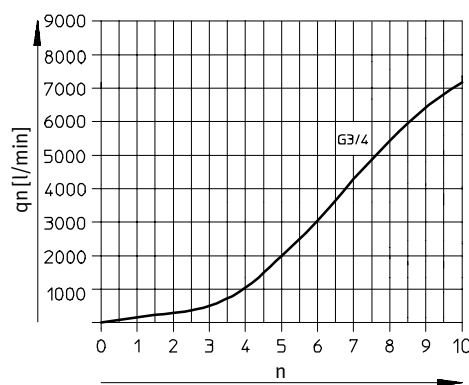
Screw-in thread G $\frac{1}{2}$



Screw-in thread G $\frac{3}{4}$



Screw-in thread G $\frac{3}{4}$



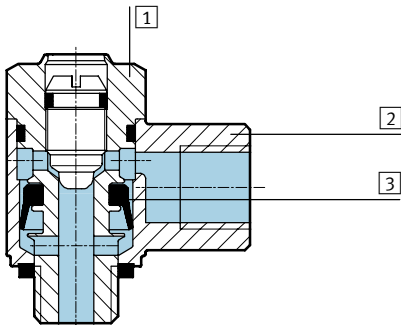
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread



Materials

Sectional view

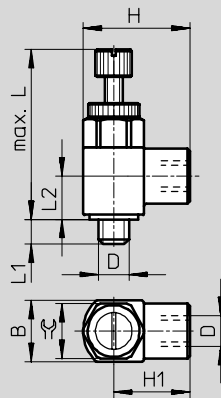
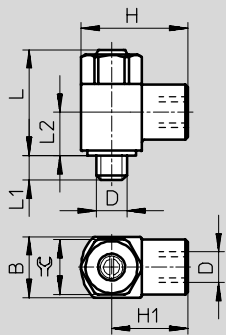


Flow control valve	
1	Threaded collar Wrought aluminium alloy (M5: brass, nickel-plated)
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber
Note on material Designs free of copper, PTFE and silicone ➔ Ordering data	

Dimensions

Slotted head screw




Knurled screw



Screw-in thread D	Connecting thread D	B	H	H1	L max.	L1	L2	☉
Slotted head screw								
M5	M5	10 ^{-0.15}	17.5	12.5	17.6	4 ±0.3	7.1	9
G ¹ / ₈	G ¹ / ₈	16 ^{-0.15}	28	20	25.2	5.3 ^{+0.45/-0.35}	10.3	14
G ¹ / ₄	G ¹ / ₄	20 ^{-0.2}	36	26	30.8	8.2 ^{+0.45/-0.35}	13.2	17
G ³ / ₈	G ³ / ₈	25 ^{-0.2}	41	28.5	37.2	8.8 ^{+0.45/-0.35}	15.5	22
G ¹ / ₂	G ¹ / ₂	32 ^{-0.2}	53	37	48.6	12.8 ±0.45	18.9	27
G ³ / ₄	G ³ / ₄	41 ^{-0.3}	64	43.5	60.2	13.5 ±0.5	24.5	36
Knurled screw								
M5	M5	10 ^{-0.15}	17.5	12.5	27.3	4 ±0.3	7.1	9
G ¹ / ₈	G ¹ / ₈	16 ^{-0.15}	28	20	38.6	5.3 ^{+0.45/-0.35}	10.3	14
G ¹ / ₄	G ¹ / ₄	20 ^{-0.2}	36	26	54.8	8.2 ^{+0.45/-0.35}	13.2	17

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

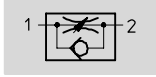
Ordering data								
Design	Screw-in thread	Connecting thread	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function, acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
Female thread, elbow outlet, slotted head screw								
	M5	M5	151 160	GRLA-M5-B	151 183	GRLZ-M5-B	151 181	GRL0-M5-B
	G1/8	G1/8	151 165	GRLA-1/8-B	151 188	GRLZ-1/8-B	-	-
	G1/4	G1/4	151 172	GRLA-1/4-B	151 195	GRLZ-1/4-B	-	-
	G3/8	G3/8	151 178	GRLA-3/8-B	-	-	-	-
	G1/2	G1/2	151 179	GRLA-1/2-B	-	-	-	-
	G3/4	G3/4	151 180	GRLA-3/4-B	-	-	-	-
Female thread, elbow outlet, knurled screw								
	M5	M5	151 163	GRLA-M5-RS-B	151 186	GRLZ-M5-RS-B	-	-
	G1/8	G1/8	151 169	GRLA-1/8-RS-B	151 192	GRLZ-1/8-RS-B	-	-
	G1/4	G1/4	151 175	GRLA-1/4-RS-B	151 198	GRLZ-1/4-RS-B	-	-
Female thread, elbow outlet, slotted head screw								
Free of copper, PTFE and silicone								
	M5	M5	165 663	GRLA-M5-B-CT	-	-	-	-
	G1/8	G1/8	165 654	GRLA-1/8-B-CT	-	-	-	-
	G1/4	G1/4	165 648	GRLA-1/4-B-CT	-	-	-	-
	G3/8	G3/8	165 662	GRLA-3/8-B-CT	-	-	-	-
	G1/2	G1/2	165 647	GRLA-1/2-B-CT	-	-	-	-
	G3/4	G3/4	165 661	GRLA-3/4-B-CT	-	-	-	-

Flow control valves and one-way flow control valves

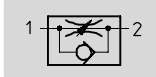
Technical data – Standard flow control valve with barbed fitting connection PK



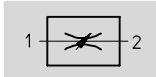
Function



One-way flow control for exhaust air
GRLA



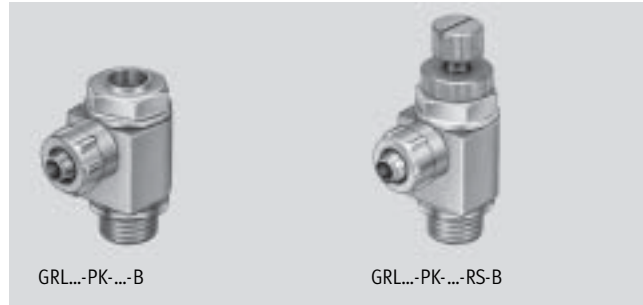
One-way flow control for supply air
GRLZ



Flow control acting at both sides
GRLO

Series B:

- Mid flow:
Precision adjustment for average speed
- Adjustment with slotted head screw
- Adjustment with knurled screw
- With screw-in thread G $\frac{1}{8}$ and G $\frac{1}{4}$ with union nut



General technical data				
Screw-in thread		M5	G $\frac{1}{8}$	G $\frac{1}{4}$
Valve function	GRLA	One-way flow control function for exhaust air		
	GRLZ	One-way flow control function for supply air		
	GRLO	Flow control function		
Setting component	Slotted head or knurled screw			
Type of mounting	Threaded			
Mounting position	Any			
Max. tightening torque	[Nm]	1.5	6	11

Operating and environmental conditions				
Screw-in thread		M5	G $\frac{1}{8}$	G $\frac{1}{4}$
Operating medium		Compressed air, filtered (to 40 μ m), lubricated or unlubricated		
Operating pressure	GRLA/GRLZ	[bar]	0.2 ... 10	0.3 ... 10
	GRLO	[bar]	0 ... 10	–
Ambient temperature	[°C]	–10 ... +60		
Temperature of medium	[°C]	–10 ... +60		

Weights [g]					
Screw-in thread		M5	G $\frac{1}{8}$	G $\frac{1}{4}$	
	GRL...-B	[g]	10	25	44
	GRL...-RS-B	[g]	11	26	45

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with barbed fitting connection PK

Standard nominal flow rate qnN [l/min] at 6 bar → 5 bar					
Screw-in thread			M5	G1/8	G1/4
One-way flow control function for exhaust air					
GRLA	PK-3	F ¹⁾	0 ... 83	0 ... 110	–
		N ²⁾	72 ... 83	100 ... 110	–
	PK-4	F	0 ... 83	0 ... 230	0 ... 260
		N	76 ... 88	190 ... 240	220 ... 260
	PK-6	F	–	0 ... 300	0 ... 540
		N	–	210 ... 290	410 ... 585
One-way flow control function for supply air					
GRLZ	PK-3	F	0 ... 83	0 ... 110	–
		N	72 ... 83	100 ... 110	–
	PK-4	F	0 ... 83	0 ... 230	0 ... 260
		N	76 ... 88	190 ... 240	220 ... 260
	PK-6	F	–	0 ... 300	0 ... 540
		N	–	210 ... 290	410 ... 585
Flow control function					
GRLO	PK-3	F	0 ... 83	–	–

- 1) F: Flow control direction
- 2) N: Non-return direction

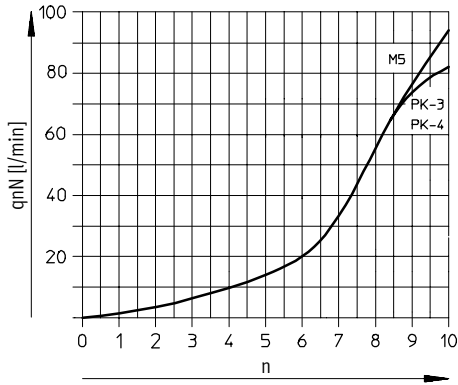
Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with barbed fitting connection PK



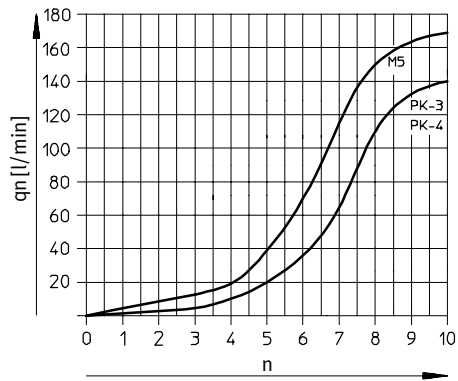
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 as a function of turns of the adjusting screw n

Screw-in thread M5

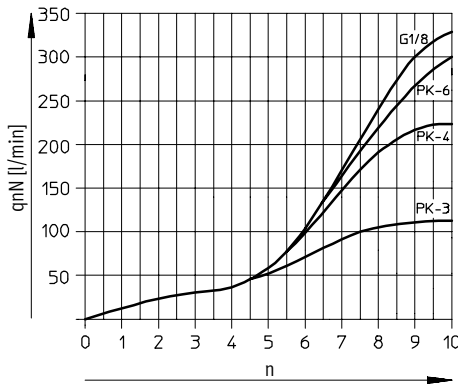


Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n

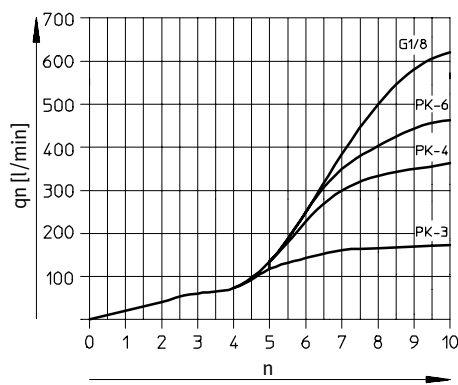
Screw-in thread M5



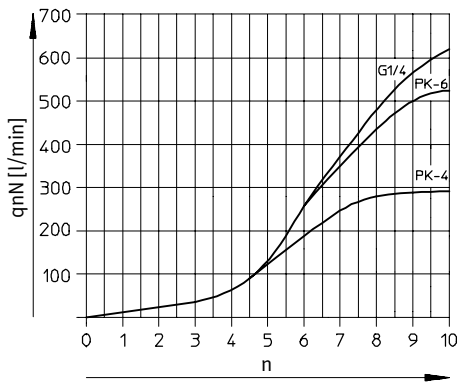
Screw-in thread G1/8



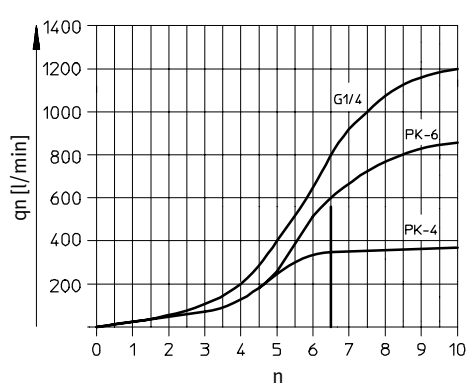
Screw-in thread G1/8



Screw-in thread G1/4



Screw-in thread G1/4

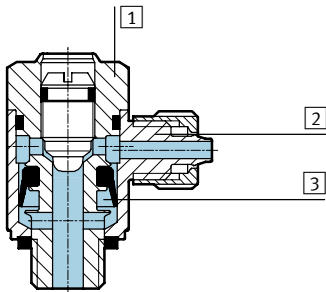


Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with barbed fitting connection PK

Materials

Sectional view

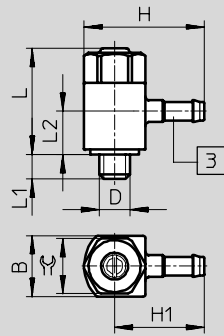


Flow control valve	
1	Threaded collar Wrought aluminium alloy (M5: brass, nickel-plated)
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber
Note on material Designs free of copper, PTFE and silicone ➔ Ordering data	

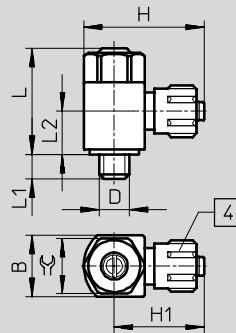
Dimensions

Slotted head screw, screw-in thread M5

Slotted head screw, screw-in thread G1/8, G1/4



3 Barbed fitting



4 Union nut

Screw-in thread D	Tubing I.D.	B	H	H1	L	L1	L2	⌀
M5	3	10 -0.15	19.7	14.7	17.6	4 ±0.3	8.5	9
	4	10 -0.15	21.7	16.7	17.6	4 ±0.3	8.5	9
G1/8	3	16 -0.15	27.1	19.1	25.2	5.3 +0.45/-0.35	13.4	14
	4	16 -0.15	30.2	22.2	25.2	5.3 +0.45/-0.35	13.4	14
	6	16 -0.15	30.3	22.3	25.2	5.3 +0.45/-0.35	12	14
G1/4	4	20 -0.2	34.2	24.2	30.8	8.2	16.9	17
	6	20 -0.2	34.3	24.3	30.8	8.2	17.2	17

Flow control valves and one-way flow control valves

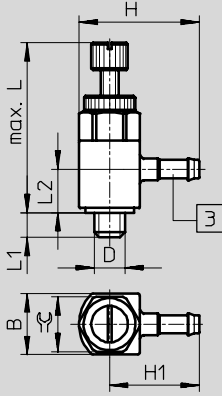
Technical data – Standard flow control valve with barbed fitting connection PK



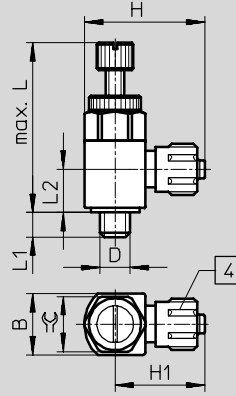
Dimensions

Knurled screw, screw-in thread M5

Knurled screw, screw-in thread G $\frac{1}{8}$, G $\frac{1}{4}$



3 Barbed fitting






4 Union nut

Screw-in thread D	Tubing I.D.	B	H	H1	L max.	L1	L2	$\approx \text{C}$
M5	3	10 -0.15	19.7	14.7	27.3	4 ±0.3	8.5	9
G $\frac{1}{8}$	4	16 -0.15	30.2	22.2	38.6	5.3 +0.45/-0.35	13.4	14
	6	16 -0.15	30.3	22.3	38.6	5.3 +0.45/-0.35	12	14
G $\frac{1}{4}$	4	20 -0.2	34.2	24.2	54.8	8.2 +0.45/-0.35	16.9	17
	6	20 -0.2	34.3	24.3	54.8	8.2 +0.45/-0.35	17.2	17

Flow control valves and one-way flow control valves



Technical data – Standard flow control valve with barbed fitting connection PK

Ordering data								
Version ¹⁾	Screw-in thread	For tubing I.D. [mm]	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
Barbed fitting, elbow outlet, slotted head screw								
	M5	3	151 161	GRLA-M5-PK-3-B	151 184	GRLZ-M5-PK-3-B	151 182	GRLO-M5-PK-3-B
		4	151 162	GRLA-M5-PK-4-B	151 185	GRLZ-M5-PK-4-B	–	–
	G ¹ / ₈	3	151 166	GRLA-1/8-PK-3-B	151 189	GRLZ-1/8-PK-3-B	–	–
		4	151 167	GRLA-1/8-PK-4-B	151 190	GRLZ-1/8-PK-4-B	–	–
		6	151 168	GRLA-1/8-PK-6-B	151 191	GRLZ-1/8-PK-6-B	–	–
	G ¹ / ₄	4	151 173	GRLA-1/4-PK-4-B	151 196	GRLZ-1/4-PK-4-B	–	–
		6	151 174	GRLA-1/4-PK-6-B	151 197	GRLZ-1/4-PK-6-B	–	–
	Barbed fitting, elbow outlet, knurled screw							
		M5	3	151 164	GRLA-M5-PK-3-RS-B	151 187	GRLZ-M5-PK-3-RS-B	–
G ¹ / ₈		4	151 170	GRLA-1/8-PK-4-RS-B	151 193	GRLZ-1/8-PK-4-RS-B	–	–
		6	151 171	GRLA-1/8-PK-6-RS-B	151 194	GRLZ-1/8-PK-6-RS-B	–	–
G ¹ / ₄		4	151 176	GRLA-1/4-PK-4-RS-B	151 199	GRLZ-1/4-PK-4-RS-B	–	–
		6	151 177	GRLA-1/4-PK-6-RS-B	151 200	GRLZ-1/4-PK-6-RS-B	–	–
Barbed fitting, elbow outlet, slotted head screw Free of copper, PTFE and silicone								
	M5	3	165 664	GRLA-M5-PK-3-B-CT	–	–	–	–
		4	165 666	GRLA-M5-PK-4-B-CT	–	–	–	–
	G ¹ / ₈	3	165 655	GRLA-1/8-PK-3-B-CT	–	–	–	–
		4	165 656	GRLA-1/8-PK-4-B-CT	–	–	–	–
		6	165 658	GRLA-1/8-PK-6-B-CT	–	–	–	–
	G ¹ / ₄	4	165 649	GRLA-1/4-PK-4-B-CT	–	–	–	–
		6	165 651	GRLA-1/4-PK-6-B-CT	–	–	–	–

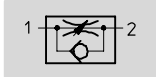
1) Union nut for barbed fitting only with screw-in thread G¹/₈ and G¹/₄

Flow control valves and one-way flow control valves

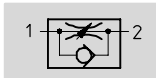
Technical data – Mini flow control valve with female thread



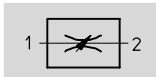
Function



One-way flow control for exhaust air
GRLA



One-way flow control for supply air
GRLZ



Flow control acting at both sides
GRLO

- Low flow:
Precision adjustment for low speed
- Adjustment with slotted head screw



General technical data			
Screw-in thread		M3	M5
Valve function	GRLA	One-way flow control function for exhaust air	
	GRLZ	One-way flow control function for supply air	
	GRLO	Flow control function	
Setting component		Slotted head or knurled screw	
Type of mounting		Threaded	
Mounting position		Any	
Max. tightening torque		[Nm]	0.3 1.5

Operating and environmental conditions			
Screw-in thread		M3	M5
Operating medium		Compressed air, filtered (to 40µm), lubricated or unlubricated	
Operating pressure	GRLA/GRLZ	[bar]	0.2 ... 10
	GRLO	[bar]	0 ... 10
Ambient temperature	[°C]	-10 ... +60	
Temperature of medium	[°C]	-10 ... +60	

Weights [g]			
Screw-in thread		M3	M5
Product weight		[g]	2 7

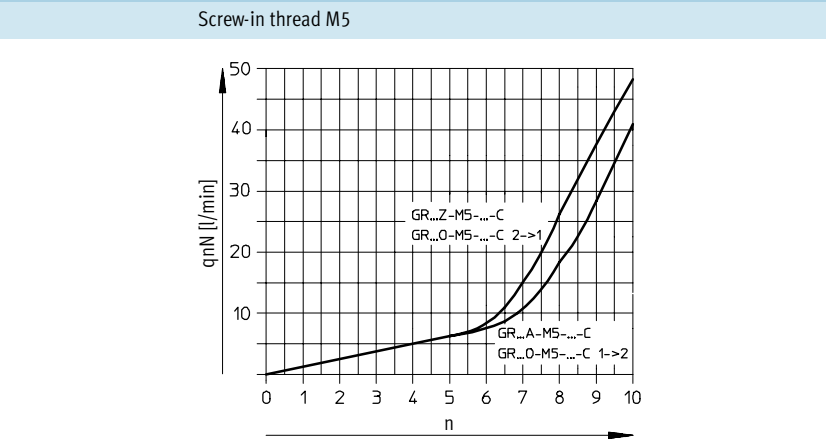
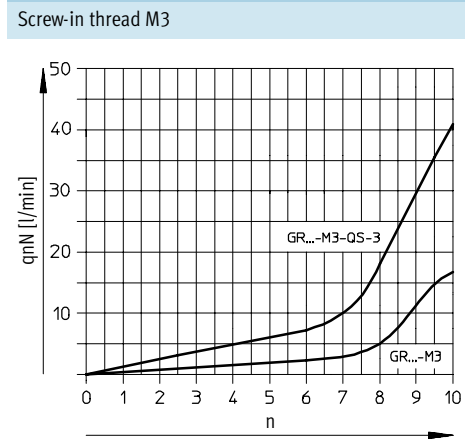
Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with female thread

Standard nominal flow rate q_{nN} [l/min] at 6 bar → 5 bar			
Screw-in thread		M3	M5
One-way flow control function for exhaust air			
GRLA	F ¹⁾	0 ... 18	0 ... 40
	N ²⁾	18 ... 20	50 ... 75
One-way flow control function for supply air			
GRLZ	F	0 ... 18	0 ... 40
	N	18 ... 20	40 ... 65
Flow control function			
GRLO	F	0 ... 18	0 ... 40
	N	0 ... 18	0 ... 48

- 1) F: Flow control direction
- 2) N: Non-return direction

Standard nominal flow rate q_{nN} at 6 bar → 5 bar as a function of turns of the adjusting screw n



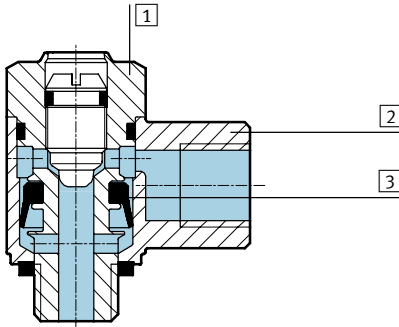
Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with female thread



Materials

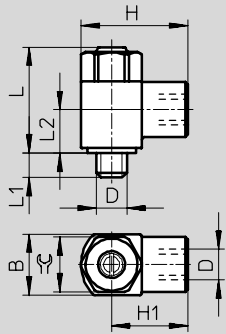
Sectional view



Flow control valve	
1	Threaded collar Brass, nickel-plated
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber

Dimensions

Screw-in thread M3/M5



Screw-in thread D	Connecting thread D	B	H	H1	L	L1	L2	\approx
M3	M3	5	9	6.5	13.3	2.5	6.4	4.5
M5	M5	8	16	12	17.7	3.1	8.2	7

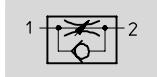
Ordering data

Version	Screw-in thread	Connecting thread	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
	M3	M3	175 038	GRLA-M3	175 040	GRLZ-M3	175 039	GRLO-M3
	M5	M5	175 047	GRLA-M5-LF-C	175 049	GRLZ-M5-LF-C	175 048	GRLO-M5-LF-C

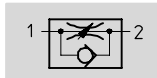
Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with barbed fitting connection PK

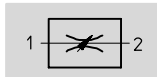
Function



One-way flow control for exhaust air
GRLA



One-way flow control for supply air
GRLZ

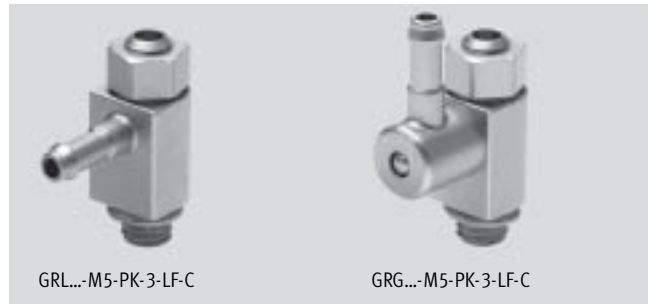


Flow control acting at both sides
GRLO

- Low flow: Precision adjustment for low speed
- Barbed fitting connection
- Adjustment with slotted head screw

Variants:

- Swivel joint, elbow outlet
- Swivel joint, parallel outlet



GRL...-M5-PK-3-LF-C

GRG...-M5-PK-3-LF-C

General technical data		
Screw-in thread		M5
Valve function	GRLA	One-way flow control function for exhaust air
	GRLZ	One-way flow control function for supply air
	GRLO	Flow control function
Setting component		Slotted head or knurled screw
Type of mounting		Threaded
Mounting position		Any
Max. tightening torque	[Nm]	1.5

Operating and environmental conditions		
Screw-in thread		M5
Operating medium		Compressed air, filtered (to 40µm), lubricated or unlubricated
Operating pressure	GRLA/GRLZ	[bar] 0.2 ... 10
	GRLO	[bar] –
Ambient temperature	[°C]	–10 ... +60
Temperature of medium	[°C]	–10 ... +60

Weights [g]		
Screw-in thread		M5
Product weight	[g]	7

Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with barbed fitting connection PK

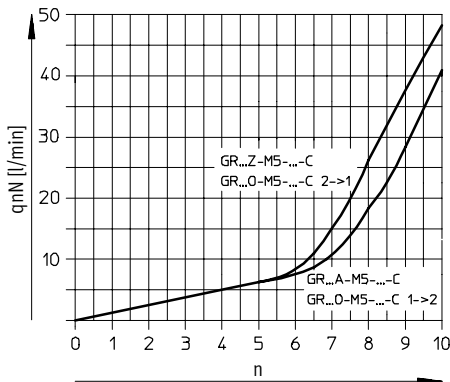


Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar			
Screw-in thread		M5	
One-way flow control function for exhaust air			
PK-3	GRLA/GRGA	F ¹⁾	0 ... 40
		N ²⁾	42 ... 63
One-way flow control function for supply air			
PK-3	GRLZ/GRGZ	F	0 ... 40
		N	35 ... 58
Flow control function			
PK-3	GRLO/GRGO	F	0 ... 40
		N	0 ... 48

- 1) F: Flow control direction
- 2) N: Non-return direction

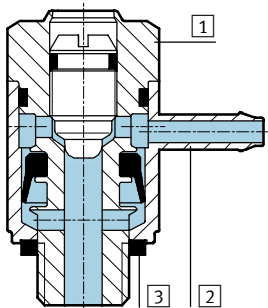
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n

Screw-in thread M5



Materials

Sectional view



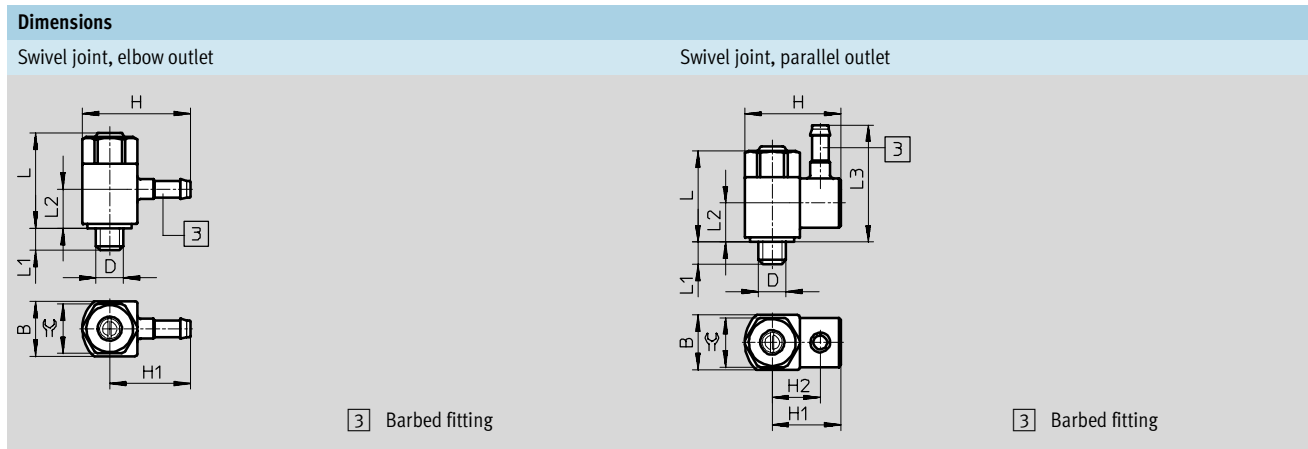
Flow control valve	
1	Threaded collar Brass, nickel-plated
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber

Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

5.6

Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with barbed fitting connection PK



Screw-in thread D	Tubing I.D.	B	H	H1	H2	L	L1	L2	L3	⌀
Swivel joint, elbow outlet										
M5	3	8	17.7	13.7	–	17.7	3.1	9.4	–	7
Swivel joint, parallel outlet										
M5	3	8	15.8	11.8	8.3	17.7	3.1	8.7	21	7

Ordering data										
Version	Screw-in thread	For tubing I.D. [mm]	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides			
			Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type
Barbed fitting, elbow outlet, slotted head screw										
	M5	3	175 050	GRLA-M5-PK-3-LF-C	175 052	GRLZ-M5-PK-3-LF-C	175 051	GRLO-M5-PK-3-LF-C		
Swivel joint, parallel outlet, slotted head screw										
	M5	3	175 059	GRGA-M5-PK-3-LF-C	175 061	GRGZ-M5-PK-3-LF-C	175 060	GRGO-M5-PK-3-LF-C		

Flow control valves and one-way flow control valves

Technical data – Corrosion resistant flow control valve with female thread



Function



One-way flow control for exhaust air
CRGRLA

- Mid flow: Precision adjustment for average speed
- Adjustment with slotted head screw



CRGRLA-...-B

General technical data					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
Valve function	One-way flow control function for exhaust air				
Setting component	Slotted head screw				
Type of mounting	Threaded				
Mounting position	Any				
Max. tightening torque [Nm]	1.5	6	11	20	40

Operating and environmental conditions					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
Operating medium	Compressed air, filtered (to 40µm), lubricated or unlubricated				
Operating pressure [bar]	0.2 ... 10	0.3 ... 10			
Ambient temperature [°C]	-20 ... +80				
Temperature of medium [°C]	-10 ... +60				

Weights [g]					
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2
	14	44	83	150	315

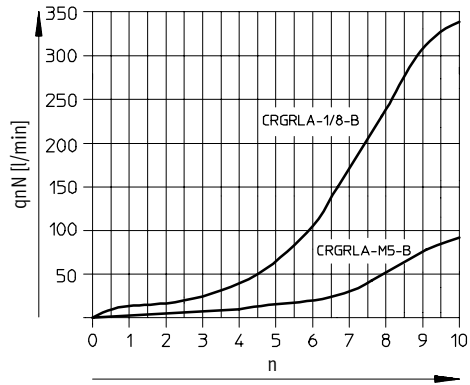
Standard nominal flow rate qnN [l/min] at 6 bar ... 5 bar						
Screw-in thread	M5	G1/8	G1/4	G3/8	G1/2	
One-way flow control function for exhaust air						
	F ¹⁾	0 ... 95	0 ... 340	0 ... 610	0 ... 1 450	0 ... 2 100
	N ²⁾	77 ... 95	260 ... 420	450 ... 820	970 ... 1 600	1 550 ... 2 200

1) F: Flow control direction
2) N: Non-return direction

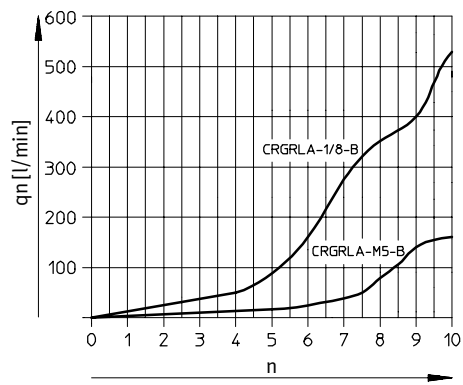
Flow control valves and one-way flow control valves

Technical data – Corrosion resistant flow control valve with female thread

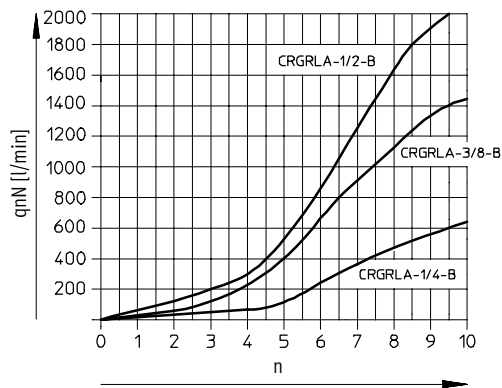
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n
Screw-in thread M5, G $\frac{1}{8}$



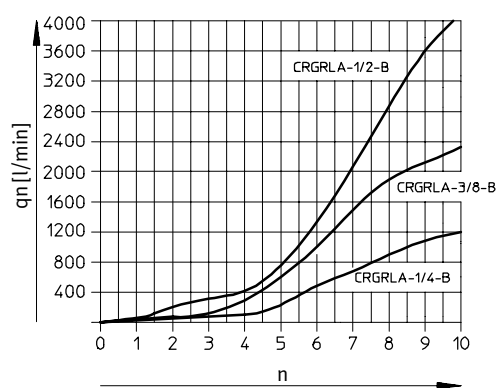
Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
Screw-in thread M5, G $\frac{1}{8}$



Screw-in thread G $\frac{1}{4}$, G $\frac{3}{8}$, G $\frac{1}{2}$



Screw-in thread G $\frac{1}{4}$, G $\frac{3}{8}$, G $\frac{1}{2}$



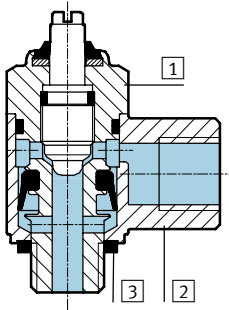
Flow control valves and one-way flow control valves

Technical data – Corrosion resistant flow control valve with female thread



Materials

Sectional view



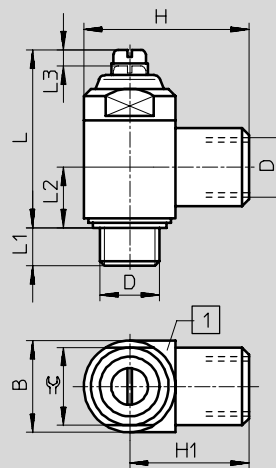
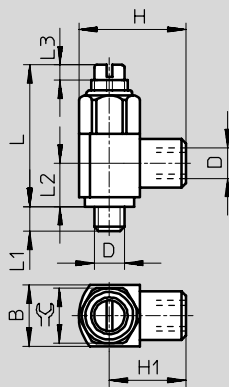
Flow control valve

1	Threaded collar	High-alloy stainless steel
2	Swivel joint	Corrosion resistant cast steel
3	Seals	Fluorocautchouc, nitrile rubber

Dimensions

Screw-in thread M5

Screw-in thread G $\frac{1}{8}$, G $\frac{1}{4}$, G $\frac{3}{8}$, G $\frac{1}{2}$



1 360 ° rotatable prior to fixing

Screw-in thread D	Connecting thread D	B	H	H1	L	L1	L2	L3	$\approx \text{C}$
M5	M5	10 -0.25	17.5 ±0.3	12.5	23.2	4	7.1	2.5	9
G $\frac{1}{8}$	G $\frac{1}{8}$	16 -0.4	28 +0.4/-0.3	20	33.7	5.3	10.3	3.5	14
G $\frac{1}{4}$	G $\frac{1}{4}$	20 -0.3	36 +0.4/-0.2	26	38.5	8.3	13.2	3.5	17
G $\frac{3}{8}$	G $\frac{3}{8}$	25 -0.3	41 +0.4/-0.2	28.5	48.5	8.8	15.4	5	22
G $\frac{1}{2}$	G $\frac{1}{2}$	32 -0.4	53 ±0.5	37	62.2	12.8	18.9	7.5	27

Ordering data

Version	Screw-in thread	Connecting thread	One-way flow control function for exhaust air
			Part No. Type
	M5	M5	161 403 CRGRLA-M5-B
	G $\frac{1}{8}$	G $\frac{1}{8}$	161 404 CRGRLA- $\frac{1}{8}$ -B
	G $\frac{1}{4}$	G $\frac{1}{4}$	161 405 CRGRLA- $\frac{1}{4}$ -B
	G $\frac{3}{8}$	G $\frac{3}{8}$	161 406 CRGRLA- $\frac{3}{8}$ -B
	G $\frac{1}{2}$	G $\frac{1}{2}$	161 407 CRGRLA- $\frac{1}{2}$ -B

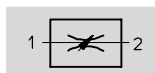
Flow control valves and one-way flow control valves

Technical data – Inline flow control valve with QS push-in connectors

Function



One-way flow control
GR-QS/GR-QS-LF



Flow control acting at both sides
GRO-QS

- Low flow:
Precision adjustment for low speed
- Mid flow:
Precision adjustment for average speed
- Adjustment with knurled screw



General technical data		QS-3	QS-4	QS-6	QS-8
Push-in connector ¹⁾					
Valve function		One-way flow control function			
Setting component		Knurled screw			
Type of mounting		Front panel mounting, in-line installation, via through-holes, with accessories			
Mounting position		Any			
Max. tightening torque	[Nm]	0.9			

1) For standard O.D. tubing

Operating and environmental conditions		QS-3	QS-4	QS-6	QS-8
Push-in connector					
Operating medium		Compressed air, filtered (to 40µm), lubricated or unlubricated			
Operating pressure	[bar]	0.2 ... 10			
Ambient temperature	[°C]	-10 ... +60			
Temperature of medium	[°C]	-10 ... +60			

Weights [g]		QS-3	QS-4	QS-6	QS-8
Push-in connector					
	[g]	15	15	25	26

Flow control valves and one-way flow control valves

Technical data – Inline flow control valve with QS push-in connectors



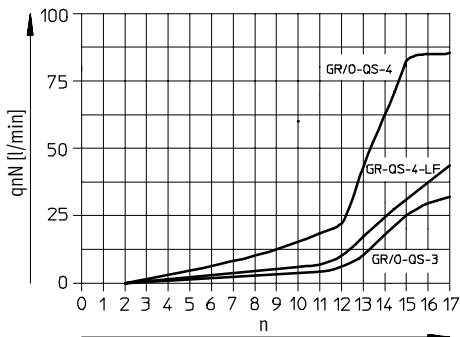
Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar					
Push-in connector		QS-3	QS-4	QS-6	QS-8
GR	F ¹⁾	0 ... 25	0 ... 85	0 ... 160	0 ... 225
	N ²⁾	65 ... 70	100 ... 110	260 ... 270	350 ... 400
GR-LF	F	–	0 ... 40	0 ... 75	–
	N	–	100 ... 110	260 ... 270	–
GRO	F	0 ... 25	0 ... 85	0 ... 160	–

- 1) F: Flow control direction
- 2) N: Non-return direction

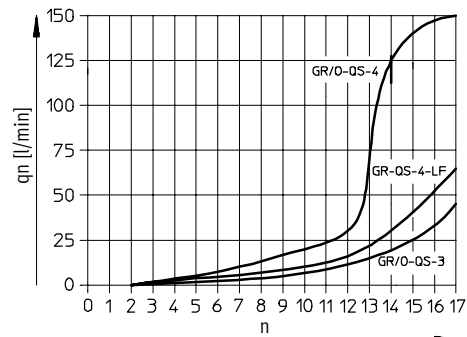
Standard flow rate q_n [l/min] at 6 bar \rightarrow 0 bar					
Push-in connector		QS-3	QS-4	QS-6	QS-8
GR	F ¹⁾	0 ... 100	0 ... 150	0 ... 205	0 ... 390
	N ²⁾	125 ... 135	170 ... 185	500 ... 510	610 ... 640
GR-LF	F	–	0 ... 130	0 ... 110	–
	N	–	170 ... 185	500 ... 510	–
GRO	F	0 ... 100	0 ... 150	0 ... 205	–

- 1) F: Flow control direction
- 2) N: Non-return direction

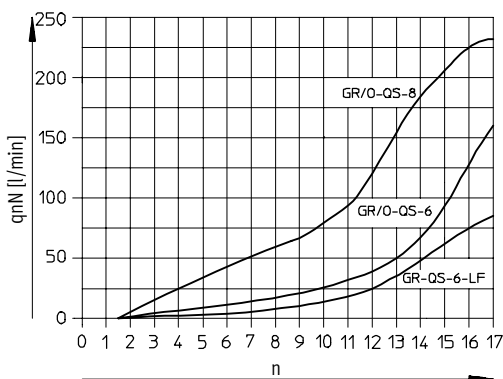
Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n
Push-in connector QS-3/QS-4



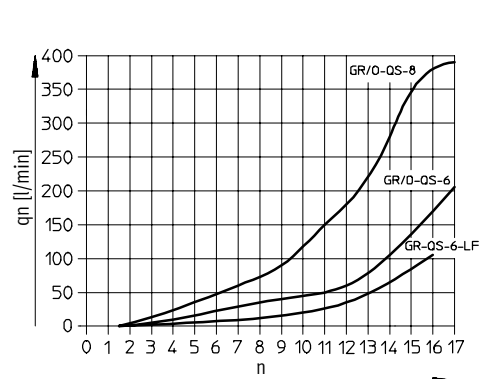
Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
Push-in connector QS-3/QS-4



Push-in connector QS-6/QS-8



Push-in connector QS-6/QS-8

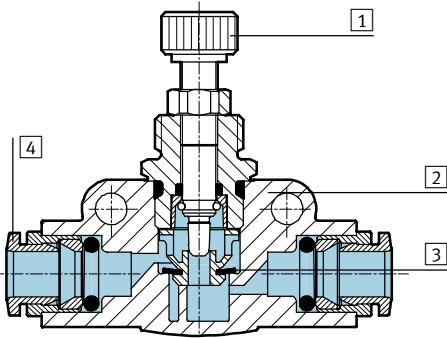


Flow control valves and one-way flow control valves

Technical data – Inline flow control valve with QS push-in connectors

Materials

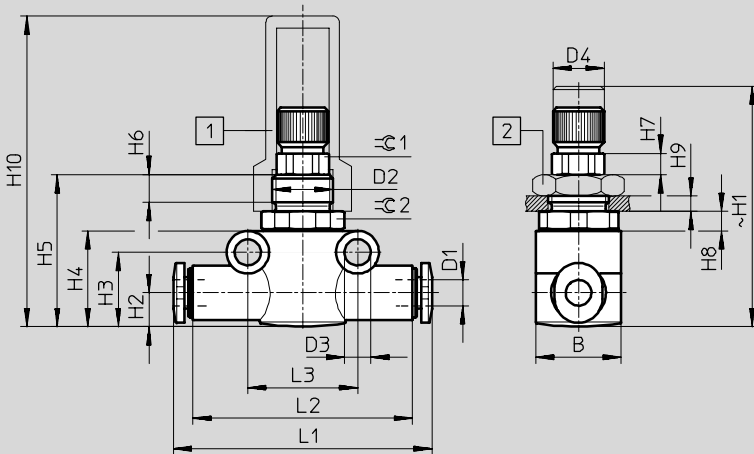
Sectional view



Flow control valve		
1	Regulating screw	Brass, nickel-plated
2	Housing	Reinforced polybutylene terephthalate
3	Seals	Nitrile rubber
4	Release ring	Polyacetal

Dimensions

Download CAD data → www.festo.com/en/engineering



- 1 Tamper-proof cap GRK
- 2 Hex nut GRM

Push-in connector	Tubing O.D. D1	B	D2	D3 Ø ±0.1	D4 Ø -0.3	H1		H2	H3	H4
						min.	max.			
QS-3	3	14	M10x1	4.3	8	36	40	5.55	12.2	15.7
QS-4	4	14	M10x1		8	36	40	5.55	12.2	15.7
QS-6	6	16	M12x1		10.1	40.5	44.5	8.4	17.3	21.3
QS-8	8	16	M12x1		10.1	40.5	44.5	8.4	17.3	21.3

Push-in connector	~ H5	~ H6	H7 ±0.1	H8	H9 max.	H10	L1	L2	L3	≈C1	≈C2
QS-3	24.9	4.5	3.5	3.2	2.5	50.9	41.8	36	18	8	13
QS-4	24.9			3.2	2.5	50.9	42.4	36	18		13
QS-6	30.1			2.8	3.5	46.1	51.6	43	24		14
QS-8	30.1			2.8	3.5	46.1	53.4	43	24		14

Ordering data

Push-in connector	For tubing O.D. [mm]	Flow rate characteristic ¹⁾	One-way flow control function		Flow control function at both sides	
			Part No.	Type	Part No.	Type
QS-3	3	Mid flow	193 965	GR-QS-3	193 971	GRO-QS-3
QS-4	4	Mid flow	193 967	GR-QS-4	193 972	GRO-QS-4
		Low flow	193 966	GR-QS-4-LF	-	-
QS-6	6	Mid flow	193 969	GR-QS-6	193 973	GRO-QS-6
		Low flow	193 968	GR-QS-6-LF	-	-
QS-8	8	Mid flow	193 970	GR-QS-8	-	-

1) Low flow: Precision adjustment for low speed
Mid flow: Precision adjustment for average speed

Flow control valves and one-way flow control valves

Accessories – In-line flow control valve with QS push-in connectors



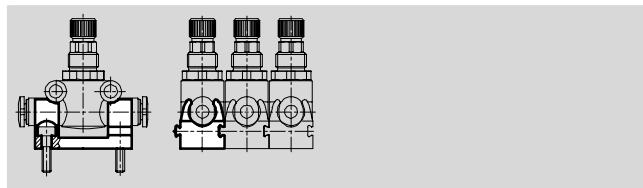
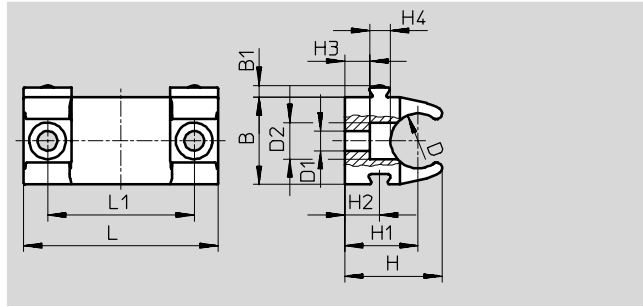
Retainer GR-H-QS

for front panel mounting

Material: Polyacetal



GR-H-QS



Dimensions and ordering data								
For push-in fitting	B	B1	D	D1	D2	H	H1	H2
QS-3/QS-4	14.3	1.9	9	3.2	6	16	12	5.7
QS-6/QS-8	14.3	1.9	14.5	3.2	6	19.2	13	5.7

For push-in fitting	H3	H4	L	L1	Product weight [g]	Part No.	Type
QS-3/QS-4	4.1	3.4	31.8	24	4	195 495	GR-H-QS-3-4
QS-6/QS-8	2.3	3.4	31.8	24	5	195 496	GR-H-QS-6-8

Hex nut GRM

for front panel mounting

Material: Steel

Tamper-proof cap GRK

Material: Polypropylene



GRM



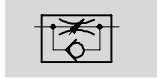
GRK

For push-in fitting	Hex nut GRM		Tamper-proof cap GRK	
	Part No.	Type	Part No.	Type
QS-3/QS-4	6 444	GRM-M5	6 436	GRK-M5
QS-6/QS-8	2 107	GRM-1/8	2 105	GRK-1/8

Flow control valves and one-way flow control valves

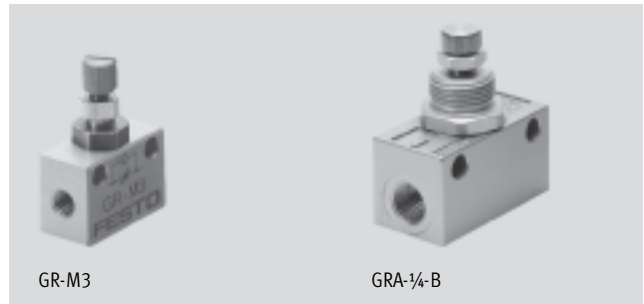
Technical data – Standard flow control valve with female thread

Function



One-way flow control
GR/GRA

- Mid flow: Precision adjustment for average speed
- Adjustment with knurled screw



GR-M3

GRA-1/4-B

General technical data							
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Valve function	One-way flow control function						
Setting component	Knurled screw						
Type of mounting	Through-hole						
	-	Front panel mounting					
Mounting position	Any						
Max. tightening torque [Nm]	0.15	0.9	0.9	0.8	1	1.2	2

Operating and environmental conditions							
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
Operating medium	Filtered compressed air, lubricated or unlubricated						
Grade of filtration of medium [µm]	5	40	40	40	40	40	40
Temperature of medium [°C]	-10 ... +60	-20 ... +60	-20 ... +60	-20 ... +75	-20 ... +75	-20 ... +75	-10 ... +60
Ambient temperature [°C]	-10 ... +60	-20 ... +60	-20 ... +60	-20 ... +75	-20 ... +75	-20 ... +75	-10 ... +60

Weights [g]							
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
	2.5	21	34	180	225	517	1 100

Standard nominal flow rate qnN [l/min] at 6 bar ⇄ 5 bar							
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
F ¹⁾	0 ... 29.5	0 ... 94	0 ... 220	0 ... 420	0 ... 1 010	0 ... 1 620	0 ... 3 300
N ²⁾	26 ... 27.5	0 ... 115	0 ... 217	0 ... 780	0 ... 1 150	0 ... 2 760	0 ... 4 800

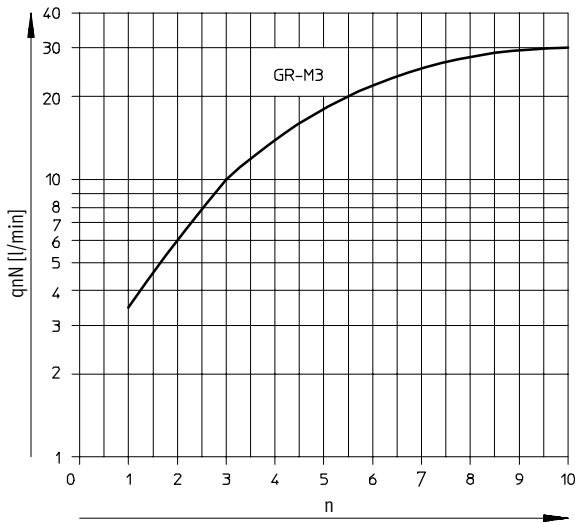
1) F: Flow control direction
2) N: Non-return direction

Flow control valves and one-way flow control valves

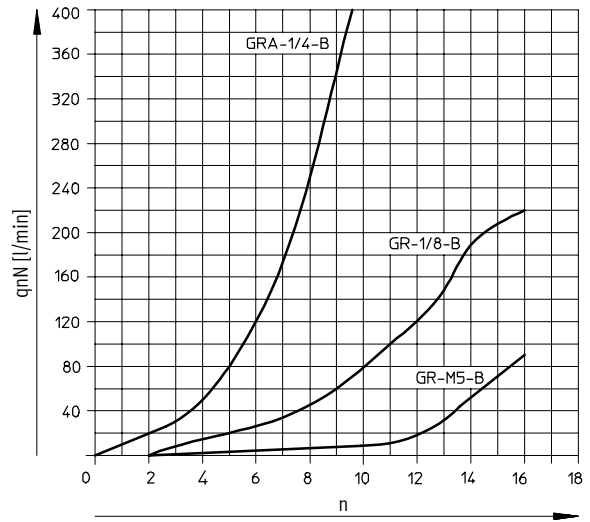
Technical data – Standard flow control valve with female thread

Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n

Connecting thread M3

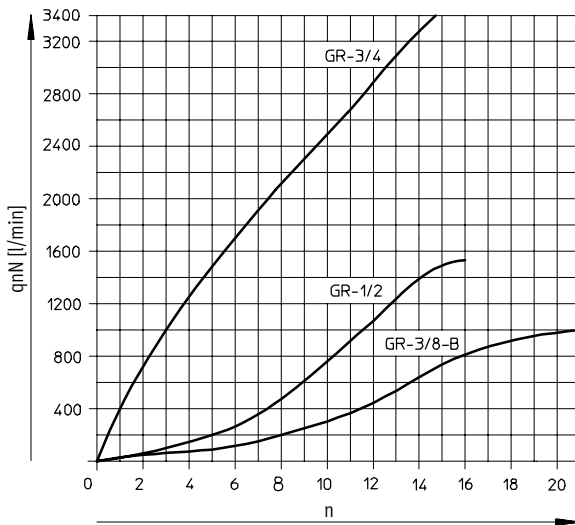


Connecting thread M5, G $\frac{1}{8}$, G $\frac{1}{4}$



Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n

Connecting thread G $\frac{3}{8}$, G $\frac{1}{2}$, G $\frac{3}{4}$

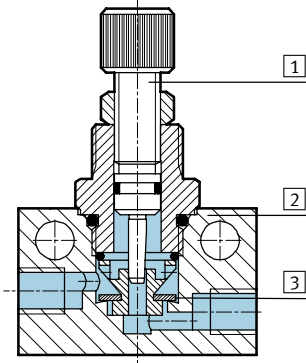


Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

Materials

Sectional view



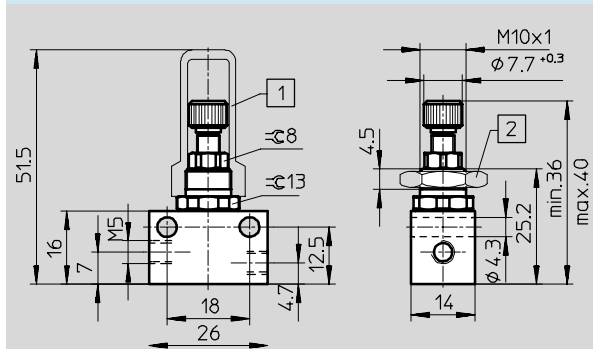
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
1 Regulating screw	Brass						Wrought aluminium alloy
2 Housing	Wrought aluminium alloy			Die-cast zinc		Wrought aluminium alloy	
3 Seal	NBR						

Dimensions

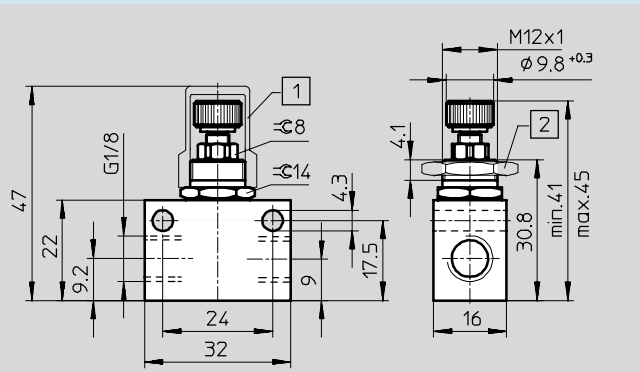
Connecting thread M3



Connecting thread M5



Connecting thread G1/8



- 1 Tamper-proof cap GRK
- 2 Hex nut GRM

Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

Flow control valves and one-way flow control valves

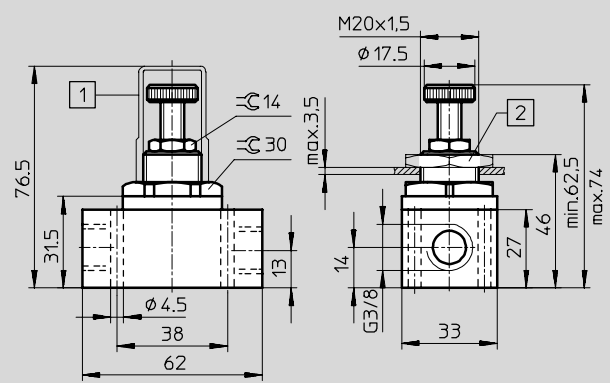
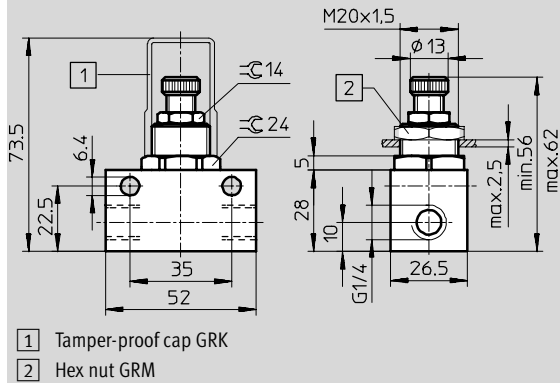
Technical data – Standard flow control valve with female thread



Dimensions

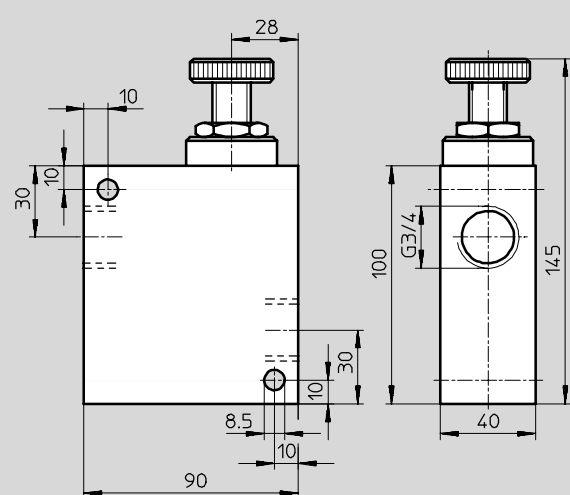
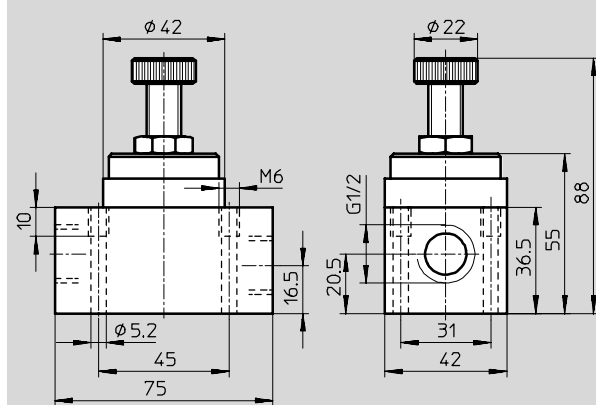
Connecting thread G $\frac{1}{4}$

Connecting thread G $\frac{3}{8}$



Connecting thread G $\frac{1}{2}$

Connecting thread G $\frac{3}{4}$



Flow, non-return and regulating valves
Flow control valves and one-way flow control valves

5.6

Ordering data

Version	Connecting thread	One-way flow control function	
		Part No.	Type
	M3	15 899	GR-M3
	M5	151 213	GR-M5-B
	G $\frac{1}{8}$	151 215	GR- $\frac{1}{8}$ -B
	G $\frac{1}{4}$	6 509	GRA- $\frac{1}{4}$ -B
	G $\frac{3}{8}$	6 308	GR- $\frac{3}{8}$ -B
	G $\frac{1}{2}$	3 720	GR- $\frac{1}{2}$
	G $\frac{3}{4}$	2 103	GR- $\frac{3}{4}$

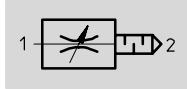
Ordering data for accessories

		For connecting thread M5		For connecting thread G $\frac{1}{8}$		For connecting thread G $\frac{1}{4}$, G $\frac{3}{8}$	
		Part No.	Type	Part No.	Type	Part No.	Type
	Hex nut	6 444	GRM-M5	2 107	GRM- $\frac{1}{8}$	204 596	GRM- $\frac{3}{8}$
	Tamper-proof cap	6 436	GRK-M5	2 105	GRK- $\frac{1}{8}$	6 309	GRK- $\frac{3}{8}$ -B

Flow control valves and one-way flow control valves

Technical data – Flow control/silencer combinations

Function



Flow control/silencer
GRE, GRU

- Mid flow:
Precision adjustment for average speed
- Adjustment with slotted head screw
- Metal design GRE
- Polymer design GRU



General technical data							
Screw-in thread		G1/8		G1/4		G3/8	
Valve function		Flow control/silencer function					
Setting component		Slotted head screw					
Noise level	GRE	[dB (A)]	85	80	87	90	–
	GRU	[dB (A)]	74	80	74	76	80
Type of mounting		Threaded					
Mounting position		Any					
Max. tightening torque		[Nm]	6	11	20	40	60

Operating and environmental conditions							
Screw-in thread		G1/8		G1/4		G3/8	
Operating medium	GRE	Filtered compressed air, lubricated or unlubricated					
	GRU	Dried and filtered compressed air, lubricated or unlubricated					
Operating pressure		[bar]	0 ... 10				
Temperature of medium		[°C]	–10 ... 70				
Ambient temperature		[°C]	–10 ... 70				

Weights [g]							
Screw-in thread		G1/8		G1/4		G3/8	
	GRE	15		25		50	
	GRU	10		25		55	

Standard flow rate qn [l/min] at 6 bar ... 0 bar							
Female thread		G1/8		G1/4		G3/8	
GRE		2 ... 520		2 ... 996		3 ... 2 000	
GRU		0 ... 1000		0 ... 1 500		0 ... 1 700	

Flow control valves and one-way flow control valves

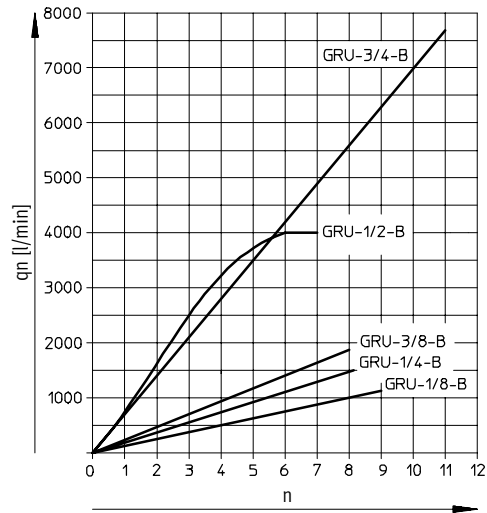
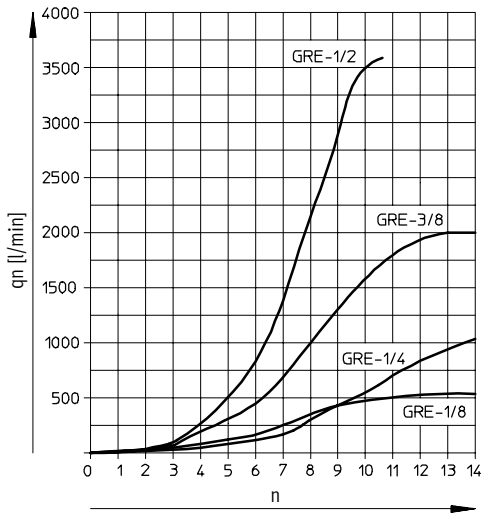
Technical data – Flow control/silencer combinations



Standard nominal flow rate q_{nN} at 6 bar → 5 bar as a function of turns of the adjusting screw n

GRE

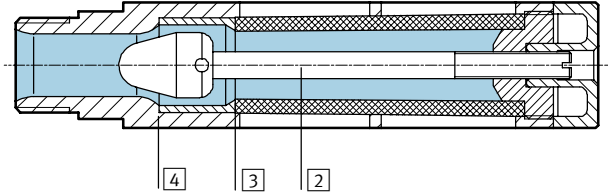
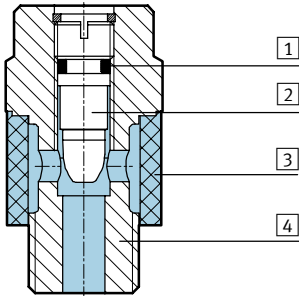
GRU



Materials

Sectional view GRE

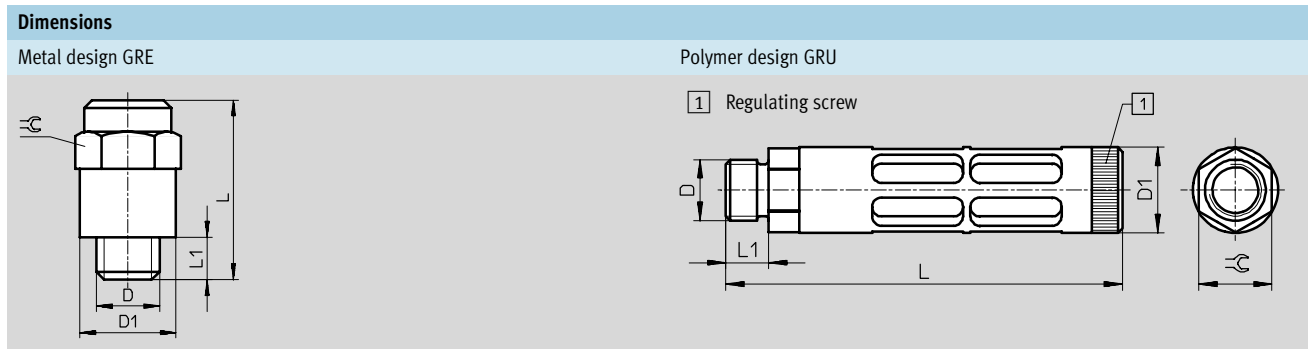
Sectional view GRU





	Metal design GRE	Polymer design GRU
1 Seal	Nitrile rubber	-
2 Regulating screw	Brass	Polyacetal
3 Silencer	Bronze	Polyethylene
4 Housing	Wrought aluminium alloy	Die-cast aluminium

Flow control valves and one-way flow control valves

Technical data – Flow control/silencer combinations



Screw-in thread D	D1 ∅	L	L1	≡
GRE				
G ¹ / ₈	15	28.5	6.5	14
G ¹ / ₄	18.2	34	8	17
G ³ / ₈	25	42	8	22
G ¹ / ₂	27	48	12	24
GRU				
G ¹ / ₈	16	46	6.5	14
G ¹ / ₄	19.5	64	8.5	17
G ³ / ₈	25	97	10.2	19
G ¹ / ₂	28	130	14	24
G ³ / ₄	38	157	16	32

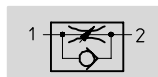
Ordering data										
Version	G ¹ / ₈		G ¹ / ₄		G ³ / ₈		G ¹ / ₂		G ³ / ₄	
	Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type
Metal design										
	10 351	GRE- ¹ / ₈	10 352	GRE- ¹ / ₄	35 310	GRE- ³ / ₈	10 353	GRE- ¹ / ₂	-	
Polymer design										
	9 516	GRU- ¹ / ₈ -B	9 517	GRU- ¹ / ₄ -B	9 518	GRU- ³ / ₈ -B	9 519	GRU- ¹ / ₂ -B	9 520	GRU- ³ / ₄ -B

 Core Range

Flow control valves and one-way flow control valves

Technical data – Standard flow control valve for M5 compact system

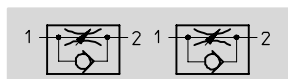
Function



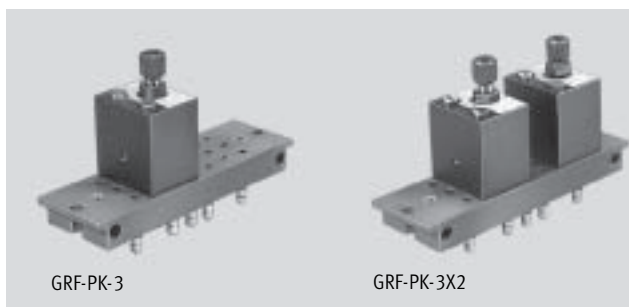
One-way flow control

GRF-PK

- Low flow:
Precision adjustment for low speed
- Adjustment with knurled screw



2 x one-way flow control valves
on one sub-base GRF-PK-3X2



GRF-PK-3

GRF-PK-3X2

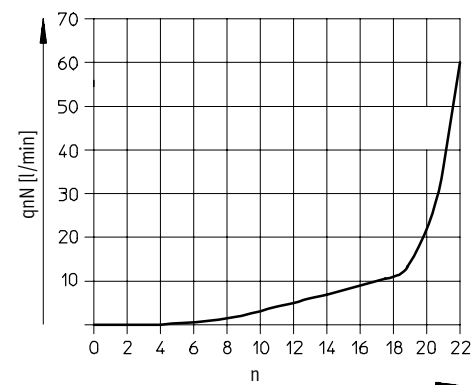
General technical data		
Type	GRF-PK-3	GRF-PK-3X2
Valve function	One-way flow control function	
Pneumatic connection	Barbed fitting PK-3	Barbed fitting PK-3
Setting component	Knurled screw	
Type of mounting	Via through-holes	
Mounting position	Any	
Max. tightening torque [Nm]	6	11

Operating and environmental conditions		
Type	GRF-PK-3	GRF-PK-3X2
Operating medium	Filtered compressed air, lubricated or unlubricated	
Operating pressure [bar]	0.5 ... 8	
Temperature of medium [°C]	-10 ... 60	
Ambient temperature [°C]	-10 ... 60	

Weights [g]		
Type	GRF-PK-3	GRF-PK-3X2
	95	145

Standard nominal flow rate q_{nN} [l/min] at 6 bar ... 5 bar		
Type	GRF-PK-3	GRF-PK-3X2
GRF	0 ... 45	0 ... 45

Standard nominal flow rate q_{nN} [l/min] at 6 bar ... 5 bar as a function of turns of the adjusting screw n

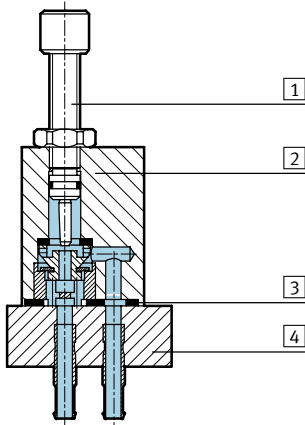


Flow control valves and one-way flow control valves

Technical data – Standard flow control valve for M5 compact system

Materials

Sectional view

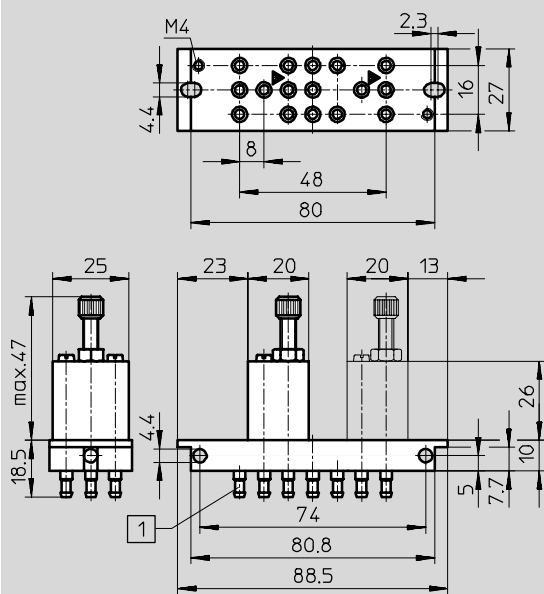


Flow control valve

1	Regulating screw	Brass
2	Housing	Corrosion resistant cast steel
3	Seals	Nitrile rubber
4	Sub-base	Polyamide


Dimensions

GRF-PK-3/GRF-PK-3X2



1 Barbed fitting PK-3

Ordering data

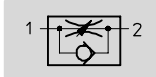
Version	For tubing I.D. [mm]	One-way flow control valve		Two one-way flow control valves	
		Part No.	Type	Part No.	Type
	3	4 565	GRF-PK-3	4 566	GRF-PK-3X2

Flow control valves and one-way flow control valves

Technical data – Precision flow control valve



Function



One-way flow control
GRP



Flow control acting at both sides
GRPO

- Low flow:
Precision adjustment for low speed
- Adjustment with knurled screw



General technical data				
Type	GRP/GRPO-10-PK-3		GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
Valve function	GRP	One-way flow control function		
	GRPO	Flow control function		
Pneumatic connection	Barbed fitting PK-3		Barbed fitting PK-3	Barbed fitting PK-4
Setting component	Knurled screw			
Type of mounting	Front panel mounting or on sub-base			
Mounting position	Any			
Max. tightening torque	[Nm]	2	2	2

Operating and environmental conditions				
Type	GRP/GRPO-10-PK-3		GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
Operating medium	Lubricated or unlubricated filtered compressed air, neutral gases			
Operating pressure	[bar]	0 ... 6		
Max. permissible flow rate	[l/min]	10	70	160
Temperature of medium	[°C]	-10 ... 50		
Ambient temperature	[°C]	-10 ... 50		

Weights [g]				
Type	GRP/GRPO-10-PK-3		GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
	48		48	48

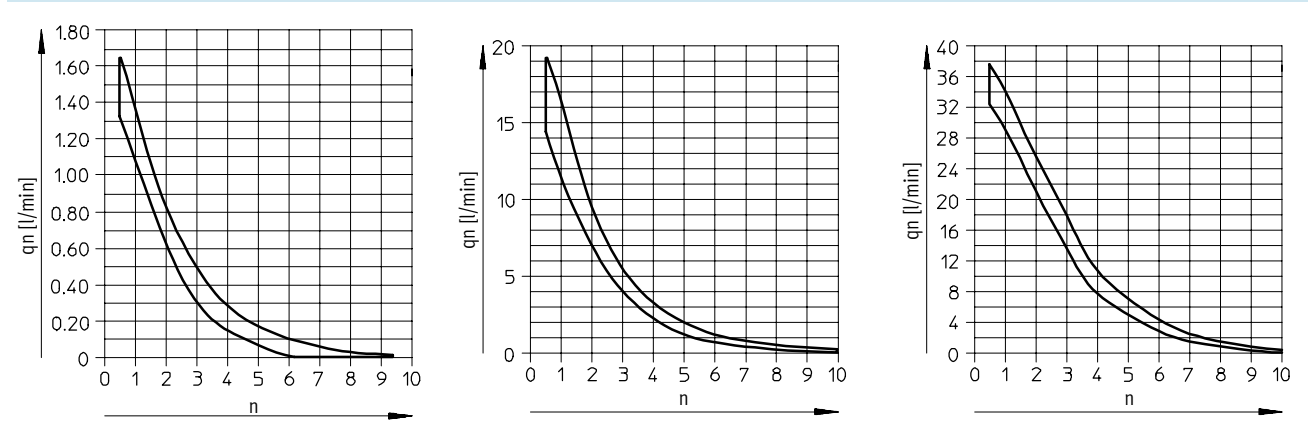
Standard flow rate q_n [l/min] at 1 bar → 0 bar				
Type	GRP/GRPO-10-PK-3		GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
GRP	F ¹⁾	0 ... 1.7	0 ... 19	0 ... 38
	N ²⁾	15 ... 50	20 ... 60	25 ... 90
GRPO	F ¹⁾	0 ... 1.7	0 ... 19	0 ... 38

- 1) F: Flow control direction
2) N: Non-return direction

Flow control valves and one-way flow control valves

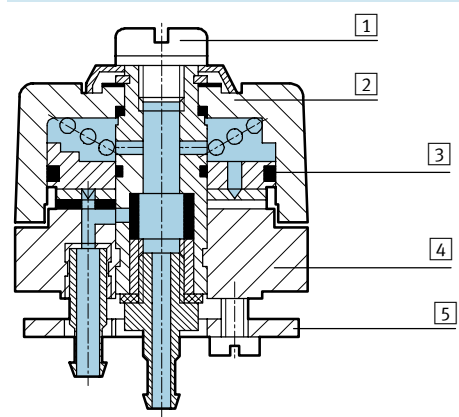
Technical data – Precision flow control valve

Standard flow rate q_n [l/min] at 1 bar ... 0 bar as a function of turns of the adjusting screw n



Materials

Sectional view



Flow control valve		
1	Regulating screw	Brass
2	Housing	Polyamide, reinforced
3	Seals	Nitrile rubber
4	Sub-base	Wrought aluminium alloy
5	Mounting plate	Wrought aluminium alloy

Flow, non-return and regulating valves
 Flow control valves and one-way flow control valves

Flow control valves and one-way flow control valves

Technical data – Precision flow control valve



Dimensions GRP/GRPO-...

44
31.2
Ø 32
Ø 30
X = 1.5 ... 10 mm

Mounting aperture

22.5
2.2
24

Connections

1 → 2 Flow control direction
2 → 1 Non-return direction

Ordering data						
Version	Max. flow rate [l/min]	For tubing I.D. [mm]	One-way flow control function		Flow control function both ways	
			Part No.	Type	Part No.	Type
	10	3	12 743	GRP-10-PK-3	13 229	GRPO-10-PK-3
	70		10 802	GRP-70-PK-3	10 803	GRPO-70-PK-3
	165	4	12 961	GRP-160-PK-4	13 230	GRPO-160-PK-4

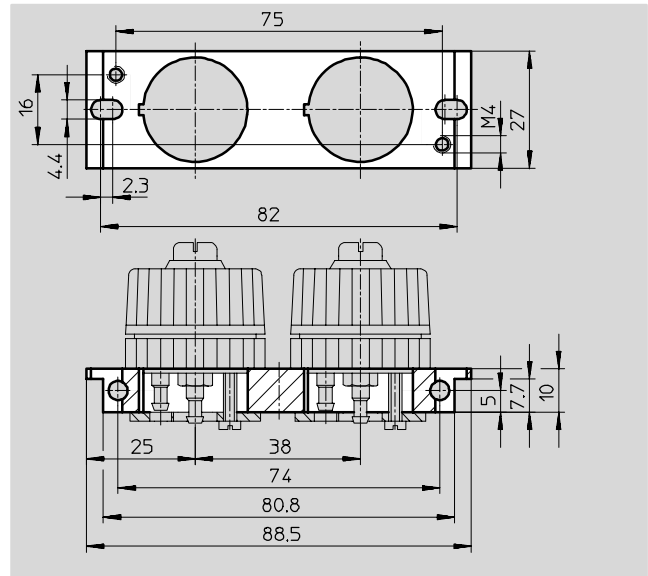
Flow, non-return and regulating valves
Flow control valves and one-way flow control valves



Flow control valves and one-way flow control valves

Accessories – Precision flow control valve

Mounting plate APL-2N-GRP
for precision flow control valve

Material:
Polyamide

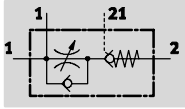


Ordering data					
	For number of flow control valves	Part No.	Type	Hole diameter [mm]	Product weight [g]
	1	10 391	APL-2N-GRP	22.5	16
	2	10 392	APL-2N-GRPX2	2 x 22.5	22

Functional combination

Technical data

Function



Functional combination with one-way flow control valve and piloted non-return valve


- Holding function and speed setting in one housing
- QS push-in connectors
- Adjustment via slotted head screw
- Additional pilot port 1 for interlinking with a second unit at port 21



General technical data		
Screw-in thread	G1/8	G1/4
Valve function	One-way flow control function for exhaust air and additional piloted non-return valve	
Setting component	Slotted head screw	
QS push-in connectors for tubing O.D. [mm]	4; 6	6; 8
Type of mounting	Can be screwed in, with external thread	
Assembly position	Any	
Max. tightening torque [Nm]	5.5	11

Operating and environmental conditions		
Screw-in thread	G1/8	G1/4
Operating medium / pilot medium	Dried air, lubricated or unlubricated, grade of filtration 40µm	
Operating pressure [bar]	0.5 ... 10	
Pilot pressure [bar]	2 ... 10	
Storage temperature [°C]	-10 ... +40	
Ambient temperature [°C]	-10 ... +60	
Temperature of medium [°C]	-10 ... +60	

Weights		
Screw-in thread / push-in connection	G1/8	G1/4
[g]	27	58

 **Note**

The GRXA - HG product family and all of its design variants must ONLY be used in safety-relevant applications in combination with additional measures detailed in EN 954-1. A supplementary risk analysis by the user/designer is essential. The instructions and notices on the enclosed product leaflets must be observed.

Functional combination

Technical data

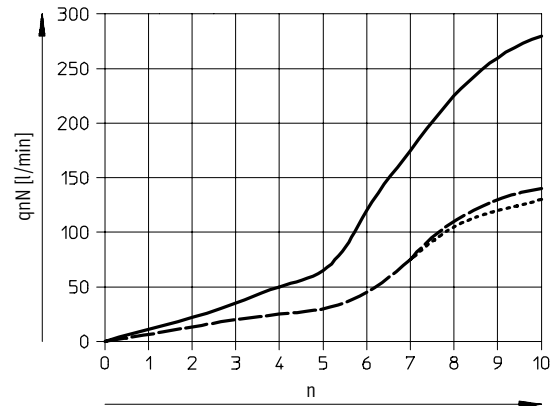
Standard nominal flow rate q_{nN} [l/min] at 6 bar \rightarrow 5 bar				
Screw-in thread		G $\frac{1}{8}$		G $\frac{1}{4}$
One-way flow control function for exhaust air and piloted non-return valve				
GRXA	QS-4	D ¹⁾	130	–
		R ²⁾	100 ... 140	–
		B ³⁾	100 ... 140	–
	QS-6	D	140	280
		R	115 ... 165	200 ... 260
		B	120 ... 160	180 ... 140
	QS-8	D	–	280
		R	–	200 ... 280
		B	–	190 ... 260

- 1) D: Flow control direction
- 2) R: Non-return direction
- 3) E: Non-return direction actuated

Standard flow rate q_n [l/min] at 6 bar \rightarrow 0 bar				
Screw-in thread		G $\frac{1}{8}$		G $\frac{1}{4}$
One-way flow control function for exhaust air and piloted non-return valve				
GRXA	QS-4	D ¹⁾	210	–
		R ²⁾	230 ... 260	–
		B ³⁾	220 ... 250	–
	QS-6	D	280	430
		R	270 ... 300	430 ... 490
		B	260 ... 300	410 ... 470
	QS-8	D	–	470
		R	–	460 ... 520
		B	–	440 ... 500

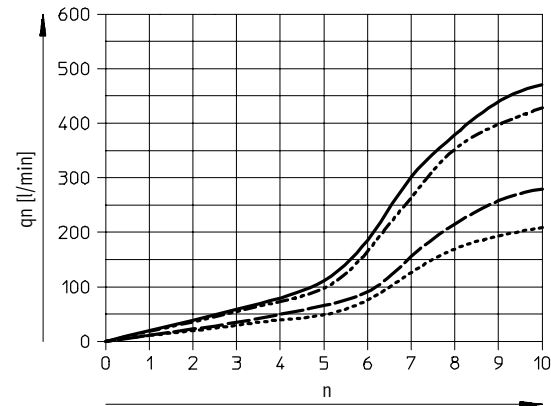
- 1) D: Flow control direction
- 2) R: Non-return direction
- 3) E: Non-return direction actuated

Standard nominal flow rate q_{nN} at 6 bar \rightarrow 5 bar as a function of turns of the adjusting screw n
One-way flow control valve



- HGXA-HG- $\frac{1}{4}$ -QS-8
- - - HGXA-HG- $\frac{1}{4}$ -QS-6
- · - · - HGXA-HG- $\frac{1}{8}$ -QS-6
- HGXA-HG- $\frac{1}{8}$ -QS-4

Standard flow rate q_n at 6 bar \rightarrow 0 bar as a function of turns of the adjusting screw n
One-way flow control valve



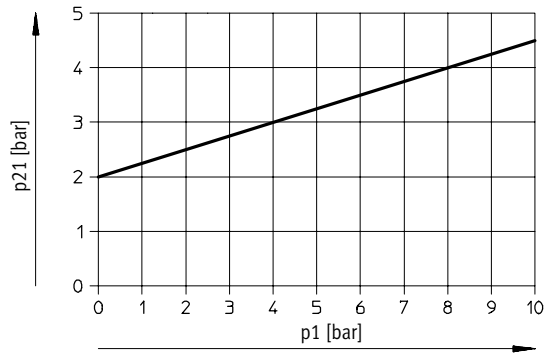
- HGXA-HG- $\frac{1}{4}$ -QS-8
- - - HGXA-HG- $\frac{1}{4}$ -QS-6
- · - · - HGXA-HG- $\frac{1}{8}$ -QS-6
- HGXA-HG- $\frac{1}{8}$ -QS-4

Functional combination

Technical data

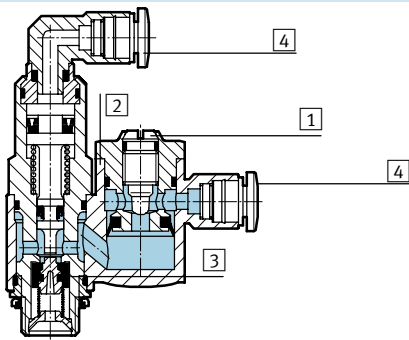
Minimum pilot pressure as a function of operating pressure

Non-return valve, piloted



Materials

Sectional view



Functional combination

1	Adjusting screw	Stainless steel
2	Swivel joint	Die-cast zinc
3	Seal	Nitrile rubber
4	Release ring	Polyacetal

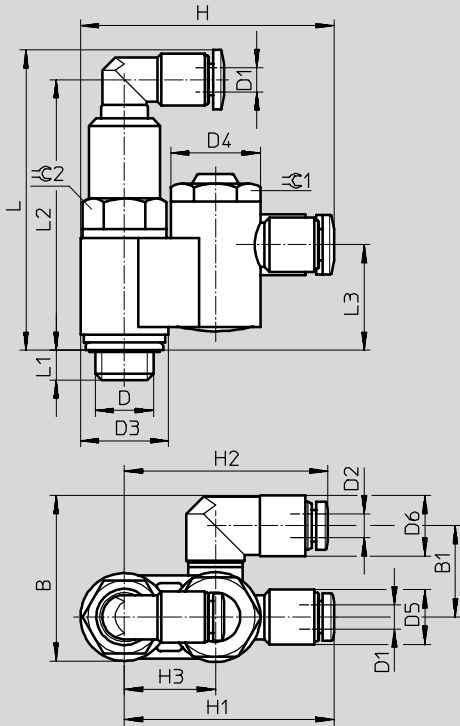
Functional combination

Technical data

Dimensions

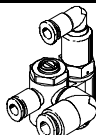
Download CAD data → www.festo.com/en/engineering

Swivel joint, elbow outlet, slotted head screw



Pneumatic connection D	B	B1	D1 Ø	D2 Ø	D3	D4 Ø	D5 Ø	D6	H	H1	H2	H3	L	L1	L2	L3	∠ 1	∠ 2
G ¹ / ₈	27.3	15	4	4	14.5	14.8	9	10	41.8	34.5	33.5	15	49.5	4.9	44.6	17.4	13	12
	30.8	17.3	6					12.5			34.5							
G ¹ / ₄	35.3	19.5	6	4	19	19	9	12.5	52.2	42.7	40.5	21	56.3	5.6	51.4	21.1	17	16
	39.5	21.5	8					17			48.7							

Ordering data

Design	Screw-in thread	For tubing outside Ø	Part No.	Type
		[mm]		
	G ¹ / ₈	4	525 667	GRXA-HG- ¹ / ₈ -QS-4
		6	525 668	GRXA-HG- ¹ / ₈ -QS-6
	G ¹ / ₄	6	525 669	GRXA-HG- ¹ / ₄ -QS-6
		8	525 670	GRXA-HG- ¹ / ₄ -QS-8