



- 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



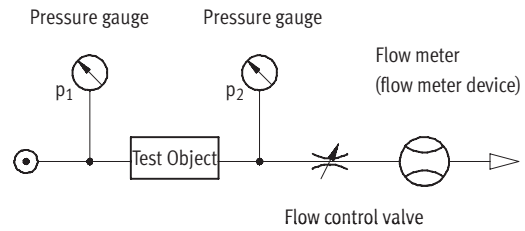
### Supply air flow control



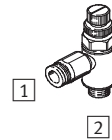
### Flow control at both sides



### Flow measurement circuit



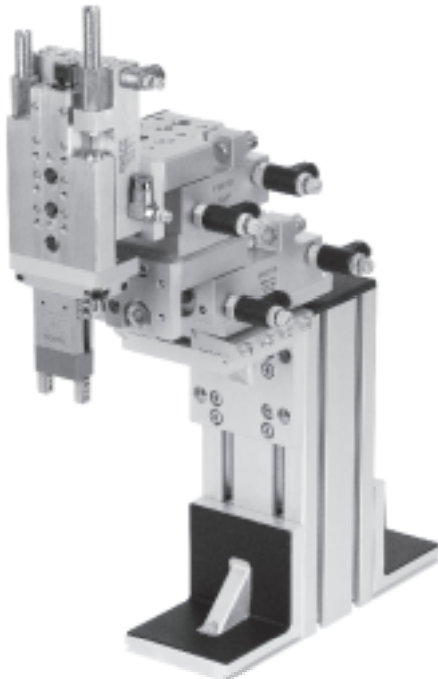
$p_1$  Input pressure  
 $p_2$  Output pressure



1 Compressed air connection  
2 Working connection

## Typical applications

### Mini slide SLT with standard flow control valves



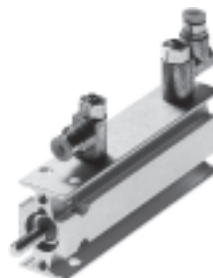
### Gripper HGW with mini flow control valves



### 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
<b>Double-acting cylinder with one-way flow control valve</b>			
<b>Exhaust air flow control</b>		<b>Supply air flow control</b>	
	<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>
<b>Single-acting cylinder with one-way flow control valve</b>			
<b>Exhaust and supply air flow control</b>		<b>Single-acting cylinder with flow control valve</b>	
<b>Flow control acting at both sides</b>		<b>Flow control acting at both sides</b>	
	<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 and one-way flow control valves

Product range overview

Function	Version	Type	Material	Flow rate characteristic <sup>1)</sup>	One-way flow control function		
					Exhaust air	Supply air	Both
					A	Z	O
Standard flow control valve with QS push-in fitting	<b>Rotatable 360° around the screw-in axis after installation</b>						
	<b>Adjustment via slotted head screw</b>						
		GRLA-...-QS-...-D GRLZ-...-QS-...-D	Metal	Low flow	■	■	-
					■	■	-
					■	-	-
					■	-	-
					■	-	-
	<b>Adjustment via slotted head screw</b>						
		GRLA-...-QS-...-MF-D	Metal	Medium flow	■	-	-
	<b>Adjustment via slotted head screw</b>						
		GRLA-F-...-QS-...-D	Chromed metal	Medium flow	■	-	-
	<b>Adjustment via knurled screw</b>						
		GRLA-...-QS-...-RS-D	Metal	Low flow	■	-	-
					■	-	-
					■	-	-
					■	-	-
					■	-	-
	<b>Adjustment via knurled screw</b>						
		GRLA-...-QS-...-RS-MF-D	Metal	Medium flow	■	-	-
					■	-	-
<b>Adjustment via slotted head screw, swivel joint rotatable 360°</b>							
	GRXA-...-QS-...-D	Metal	Low flow	■	-	-	
				■	-	-	
				■	-	-	
<b>Adjustment via knurled screw</b>							
	GRLA-...-QS-...-RS-B	Polymer	High flow	■	-	-	
				■	-	-	
				■	-	-	
<b>Adjustment via slotted head screw, push-in sleeve for QS push-in fittings</b>							
	VFOC-E-...	Metal	Low flow	■	-	-	
				■	-	-	

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

## Flow control and one-way flow control valves

Product range overview

**FESTO**

Type	Pneumatic connection							Free of copper, PTFE and silicone	→ Page	
	Thread	Tubing Ø [mm]								Tubing type <sup>1)</sup>
		3	4	6	8	10	12			
<b>Rotatable 360° around the screw-in axis after installation</b>										
<b>Adjustment via slotted head screw</b>										
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	-	-	-	-	-	■		■	
<b>Adjustment via slotted head screw</b>										
GRLA-...-QS-...-MF-D	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
<b>Adjustment via slotted head screw</b>										
GRLA-F-...-QS-...-D	G1/8	-	■	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-20
	G1/4	-	-	■	■	-	-		■	
<b>Adjustment via knurled screw</b>										
GRLA-...-QS-...-RS-D	M5	■	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
	G1/8	■	■	■	■	-	-		■	
	G1/4	-	-	■	■	■	-		■	
	G3/8	-	-	■	■	■	-		■	
	G1/2	-	-	-	-	-	■		■	
<b>Adjustment via knurled screw</b>										
GRLA-...-QS-...-RS-MF-D	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
<b>Adjustment via slotted head screw, swivel joint rotatable 360°</b>										
GRXA-...-QS-...-D	M5	■	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	■	2 / 5.6-13
	G1/8	■	■	■	■	-	-		■	
	G1/4	-	-	■	■	■	-		■	
<b>Adjustment via knurled screw</b>										
GRLA-...-QS-...-RS-B	G1/8	-	-	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-20
	G1/4	-	-	■	■	-	-		-	
	G3/8	-	-	■	■	-	-		-	
<b>Adjustment via slotted head screw, push-in sleeve for QS push-in fittings</b>										
VFOC-E-...	-	-	■	-	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-79
	-	-	-	■	-	-	-		-	

1) Tubing → Volume 3

# Flow control and one-way flow control valves

Product range overview



Function	Version	Type	Material	Flow rate characteristic <sup>1)</sup>	One-way flow control function			
					Exhaust air	Supply air	Both	
					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	■	■	■ <sup>2)</sup>
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 medium speed  
 High flow: Precision adjustment for high speed
- 2) Only for tubing I.D. 3 mm

# Flow control 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 <sup>1)</sup>
		3	4	6	8	10	12			
<b>Adjustment via slotted head screw</b>										
GRLA-...-B	M5	Dependent on fitting						-	2 / 5.6-34	
GRLZ-...-B	G1/8									
GRLZ-...-B	G1/4									
GRLZ-...-B	G3/8									
GRLZ-...-B	G1/2									
GRLZ-...-B	G3/4									
<b>Adjustment via knurled screw</b>										
GRLA-...-RS-B	M5	Dependent on fitting						-	2 / 5.6-34	
GRLZ-...-RS-B	G1/8									
GRLZ-...-RS-B	G1/4									
<b>Adjustment via slotted head screw</b>										
GRLA-...-PK-...-B	M5	■	■	-	-	-	-	PU/PL/PP (standard I.D.)	2 / 5.6-40	
GRLZ-...-PK-...-B	G1/8	■	■	■	-	-	-			
GRLZ-...-PK-...-B	G1/4	-	■	■	-	-	-			
<b>Adjustment via knurled screw</b>										
GRLA-...-PK-...-RS-B	M5	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	2 / 5.6-40	
GRLZ-...-PK-...-RS-B	G1/8	-	■	■	-	-	-			
GRLZ-...-PK-...-RS-B	G1/4	-	■	■	-	-	-			

1) Tubing → Volume 3

# Flow control and one-way flow control valves

Product range overview



Function	Version	Type	Material	Flow rate characteristic <sup>1)</sup>	One-way flow control function						
					Exhaust air	Supply air	Both				
					A	Z	O				
Mini flow control valve with QS push-in fitting	Adjustment via slotted head screw			Low flow							
		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			Low flow							
		GRLA-...	Metal					Low flow	■	■	■
		GRLZ-...									
		GRLA-...-LF-C	Metal					Low flow	■	■	■
		GRLZ-...-LF-C									
	GRLO-...-LF-C	Metal	Low flow					■	■	■	
GRLO-...-LF-C											
Mini flow control valve with barbed fitting connection PK	Adjustment via slotted head screw			Low flow							
		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 flow control valve with female thread connection	Adjustment via slotted head screw			Medium flow							
		CRGRLA-...-B	Stainless steel					Medium flow	■	-	-

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



# Flow control and one-way flow control valves

Product range overview


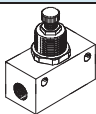





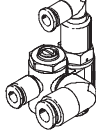

FESTO

Type	Pneumatic connection							Free of copper, PTFE and silicone	→ Page	
	Thread	Tubing Ø [mm]								Tubing type <sup>1)</sup>
		3	4	6	8	10	12			
<b>Adjustment via slotted head screw</b>										
GRLA-...-QS-... GRLZ-...-QS-... GRLO-...-QS-...	M3	■	-	-	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-29
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	■	■	-	-	-	-		-	
<b>Adjustment via slotted head screw</b>										
GRLA-... GRLZ-... GRLO-...	M3	Dependent on fitting						-	2 / 5.6-46	
GRLA-...-LF-C GRLZ-...-LF-C GRLO-...-LF-C	M5							-		
<b>Adjustment via slotted head screw</b>										
GRLA-...-PK-...-LF-C GRLZ-...-PK-...-LF-C GRLO-...-PK-...-LF-C	M5	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-49
GRGA-...-PK-...-LF-C GRGZ-...-PK-...-LF-C GRGO-...-PK-...-LF-C	M5	■	-	-	-	-	-		-	
<b>Adjustment via slotted head screw</b>										
CRGRLA-...-B	M5	Dependent on fitting						-	2 / 5.6-52	
	G1/8							-		
	G1/4							-		
	G3/8							-		
	G1/2							-		

1) Tubing → Volume 3

## Flow control and one-way flow control valves

Product range overview

Function	Version	Type	Material	Flow rate characteristic <sup>1)</sup>	Flow control direction		
					Exhaust air	Supply air	Both
					A	Z	O
<b>Inline flow control valve with QS push-in fitting</b> 	<b>Adjustment via knurled screw</b>						
	GR-QS-... GR-QS-...-LF GRO-QS-...	Polymer	Medium flow	■	■	-	
			Low flow	■	■	-	
			Medium flow	-	-	■	
<b>Inline flow control valve with female thread connection</b> 	<b>Adjustment via knurled screw</b>						
	GR-...-B GRA-...-B	Metal	Medium flow	■	■	-	
			■	■	-		
			■	■	-		
			■	■	-		
			■	■	-		
			■	■	-		
■			■	-			
<b>Flow control/silencer combinations, threaded design</b>  	<b>Adjustment via slotted head screw, directly screwed into valve</b>						
	GRE-...	Metal	Medium flow	■	-	-	
			■	-	-		
			■	-	-		
			■	-	-		
	GRU-...	Polymer	High flow	■	-	-	
			■	-	-		
			■	-	-		
■			-	-			
<b>Standard flow control valve with barbed fitting connection PK, frame assembly</b> 	<b>Adjustment via knurled screw</b>						
	GRF-PK-3-...	Metal	Low flow	■	■	-	
<b>Precision flow control valve with barbed fitting connection PK</b> 	<b>Adjustment via rotary knob</b>						
	GRP-...-PK-... GRPO-...-PK-...	Polymer	Low flow	■	■	■	
<b>Precision flow control valve on sub-base</b> 	<b>Adjustment via rotary knob</b>						
	GRP-...-1/8-AL GRPO-...-1/8-AL	Polymer	Low flow	■	■	■	
<b>Functional combination with one-way flow control valve and piloted non-return valve</b> 	<b>Adjustment via slotted head screw</b>						
	GRXA-HG-...-QS-...	Metal	High flow	■	-	-	
<b>One-way flow control valve with 5 selectable flow control ranges</b> 	<b>Precision adjustment via internal hex and setting of the ranges using a rotary switch</b>						
	GRLSA-1/8-QS-6	Metal	Low flow	■	-	-	

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

# Flow control and one-way flow control valves

Product range overview

**FESTO**

Type	Pneumatic connection								Free of copper, PTFE and silicone	→ Page
	Thread	Tubing Ø [mm]						Tubing type <sup>1)</sup>		
		3	4	6	8	10	12			
<b>Adjustment via knurled screw</b>										
GR-QS-...	-	■	■	■	■	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-55
GR-QS-...-LF	-	-	■	■	-	-	-		-	
GRO-QS-...	-	■	■	■	-	-	-		-	
<b>Adjustment via knurled screw</b>										
GR-...-B	M3	Dependent on fitting							-	2 / 5.6-59
GRA-...-B	M5								-	
	G1/8								-	
	G1/4								-	
	G3/8								-	
	G1/2								-	
	G3/4								-	
<b>Adjustment via slotted head screw, directly screwed into valve</b>										
GRE-...	G1/8	-	-	-	-	-	-	-	-	2 / 5.6-63
	G1/4								-	
	G3/8								-	
	G1/2								-	
GRU-...	G1/8	-	-	-	-	-	-	-	-	2 / 5.6-63
	G1/4								-	
	G3/8								-	
	G1/2								-	
	G3/4	-								
<b>Adjustment via knurled screw</b>										
GRF-PK-3-...	-	■	-	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-66
<b>Adjustment via rotary knob</b>										
GRP-...-PK-...	-	■	■	-	-	-	-	PU/PL/PP (standard I.D.)	-	2 / 5.6-72
GRPO-...-PK-...										
GRP-...-1/8-AL	G1/8	-	-	-	-	-	-	-	-	2 / 5.6-68
GRPO-...-1/8-AL										
<b>Adjustment via slotted head screw</b>										
GRXA-HG-...-QS-...	G1/8	-	■	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-75
	G1/4	-	-	■	■	-	-		-	
<b>Precision adjustment via internal hex and setting of the ranges using a rotary switch</b>										
GRLSA-1/8-QS-6	G1/8	-	-	■	-	-	-	PUN/PAN/PLN/PFAN (standard O.D.)	-	2 / 5.6-79

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 -

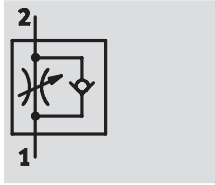
Type	
Swivel joint, elbow outlet	
GRLA	One-way flow control valve for exhaust air
CRGRLA	One-way flow control valve for exhaust air, corrosion-resistant
GRLZ	One-way flow control valve for supply air
GRLO	Flow control valve without non-return function
Swivel joint, parallel	
GRGA	One-way flow control 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
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 <sup>1)</sup>	Series D
Material note	
CT <sup>1)</sup>	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

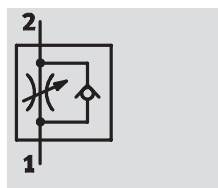


One-way flow control valve for exhaust air  
GRLA/GRXA

- 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



One-way flow control valve for supply air  
GRLZ

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					
Storage temperature	[°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 qnN [l/min] at 6 bar → 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
GRLA-/GRXA- ... -D	QS-3	D <sup>1)</sup>	0 ... 100	–	0 ... 130	–	–
		R <sup>2)</sup>	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 qn [l/min] at 6 bar → 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
GRLA-/GRXA- ... -D	QS-3	D <sup>1)</sup>	0 ... 145	–	0 ... 180	–	–
		R <sup>2)</sup>	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	–	–

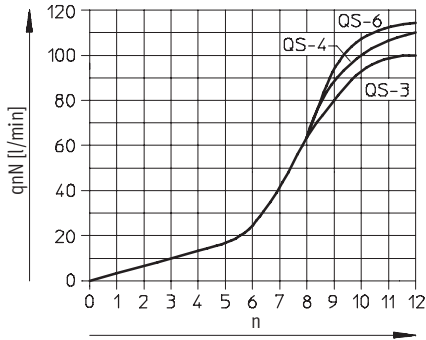
- 1) D: Flow control direction  
2) R: Non-return direction

# Flow control valves and one-way flow control valves

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

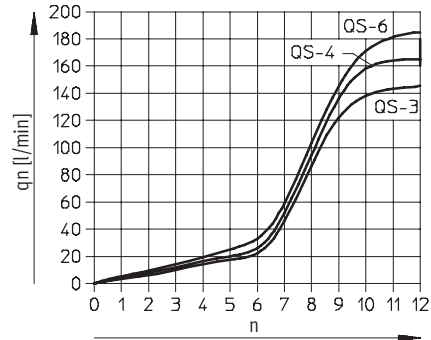
**Standard nominal flow rate  $q_{nN}$  [l/min] at 6 bar  $\rightarrow$  5 bar as a function of turns of the adjusting screw n**

Screw-in thread M5

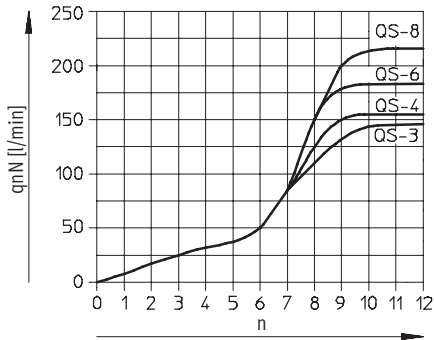


**Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw n**

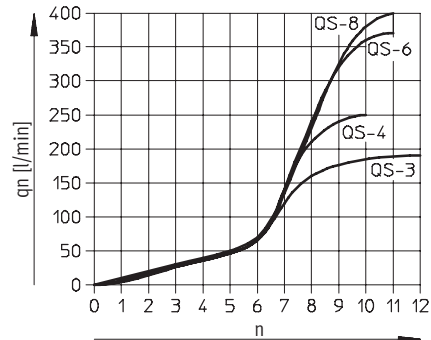
Screw-in thread M5



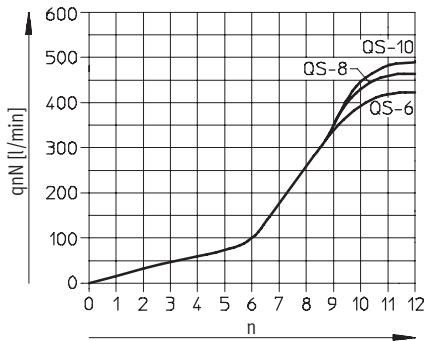
**Screw-in thread G1/8**



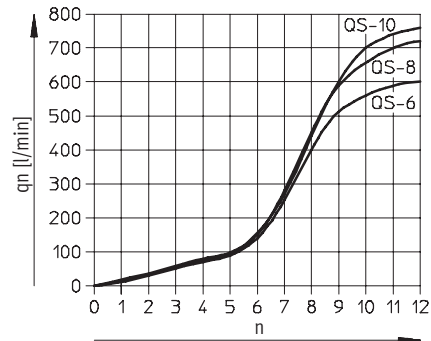
**Screw-in thread G1/8**



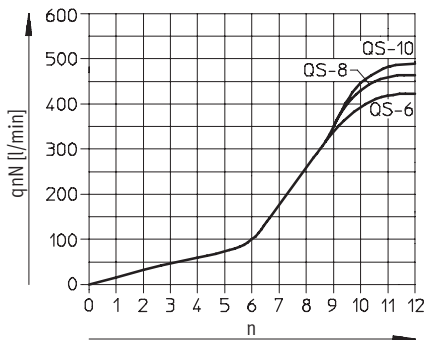
**Screw-in thread G1/8 with flow rate MF**



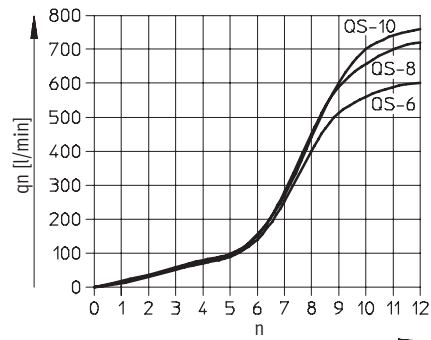
**Screw-in thread G1/8 with flow rate MF**



**Screw-in thread G1/4**



**Screw-in thread G1/4**



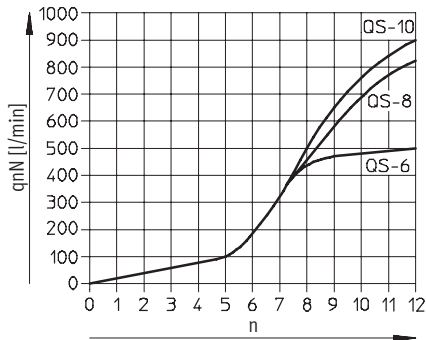
# Flow control valves and one-way flow control valves

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



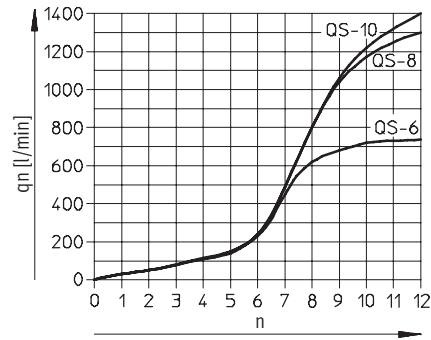
**Standard nominal flow rate  $q_{nN}$  [l/min] at 6 bar  $\rightarrow$  5 bar as a function of turns of the adjusting screw  $n$**

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

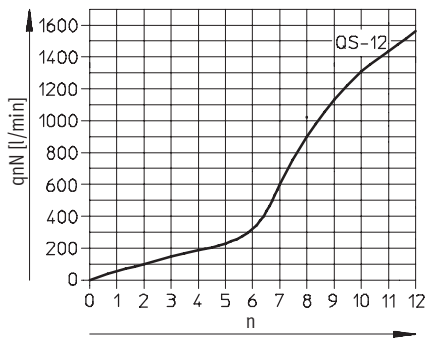


**Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$**

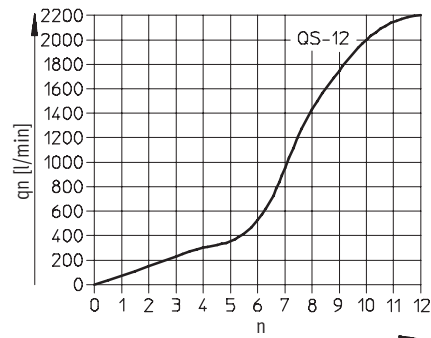
Screw-in thread G $\frac{3}{8}$



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

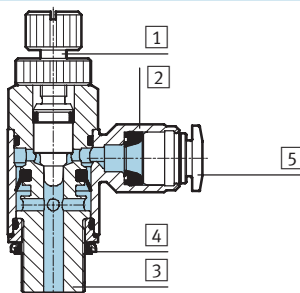


**Screw-in thread G $\frac{1}{2}$**



## Materials

Sectional view



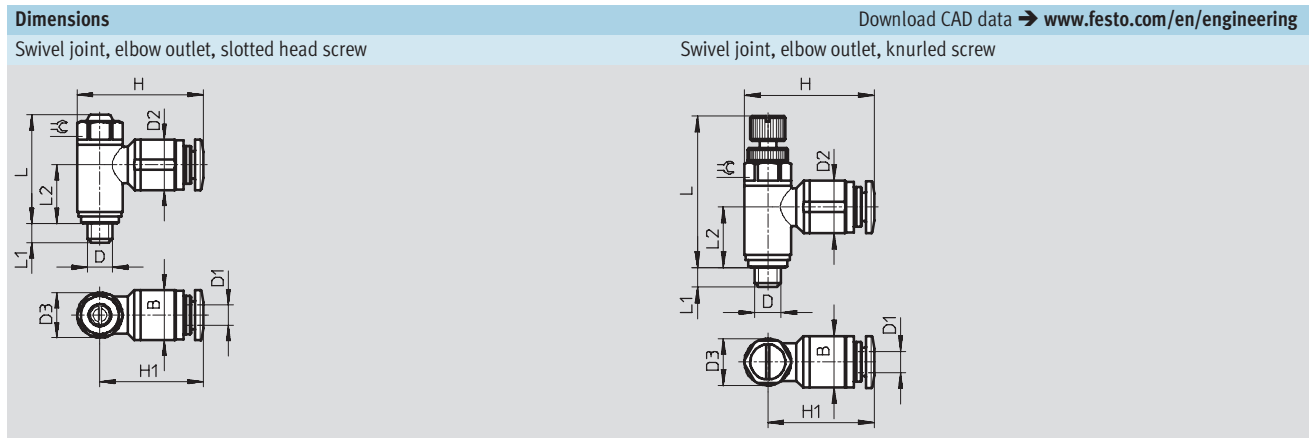
Flow control valve		
1	Regulating screw	Stainless steel
2	Swivel joint	Die-cast zinc
3	Threaded collar	Wrought aluminium alloy (M5: nickel-plated brass)
4	Seal	Nitrile rubber
5	Release ring	Polyacetal
Material note		Free of copper, PTFE and silicone



# 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	⌘
<b>Swivel joint, elbow outlet, slotted head screw</b>										
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		12.5 ±0.2		29.4	22.5			13.7	
	6		14.5 ±0.2		32.6	25.7			17.2	
	8		12.5 ±0.2		35.6	28.7				
G $\frac{1}{8}$ (MF)	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		14.5 ±0.2		39.6	30.7				
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		14.5 ±0.2		42.0	30.7				
	10		17.5 ±0.2		42.0	33.1				
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		14.5 ±0.2		44.1	32.9			19.3	
	10		17.5 ±0.2		46.7	35.5				
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
<b>Swivel joint, elbow outlet, knurled screw</b>										
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		10.2 ±0.2		29.4	22.5			14.4	
	6		12.5 ±0.2		32.6	25.7			13.7	
G $\frac{1}{8}$ (MF)	6	13.8	12.5 ±0.2	17.8 ±0.15	36.6	27.7	48	5.1 +0.17/-0.25	17.2	15
	8		14.5 ±0.2		39.6	30.7				
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		14.5 ±0.2		42.0	30.7				
	10		17.5 ±0.2		42.0	33.1				
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		14.5 ±0.2		44.1	32.9			19.3	
	10		17.5 ±0.2		46.7	35.5				
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

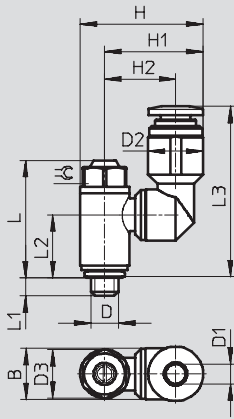
Technical data – Standard flow control valve with QS push-in connector, series D



## Dimensions

Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)




Swivel joint, outlet parallel and rotatable, slotted head screw



Screw-in thread D	Tubing O.D. D1	B	D2 ∅ +0.15/-0.1	D3 ∅	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 <sup>1</sup> / <sub>8</sub>	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 <sup>1</sup> / <sub>4</sub>	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

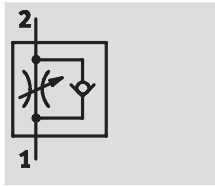
Technical data – Standard flow control valve with QS push-in connector, series D

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	–	–

## Flow control and one-way flow control valves

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

### Function



One-way flow control valve  
GRLA-F

### D series:

- QS push-in connector
- Swivel joint rotatable 360° after installation
- Adjustment via slotted head screw
- Surfaces nickel and chrome plated
- Temperature ranges  
0 ... +150 °C



GRLA-F...-QS-...-D

General technical data		
Screw-in thread	G1/8	G1/4
Valve function	One-way flow control function for exhaust air	
Adjustment component	Slotted head screw	
Type of actuation	Manual	
Type of mounting	Screw-in	
Installation position	Any	
Special features	Freely rotatable around the screw-in axis after installation	
Max. tightening torque [Nm]	5.5	11

Operating and environmental conditions		
Screw-in thread	G1/8	G1/4
Operating medium	Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm	
Operating pressure [bar]	0.2 ... 10	
Storage temperature [°C]	-10 ... +150	
Ambient temperature [°C]	0 ... +150	
Temperature of medium [°C]	0 ... +150	
Corrosion resistance class CRC	3 <sup>1)</sup>	

<sup>1)</sup> Corrosion resistance class 3 to Festo standard 940 070  
Components requiring higher corrosion resistance. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.

Weight [g]					
Screw-in thread/QS push-in connector	G1/8/4	G1/8/6	G1/8/8	G1/4/6	G1/4/8
GRLA-F	25	25	25	37	37

# Flow control and one-way flow control valves

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

Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar → 5 bar				
Screw-in thread		G $\frac{1}{8}$	G $\frac{1}{4}$	
One-way flow control function for exhaust air				
GRLA-F... -D	QS-4	D <sup>1)</sup>	0 ... 180	–
		R <sup>2)</sup>	103 ... 188	–
	QS-6	D	0 ... 255	0 ... 430
		R	111 ... 280	384 ... 478
	QS-8	D	0 ... 275	0 ... 530
		R	132 ... 307	402 ... 578

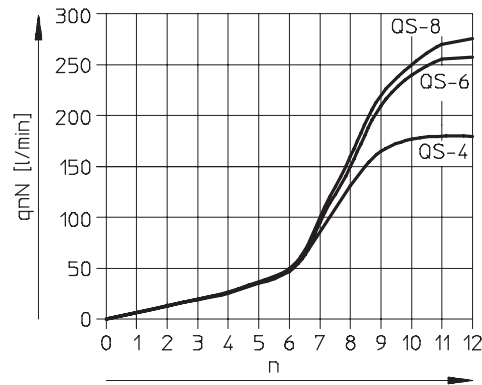
- 1) D: Flow control direction
- 2) R: Non-return direction

Standard flow rate $q_n$ [l/min] at 6 bar → 0 bar				
Screw-in thread		G $\frac{1}{8}$	G $\frac{1}{4}$	
One-way flow control function for exhaust air				
GRLA-F... -D	QS-4	D <sup>1)</sup>	250	–
		R <sup>2)</sup>	270 ... 300	–
	QS-6	D	370	600
		R	330 ... 390	570 ... 680
	QS-8	D	400	720
		R	330 ... 410	610 ... 760

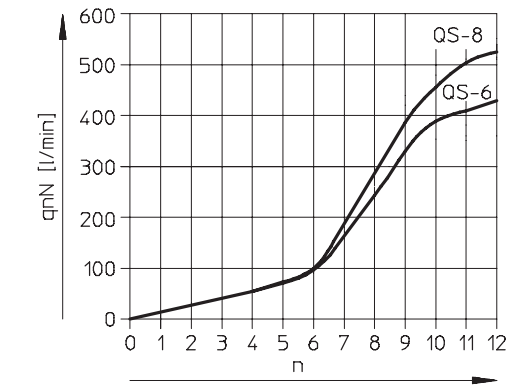
- 1) D: Flow control direction
- 2) R: Non-return direction

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

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

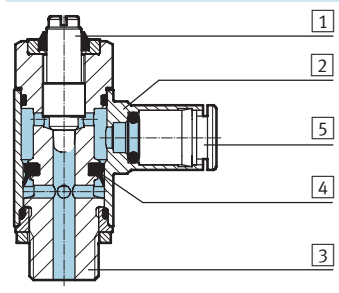


Screw-in thread G $\frac{1}{4}$



### Materials

Sectional view



One-way flow control valve		
1	Regulating screw	High-alloy stainless steel
2	Swivel joint	Nickel and chrome plated brass
3	Hollow bolt	Wrought aluminium alloy
4	Seal	Fluorocarbon rubber
5	Release ring	Nickel and chrome plated brass
–		Free of copper and PTFE

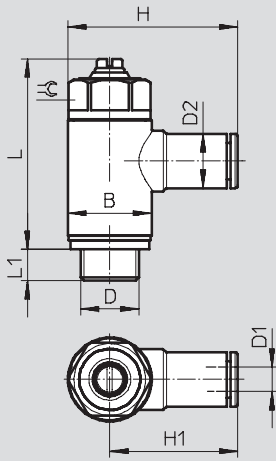
## Flow control and one-way flow control valves

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

### Dimensions


Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

Swivel joint, elbow outlet, slotted head screw



Screw-in thread D	Tubing outer Ø D1	D2 Ø	B	H	H1	L max.	L1	⌀
G <sup>1</sup> / <sub>8</sub>	4	9	13.8	28.0	21.1	31.6	5.2	12
	6	11		31.0	24.1			
	8	13		31.9	25.0			
G <sup>1</sup> / <sub>4</sub>	6	11	17.8	35.1	26.2	34.9	5.9	15
	8	13		35.9	27.0			

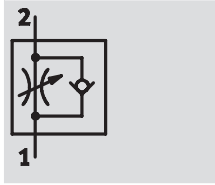
### Ordering data

Constructional design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air	
			Part No.	Type
Swivel joint, elbow outlet, slotted head screw				
	G <sup>1</sup> / <sub>8</sub>	4	195 597	GRLA-F- <sup>1</sup> / <sub>8</sub> -QS-4-D
		6	195 598	GRLA-F- <sup>1</sup> / <sub>8</sub> -QS-6-D
		8	195 599	GRLA-F- <sup>1</sup> / <sub>8</sub> -QS-8-D
	G <sup>1</sup> / <sub>4</sub>	6	195 600	GRLA-F- <sup>1</sup> / <sub>4</sub> -QS-6-D
		8	195 601	GRLA-F- <sup>1</sup> / <sub>4</sub> -QS-8-D

# 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



GRLA-...-QS-...-RS-B

General technical data				
Screw-in thread		G1/8	G1/4	G3/8
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
Permissible actuation torque for the regulating screw	[Nm]	0.4		

Operating and environmental conditions				
Screw-in thread		G1/8	G1/4	G3/8
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		G1/8	G1/4	G3/8
GRLA		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



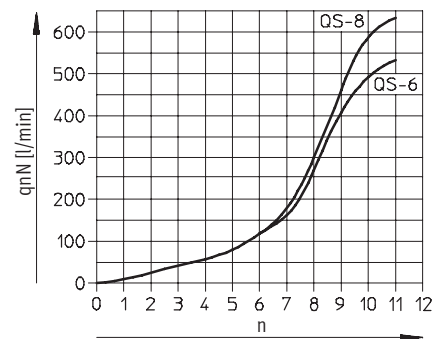
Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar $\rightarrow$ 5 bar					
Screw-in thread		$G\frac{1}{8}$	$G\frac{1}{4}$	$G\frac{3}{8}$	
One-way flow control function for exhaust air					
GRLA	QS-6	D <sup>1)</sup>	0 ... 520	0 ... 520	0 ... 530
		R <sup>2)</sup>	400 ... 550	400 ... 550	400 ... 550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

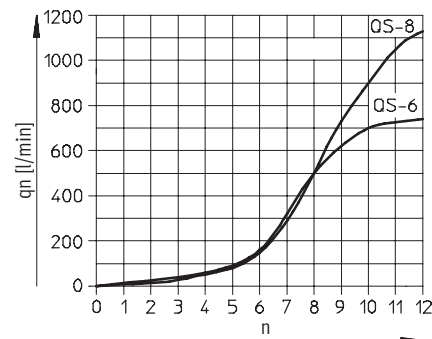
Standard flow rate $q_n$ [l/min] at 6 bar $\rightarrow$ 0 bar					
Screw-in thread		$G\frac{1}{8}$	$G\frac{1}{4}$	$G\frac{3}{8}$	
One-way flow control function for exhaust air					
GRLA	QS-6	D <sup>1)</sup>	0 ... 720	0 ... 740	0 ... 740
		R <sup>2)</sup>	600 ... 750	620 ... 760	620 ... 760
	QS-8	D	0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

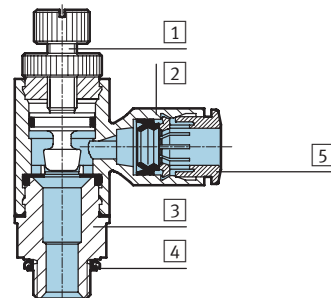


**Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$**   
Screw-in thread  $G\frac{1}{8}$ ,  $G\frac{1}{4}$ ,  $G\frac{3}{8}$



## 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

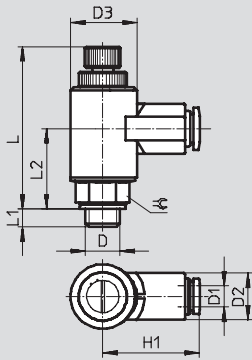


# Flow control valves and one-way flow control valves

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

**Dimensions** Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

Swivel joint, elbow outlet, knurled screw



Screw-in thread D	Tubing O.D. D1	D2 Ø	D3 Ø -0.1	H1	L max.	L1	L2	⊖
G1/8	6	13	17.9	27.2	53	4.7	22.8	13
	8	17		35.4				
G1/4	6	13	17.9	27.2	53.6	5.8	22.3	17
	8	17		35.4				
G3/8	6	13	17.9	27.2	54.6	6	23.1	19
	8	17		35.4				

**Ordering data**

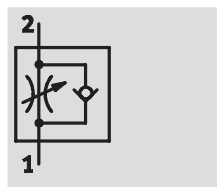
Design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air	
			Part No.	Type
Swivel joint, elbow outlet, knurled screw				
	G1/8	6	162 965	GRLA-1/8-QS-6-RS-B
		8	162 966	GRLA-1/8-QS-8-RS-B
	G1/4	6	162 967	GRLA-1/4-QS-6-RS-B
		8	162 968	GRLA-1/4-QS-8-RS-B
	G3/8	6	162 969	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

## Flow control and non-return valves

Technical data – Standard flow control valve with QS push-in fitting, series B, in bulk packs of 20

### Function



One-way flow control valve for exhaust air  
GRLA

### Series B:

- High flow: Precision adjustment for high speed
- QS push-in fitting
- Rotatable connection, rotatable 360° after installation
- Adjustment via slotted head screw
- Bulk pack of 20 pieces



GRLA-...-QS-...-B-20

General technical data			
Screw-in thread		G1/8	G1/4
Valve function	One-way flow control function for exhaust air		
Setting component	Slotted head screw		
Type of mounting	Threaded		
Assembly position	Any		
Special features	Freely rotatable around the screw-in axis after installation		
Max. tightening torque	[Nm]	4	11
Permissible actuation torque for the regulating screw	[Nm]	0.4	

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

# Flow control and non-return valves

Technical data – Standard flow control valve with QS push-in fitting, series B, bulk packs of 20

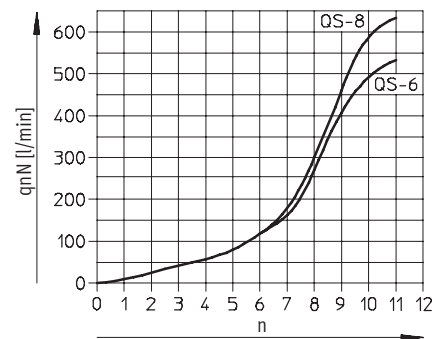
Standard nominal flow rate qnN [l/min] at 6 bar → 5 bar				
Screw-in thread		G1/8	G1/4	
One-way flow control function for exhaust air				
GRLA	QS-6	D <sup>1)</sup>	0 ... 520	–
		R <sup>2)</sup>	400 ... 550	–
	QS-8	D	0 ... 650	0 ... 650
		R	600 ... 750	600 ... 750

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

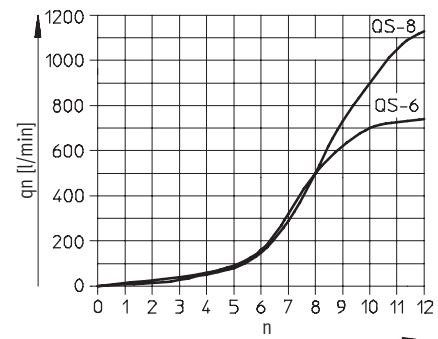
Standard flow rate qn [l/min] at 6 bar → 0 bar				
Screw-in thread		G1/8	G1/4	
One-way flow control function for exhaust air				
GRLA	QS-6	D <sup>1)</sup>	0 ... 720	–
		R <sup>2)</sup>	600 ... 750	–
	QS-8	D	0 ... 1,080	0 ... 1,130
		R	800 ... 1,250	900 ... 1,260

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

Standard nominal flow rate qnN at 6 bar → 5 bar as a function of turns of the adjusting screw n  
Screw-in thread G1/8, G1/4

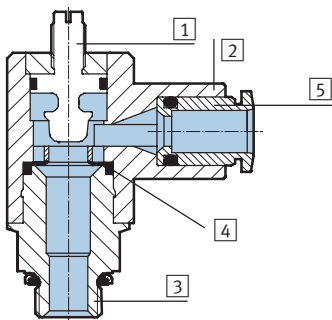


Standard flow rate qn at 6 bar → 0 bar as a function of turns of the adjusting screw n  
Screw-in thread G1/8, G1/4



## Materials

Sectional view



Flow control valve		
1	Regulating screw	Brass
2	Rotatable connection	Polybutylene terephthalate, reinforced
3	Threaded spigot	Wrought aluminium alloy
4	Seal	Nitrile rubber
5	Release ring	Polyacetate

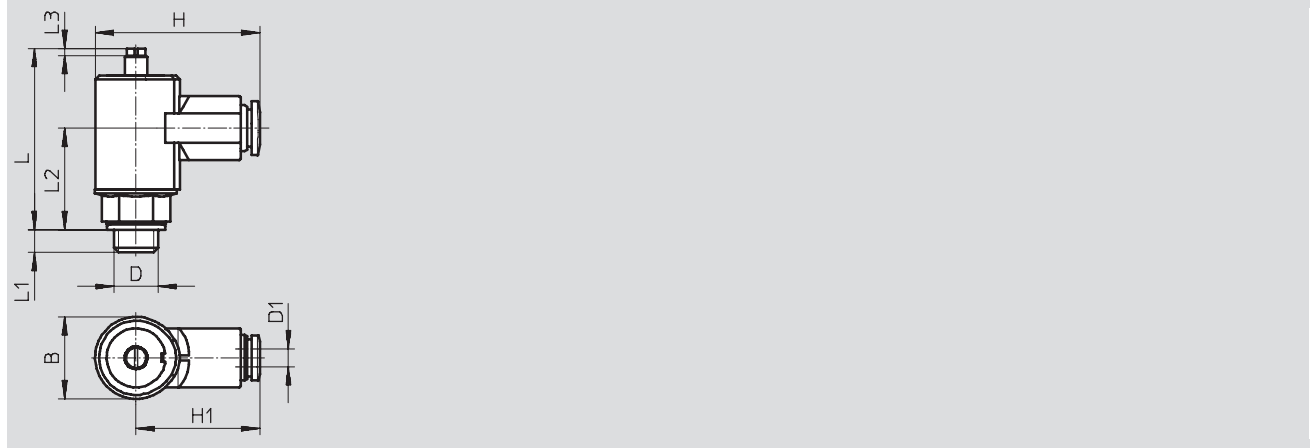
# Flow control and non-return valves

Technical data – Standard flow control valve with QS push-in fitting, series B, bulk packs of 20



**Dimensions** Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

Rotatable connection, elbow outlet, slotted head screw



Screw-in thread D	Tubing O.D. D1	B Ø -0.1	H	H1	L max.	L1	L2
G <sup>1</sup> / <sub>8</sub>	6	17.9	36.2	27.2	40.1	4.7	22.8
	8		44.4	35.4			
G <sup>1</sup> / <sub>4</sub>	8				39.6	5.8	22.8

**Ordering data Bulk packs of 20**

Design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air Part No.    Type
--------	-----------------	----------------------	---

Rotatable connection, elbow outlet, slotted head screw

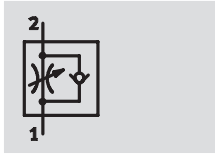
	G <sup>1</sup> / <sub>8</sub>	6	<b>540 358</b> <b>GRLA-<sup>1</sup>/<sub>8</sub>-QS-6-B-20</b>
		8	<b>540 359</b> <b>GRLA-<sup>1</sup>/<sub>8</sub>-QS-8-B-20</b>
	G <sup>1</sup> / <sub>4</sub>	8	<b>540 360</b> <b>GRLA-<sup>1</sup>/<sub>4</sub>-QS-8-B-20</b>

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 – Mini flow control valve with QS push-in connector

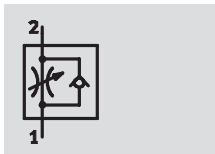
Function



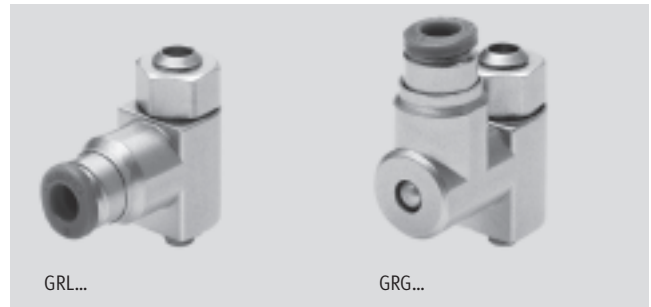
One-way flow control for exhaust air  
GRLA/GRGA



Flow control acting at both sides  
GRLO/GRGO



One-way flow control for supply air  
GRLZ/GRGZ



- 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 qnN [l/min] at 6 bar → 5 bar				
Screw-in thread		M3	M5	
One-way flow control function for exhaust air				
GRLA/GRGA	QS-3	F <sup>1)</sup>	0 ... 41	0 ... 40
		N <sup>2)</sup>	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 qn [l/min] at 6 bar → 0 bar				
Screw-in thread		M3	M5	
One-way flow control function for exhaust air				
GRLA/GRGA	QS-3	F <sup>1)</sup>	0 ... 95	0 ... 95
		N <sup>2)</sup>	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

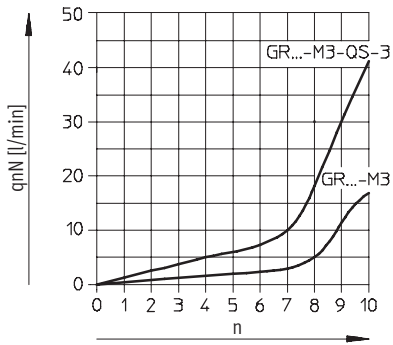
- 1) F: Flow control direction  
2) N: Non-return direction

# Flow control valves and one-way flow control valves

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

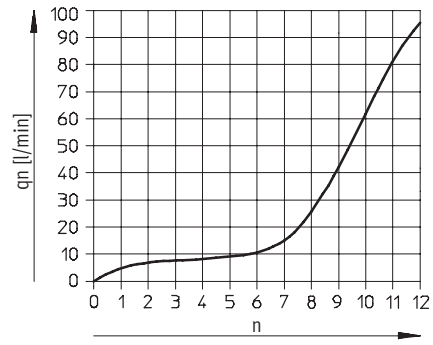
**Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5 bar as a function of turns of the adjusting screw  $n$**

Screw-in thread M3

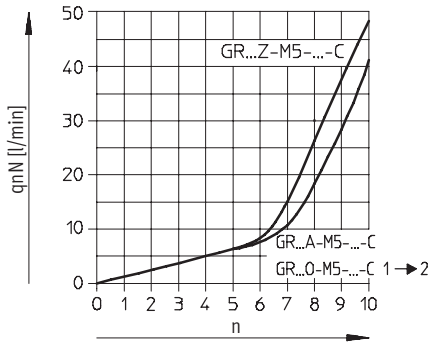


**Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$**

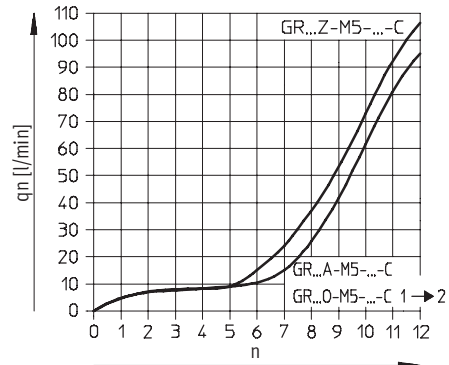
Screw-in thread M3



**Screw-in thread M5**



**Screw-in thread M5**



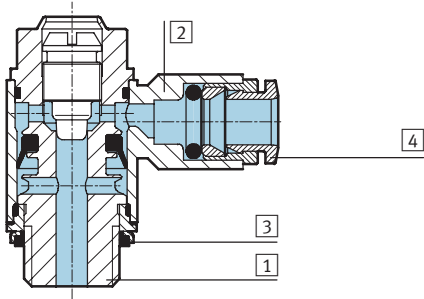
# Flow control valves and one-way flow control valves

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



## Materials

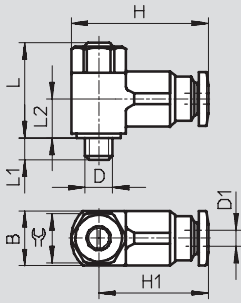
Sectional view



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

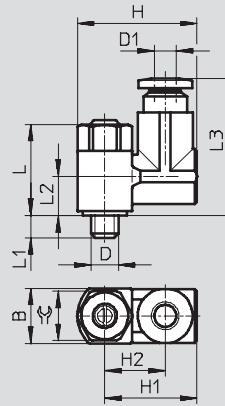
## Dimensions GRL...

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

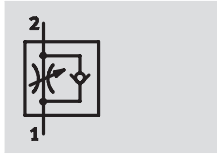
Ordering data								
Design	Screw-in thread	For tubing O.D. [mm]	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
QS push-in connector, elbow outlet, slotted head screw								
	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

# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread



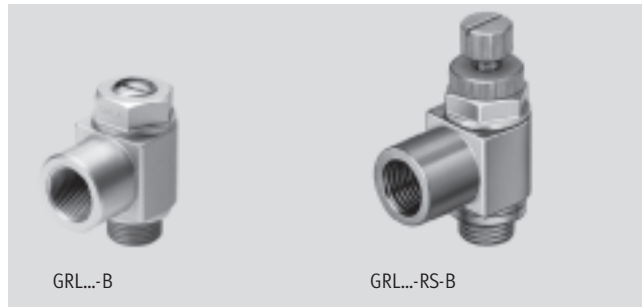
## Function



One-way flow control for exhaust air  
GRLA

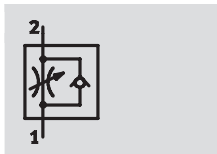


Flow control acting at both sides  
GRLO



GRL...-B

GRL...-RS-B



One-way flow control for supply air  
GRLZ

- 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

• † - Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

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		11	28	60	97	204	377
GRL...-RS-B		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 <sup>1)</sup>	0 ... 95	0 ... 340	0 ... 610	0 ... 1 450	0 ... 2 100	0 ... 4 320
	N <sup>2)</sup>	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

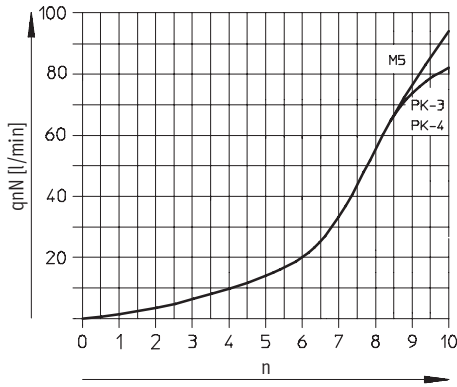
# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread



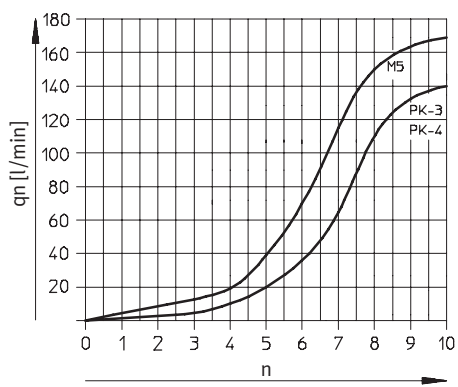
Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5  
as a function of turns of the adjusting screw  $n$

Screw-in thread M5

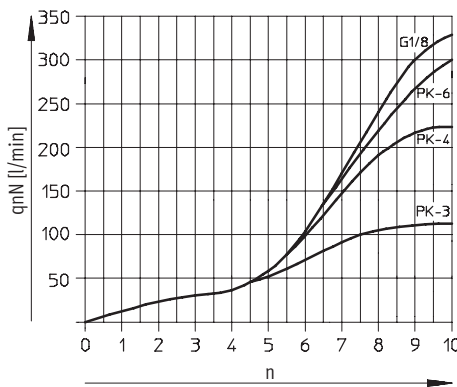


Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar  
as a function of turns of the adjusting screw  $n$

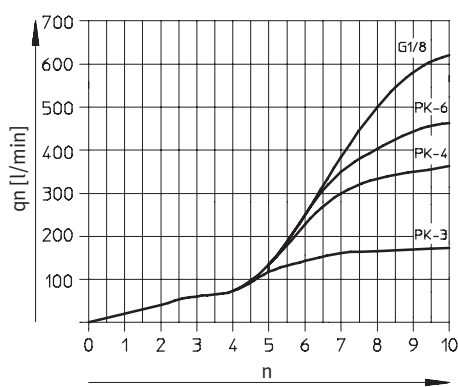
Screw-in thread M5



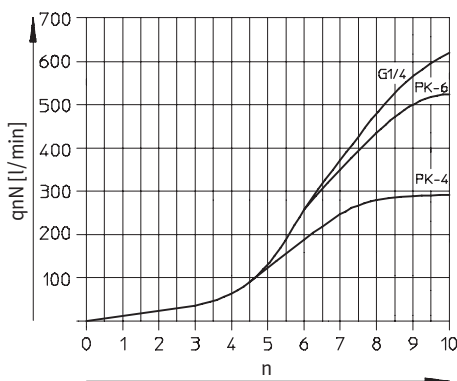
Screw-in thread G1/8



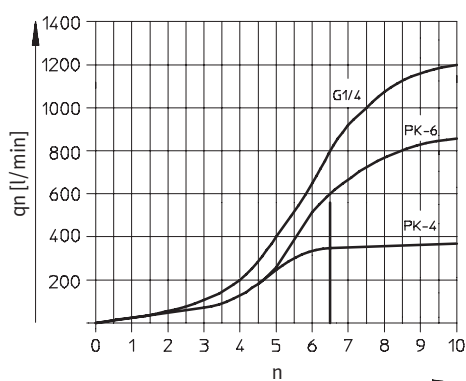
Screw-in thread G1/8



Screw-in thread G1/4



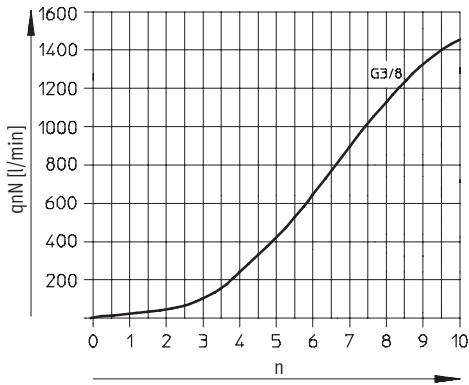
Screw-in thread G1/4



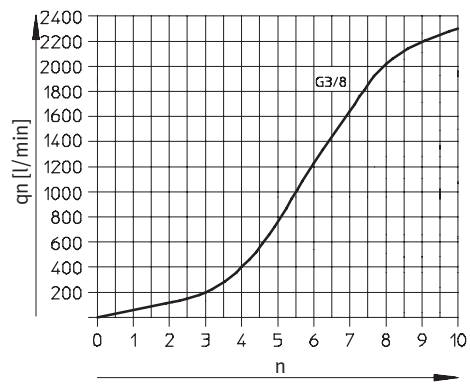
# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

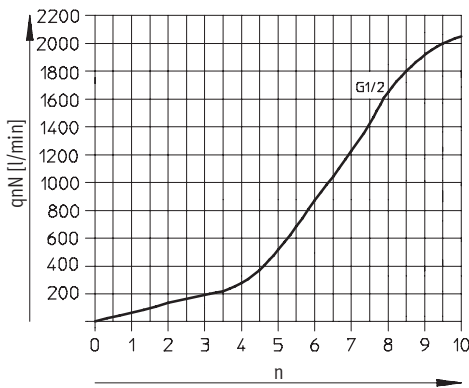
**Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5 as a function of turns of the adjusting screw  $n$**   
Screw-in thread G $\frac{3}{8}$



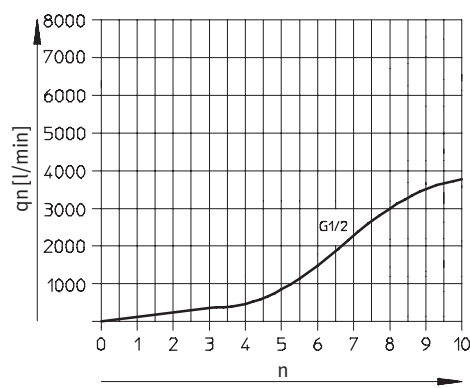
**Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$**   
Screw-in thread G $\frac{3}{8}$



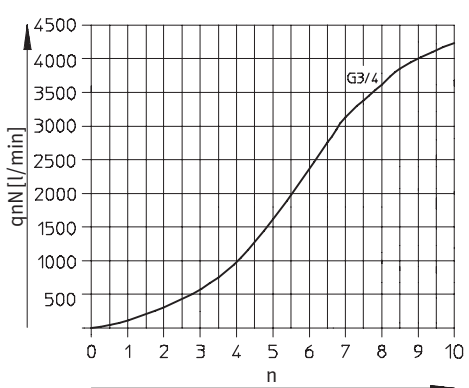
**Screw-in thread G $\frac{1}{2}$**



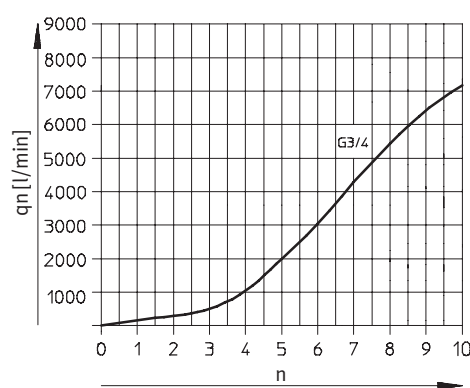
**Screw-in thread G $\frac{1}{2}$**



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



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



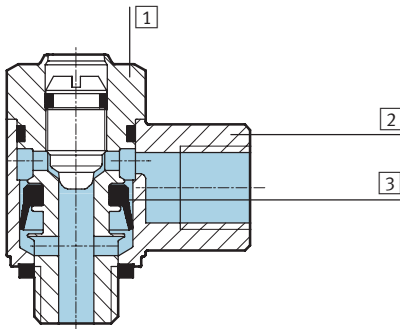
# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread



## Materials

Sectional view

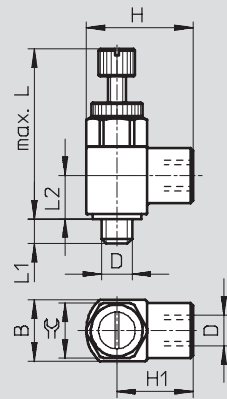
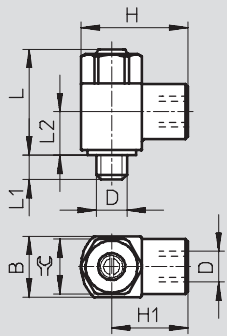


Flow control valve	
1	Threaded collar Wrought aluminium alloy (M5: brass, nickel-plated)
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber
Note on material Designs free of copper, PTFE and silicone → Ordering data	

## Dimensions

Slotted head screw

Knurled screw






Screw-in thread D	Connecting thread D	B	H	H1	L max.	L1	L2	☉
<b>Slotted head screw</b>								
M5	M5	10 -0.15	17.5	12.5	17.6	4 ±0.3	7.1	9
G1/8	G1/8	16 -0.15	28	20	25.2	5.3 +0.45/-0.35	10.3	14
G1/4	G1/4	20 -0.2	36	26	30.8	8.2 +0.45/-0.35	13.2	17
G3/8	G3/8	25 -0.2	41	28.5	37.2	8.8 +0.45/-0.35	15.5	22
G1/2	G1/2	32 -0.2	53	37	48.6	12.8 ±0.45	18.9	27
G3/4	G3/4	41 -0.3	64	43.5	60.2	13.5 ±0.5	24.5	36
<b>Knurled screw</b>								
M5	M5	10 -0.15	17.5	12.5	27.3	4 ±0.3	7.1	9
G1/8	G1/8	16 -0.15	28	20	38.6	5.3 +0.45/-0.35	10.3	14
G1/4	G1/4	20 -0.2	36	26	54.8	8.2 +0.45/-0.35	13.2	17

☉ - Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

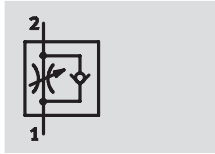
Ordering data								
Design	Screw-in thread	Connecting thread	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function, acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
Female thread, elbow outlet, slotted head screw								
	M5	M5	151 160	GRLA-M5-B	151 183	GRLZ-M5-B	151 181	GRLO-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



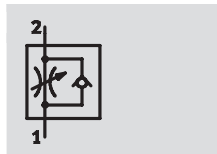
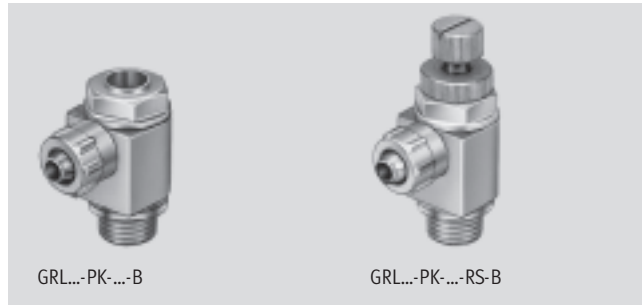
## Function



One-way flow control for exhaust air  
GRLA



Flow control acting at both sides  
GRLO



One-way flow control for supply air  
GRLZ

### 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 $\frac{1}{8}$
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	11

Operating and environmental conditions			
Screw-in thread		M5	G $\frac{1}{8}$
Operating medium		Compressed air, filtered (to 40 $\mu$ 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 $\frac{1}{8}$
	GRL...-B [g]	10	44
	GRL...-RS-B [g]	11	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 q <sub>nN</sub> [l/min] at 6 bar → 5 bar					
Screw-in thread			M5	G $\frac{1}{8}$	G $\frac{1}{4}$
<b>One-way flow control function for exhaust air</b>					
GRLA	PK-3	F <sup>1)</sup>	0 ... 83	0 ... 110	–
		N <sup>2)</sup>	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
<b>One-way flow control function for supply air</b>					
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
<b>Flow control function</b>					
GRLO	PK-3	F	0 ... 83	–	–

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

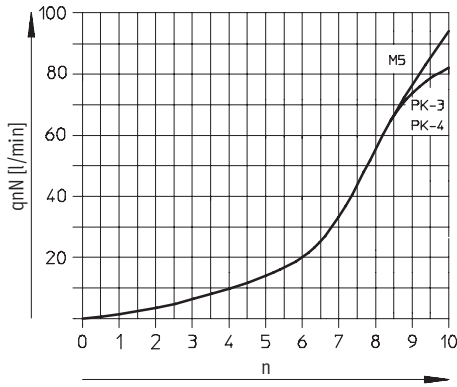
# Flow control valves and one-way flow control valves

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



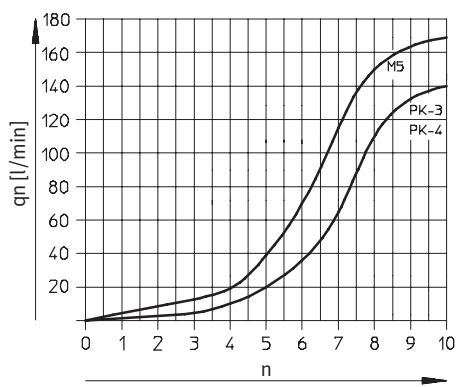
Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5  
as a function of turns of the adjusting screw  $n$

Screw-in thread M5

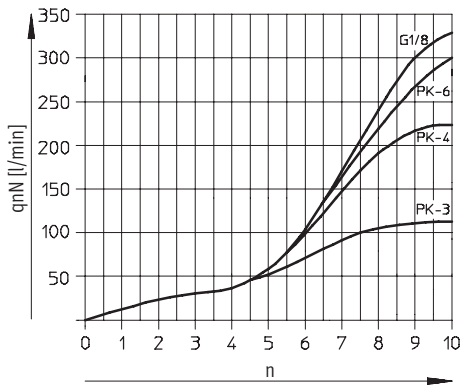


Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar  
as a function of turns of the adjusting screw  $n$

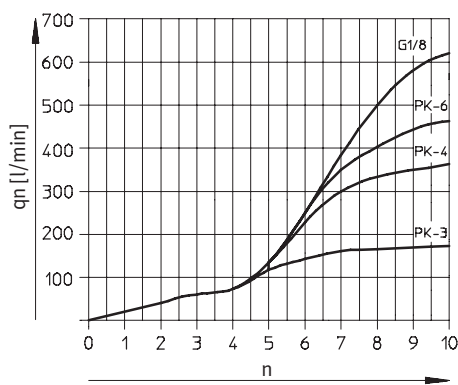
Screw-in thread M5



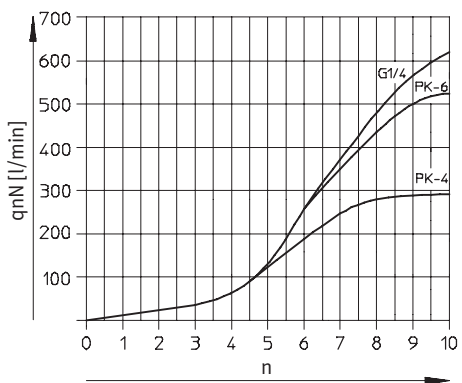
Screw-in thread G1/8



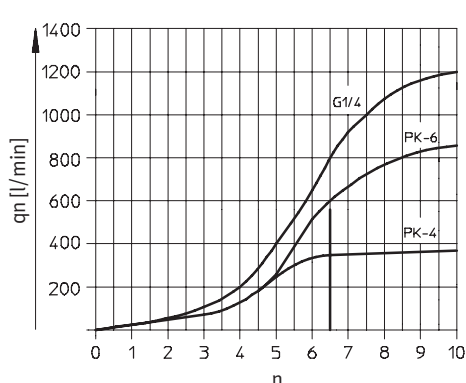
Screw-in thread G1/8



Screw-in thread G1/4



Screw-in thread G1/4

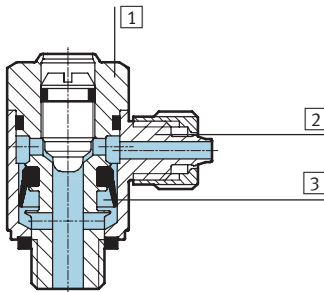


# Flow control valves and one-way flow control valves

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

## Materials

Sectional view

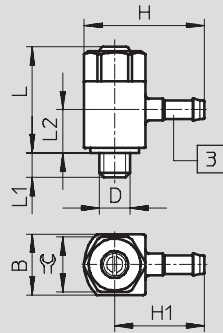


Flow control valve	
1	Threaded collar Wrought aluminium alloy (M5: brass, nickel-plated)
2	Swivel joint Die-cast zinc
3	Seals Nitrile rubber
Note on material Designs free of copper, PTFE and silicone → Ordering data	

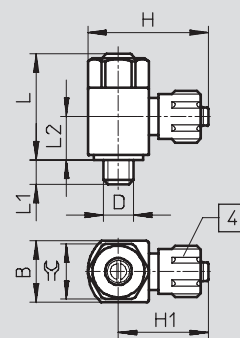
## Dimensions

Slotted head screw, screw-in thread M5

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



3 Barbed fitting

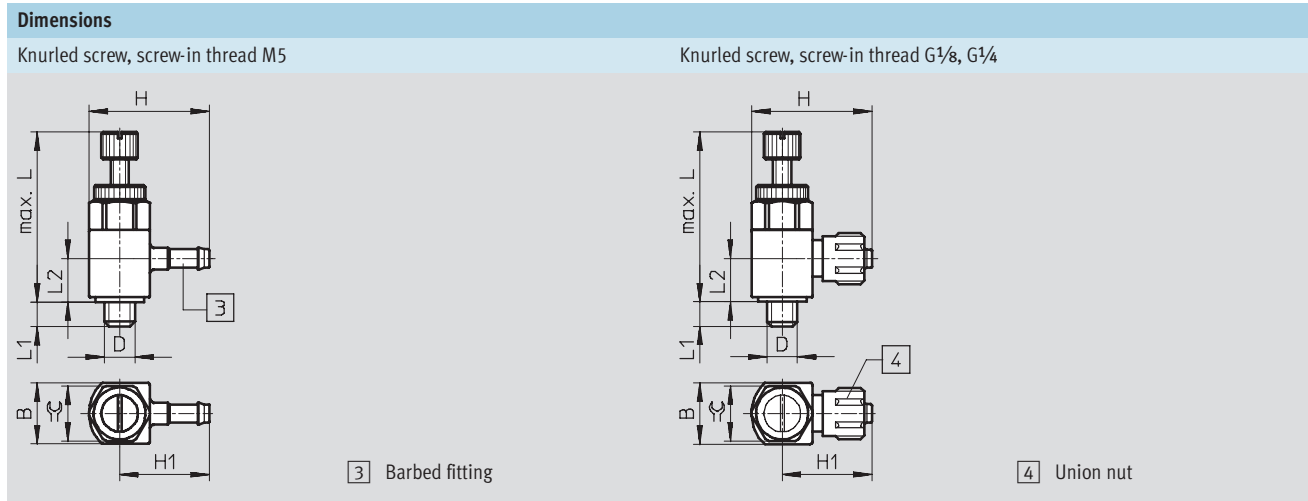


4 Union nut

Screw-in thread D	Tubing I.D.	B	H	H1	L	L1	L2	⌀C
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
G $\frac{1}{8}$	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
G $\frac{1}{4}$	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






Screw-in thread D	Tubing I.D.	B	H	H1	L max.	L1	L2	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, 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 – Standard flow control valve with barbed fitting connection PK

Ordering data								
Version <sup>1)</sup>	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	–	
	G1/8	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	–	
	G1/4	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	–
G1/8		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	–	
G1/4		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	–	–	–	
	G1/8	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	–	–	–	
	G1/4	4	165 649	GRLA-1/4-PK-4-B-CT	–	–	–	
6		165 651	GRLA-1/4-PK-6-B-CT	–	–	–		

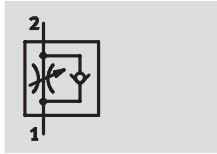
1) Union nut for barbed fitting only with screw-in thread G1/8 and G1/4

# Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with female thread



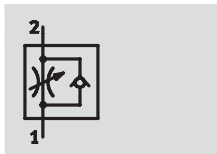
## Function



One-way flow control for exhaust air  
GRLA



Flow control acting at both sides  
GRLO



One-way flow control for supply air  
GRLZ



- 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

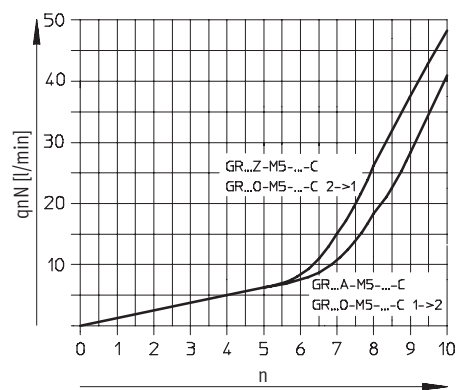
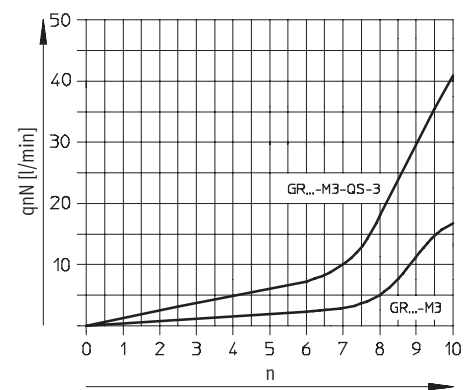
# Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with female thread

Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar $\rightarrow$ 5 bar			
Screw-in thread		M3	M5
One-way flow control function for exhaust air			
GRLA	F <sup>1)</sup>	0 ... 18	0 ... 40
	N <sup>2)</sup>	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  $\rightarrow$  5 bar as a function of turns of the adjusting screw n



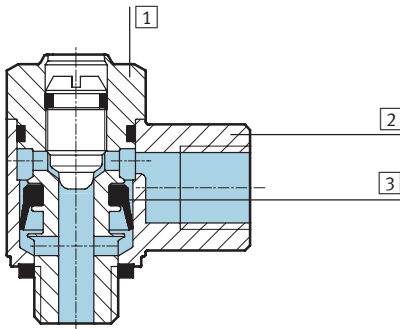
# Flow control valves and one-way flow control valves

Technical data – Mini flow control valve with female thread



## Materials

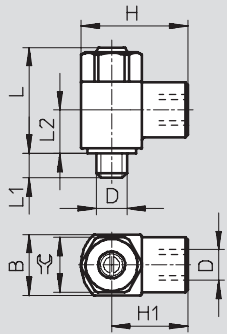
Sectional view



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	⌀C
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

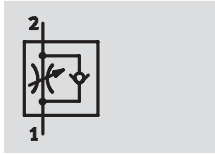
Version	Screw-in thread	Connecting thread	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides	
			Part No.	Type	Part No.	Type	Part No.	Type
	M3	M3	175 038	GRLA-M3	175 040	GRLZ-M3	175 039	GRLO-M3
	M5	M5	175 047	GRLA-M5-LF-C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

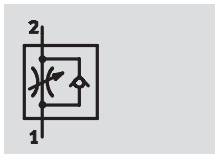
Function



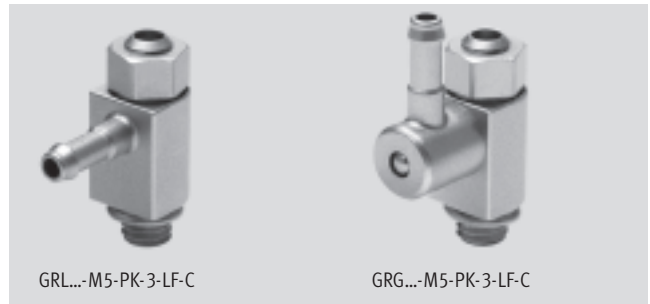
One-way flow control for exhaust air  
GRLA



Flow control acting at both sides  
GRLO



One-way flow control for supply air  
GRLZ



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

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

- Low flow: Precision adjustment for low speed
  - Barbed fitting connection
  - Adjustment with slotted head screw
- Variants:
- Swivel joint, elbow outlet
  - Swivel joint, parallel outlet

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

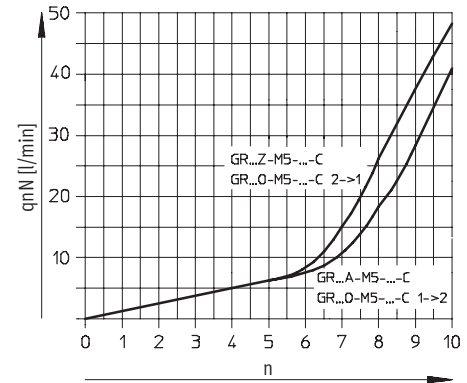


Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar $\rightarrow$ 5 bar			
Screw-in thread		M5	
One-way flow control function for exhaust air			
PK-3	GRLA/GRGA	F <sup>1)</sup>	0 ... 40
		N <sup>2)</sup>	42 ... 63
One-way flow control function for supply air			
PK-3	GRLZ/GRGZ	F	0 ... 40
		N	35 ... 58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

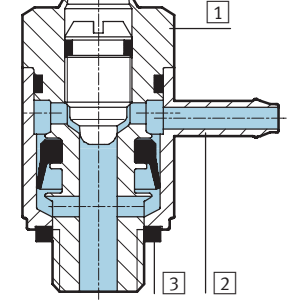
Screw-in thread M5



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

## Materials

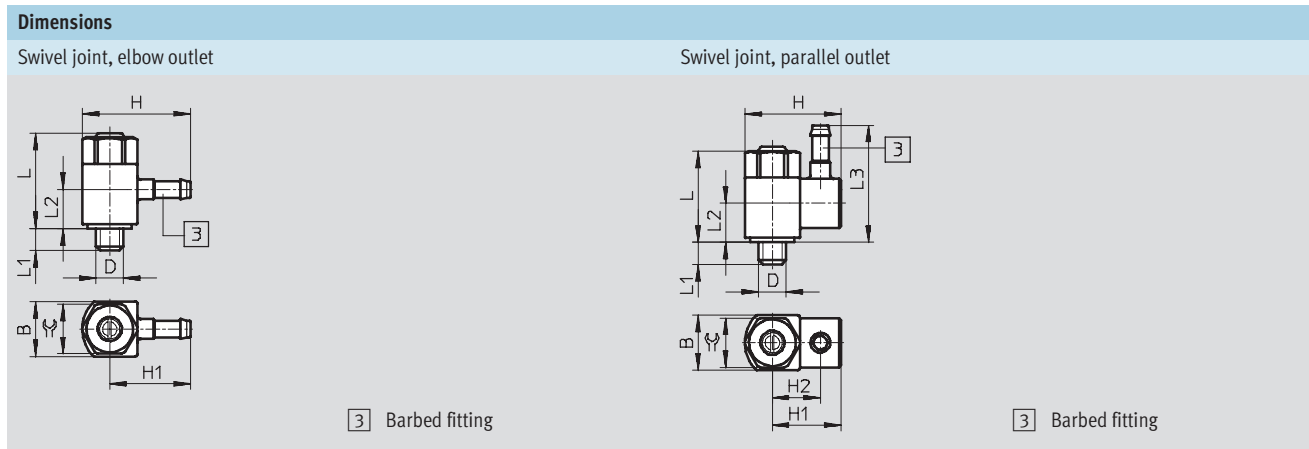
Sectional view



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

# 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	⌀
<b>Swivel joint, elbow outlet</b>										
M5	3	8	17.7	13.7	–	17.7	3.1	9.4	–	7
<b>Swivel joint, parallel outlet</b>										
M5	3	8	15.8	11.8	8.3	17.7	3.1	8.7	21	7

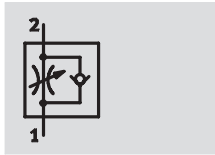
<b>Ordering data</b>										
Version	Screw-in thread	For tubing I.D. [mm]	One-way flow control function for exhaust air		One-way flow control function for supply air		Flow control function acting at both sides			
			Part No.	Type	Part No.	Type	Part No.	Type		
<b>Barbed fitting, elbow outlet, slotted head screw</b>										
	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		
<b>Swivel joint, parallel outlet, slotted head screw</b>										
	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



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



CRGRA-...-B

One-way flow control for exhaust air  
CRGRA

General technical data					
Screw-in thread	M5	G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$
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

• † : Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

Operating and environmental conditions					
Screw-in thread	M5	G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$
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	G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$
	14	44	83	150	315

Standard nominal flow rate qnN [l/min] at 6 bar → 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						
	F <sup>1)</sup>	0 ... 95	0 ... 340	0 ... 610	0 ... 1 450	0 ... 2 100
	N <sup>2)</sup>	77 ... 95	260 ... 420	450 ... 820	970 ... 1 600	1 550 ... 2 200

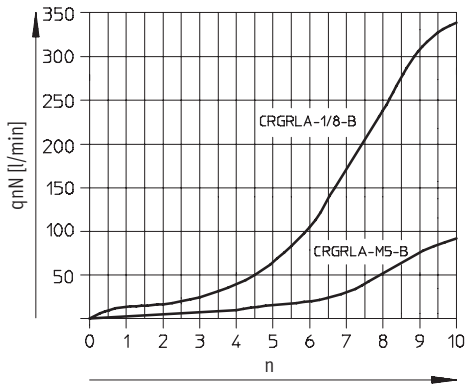
- 1) F: Flow control direction  
2) N: Non-return direction

# Flow control valves and one-way flow control valves

Technical data – Corrosion resistant flow control valve with female thread

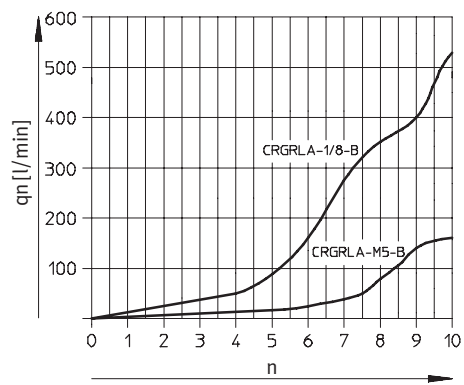
Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5 bar  
as a function of turns of the adjusting screw  $n$

Screw-in thread M5, G $\frac{1}{8}$

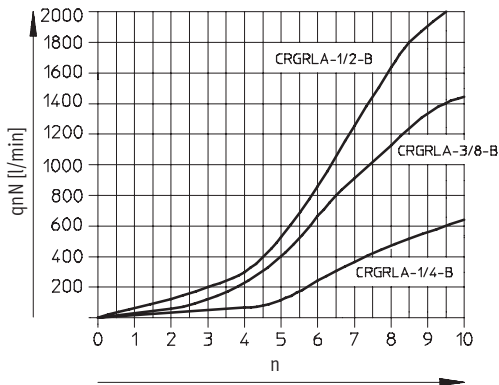


Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar  
as a function of turns of the adjusting screw  $n$

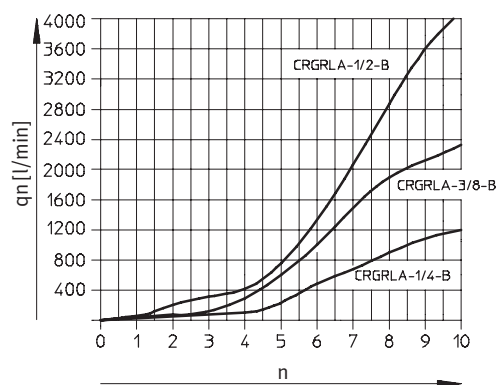
Screw-in thread M5, G $\frac{1}{8}$



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

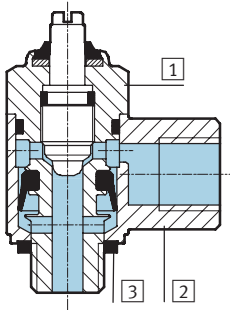
# Flow control valves and one-way flow control valves

Technical data – Corrosion resistant flow control valve with female thread



## Materials

Sectional view

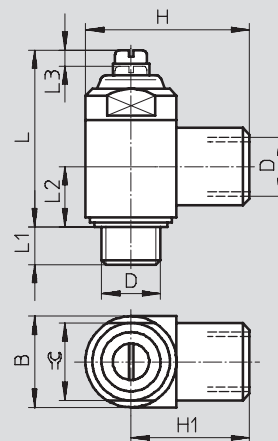
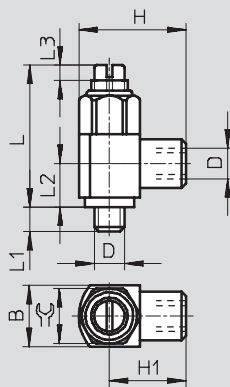


Flow control valve		
1	Threaded collar	High-alloy stainless steel
2	Swivel joint	High-alloy stainless steel
3	Seals	Fluorocautchouc, nitrile rubber

## Dimensions

Screw-in thread M5

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



Screw-in thread D	Connecting thread D	B	H	H1	L	L1	L2	L3	$\approx$
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	5.5	10.3	3.5	14
G $\frac{1}{4}$	G $\frac{1}{4}$	20 -0.3	36 +0.4/-0.2	26	38.8	6.5	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	7.5	15.4	5	22
G $\frac{1}{2}$	G $\frac{1}{2}$	32 -0.4	53 ±0.5	37	62.2	9	18.9	7.5	27

– Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

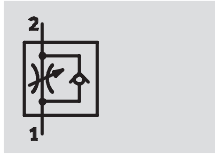
## Ordering data

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

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



GR-QS-...  
GRO-QS-...



Flow control acting at both sides  
GRO-QS

General technical data				
Push-in connector <sup>1)</sup>	QS-3	QS-4	QS-6	QS-8
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				
Push-in connector	QS-3	QS-4	QS-6	QS-8
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]					
Push-in connector	QS-3	QS-4	QS-6	QS-8	
	[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



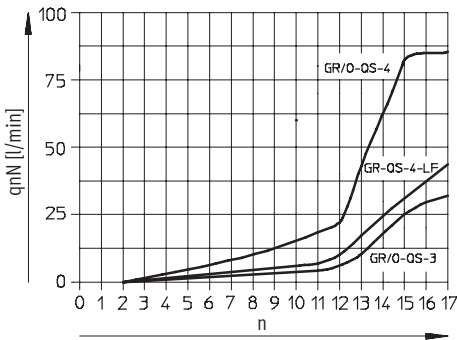
Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar $\rightarrow$ 5 bar					
Push-in connector		QS-3	QS-4	QS-6	QS-8
GR	F <sup>1)</sup>	0 ... 25	0 ... 85	0 ... 160	0 ... 225
	N <sup>2)</sup>	65 ... 70	100 ... 110	260 ... 270	350 ... 400
GR-LF	F	–	0 ... 40	0 ... 75	–
	N	–	100 ... 110	260 ... 270	–
GRO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

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

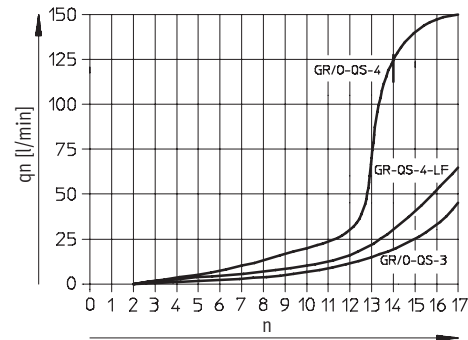
Standard flow rate $q_n$ [l/min] at 6 bar $\rightarrow$ 0 bar					
Push-in connector		QS-3	QS-4	QS-6	QS-8
GR	F <sup>1)</sup>	0 ... 100	0 ... 150	0 ... 205	0 ... 390
	N <sup>2)</sup>	125 ... 135	170 ... 185	500 ... 510	610 ... 640
GR-LF	F	–	0 ... 130	0 ... 110	–
	N	–	170 ... 185	500 ... 510	–
GRO	F	0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

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

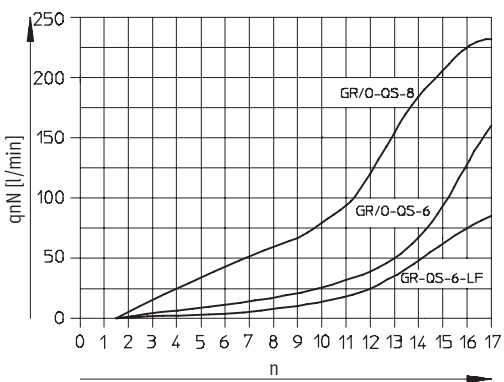
Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5 bar as a function of turns of the adjusting screw  $n$   
Push-in connector QS-3/QS-4



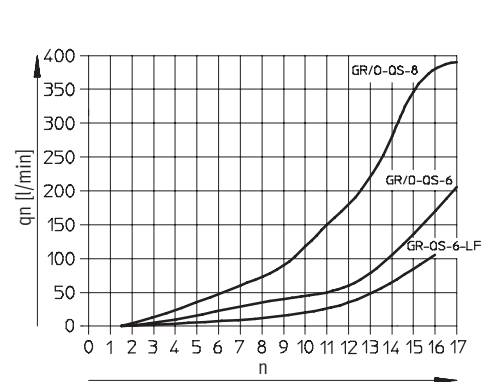
Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$   
Push-in connector QS-3/QS-4



Push-in connector QS-6/QS-8



Push-in connector QS-6/QS-8



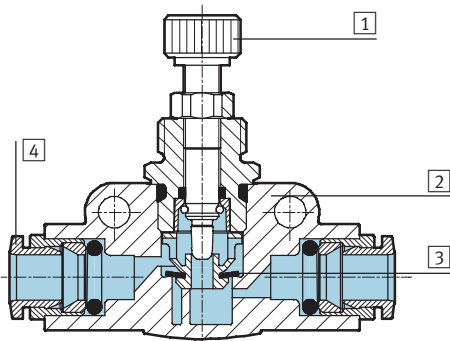


# Flow control valves and one-way flow control valves

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

## Materials

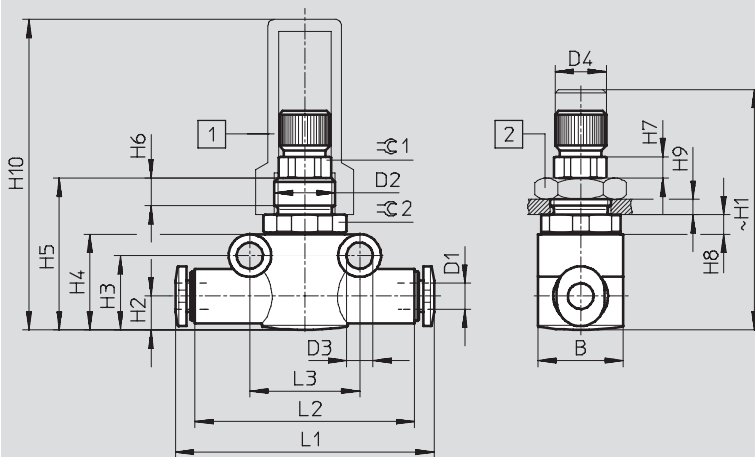
Sectional view



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](http://www.festo.com/en/engineering)



Push-in connector	Tubing O.D. D1	B	D2	D3 $\varnothing \pm 0.1$	D4 $\varnothing - 0.3$	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 $\pm 0.1$	H8	H9 max.	H10	L1	L2	L3	$\approx C1$	$\approx C2$
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 <sup>1)</sup>	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 – Inline flow control valve with QS push-in connectors



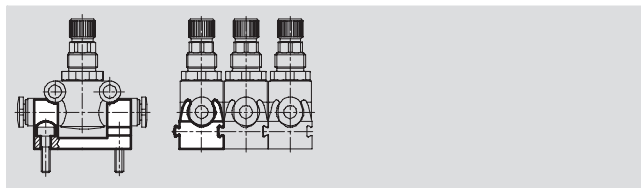
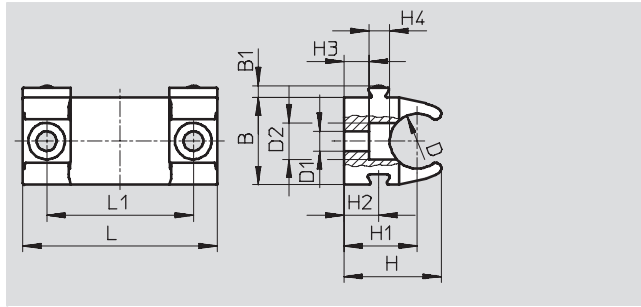
## Retainer GR-H-QS

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	19.8	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



GRM



GRK

## Tamper-proof cap GRK

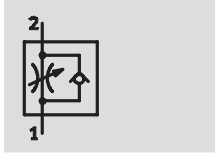
Material: Polypropylene

Ordering data					
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



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

• Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

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 q <sub>N</sub> [l/min] at 6 bar → 5 bar							
Connecting thread	M3	M5	G1/8	G1/4	G3/8	G1/2	G3/4
F <sup>1)</sup>	0 ... 29.5	0 ... 94	0 ... 220	0 ... 420	0 ... 1 010	0 ... 1 620	0 ... 3 300
N <sup>2)</sup>	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

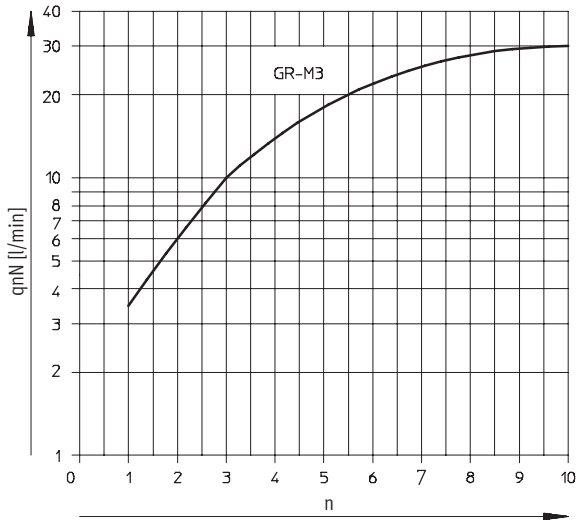
# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve with female thread

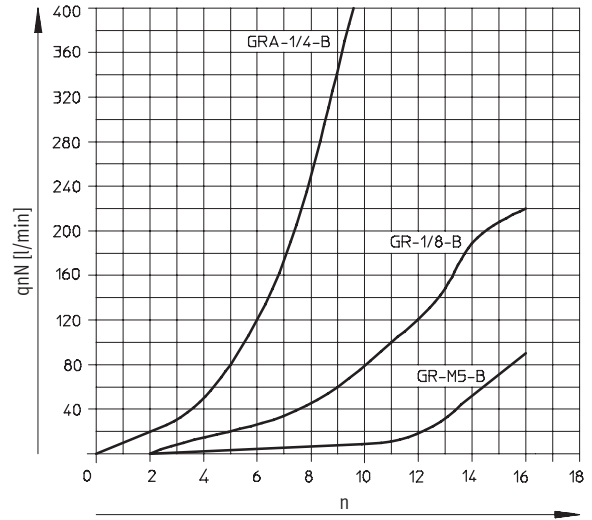


## Standard nominal flow rate $q_{nN}$ at 6 bar $\rightarrow$ 5 bar as a function of turns of the adjusting screw $n$

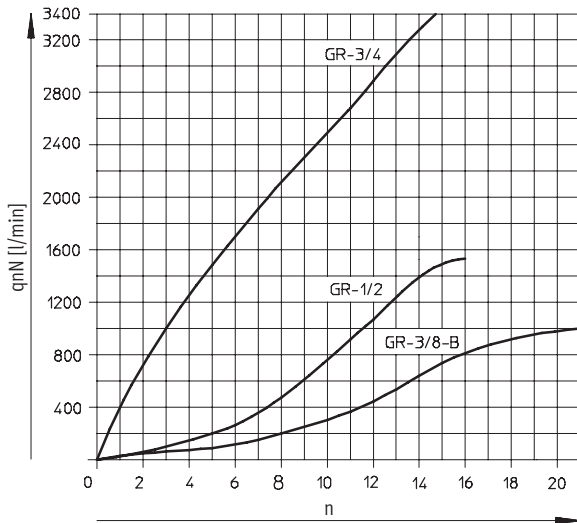
Connecting thread M3



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



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



# Flow control valves and one-way flow control valves

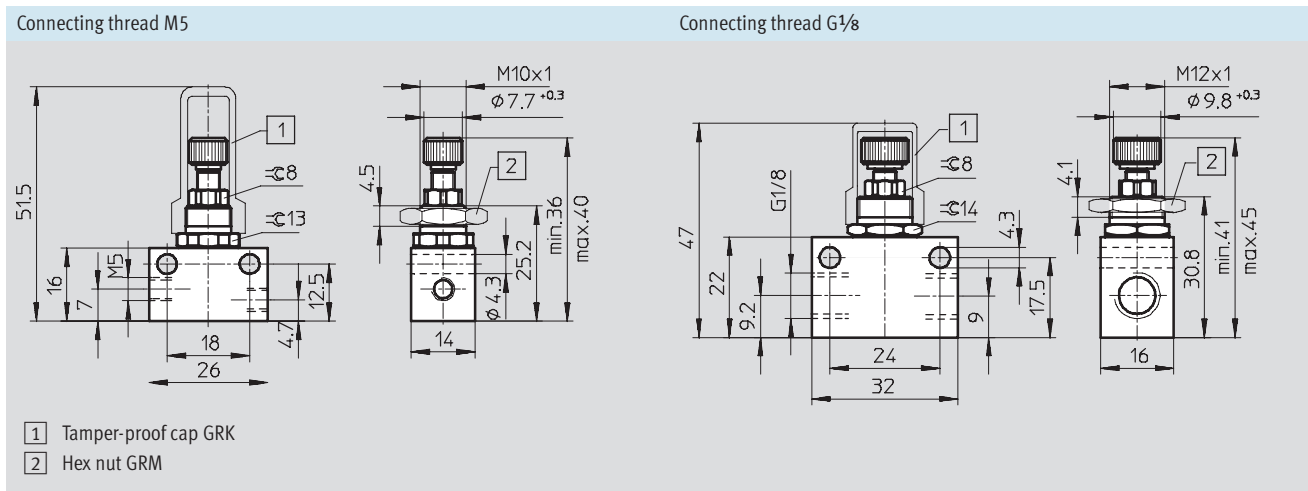
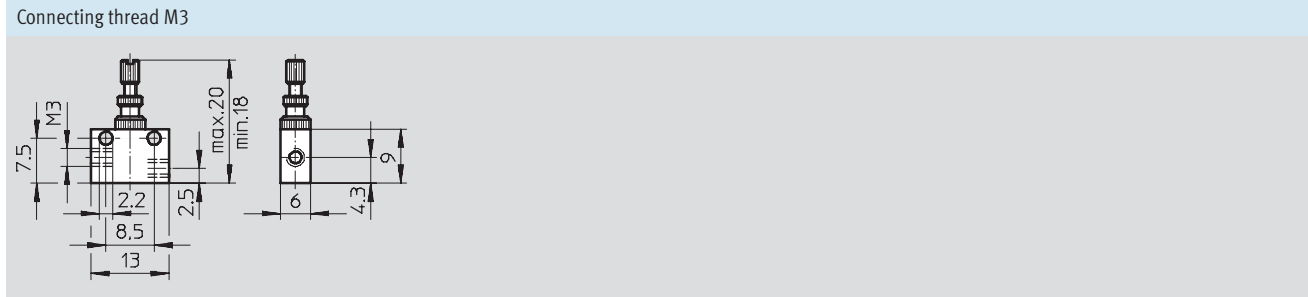
Technical data – Standard flow control valve with female thread

## Materials



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

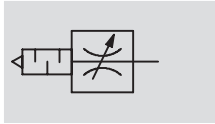




# Flow control valves and one-way flow control valves

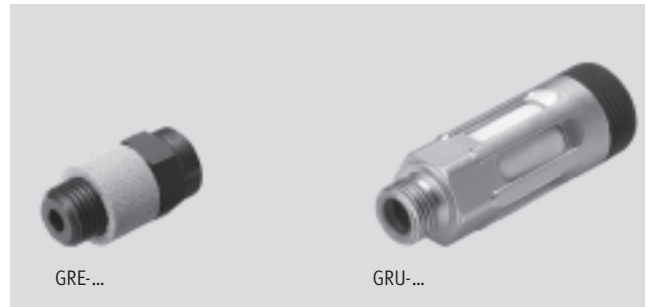
Technical data – Flow control/silencer combinations

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	
		75		100		170	

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	
		3 ... 3 600		0 ... 4 000		0 ... 8 000	

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

# Flow control valves and one-way flow control valves

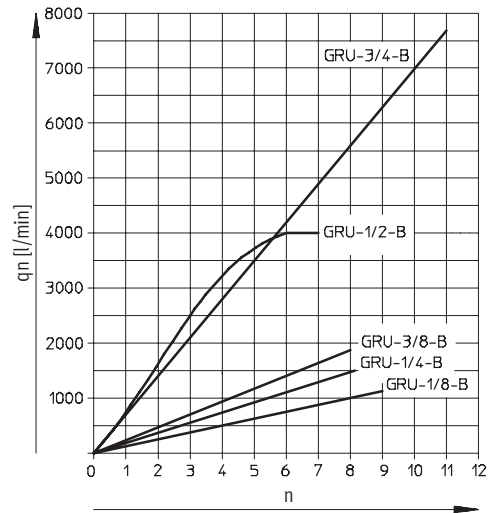
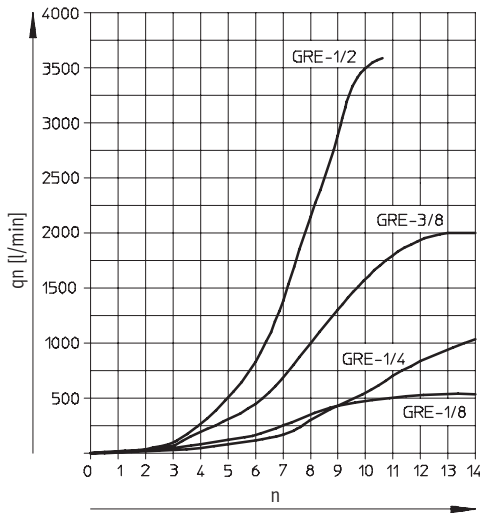
Technical data – Flow control/silencer combinations



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

GRE

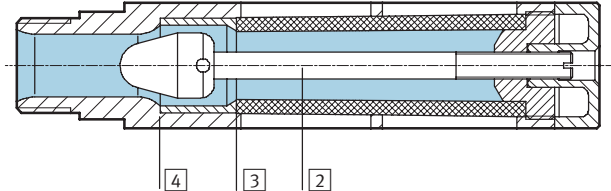
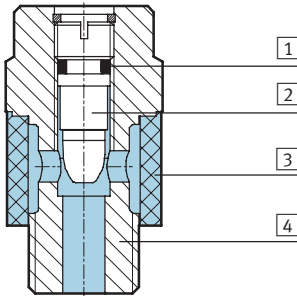
GRU



## Materials

Sectional view GRE

Sectional view GRU

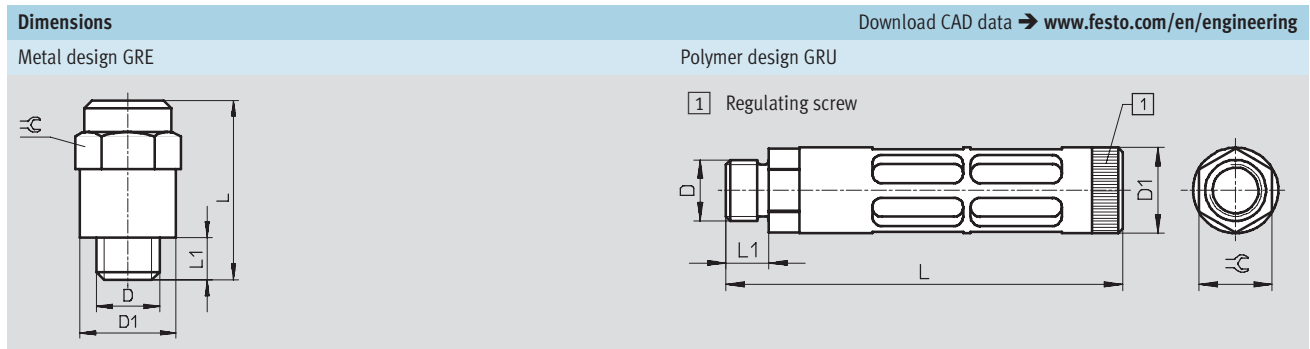


	Metal design GRE	Polymer design GRU
1 Seal	Nitrile rubber	-
2 Regulating screw	Brass	Polyacetal
3 Silencer	Bronze	Polyethylene
4 Housing	Wrought aluminium alloy	Die-cast aluminium



# Flow control valves and one-way flow control valves

Technical data – Flow control/silencer combinations



Screw-in thread D	D1 ∅	L	L1	≡
<b>GRE</b>				
G <sup>1</sup> / <sub>8</sub>	15	28.5	6.5	14
G <sup>1</sup> / <sub>4</sub>	18.2	34	8	17
G <sup>3</sup> / <sub>8</sub>	25	42	8	22
G <sup>1</sup> / <sub>2</sub>	27	48	12	24
<b>GRU</b>				
G <sup>1</sup> / <sub>8</sub>	16	46	5.4	14
G <sup>1</sup> / <sub>4</sub>	19.5	63.3	6.4	17
G <sup>3</sup> / <sub>8</sub>	25	95.3	7.5	19
G <sup>1</sup> / <sub>2</sub>	28	130	14	24
G <sup>3</sup> / <sub>4</sub>	38	157	16	32

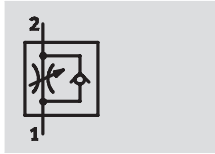
<b>Ordering data</b>										
Version	G <sup>1</sup> / <sub>8</sub>		G <sup>1</sup> / <sub>4</sub>		G <sup>3</sup> / <sub>8</sub>		G <sup>1</sup> / <sub>2</sub>		G <sup>3</sup> / <sub>4</sub>	
	Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type
<b>Metal design</b>										
	<b>10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

# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve for M5 compact system

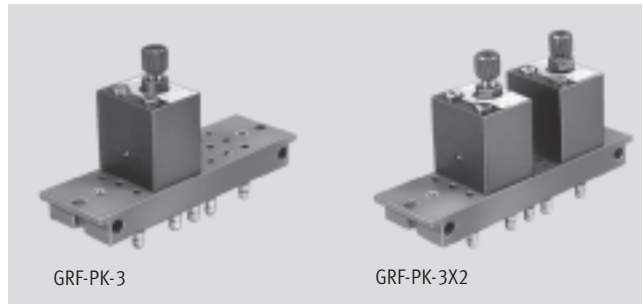


Function



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

One-way flow control  
GRF-PK



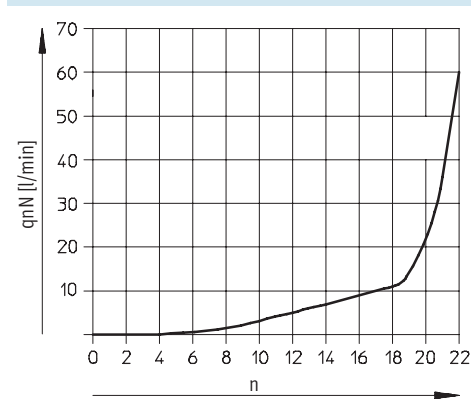
General technical data		
Type	GRF-PK-3	GRF-PK-3X2
Valve function	One-way flow control function	
Pneumatic connection	Barbed fitting PK-3	Barbed fitting PK-3
Setting component	Knurled screw	
Type of mounting	Via through-holes	
Mounting position	Any	
Max. tightening torque [Nm]	6	11

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 $\rightarrow$ 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  $\rightarrow$  5 bar as a function of turns of the adjusting screw n

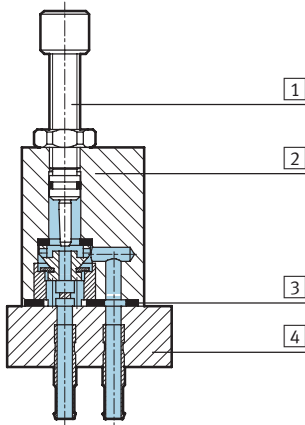


# Flow control valves and one-way flow control valves

Technical data – Standard flow control valve for M5 compact system

## Materials

Sectional view

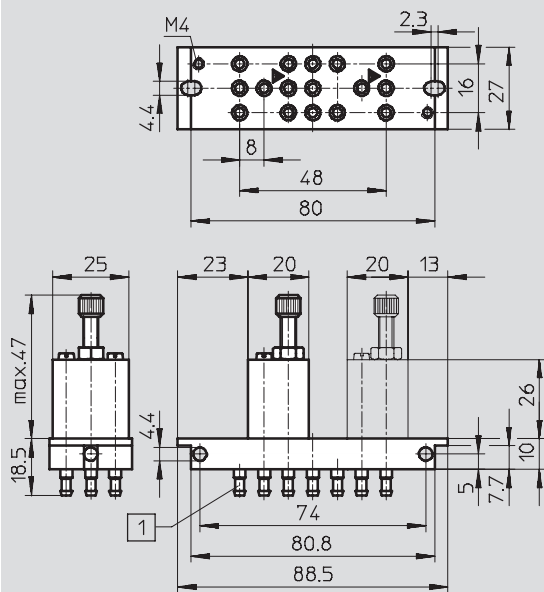


### Flow control valve

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

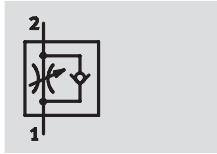
Version	For tubing I.D. [mm]	One-way flow control valve		Two one-way flow control valves	
		Part No.	Type	Part No.	Type
	3	4 565	GRF-PK-3	4 566	GRF-PK-3X2

# Flow control and one-way flow control valves

Technical data – Precision flow control valve on sub-base



## Function



One-way flow control valve  
GRP



Flow control valve, operative in both  
directions  
GRPO

- Low flow:  
Precision adjustment for low speed
- Adjustment via rotary knob



General technical data		
Type	GRP/GRPO-70-1/8-AL	GRP/GRPO-160-1/8-AL
Valve function	GRP	One-way flow control function
	GRPO	Bi-directional flow control function
Pneumatic connection	G1/8	
Means of setting	Rotary knob	
Type of mounting	On sub-base	
Installation position	Any	
Type of actuation	Manual	

• † - Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

Operating and environmental conditions		
Type	GRP/GRPO-70-1/8-AL	GRP/GRPO-160-1/8-AL
Operating medium	Filtered compressed air, lubricated or unlubricated, neutral gases	
Operating pressure	[bar]	0 ... 8
Operating pressure 2 → 1	[bar]	GRP: 0 ... 8, GRPO: 0 ... 0.5
Temperature of medium	[°C]	-10 ... 50
Ambient temperature	[°C]	-10 ... 50

Weight [g]		
Type	GRP/GRPO-70-1/8-AL	GRP/GRPO-160-1/8-AL
	110	110

Standard flow rate qn [l/min] 1 bar → 0 bar		
Type	GRP/GRPO-70-1/8-AL	GRP/GRPO-160-1/8-AL
GRP	D <sup>1)</sup>	0 ... 19
	R <sup>2)</sup>	20 ... 60
GRPO	D <sup>1)</sup>	0 ... 19

1) D: Flow control direction

2) R: Non-return direction

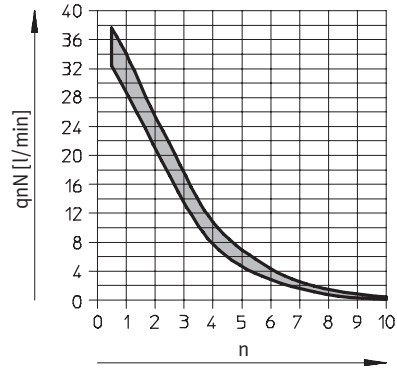
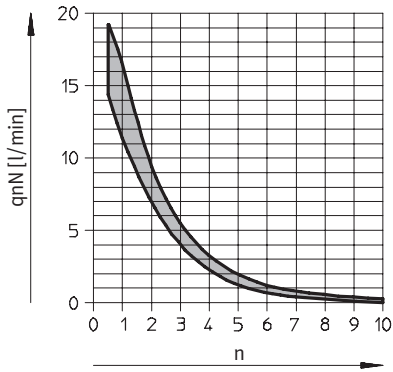
# Flow control and one-way flow control valves

Technical data – Precision flow control valve

## Standard flow rate $q_N$ [l/min] 1 bar $\rightarrow$ 0 bar as a function of turns of the adjusting screw $n$

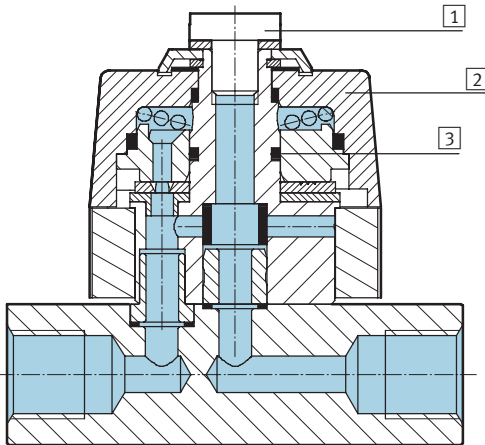
GRP/GRPO-70-1/8-AL

GRP/GRPO-160-1/8-AL



## Materials

Sectional view



### Flow control valve

1	Locking screw	Brass
2	Rotary knob	Reinforced polyamide
3	Seals	Nitrile rubber

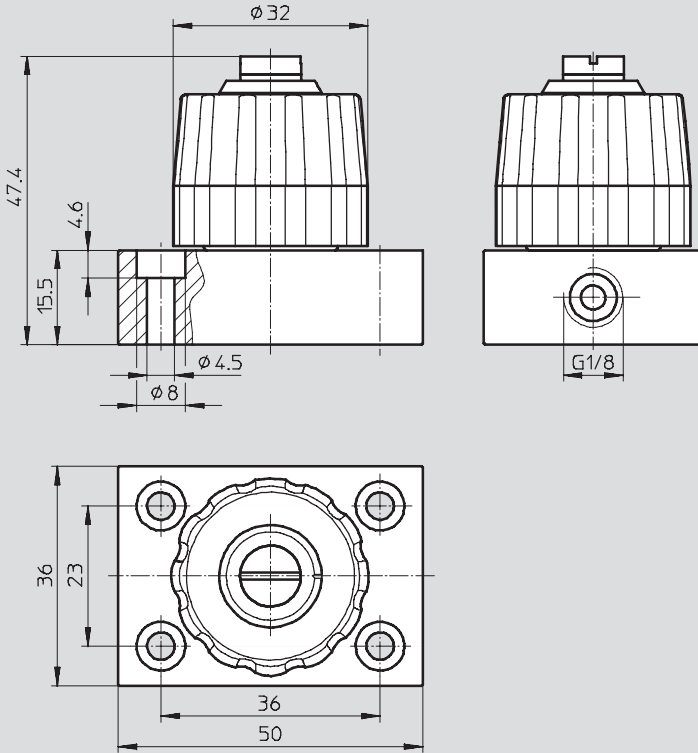
# Flow control and one-way flow control valves

Technical data – Precision flow control valve



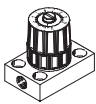
## Dimensions

Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)



Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1.

## Ordering data

Version	One-way flow control valve		Bi-directional flow control valve	
	Part No.	Type	Part No.	Type
	542 022	GRP-70-1/8-AL	542 024	GRPO-70-1/8-AL
	542 023	GRP-160-1/8-AL	542 025	GRPO-160-1/8-AL

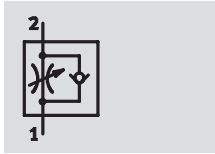
Flow, non-return and regulating valves  
Flow control valves and one-way flow control valves

5.6

# Flow control and one-way flow control valves

Technical data – Precision flow control valve for front panel mounting

Function



One-way flow control valve  
GRP



Flow control valve, operative in both directions  
GRPO

- Low flow:  
Precision adjustment for low speed
- Adjustment via rotary knob



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	Bi-directional flow control function	
Pneumatic connection	Barbed connector PK-3	Barbed connector PK-3	Barbed connector PK-4
Means of setting	Rotary knob		
Type of mounting	Front panel mounting or on sub-base		
Installation position	Any		

Operating and environmental conditions			
Type	GRP/GRPO-10-PK-3	GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
Operating medium	Filtered compressed air, lubricated or unlubricated, neutral gases		
Operating pressure	[bar]	0 ... 6	
Operating pressure 2 → 1	[bar]	GRP: 0 ... 8, GRPO: 0 ... 0.5	
Temperature of medium	[°C]	-10 ... 50	
Ambient temperature	[°C]	-10 ... 50	

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

Standard flow rate qn [l/min] 1 bar → 0 bar			
Type	GRP/GRPO-10-PK-3	GRP/GRPO-70-PK-3	GRP/GRPO-160-PK-4
GRP	D <sup>1)</sup>	0 ... 1.7	0 ... 38
	R <sup>2)</sup>	15 ... 50	25 ... 90
GRPO	D <sup>1)</sup>	0 ... 1.7	0 ... 38

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

# Flow control and one-way flow control valves

Technical data – Precision flow control valve

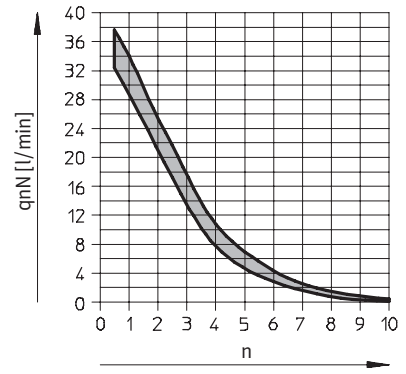
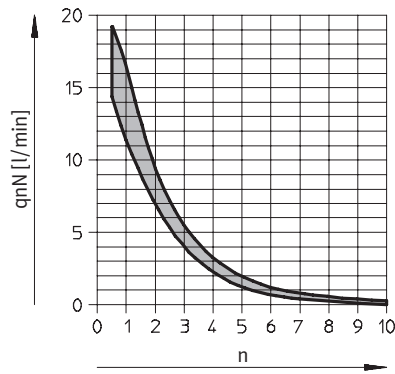
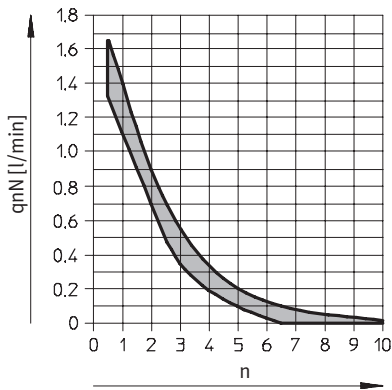


## Standard flow rate $q_N$ [l/min] 1 bar $\rightarrow$ 0 bar as a function of turns of the adjusting screw $n$

GRP/GRPO-10-PK-3

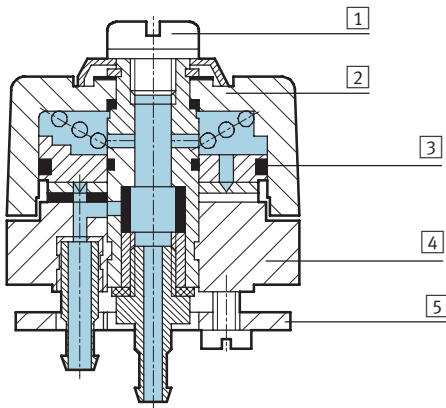
GRP/GRPO-70-PK-3

GRP/GRPO-160-PK-4



## Materials

Sectional view



Flow control valve		
1	Locking screw	Brass
2	Rotary knob	Reinforced polyamide
3	Seals	Nitrile rubber
4	Back plate	Wrought aluminium alloy
5	Mounting plate	Wrought aluminium alloy



# Flow control and one-way flow control valves

Technical data – Precision flow control valve



Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

Dimensions	Mounting aperture	Ports
		<p style="text-align: right;">1 → 2 Flow control direction 2 → 1 Non-return direction</p>

Ordering data					
Version	For tubing I.D. [mm]	One-way flow control function		Bi-directional flow control function	
		Part No.	Type	Part No.	Type
	3	12 743	GRP-10-PK-3	13 229	GRPO-10-PK-3
		10 802	GRP-70-PK-3	10 803	GRPO-70-PK-3
	4	12 961	GRP-160-PK-4	13 230	GRPO-160-PK-4

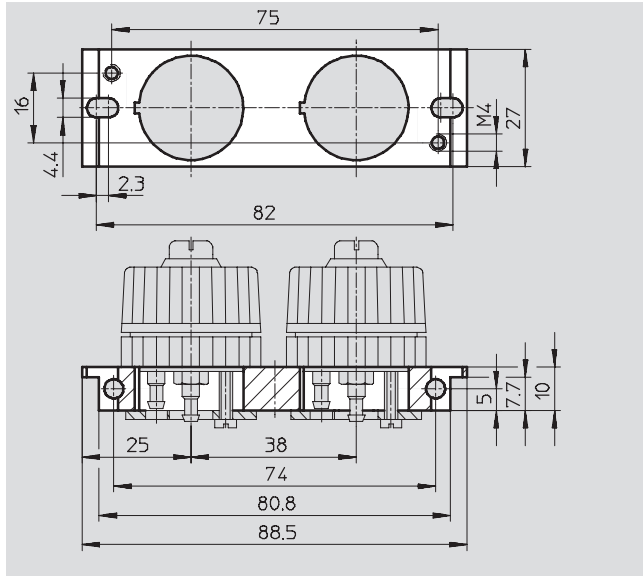
# Flow control and one-way flow control valves

Accessories – Precision flow control valve



**Mounting plate APL-2N-GRP**  
for precision flow control valves

Material:  
Polyamide

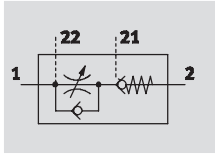


Ordering data					
	For no. of flow control valves	Hole Ø [mm]	Product weight [g]	Part No.	Type
	1	22.5	16	10 391	APL-2N-GRP
	2	2 x 22.5	22	10 392	APL-2N-GRPX2

# Functional combination GRXA-HG

Technical data

Function



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



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

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 fittings for tubing O.D. [mm]	4; 6	6; 8
Type of mounting	Screw in via male 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 40 µm	
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 fitting	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



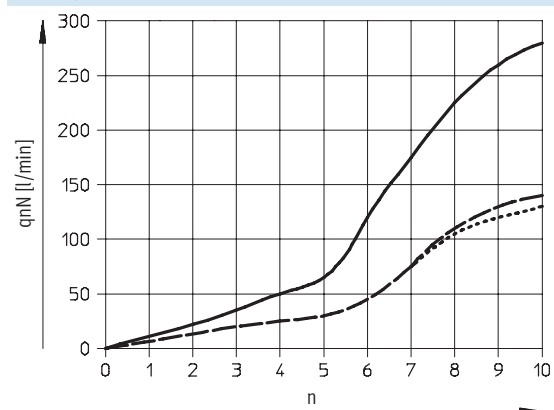
Standard nominal flow rate $q_{nN}$ [l/min] at 6 bar $\rightarrow$ 5 bar				
Screw-in thread		$G\frac{1}{8}$	$G\frac{1}{4}$	
One-way flow control function for exhaust air and piloted non-return valve				
GRXA-HG	QS-4	D <sup>1)</sup>	130	–
		R <sup>2)</sup>	100 ... 140	–
		B <sup>3)</sup>	100 ... 140	–
	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) B: 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-HG	QS-4	D <sup>1)</sup>	210	–
		R <sup>2)</sup>	230 ... 260	–
		B <sup>3)</sup>	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

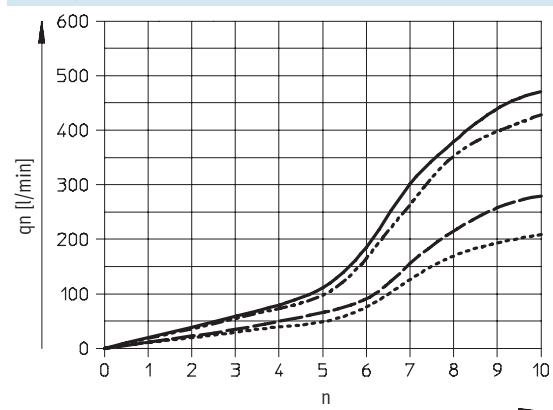
- 1) D: Flow control direction
- 2) R: Non-return direction
- 3) B: Non-return direction actuated

**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



- GRXA-HG-1/4-QS-8
- - GRXA-HG-1/4-QS-6
- ..... GRXA-HG-1/8-QS-6
- · - · GRXA-HG-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



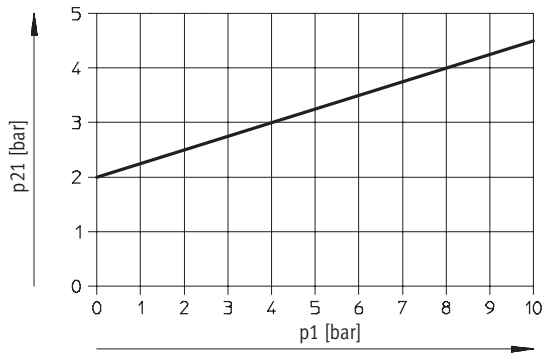
- GRXA-HG-1/4-QS-8
- - GRXA-HG-1/4-QS-6
- ..... GRXA-HG-1/8-QS-6
- · - · GRXA-HG-1/8-QS-4

# Functional combination

Technical data

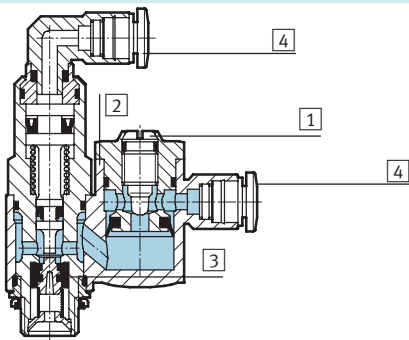
## Minimum pilot pressure as a function of operating pressure

Non-return valve, piloted



## Materials

Sectional view



### Functional combination

1	Adjusting screw	Stainless steel
2	Rotatable connection	Die-cast zinc
3	Seal	Nitrile rubber
4	Release ring	Polyacetate

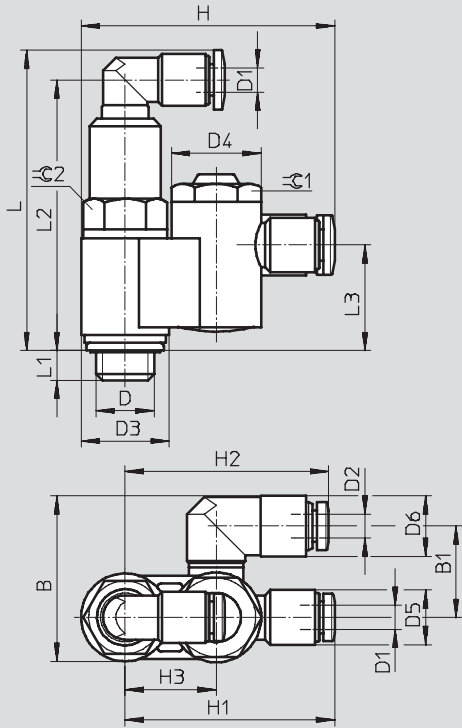
# Functional combination

Technical data



Dimensions Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

Rotatable connection, 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	≈C 1	≈C 2
G <sup>1</sup> / <sub>8</sub>	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 <sup>1</sup> / <sub>4</sub>	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	58.2		48.7							

## Ordering data

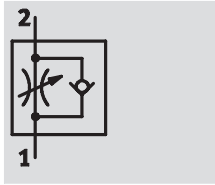
Design	Screw-in thread	For tubing Outside	Part No.	Type
		[mm]		
	G <sup>1</sup> / <sub>8</sub>	4	525 667	GRXA-HG- <sup>1</sup> / <sub>8</sub> -QS-4
		6	525 668	GRXA-HG- <sup>1</sup> / <sub>8</sub> -QS-6
	G <sup>1</sup> / <sub>4</sub>	6	525 669	GRXA-HG- <sup>1</sup> / <sub>4</sub> -QS-6
		8	525 670	GRXA-HG-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

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

# One-way flow control valve VFOC

Technical data

Function



One-way flow control valve

- QS push-in connection
- Adjustment via slotted head screw
- Push-in sleeve for QS push-in fittings
- Exhaust air flow control



General technical data		
Push-in connector	QS-4	QS-6
Valve function	One-way flow control function for exhaust air	
Adjusting facility	Slotted head screw	
QS push-in connectors for tubing O.D. [mm]	4	6
Type of mounting	Push-in sleeve	
Mounting position	Any	

Operating and environmental conditions		
Push-in connector	QS-4	QS-6
Operating medium / pilot medium	Dried air, lubricated or unlubricated, grade of filtration 40µm	
Operating pressure [bar]	0.2 ... 10	
Storage temperature [°C]	-10 ... +40	
Ambient temperature [°C]	-10 ... +60	
Temperature of medium [°C]	-10 ... +60	

Weight		
Push-in connector	QS-4	QS-6
Weight [g]	9.2	21.6

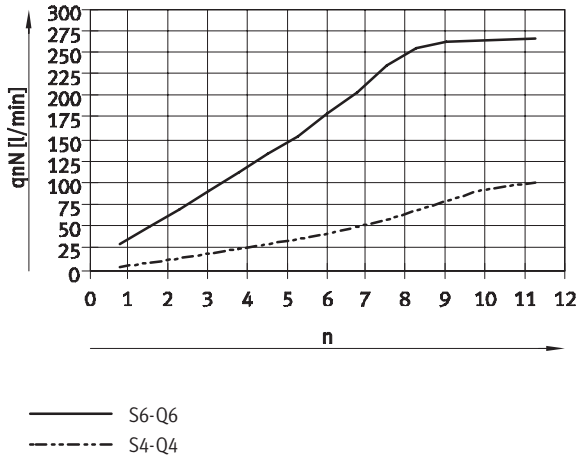
Standard nominal flow rate q <sub>nN</sub> [l/min] at 6 bar → 5 bar		
Push-in connector	QS-4	QS-6
Flow control direction	See graph	See graph
Non-return direction	60 ... 100	170 ... 260

Standard flow rate q <sub>n</sub> [l/min] at 6 bar → 0 bar		
Push-in connector	QS-4	QS-6
Flow control direction	See graph	See graph
Non-return direction	130 ... 160	330 ... 400

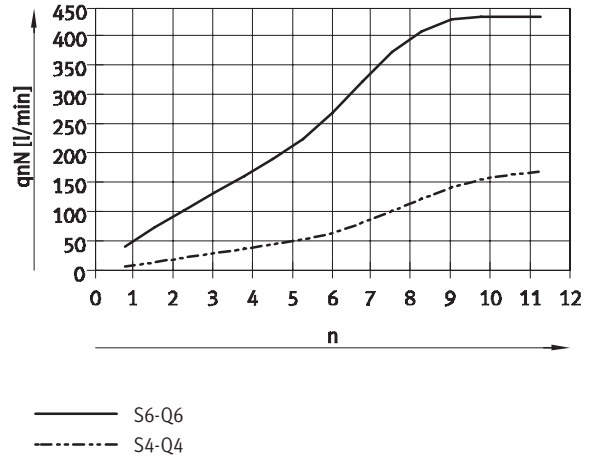
# One-way flow control valve VFOC

Technical data

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

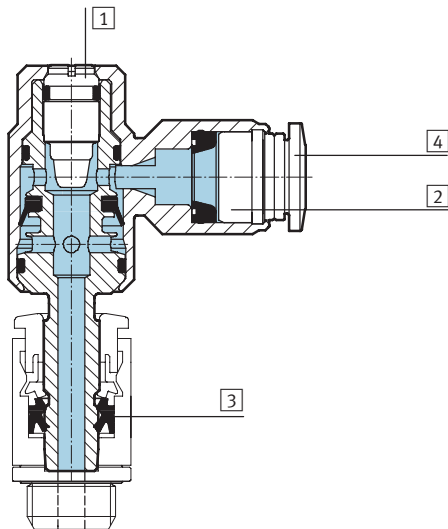


Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of turns of the adjusting screw  $n$




## Materials

Sectional view



One-way flow control valve		
1	Adjusting screw	Stainless steel
2	Rotatable connection	Die-cast zinc
3	Seal	Nitrile rubber
4	Release ring	Polyacetate

 Note  
 The push-in sleeves of the one-way flow control valves VFOC are exclusively matched to QS fittings from Festo, **→ Volume 3**. This combination alone guarantees a secure fit in the push-in fitting.

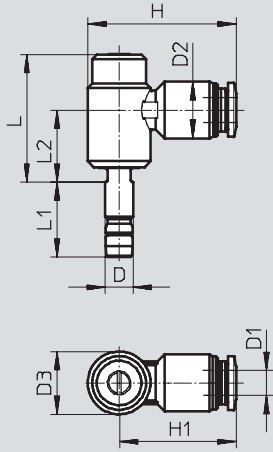


# One-way flow control valve VFOC

Technical data


**Dimensions**

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Type	D	D1	D2 ∅	D3 ∅	H	H1	L	L1	L2
VFOC-E-S4-Q4	S4	QS-4	8.9 ±0.07	10 ±0.2	24.3	20.3	23.2	14.8	13.2
VFOC-E-S6-Q6	S6	QS-6	13.8 ±0.07	12.5 ±0.2	32.6	25.7	28	16.5	15.8

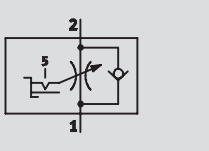
**Ordering data**

Design	Push-in connector	For tubing O.D.	Part No.	Type
		[mm]		
	QS-4	4	540 362	VFOC-E-S4-Q4
	QS-6	6	540 363	VFOC-E-S6-Q6

# One-way flow control valves GRLSA

Technical data

Function



One-way flow control valve with 5 selectable flow control ranges

- QS push-in fittings
- 5 flow control ranges selectable via a rotary switch
- Continuous precision adjustment via internal hex on a reference scale marked with 30 degrees (10 positions)
- Exhaust air flow control



### General technical data

Screw-in thread	G1/8
Valve function	One-way flow control function for exhaust air
Means of adjustment	Internal hex
Actuation type	Manual
Type of mounting	Screw-in
Mounting position	Any
Special features	Freely rotatable around the screw-in axis after installation
Max. tightening torque [Nm]	5.5

### Operating and environmental conditions

Screw-in thread	G1/8
Operating/control medium	Dried air, lubricated or unlubricated, grade of filtration 40 µm
Operating pressure [bar]	0.2 ... 10
Storage temperature [°C]	-10 ... +40
Ambient temperature [°C]	-10 ... +60
Temperature of medium [°C]	-10 ... +60
Pneumatic connection 2	G1/8
Pneumatic connection 1	QS-6

### Weight

Screw-in thread	G1/8
Weight [g]	19.5

### Standard nominal flow rate q<sub>nN</sub> at 6 bar → 5 bar

Screw-in thread	G1/8
Flow control direction [l/min]	0 ... 250
Non-return direction [l/min]	180 ... 310

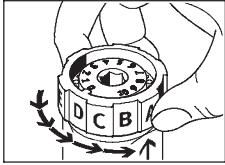
### Standard flow rate q<sub>n</sub> at 6 bar → 0 bar

Screw-in thread	G1/8
Flow control direction [l/min]	0 ... 410
Non-return direction [l/min]	430 ... 540

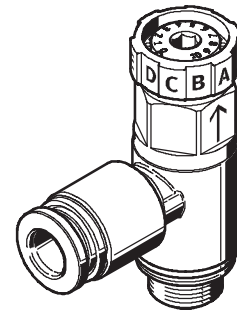
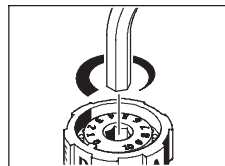
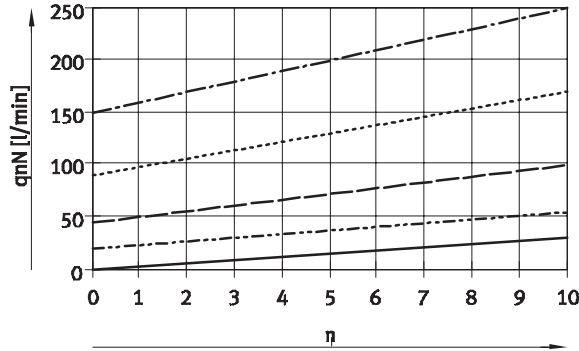
# One-way flow control valves GRLSA

Technical data

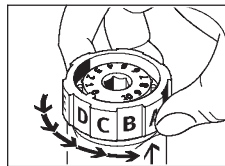
Standard nominal flow rate  $q_{nN}$  at 6 bar  $\rightarrow$  5 bar as a function of spindle swivel angle  $n = 300$  degrees



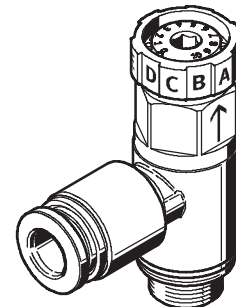
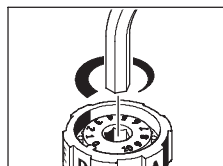
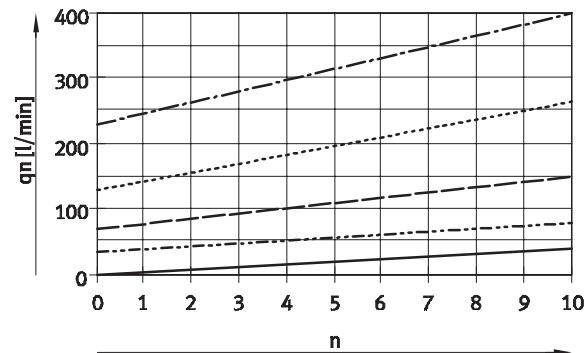
- Setting: A
- - - Setting: B
- — — Setting: C
- · · · · Setting: D
- · - · - Setting: E



Standard flow rate  $q_n$  at 6 bar  $\rightarrow$  0 bar as a function of spindle swivel angle  $n = 300$  degrees



- Setting: A
- - - Setting: B
- — — Setting: C
- · · · · Setting: D
- · - · - Setting: E

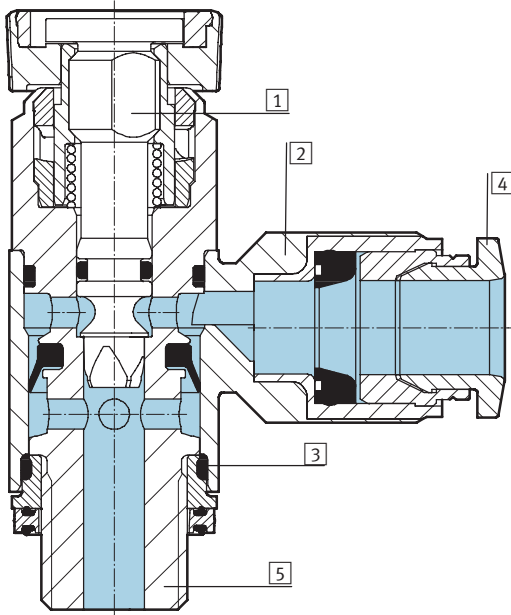


# One-way flow control valves GRLSA

Technical data

## Materials

Sectional view

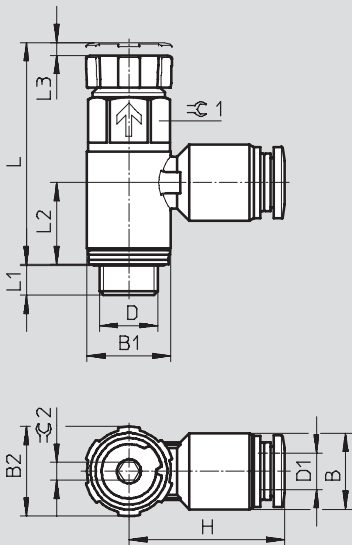


One-way flow control valve

1	Regulating screw	Reinforced polyamide
2	Swivel connection	Die-cast zinc
3	Seal	Nitrile rubber
4	Release ring	Polyacetate
5	Hollow bolt	Wrought aluminium alloy, anodised
		Free of copper and PTFE


## Dimensions

Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)



Type	D	D1	B	B1	B2	H	L	L1	L2	L3	⌀ 1	⌀ 2
GRLSA-1/8-QS-6	G1/8	6	12.5	13.8	15	25.7	36.6	5.1	13.6	2	12	3

## Ordering data

Design	Screw-in thread	QS	Part No.	Type
		[mm]		
	G1/8	6	540 661	GRLSA-1/8-QS-6