One-way flow control valves GRLA, GRLZ

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Worldwide:	Quickest delivery – wherever, whenever	The Core Range offers you the best value for your automation tasks.
Simply good:	Expected high Festo quality	
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Just look for the star!

Key features

Function

The piston speed of both advancing and retracting pneumatic cylinders can be regulated using one-way flow control valves.

This is achieved by restricting the flow rate of compressed air in exhaust air or supply air direction as required. The non-return function works in the opposite direction.

The flow control function creates an adjustable annular gap inside the valve. This gap can be increased or decreased by turning the knurled screw or slotted head screw.

The required restriction can be set with the help of this adjustment element.

General information

Standard nominal flow rate qnN

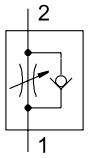
The standard nominal flow rate qnN is the volumetric flow rate based on standard conditions at an operating pressure of p_1 = 6 bar and an output pressure of p_2 = 5 bar, measured at room temperature t = 20°C.

Standard flow rate qn

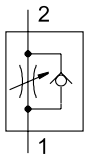
The standard flow rate qn is measured at an operating pressure of p1 = 6 bar and an output pressure with respect to atmospheric pressure (p2 = 0 bar).

Symbols

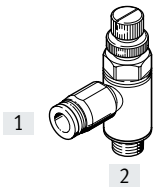
Exhaust air one-way flow control function



Supply air one-way flow control function



Connections

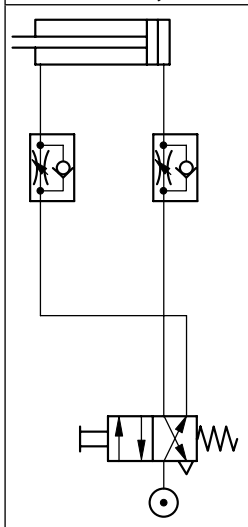
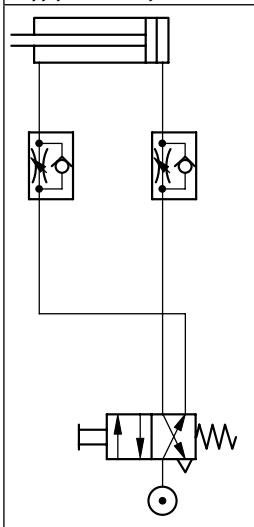
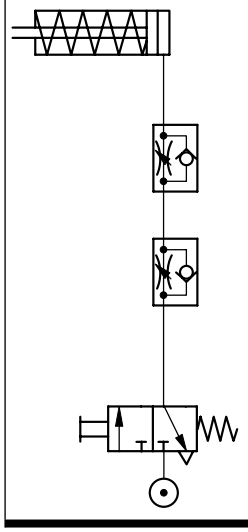
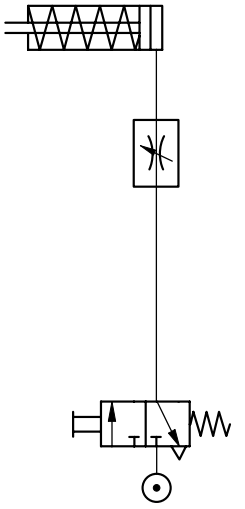


[1] Pneumatic connection 1 (compressed air connection)

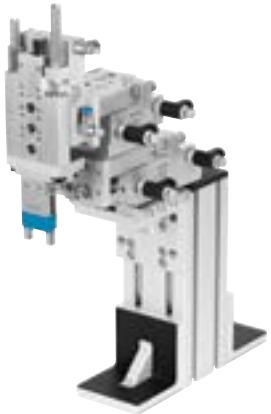
[2] Pneumatic connection 2 (working port)

Key features

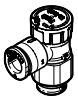
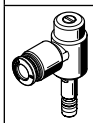
Flow control functions and range of applications

Application	Description	Application	Description
Double-acting cylinder with one-way flow control valve			
Exhaust air one-way flow control function		**Supply air one-way flow control function**	
	Speed is adjustable using exhaust air flow control. Free flowing supply air and throttled exhaust air ensure that the piston moves between the air pockets (improves motion, even with load changes).		Speed for advance and return strokes can be adjusted. The flow rate is identical in both directions.
Single-acting cylinder with one-way flow control valve		**Single-acting cylinder with flow control valve**	
Exhaust air and supply air one-way flow control function		**Flow control function in both directions**	
	Speed for advance and return strokes can be adjusted. The flow rate can be adjusted differently for both directions.		Speed adjustment through flow control on both sides is often used with single-acting or small cylinders. The benefit of this application is its simplicity.

Application examples

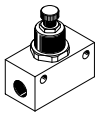
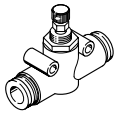
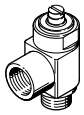
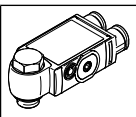
Mini slide SLT with one-way flow control valve, standard	Flat cylinder DZF with one-way flow control valve, mini
	

Product range overview – One-way flow control valves

Version	Valve function	Version	Type	Outlet direction of connection	Pneumatic connection 1	Pneumatic connection 2	qnN[1] [l/min]	Adjusting element	→ Page/ Internet
Standard	**Polymer**								
	Exhaust air one-way flow control function		VFOE-LE	Elbow outlet	QS-4, QS-6, QS-8, QS-10, QS-12	M5, G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2	90 ... 1200	Rotary knob with latch	vfoe
	Supply air one-way flow control function		VFOE-LS	Elbow outlet	QS-4, QS-6, QS-8	M5, M7, G1/8, R1/8	90 ... 180	Rotary knob with latch	vfoe
	Metal								
	Exhaust air one-way flow control function		GRLA	Elbow outlet	QS-3, QS-4, QS-6, QS-8, QS-10, QS-12	M5, G1/8, G1/4, G3/8, G1/2	100 ... 1580	Slotted head screw Knurled screw	7
					M5, G1/8, G1/4, G3/8, G1/2, G3/4	M5, G1/8, G1/4, G3/8, G1/2, G3/4	95 ... 4320	Slotted head screw	
					M5, G1/8, G1/4	M5, G1/8, G1/4	95 ... 610	Knurled screw	
					PK-3, PK-4, PK-6	M5, G1/8, G1/4	83 ... 540	Slotted head screw	
			GRLSA	Elbow outlet	QS-6, QS-8	G1/8, G1/4	0 ... 450	Rotary knob with scale, internal hex	16
	Supply air one-way flow control function		GRLZ	Elbow outlet	QS-3, QS-4, QS-6, QS-8	M5, G1/8	100 ... 215	Slotted head screw	7
					M5, G1/8, G1/4	M5, G1/8, G1/4	95 ... 610	Slotted head screw Knurled screw	
					PK-3, PK-4, PK-6	M5, G1/8, G1/4	83 ... 540	Slotted head screw	
			VFOC-S	Elbow outlet	QS-4, QS-6	Push-in sleeve[2] QS-4, QS-6	0 ... 270	Slotted head screw	vfoc
	Nickel-plated metal								
	Exhaust air one-way flow control function		VFOH-LE	Elbow outlet	QS-4, QS-6, QS-8, QS-10	G1/8, G1/4	180 ... 530	External hex	vfoh

1) Standard nominal flow rate in flow control direction.
2) Only suitable for push-in connector QS.

Product range overview – One-way flow control valves

Version	Valve function	Version	Type	Outlet direction of connection	Pneumatic connection 1	Pneumatic connection 2	qnN[1)] [l/min]	Adjusting element	→ Page/ Internet
Mini	**Metal**								
	Exhaust air one-way flow control function		GRLA	Elbow outlet	QS-3, QS-4	M3, M5	40 ... 41	Slotted head screw	19
					M3	M3	0 ... 18	Slotted head screw	
	Supply air one-way flow control function		GRLZ	Elbow outlet	QS-3, QS-4	M3, M5	41 ... 48	Slotted head screw	
					M3	M3	0 ... 18	Slotted head screw	
In-line installation	**Metal**								
	One-way flow control function		GR/GRA	Straight	M3, M5, G1/8, G1/4, G3/8, G1/2, G3/4	M3, M5, G1/8, G1/4, G3/8, G1/2, G3/4	29.5 ... 3300	Knurled screw	gr
	Polymer								
	One-way flow control function		GR	Straight	QS-3, QS-4, QS-6, QS-8	QS-3, QS-4, QS-6, QS-8	85 ... 265	Knurled screw	gr
Corrosion-resistant	**Stainless steel**								
	Exhaust air one-way flow control function		CRGRLA	Elbow outlet	M5, G1/8, G1/4, G3/8, G1/2	M5, G1/8, G1/4, G3/8, G1/2	95 ... 2100	Slotted head screw	24
Function combination	**Polymer**								
	Exhaust air one-way flow control function		VFOF	Elbow outlet	QS-6, QS-8	G1/8, G1/4	240 ... 590	Internal hex	vfof

1) Standard nominal flow rate in flow control direction.

Type codes

001	Series	
GRLA	One-way flow control valve	
GRLSA	One-way flow control valve	
CRGRLA	One-way flow control valve, corrosion resistant	
GRLZ	One-way flow control valve	

002	Pneumatic connection	
M3	Male thread M3	
M5	Male thread M5	
1/8	Male thread G1/8	
1/4	Male thread G1/4	
3/8	Male thread G3/8	
1/2	Male thread G1/2	
3/4	Male thread G3/4	

003	Pneumatic connection 1	
	Connection size as for port 1 or 2	
QS-3	Push-in connector 3 mm	
QS-4	Push-in connector 4 mm	
QS-6	Push-in connector 6 mm	
QS-8	Push-in connector 8 mm	
QS-10	Push-in connector 10 mm	
QS-12	Push-in connector 12 mm	
PK-3	CK connection 3 mm	
PK-4	CK connection 4 mm	
PK-6	CK connection 6 mm	

004	Adjusting component	
	Standard	
RS	Knurled screw	

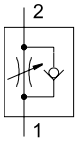
005	Flow rate characteristic	
	None	
LF	Low flow	
MF	Medium flow	

006	Generation	
	None	
B	Series B	
C	Series C	
D	D series	

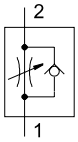
Datasheet – Push-in connector QS, metal

One-way flow control function

Exhaust air



Supply air



Can be rotated 360° around the screw-in axis after installation.

- Flow rate
  100 ... 1580 l/min
- Temperature range
  –10 ... +60°C
- Operating pressure
  0.2 ... 10 bar

GRLA/GRLZ

GRLA-...-RS

General technical data – GRLA

Pneumatic connection 2		M5	G1/8	G1/4	G3/8	G1/2
Pneumatic connection 1		QS-3, QS-4, QS-6	QS-3, QS-4, QS-6, QS-8	QS-6, QS-8, QS-10	QS-6, QS-8, QS-10	QS-12
Valve function		Exhaust air one-way flow control function				
Adjusting element		Slotted head screw				
		Knurled screw				
Type of mounting		Screw-in, via male thread				
Mounting position		Any				
Nominal tightening torque	[Nm]	0.8 ±10%	3 ±10%	5 ±10%	10 ±10%	15 ±10%

General technical data – GRLZ

Pneumatic connection 2		M5	G1/8
Pneumatic connection 1		QS-3, QS-4, QS-6	QS-3, QS-4, QS-6, QS-8
Valve function		Supply air one-way flow control function	
Adjusting element		Slotted head screw	
Type of mounting		Screw-in, via male thread	
Mounting position		Any	
Nominal tightening torque	[Nm]	0.8 ±10%	3 ±10%

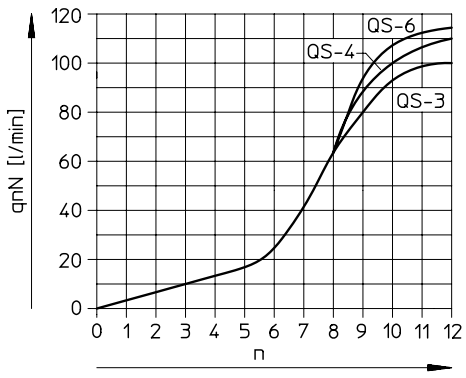
Operating and environmental conditions

Operating pressure for entire temperature range	[bar]	0.2 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Ambient temperature	[°C]	–10 ... +60
Temperature of medium	[°C]	–10 ... +60
Storage temperature	[°C]	–10 ... +40
Maritime classification		See certificate[1)]

1) More information: www.festo.com/catalogue/grla → Support/Downloads

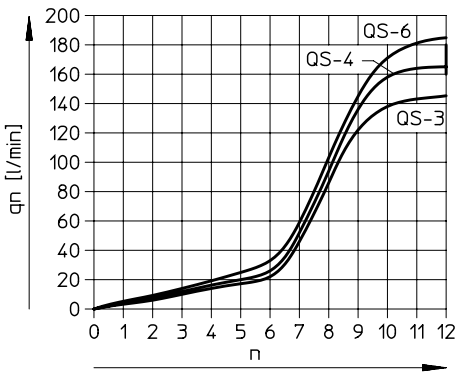
Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

GRLA/GRLZ-M5



Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

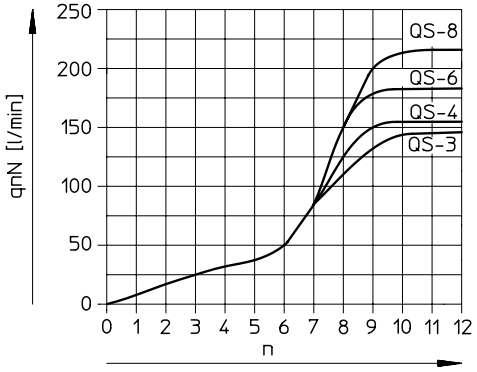
GRLA/GRLZ-M5



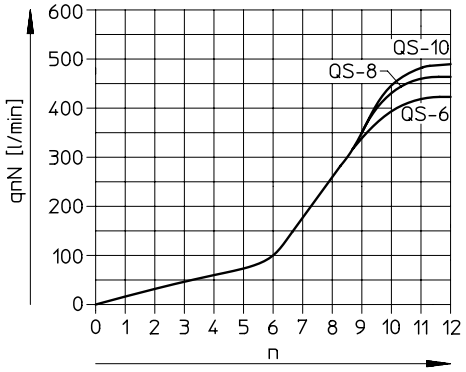
Datasheet – Push-in connector QS, metal

Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

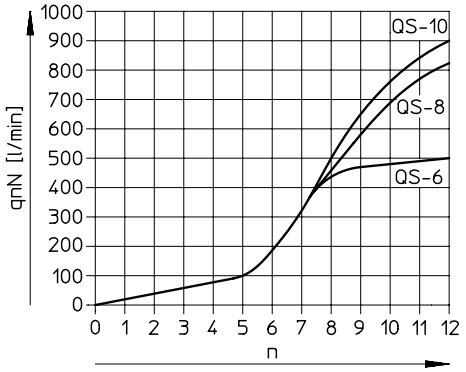
GRLA/GRLZ-1/8



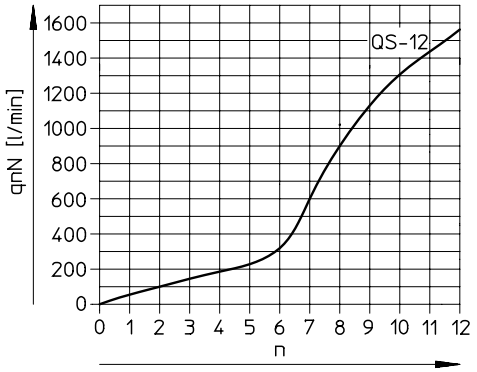
GRLA-1/8-...-MF, GRLA-1/4



GRLA-3/8

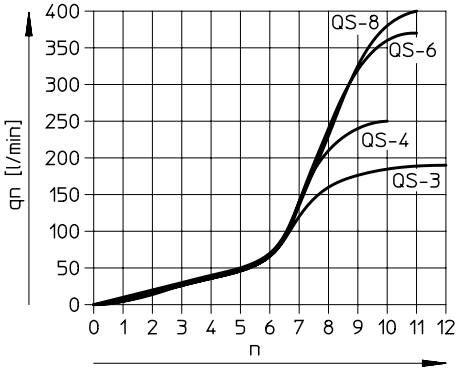


GRLA-1/2

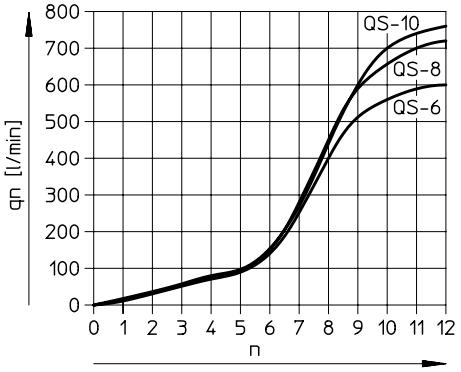


Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

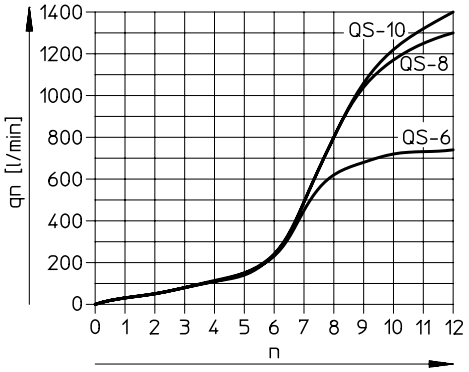
GRLA/GRLZ-1/8



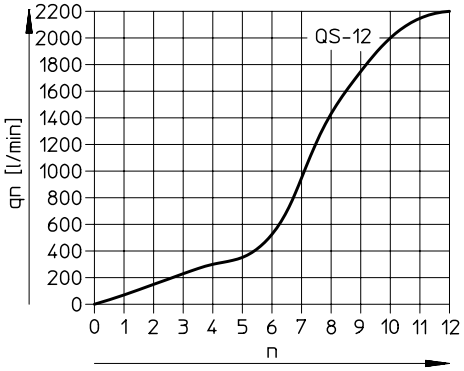
GRLA-1/8-...-MF, GRLA-1/4



GRLA-3/8



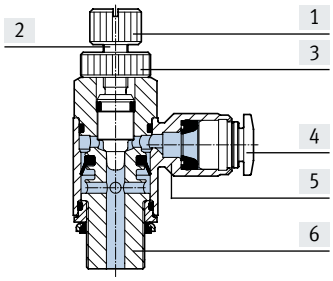
GRLA-1/2



Datasheet – Push-in connector QS, metal

Materials

Sectional view

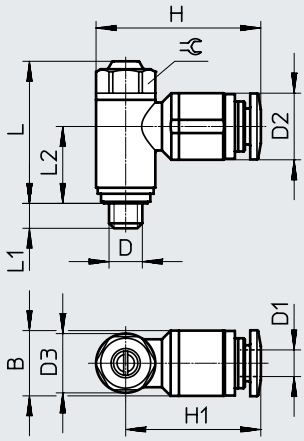


One-way flow control valve		
[1]	Knurled head (GRLA-...-RS only)	Anodised wrought aluminium alloy
[2]	Adjusting screw	Brass
[3]	Hollow bolt (GRLA-...-RS only)	Anodised wrought aluminium alloy
[4]	Releasing ring	POM
[5]	Swivel joint	Chromated die-cast zinc
[6]	Screwed trunnion	Anodised wrought aluminium alloy GRLA/GRLZ-M5: Brass
–	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

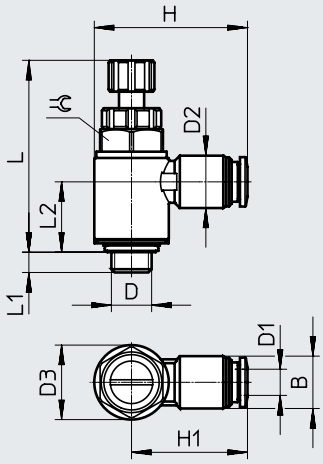
Dimensions

Download CAD data ➔ www.festo.com

Slotted head screw



Knurled screw



Type	Connection	Tubing O.D.	B	D2	D3	~H	~H1	~L				L1	~L2	⫧
								Slotted head screw		Knurled screw				
	D	D1		ø	ø									
GRL...-M5	M5	3	–	8.2 +0.15	8.9 ±0.07	22.4	18	20.8	±3.3%	31.5	±2.4%	3.9 +0.1/–0.45	10.7	8
		4	9.8 ±0.2	10.0 ±0.2		24.7	20.3							
		6	–	12.0 ±0.2		26.5	22						9.7	
GRL...-1/8	G1/8	3	–	10.2 ±0.2	13.8 ±0.07	31.9	25	26.5	±2.1%	40.4	±1.6%	5.05 +0.15/–0.3	14.2	12
		4		10.2 ±0.2		29.4	22.5						13.5	
		6		12.5 ±0.2		32.6	25.7							
		8		14.5 ±0.2		35.6	28.7							
GRLA-1/8-...-MF		6	–	12.5 ±0.2	17.8 ±0.15	36.6	27.7	30.9	±1.9%	–		5.05 +0.15/–0.3	17	15
		8		14.5 ±0.2		39.6	30.7							
GRLA-1/4	G1/4	6	–	12.5 ±0.2	17.8 ±0.15	36.6	27.7	31.5	±1.9%	48.5	±1.4%	5.9 +0.17/–0.25	17.2	15
		8		14.5 ±0.2		39.6	30.7							
		10		17.5 ±0.2		42.0	33.1						16.1	
GRLA-3/8	G3/8	6	–	12.5 ±0.2	22.4 ±0.15	39.8	28.6	35.3	±1.7%	55	±1.3%	6.9 +0.15/–0.3	19.55	19
		8		14.5 ±0.2		44.1	32.9							
		10		17.5 ±0.2		46.7	35.5							
GRLA-1/2	G1/2	12	–	20.5 ±0.15	27.8 ±0.15	55.3	41.4	42.6	±1.4%	65.9	±1.1%	8.35 +0.15/–0.3	22.75	24

Datasheet – Push-in connector QS, metal

★ Core Range

Ordering data – Exhaust air one-way flow control function

	Pneumatic connection		Standard nominal flow rate qnN At 6 → 5 bar		Standard flow rate qn At 6 → 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Slotted head screw									
	M5	QS-3	100	60 ... 100	145	150 ... 170	13	★ 193137	GRLA-M5-QS-3-D
		QS-4	110	65 ... 110	165	140 ... 160		★ 193138	GRLA-M5-QS-4-D
		QS-6	115	70 ... 110	185	145 ... 170		★ 193139	GRLA-M5-QS-6-D
	G1/8	QS-3	130	100 ... 130	180	200 ... 220	22	★ 193142	GRLA-1/8-QS-3-D
		QS-4	160	120 ... 190	250	270 ... 300		★ 193143	GRLA-1/8-QS-4-D
		QS-6	185	160 ... 240	370	330 ... 390		★ 193144	GRLA-1/8-QS-6-D
			400	290 ... 420	600	570 ... 680	32	★ 537075	GRLA-1/8-QS-6-MF-D
		QS-8	215	175 ... 250	400	330 ... 410	22	★ 193145	GRLA-1/8-QS-8-D
			475	325 ... 500	720	610 ... 760	32	★ 537076	GRLA-1/8-QS-8-MF-D
	G1/4	QS-6	400	290 ... 420	600	570 ... 680	42	★ 193146	GRLA-1/4-QS-6-D
		QS-8	475	325 ... 500	720	610 ... 760		★ 193147	GRLA-1/4-QS-8-D
		QS-10	480	345 ... 500	760	630 ... 790		★ 193148	GRLA-1/4-QS-10-D
	G3/8	QS-6	495	320 ... 495	740	840 ... 890	60	★ 193149	GRLA-3/8-QS-6-D
		QS-8	820	450 ... 850	1300	1080 ... 1420		★ 193150	GRLA-3/8-QS-8-D
		QS-10	900	540 ... 975	1400	1160 ... 1620		★ 193151	GRLA-3/8-QS-10-D
	G1/2	QS-12	1580	925 ... 1605	2220	1910 ... 2500	106	★ 193152	GRLA-1/2-QS-12-D
Knurled screw									
	M5	QS-3	100	60 ... 100	145	150 ... 170	14	★ 197576	GRLA-M5-QS-3-RS-D
		QS-4	110	65 ... 110	165	140 ... 160		★ 197577	GRLA-M5-QS-4-RS-D
		QS-6	115	70 ... 110	185	145 ... 170		★ 197578	GRLA-M5-QS-6-RS-D
	G1/8	QS-3	130	100 ... 130	180	200 ... 220	23	★ 197579	GRLA-1/8-QS-3-RS-D
		QS-4	160	120 ... 190	250	270 ... 300		★ 197580	GRLA-1/8-QS-4-RS-D
		QS-6	185	160 ... 240	370	330 ... 390		★ 197581	GRLA-1/8-QS-6-RS-D
		QS-8	215	175 ... 250	400	330 ... 410	24	★ 534337	GRLA-1/8-QS-8-RS-D
	G1/4	QS-6	400	290 ... 420	600	570 ... 680	50	★ 534338	GRLA-1/4-QS-6-RS-D
		QS-8	475	325 ... 500	720	610 ... 760		★ 534339	GRLA-1/4-QS-8-RS-D
		QS-10	480	345 ... 500	760	630 ... 790		★ 534340	GRLA-1/4-QS-10-RS-D
	G3/8	QS-6	495	320 ... 495	740	840 ... 890	72	★ 534341	GRLA-3/8-QS-6-RS-D
		QS-8	820	450 ... 850	1300	1080 ... 1420		★ 534342	GRLA-3/8-QS-8-RS-D
		QS-10	900	540 ... 975	1400	1160 ... 1620		★ 534343	GRLA-3/8-QS-10-RS-D
	G1/2	QS-12	1580	925 ... 1605	2220	1910 ... 2500	124	★ 534344	GRLA-1/2-QS-12-RS-D

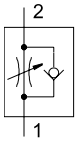
Ordering data – Supply air one-way flow control function

	Pneumatic connection		Standard nominal flow rate qnN At 6 → 5 bar		Standard flow rate qn At 6 → 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Slotted head screw									
	M5	QS-3	100	60 ... 100	135	130 ... 160	13	★ 193153	GRLZ-M5-QS-3-D
		QS-4	110	65 ... 110	160	150 ... 180		★ 193154	GRLZ-M5-QS-4-D
		QS-6	115	70 ... 110	170	160 ... 200		★ 193155	GRLZ-M5-QS-6-D
	G1/8	QS-3	130	100 ... 130	200	180 ... 200	22	★ 193156	GRLZ-1/8-QS-3-D
		QS-4	160	120 ... 190	300	260 ... 290		★ 193157	GRLZ-1/8-QS-4-D
		QS-6	185	160 ... 240	340	390 ... 460		★ 193158	GRLZ-1/8-QS-6-D
		QS-8	215	175 ... 250	370	390 ... 470		★ 193159	GRLZ-1/8-QS-8-D

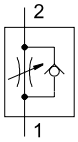
Datasheet – Female thread/barbed connector, metal

One-way flow control function

Exhaust air



Supply air



Flow rate
83 ... 4320 l/min

Temperature range
–10 ... +60°C

Operating pressure
0.2 ... 10 bar

GRLA/GRLZ

GRLA/GRLZ-...-RS

GRLA/GRLZ-...-PK

General technical data – GRLA

Connection type		Female thread						Barbed connector		
Pneumatic connection 2		M5	G1/8	G1/4	G3/8	G1/2	G3/4	M5	G1/8	G1/4
Pneumatic connection 1		M5[1)]	G1/8[1)]	G1/4[1)]	G3/8[1)]	G1/2[1)]	G3/4[1)]	PK-3, PK-4	PK-3, PK-4, PK-6	PK-4, PK-6
Valve function		Exhaust air one-way flow control function								
Adjusting element		Slotted head screw								
		Knurled screw			–					
Type of mounting		Screw-in								
Mounting position		Any								
Max. tightening torque	[Nm]	1.5	6	11	20	40	60	1.5	6	11

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

General technical data – GRLZ

Connection type		Female thread			Barbed connector		
Pneumatic connection 2		M5	G1/8	G1/4	M5	G1/8	G1/4
Pneumatic connection 1		M5[1)]	G1/8[1)]	G1/4[1)]	PK-3, PK-4	PK-3, PK-4, PK-6	PK-4, PK-6
Valve function		Supply air one-way flow control function					
Adjusting element		Slotted head screw					
		Knurled screw			–		
Type of mounting		Screw-in					
Mounting position		Any					
Max. tightening torque	[Nm]	1.5	6	11	1.5	6	11

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

Operating and environmental conditions

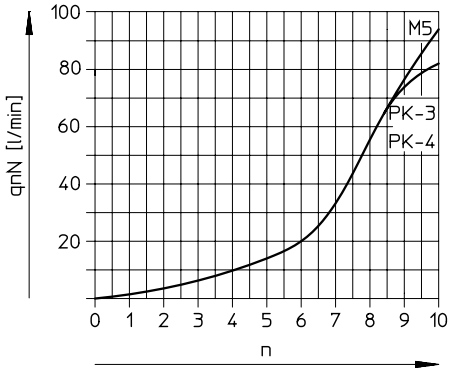
Pneumatic connection 2		M5	G1/8	G1/4	G3/8	G1/2	G3/4
Operating pressure for entire temperature range	[bar]	0.2 ... 10	0.3 ... 10				
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]					
Note on the operating/pilot medium		Lubricated operation possible (in which case lubrication will always be required)					
Ambient temperature	[°C]	–10 ... +60					
Temperature of medium	[°C]	–10 ... +60					
Storage temperature	[°C]	–10 ... +40					
Maritime classification		GRLA: see certificate[1)]					

1) More information: www.festo.com/catalogue/grla → Support/Downloads

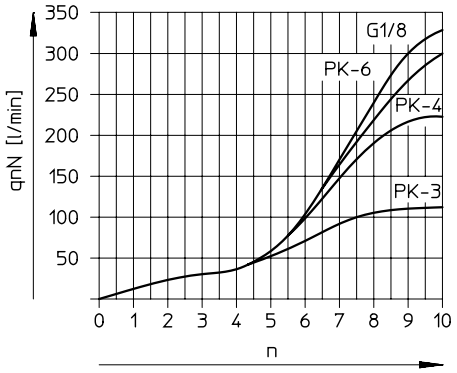
Datasheet – Female thread/barbed connector, metal

Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

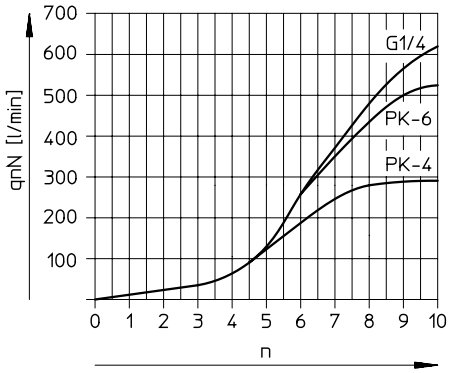
GRLA/GRLZ-M5



GRLA/GRLZ-1/8

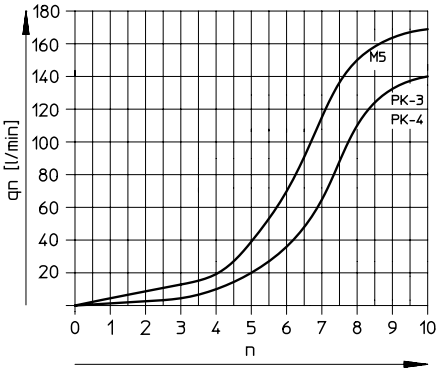


GRLA/GRLZ-1/4

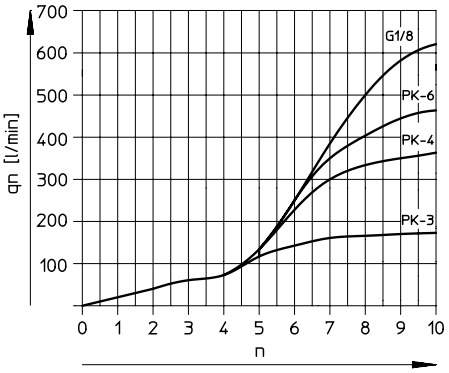


Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

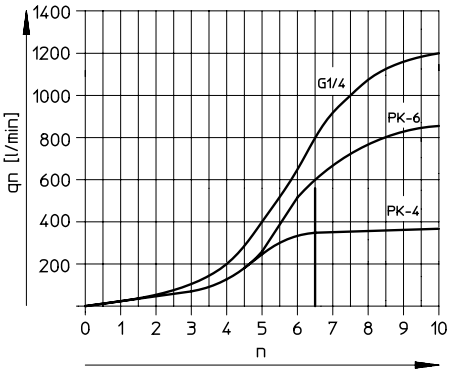
GRLA/GRLZ-M5



GRLA/GRLZ-1/8



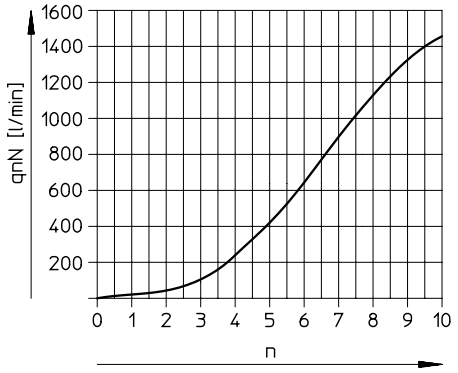
GRLA/GRLZ-1/4



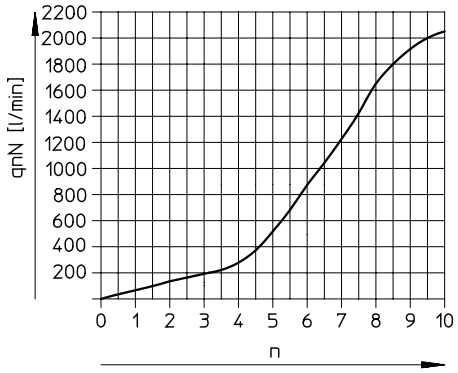
Datasheet – Female thread/barbed connector, metal

Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

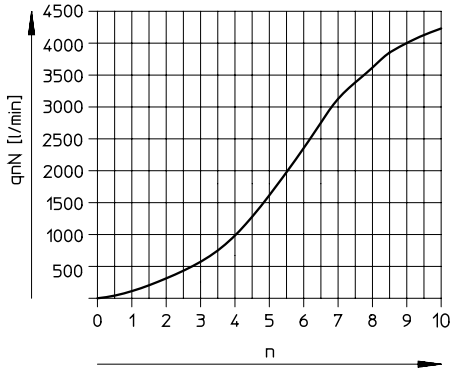
GRLA-3/8



GRLA-1/2

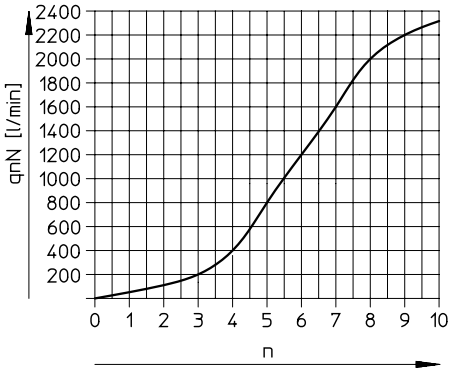


GRLA-3/4

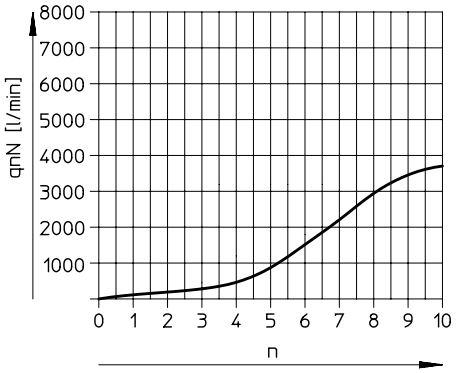


Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

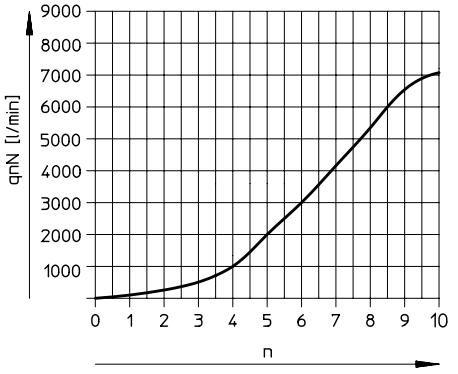
GRLA-3/8



GRLA-1/2

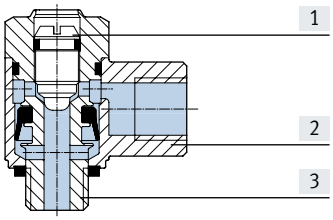


GRLA-3/4



Materials

Sectional view

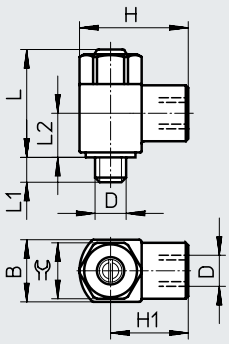


One-way flow control valve		
[1]	Adjusting screw	Brass
[2]	Swivel joint	Die-cast zinc
[3]	Screwed trunnion	Wrought aluminium alloy GRLA/GRLZ-M5: Nickel-plated brass
–	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

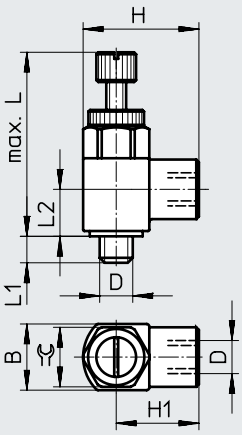
Datasheet – Female thread/barbed connector, metal

Dimensions – Connection type: Female thread Download CAD data ➔ www.festo.com

Slotted head screw



Knurled screw

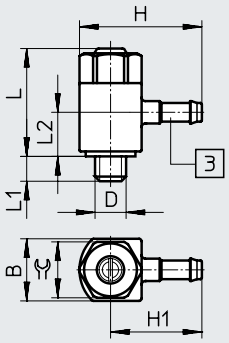


Type	Connection D	Nominal size [mm]	B	~H	~H1	~L Slotted head screw		~L Knurled screw		L1	~L2	⌀
GRL...-M5	M5	2	10 –0.15	17.5	12.5	18	±6.2%	28	±3.4%	4.0 ±0.3	7.1	9
GRL...-1/8	G1/8	4	16 –0.15	28	20	26	±3.9%	39.4	±2.1%	5.3 +0.45/–0.35	10.3	14
GRL...-1/4	G1/4	6	20 –0.2	36	26	31.7	±3.2%	47.4	±2.0%	8.2 +0.45/–0.35	13.2	17
GRLA-3/8	G3/8	8.5	25 –0.2	41	28.5	38.5	±2.9%	–		8.8 +0.45/–0.35	15.5	22
GRLA-1/2	G1/2	10.6	32 –0.2	53	37	50	±2.4%	–		12.8 ±0.45	18.9	27
GRLA-3/4	G3/4	14	41 –0.3	64	43.5	61.8	±2.2%	–		13.5 ±0.5	24.5	36

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

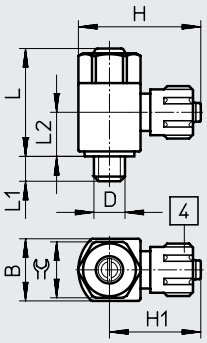
Dimensions – Connection type: Barbed connector Download CAD data ➔ www.festo.com

GRL...-M5



[3] Barbed connector

GRL...-1/8, GRL...-1/4

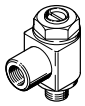
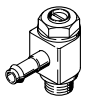
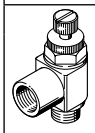


[4] Union nut

Type	Connection D	Nominal size [mm]	B	~H	~H1	~L		L1	~L2	⌀
GRL...-M5-PK-3	M5	2	10 –0.15	19.7	14.7	18	±5.7%	4.0 ±0.3	8.5	9
GRL...-M5-PK-4			10 –0.15	21.7	16.7	18	±5.7%	4.0 ±0.3	8.5	9
GRL...-1/8-PK-3	G1/8	4	16 –0.15	27.1	19.1	26	±3.9%	5.3 +0.45/–0.35	13.4	14
GRL...-1/8-PK-4			16 –0.15	30.2	22.2	26	±3.9%	5.3 +0.45/–0.35	13.4	14
GRL...-1/8-PK-6			16 –0.15	30.3	22.3	26	±3.9%	5.3 +0.45/–0.35	12.0	14
GRL...-1/4-PK-4	G1/4	6	20 –0.2	34.2	24.2	31.7	±3.3%	8.2 +0.45/–0.35	16.9	17
GRL...-1/4-PK-6			20 –0.2	34.3	24.3	31.7	±3.3%	8.2 +0.45/–0.35	17.2	17

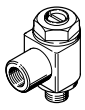
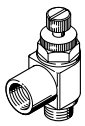
Datasheet – Female thread/barbed connector, metal

Ordering data – Exhaust air one-way flow control function

	Pneumatic connection		Standard nominal flow rate qnN At 6 → 5 bar		Standard flow rate qn At 6 → 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Slotted head screw									
	M5	M5	95	76 ... 95	169	135 ... 170	11	**151160**	**GRLA-M5-B**
	G1/8	G1/8	340	260 ... 420	615	470 ... 760	28	**151165**	**GRLA-1/8-B**
	G1/4[2]	G1/4[3]	610	450 ... 820	1200	885 ... 1615	59	**151172**	**GRLA-1/4-B**
	G3/8	G3/8	1450	970 ... 1600	2300	1540 ... 2540	97	**151178**	**GRLA-3/8-B**
	G1/2	G1/2	2100	1550 ... 2200	4000	2950 ... 4190	204	**151179**	**GRLA-1/2-B**
	G3/4	G3/4	4320	3220 ... 4720	7300	5440 ... 7300	377	**151180**	**GRLA-3/4-B**
	M5	PK-3	83	72 ... 83	140	120 ... 140	10	**151161**	**GRLA-M5-PK-3-B**
		PK-4	83	76 ... 88	140	128 ... 148	10	**151162**	**GRLA-M5-PK-4-B**
	G1/8	PK-3[1]	110	100 ... 110	162	145 ... 165	22	**151166**	**GRLA-1/8-PK-3-B**
		PK-4[1]	230	190 ... 240	360	295 ... 375	25	**151167**	**GRLA-1/8-PK-4-B**
		PK-6[1]	300	210 ... 290	455	320 ... 440	26	**151168**	**GRLA-1/8-PK-6-B**
	G1/4[2]	PK-4[4]	260	220 ... 260	370	315 ... 370	44	**151173**	**GRLA-1/4-PK-4-B**
		PK-6[4]	540	410 ... 585	840	635 ... 910	45	**151174**	**GRLA-1/4-PK-6-B**
Knurled screw									
	M5	M5	95	76 ... 95	169	135 ... 170	12	**151163**	**GRLA-M5-RS-B**
	G1/8	G1/8	340	260 ... 420	615	470 ... 760	30	**151169**	**GRLA-1/8-RS-B**
	G1/4[2]	G1/4[3]	610	450 ... 820	1200	885 ... 1615	59	**151175**	**GRLA-1/4-RS-B**

1) Via union nut
2) Male thread
3) Female thread
4) For barbed connector internal diameter with union nut

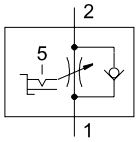
Ordering data – Supply air one-way flow control function

	Pneumatic connection		Standard nominal flow rate qnN At 6 → 5 bar		Standard flow rate qn At 6 → 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Slotted head screw									
	M5	M5	95	76 ... 95	169	135 ... 170	11	**151183**	**GRLZ-M5-B**
	G1/8	G1/8	340	260 ... 420	615	470 ... 760	28	**151188**	**GRLZ-1/8-B**
	G1/4[2]	G1/4[3]	610	450 ... 820	1200	885 ... 1615	59	**151195**	**GRLZ-1/4-B**
	M5	PK-3	83	72 ... 83	140	120 ... 140	10	**151184**	**GRLZ-M5-PK-3-B**
		PK-4	83	76 ... 88	140	125 ... 150	10	**151185**	**GRLZ-M5-PK-4-B**
	G1/8	PK-3[1]	110	100 ... 110	162	145 ... 165	22	**151189**	**GRLZ-1/8-PK-3-B**
		PK-4[1]	230	190 ... 240	360	295 ... 375	25	**151190**	**GRLZ-1/8-PK-4-B**
		PK-6[1]	300	210 ... 290	455	320 ... 440	26	**151191**	**GRLZ-1/8-PK-6-B**
	G1/4[2]	PK-4[4]	260	220 ... 260	370	315 ... 370	44	**151196**	**GRLZ-1/4-PK-4-B**
		PK-6[4]	540	410 ... 585	840	635 ... 910	45	**151197**	**GRLZ-1/4-PK-6-B**
Knurled screw									
	M5	M5	95	76 ... 95	169	135 ... 170	12	**151186**	**GRLZ-M5-RS-B**
	G1/8	G1/8	340	260 ... 420	615	470 ... 760	30	**151192**	**GRLZ-1/8-RS-B**
	G1/4[2]	G1/4[3]	610	450 ... 820	1200	885 ... 1615	59	**151198**	**GRLZ-1/4-RS-B**

1) Via union nut
2) Male thread
3) Female thread
4) For barbed connector internal diameter with union nut

Datasheet – Push-in connector QS, metal

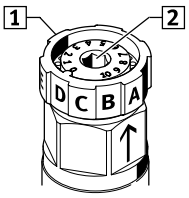
One-way flow control function
Exhaust air



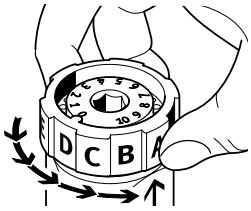
- Flow rate
  0 ... 450 l/min
- Temperature range
  –10 ... +60°C
- Operating pressure
  0.2 ... 10 bar

This one-way flow control valve provides the perfect conditions and a unique design for optimum and easy setting of the flow rate.

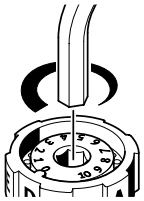
There are two setting options:



[1] Gradual for preselecting the flow rate range in 5 steps using a rotary switch:
A, B, C, D, E



[2] Infinitely variable for precision adjustment with a hex key using a scale marked from 0 to 10



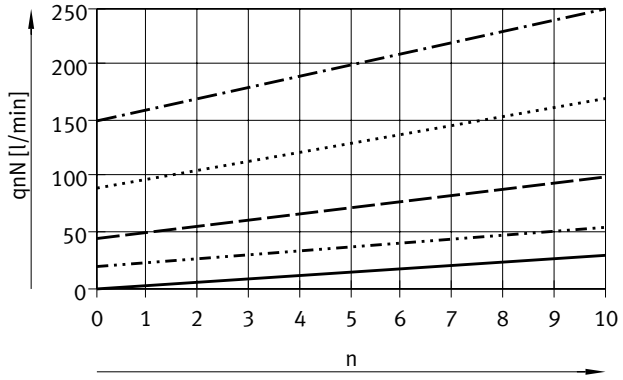
General technical data			
Pneumatic connection 2		G1/8	G1/4
Pneumatic connection 1		QS-6	QS-8
Valve function		Exhaust air one-way flow control function	
Adjusting element		Rotary knob with scale and hex socket	
Actuation type		Manual	
Type of mounting		Screw-in	
Mounting position		Any	
Nominal tightening torque	[Nm]	3.5 ±20%	11 ±10%

Operating and environmental conditions		
Operating pressure for entire temperature range	[bar]	0.2 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubrication will always be required)
Ambient temperature	[°C]	–10 ... +60
Temperature of medium	[°C]	–10 ... +60
Storage temperature	[°C]	–10 ... +40

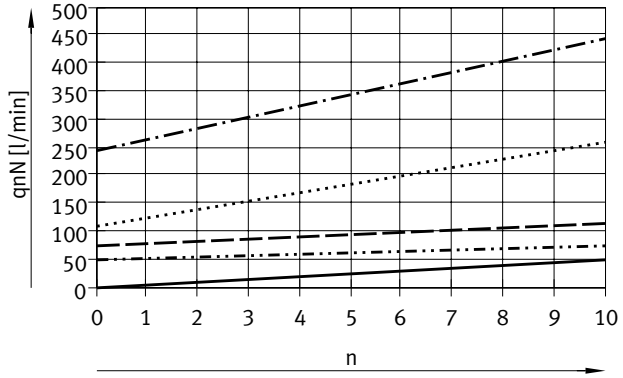
Datasheet – Push-in connector QS, metal

Standard nominal flow rate qnN at 6 → 5 bar as a function of the position of the flow control screw (scale) n

GRLSA-1/8

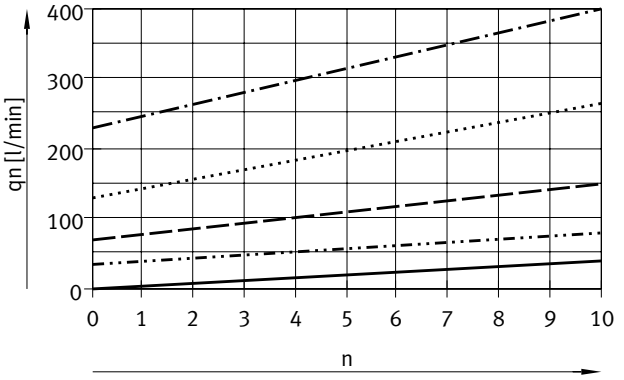


GRLSA-1/4

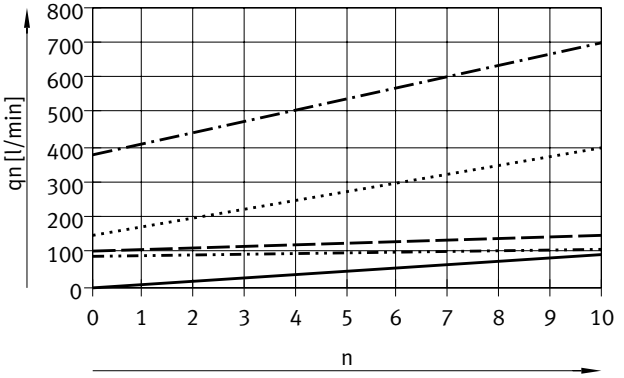


Standard flow rate qn at 6 → 0 bar as a function of the position of the flow control screw (scale) n

GRLSA-1/8



GRLSA-1/4

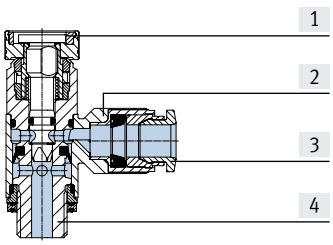


Stage: A
Stage: B
Stage: C
Stage: D
Stage: E

Flow rate value tolerance: ±20%

Materials

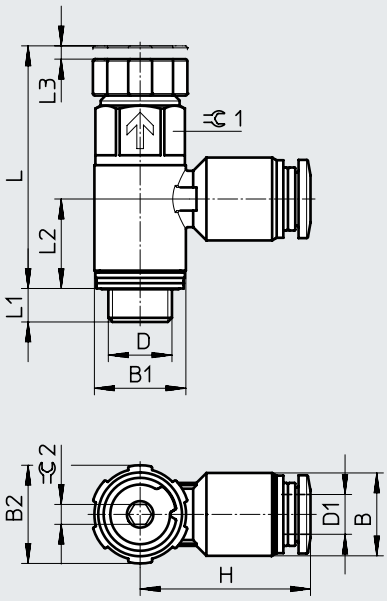
Sectional view



One-way flow control valve	
[1] Adjusting screw	Reinforced PA
[2] Swivel joint	Die-cast zinc
[3] Releasing ring	POM
[4] Hollow bolt	Anodised wrought aluminium alloy
– Seals	NBR
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364-B2-L

Datasheet – Push-in connector QS, metal

Dimensions Download CAD data ➔ www.festo.com



Type	Connection D	Tubing O.D. D1	B	B1	B2	H	L	L1	L2	L3	⊂1	⊂2
GRLSA-1/8	G1/8	6	12.5	13.8	15	25.7	36.6	5.1	13.5	2	12	3
GRLSA-1/4	G1/4	8	14.5	17.8	18.8	30.75	46.5	7	17.2	3	15	3

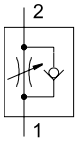
Ordering data

	Pneumatic connection		Standard nominal flow rate qnN At 6 ➔ 5 bar		Standard flow rate qn At 6 ➔ 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
	G1/8	QS-6	0 ... 250	180 ... 310	0 ... 410	430 ... 540	19.5	**540661**	**GRLSA-1/8-QS-6**
	G1/4	QS-8	0 ... 450	390 ... 570	0 ... 700	820 ... 930	34.8	**540662**	**GRLSA-1/4-QS-8**

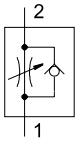
Datasheet – Push-in connector QS, metal

One-way flow control function

Exhaust air



Supply air



Low flow: precise adjustment
For low speed

Flow rate
40 ... 48 l/min

Temperature range
–10 ... +60°C

Operating pressure
0.2 ... 10 bar

General technical data – GRLA			
Pneumatic connection 2		M3	M5
Pneumatic connection 1		QS-3	QS-3, QS-4
Valve function		Exhaust air one-way flow control function	
Adjusting element		Slotted head screw	
Type of mounting		Screw-in	
Mounting position		Any	
Max. tightening torque	[Nm]	0.3	1.5

General technical data – GRLZ			
Pneumatic connection 2		M3	M5
Pneumatic connection 1		QS-3	QS-3, QS-4
Valve function		Supply air one-way flow control function	
Adjusting element		Slotted head screw	
Type of mounting		Screw-in	
Mounting position		Any	
Max. tightening torque	[Nm]	0.3	1.5

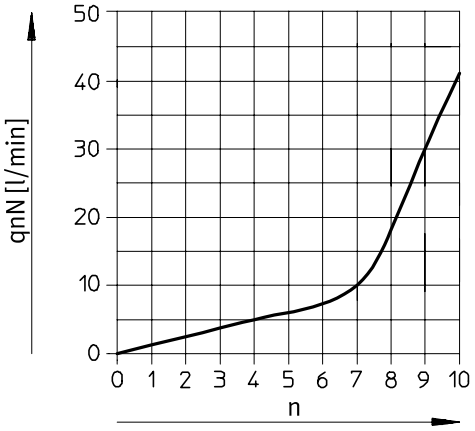
Operating and environmental conditions		
Operating pressure	[bar]	0.2 ... 10
	[psi]	2.9 ... 145
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubrication will always be required)
Ambient temperature	[°C]	–10 ... +60
Temperature of medium	[°C]	–10 ... +60
Storage temperature	[°C]	–10 ... +40
Maritime classification		GRLA: see certificate[1)]

1) More information: www.festo.com/catalogue/grla ➔ Support/Downloads

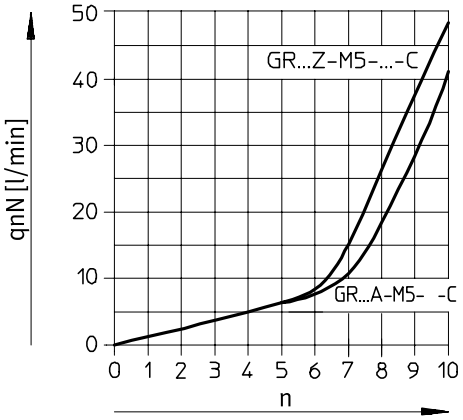
Datasheet – Push-in connector QS, metal

Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

GRLA/GRLZ-M3

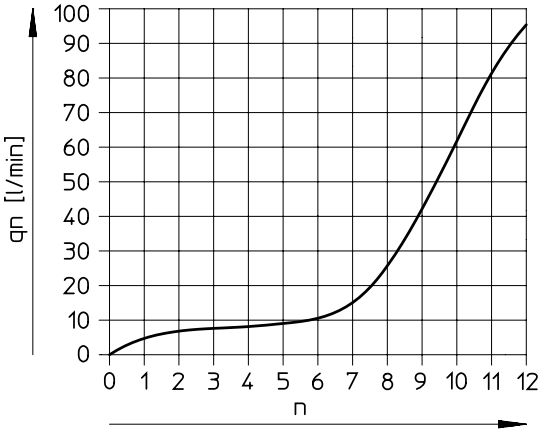


GRLA/GRLZ-M5

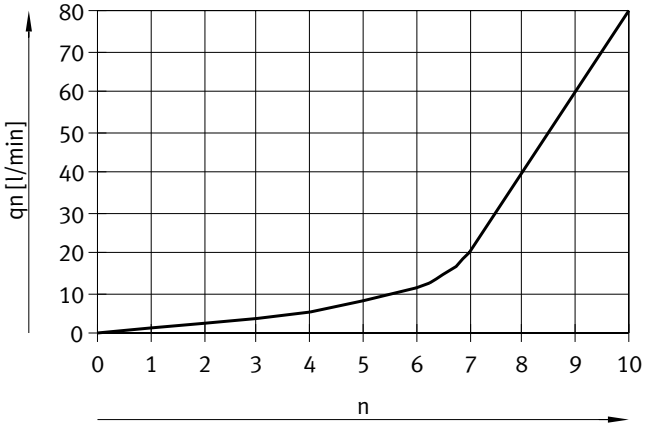


Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

GRLA/GRLZ-M3

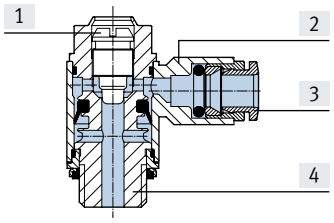


GRLA/GRLZ-M5



Materials

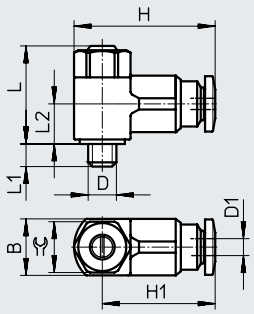
Sectional view



One-way flow control valve		
[1]	Adjusting screw	Brass
[2]	Swivel joint	Die-cast zinc
[3]	Releasing ring	POM
[4]	Screwed trunnion	Brass, nickel-plated
–	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

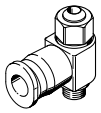
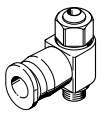
Datasheet – Push-in connector QS, metal

Dimensions Download CAD data ➔ www.festo.com



Type	Connection D	Nominal size [mm]	Tubing O.D. D1	B	~H	~H1	~L		L1	~L2	⫩
GRLA/GRLZ	M3	1.4	3	8 –0.15	20	15.8	16.6	±3.3%	2.3 +0.15/–0.3	7	7
	M5	1.4	3	9.8 –0.15	22.4	18.4	17.2	±3.1%	3.1 +0.15/–0.35	7.3	
		1.4	4	9.8 –0.15	22.2	18.2	17.2	±3.1%	3.1 +0.15/–0.35	7.3	

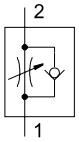
Ordering data

	Pneumatic connection		Standard nominal flow rate qnN At 6 ➔ 5 bar		Standard flow rate qn At 6 ➔ 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Exhaust air one-way flow control function									
	M3	QS-3	41	27 ... 50	95	75 ... 110	7	**175041**	**GRLA-M3-QS-3**
	M5	QS-3	40	46 ... 70	80	90 ... 140	9	**175053**	**GRLA-M5-QS-3-LF-C**
		QS-4	40	50 ... 75	80	100 ... 150	9	**175056**	**GRLA-M5-QS-4-LF-C**
Supply air one-way flow control function									
	M3	QS-3	41	27 ... 44	95	75 ... 100	7	**175043**	**GRLZ-M3-QS-3**
	M5	QS-3	48	36 ... 52	80	60 ... 90	9	**175055**	**GRLZ-M5-QS-3-LF-C**
		QS-4	48	40 ... 65	80	65 ... 110	9	**175058**	**GRLZ-M5-QS-4-LF-C**

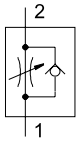
Datasheet – Female thread, metal

One-way flow control function

Exhaust air



Supply air



- Flow rate
  0 ... 18 l/min
- Temperature range
  –10 ... +60°C
- Operating pressure
  0.2 ... 10 bar

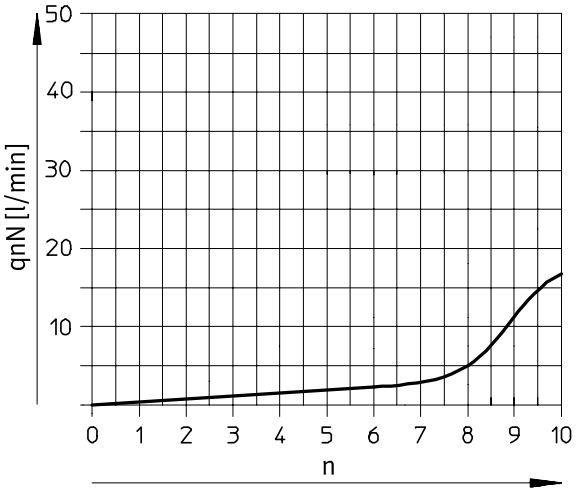
General technical data – GRLA		
Pneumatic connection 2		M3
Pneumatic connection 1		M3
Valve function		Exhaust air one-way flow control function
Adjusting element		Slotted head screw
Type of mounting		Screw-in
Mounting position		Any
Max. tightening torque	[Nm]	0.3

General technical data – GRLZ		
Pneumatic connection 2		M3
Pneumatic connection 1		M3
Valve function		Supply air one-way flow control function
Adjusting element		Slotted head screw
Type of mounting		Screw-in
Mounting position		Any
Max. tightening torque	[Nm]	0.3

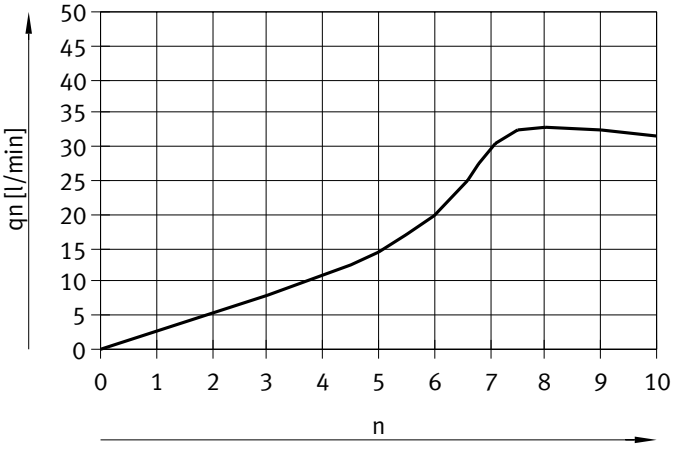
Operating and environmental conditions		
Operating pressure	[bar]	0.2 ... 10
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubrication will always be required)
Ambient temperature	[°C]	–10 ... +60
Temperature of medium	[°C]	–10 ... +60
Storage temperature	[°C]	–10 ... +40
Maritime classification		GRLA: see certificate[1)]

1) More information: www.festo.com/catalogue/grla ➔ Support/Downloads

Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n



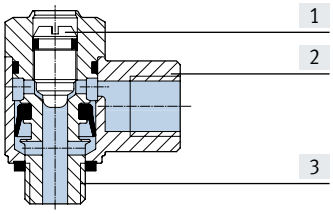
Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n



Datasheet – Female thread, metal

Materials

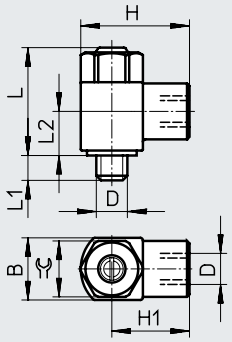
Sectional view



One-way flow control valve		
[1]	Adjusting screw	Brass
[2]	Swivel joint	Die-cast zinc
[3]	Screwed trunnion	Brass, nickel-plated
–	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

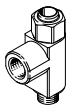
Dimensions

Download CAD data ➔ www.festo.com



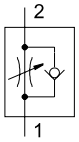
Type	Connection D	Nominal size [mm]	B	~H	~H1	~L		L1	~L2	⌀G
GRLA/GRLZ	M3	0.8	5 –0.1	9	6.5	13.4	±3.9%	2.5 +0.15/–0.3	6.4	4.5

Ordering data

	Pneumatic connection		Standard nominal flow rate qnN At 6 ➔ 5 bar		Standard flow rate qn At 6 ➔ 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
Exhaust air one-way flow control function									
	M3	M3	18	18 ... 20	33	33 ... 37	2	**175038**	**GRLA-M3**
Supply air one-way flow control function									
	M3	M3	18	18 ... 20	33	33 ... 37	2	**175040**	**GRLZ-M3**

Datasheet – Female thread, stainless steel

One-way flow control function
Exhaust air



- Flow rate
  95 ... 2100 l/min
- Temperature range
  –20 ... +80°C
- Operating pressure
  0.3 ... 10 bar

General technical data						
Pneumatic connection 2		M5	G1/8	G1/4	G3/8	G1/2
Pneumatic connection 1		M5	G1/8	G1/4	G3/8	G1/2
Valve function		Exhaust air one-way flow control function				
Adjusting element		Slotted head screw				
Actuation type		Manual				
Type of mounting		Screw-in				
Mounting position		Any				
Rotatability		360°/continuous rotation not permitted				
Max. tightening torque	[Nm]	1.5	6	11	20	40
Permissible actuation torque, adjusting screw	[Nm]	0.2	0.5	1.5	2	3

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

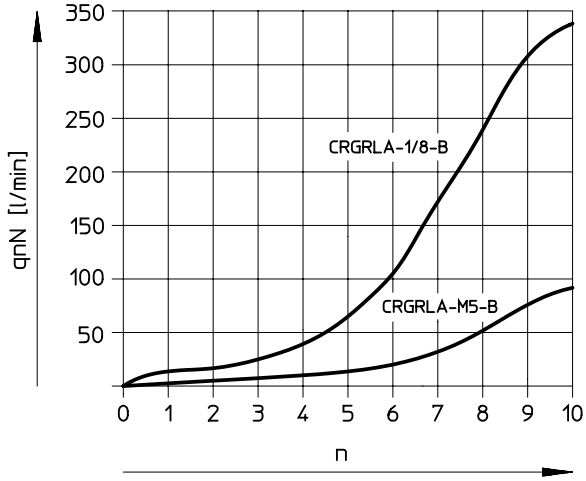
Operating and environmental conditions						
Pneumatic connection 2		M5	G1/8	G1/4	G3/8	G1/2
Operating pressure	[MPa]	0.02 ... 1	0.03 ... 1			
	[bar]	0.2 ... 10	0.3 ... 10			
	[psi]	2.9 ... 145	4.35 ... 145			
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]				
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)				
Suitable for the production of lithium-ion batteries		Metals with more than 1% by mass of copper, zinc or nickel are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils				
Cleanroom class		Element installed statically, no meaningful evaluation possible according to ISO 14644-1				
Ambient temperature	[°C]	–20 ... +80				
Temperature of medium	[°C]	–10 ... +60				
Storage temperature	[°C]	–10 ... +40				
Corrosion resistance class CRC[1)]		3				
Food-safe		See supplementary material information[2)]				
Maritime classification		See certificate[2)]				

1) More information www.festo.com/x/topic/crc
2) More information: www.festo.com/catalogue/crgrla ➔ Support/Downloads.

Datasheet – Female thread, stainless steel

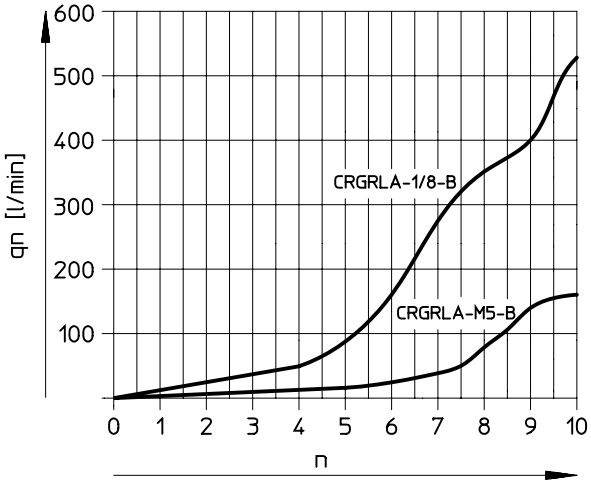
Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

CRGRLA-M5, CRGRLA-1/8



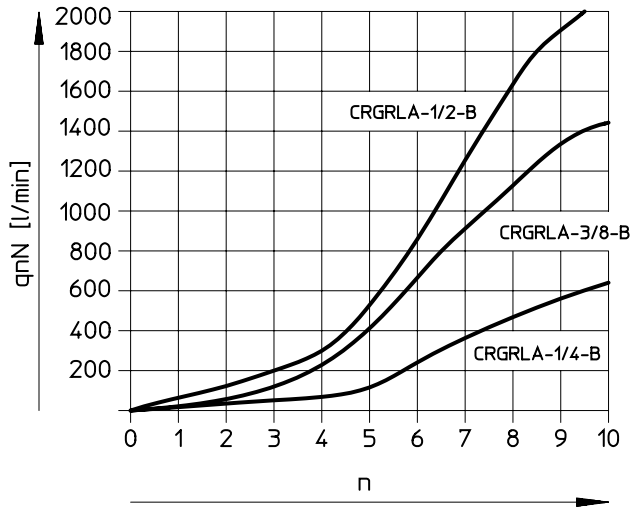
Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

CRGRLA-M5, CRGRLA-1/8



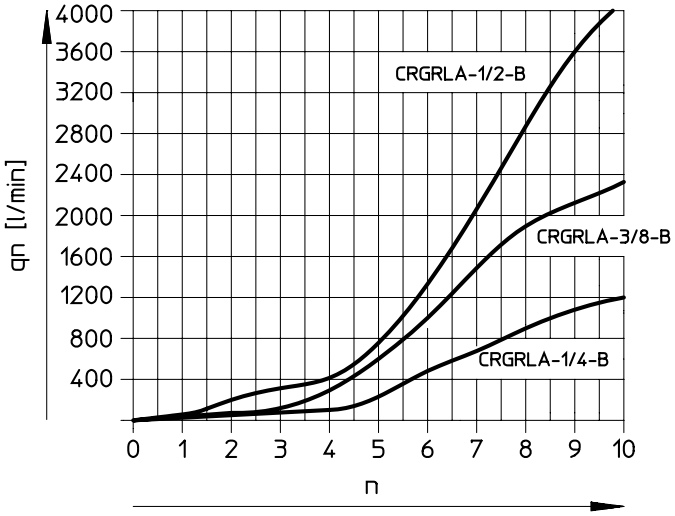
Standard nominal flow rate qnN at 6 → 5 bar as a function of spindle rotations n

CRGRLA-1/4, CRGRLA-3/8, CRGRLA-1/2



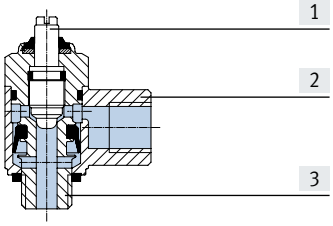
Standard flow rate qn at 6 → 0 bar as a function of spindle rotations n

CRGRLA-1/4, CRGRLA-3/8, CRGRLA-1/2



Materials

Sectional view

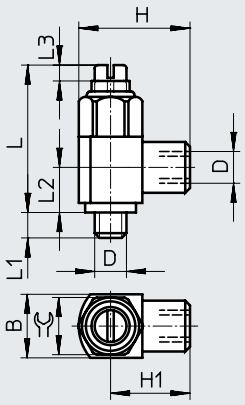


One-way flow control valve	
[1] Adjusting screw	High-alloy stainless steel
[2] Swivel joint	High-alloy stainless steel
[3] Hollow bolt	High-alloy steel
– Seals	FPM, PVC
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364-B2-L
Cleanroom class	Class 4 to ISO 14644-1

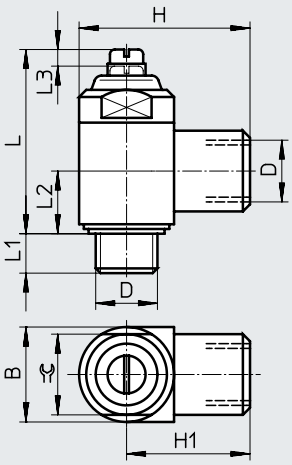
Datasheet – Female thread, stainless steel

Dimensions Download CAD data ➔ www.festo.com

CRGRLA-M5



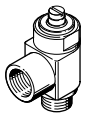
CRGRLA-1/8, CRGRLA-1/4, CRGRLA-3/8, CRGRLA-1/2



Type	Connection D	Nominal size [mm]	B	H	H1	~L		~L1	~L2	~L3	⫧
CRGRLA-M5	M5	2	10 –0.25	17.5 ±0.3	12.5	22.9	±3.5%	4	7.1	2.5	9
CRGRLA-1/8	G1/8	4	16 –0.4	28 +0.4/–0.3	20	33.8	±2.7%	5.5	10.3	3.5	14
CRGRLA-1/4	G1/4	6	20 –0.3	36 +0.4/–0.2	26	38.8	±2.7%	6.5	13.2	3.5	17
CRGRLA-3/8	G3/8	8.5	25 –0.3	41 +0.4/–0.2	28.5	48.5	±2.2%	7.5	15.4	5	22
CRGRLA-1/2	G1/2	10.6	32 –0.4	53 ±0.5	37	62.2	±1.7%	9	18.9	7.5	27

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

Ordering data

	Pneumatic connection		Standard nominal flow rate qnN At 6 ➔ 5 bar		Standard flow rate qn At 6 ➔ 0 bar		Weight	Part no.	Type
			In flow control direction	In non-return direction	In flow control direction	In non-return direction			
	2	1	[l/min]	[l/min]	[l/min]	[l/min]	[g]		
	M5	M5	95	77 ... 95	165	140 ... 150	10.2	**161403**	**CRGRLA-M5-B**
	G1/8	G1/8	340	260 ... 420	580	530 ... 590	37.8	**161404**	**CRGRLA-1/8-B**
	G1/4	G1/4	610	450 ... 820	1265	1030 ... 1345	71.6	**161405**	**CRGRLA-1/4-B**
	G3/8	G3/8	1450	970 ... 1600	2515	2095 ... 2665	126.9	**161406**	**CRGRLA-3/8-B**
	G1/2	G1/2	2100	1550 ... 2200	4265	3550 ... 4325	262.3	**161407**	**CRGRLA-1/2-B**