

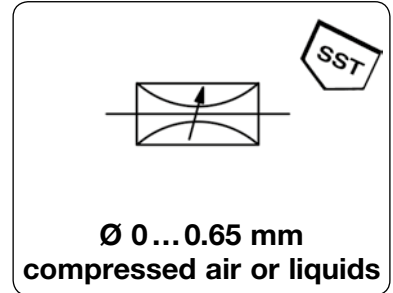
MICRO-/ MINIATURE-DEVICES

	DESCRIPTION	DN/Ø	FLOW RATE l/min	CONNECTION thread	SERIES	PAGE
NEEDLE VALVE	made of stainless steel, miniature	Ø 3.0 - 4.5	0 ... 32	nipple	NV30	20.02
PRECISION RESTRICTOR	made of brass, micro	Ø 0.06 - 0.64		nipple, 10-32"	RF	20.03
	made of plastic	Ø 0.08 - 1.02		nipple	R-0	20.04
	with filter	Ø 0.10 - 0.76		nipple	F950	20.04
INLINE-FILTER	micro, up to 8.6 bar	5 ... 73 µm		nipple, 10-32"	F9 . .	20.05
CHECK VALVE	micro, up to 5.2 bar	1,5 / 3,8		nipple	F2804	20.06
	restrictor check valve	0.1/ ... / 1.02		10-32"	F2804	20.06



20

Description	The precision needle valve is a manually adjustable flow control valve used in pneumatic and fluid systems. Unique laminar flow design ensures sensitive reproducible control. Ideal for precision gas metering and circuit speed or sequencing control.	
Media	5 µm filtered compressed air, non-corrosive gases or liquids	
Operating pressure	vacuum up to positive pressure of max. 12 bar	
Adjustment	The flow control needle needs 8 screw turns for maximum flow, approximately equal to an 0.65 mm / 0.025" orifice.	
Panel mounting	borehole 8 mm / 0.312", max. panel thickness 3.5 mm / 0.15"	
Temperature range	-40 °C to 95 °C / -40 °F to 203 °F	
Material	Body and needle: stainless steel	Elastomer: NBR/Buna-N



Flow adjustment mit	Operating pressure max. bar	Volume flow at 3.5 bar and 6 turns l/min	Nipple diameter Ø mm	inch	Order number
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Needle valve with knurled screw				operating pressure max. 12 bar, stainless steel, Ø 0...0.65 mm	NV30-K
knurled-head	12	0...32	3.0	1/16"	NV30-2K
			4.5	1/8"	NV30-4K



NV30-2K
with knurled-head

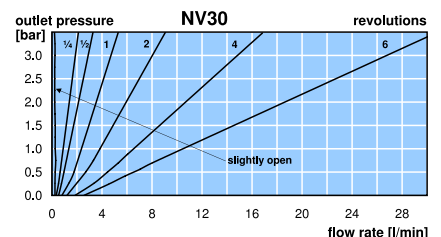
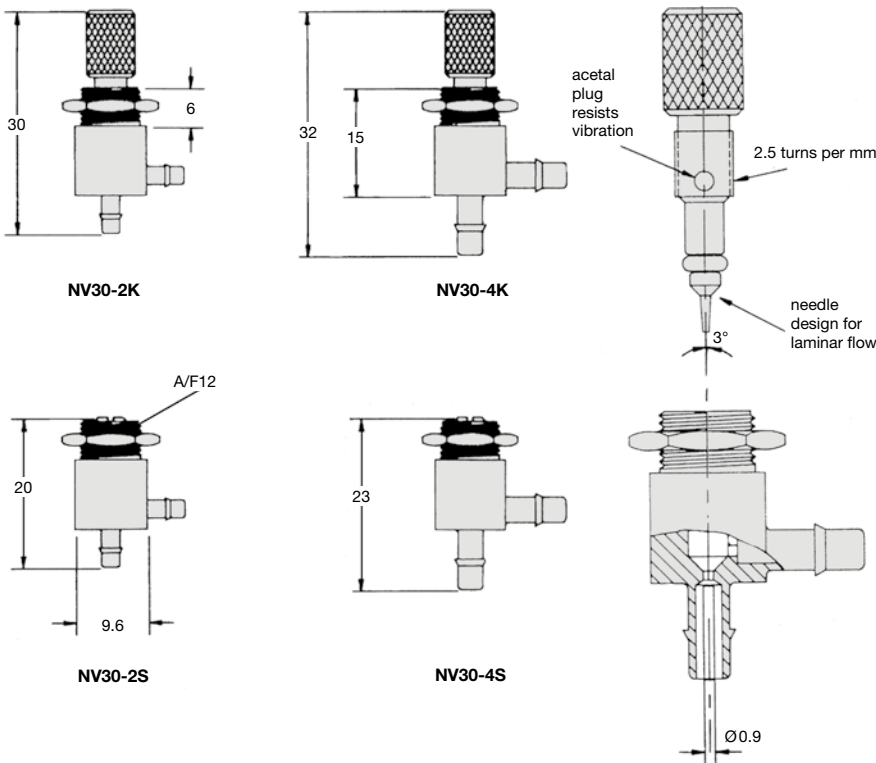
Needle valve with slotted screw				operating pressure max. 12 bar, stainless steel, Ø 0...0.65 mm	NV30-S
slotted screw	12	0...32	3.0	1/16"	NV30-2S
			4.5	1/8"	NV30-4S



NV30-4S
with slotted screw



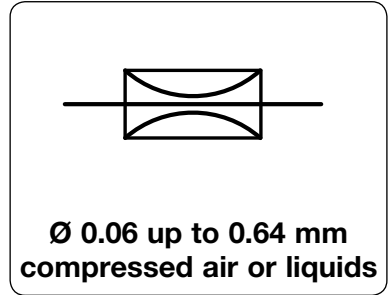
NV30-2K



PRECISION RESTRICTOR IN BRASS BODY

RF

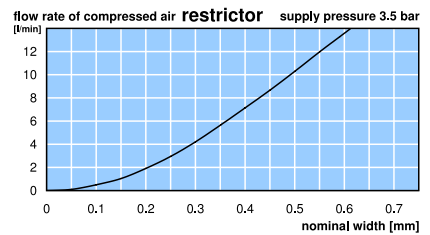
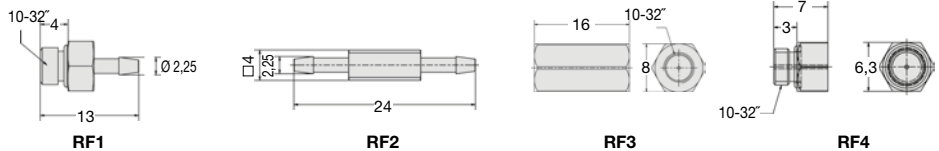
Description	Precision sapphire restrictor for reducing the flow of air or gas. Fixed flow restrictors are used in back pressure and air jet sensing circuits.		
Media	5 µm filtered compressed air, non-corrosive gases or liquids		
Diameter tolerances	-3% to +10% of nominal diameter		
Operating pressure	vacuum up to positive pressure of max. 12 bar		
Temperature range	5 °C to 50 °C / 41 °F to 122 °F		
Material	Body: brass	Restrictor: sapphire	



Nominal size Ø mm	Order number			
	10-32" / nipple Ø 2 RF1	nipple Ø 2.2 RF2	10-32" RF3	10-32" / open orifice RF4



Restrictor	operating pressure max. 12 bar				RF
0.06	RF106	RF206	RF306	RF406	
0.07	RF107*	RF207	RF307	RF407	
0.08	RF108*	RF208*	RF308*	RF408*	
0.09	RF109	RF209	RF309	RF409	
0.10	RF110*	RF210*	RF310*	RF410*	
0.11	RF111	RF211	RF311	RF411	
0.12	RF112	RF212	RF312	RF412	
0.13	RF113	RF213	RF313	RF413	
0.14	RF114	RF214	RF314	RF414	
0.15	RF115*	RF215*	RF315*	RF415*	
0.16	RF116	RF216	RF316	RF416	
0.17	RF117	RF217	RF317	RF417	
0.18	RF118	RF218	RF318	RF418	
0.20	RF120	RF220	RF320	RF420	
0.22	RF122*	RF222*	RF322*	RF422*	
0.24	RF124	RF224	RF324	RF424	
0.26	RF126	RF226	RF326	RF426	
0.28	RF128	RF228	RF328	RF428	
0.30	RF130	RF230	RF330	RF430	
0.32	RF132*	RF232*	RF332*	RF432*	
0.34	RF134	RF234	RF334	RF434	
0.36	RF136	RF236	RF336	RF436	
0.40	RF140	RF240	RF340	RF440	
0.44	RF144*	RF244*	RF344*	RF444*	
0.48	RF148	RF248	RF348	RF448	
0.52	RF152	RF252	RF352	RF452	
0.54	RF154	RF254	RF354	RF454	
0.58	RF158	RF258	RF358	RF458	
0.64	RF164*	RF264*	RF364*	RF464*	



* preferred stock items

PDF CAD
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Order example:
RF106

PRECISION RESTRICTOR IN PLASTIC BODY

R-0 / F950

Precision Restrictor R-0

Description Precision sapphire restrictor for reducing the flow of compressed air or non-corrosive gases

Medium compressed air or non-corrosive gases

Filter element 5 µm for DN0.08 up to DN0.23, from DN0.25 on 100 µm

Operating pressure vacuum up to max. 7 bar

Material Body: polycarbonate, FDA-approved Restrictor: sapphire Filter element: stainless steel fabric

Temperature range 5 °C to 50 °C / 41 °F to 122 °F

Ø-Tolerance ± 0.005 mm respectively ± 3% of volume flow

Restrictor with Filter F950

Description Disposable in-line-filter with Dutch weave screen of 304 stainless steel. Flow direction and filter size in µm are clearly marked. The colour indicates the nominal size.

Diameter tolerance -3% to +10% of nominal diameter

Filter element 5 µm at DN 0.10 to DN 0.15, 43 µm at DN 0.18 to DN 0.41, 73 µm at DN 0.51 to DN 0.76

Operating pressure max. 7 bar

Material Body: polysulphone Restrictor: sapphire Filter element: stainless steel fabric

Temperature range 5 °C to 50 °C / 41 °F to 122 °F

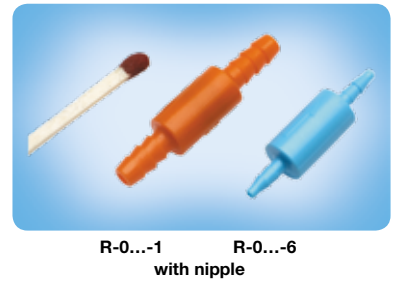
R-0 **F950**

0.08 up to 1.02 mm **0.1 up to 0.76 mm**
5 / 43 / 73 µm

Dimensions	Connection	Nominal size	Order	Nominal size	Order
A	inlet / outlet	colour / DN	number	colour / DN	number
mm		Ø mm		Ø mm	

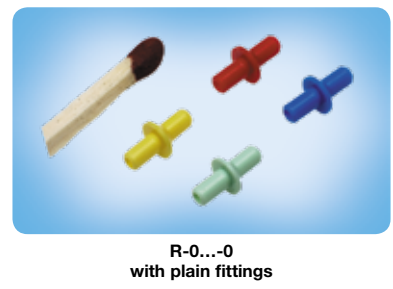
Restrictor, barbed fittings Ø 2.7 operating pressure max 7 bar **R-0...-6**

30 fittings Ø 2.7	gold	0.08	R-003-6	orange	0.36	R-014-6
	purple	0.10	R-004-6*	grey	0.41	R-016-6*
	white	0.13	R-005-6	brown	0.43	R-017-6
	yellow	0.18	R-007-6	red	0.48	R-019-6
	light green	0.20	R-008-6*	dark blue	0.51	R-020-6*
	lavender	0.23	R-009-6	black	0.64	R-025-6
	light blue	0.25	R-010-6	beige	0.76	R-030-6
	green	0.30	R-012-6*	dark grey	0.89	R-035-6*
				cyan	1.02	R-040-6*



Restrictor, barbed fittings Ø 4,7 operating pressure max 7 bar **R-0...-1**

34 fittings Ø 4.7	gold	0.08	R-003-1	orange	0.36	R-014-1
	purple	0.10	R-004-1*	grey	0.41	R-016-1*
	white	0.13	R-005-1	brown	0.43	R-017-1
	yellow	0.18	R-007-1	red	0.48	R-019-1
	light green	0.20	R-008-1*	dark blue	0.51	R-020-1*
	lavender	0.23	R-009-1	black	0.64	R-025-1
	light blue	0.25	R-010-1	beige	0.76	R-030-1
	green	0.30	R-012-1*	dark grey	0.89	R-035-1*
				cyan	1.02	R-040-1*



Restrictor with filter operating pressure max. 7 bar nipple Ø 2.7 mm, 5/43/73 µm **F950**

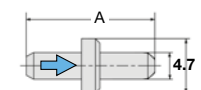
34 fittings Ø 2.7	purple	0.10	5 µm	F950- 5-041-B80*
	light green	0.13	5 µm	F950- 5-050-B80
	red	0.15	5 µm	F950- 5-051-B80
	cyan	0.18	43 µm	F950-43-071-B80*
	yellow	0.25	43 µm	F950-43-101-B80
	black	0.30	43 µm	F950-43-121-B80*
	grey	0.41	43 µm	F950-43-161-B80
	blue	0.51	73 µm	F950-73-201-B80*
	brown	0.64	73 µm	F950-73-251-B80
	beige	0.76	73 µm	F950-73-301-B80*



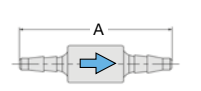
Special options, add the appropriate letter

plain fittings Ø 2.3 A = 9,9 mm for R-0 R-0...-0

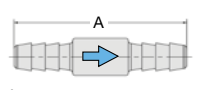
nipple Ø 4.7 A = 34 mm for F950 F950-...-...-B85



plain fittings
R-0...-0

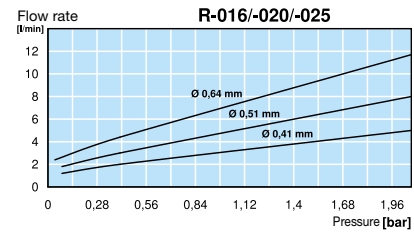
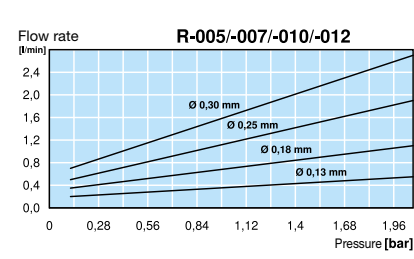


barbed fittings Ø 2.7
R-0...-6
F950-...-...-B80



barbed fittings Ø 4.7
R-0...-1
F950-...-...-B85

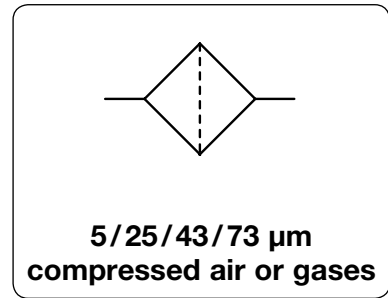
* preferred stock items *1 nominal size see RF2



MICRO IN-LINE FILTER

F950 / F960 / F970

Description	Compact in-line filter with fittings or threaded connection. Flow direction and filter size in μm are clearly marked.	
Media	compressed air or non-corrosive gases	
Diameter tolerances	-3% to +10% of nominal diameter	
Filter element	5 μm , 25 μm , 43 μm or 73 μm	
Operating pressure	max. 8.6 bar	
Temperature range	5 °C to 50 °C / 41 °F to 122 °F	
Material	Body: polysulphone	Filter element: Dutch weave stainless steel



Dimensions A mm	Operating pressure max. bar	Connection inlet / outlet	Filter element μm	Order number
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Micro pressure filter			operating pressure max. 8.6 bar	F900
26	8.6	fittings $\text{\O} 2.7$	5	F950-05B80
			25	F950-25B80
			43	F950-43B80
			73	F950-73B80
30	8.6	fittings $\text{\O} 4.7$	5	F950-05B85
			25	F950-25B85
			43	F950-43B85
			73	F950-73B85
24	8.6	10-32" / fittings $\text{\O} 2.7$	5	F960-05B80
			25	F960-25B80
			43	F960-43B80
			73	F960-73B80
28	8.6	10-32" / fittings $\text{\O} 4.7$	5	F960-05B85
			25	F960-25B85
			43	F960-43B85
			73	F960-73B85
15	8.6	10-32" / 10-32"	5	F970-05
			25	F970-25
			43	F970-43
			73	F970-73



F950 with nipple



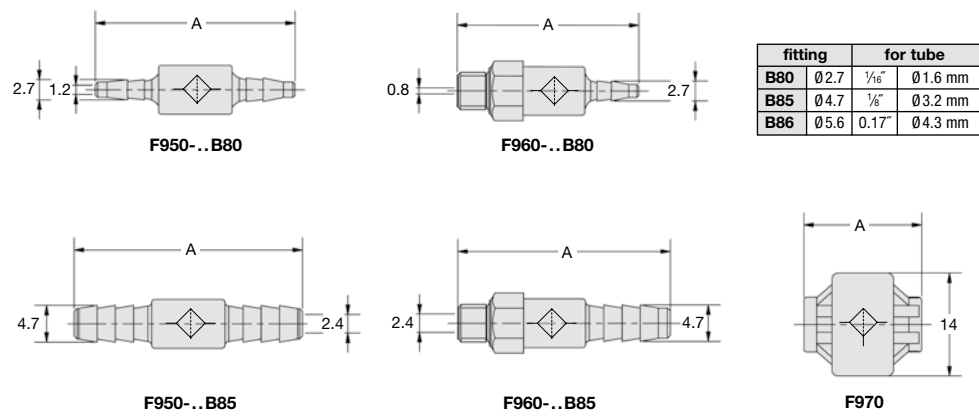
F960 with nipple and thread



F970 with thread

Accessories, enclosed
 connecting nipple for F960 and F970

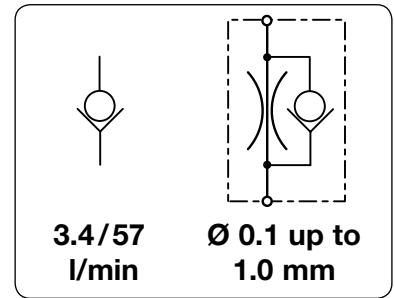
10-32" / fitting $\text{\O} 2.7$	F3120-80
$\text{\O} 4.7$	F3120-85
$\text{\O} 5.6$	F3120-86



Order example:
F950-05B80

PDF CAD
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Check valve	The check valve permits flow in one direction only. A small check disc within the housing ensures free flow in one direction and at the same time seals off on the other side.	
Restrictor check valve	The restrictor check valve provides a constant flow in one direction, defined through the orifice size, and a flow of the full nominal size towards the other direction.	
Media	5 µm filtered compressed air or non-corrosive gases	
Diameter tolerance	-3% to +10% of nominal diameter	
Operating pressure	max. 0.7 bar at F2804-400/1/2/3,	max. 5.2 bar at F2804-404
Cracking pressure	< 20 mbar at F2804-400/1/2/3,	< 25 mbar at F2804-404
Temperature range	5 °C to 50 °C / 41 °F to 122 °F	
Material	Body: polysulphone at F2804-400/1/2/3, polypropylene at F2804-404 Check disc: Celcon® at F2804-401/2, silicone at F2804-400/3/4	



Dimensions	Operating pressure	Check disk	Connection	Leakage rate	Flow rate	Nominal size	Order number
A	max. bar	made of		< ml/min*3	l/min*2	colour / DN	
mm							

Check valve		operating pressure max. 0.7 / 5.2 bar			F2804		
12	0.7	silicone plain fittings Ø 2.4	3	3.4	red	1.5	F2804-400*1
		Celcon®	51		orange	1.5	F2804-401
		Celcon®	17		green	1.5	F2804-402
		silicone	3		blue	1.5	F2804-403
26	0.7	Celcon® fittings Ø 2.7	51	3.4	grey	1.5	F2804-401-B80
		Celcon®	17		grey	1.5	F2804-402-B80
		silicone	3		grey	1.5	F2804-403-B80*1
30	0.7	Celcon® fittings Ø 4.7	51	3.4	grey	1.5	F2804-401-B85
		Celcon®	17		grey	1.5	F2804-402-B85
		silicone	3		grey	1.5	F2804-403-B85*1
15	5.2	silicone 10-32"	1	57	grey	3.8	F2804-404*1
		silicone fittings Ø 2.7	1		grey	3.8	F2804-404-B80
		silicone fittings Ø 4.7	1		grey	3.8	F2804-404-B85



F2804-400 / 1 / 2 / 3 check valve



F2804-404 - B85 / ... - B80 check valve



F2804-404 - 071 / -301 restrictor check valve

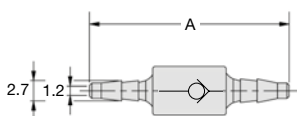
Restrictor check valve		operating pressure max. 5.2 bar			F2804		
15	5.2	silicone 10-32"		0.10			F2804-404-041*1
				0.13			F2804-404-050
				0.15			F2804-404-051
				0.18			F2804-404-071
				0.25			F2804-404-101*1
				0.30			F2804-404-121
				0.41			F2804-404-161
				0.51			F2804-404-201
				0.64			F2804-404-251*1
				0.76			F2804-404-301
				1.02			F2804-404-401*1

Special options, add the appropriate number

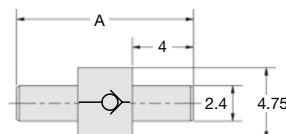
increased cracking pressure for check valve, with spring 35 mbar **F2804-404-05**

Accessories, enclosed

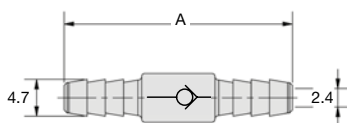
connecting nipple for F2804-404 10-32" / fitting Ø 2.7 **F3120-80**
 Ø 4.7 **F3120-85**
 Ø 5.6 **F3120-86**



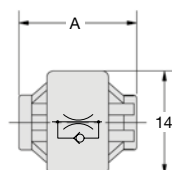
F2804-40.-B80



F2804-40.- with plain fittings



F2804-40.-B85



F2804-404

fitting	for tube	
B80	Ø 2.7	1/16" Ø 1.6 mm
B85	Ø 4.7	1/8" Ø 3.2 mm
B86	Ø 5.6	0.17" Ø 4.3 mm

*1 preferred stock items *2 at max. operating pressure *3 at Δp or P₁ = 70 mbar, at type F2804-404: P₁ = 5.2 bar

PDF CAD
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Order example:
F2804-400