

## Micro-/ Miniature-Devices

	Description	DN/Ø	Flow rate l/min	Connection thread	Device	Page
<b>needle valve</b>	miniature	Ø 3.0 - 4.5	0 ... 32	nipple	NV30	<b>20.02</b>
<b>precision restrictor</b>	made of brass, micro	Ø 0.06 - 0.64		nipple, 10-32"	RF	<b>20.03</b>
	made of plastic	Ø 0.08 - 1.02		nipple	R-0	<b>20.04</b>
	with filter	Ø 0.10 - 0.76		nipple	F950	<b>20.04</b>
<b>inline-filter</b>	micro, up to 8.6 bar		5 ... 73 µm	nipple, 10-32"	F9 . .	<b>20.05</b>
<b>check valve</b>	micro, up to 5.2 bar	1,5 / 3,8		nipple	F2804	<b>20.06</b>
	restrictor check valve	0.1/ ... / 1.02		10-32"	F2804	<b>20.06</b>



# 20

## Micro-/Miniature-Devices

# Precision Needle Valve, Ø 0...0.65 mm

NV30

<b>Description</b>	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.	
<b>Media</b>	5 µm filtered compressed air, non-corrosive gases or liquids	
<b>Operating pressure</b>	vacuum up to positive pressure of max. 12 bar	
<b>Adjustment</b>	The flow control needle needs 8 screw turns for maximum flow, approximately equal to an 0.65 mm / 0.025" orifice.	
<b>Panel mounting</b>	borehole 8 mm / 0.312", max. panel thickness 3.5 mm / 0.15"	
<b>Temperature range</b>	-40 °C to 95 °C / -40 °F to 203 °F	
<b>Material</b>	Body and needle: nickel-plated brass	Elastomer: NBR/Buna-N



Ø 0...0.65 mm  
compressed air or liquids

Flow adjustment	Operating pressure	Volume flow at 3.5 bar and 6 turns	Nipple diameter	Order number
mit	max. bar	l/min	Ø mm / inch	

Needle valve with knurled screw		operating pressure max. 12 bar, nickel-plated brass, Ø 0...0.65 mm		NV30-K
knurled-head	12	0...32	3.0 / 1/16"	NV30-2K
			4.5 / 1/8"	NV30-4K

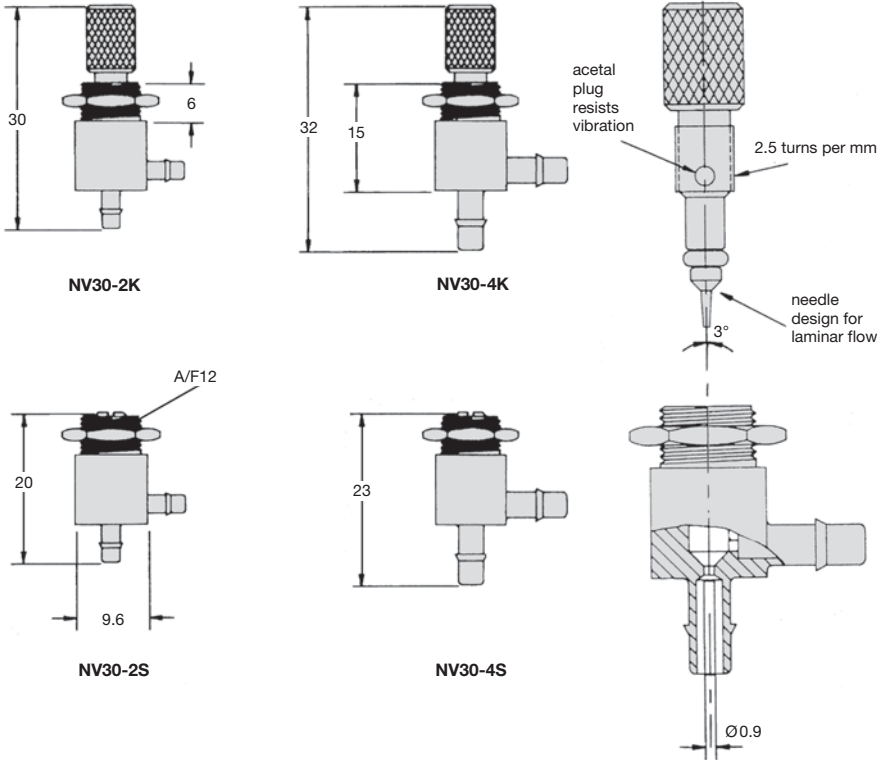


NV30-2K  
with knurled-head

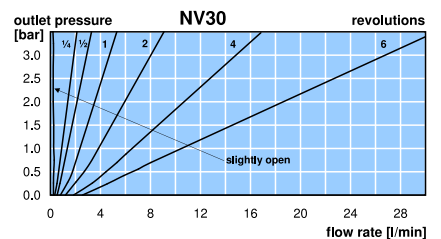
Needle valve with slotted screw		operating pressure max. 12 bar, nickel-plated brass, Ø 0...0.65 mm		NV30-S
slotted screw	12	0...32	3.0 / 1/16"	NV30-2S
			4.5 / 1/8"	NV30-4S



NV30-4S  
with slotted screw



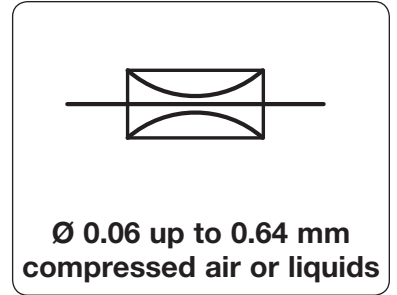
NV30-2K



# Precision Restrictor in Brass Body

RF





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

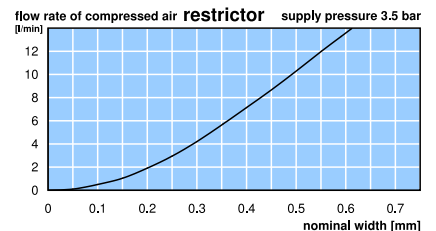
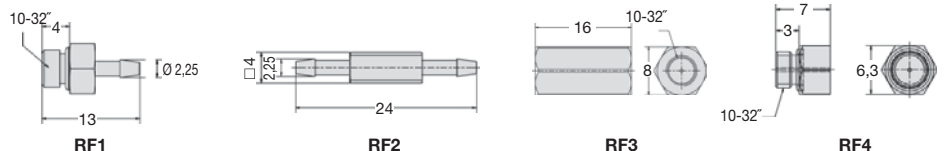


Nominal size Ø mm	Order number			
	10-32" / nipple Ø 2 RF1	nipple Ø 2.2 RF2	10-32" RF3	10-32" / open orifice RF4



## 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

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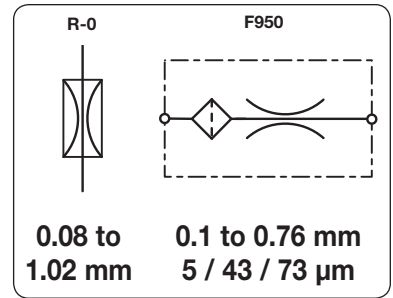


Order example:  
RF106

# Precision Restrictor in Plastic Body

R-0/F950

Precision Restrictor R-0	
<b>Description</b>	Precision sapphire restrictor for reducing the flow compressed air or non-corrosive gases
<b>Medium</b>	compressed air or non-corrosive gases
<b>Filter element</b>	5 µm for DN0.08 up to DN0.23, from DN0.25 on 100 µm
<b>Operating pressure</b>	vacuum up to max. 7 bar
<b>Material</b>	Body: polycarbonate, FDA-approved Restrictor: sapphire Filter element: stainless steel fabric
<b>Temperature range</b>	5 °C to 50 °C / 41 °F to 122 °F
Restrictor with Filter F950	
<b>Description</b>	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.
<b>Diameter tolerance</b>	-3% to +10% of nominal diameter
<b>Filter element</b>	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
<b>Operating pressure</b>	max. 7 bar
<b>Material</b>	Body: polysulphone Restrictor: sapphire Filter element: stainless steel fabric
<b>Temperature range</b>	5 °C to 50 °C / 41 °F to 122 °F



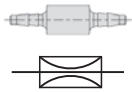
Dimensions	Connection	Nominal size	Order	Nominal size	Order
A	inlet / outlet	colour / DN	number	colour / DN	number
mm		Ø mm		Ø mm	

## 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*



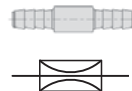
R-0...-1 R-0...-6  
with nipple

## 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*



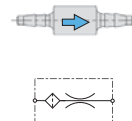
R-0...-0  
with plain fittings

## 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*



F950...B85/ ... B80  
with filter

Supply pressure

## Special options, add the appropriate letter

plain fittings Ø 2.3 A = 9,9 mm

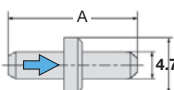


for R-0 R-0...-0

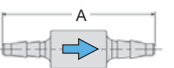
nipple Ø 4.7 A = 34 mm



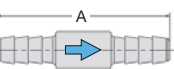
for F950 F950-...-...-B85



plain fittings  
R-0...-0



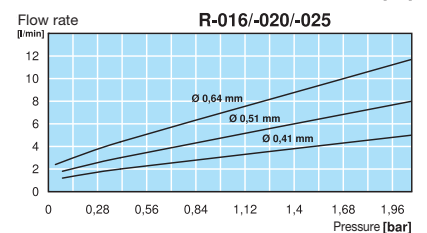
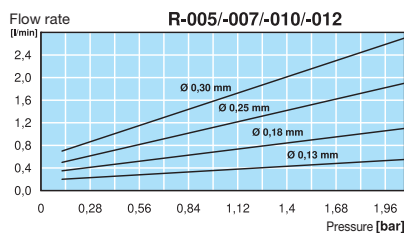
barbed fittings Ø 2.7  
R-0...-6  
F950-...-...-B80



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

\* preferred stock items

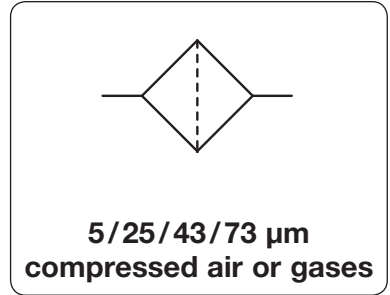
\*1 nominal size see RF2



# Micro In-Line Filter

F950/F960/F970

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



Dimensions A mm	Operating pressure max. bar	Connection inlet / outlet	Filter element $\mu\text{m}$	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



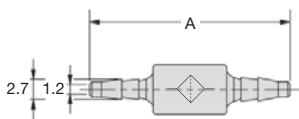
F960 with nipple and thread



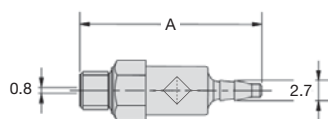
F970 with thread

## Accessories

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

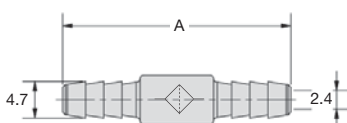


F950...B80

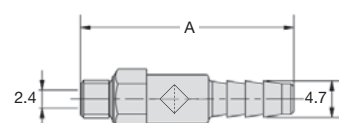


F960...B80

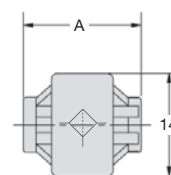
fitting	for tube	
B80	$\text{\O} 2.7$	$\frac{1}{16}$ " $\text{\O} 1.6$ mm
B85	$\text{\O} 4.7$	$\frac{1}{8}$ " $\text{\O} 3.2$ mm
B86	$\text{\O} 5.6$	0.17" $\text{\O} 4.3$ mm



F950...B85



F960...B85



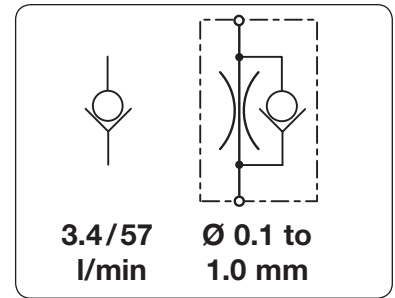
F970

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Order example:  
F950-05B80

<b>Check valve</b>	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.	
<b>Restrictor check valve</b>	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.	
<b>Media</b>	5 µm filtered compressed air or non-corrosive gases	
<b>Diameter tolerance</b>	-3% to +10% of nominal diameter	
<b>Operating pressure</b>	max. 0.7 bar at F2804-400/1/2/3,	max. 5.2 bar at F2804-404
<b>Cracking pressure</b>	< 20 mbar at F2804-400/1/2/3,	< 25 mbar at F2804-404
<b>Temperature range</b>	5 °C to 50 °C / 41 °F to 122 °F	
<b>Material</b>	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 A mm	Operating pressure max. bar	Check disk made of	Connection	Leakage rate < ml/min*3	Flow rate l/min*2	Nominal size colour / DN	Order number
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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

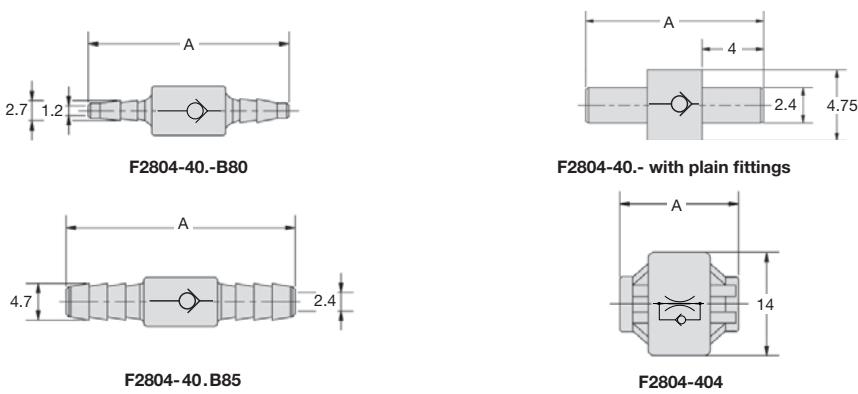


F2804-404 - 071 / -301 restrictor check valve

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



fitting	for tube	
B80	Ø2.7	1/16" Ø1.6 mm
B85	Ø4.7	1/8" Ø3.2 mm
B86	Ø5.6	0.17" Ø4.3 mm

\*1 preferred stock items      \*2 at max. operating pressure      \*3 at Δp or P<sub>1</sub> = 70 mbar, at type F2804-404: P<sub>1</sub> = 5.2 bar

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**Order example:**  
F2804-400