Maintaining flow rate constant under fluctuating pressure

Constant Flow Valves

FPC Series
RSP Series
NSPW Series
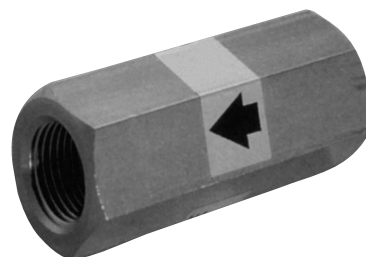NFFW Series
NFF-S Series

■ General description

The constant flow valves are used to maintain preset flow rate in a line that develops primary (inlet side) or secondary (outlet side) pressure fluctuations.

Requiring no control device against pressure fluctuation, these valves contribute to savings in space and cost. Especially, they offer best suited and handy use with cooling and hot water lines of air conditioning systems in buildings and water supply lines in plants and multiple housing.
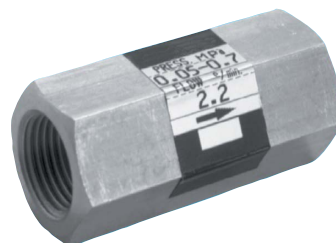
Also, as the valves need no power supply to operate, they are safe against highly flammable and hazardous fluids. They are accurately set for necessary flow rate to the customer's specification in the factory before shipment so that no field setting is required.

■ Features

- Designed to make stable liquid feed possible at constant flow rate.
- Inexpensive. Compact. Light in weight
- Installable in horizontal or vertical direction as desired.
- Applicable in wide range of use with small (10mm) to large (80mm) bore diameters.
- Maximum working temperature: 180°C (needle type)
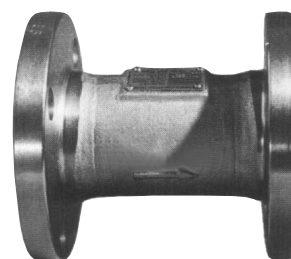- Available in five types suitable for various needs.

[FPC Series]
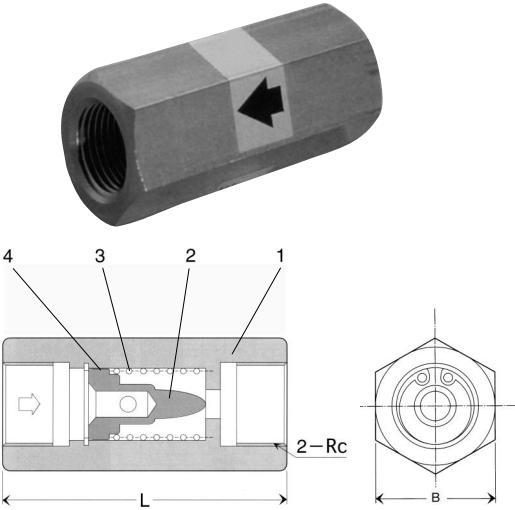

[RSP Series]

[NSPW Series]

[NFFW Series]

[NFF-S Series]

TOKYO KEISO CO., LTD.

[FPC Series]

■ Small flow rate needle type constant flow valve

Capable of highly accurate design flow rate control

● Main parts list

No.	Name of Parts	Materials
1	Valve Body	SUS304
2	Needle	SUS304
3	Spring	SUS304
4	C-Ring	SUS304

● Common specification

Item	Description
Fluids	Water
Fluids Temp.	Max 100°C
Flow rate accuracy	±10%
Pressure Use	Max 1.0MPa

● Model coding system of product

F P C — N ☐ ☐ P — 0.7
Series   Size   Flow

● Specification

Model	Connection		Control Pressure Difference (MPa)	Dimensions (m/m)		Flow (L/min)						Mass (kg)
	Size (in.)	Type		L	C							
FPC-N8P	1/4			50	19	0.7	1.0	1.5	2.0			0.2
FPC-N10P	3/8	Rc Screw	0.05 to 0.7	55	23	1.5	2.0	2.5	3.0	4.0	5.0	0.2
FPC-N15P	1/2			65	26	4.0	5.0	7.0				0.3

● Precaution Statement

1. Set same size of straight run of pipe with constant flow valve in back and forth of it. Primary side→over Size×5 [mm] Secondary side→over Size×10 [mm]
2. Vibrations and noise may occur by usage situation, piping configuration and pump characteristics.

[RSP Series]

■ Washer type constant flow valve

The valve is so constructed as to utilize rubber elasticity for constant flow rate. Light in weight, compact and best suited for equipment setup.

● Main parts list

No.	Name of Parts	Materials
1	Valve Body	C3604
2	Flow Washer※	NBR·NR
3	Stop Ring	SUS304

※Materials are different by flow

● Common specification

Item	Description
Fluids	Water
Fluids Temp.	Max. 35°C
Flow rate accuracy	±20%
Pressure Use	Max 0.7MPa
Option	Body Material: SUS304

● Specification

Model	Connection		Control Pressure Difference (MPa)	Dimensions (m/m)		Flow (L/min)						Mass (kg)
	Size (in.)	Type		L	B							
RSP-12	3/8	Rc	0.05 to 0.7	50	23	0.6	0.8	1.2	1.5	1.8		0.15
						2.2	2.5	2.6	3.0	3.5		
RSP-15	1/2		0.05 to 0.7	55	26	4.0	5.0	5.5	8.5	9.0		0.2

● Model coding system of product

R S P — ☐ ☐
        Size
Series
 RSP   : Body material C3604
  RSSP : Body material SUS304

● Precaution Statement

1. Set same size of straight run of pipe with constant flow valve in back and forth of it. Primary side→over Size×5 [mm] Secondary side→over Size×10 [mm]
2. Vibrations and noise may occur by usage situation, piping configuration and pump characteristics.

[NSPW. NFFW. NFF-S Series]

■ Needle type constant flow valve

The valve is so constructed that it receives fluctuating fluid pressure with piston and changes fluid passage area by balancing received pressure with spring force, thereby maintaining constant flow rate.

NSPW Series

NFFW Series

NFF-S Series
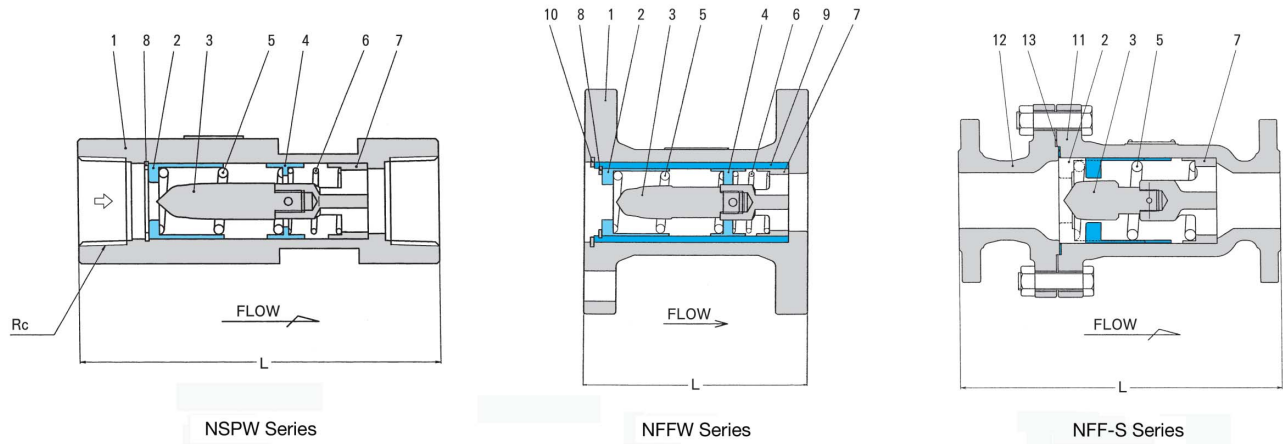
● Main parts list

No.	Name of Parts	Materials			
		NSPW	NFFW	NFF	NFF-S
1	Valve Body	CAC406	FC250		—
2	Piston	SUS403			SCS2
3	Needle	SUS403			
4	Spring Holder	C3604	C3604 or SUS403※		—
5	Spring A	SUS304	SUS304 or SUP9※		
6	Spring B	SUS304			—
7	Needle Holder	SUS403	S25C or FCD400※		FCD400
8	Stop Ring	SUS304			—
9	Sleeve	—	CAC406		—
10	Stop Ring	—	SUS304		—
11	Lower Body	—			FC250
12	Upper Body	—			FC250
13	Body Packing	—			NON-ASBESTOS

※Materials are different by valve size.

● Specification

Model	Connection		Control Pressure Difference [MPa]	Dimensions [mm]	Mass [kg]
	Size	Type		L	
NSPW-10	3/8	Rc Screw	0.03～1※	85	0.4
NSPW-15	1/2			95	0.4
NSPW-20	3/4			110	0.7
NSPW-25	1			135	1.3
NFFW-32	1 1/4	Flange JIS10KFF	0.03～1※	120	4.6
NFFW-40	1 1/2			140	5.4
NFFW-50	2			160	7
NFFW-65	2 1/2			190	11.3
NFFW-80	3			220	16.1
NFF-50S	2	Flange JIS10KFF	0.05～0.7※	300	15
NFF-80S	3			350	30

※ Control pressure difference depends on setting flow rate.
　Please refer to flow chart.

● Common specification

Item	Description	
Fluid	Water　Other Liquid	Oil
Fluid Temperature	MAX80°C	MAX180°C
Flow rate Accuracy	5 to　20L/min: ±15% 22 to 850L/min: ±10%	
Pressure Use	MAX 1.0MPa	
Option	Body Materials: SUS304, SCPH2 Except Flange Rating other JIS10KFF	

● Model coding system of product
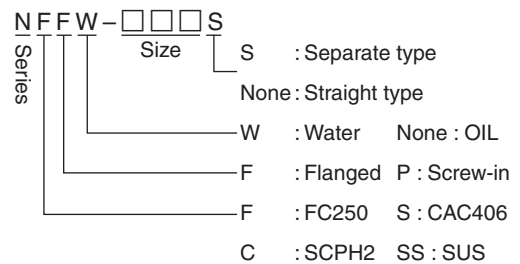
N F F W – □ □ □ S

Series

Size　S　: Separate type

None : Straight type

W　: Water　　None : OIL

F　: Flanged　　P : Screw-in

F　: FC250　　S : CAC406

C　: SCPH2　　SS : SUS

● Precaution Statement

1. Set same size of straight run of pipe with constant flow valve in back and forth of it.
   Primary side→over Size×5 [mm] Secondary side→over Size×10 [mm]
2. Vibrations and noise may occur by usage situation, piping configuration and pump characteristics.

■ Flow Rate List (Capacity for water)

Connection	Rc Screw				Flange						
Size / Flow L/min	10	15	20	25	32	40	50	50S	65	80	80S
5	○	○									
6	○	○									
7	○	○									
8	○	○									
9	○	○									
10	△	○	○								
11	△	○	○								
12	△	○	○								
14		△	○								
16		△	○	○							
18		△	○	○							
20		△	○	○							
22			○	○							
25			○	○							
28			△	○							
30			△	○	○	○					
33			△	○	○	○					
36			△	○	○	○					
40				○	○	○					
45				△	○	○					
50				△	○	○					
55				△	○	○					
60					○	○					
65					○	○					
70					○	○					
80					△	○					
90					△	○	○		○		
100						△	○		○		
110						△	○		○		
120						△	○		○		
140						△	○		○		
150							○				
160							○		○		
170							△	▲			
180							△	▲	△	○	
190							△	▲			
200							△	▲	○	○	
210								▲			
220							△	▲	○	○	
230								▲			
240								▲			
250					min. 0.06			▲	△	○	
260								▲			
270								▲			
280								▲	△	○	
300								▲	△	○	
330									△	○	
340								▲			
360										○	
400								▲	min. 0.1	△	▲
425										△	
450								min. 0.1		△	▲
500											△
550										min. 0.07	▲
600										min. 0.08	▲
650										min. 0.09	▲
700										min. 0.10	▲
750										min. 0.12	▲
800											▲
850										min. 0.15	min. 0.06
Face to Face Dimensions m/m	85	95	110	135	120	140	160	300	190	220	350

How to understand the "chart" Min. controlled differential pressure: ○ mark: 0.03MPa
△▲ mark: 0.05MPa
Max. controlled differential pressure. non colored column: 1 MPa colored column: 0.7MPa
Except water, please refer to specific gravity conversion table.

● Control Properties

Pressure difference betweem inlet and outlet: Δ P (MPa)
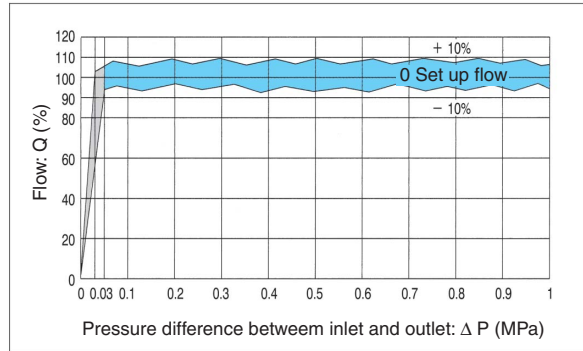
● Selection of Constant Flow Valve

■ For water (density: 1g/cm³), select optimal flow rate vs. connection size from the above list.

■ For other special fluids, the selection requires compensation by their density.

■ Viscosity compensation

For fluids below 5×10^{-5} m²/s (50 cst) in dynamic viscosity, the flow rate vs.connection size selection has little to do with viscosity. Change in the selection according to viscosity depends greatly on flow rate and pressure (flow velocity). When flow rate is small or fluid pressure (flow velocity) is low, viscosity is the influencing factor for the selection. Consult with us before selection in the case of high viscosity and small flow rate.

(Example) If oil has a flow rate of 500 ℓ /min with density at 0.8g/cm³, obtain a density conversion factor of 1.118 as follows.

Density conversion factor : $k = \dfrac{1}{\sqrt{\gamma}}$

k : Density conversion factor
γ : Density (g/cm³)

Thus, 500 ÷ 1.118 ≒ 447 ℓ /min. Accordingly, select an approximate flow rate of 450 ℓ vs. connection size of 50S, 80 or 80S from the above list.

∗ Uses for flow rate beyond 450 ℓ /min are outside of accuracy guarantee range.

*Specification is subject to change without notice.