Precision Needle Valve

MODEL 2412 SERIES

Gas Liquid

Applicable fluids Gas N_2, Air, H_2, He, Ar, O_2, CO_2, etc. Liquid H_2O

Max. flow rate Gas 5mL/min to 100L/min (Air at 20°C, 0.1MPa differential pressure) Liquid 5mL/min to 2L/min (H_2O at 20°C, 0.1MPa differential pressure)

* Up to the working conditions. For details, see the reference data.

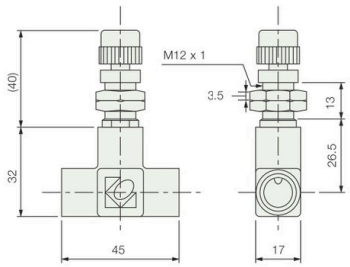
- Stable control of minute flow rate
- Superior control performance by a non-rotating structure
- Capable of selecting optimum controllability according to the working conditions with wide variety of needles

2412L

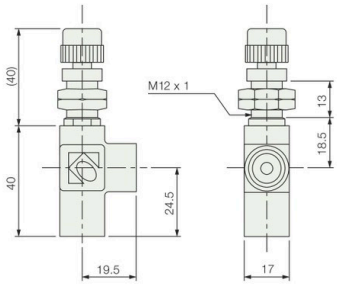
2412T

Dimensions

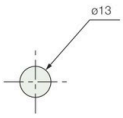
<<2412T>>



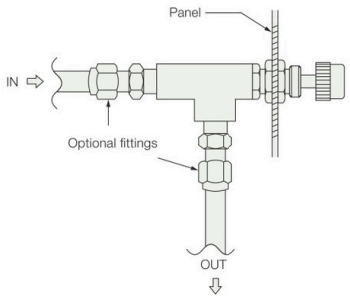
<<2412L>>



(Cutting dimensions)



Example of use



Standard Specifications

MODEL	2412	
Applicable fluids	N_2, Air, H_2, He, Ar, O_2, CO_2, etc.	H_2O
Number of turns of regulating screw	Approx. 12 turns	
Max. working pressure	1MPa(G)	
Max. working temperature	SS: 120°C B: 70°C	
Materials of parts in contact with fluid	SS: SUS316, PCTFE, FKM B: Brass, POM, NBR, SUS316	
Connection	Rc1/4	
Weight	Approx. 150g	

Flow Control Valve

Flow ratings table (reference)

Flow rate when the valve is fully opened to atmosphere.

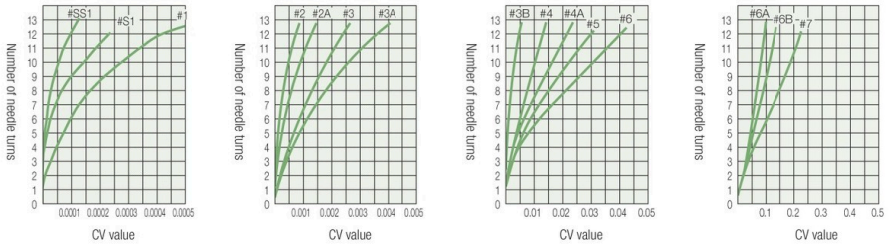
Unit of flow rate: L/min

Needle No.	Supply pressure (MPa(G)) (Air at 20˚C)							Supply pressure (MPa(G)) (H_2O at 20˚C)		
	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.05	0.1	0.15
#SS1	0.023	0.047	0.078	0.11	0.15	0.19	0.22	–	–	–
#S1	0.068	0.11	0.20	0.27	0.34	0.40	0.47	–	–	–
#1	0.15	0.23	0.36	0.51	0.65	0.79	0.93	0.00145	0.0026	0.0036
#2	0.34	0.46	0.71	1.0	1.2	1.5	1.75	0.0076	0.012	0.0153
#2A	0.45	0.65	1.0	1.3	1.65	2.0	2.3	0.0132	0.0195	0.0245
#3	0.9	1.3	2.0	2.6	3.25	3.9	4.6	0.0260	0.0390	0.0510
#3A	1.25	1.9	2.75	3.65	4.5	5.3	6.4	0.0365	0.0546	0.0740
#3B	1.85	2.5	3.7	5.0	6.0	7.2	8.3	0.053	0.0760	0.0980
#4	4.3	6.2	9.0	12.0	15.0	18.3	22.0	0.124	0.188	0.234
#4A	8.0	11.0	15.0	21.0	26.0	31.0	36.0	0.228	0.336	0.417
#5	10.0	14.0	21.0	27.0	33.0	40.0	46.0	0.294	0.435	0.576
#6	22.0	31.0	45.0	60.0	75.0	92.0	105.0	0.564	0.834	1.100
#6A	30.0	41.0	60.0	80.0	100	118	138	0.774	1.190	–
#6B	38.0	53.0	82.0	106	135	160	185	1.280	1.950	–
#7	80.0	110	160	215	260	285	310	1.840	2.890	–

* An actual flow rate may deviate from the values in the table within a range of 80% to 130% depending on the working conditions and instrumental errors. Use them as reference values.
* The above table shows a data example of the 2412L. Due to a structural difference, if a flow rate increases, 2412L shows better flow characteristics than the 2412T. So 2412L is recommended for over 5L/min flow rate condition.

CV value (reference)

Needle No.	MAX CV value
#SS1	0.00012
#S1	0.00022
#1	0.00058
#2	0.0012
#2A	0.0016
#3	0.0033
#3A	0.0048
#3B	0.0063
#4	0.016
#4A	0.028
#5	0.035
#6	0.078
#6A	0.10
#6B	0.13
#7	0.28



Ordering

MODEL	Shape	Material	Connection	Fluid	Inlet / outlet differential pressure	Max. flow rate	Other options
2412	L	SS: SUS316	1/4: Rc1/4				FFKM O-ring
	T	B: Brass	1/8: Rc1/8				With lock nut
Illustrative example: 2412	L	SS	1/4	N_2	0.3MPa	5L/min	

* We will select an optimum needle number based on the conditions such as the pressure, fluid and flow rate. Use the ratings table only as reference.
* No shutting O-ring for FFKM option.

Performance comparison data of 2412 and 2400 (reference)

Followings are the comparison survey at low pressure conditions.
See them as the performance comparison reference data of the precision needle valve 2412 and the simplified needle valve 2400.
They are typical values, not guaranteed ones.

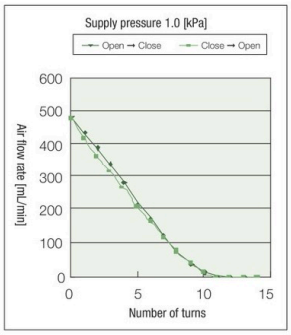
[Items] 2412T-SS-1/4-Air-#4
2400T-S-1/4-N1

[Hysteresis characteristics]
(Fluid) Air (Supply pressure) 1kPa (Hysteresis check) Needle open → Close → Open

2412T

Supply pressure 1.0 [kPa]

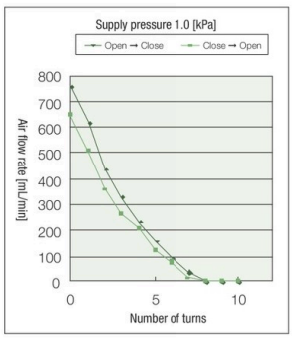
Number of turns	Air flow rate [mL/min]	
	Open → Close	Close → Open
0	480	475
1	435	415
2	390	360
3	340	315
4	285	265
5	220	205
6	175	165
7	124	118
8	75	75
9	37	38
10	13	12
11	1	0
12	0	0
13	0	0
14	0	0



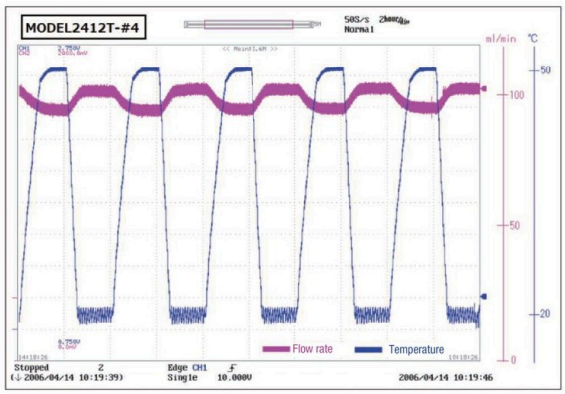
2400T

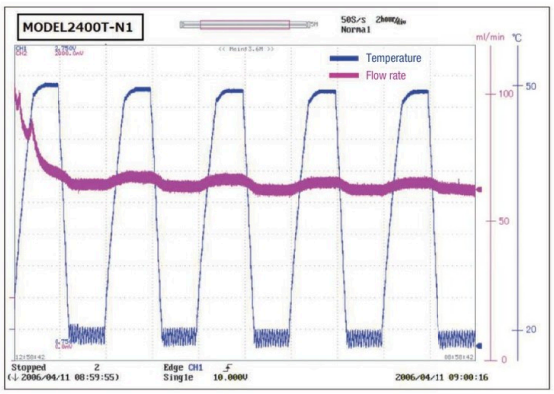
Supply pressure 1.0 [kPa]

Number of turns	Air flow rate [mL/min]	
	Open → Close	Close → Open
0	760	650
1	620	510
2	440	360
3	330	265
4	235	205
5	160	125
6	95	75
7	40	16
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0



[Temperature condition flow rate stability test]
(Ambient temperature setting) Starting from 20°C, repeat 5 cycles of 20°C → 50°C, 3 hours → 20°C, 3 hours.





(Supplementary explanation)
In the above data, Model 2412 is superior in both the restorability of hysteresis and the flow rate stability under temperature change condition. This is because the precision needle 2412 has an adjusting shaft and a needle separated, converts a rotating direction into a translatory motion and its conversion threads are provided with a backlash-free mechanism, allowing very stable adjustment and setting, whereas the simplified needle 2400 is a single-axis rotary needle where a knob adjusting shaft itself is a needle shaft. (See Page 93 for the detailed principle) The valve part of the 2412 is used for the precision flow meters such as RK1200 and the flow controllers of the valves 2203, 2204 and 2600. The 2400 is used for simple flow meters such as RK1600R. Select the models conforming to your specifications (performance, cost, etc.). It is recommended to test at harsh working conditions with an actual machine.