

Precision Needle Valve w/Non-rotary Needle

MODEL 2412 SERIES

This needle valve has been designed to control minute gas and liquid flows with precision and ease. Design allows the rotation of the regulating screw to transform into linear motion of the needle without subjecting the needle to gaps and/or vibrations produced by the screw, so smooth, stable flows can be ensured.

Capable of controlling ultra-minute flows

Very accurate, stable control of ultra-minute flows up to 1 ML/MIN possible

Wide variations of needle type

15 types of needles are available for your choice of the type that best suits your needs.

Needle of non-rotary structure

Because this valve is constructed so that the rotation of the regulating screw is transformed into linear motion of the needle, the valve has a longer life in addition to superior control performance.

Superior temperature characteristic (15-35°C)

The valve counts on an outstanding temperature characteristic (flow fluctuations remain within an insignificant range of 0.3%/°C to ambient temperature variations) thanks to the temperature compensation system incorporated in the valve's needle and orifice. This temperature compensation system is a utility model of KOFLOC registered at the United States Patent and Trademark Office. (Optional specification for needles #SS1 to #3B-BS)

This temperature compensation system is applicable to gases only, and not to liquids, because the viscosity of a liquid may fluctuate depending upon the temperature conditions.



2412L

2412T

Applications

- For accurate control of minute flows of gases and liquids

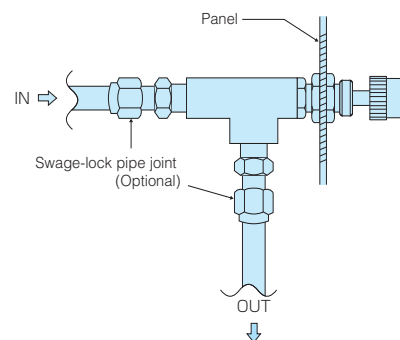
Standard Specifications

Rated flow ranges	See page 117.
Number of turns of regulating screw	Approx. 12 turns
Maximum operating pressure	1.0 MPa
Maximum operating temperature	(B) 70°C (SS) 120°C
Materials of parts in contact with fluids	(B) Brass, POM, NBR (SS) SUS316, fluorocarbon resin, FKM
Fluids	Gas and liquid
Connection end	Rc 1/4 (standard)

Optional Specifications

- Connection opening
- Materials not included in the standard specifications

Example of Use with Model 2412



Dimensions

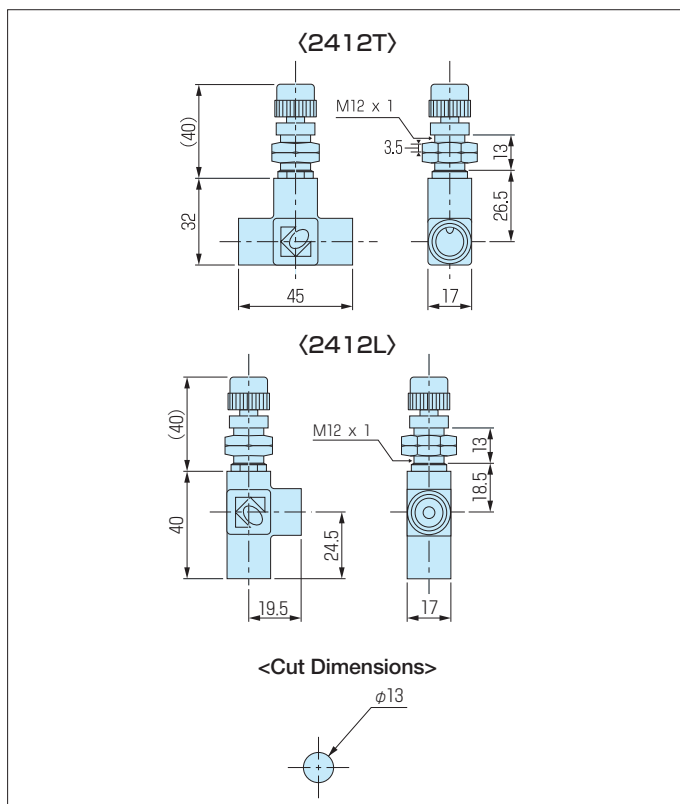


Table of Rated Flow Ranges (Reference)

Due to operating conditions and instrumental errors, there may be differences in the range of 80% to 130% between the values indicated in this table and those that are actually used by the customer. Please use these values for reference only.

Flow rate when the outlet valve is totally opened to release flows into air

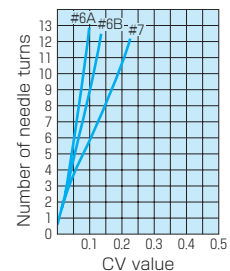
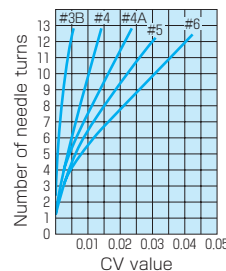
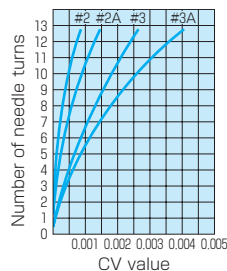
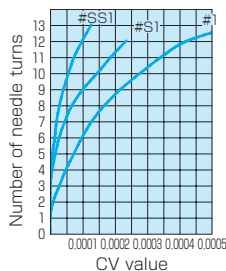
Flow unit : L/MIN

Needle #	Supply pressure (MPa) (Air at 20°C)							Supply pressure (MPa) (Water 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	0.08	0.09	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	—

* The values shown in the table above are data for Model 2412L for illustrative purposes only. As compared with the 2412L, flows on the 2412T will run less smooth when the flow rate increases. It is therefore recommended that the 2412L be used for flows of 5 L/MIN or more.

CV Values

Needle #	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



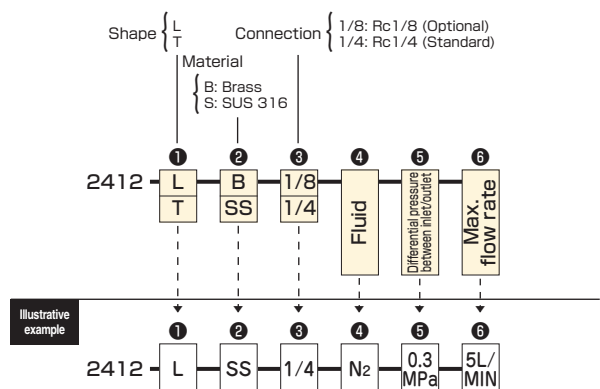
Notes:

- For large flows, please refer to Model 2412D (page 125).
- We can suggest you the needle most suitable for your equipment if the pressure, fluid, flow rate and other operating conditions of your equipment are known. Please use the above table for reference only.

Options

- Perfluoro O-ring
Note) No needle valve shut off O-ring.
- Lock nut

Ordering



* Refer to "Ordering" and "Illustrative example" when placing an order or requesting a quotation. Fill in the blanks in the "Order/Quotation Request Card" at the end of the catalog, and send the card by fax.

Comparison Data of MODEL 2412 and MODEL 2400 (reference data)

Followings are performance comparative reference data of precision needle valve MODEL 2412 and simplified needle valve MODEL 2400 under low pressure conditions. Please note that it is not a guaranteed value.

[Item] MODEL2412T-SS-1/4-AIR-#4
MODEL2400T-S-1/4-N1

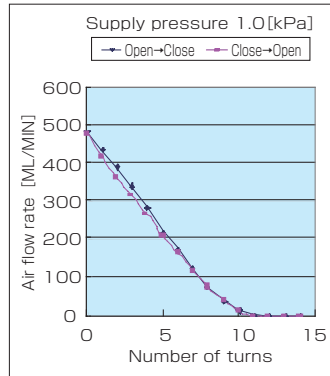
[Hysteresis characteristics]

(Fluid) AIR (Supply pressure) 1kPa (Hysteresis check) Needle open→close→open

MODEL2412T

Supply pressure 1.0[kPa]

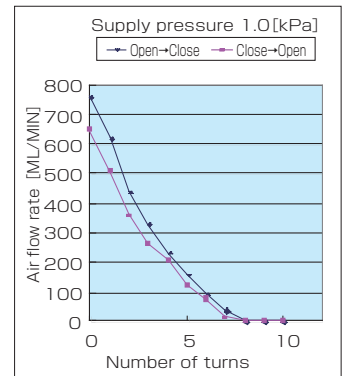
Number of turns	Air flow [ML/MIN]	
	Open→Close	Close→Open
0	480	475
1	435	415
2	390	360
3	340	315
4	285	265
5	220	205
6	175	165
7	124	118
8	75	75
9	37	38
10	13	12
11	1	0
12	0	0
13	0	0
14	0	0



MODEL2400T

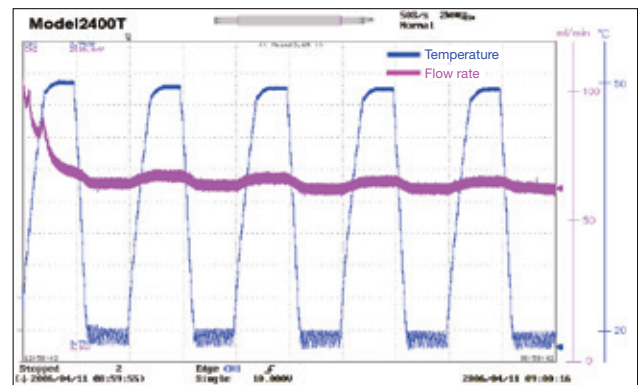
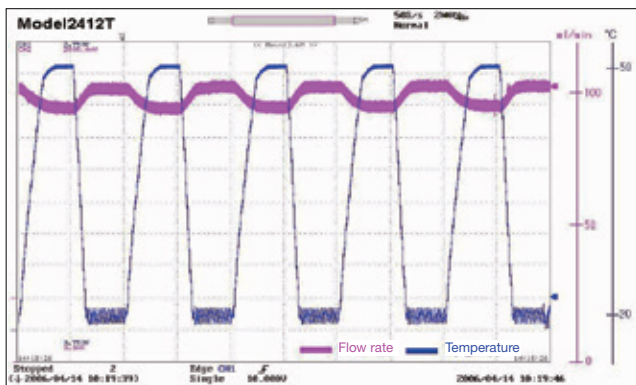
Supply pressure 1.0[kPa]

Number of turns	Air flow [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 stability test]

(Temperature setting) 20°C start → 50°C 3hr → 20°C 3hr (1 cycle) 5 times repeat



Note)

In the above data, MODEL 2412 shows excellent results in restorability of hysteresis and flow stability in fluctuate temperature condition.

The valve parts of MODEL 2412 is used for RK 1250, 1200 precision flow meters and MODEL 2203, 2204, 2600 valves. On the other hand, MODEL 2400 is used for RK 1650, 1600 and other simplified flow meters.