

**KOGANEI**

Auxiliary

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**THROTTLE VALVE**

**INSTRUCTION MANUAL** Ver.1.0

## Safety Precautions (Throttle Valves)

The following is a safety precaution to Throttle Valves. For other safety precautions, be sure to read the precautions on p.49.

### Warning

- When adjusting the actuator speed, begin adjustment with the needle on the body in a completely closed state and then steadily open it up. When the needle is opened, there is a danger of the actuator rod popping out. Note that the needle is rotated clockwise to close and counterclockwise to open.
- Do not force the product to rotate or swing even if the plastic body is rotatable. Such application could cause damage or leakage in the body.
- Do not use a mechanical tool to tighten the lock nut; instead, manually tighten the lock nut firmly in place. Using a mechanical tool to tighten could result in damage to the lock nut or the body. Also, if the lock nut is not firmly tightened, it could become loose, causing the initial setting to shift the position.

## Handling Instructions and Precautions

### ● Mounting

#### Precautions for mounting the body

1. To mount the body, use a suitable tool to tighten it to the outer hexagonal section of the body.
2. When tightening body thread, tighten to the recommended tightening torque shown in the table below. Tightening to more than the recommended torque could result in broken thread sections or air leaks due to deformed gaskets. Tightening to less than the recommended torque could lead to loose body thread or air leaks.

#### Recommended tightening torque

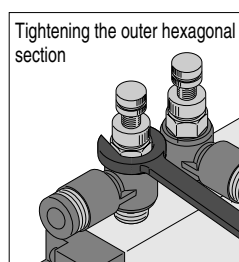
Thread type	Thread	Tightening torque
Metric thread	M5×0.8	1.5~1.9N·m [1.11~1.40ft·lbf]
	M6×1	2~2.7N·m [1.48~1.99ft·lbf]
Taper pipe thread	R1/8	7~9N·m [5.2~6.6ft·lbf]
	R1/4	12~14N·m [8.9~10.3ft·lbf]
	R3/8	22~24N·m [16.2~17.7ft·lbf]
	R1/2	28~30N·m [20.7~22.1ft·lbf]

#### Precautions for disconnecting the body

1. To disconnect the body, use a suitable tool to loosen it from the outer hexagonal section of the body.
2. Clean off the sealant coating on the thread of the removed mating part. The coated sealant could enter other relating parts, and cause breakdowns.

#### Method for tightening body thread

For tightening body thread, use a wrench on outer hexagonal section.



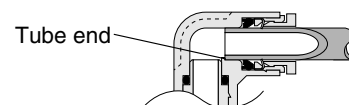
### Caution

- The Throttle Valve allows a certain amount of leakage. Do not use for applications where zero leakage is required.
- A clogged element in the TVM exhaust throttle valve with muffler causes exhaust resistance to increase. Such clogging could deteriorate overall system functions.
- If a clogged element in the TVM exhaust throttle valve with muffler results in deterioration of function, the throttle valve body will need to be replaced. Note that replacement of the element alone is not possible.

### ● Tube connection and disconnection

#### Precautions for connecting the tube

1. Check that the cut section of the tube has been cut at straight angle, that the outer surface of the tube is not scratched, and that the tube has not become oval shaped.
2. When connecting a tube, failure to insert the tube all the way to the end could result in air leaks.



3. After connection, pull the tube to check that it will not disconnect.

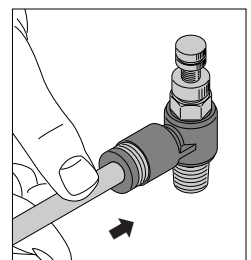
#### Precautions for disconnecting the tube

1. Before disconnecting a tube, check that the pressure inside the tube is down to zero.
2. Push the release ring evenly all the way to the end, and then pull the tube out. An insufficient push could make it impossible to pull the tube out, or could scratch the tube, leaving scratched tube material inside the fitting.

#### Tube connection and disconnection method

##### 1. Tube connection

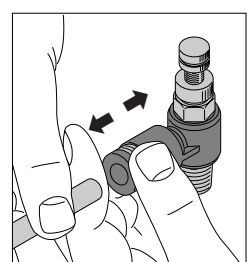
The Throttle Valve is equipped with a lock claw that holds the tube in place when it has been pushed all the way to the end, and with an elastic sleeve for sealing the tube periphery.



##### 2. Tube disconnection

To disconnect the tube, first push on the release ring, releasing the lock claw, and then pull the tube out.

Always stop the air supply before removing the tube.



## Handling Instructions and Precautions

For cases where tight or cramped piping spaces hinder tube removal operations, a special tool is available. Consult us for details.

### Special tool for tube removal

For  $\phi$  3 [0.118in.],  $\phi$  4 [0.157in.] and  $\phi$  6 [0.236in.] tubes  
Order code : **UJ-1**



For  $\phi$  6 [0.236in.],  $\phi$  8 [0.315in.],  
 $\phi$  10 [0.394in.] and  $\phi$  12 [0.472in.] tubes  
Order code : **UJ-2**



### ● Usable tubes

Either nylon or urethane tubes can be used. The tube outer diameter accuracy should be, for nylon tubes, within  $\pm 0.1\text{mm}$  [ $\pm 0.004\text{in.}$ ] of the nominal dimensions, and for urethane tubes, within  $\pm 0.15\text{mm}$  [ $\pm 0.006\text{in.}$ ] of the nominal dimensions, while the ovalness (difference between long diameter and short diameter) should be within  $0.2\text{ mm}$  [ $0.008\text{in.}$ ].

**Cautions:** 1. Use tubes with no visible scratches on the outer surface. If a scratch is made during repeated use, cut off the scratched portion.

2. Do not bend or twist the tube too much near the connection to the fitting. It could result in air leaks. The minimum bending radius for nylon tubes is as shown in the table below.

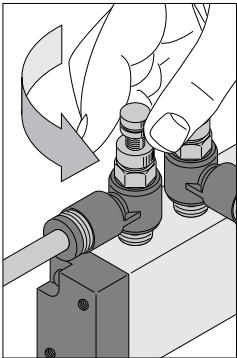
mm [in.]

Tube size	Minimum bending radius
$\phi$ 4 [0.157]	20 [0.8]
$\phi$ 6 [0.236]	30 [1.2]
$\phi$ 8 [0.315]	50 [2.0]
$\phi$ 10 [0.394]	80 [3.2]
$\phi$ 12 [0.472]	150 [5.9]

### ● Speed adjustment of pneumatic equipment

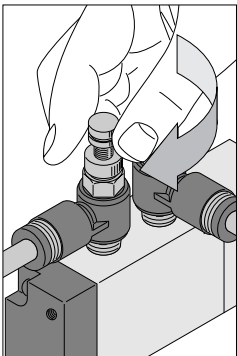
#### 1. To increase the speed

From a completely closed position, rotate the throttle valve's needle in the counterclockwise direction to increase the speed of the pneumatic equipment. When the desired speed has been attained, always tighten the lock nut to ensure that the speed setting does not shift the position.



#### 2. To decrease the speed

If the throttle valve's needle has been rotated too far (the speed is now too fast), rotate it in the clockwise direction to decrease the speed. When the desired speed has been attained, always tighten the lock nut to ensure that the speed setting does not shift the position.

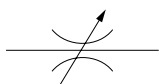


# THROTTLE VALVES

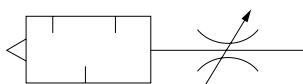
## Throttle Valves Exhaust Throttle Valves with Muffler

- Perform speed control and pneumatic signal control for pneumatic equipment.
- Also adjust flow rate during operations.
- A stop mechanism ensures safety even when the needle is fully open.

### Symbols



Throttle valve



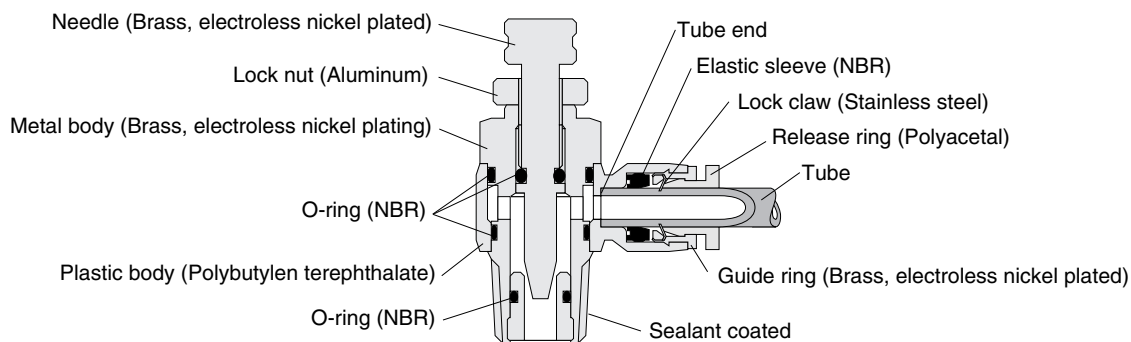
Exhaust throttle valve with muffler

### Specifications

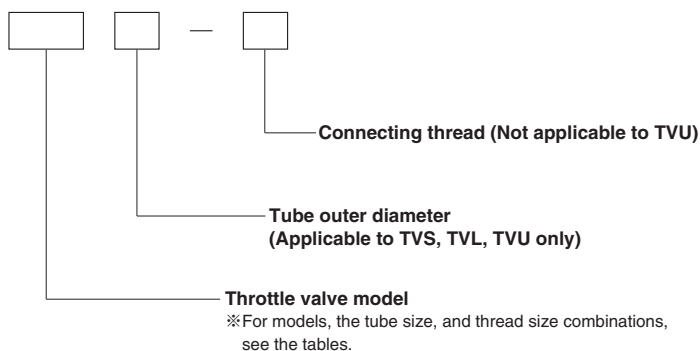
Media	Air
Operating pressure range	0~0.9MPa [0~131psi.]
Operating vacuum pressure	—100kPa [—29.54in.Hg]
Operating temperature range	0~60°C [32~140°F]
Recommended tube	Nylon tube, urethane tube
Sales unit	1 pc.

Remark: Supplied with a gasket or sealant coated.

### Inner Construction, Major Parts and Materials



### Order Codes



#### ●TVS Straight 430



Tube size	Thread size				
	M5×0.8	R1/8	R1/4	R3/8	R1/2
4	M5	01	—	—	—
6	M5	01	02	—	—
8	—	01	02	03	—
10	—	—	02	03	—
12	—	—	—	03	04

●For the NCU and non-lubricant specifications, see p.436.

#### ●TVL Elbow 431



Tube size	Thread size				
	M5×0.8	R1/8	R1/4	R3/8	R1/2
4	M5	01	—	—	—
6	M5	01	02	—	—
8	—	01	02	03	—
10	—	—	02	03	—
12	—	—	—	03	04

#### ●TVU Union straight 432



Tube size
4
6
8
10
12

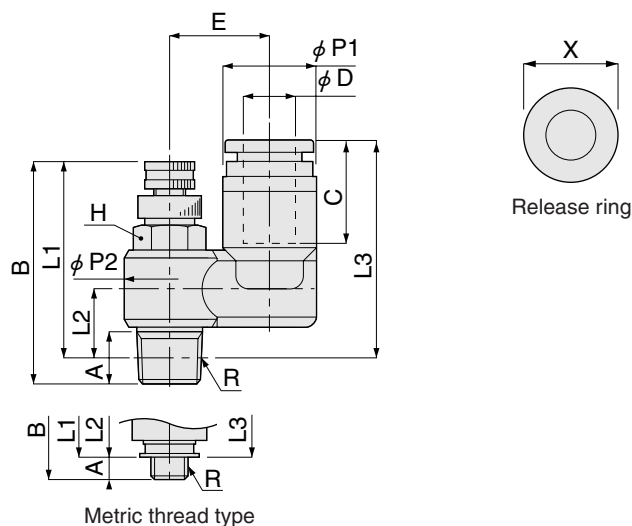
#### ●TVM Exhaust throttle valve with muffler 432



Thread size
M5×0.8
R1/8
R1/4
R3/8
R1/2

## Dimensions (mm)

### Straight TVS

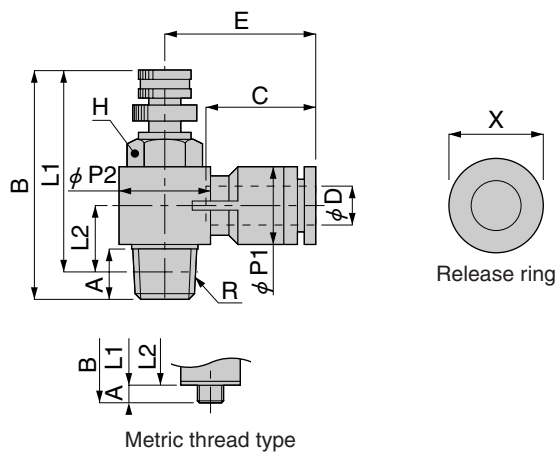


Model	Tube outer diameter $\phi D$	R	A	B		L1 <sup>Note</sup>		L2 <sup>Note</sup>	L3 <sup>Note</sup>	$\phi P1$	$\phi P2$	C	E	Width across flats H	X	Mass (g) [oz.]
				MAX	MIN	MAX	MIN									
<b>TVS4-M5</b>	4	M5×0.8	2.9	29.7	27	26.8	24.1	6.8	23.9	10.2	9.8	14.9	10.5	8	9.9	9.2 [0.325]
<b>TVS4-01</b>		R1/8	8	41.3	35.2	37.3	31.2	10.9	28.9		14.4		13	10		20 [0.71]
<b>TVS6-M5</b>	6	M5×0.8	2.9	29.7	27	26.8	24.1	6.8	26	12.6	9.8	17	12.2	8	11.8	11 [0.39]
<b>TVS6-01</b>		R1/8	8	41.3	35.2	37.3	31.2	10.9	31		14.4		14.2	10		20 [0.71]
<b>TVS6-02</b>		R1/4	11.1	48.7	41.9	42.7	35.9	12	32.1		18.4		17.2	14		39 [1.38]
<b>TVS8-01</b>	8	R1/8	8	41.3	35.2	37.3	31.2	10.9	32.4	14.6	14.4	18.1	15.2	10	13.8	23 [0.81]
<b>TVS8-02</b>		R1/4	11.1	48.7	41.9	42.7	35.9	12	33.6		18.4		18.2	14		42 [1.48]
<b>TVS8-03</b>		R3/8	13.2	55	47.1	48.6	40.7	15.4	37.8		22		19.2	19		73 [2.57]
<b>TVS10-02</b>	10	R1/4	11.1	48.7	41.9	42.7	35.9	12	35.9	17.8	18.4	20.2	19.8	14	16.8	45 [1.59]
<b>TVS10-03</b>		R3/8	13.2	55	47.1	48.6	40.7	15.4	40.1		22		20.8	19		77 [2.72]
<b>TVS12-03</b>	12	R3/8	13.2	55	47.1	48.6	40.7	15.4	42.8	21.2	22	23.4	22.5	19	19.8	81 [2.86]
<b>TVS12-04</b>		R1/2	16	59.8	52.5	51.6	44.4	18.2	47		28		25.5	24		125 [4.41]

Note: The L1, L2 and L3 dimensions for the taper thread type are the reference dimensions after the fittings are assembled.

## Dimensions (mm)

### Elbow TVL

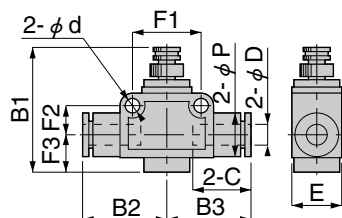


Model	Tube outer diameter $\phi$ D	R	A	B		L1 <sup>Note</sup>		L2 <sup>Note</sup>	$\phi$ P1	$\phi$ P2	C	E	Width across flats H	X	Mass (g) [oz.]
				MAX	MIN	MAX	MIN								
<b>TVL4-M5</b>	4	M5×0.8	2.9	29.7	27	26.8	24.1	7.2	9.9	9.8	14.9	19.9	8	9.9	7.9 [0.279]
<b>TVL4-01</b>		R1/8	8	41.3	35.2	37.3	31.2	9.7	10	14.4		21.4	10		21 [0.74]
<b>TVL6-M5</b>	6	M5×0.8	2.9	29.7	27	26.8	24.1	8.4	12.4	9.8	17	24	8	11.8	11 [0.39]
<b>TVL6-01</b>		R1/8	8	41.3	35.2	37.3	31.2	10.9		14.4		23.5	10		22 [0.78]
<b>TVL6-02</b>		R1/4	11.1	48.7	41.9	42.7	35.9	12.2		18.4		25.5	14		40 [1.41]
<b>TVL8-01</b>	8	R1/8	8	41.3	35.2	37.3	31.2	11.9	14.4	14.4	18.1	26.9	10	13.8	22 [0.78]
<b>TVL8-02</b>		R1/4	11.1	48.7	41.9	42.7	35.9	13.2		18.4		28.4	14		40 [1.41]
<b>TVL8-03</b>		R3/8	13.2	55	47.1	48.6	40.7	15.4		22		28.9	19		71 [2.50]
<b>TVL10-02</b>	10	R1/4	11.1	48.7	41.9	42.7	35.9	14.8	17.6	18.4	20.2	30.9	14	16.8	44 [1.55]
<b>TVL10-03</b>		R3/8	13.2	55	47.1	48.6	40.7	16.7		22		31.2	19		74 [2.61]
<b>TVL12-03</b>	12	R3/8	13.2	55	47.1	48.6	40.7	18.4	21	22	23.4	36.9	19	19.8	78 [2.75]
<b>TVL12-04</b>		R1/2	16	59.8	52.5	51.6	44.4	19.7		28		36.4	24		119 [4.20]

Note: The L1 and L2 dimensions for the taper thread type are the reference dimensions after the fittings are assembled.

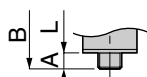
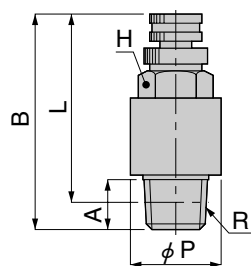
## Dimensions (mm)

### Union straight TVU



Model	Tube outer diameter $\phi D$	B1		B2	B3	$\phi P$	E	C	$\phi d$	F1	F2	F3	Mass (g) [oz.]
		MAX	MIN										
<b>TVU4</b>	4	28.6	25.9	20.4	20.4	10.5	11	14.9	3.2	14	6.5	6.5	13 [0.46]
<b>TVU6</b>	6	41.6	36.1	24.9	24.9	13	15	16.9	4.3	20	8.5	11	30 [1.06]
<b>TVU8</b>	8	46.2	40.6	27.4	27.4	15	18	18.4	4.3	22	9.5	12	45 [1.59]
<b>TVU10</b>	10	52.2	45.7	31.7	31.7	18	21	20.7	4.3	26	11	12	75 [2.65]
<b>TVU12</b>	12	56	48.7	37.2	37.2	21	28	23.4	4.3	32	13	16	127 [4.48]

### Exhaust throttle valve with muffler TVM



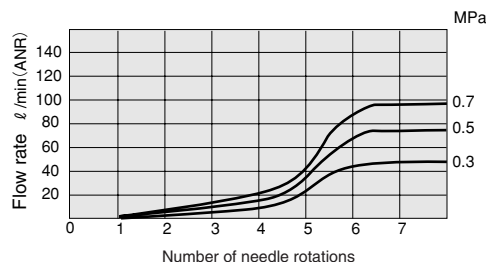
Metric thread type

Model	R	A	B		L <sup>Note</sup>		$\phi P$	Width across flats H	Mass (g) [oz.]
			MAX	MIN	MAX	MIN			
<b>TVM-M5</b>	M5×0.8	3	25.8	21.9	22.8	18.9	10	8	4.6 [0.162]
<b>TVM-01</b>	R1/8	8	35.8	29.3	31.8	25.4	14	10	14 [0.49]
<b>TVM-02</b>	R1/4	11	37.2	31.6	31.2	25.6	18	14	26 [0.92]
<b>TVM-03</b>	R3/8	12.5	42.0	35.2	35.7	28.9	22	17	47 [1.66]
<b>TVM-04</b>	R1/2	14.5	42.7	36.9	34.5	28.7	27	21	68 [2.40]

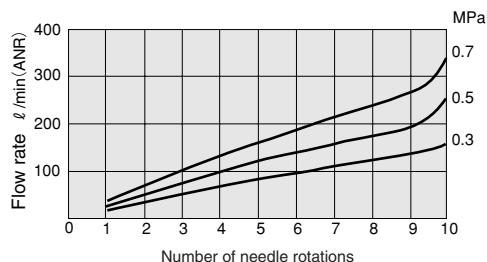
Note: The L dimensions for the taper thread type are the reference dimensions after the fittings are assembled.

## Flow Rate Characteristics (Straight, Elbow)

### TVS 4-M5, TVS 6-M5

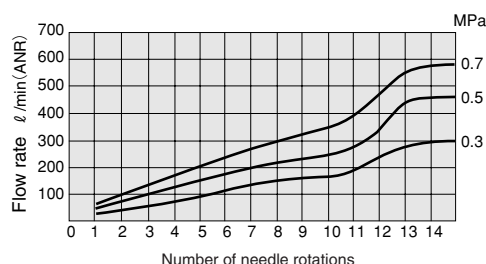


### TVS 4-01, TVS 6-01, TVS 8-01

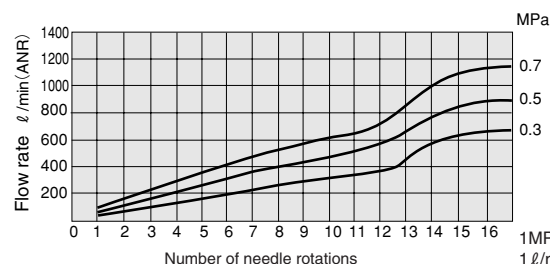


1MPa = 145psi.  
1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

### TVS 6-02, TVS 8-02, TVS 10-02

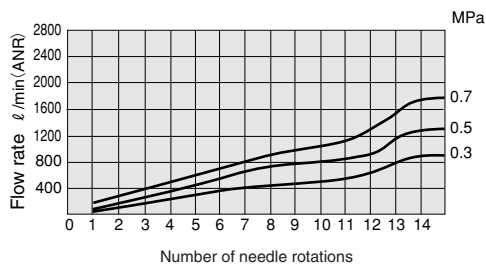


### TVS 8-03, TVS 10-03, TVS 12-03



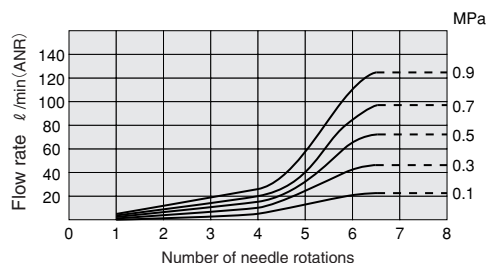
1MPa = 145psi.  
1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

### TVS 12-04

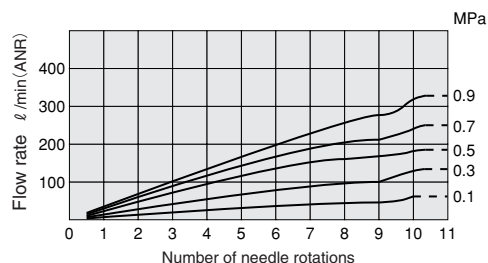


1MPa = 145psi. 1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

### TVL 4-M5, TVL 6-M5

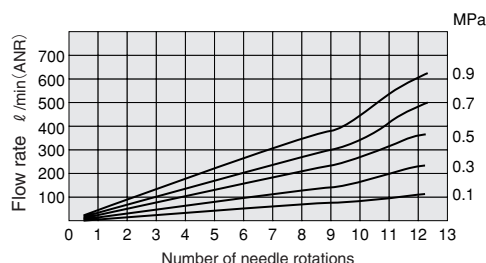


### TVL 4-01, TVL 6-01, TVL 8-01

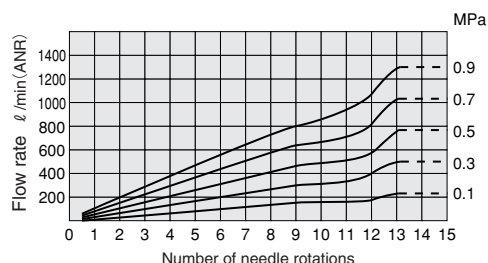


1MPa = 145psi.  
1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

### TVL 6-02, TVL 8-02, TVL 10-02

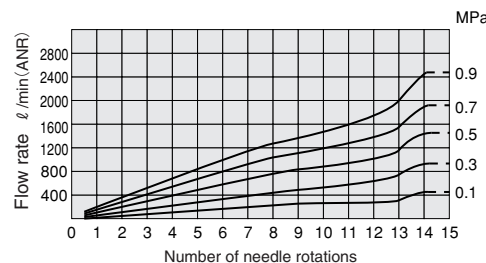


### TVL 8-03, TVL 10-03, TVL 12-03



1MPa = 145psi.  
1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

### TVL 12-04

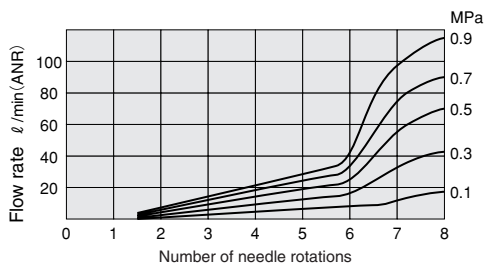


1MPa = 145psi. 1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

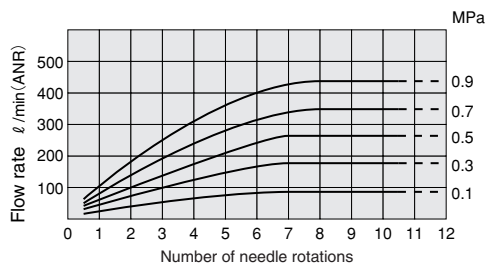


# Flow Rate Characteristics (Union Straight)

TVU4

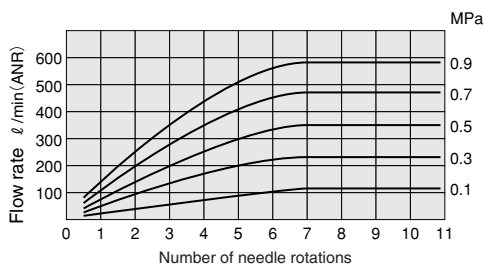


TVU6

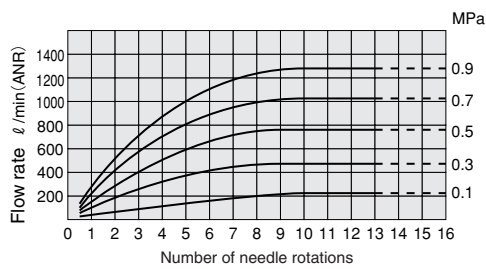


1MPa = 145psi. 1 l/min = 0.0353ft³/min.

TVU8

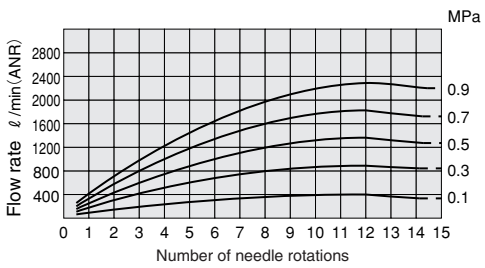


TVU10



1MPa = 145psi. 1 l/min = 0.0353ft³/min.

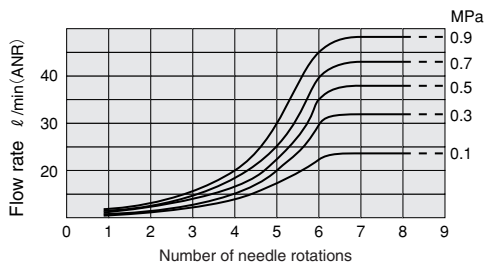
TVU12



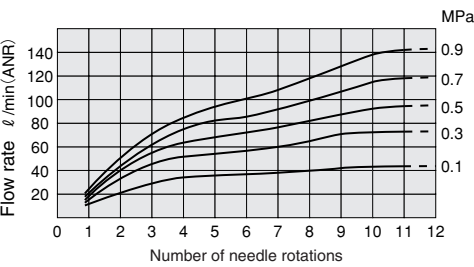
1MPa = 145psi. 1 l/min = 0.0353ft³/min.

Flow Rate Characteristics (Exhaust Throttle Valve with Muffler)

TVM-M5

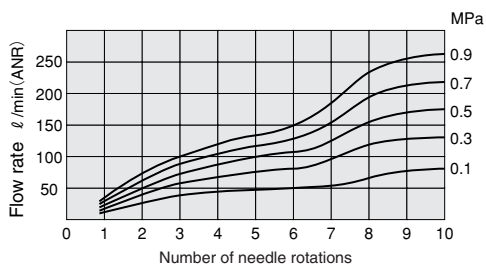


TVM-01

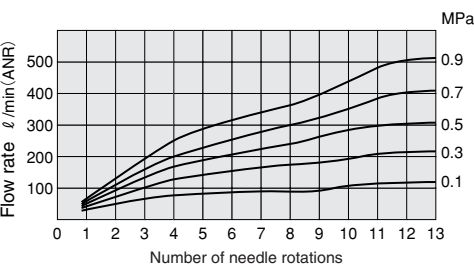


1MPa = 145psi. 1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

TVM-02

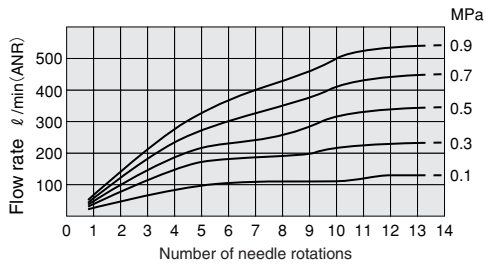


TVM-03



1MPa = 145psi. 1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

TVM-04



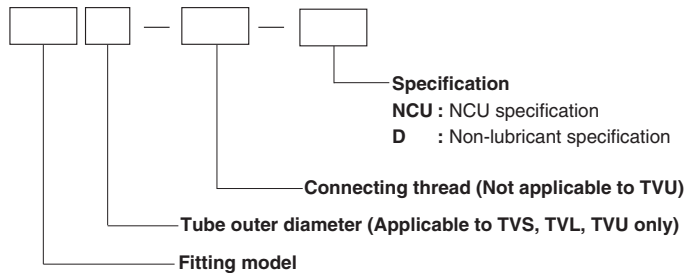
1MPa = 145psi. 1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

# THROTTLE VALVES

## NCU Specification and Non-lubricant Specification

### NCU Specification and Non-lubricant Specification

#### ● Order Codes



- For specifications, see p.429.
- The dimensions, inner construction, major parts and materials for the **NCU** specification and non-lubricant specification shown below are the same as the standard type. See inner construction, major parts and materials on p.429 and dimensions on p.430~432. The sealant is not applied to the R taper thread portion of the **NCU** specifications.

**Caution:** For delivery, consult us.

※For the fitting models, the tube size and thread combinations, see the table below. Columns showing the “←” symbol indicate that standard products can be used as the **NCU** specification. In these cases, place orders for the standard products.

#### ● Model Table (NCU Specification)

Type	Tube outer diameter	Thread	Standard type model (reference)	NCU specification model
Straight <b>TVS</b>	4	M5×0.8	TVS4-M5	←
		R1/8	TVS4-01	TVS4-01-NCU
	6	M5×0.8	TVS6-M5	←
		R1/8	TVS6-01	TVS6-01-NCU
		R1/4	TVS6-02	TVS6-02-NCU
	8	R1/8	TVS8-01	TVS8-01-NCU
		R1/4	TVS8-02	TVS8-02-NCU
		R3/8	TVS8-03	TVS8-03-NCU
	10	R1/4	TVS10-02	TVS10-02-NCU
		R3/8	TVS10-03	TVS10-03-NCU
	12	R3/8	TVS12-03	TVS12-03-NCU
		R1/2	TVS12-04	TVS12-04-NCU
Elbow <b>TVL</b>	4	M5×0.8	TVL4-M5	←
		R1/8	TVL4-01	TVL4-01-NCU
	6	M5×0.8	TVL6-M5	←
		R1/8	TVL6-01	TVL6-01-NCU
		R1/4	TVL6-02	TVL6-02-NCU
	8	R1/8	TVL8-01	TVL8-01-NCU
		R1/4	TVL8-02	TVL8-02-NCU
		R3/8	TVL8-03	TVL8-03-NCU
	10	R1/4	TVL10-02	TVL10-02-NCU
		R3/8	TVL10-03	TVL10-03-NCU
	12	R3/8	TVL12-03	TVL12-03-NCU
		R1/2	TVL12-04	TVL12-04-NCU
Union straight <b>TVU</b>	4	—	TVU4	←
	6	—	TVU6	←
	8	—	TVU8	←
	10	—	TVU10	←
	12	—	TVU12	←
Exhaust throttle valve with muffler <b>TVM</b>	—	M5×0.8	TVM-M5	←
	—	R1/8	TVM-01	TVM-01-NCU
	—	R1/4	TVM-02	TVM-02-NCU
	—	R3/8	TVM-03	TVM-03-NCU
	—	R1/2	TVM-04	TVM-04-NCU

#### ● Model Table (Non-lubricant Specification)

Type	Tube outer diameter	Thread	Standard type model (reference)	Non-lubricant specification model
Exhaust throttle valve with muffler <b>TVM</b>	—	M5×0.8	TVM-M5	TVM-M5-D
	—	R1/8	TVM-01	TVM-01-D
	—	R1/4	TVM-02	TVM-02-D
	—	R3/8	TVM-03	TVM-03-D
	—	R1/2	TVM-04	TVM-04-D