



Easy to read flow adjustment/control achieved. **New Product**

# Needle valve with adjusting dial DVL Series

NEEDLE VALVE WITH ADJUSTING DIAL



CKD Corporation

CC-860A

# Realizing visible flow rate adjustment and control

The needle valve with dial DVL-S and DVL-N uses a rotary needle valve with linear flow properties, and numerically indicates speed with a dial.

Anyone can easily adjust cylinder speed and flow accurately and with good reproducibility using this needle valve.



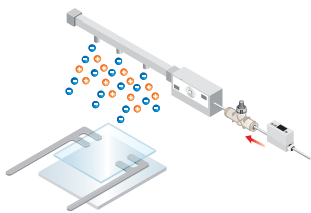
## ● Use as a speed controller

The standard type has a built-in check valve, and can be used as a speed adjustment valve or vacuum break valve for pneumatic cylinders.

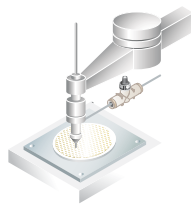
## ● Oil-prohibited specifications available

These specifications enable use in environments susceptible to oil, in clean rooms, and in vacuum applications.

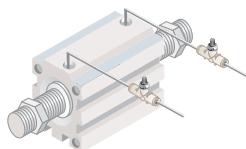
● Adjustment of ionizer purge gas flow rate



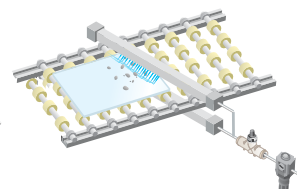
● Adjustment of vacuum break flow in vacuum pickup processes



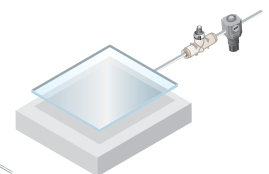
● Cylinder drive



● Air knife



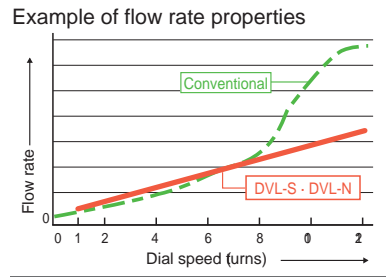
● Transfer of LCD substrates (noncontact)



# DVL Series

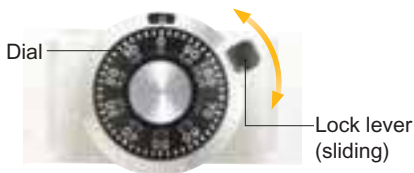
Industry's first needle valve with dial

● **Linear flow rate properties**  
 Linear flow rate properties proportional to needle speed are attainable.



● **Dial indication of rotation**  
 Needle rotation is numerically displayed with the dial.

● **Visible control of flow rates**  
 The flow rate is controlled easily and visibly with the dial indication.  
 Work manuals are now quantifiable.

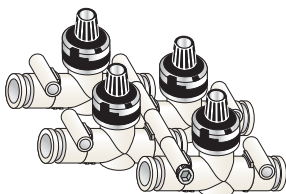


● **Prevent adjustment mistakes**  
 Anyone can easily and accurately adjust values.  
 High reproducibility prevents adjustment errors.

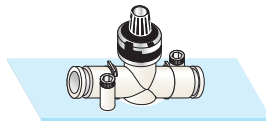
● **One-touch lock**  
 The needle is fixed easily with the sliding lock lever, making adjustment work even easier.

● **Reduce work hours**  
 Adjustment work is done quickly, greatly reducing the number of work hours for setup.

● **Unrestricted installation**  
 The installation section rotates 360°, enabling mounting and installation to be selected freely from the base, side, or panel mounting. No mounting bracket is needed.



● Example of manifold



● Example of base mounting

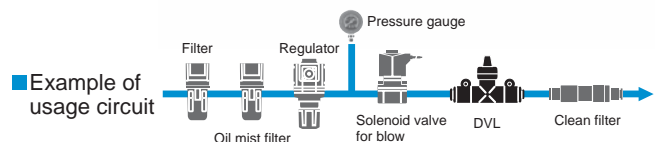


● Example of panel mounting



● Rotary mounting hole

● Sealants have outstanding ozone resistance (oil-prohibited).  
 RoHS Directive-compliant



■ DVL Series Product

Model variations	Tube bore	Flow rate range	Application
Check valve Standard type <b>DVL-S</b>	φ 4	20, 80	<ul style="list-style-type: none"> <li>Control actuator speed</li> <li>Adjust vacuum break flow rate for small electronic parts</li> <li>Control pressing pressure and tension</li> </ul>
	φ 6	20, 80, 160, 240	
	φ 8	20, 80, 160, 240, 400	
	φ 10	240, 400	
	φ 12	400	
Needle valve Oil-prohibited type <b>DVL-N</b>	φ 4	20, 80	Compatible with clean environments and vacuum fields <ul style="list-style-type: none"> <li>Adjust floating conveying flow rate</li> <li>Control ionizer purge gas flow rate</li> <li>Blow workpieces with air</li> </ul>
	φ 6	20, 80, 160, 240	
	φ 8	20, 80, 160, 240, 400	
	φ 10	240, 400	
	φ 12	400	



# Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanical mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.

## WARNING

**1** This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience in handling.

**2** Use this product in accordance of specifications.

This product must be used within its stated specifications. It must not be modified or machined.

This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.

(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

- ① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
- ② Use for applications where life or assets could be adversely affected, and special safety measures are required.

**3** Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.,

ISO4414, JIS B8370 (pneumatic system rules)

JFPS2008 (principles for pneumatic cylinder selection and use)


Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.


**4** Do not handle, pipe, or remove devices before confirming safety.


- ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
- ② Note that there may be hot or charged sections even after operation is stopped.
- ③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
- ④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

**5** Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

 **DANGER:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

 **WARNING:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

 **CAUTION:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

### Disclaimer

1. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.
2. CKD cannot be held responsible for the following damage:
  - (1) Damage resulting from failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.
  - (2) When a CKD product is assembled into customer equipment, damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry.
  - (3) Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.
  - (4) Damage resulting from product modifications not approved by CKD, or from faults due to combination with other software or other connected devices.



## Safety precautions

# Pneumatic components warning and cautions

Always read this section before starting use.

Refer to "Pneumatic, vacuum and auxiliary components (No. CB-24SA)" for general precautions of pneumatic components.

### Needle valve with adjusting dial

## Design & Selection

### CAUTION

- **This valve can not be used as a stop valve that has no leakage.**  
Due to structure, a few leakage could occur.
- **Care must be taken because the flow varies from the characteristics value on page 3 depending on the piping conditions before or after the product and temperature.**
- **The particle occurrence in the flow path is not zero.**  
Even when using oil-prohibited models, install a final clean filter if dust could be a problem with the circuit.
- **Oil-prohibition specifications apply for fluid passage section only.**  
Do not wash this product because grease is used for internal parts other than wetted sections.
- **Do not use this valve in circuits where ozone is generated intentionally.**  
Ozone resistance is sufficient for naturally generated ambient ozone. Packing deteriorates if ozone levels are high.

- **Use this product in accordance with the specifications range.**  
**Consult with CKD when using the product for special applications.**
  - Use with exceeding the specifications range may result in insufficient performance, and safety can not be secured.
  - Could not use in special applications and environment. For example, use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
- **Confirm that the product will withstand the working environment.**
  - This product cannot be used in environments where functional obstacles could occur. Special environments reaching high temperatures, having chemical atmospheres, or having chemicals, vibration, humidity, moisture, dripping, or gas are present. Environments where ozone is generated.
  - Do not use the product in the place that the product could directly contact with coolant or spatter, etc.

## Installation & Adjustment

### CAUTION

- **When adjusting the flow rate, turn the dial clockwise to open the valve and counterclockwise to close it.**
- **After adjusting the flow rate, fix the dial with the sliding lock lever.**
- **The flow rate is controlled from 1 to 12 or 13 on the dial rotation indicator.**  
Avoid flow rate control exceeding this range. If the dial is forcibly fully closed or open, faults could occur and flow rate properties deviate.

- **Even when the needle is fully closed, the dial indication is not 0.**  
The flow rate in the dial indication is calibrated when the needle is not fully closed. Note that 0 is not necessarily indicated when the needle is fully closed.  
**When 0 is exceeded, 19 or nothing may be displayed.**
- **Do not remove the dial from the main body.**  
Removing the dial may prevent the flow rate from being readjusted or calibrated.
- **Install an air filter in front of the circuit.**  
The flow varies depending on clogging or foreign matters adhered in the orifice.

## Installation & Adjustment

- **With the DVL-N, dial rotation may be stiff.**

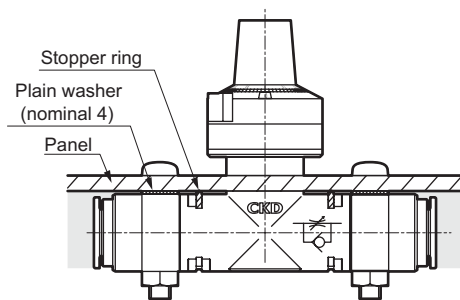
Because of oil-prohibited specifications, dial movement may be slightly stiffer than with the DVL-S.

- **Rotate the mounting hole section at no pressurized state.**

- **With the DVL-N, turning in the mounting hole may be slightly stiff.**

Because of oil-prohibited specifications, movement of the rotary mounting hole will be stiffer than for the DVL-S.

- **When installing on a panel, the stopper ring will interfere with the panel, so insert a flat washer between the mounting hole and panel.**



- **When piping, fix the product with bolts or Insulock ties, etc.**

If the product moves or twists, the tube could be dislocated.

- **Tighten the bolt on the mounting hole with a torque of 0.8 N.m or less.**

- **There is no direction for needle valve piping.**

- **Before replacing tubing, stop the air flow and confirm that no pressure remains.**

- **Handling push-in joint/tube**

Refer to "Pneumatic, vacuum and auxiliary components (No. CB-24SA)" for warnings and cautions of joint/tube.

- **When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.**

Piping connection could be dislocated or the piping tube fly off, leading to accidents.

- **After connecting piping, check pipe connections for air leaks before supplying compressed air.**

Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

- **Pipe so that piping connections do not become dislocated due to device movement, vibration, or tension.**

- **Ensure space around the pneumatic component for installation, removal, wiring, and piping work.**

- **Avoid use in applications involving continuous turning or swaying.**

Otherwise the joint could be damaged.

- **Avoid use in areas with high vibration or impact.**

### When using for actuator speed control

- **Final speed must be adjusted as necessary.**

Speed differs greatly depending on product differences, working conditions, actuator differences, and temperature, so confirm the final speed as necessary. Aging of the actuator may cause speed to fluctuate greatly.

- **Check flow direction with JIS symbol.**

If installed in reverse, speed adjustment will not be applied and the actuator could pop out, creating a hazard.

- **Adjust speed by opening when the needle is nearly closed.**

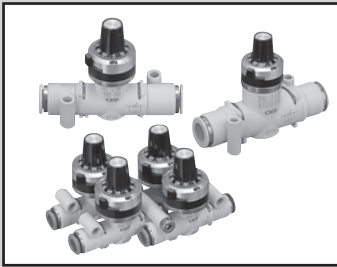
The actuator could suddenly pop out if the needle is open.

- **Understand compressed air features before designing a pneumatic circuit.**

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MEMO

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Needle valve with adjusting dial, check valve type

# DVL-S Series

Needle valve with adjusting dial, needle valve/oil-prohibition type

# DVL-N Series

●Port size:  $\Phi 4$ ,  $\Phi 6$ ,  $\Phi 8$ ,  $\Phi 10$ ,  $\Phi 12$

JIS symbol



DVL-S



DVL-N

## Specifications

### ● Needle valve with adjusting dial, check valve type DVL-S

Descriptions		DVL-S-06					DVL-S-08		DVL-S-10		
		020		080		160	240		400		
Applicable tube outer diameter	mm	$\Phi 4$	$\Phi 6$	$\Phi 4$	$\Phi 6$	$\Phi 6$	$\Phi 6$	$\Phi 8$	$\Phi 8$	$\Phi 10$	$\Phi 12$
Working fluid		Compressed air									
Max. working pressure	MPa	1.0									
Min. working pressure	MPa	0.1 (Note 3)									
Withstanding pressure	MPa	1.5									
Fluid temperature	$^{\circ}\text{C}$	5 to 60 (no freezing Note 2)									
Ambient temperature	$^{\circ}\text{C}$	0 to 60 (no freezing)									
Product weight	g	54	48	54	48	48	60	61	82	86	88
Needle control range		1 to 12 rotations					1 to 13 rotations				
Free flow	Flow $\ell/\text{min}$ (ANR)	170	300	170	300	300	400	550	900	1100	1200
	Effective sectional area $\text{mm}^2$	2.5	4.5	2.5	4.5	4.5	6	8	13.5	16.5	18
Controlled flow	Flow $\ell/\text{min}$ (ANR)	18		80		160	240		440		
	Effective sectional area $\text{mm}^2$	0.15		1.2		2.4	3.6		6.6		

Note 1: The flow is the atmospheric pressure conversion value at pressure 0.5MPa.

Note 2: Freezing could occur by adiabatic expansion depended with air quality (dew point).

Note 3: Vacuum up to  $-100$  kpa is possible only when a free flow direction is selected. The needle cannot be controlled.

### ● Needle valve with adjusting dial, needle valve/oil-prohibition type DVL-N

Descriptions		DVL-N-06					DVL-N-08		DVL-N-10		
		020		080		160	240		400		
Applicable tube outer diameter	mm	$\Phi 4$	$\Phi 6$	$\Phi 4$	$\Phi 6$	$\Phi 6$	$\Phi 6$	$\Phi 8$	$\Phi 8$	$\Phi 10$	$\Phi 12$
Working fluid		Compressed air/N <sub>2</sub> gas/low vacuum									
Max. working pressure	MPa	0.7									
Negative pressure	kPa	$-100$									
Withstanding pressure	MPa	1.5									
Fluid temperature	$^{\circ}\text{C}$	5 to 60 (no freezing Note 2)									
Ambient temperature	$^{\circ}\text{C}$	0 to 60 (no freezing)									
Product weight	g	54	48	54	48	48	60	61	82	86	88
Needle control range		1 to 12 rotations					1 to 13 rotations				
Flow $\ell/\text{min}$ (ANR)		18		80		160	240		440		
Effective sectional area $\text{mm}^2$		0.15		1.2		2.4	3.6		6.6		

Note 1: The flow is the atmospheric pressure conversion value at pressure 0.5MPa.

Note 2: Freezing could occur by adiabatic expansion depended with air quality (dew point).



### How to order

**DVL - S - 06 - H66 - 020**

Model no.

**A** Control method

**B** Body size

**C** Applicable tube outer diameter

**D** Flow type

Refer to the table below for the body size, applicable tube outer diameter and the flow type combination.

Symbol	Descriptions
<b>A Control method (oil removing)</b>	
<b>S</b>	Check valve type
<b>N</b>	Needle valve (oil-prohibition type)
<b>B Body size</b>	
<b>06</b>	1/8 screw or equivalent
<b>08</b>	1/4 screw or equivalent
<b>10</b>	3/8 screw or equivalent
<b>C Applicable tube outer diameter</b>	
<b>H44</b>	Φ4
<b>H66</b>	Φ6
<b>H88</b>	Φ8
<b>H1010</b>	Φ10
<b>H1212</b>	Φ12
<b>D Flow type</b> <span style="float: right;">Note 1</span>	
<b>020</b>	18 ℓ/min. (ANR)
<b>080</b>	80 ℓ/min. (ANR)
<b>160</b>	160 ℓ/min. (ANR)
<b>240</b>	240 ℓ/min. (ANR)
<b>400</b>	440 ℓ/min. (ANR)

### Note on model no. selection

Note 1: The flow indicates the reference flow at 0.5 MPa.

Note 2: DVL-S and DVL-N can be distinguished by push ring color.

DVL-S: White  
DVL-N: Blue

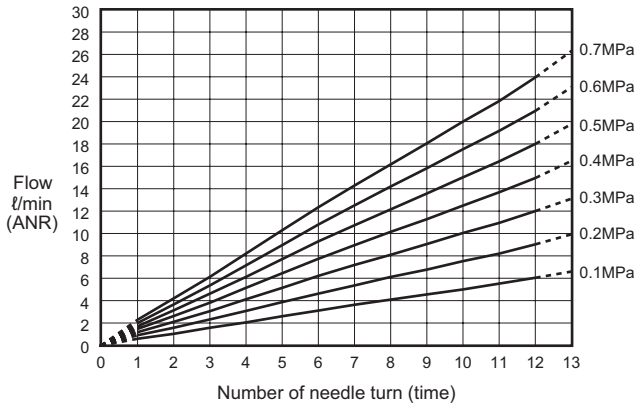
### Body size, applicable tube outer diameter and flow type combination

	<b>B</b> Body size						
	06		08	10			
<b>C</b> Applicable tube outer diameter	H44	H66	H66	H88	H88	H1010	H1212
<b>D</b> Flow type							
<b>020</b>	●	●					
<b>080</b>	●	●					
<b>160</b>		●					
<b>240</b>			●	●			
<b>400</b>					●	●	●

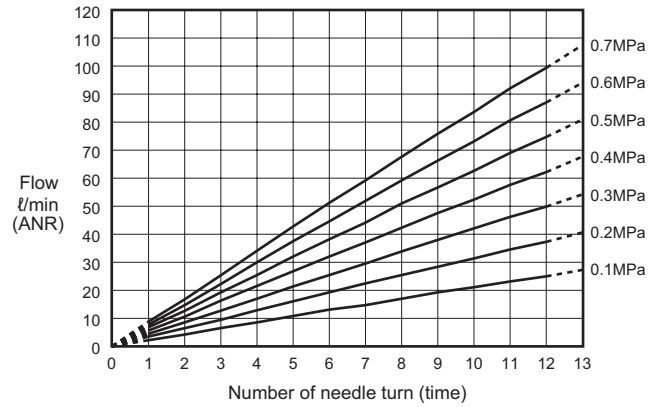
## Flow characteristics

\*The flow characteristic graph is for reference. The value is not guaranteed.

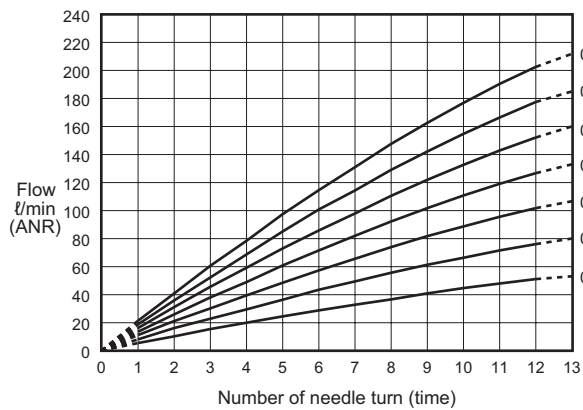
### ● DVL-\*-020



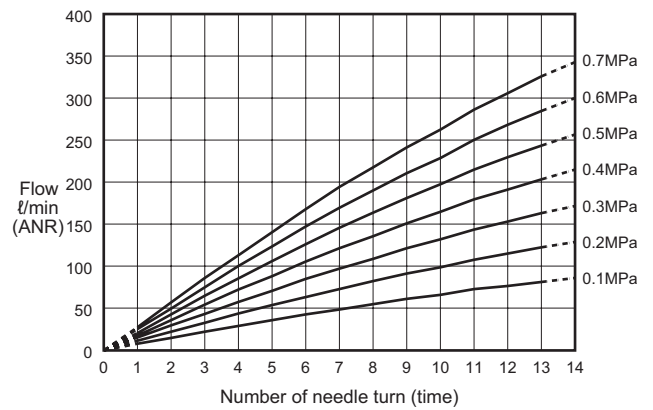
### ● DVL-\*-080



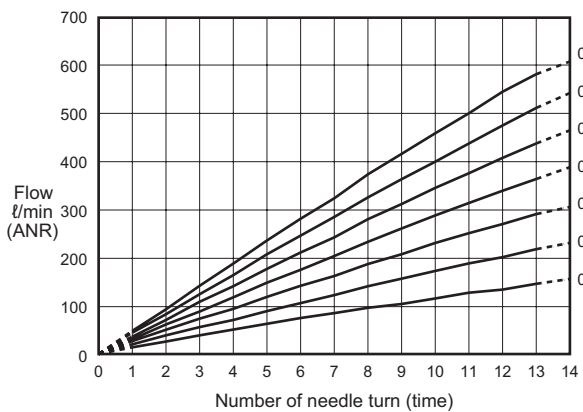
### ● DVL-\*-160



### ● DVL-\*-240

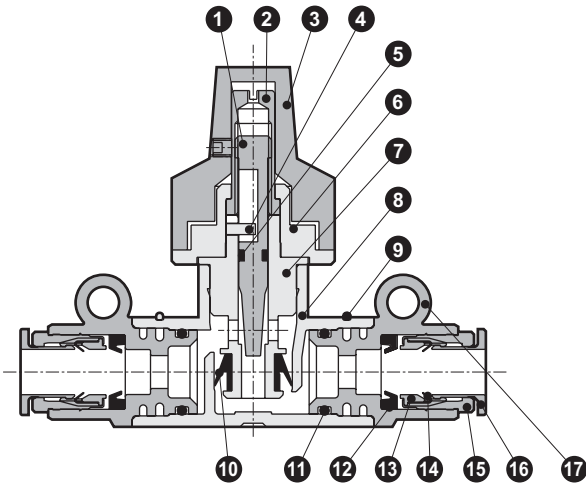


### ● DVL-\*-400



### Internal structure and parts list

#### ● DVL-S

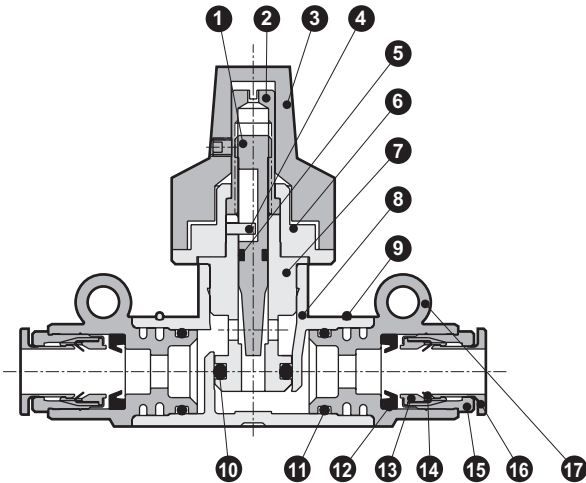


No.	Parts name	Material
1	Needle	Brass
2	Rotary shaft	Brass
3	Dial	Aluminum alloy, polyamide, other
4	Parallel pin	Stainless steel
5	O ring	Nitrile rubber
6	Guide bush	Brass
7	Check bracket	Brass
8	Body	PBT
9	Stopper ring	Stainless steel
10	Check packing seal	Hydrogen nitrile rubber
11	O ring	Nitrile rubber
12	Packing seal	Nitrile rubber
13	Holder	Brass
14	Chuck	Stainless steel
15	Outer ring	Brass
16	Push ring	PBT
17	Joint case	PBT

Note 1: All the brass parts are plated with electroless nickeling.

Note 2: Some sections' structures differ depended with model no. (No material changed)

#### ● DVL-N

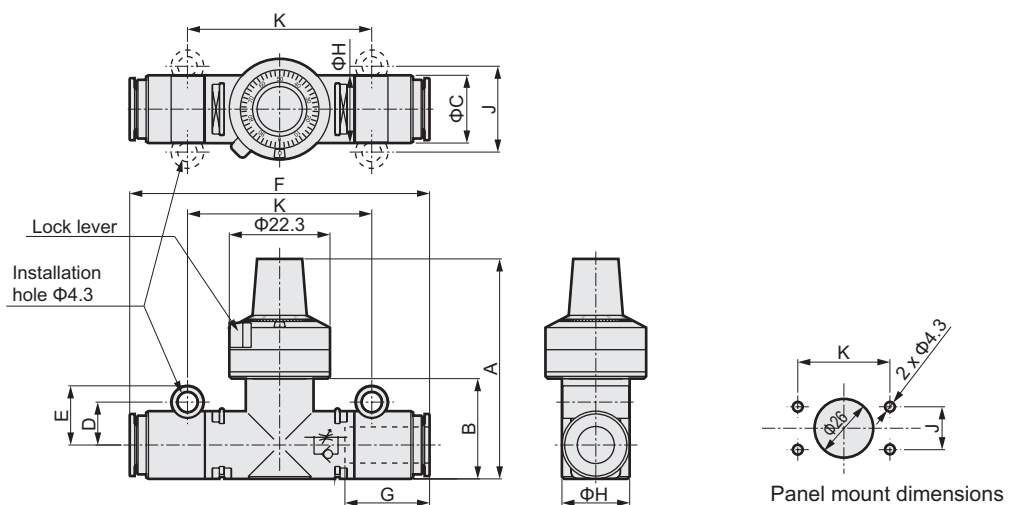


No.	Parts name	Material
1	Needle	Brass
2	Rotary shaft	Brass
3	Dial	Aluminum alloy, polyamide, other
4	Parallel pin	Stainless steel
5	O ring	Fluoro rubber
6	Guide bush	Brass
7	Check bracket	Brass
8	Body	PBT
9	Stopper ring	Stainless steel
10	O ring	Hydrogen nitrile rubber
11	O ring	Hydrogen nitrile rubber
12	Packing seal	Hydrogen nitrile rubber
13	Holder	Brass
14	Chuck	Stainless steel
15	Outer ring	Brass
16	Push ring	PBT
17	Joint case	PBT

Note 1: All the brass parts are plated with electroless nickeling.

Note 2: Some sections' structures differ depended with model no. (No material changed)

### Dimensions



Model no.	Applicable tube outer diameter	A	B	C	D	E	F	H	J	K	G (Tube insertion length)
DVL-*-06-H44-*	$\Phi 4$	45.5	17	12	8.1	11.6	55	12	16.2	30.8	12.9
DVL-*-06-H66-*	$\Phi 6$			49.5			13.7				
DVL-*-08-H66-*	$\Phi 6$	50	22.5	13	9.5	13.1	64	15	19	41	18
DVL-*-08-H88-*	$\Phi 8$			66.5			19				
DVL-*-10-H88-*	$\Phi 8$	58	29	15	11.5	15.1	71	20	23	47	19
DVL-*-10-H1010-*	$\Phi 10$			18			21				
DVL-*-10-H1212-*	$\Phi 12$			20.4			22				

## Related products

### Small size flow sensor FSM Series

Catalog No. CC-687A

3 series of small size flow sensor for different applications

#### FSM-H Series

- Compact/high speed, extremely small flow rate  
Detecting extremely small flow rate with 1 ml/min. or less at high speed
- Positive and negative pressure combination

#### FSM Series

- Compact/quick response
- Compatible with argon (Ar), carbon dioxide (CO<sub>2</sub>).

#### FSM-V Series

- Extremely small size/high speed response  
Quick response of 5 ms possible.



### Inline clean filter FCS500/FCS1000 Series

Appropriate as final filter of different clean applications (Air and inert gas)

- **High accuracy filtration 0.01μm and efficient removal 99.99%**  
The hollow fiber membrane enables a filtration accuracy of 0.01 μm and efficient removal of 99.99%.
- Long service life  
Life has been increased to about five times that of the flat membrane.
- Compact, light in weight, large flow rate  
The filtration area is 3 to 10 times larger than a flat membrane having the same capacity, so pressure loss is low even in high flows. The filter is compact and light-weight even for the same flow.
- Oil-prohibited specifications  
The entire part has been degreased and cleaned. All steps from assembly to packing are done in a cleanroom.
- Easy maintenance  
A transparent case is used for the resin type, enabling element contamination to be visually confirmed.
- Wide variation  
2 series, with flow 500 or 1000, are available. These are made of resin or stainless steel. Push-in joint, male or female thread piping are also available.



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