

# MODEL PD-3 AIR OPERATED VALVE PRODUCT MANUAL

Thank you very much for choosing the Yoshitake's product. To ensure the correct and safe use of the product, please read this manual before use. This manual shall be kept with care for future references. The symbols used in this manual have the following meanings.

	<b>Warning</b>	This symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
	<b>Caution</b>	This symbol indicates a hazardous situation that, if not avoided, may result in minor or moderate injury or may result in only property damage.

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# YOSHITAKE

## 1. Usage of the Product

PD-3 is air operated ON-OFF valve for wide usage application.

## 2. Specifications

Model	PD-3					
Application	Steam, air, cold and hot water, oil, other non-dangerous fluid (600cSt or less)					
Nominal size	15A to 50A					
Working pressure	15A:0 to 2.2MPa *1	20A:0 to 1.3MPa	25A:0 to 0.9MPa	25A:0 to 2.2MPa *1	40A:0 to 1.0MPa	50A:0 to 0.75MPa
Pilot air pressure	15A:0.35 to 1.0MPa	20A:0.45 to 1.0MPa	25A:0.57 to 1.0MPa	25A:0.35 to 1.0MPa	40A:0.44 to 1.0MPa	50A:0.56 to 1.0MPa
Temperature range	-30 to 200°C (no freezing condition)					
Ambient temperature range	-15 to 60°C					
Material	Body	Stainless steel				
	Valve disc	PTFE				
	Bonnet	Brass + chrome plating				
Installation posture	Any direction is possible.					
Connection	JIS Rc screwed					
Operation	Normally close (pressure to open)					
Cv value	15A:4	20A:9.2	25A:17.4	32A:27.8	40A:40.6	50A:63.8

\*1 When fluid is steam, maximum working pressure is 1.5 MPa.

\*2 Available with normally open type (pressure to close).

●For the specification other than the above, please contact us.



### Caution

Please confirm that the tag indication of the product corresponds with the specifications of the ordered product model before use.

\* If they are different, please contact us without using the product.

### 3. Dimensions and Weights

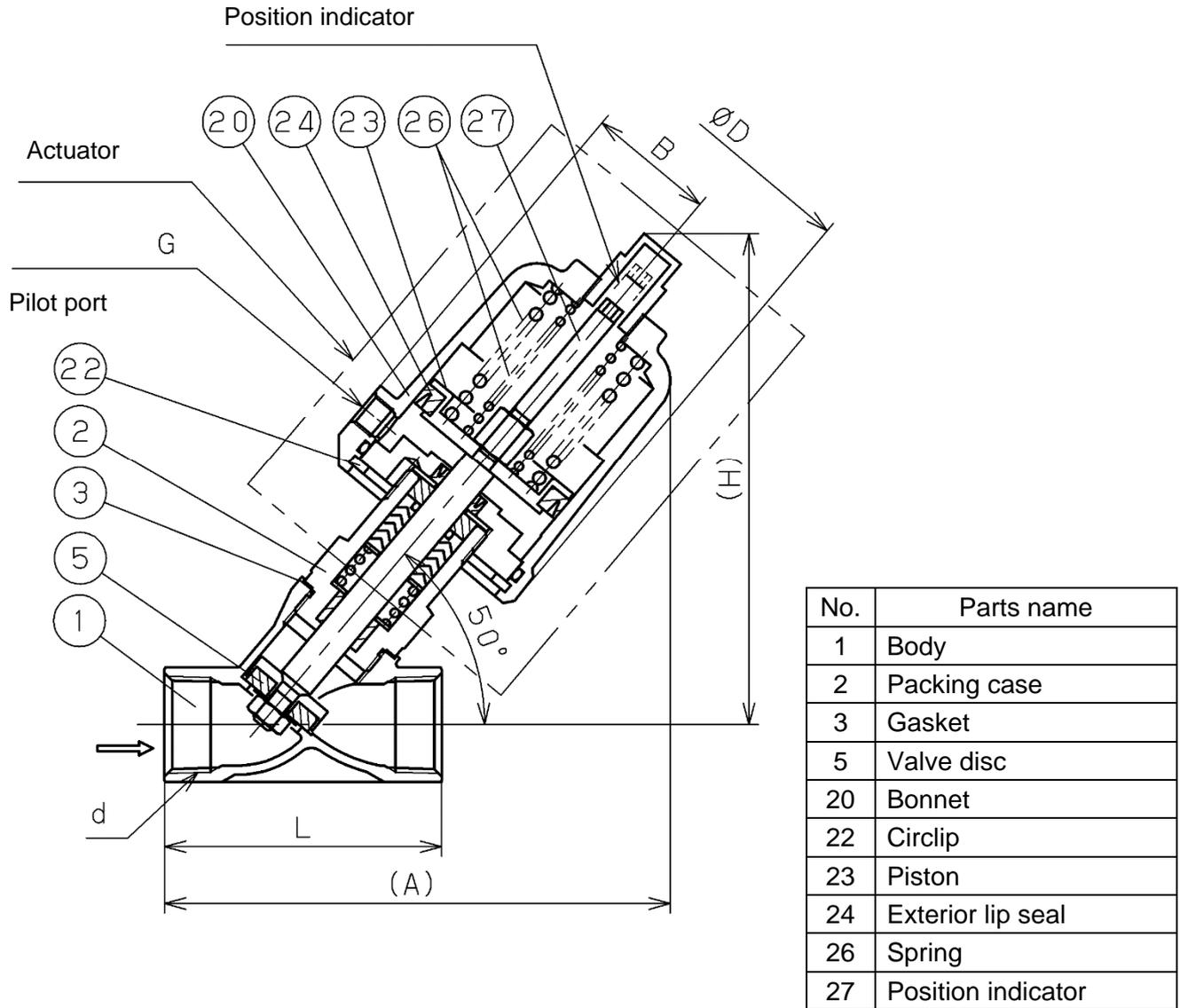


Fig.1

(mm)

Size	Working Press. (MPa)	Pilot Press. (MPa)	d	L	A	H	B	D	G	Weight (kg)
15A	0-2.2	0.35-1.0	Rc 1/2	65	135	130	34.5	62	G 1/8"	1.1
20A	0-1.3	0.45-1.0	Rc 3/4	75	140	135	34.5	62	G 1/8"	1.2
25A	0-0.9	0.57-1.0	Rc 1	90	150	140	34.5	62	G 1/8"	1.4
25A	0-2.2	0.35-1.0	Rc 1	90	190	185	55	96	G 1/4"	3.0
32A	0-1.2	0.35-1.0	Rc 1 1/4	110	205	200	55	96	G 1/4"	3.3
40A	0-1.0	0.44-1.0	Rc 1 1/2	120	210	205	55	96	G 1/4"	3.6
50A	0-0.75	0.56-1.0	Rc 2	150	225	215	55	96	G 1/4"	4.2

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## 4. Operation

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### 1. Closing operation (normal state)

When pilot pressure is not applied, valve disc [5] is closed by power of spring [26].

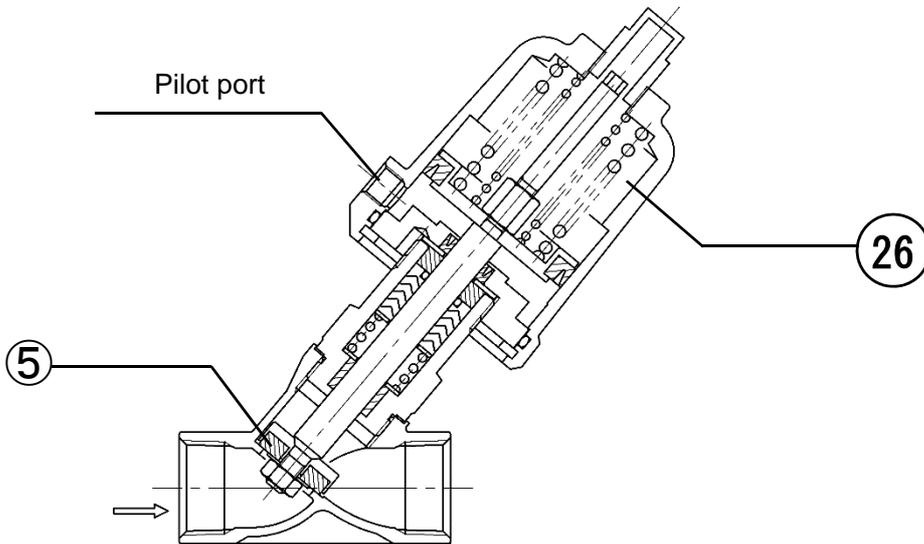


Fig.2

### 2. Opening operation

When pilot pressure is applied from pilot port, pressure is added to bottom part of piston [23], and overcome load of spring [26] and push up piston [23] and open valve disc [5]. Also, position indicator [27] connected to piston [23] is pushed up at the same time, then valve opening can be checked from outside visually.

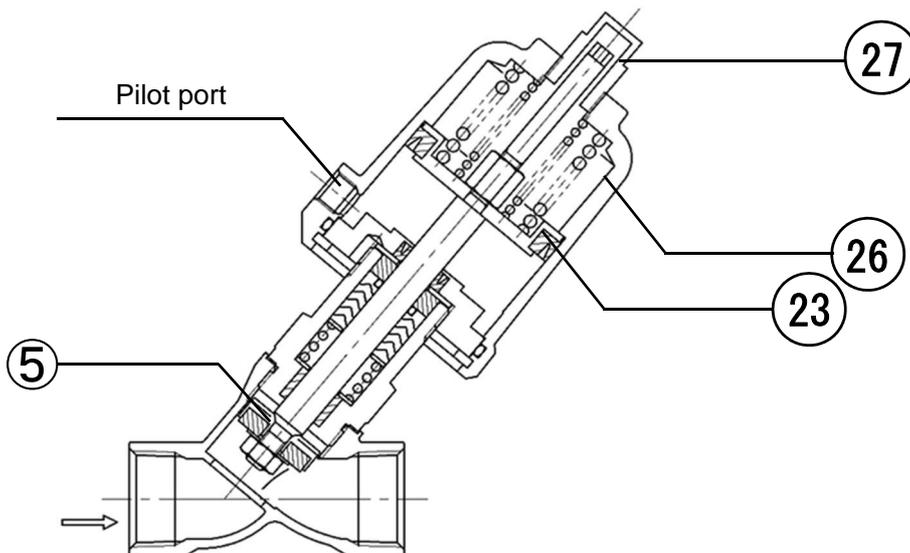


Fig.3

## 5. Piping example

### 5. 1 Piping example

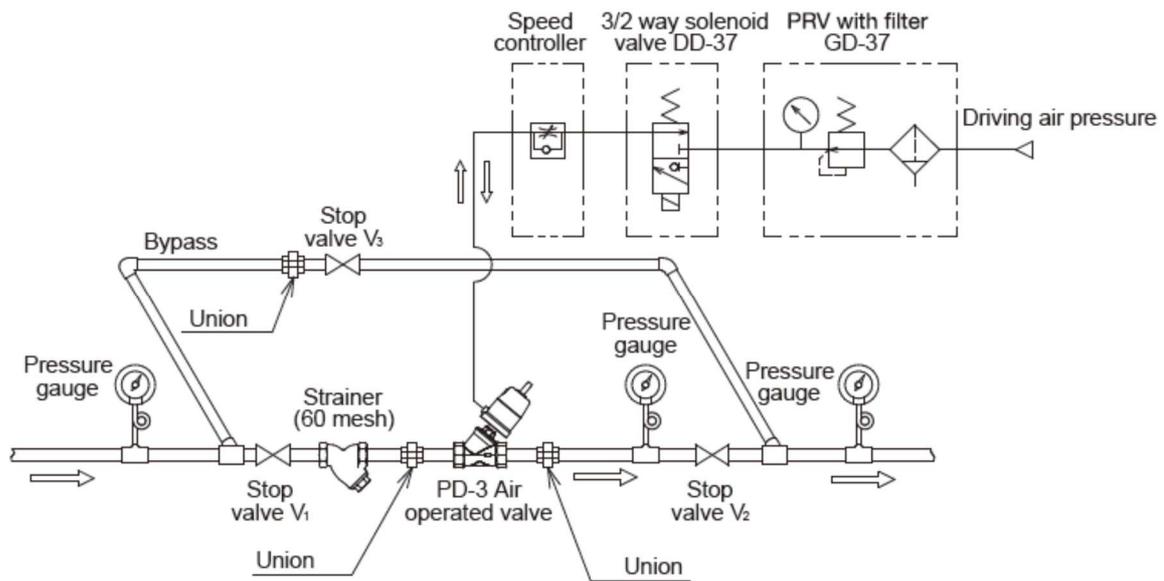


Fig. 4

### 5.2 Precaution for installation

#### Caution

1. Do not disassemble the product unless it is necessary.  
\* Failure to follow this notice may prevent the product from functioning properly.
2. Before installing the product in piping, be sure to remove foreign substance and scale from the piping.  
\* Failure to follow this notice may prevent the product from achieving its intended performance and lead to malfunction due to the ingress of foreign substances and scale into the product.
3. Be sure to install a strainer (60 mesh or equivalent) at the inlet side of the product.  
\* Failure to follow this notice may prevent the product from achieving its intended performance and lead to malfunction due to the ingress of foreign substances and scale into the product.
4. Install stop valve and bypass piping for the product.  
\* Failure to follow this notice may prevent the product from maintenance and inspection.
5. When installation, check the direction of the product so that the fluid flowing and the arrow marked on the product are in the same direction.  
\* Failure to follow this notice may prevent the product from functioning properly.
6. Connect the product to piping securely so that fluid cannot leak.  
\* Insufficient connection may lead to leakage by vibration. Also, high temperature fluid can cause scald.  
\* If using seal agent for piping to connection part, prevent it from commingling into the product. Seal agent commingles into the product may hamper proper operation.
7. If there is possibility of freezing, take measures to prevent fluid from freezing.  
\* Failure to follow this notice may damage the product due to freezing of the product.
8. Install pipes so that excessive load, torque or vibration cannot be applied to the product.  
\* Failure to follow this notice may lead to malfunction or drastically shortened service life of the product.
9. When connecting the product to piping, connect it by grasping hexagonal part of inlet and outlet sides of the body with tool. Do not screw the product into piping with grasping the actuator part.
10. Be sure to secure enough space required for maintenance.  
\* Failure to follow this notice prevents required operation at the time of maintenance.
11. Install pilot pressure piping and valve to operate the product so that excessive load, torque or vibration cannot be applied to the product.  
\* Failure to follow this notice may lead to malfunction or drastically shortened service life of the product.
12. Before driving piping equipment, check if the product functions properly.
13. For installation posture, any direction is possible.
14. Compressed air to supply to actuator should be clean and dry air without commingling of water, oil, or foreign substances.  
\* Commingling of foreign substances leads to malfunction of the product.

## Minimum maintenance space for disassembly

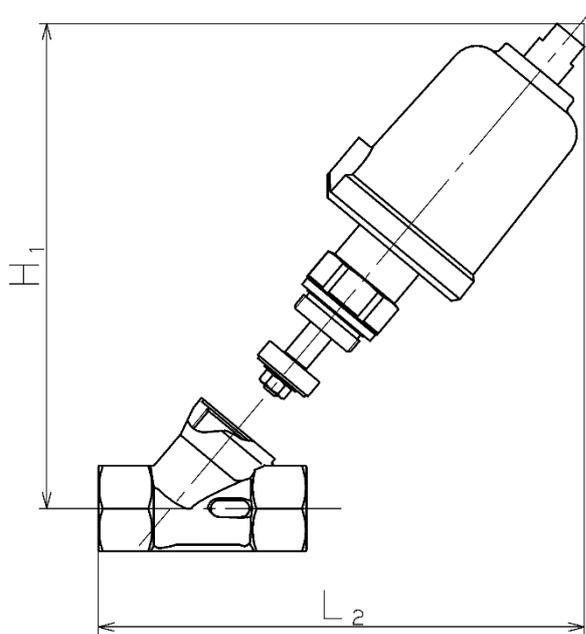


Fig. 5

	(mm)	
Size	H <sub>1</sub>	L <sub>2</sub>
15A	200	200
20A	210	210
25A	220	220
32A	280	280
40A	290	290
50A	310	310

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## 6. Operating procedure

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### 6.1 Warning and caution for operation

#### Warning

1. Do not touch the product with bare hands in case of high temperature fluid.  
\* Failure to follow this notice may scald your skin.
2. Before letting fluid flow, be sure to check that there is no danger if fluid flows to end of piping, the product is connected firmly, and pilot pressure piping is connected firmly to pilot port.  
\* Failure to follow this notice may contaminate the surroundings. Also, fluid with high temperature may scald your skin.

#### Caution

1. Before leading fluid into the product, close the stop valves at the inlet and outlet of the product and remove foreign substances and scale from the piping completely by using a bypass line.  
\* Failure to follow this notice may prevent the product from functioning properly due to the ingress of foreign substances and scale into the product. Also, foreign substance stuck inside the product leads to malfunction.
2. Open each stop valve in the piping to avoid water hammer or condensate obstruction when leading fluid to the product.  
\* Rapid opening of stop valve may break the product or peripheral equipment by water hammer or condensate obstruction.
3. If fluid leakage from piping connection part of the product is found after leading fluid to the product, stop the fluid immediately and discharge inner pressure of the product, piping and peripheral equipment, and retighten piping connection (for fluid with high temperature, after cooling the product).  
\* Failure to follow this notice may result in making the surroundings dirty. Also, fluid with high temperature may scald your skin.

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## 7. Maintenance

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Most of problems with the product are caused by foreign substances and scale in the piping. A phenomenon similar to valve failure could occur due to the failure of the pressure gauge, leakage or insufficient tightening of the stop valve in the by-pass line, clogging of the strainer, and other causes. Check the above possible causes and take a proper remedy and preventive measures specified in "7.2 Troubleshooting".

### 7.1 Warning and inspection for maintenance and inspection



#### Warning

1. Conduct periodic inspection to maintain functions and performance of the product.
  - \* General users should ask experts (staff of facility management/engineering companies, etc.) to perform periodic inspection.
2. When conducting disassembly or inspection, be sure to discharge inner pressure of the product, piping and equipment, and cool down the body of the product until it can be touched by bare hands. Do not touch it with bare hand directly till it is cooled completely.
  - \* Failure to follow this notice may result in scalds or injury due to the residual pressure. Also, it may make the surroundings dirty.



#### Caution

1. Completely discharge the fluid inside of the product and piping before leaving the product not operated for a long time or at the time of regular inspection.
  - \* Failure to follow this notice may cause malfunction due to occurrence of foreign substance or scale inside of the piping.
2. After leaving the product not operated for a long period, perform periodic inspection before start-up of operation.

#### 7.1.1 Consumable parts and replacement term

For consumable parts, service life differs according to frequency of usage or usage condition. Rough indication of replacement term is as follows (parts number in the chart indicates number in "7.3 Fig.3 Exploded view"):

Parts name	Parts number	Replacement term
Gasket	3	3 years

#### 7.1.2 Regular inspection items and period to maintain function and performance

Regular inspection items and period are as follows:

Inspection items	Inspection period
Leakage check (visual check) with conducting open and closing operation	More than once a year
Leakage check (visual check) from leak detection port (see Fig.6)	More than once a year
Leakage check (visual check) from position indicator (see Fig.1)	More than once a year

**7. 2 Troubleshooting** (see “3. Dimensions and Weights”, “7.3 Exploded view” and “7.4 Disassembly and reassembly”).)

Trouble	Cause	Remedy
1. Fluid does not flow (Valve disc is kept closing and does not open).	Pilot pressure is not supplied.	Check air supply piping.
	Pilot pressure is low.	Apply pilot pressure as specified in “2. Specification”.
	Sealing defect of outer lip seal [24].	Replace the actuator set.
2. Fluid keeps flowing, does not stop. (Valve disc is kept opening and does not close.) Or, there is valve leakage.	Leakage from stop valve on bypass piping.	Close stop valve. Or, leakage still occurs even if closing stop valve, replace stop valve.
	Pilot pressure exists inside the bonnet.	Remove pilot pressure from pilot port.
	Foreign substance is stuck on the seat part (see Fig.7) between valve disc [5] and body [1].	Clean the seat part (see Fig.7) between valve disc [5] and body [1].
	There is damage on the seat part (see Fig.7) between valve disc [5] and body [1].	If there is damage on valve disc [5], replace the actuator set. If there is damage on the seat part (see Fig.7) of body [1], replace the product.
	Defect of spring [26] inside actuator.	Replace the actuator set.
3. Fluid leaks from the connection part of packing case [2] and body [1].	Leakage from gasket due to loose of packing case [2].	Tighten packing case [2] until the specified tightening torque.
	Leakage from gasket [3] due to deterioration.	Replace gasket [3].
4. Fluid leaks from the leak detection port (see Fig. 6).	Leakage due to deterioration of O ring or packing, etc. inside the actuator set.	Replace the actuator set.
5. Pilot pressure leaks from position indicator part.		

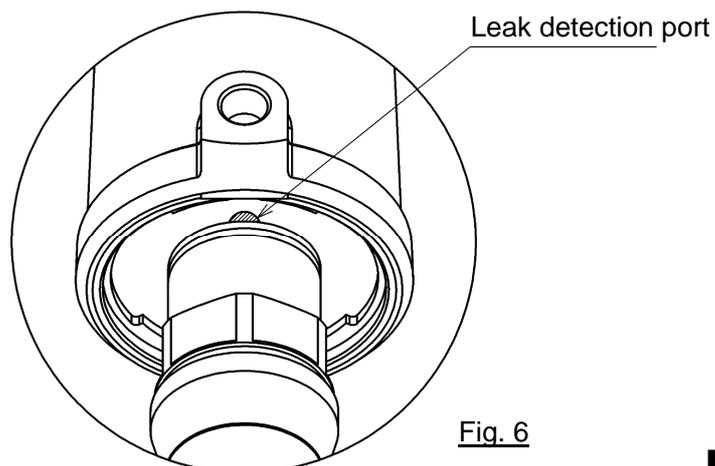
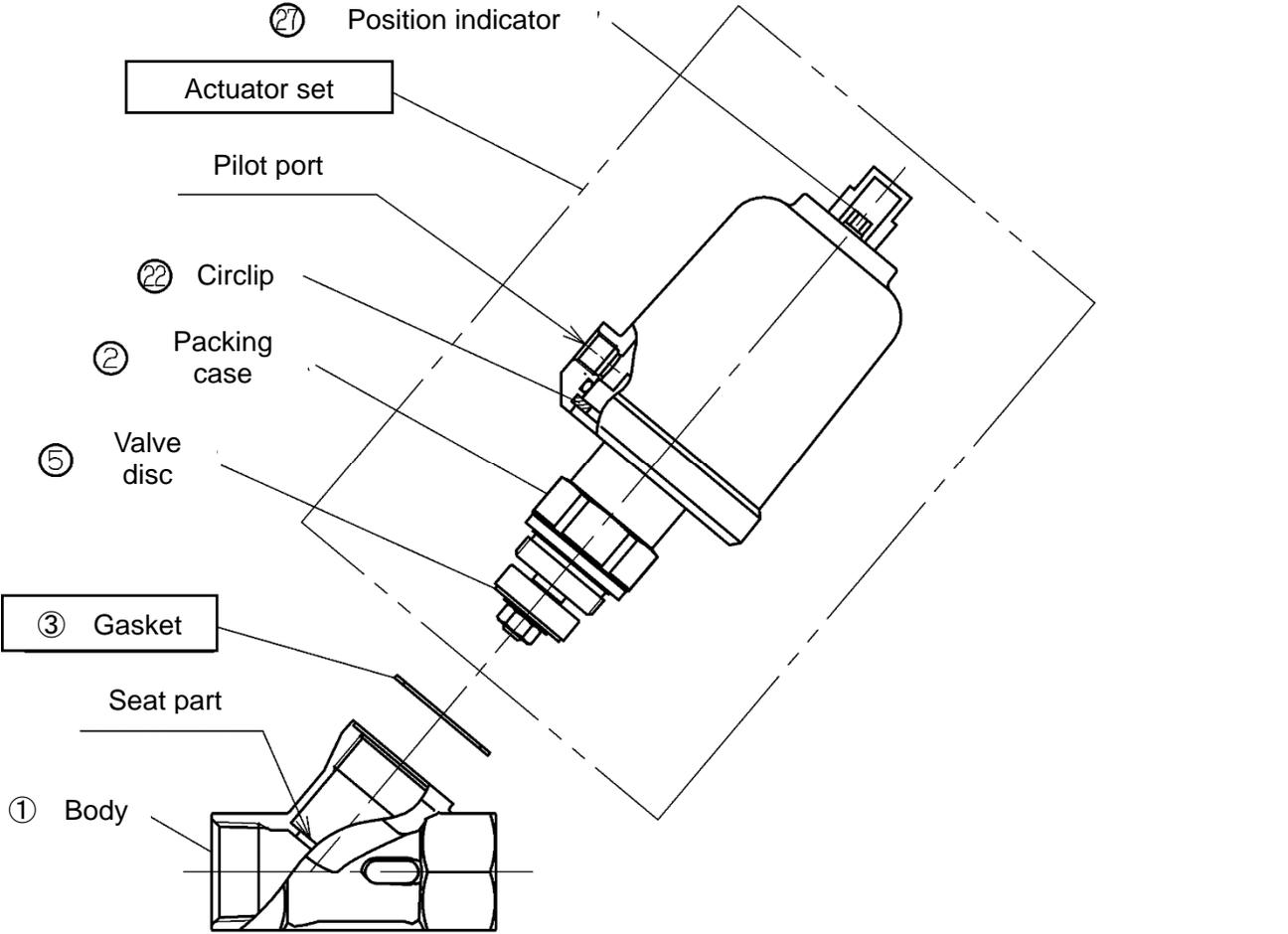


Fig. 6

**7. 3 Exploded view**



The parts names shown in  are available as consumable supply.

Fig. 7 Exploded view

## 7.4 Disassembly and reassembly

### 7.4.1 Disassembly

#### 7.4.1.1 Warning before disassembly



#### Warning

1. Be sure not to remove circlip [22]. (See “3. Dimension and Weight.”)
  - \* Failure to follow this notice makes inner spring [26] fly out and result in injury.
2. To remove actuator set from body [1], supply pilot pressure to pilot port, and rise valve disc [5]. Then loose and remove actuator set by grasping hexagonal part of packing case [2]. Also, be sure not to stop pilot pressure during supply till the work is finished.
  - \* Actuator set cannot be removed when pilot pressure is not supplied to pilot port. Also, it is very dangerous to stop pilot pressure during supply at work because actuator set flies out from body [1] and result in injury.
3. Before disassembly, be sure to discharge the pressure inside of the product, piping and equipment completely (after cooling down the product in case of high-temperature fluid). Also, do not touch it with bare hands directly till it is cooled.
  - \* Failure to follow this notice may make the surroundings dirty or result in injury or burns due to residual pressure if inner pressure is not discharged completely from the product, piping and equipment.

#### 7.4.1.2 Disassembly procedure

1. Adding pilot pressure through pilot port, check that valve disc is up by position indicator [27].
2. Grasp and loose hexagonal part of packing case [2] with spanner, and remove actuator set from body [1].
3. Remove gasket [3].

### 7.4.2 Reassembly

#### 7.4.2.1 Warning and caution for reassembly after disassembly



#### Warning

1. To install actuator set on body [1], supply pilot pressure to pilot port, and rise valve disc [5] and then tighten actuator set by grasping hexagonal part of packing case [2]. Also, be sure not to stop pilot pressure during supply till the work is finished.
  - \* Actuator set cannot be installed on body [1] when pilot pressure is not supplied to pilot port because valve disc is down. Also, it is very dangerous to stop pilot pressure during supply at work because actuator set flies out from body [1] and result in injury.



#### Caution

1. Check that there is no damage on valve disc [5] and seat part of body.
  - \* Damage on valve disc or seat part of body leads to valve leakage. Also, replace gasket [3] with new one. If not, it leads to outside leakage.
  - \* For gasket, be sure to use gasket which Yoshitake prepares. If using other gasket, it may leads to outside leakage.
2. For operation after reassembly, follow “6.1 Warning and caution for operation”.

#### 7.4.2.2 Reassembly procedure

1. Supply pilot pressure to pilot port of actuator set.
2. Put new gasket [3] to body [1] and then put actuator set.
3. Tighten packing case [2] with torque indicated in “7.4.3 Recommended torque for actuator set”.
4. After the reassembly, be sure to check opening and closing operation and that there is no leakage from gasket [3].

#### 7.4.3 Recommended torque for actuator set

To install actuator set on body, tighten so that appropriate pressure can be applied on gasket [3] with torque wrench. In this case, use tightening torque as follows:

Size	Tightening torque
15A	60 Nm
20A	90 Nm
25A	120 Nm
32A	150 Nm
40A	190 Nm
50A	230 Nm