

Model TAV-4

Air Vent Valve with Vacuum Breaker

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.

	Warning	This symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
	Caution	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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1. Usage of the Product

TAV-4 air vent valve with vacuum breaker is used mainly being installed at the top of water supply vertical pipe, such as on housing complex.

This product exhausts air from water supply vertical piping at the time of water being filled to reduce air discharge from faucet, etc.

Moreover, the product exhausts air accumulated in the piping in normal use to lessen water running resistance.

Further, the product sucks air from the outside of the piping to destruct negative pressure generated inside the water supply vertical pipe.

2. Features

1. Rapid air intake performance

Under the standards of the Nagoya City Waterworks & Sewerage Bureau and of the Urban Renaissance Agency (equal to Swedish standard), one product of 20A is appropriate for water supply vertical pipe of 50A. Under the standard of the Bureau of Waterworks, Tokyo Metropolitan Government, one product of 25A is appropriate for water supply vertical pipe of 75A.

2. Initial exhaust function

The product exhausts air from water supply vertical pipe when the pipe is filled with water to reduce air blowout from faucet, etc.

3. Usable in cold area

The product complies with the cold resistance performance standard set by the Ministry of Health, Labor and Welfare, Japan.

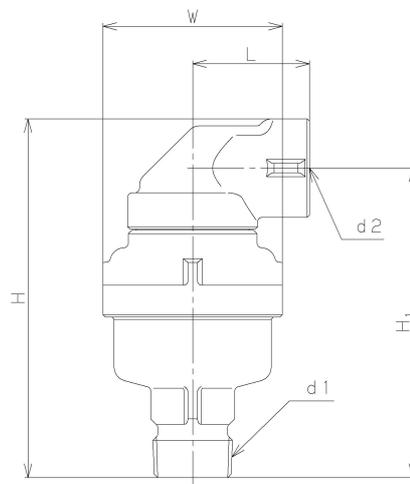
4. 360 degrees rotatable

Pipe end core can be connected to the pipe connection port, and the product can turn by 360 degrees. So, the guide pipe connection port can face any necessary direction.

3. Specifications, Dimensions and Performance

3.1 Specifications

Model		TAV-4	
Nominal size		20A	25A
Application		City water (clean water)	
Working pressure		0.05-1.0 MPa	
Intake air quantity (under the pressure difference of 2.9 kPa)		15.1 L/sec	23.4 L/sec
Working temperature		0-40°C (no freeze condition)	
Material	Body	Cast bronze (NPb-treated)	
	Float	Synthetic resin	
	Exhaust Packing	Synthetic rubber	



3.2 Dimensions

Nominal size	Connection		Dimension (mm)				Weight (kg)
	d1: Pipe connection port	d2: Guide pipe connection port	H: Total height	H1: Height	W: Diameter	L: Length	
20A	JIS R 3/4	JIS Rc 1	151	130	Φ76	49.5	1.2
25A	JIS R 1		153	132			



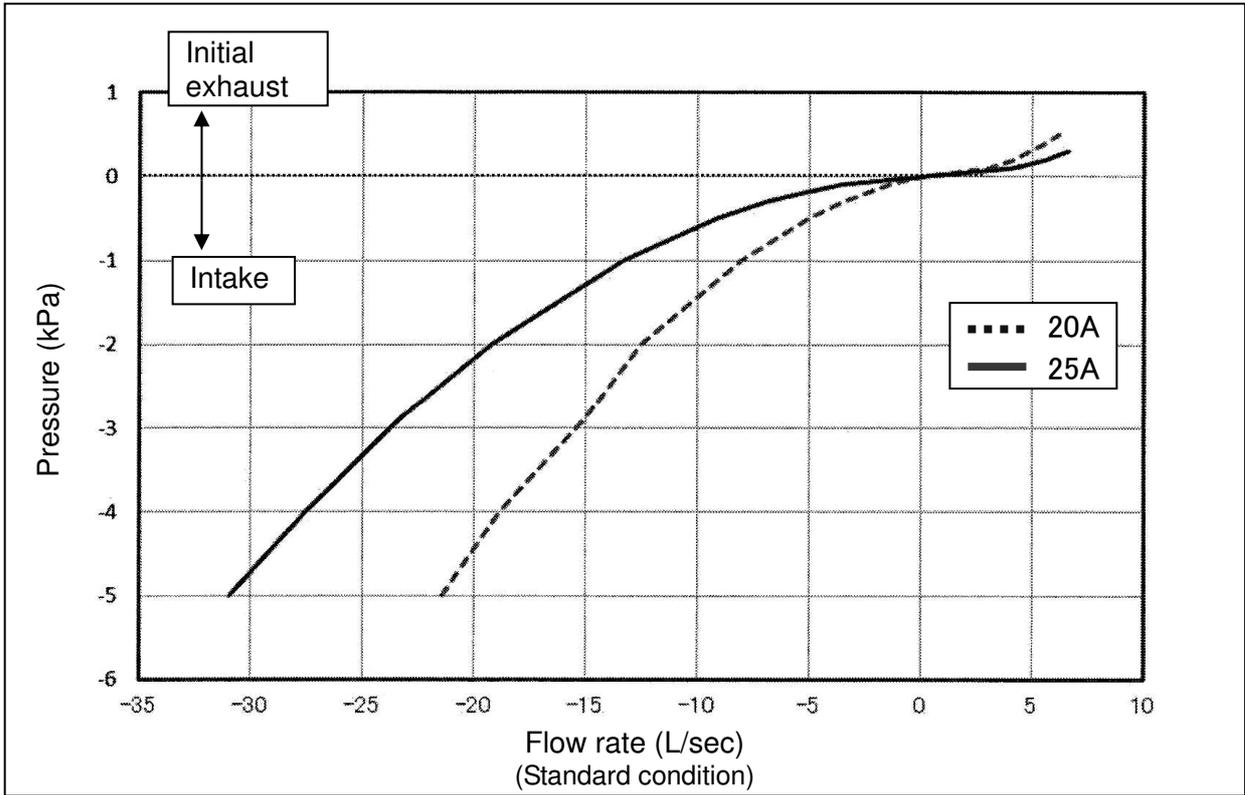
Caution

Please confirm that the indications on the product correspond with the specifications of the ordered model before use.

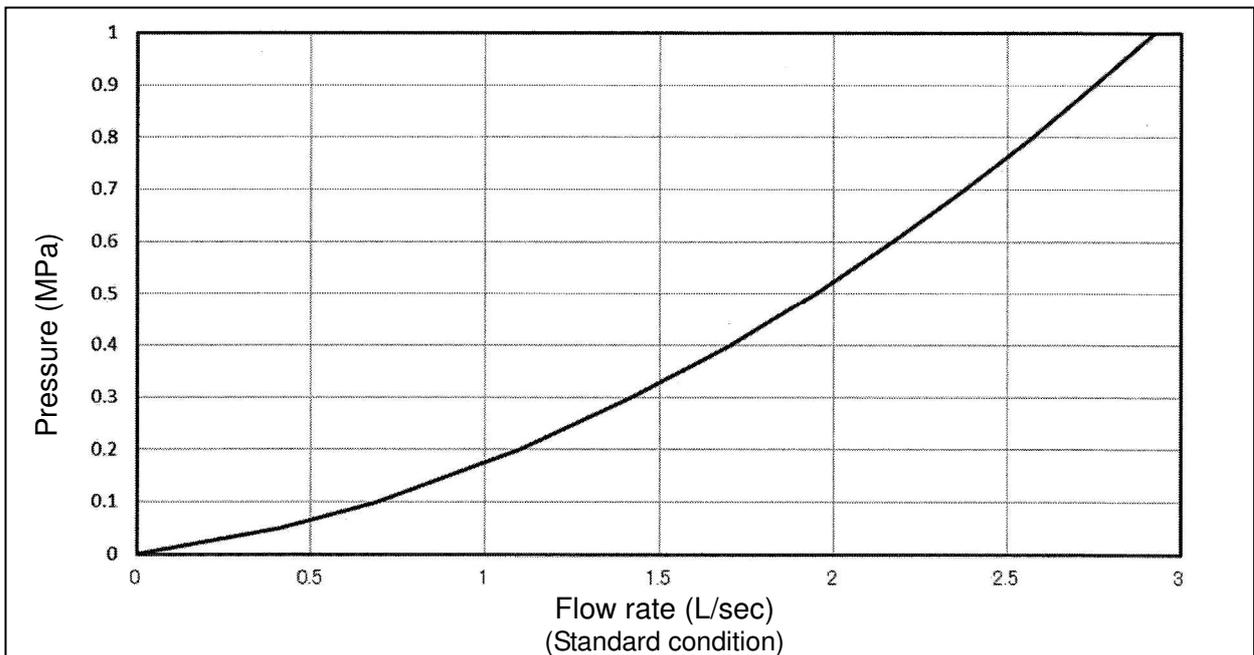
* If they are different, please contact us without using the product.

3.3 Performance

3.3.1 Intake/exhaust performance

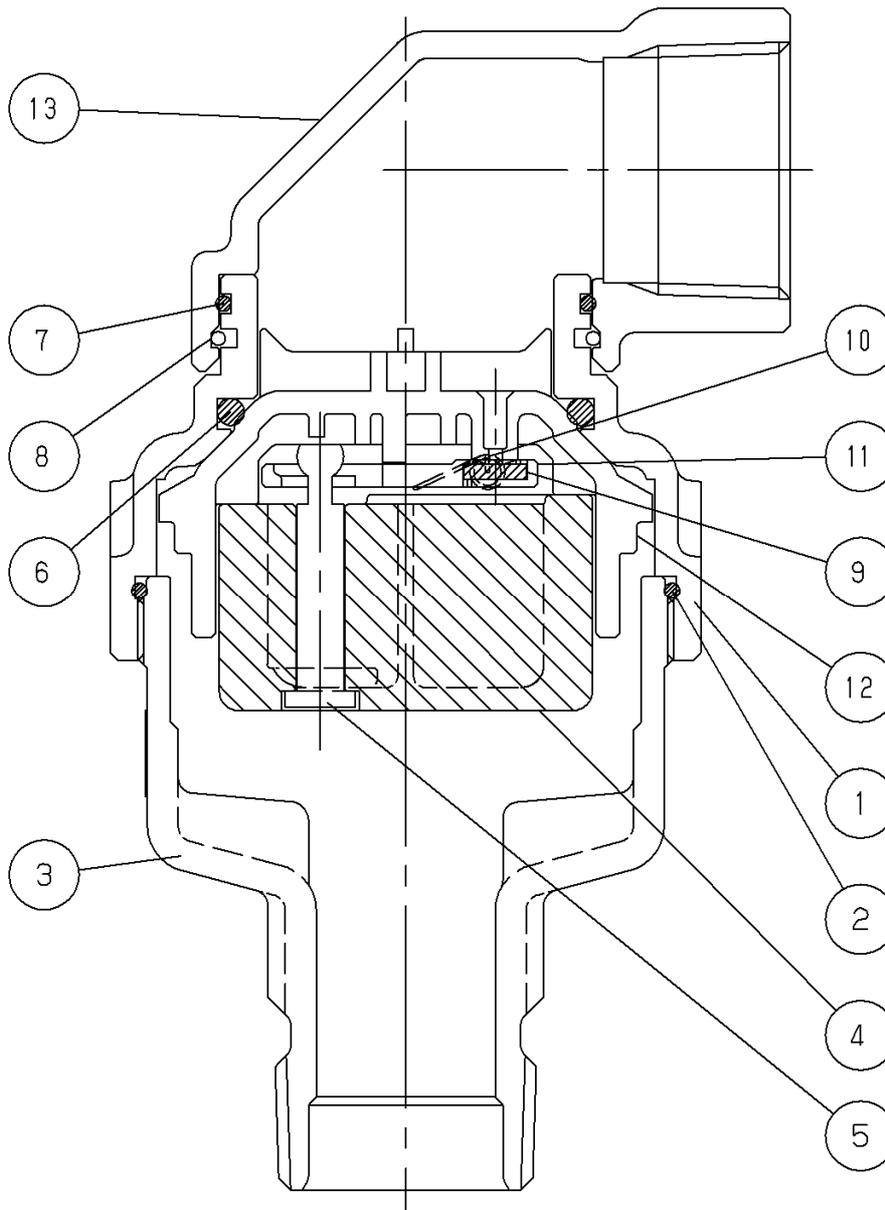


3.3.2 Exhaust performance under pressure



The value read from the charts above should be used as a reference. Please take the safety factor of 20% at least because the performance changes due to fluctuations in piping conditions or usage conditions.

4. Structure



[Main parts list]

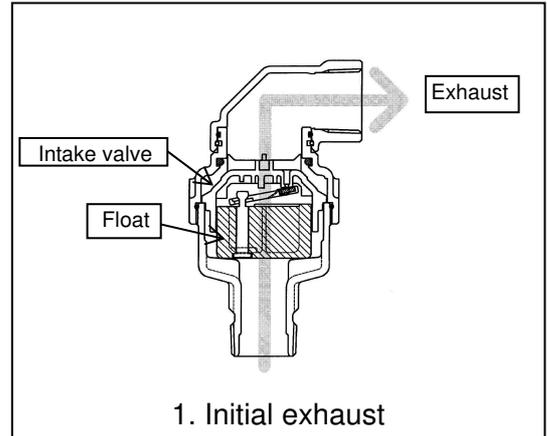
No.	Part name
1	Bonnet
2	O ring
3	Body
4	Float body
5	Float shaft
6	O ring
7	O ring

No.	Part name
8	Ring
9	Exhaust packing
10	Exhaust Spring
11	Lever board
12	Intake valve
13	Cover

5. Operation

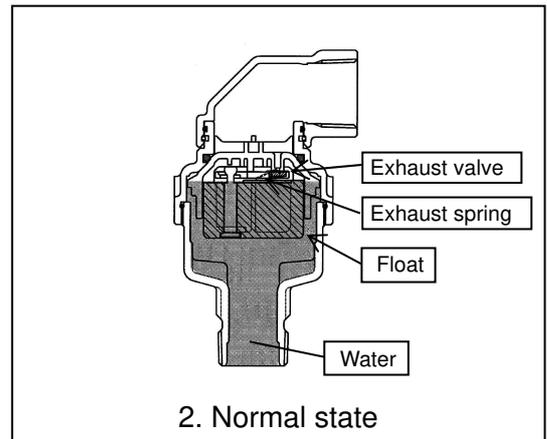
1. Initial exhaust

Since the intake valve is lowered by the weight of the float until water fills into piping and then flows into product, the valve exhausts large quantity of air inside the piping. When the quantity of air has decreased and water has flown into the product, the intake valve floats to shut the opening.



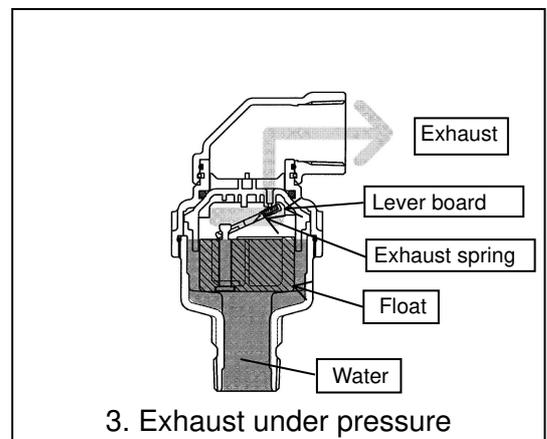
2. Normal state

When the inside of the product is filled with water, the exhaust valve is closed by water pressure and the force of the exhaust spring. In this state, the intake valve is closed only by water pressure. Since the exhaust valve is not integral to the float, the valve position is stable and less likely to be affected by float vibration of water pressure fluctuation.



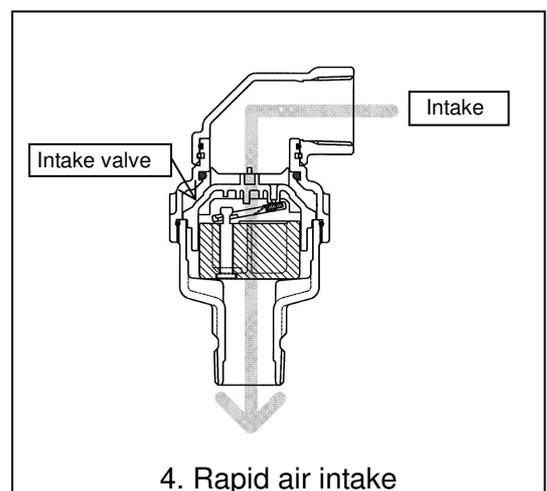
3. Exhaust under pressure

When air flows into the body which is filled with water, the float lowers gradually as water level lowers. From a certain position, the weight of the float begins to be added to the lever board. When this overcomes the pressure difference between the body inside and the atmosphere and the power of the exhaust spring, the exhaust valve opens for exhausting. When the quantity of air has decreased and water has flown into the body, the float moves up. As a result, the weight of the float applied onto the lever board is lost, and the exhaust valve is closed by the force of the exhaust spring.



4. Rapid air intake

When internal pressure of the piping becomes lower than atmospheric pressure due to water stoppage or draining operation, internal pressure of the product also drops. Then, since the intake valve lowers, the product starts air intake.



6. Installation

6.1 Selection

There are some standards of the intake air quantity required for negative pressure destruction per nominal size of the water supply vertical pipes. Intake/exhaust valves need to be installed according to these standards.

Intake air quantity required per nominal size of vertical pipes and selection of TAV-4.

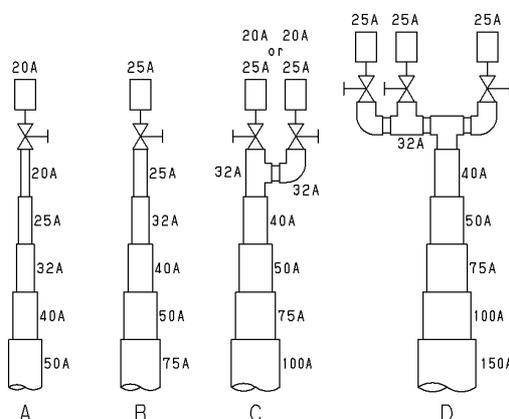
Nominal size of the vertical pipe	Reference value of air intake quantity of Nagoya City Waterworks & Sewerage Bureau, and of the Urban Renaissance Agency (Swedish intake air performance standard).		Standard of Bureau of Waterworks Tokyo Metropolitan Government		Selection of TAV-4
	L/sec	L/min	L/sec	L/min	
20A	1.5	90	1.5	90	1 piece of TAV-4 20A [Intake air quantity of TAV-4 20A: 15.1 L/sec (906 L/min)]
25A	2.5	150	2.5	150	
32A	4.0	240	3.5	210	
40A	7.0	420	5.5	330	
50A	-	-	9.0	540	
	14.0	840	-	-	
75A	-	-	15.5	930	1 piece of TAV-4 25A [Intake air quantity of TAV-4 25A: 23.4 L/sec (1404 L/min)]
	33.4	2004	-	-	
100A	-	-	25.0	1500	2 pieces or more
150A	-	-	56.7	3400	

- * Intake air quantity is the value at the pressure difference of 2.9 kPa, under standard condition.
- * When TAV-4 is used with pipe end core, intake air quantity becomes 11.2 L/sec (672L/min) for 20A, and 17.5 L/sec (1050L/min) for 25A.
- * Intake air quantity required may differ according to piping configuration or water service business units. Please contact the water service business unit of each area for details.
- * When using the products in combination of 2 pieces or more, make sure that the combination satisfies the intake air quantity required.

6.2 Piping example

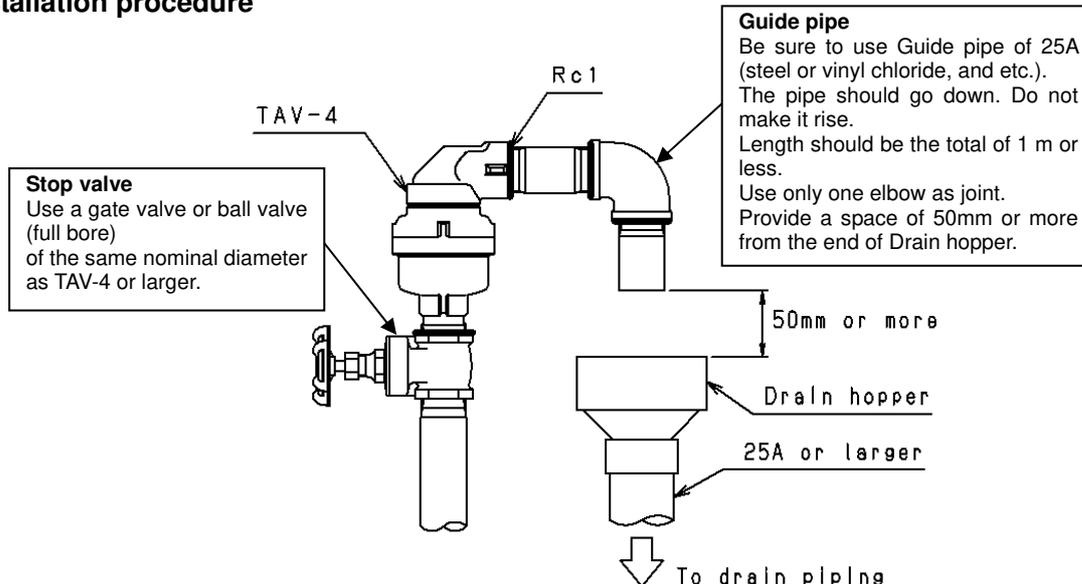
According to the result of the above selection, install the product that satisfies or exceeds the sufficient intake air quantity.

The piping example is shown below.



- Piping A needs one piece of 20A because the maximum diameter of the piping is 50A.
- Piping B needs one piece of 25A because it includes 75A (according to the Standard of Bureau of Waterworks Tokyo Metropolitan Government).
- Piping C and D are examples of installing more than one piece. Be sure to keep smooth air flow at the branches.

6.3 Installation procedure



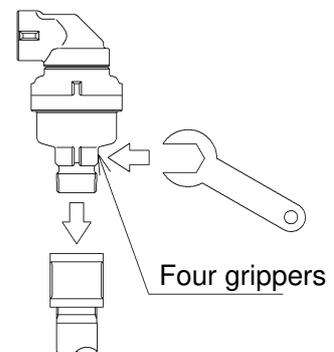
*** Standards for installation may differ according to water service business units. Please contact the water service business unit of each area for details.**

6.4 Precautions for installation

Caution

1. Do not give the product any shock or impact. Handle with care.
2. Do not expose the product to direct sunlight or rain while in storage
3. Do not install the product in a place with possibility of snowfall, and etc.
* Snowfall may damage the product.
4. When installing the product, secure enough space for maintenance and inspection.
5. Install the product at a place of 300mm or higher above the overflow line of water supply equipment or water container.
6. Do not use the product for any purposes other than the intended use.
7. Do not use the product for any fluid other than city water. Use the product within the specified ranges of the working pressure or the maximum working temperature, etc.
8. Do not connect an earth to the product or the piping. It may cause corrosion.
9. Before connecting the product to piping, remove foreign substances and wash thoroughly so that oil such as cutting oil, solvent, and chemicals do not remain.
* Insufficient cleaning of the inside of the piping may cause malfunction of the product and cause water leakage.
10. When installing the product to the piping, be careful of the amount and positions of the sealing material to avoid it get inside the piping.
* Sealing material inside the piping may hamper the proper operation of the product.
11. Do not disassemble the product.
* Disassembling may hamper the functions of the product.
12. Be sure to connect a guide pipe to air inlet and exhaust outlet, and lead it to drain hopper (drain ditch), in order to be prepared for unexpected water leakage.
(Take a distance of 50mm at least, between the guide pipe edge and the drain hopper's brim.)
13. Be sure to connect a guide pipe (25A or larger) to the guide pipe connection port, and lead it to drainage.
14. Be sure to make the guide pipe go down from the product. Do not make it riser piping.

15. Be sure to make the pipe size of the guide pipe and drainage including drain hopper 25A or larger.
* Narrow guide piping causes insufficient air intake.
16. Avoid applying excessive load to the product while installation. Excessive load may cause leakage from the connection or malfunction of the product.
17. Securely connect the product to the piping.
* With insecure connection, fluid leakage may be induced by vibration.
18. Install the product perpendicularly (within 5 degrees from vertical), in a point where air easily accumulates.
* Installation with excessive tilt may cause malfunction of leakage.
19. Take measures to prevent the fluid from freezing.
(If there is a risk of freezing, take appropriate measures such as insulation, heating pipes, draining, etc.)
* Freezing may cause malfunction of the product.
20. Be careful not to have the product contact with oil, solvent, or chemicals.
21. In case the fluid or the environment contains components that adversely affect the internal parts, the deterioration of the rubber parts is accelerated, causing external leakage and malfunction of the product.
22. For maintenance and inspection, be sure to install a stop valve (gate valve, full-bore ball valve, cock, etc.) with the same nominal diameter as the product or larger. Do not use a globe valve.
23. Be careful not to crush or block up the guide pipe.
* Functions of the product maybe hampered.
24. Do not apply excessive transverse load to the product, or prop or hang heavy goods on the product.
* Functions of the product may be hampered.
25. Install a stop valve on the inlet side of the product. In case of leakage due to foreign substance, etc., immediately close the stop valve.
26. Avoid leading the air intake guide pipe in a location where the pipe can suck dust or other foreign substances.
* Functions of the product may be hampered.
27. When installing the product to piping, be sure to set a tool (spanner wrench, chain wrench, pipe wrench) on the four grippers located right above the screwed connection part, and tighten the connection.
(See the figure on the right.)
Do not apply the tool to any part other than the four grippers.
* The product may be damaged.



7. Operating Procedure

7.1 Precautions for operation

Warning

1. Before leading fluid, make sure that there is no danger when the fluid flows to the end of piping.
* The fluid outflow may cause property damage.

Caution

1. Water may spray out at exhausting. This is not failure.
2. Be sure to drain water when temperature is low in winter or water is not applied in the piping where the product is installed for a long period of time.
* Water left inside the product may freeze and cause damage to the product. It may also cause malfunction of the product due to rust inside the pipe.
3. In case of troubles, close the stop valve right under the product first, and then see “8.1 Troubleshooting.” Please contact us or Yoshitake’s distributor if necessary.
4. When leading fluid, open the fluid supply valve slowly to avoid water hammer.
* If fluid supply is too quick, the product may be damaged by water hammer.
5. Be careful not to crush or block up the guide pipe.
* Functions of the product may be hampered.
6. Do not apply excessive transverse load to the product, or prop or hang heavy goods on the product.
* Functions of the product may be hampered.
7. Water may drain out from the product under subnormal pressure (less than 0.05MPa). This is not failure.

8. Maintenance

8.1 Troubleshooting

Trouble	Cause	Remedy
Air exhaust from faucet (No or insufficient exhaust from the product)	Fluid pressure exceeds the specified working pressure.	Adjust the fluid pressure to the appropriate level.
	Stop valve right under the product is closed or opened only slightly.	Open the stop valve completely.
	Guide pipe is partly or completely blocked.	Check the guide pipe.
	The product is installed in an improper position.	Change the layout. (See 6.3 Installation procedure.)
	The piping, joint or stop valve right under the product has narrow portion in its channel.	Replace the piping, joint or stop valve.
	Failure of the product.	Replace the product.
Air exhaust from faucet (Unnecessary intake to the product)	The product is used at a pressure below the specified working pressure range.	Use the product at the appropriate pressure level.
	Water supply is insufficient (Pressure drops in the vertical water supply pipe).	Reconsider the piping and booster pump.
	Failure of the product.	Replace the product.

Trouble	Cause	Remedy
No or insufficient intake	Piping pressure is not negative.	This is not failure of the product.
	Stop valve right under the product is closed or opened only slightly.	Open the stop valve completely.
	Guide pipe is partly or completely blocked.	Check the guide pipe.
	The product is installed in an improper position.	Change the layout. (See 6.3 Installation procedure.)
	Failure of the product.	Replace the product.
Leakage from guide pipe	Spray water accompanying exhaust air is dripping.	This is not failure of the product.
	Abnormally low pressure (less than 0.5 MPa).	This is not failure of the product. Use the product within the working pressure range.
	Foreign substances are stuck in the intake valve or the exhaust valve.	Remove the product and apply back washing by water or air from the guide pipe connection port. If the trouble still exists, replace the product.
	Failure of the product.	Replace the product.

Do not disassemble the product.

* Disassembly hampers functions of the product, because some of the internal parts are adjusted properly.

8.2 Daily inspection

Please conduct daily inspection to maintain the functions and performance of the product.

* In case of any abnormal condition, please contact the professional or the nearest distributor of Yoshitake.

Daily Inspection

Inspection	How to inspect	Troubleshooting
Operation	Confirm that air is exhausted from the guide pipe both visually and auditorily. (Note that the valve is closed during no air exists inside the pipe.)	See 8.1 Troubleshooting.
Leakage from guide pipe	Check visually	See 8.1 Troubleshooting.

Recommended service life:

The product is recommended to be replaced by new one after 3 to 5 years' service with daily inspection. However, please note that this recommended service life drastically varies due to usage conditions.

Warranty Information

1. Limited warranty

This product has been manufactured using highly-advanced techniques and subjected to strict quality control. Please be sure to use the product in accordance with instructions on the manual and the label attached to it.

Yoshitake warrants the product to be free from any defects in material and workmanship under normal usage for a period of one year from the date of receipt by the original user, but no longer than 24 months from the date of shipment from Yoshitake's factory.

2. Parts supply after product discontinuation

This product may be subject to discontinuation or change for improvement without any prior notice. After the discontinuation of the product, Yoshitake supplies the repair parts for 5 years otherwise individually agreed.

3. This warranty does not cover the damage due to any of below:

- (1) Valve seat leakage or malfunction caused by foreign substances inside piping.
- (2) Improper handling or misuse.
- (3) Improper supply conditions such as abnormal water pressure/quality.
- (4) Water scale or freezing.
- (5) Trouble with power/air supply.
- (6) Any alteration made by other than Yoshitake.
- (7) Use under severe conditions deviating from the design specifications (e.g. in case of corrosion due to outdoor use).
- (8) Fire, flood, earthquake, thunder and other natural disasters.
- (9) Consumable parts such as O-ring, gasket, diaphragm and etc.

Yoshitake is not liable for any damage or loss caused by malfunction or defect of the product.