



流れ・ビューティフル

株式
会社



Water Hammer Arrestor
(for Water)

NEW *Shock-less*

Water Hammer Arrestor

WHA-6 (Screwed JIS R)

WHA-6F (Flanged JIS 10K FF)

Effectively absorb pipeline fluctuations
and water hammer noise

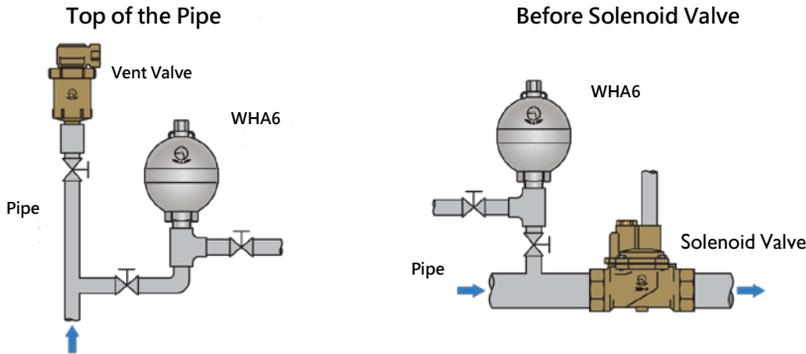
- The pressure of air loaded can be adjusted to match the site of installation
- Stainless steel is applied to the body material, and the new structure makes it highly durable.
- Water hammer adsorbing parts (bladder) can be replaced.



It functions to absorb the water hammer impact generated not only in housing complexes and office buildings but also certainly in the water supply line and the main water supply line of the receiving tanks.

This water hammer arrestor is also the optimal countermeasure against water hammer generated on reduced pressure zone valves in the gravity water supply system.

Water hammer installation diagram



To absorb water hammer at the top of pipe shaft, water tank, supply line, etc.

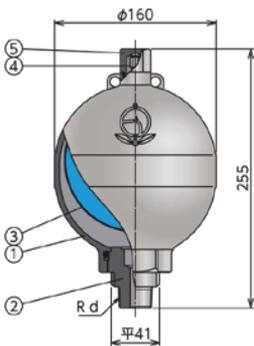
Specification

Model Name	WHA-6型	WHA-6F型
Code Name	WHA6-D	WHA6F-D
Size	15 -25	
Applicable Fluid	Water	
Fluid Temperature	5-40°C	
Max Water Hammer Pressure (1)	Max 0,98MPa	
Seal Air Pressure	Max 0.98MPa(Preloaded pressure (0.35 Mpa) In actual use, loaded pressure needs to be adjusted at 70-80% of hydraulic pressure	
Internal Volume	2L (Absorption volume:1L)	
End Connection	Screwed JIS R	Flanged JIS 10K FF
Materials	Body (SCS), Bladder (EPDM)	
Pressure Test	Hydraulic 1.75MPa	
Installation	Vertical mounting with connections facing down	

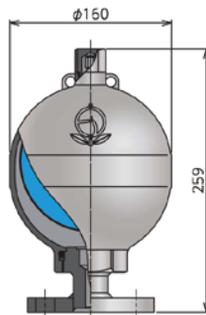
- *1. Water hammer value without the water hammer arrestor installed.
- *2. The product will be delivered with the specified preloaded air pressure. If it is not specified, the product will be delivered with the standard preloaded air pressure (0.35 Mpa).
- *3. When using to suppress the pulsation of water supply pressure, adjust it to about 50% of the dynamic water pressure.

Construction

WHA-6



WHA-6F



Dimensions

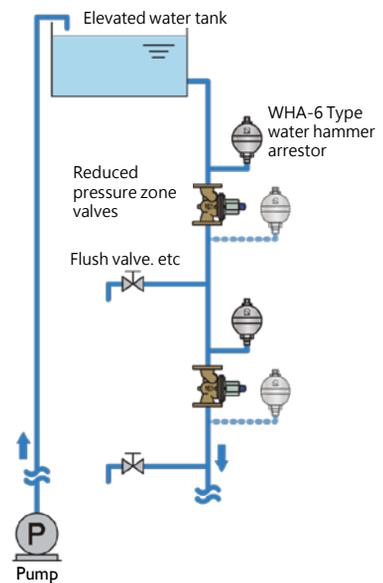
Outer diameter	WHA-6		WHA-6F	
	d	Weight(kg)	Weight(kg)	Weight(kg)
15	1/2	4.5	5	
20	3/4	4.5	5.5	
25	1	4.5	5.5	

JIS 10K Flange

Parts

No.	Name	Material
1	Body	SCS13
2	Connector	SUS304
3	Bladder	EDPM
4	Air Valve	C3604
5	Cover	SUS304

Gravity water supply system



In the water supply system using reduced pressure zone valves in the vertical pipeline of the elevated water tank in high-rise buildings, the vibration of the pipeline or water hammer may occur due to the operation of flush valves.etc.

Cause

The pressure at the primary side of the reduced pressure zone valve drops due to the operation of the flush valve. After this, the pressure restores and induces fluctuations of pressure which causes water hammer in the pipeline.

Countermeasure

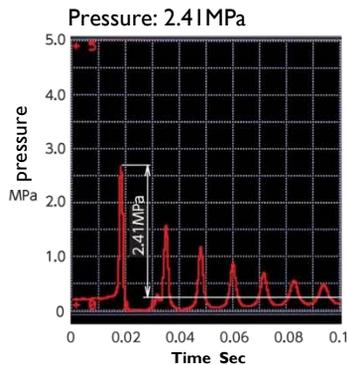
By installing a water hammer arrestor at the primary side of the reduced pressure zone valve, it can reduce momentary pressure drop and absorb water hammer. In addition, by making the length of the horizontal pipe from an elevated water tank as short as possible, it also helps to reduce the water hammer.

Note. The calculation formula above is for reference only. Depending on the site of installation, the number of water hammer arrestor may vary.

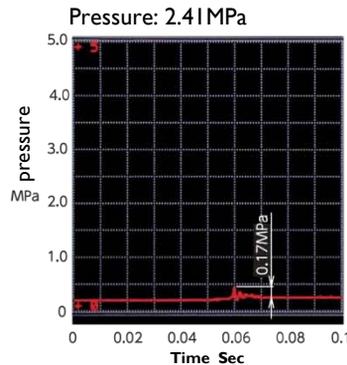
Efficiency

The experiment collects the data of water hammer pressure when the solenoid valve closes quickly and absorb water hammer by installing a water hammer arrestor.

Without Water Hammer Arrestor

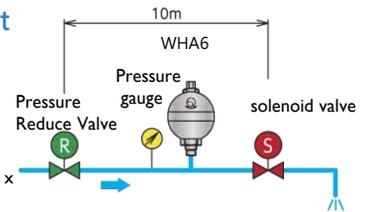


Water Hammer Arrestor Installed

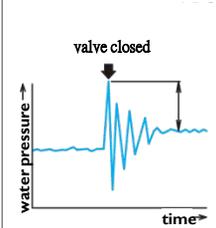


Environment

Size: 20A
 Water Supply Pressure: 0.2MPa
 Hydrostatic pressure: 0.29MPa
 Air Pressure: 0.16MPa
 (Water Supply Pressure x 80%)
 Flow: 2m/s



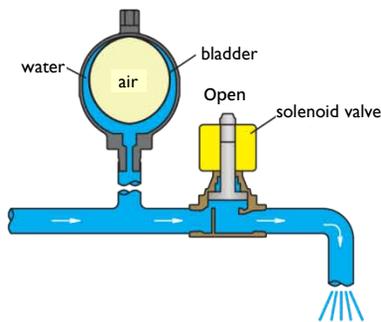
Water Hammer



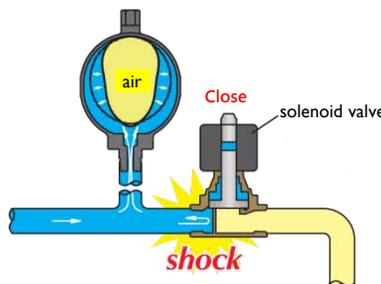
If the fluid flowing in the pipeline passes through the faucet or valve, the faucet or valve closes instantly and quickly. The water pressure from the upstream of the valve will rise rapidly. The rising water pressure becomes a pressure wave that reciprocates between this point and the water supply source and gradually decays. This phenomenon is called a water hammer (water hammer action). Excessive water hammer will generate water noise and vibrate the pipeline equipment.

Action

Solenoid Valve Open



Solenoid Valve Close (Water Hammer)



1. The bladder will be inflated depending on the balance between the enclosed air pressure and the water supply pressure (dynamic water pressure).
2. The water hammer generates pressure waves by the suddenly closed solenoid valve, and it flows into the water hammer arrestor, the bladder diminishes to absorb the water hammer.

※ The use of a piston solenoid valve will generate a powerful water hammer. When using solenoid valves in water supply pipes, we recommend installing WS, VVF diaphragm type solenoid valves with a water hammer relief device.

Inspection & Adjustment

1. Check the air pressure of the seal once or more every year.
2. When checking and adjusting the air pressure, please make sure that the water pressure inside the water hammer is zero. If it is performed in the pipeline, close the water supply valve in front, release the pressure of the water stop valve and open the valve to drain (see Page), if the water hammer is pressurized, an accurate pressure check will not be possible.
3. Check and adjust the air pressure with a car vapor pressure gauge and inflation device.
4. The air pressure index is 70-80% of the dynamic water pressure. When absorbing the periodic fluctuation environment under the water supply pressure, please adjust the air pressure to 50% of the water supply pressure.

Inspection procedures

1. Remove the protective covers (2)
2. Use a pressure gauge to check the air pressure by pressing the air valve and record the test data.
3. If the air pressure meets the specified pressure, tighten the lid. otherwise, adjust the pressure to meet the specified pressure.

Adjusting the pressure

1. If the seal air pressure is lower than the specified pressure, refill the air with an inflator until the specified pressure reaches.
2. If the seal air pressure is too high, press the valve needle to release the air until the pressure drops below the specified pressure, and then replenish the air like step 1.
3. Recording the air pressure data after adjusting the pressure, and then tighten the protective both 2 covers.

Note. For adjustment, check the pressure with a pressure gauge.

Inspection Procedures 2
Check the air pressure



Adjusting the pressure 1
Refill the air



Adjusting the pressure 2
Release the sealed air



Adjusting the pressure 3
Check the air pressure

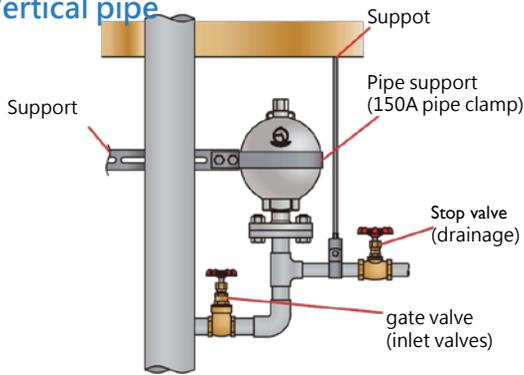




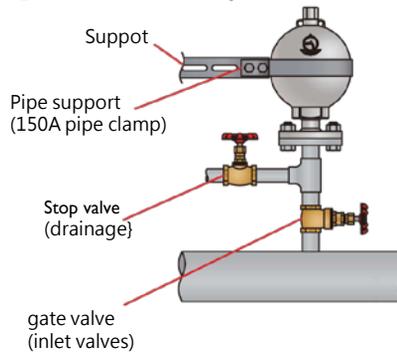
For installation and operation precautions, please refer to the instruction manual of the individual model.

Example

Vertical pipe



Horizontal Pipe



When the water hammer occurs, the water hammer arrester and pipes will vibrate due to impact.

Also, when filling water, the connecting pipe will bear the load of water hammer and water, so please ensure that the pipe fixing point has sufficient strength.

Precautions

- When the water hammer occurs, the water hammer arrester and piping vibrate due to impact. Also, when the water is filled, a water hammer arrester and water load will be applied to the connecting piping, so be sure to fix the piping securely.
- Install it as close as possible to the equipment or device that is the source of the water hammer.
- Check the water supply (dynamic water pressure) and adjust the pre-loaded air pressure before installing it to the piping. (Air filled device: for automobiles)
Pre-loaded air pressure
When used for water hammer absorption: 70-80% of dynamic water pressure.
When used for absorption the pulsation of water supply pressure: about 50% of the dynamic water pressure.
- Thoroughly clean up the piping before installing the product.
- Vertically connecting the pipe to the bottom, and install the water supply valve (for water supply introduction/ stop) on the primary side of this product. Then install a stop valve (for pressure discharging) between the water supply valve and the water hammer arrester.
- Install a strainer on the inlet side case there is any risk of foreign matter flowing in.
- When attaching/removing the screw-in type WHA-6 to / from the piping, apply a tool to the two joint surfaces (flat 41).
- This product is made of stainless steel. Insulation should be implemented when connecting with dissimilar metal piping.
- Ensure to have the inspections regularly (air pressure inspection, adjustment, removal, and replacement of parts).



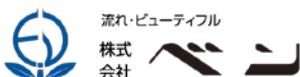
Calculation

Method (Greer Mercier)

$$V = \frac{4 \times 10^{-3} \times Q \times P_{\max} \times (0.0164 \times L - T)}{(P_{\max} - P_0)}$$

- V : Water hammer absorption capacity(L)
*WHA-6,6F capacity=1L
- Q : Flow (L/min)
- P₀ : Water Pressure (Mpa)
- P_{max}: Impact pressure (Mpa)
*P_{max}=P₀ x 1.5
- L : Pipe length (m)
- T : Valve closing time (sec)
*0 sec as safe value

Note. The above calculations are for reference only



本社 〒146-0095

東京都大田区多摩川2-2-13

TEL 03-3759-0170 FAX 03-3759-1414

<http://www.venn.co.jp>

VENN CO., LTD.

Hong Kong Distributor

TACHIBANA ENGINEERING

立花工程(香港)有限公司

Unit C, 6/F, Reason Group Tower, 403 Castle Peak Road, Kwai Chung, N.T., Hong Kong

香港新界葵涌青山道403號匯城集團大廈6樓C室

Tel 電話: 852-2403-4898 Fax 傳真: 852-2403-4000 Email 電郵: info@te.com.hk

Website 網站: <https://www.te.com.hk>