

MODEL AF-5

FULL BORE SAFETY VALVE

PRODUCT MANUAL

The following safety symbols are used in this 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

	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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Warranty information

YOSHITAKE

1. Usage of the Product

AF-5 can be used for various pressure vessels such a steam boiler, various pressure vessels, and suitable for the downstream of a pressure reducing valve instrumentation apparatus.

2. Specifications

Application		Steam	Air, other non-dangerous fluids
Structure		*Open type with a lever	
Working pressure		0.1~2.0 MPa	0.1~1.0 MPa
Max. temperature		220℃	
Material	Valve case	Cast bronze	
	Valve and valve seat	Stainless steel	
Connection		Inlet: JIS R	
		Outlet: JIS Rc	

* The structure in which the fluid is discharged from the outlet and other parts.



Warning

1. Please do not use this product in the equipment and devices in which the valve seat leakage is not accepted.
* This product has a valve seat leakage within the allowable value, and it cannot be fully closed (valve seat leakage cannot be 0).
2. Do not use the product for equipment or device which vibrates excessively.
* Failure to follow this notice may result in malfunction.
3. Do not adjust or change the set pressure.
* Failure to follow this notice may result in damage to the equipment.



Caution

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

* If they are different, do not use the product and contact us.

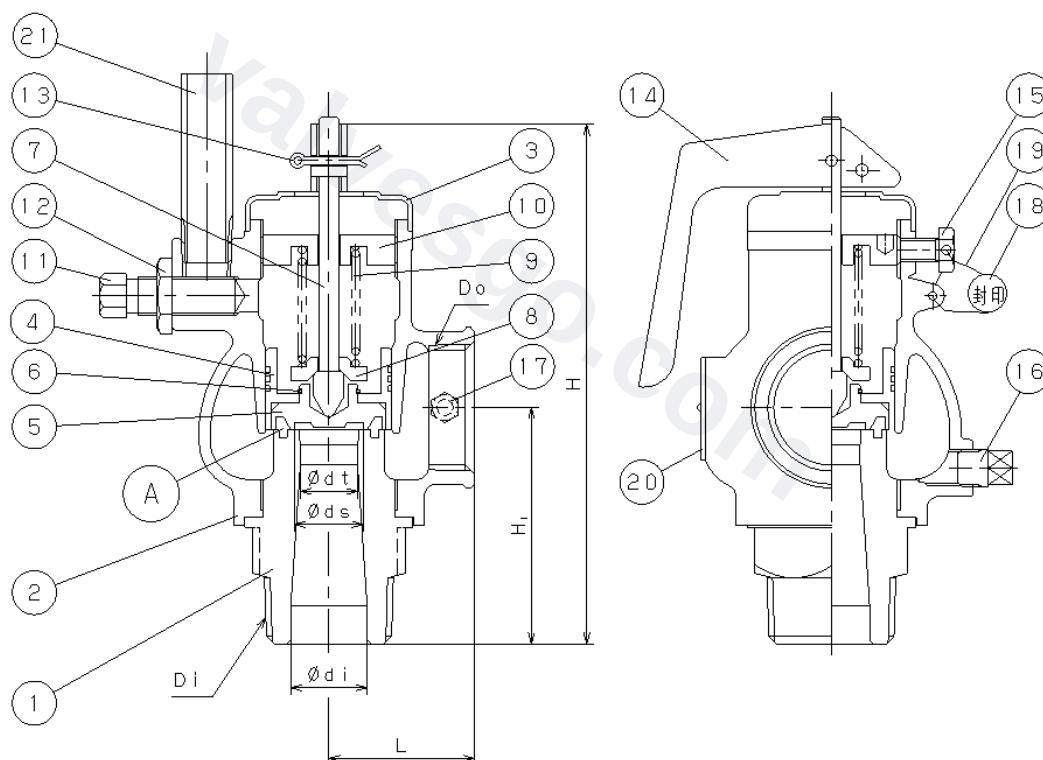
3. Dimensions and weights

(mm)

Nominal size	dt	d	Lift	di	Di	Do	L	H	H ₁	Plug	Flow area (mm ²)	Weight (kg)
20	15	18	3.3	20	R 1	Rc 1	38	136 (151)	61	R 1/8	176.6	1.3 (1.5)
25	19	22	4.4	25	R 1 1/4	Rc 1 1/4	45	157 (182)	70	R 1/8	283.3	1.9 (2.1)
32	24	28	5.5	32	R 1 1/2	Rc 1 1/2	52	183 (202)	80	R 1/8	452.1	2.7 (3.0)
40	30	35	6.8	40	R 2	Rc 2	65	216 (252)	98	R 1/4	706.5	5.1 (6.0)
50	38	44	8.7	50	R 2 1/2	Rc 2 1/2	77	262 (314)	121	R 1/4	1133.5	8.4 (9.5)

* Size and the dimension of connection thread (Di・Do) are different.

Figures inside () refer to when applicable pressure is 1.61 to 2.0 MPa.



1	Valve seat	8	Spring plate	15	Hexagon bolt
2	Spring chamber	9	Spring	16	Plug
3	Cover	10	Adjusting screw	17	Hexagon bolt
4	Valve guide	11	Needle valve	18	Seal ball
5	Valve	12	Lock nut	19	Seal wire
6	Retaining Ring C type	13	Split pin	20	Nameplate
7	Spindle	14	Lever	21	Pipe

4. Operation

(1) Blowout operation

As inlet pressure approaches the blowout pressure, the force of fluid pushing up the valve [5] approaches the force of the spring [9] pressing down the valve. The safety valve commences to blow when the inlet pressure reaches around 3% below the blowout pressure.

The fluid starts to leak by simmering and accumulates gradually on the valve holder A. When the fluid pressure reaches the blowout pressure the valve pops.

(2) Closing operation

Since the inlet pressure of the safety valve decreases when the fluid is released into the atmosphere by the pop action of the valve [5], the force of fluid lift is lowered. At this point, the repelling force of the spring [9] becomes larger than the force of fluid lift and thus the valve closes. In addition, since the safety valve blows, the pressure of fluid entering into the back of the valve holder (back pressure) adds to the closing force.

(3) Lift lever mechanism

Warning

1. Do not touch the product/pipes or the lever [14] with bare hands.
* Failure to follow this notice may result in scalds or injury in case that fluid is hot.
2. When checking the operation of the product, wear earplugs and stand clear of exhaust pipe end during inspection. Do not look down or touch the open end of the exhaust pipe.
* Failure to follow this notice may result in scalds or injury due to blow-off. Be aware that the product makes a loud noise at start-up.
3. Fluid is discharged from outlet and partly from the other parts.

Due to lift lever mechanism a discharge inspection can be manually performed at more than 75% of the blowout pressure.

5. Maintenance and inspection

5.1 Pre-warning and precaution for use

Warning

1. Do not install any closing device such as a stop valve at inlet and outlet sides of the product.
2. Install an exhaust pipe on outlet side of the product, and lead it to a place where there is no risk of physical damage even if fluid blows out.
* Failure to follow this notice may result in injury and scalds in case of fluid blow out.
3. Do not disassemble the product.
* Failure to follow this notice may prevent the product from functioning properly and lead to danger.
4. When installing the product, securely wrapped around the seal tape to the threaded portion, please tighten by applying a spanner to the hexagonal portion of the valve seat [1]. (Please never tighten against a pipe wrench or other tools on the spring chamber [2]).
* It is dangerous because using fluid is blown out by cracking and loosening of the thread portion.
5. Regarding applicable fluid, viscous fluid that may make fixation of the valve and valve seat cannot be used.
* Failure to follow this notice may make valve and valve seat fixed and prevent the product from functioning properly.
6. Fluid is discharged from outlet and partly from the other parts.
7. If the product is not operated for a long time, perform test working before starting operation.



Caution

1. Before installing the product, remove foreign substances and scale from the piping.
 - * Failure to follow this notice may hamper proper operation.
2. When installing the product, match the direction of fluid flow with the inlet and outlet of the product respectively.
 - * Failure to follow this notice prevents the product from functioning properly.
3. Please do pipe properly that is not given the excessive load, bending and vibration to the product.
 - * There is a possibility of the malfunction, and the life time of the product is significantly shorter.
4. Inner diameter of pipe mount and exhaust pipe must be equal to or more than those of each inlet and outlet of the product.
 - * Failure to follow this notice may result in malfunction or insufficient amount of blowout.
5. There is no problem with this product becoming wet by rain water. However, if this product gets wetted by water all time, consider installation place to keep from water.
6. Connect the product to the pipes securely.
 - * Improper connecting may cause fluid leakage from the piping joint when vibration is applied, or may cause scalds in case that fluid is hot.
7. Lead exhaust pipe to outside of buildings if there is a risk that fluid blowout causes alarm activation or contamination of the peripheral equipment.
 - * Improper placement may cause contamination of the peripheral equipment.
8. If there is a risk that condensate or rain water accumulates in exhaust pipe, attach drain pipe with the product and/or the exhaust pipe in a position where they can be drained.
 - * Failure to follow this notice may cause rust and result in malfunction.
9. Do not conduct piping with dissimilar metal provoking potential difference. Failure to follow this instruction result in galvanic corrosion of this product or parts.
10. Pipe mount of safety valve should have sufficient strength and rigidity against compression, shear stress and bending stress caused by reaction force because the pipe amount is subject to the reaction which is caused along the center line of a blowout pipe connected to the safety valve in the direction contrary to the discharging direction.
11. Please install the safety valve whose valve spindle shaft is vertically, and it should be mounted directly to the vessel as much as possible. In addition, please install it to the place where can do maintenance and inspection easily.
12. When installing an exhaust pipe, the inner diameter of an exhaust pipe should be as larger possible than that of an outlet pipe of a safety valve and not to have an undue back pressure (It does not exceed 10% of the blowout pressure).

5.2 Warning for use



Warning

1. Please do not directly touch the product with bare hands.
* Failure to follow this notice may result in scalds or injury in case that fluid is hot.
2. Please do not put your head and hands on the outlet side.
* When suddenly blowing out, there is a risk of injury or burns.
3. Please do not turn the adjustment screw [10].
* It is dangerous because it blows out at low pressure or not blow out at set pressure.



Caution

1. Before applying higher pressure fluid to the product, check that no problems have occurred in the equipment on the piping.
* Failure to follow this notice may damage the equipment.
2. Completely discharge fluid from the product and piping before leaving the product not operated for a long time.
* Failure to follow this notice may cause foreign substances and scale inside of the piping and may result in malfunction of the product.

5.3 Warning for inspection



Warning

Inspection must be done by experienced professional.

1. Completely discharge inside pressure from the product, piping and equipment prior to inspection. When fluid is hot, cool down the product to the condition that it can be touched with bare hands.
* Failure to follow this notice may result in scalds or injury due to the residual pressure.
2. Do not touch the product/pipes or the lever [14] with bare hands.
* Failure to follow this notice may result in scalds or injury in case that fluid is hot.
3. When checking the operation of the product, wear earplugs and stand clear of exhaust pipe end during inspection. Do not look down or touch the open end of the exhaust pipe.
* Failure to follow this notice may result in scalds or injury due to blow-off. Be aware that the product makes a loud noise at start-up.
4. Safety valve has structure which cannot be disassembled by customers (sealed). If disassembly or inspection is required, contact us.
* When disassembled and reassembled by customers, there is possibility that this product does not work properly, which is dangerous.