MODEL AL-400L,400TL
SAFETY RELIEF 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.

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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YOSHITAKE

■EPDT-435■

1.Specifications

Model		AL-400L	AL-400TL
Structure		Open type with lever	Closed type with lever*1
Nominal size		15～50A	
Application		Steam	Air, Water, Other Non-dangerous gases
Working pressure		0.05～1.6MPa	0.05～1.3MPa
Temperature		220℃	5～120℃
Material	Body and Spring chamber	Ductile cast iron	
	Valve and Valve seat	Stainless steel	Stainless steel (With PTFE valve disc)
Connection		JIS 10K FF Flanged*2 JIS 16K FF Flanged*2	

*1 Closed type is a structure that does not allow any part of the blown fluid to be discharged to the outside except at the outlet.

*2 JIS 16K FF flanges are used when the applicable pressure exceeds 1.0 MPa.

⚠ Warning

(1) Do not use this product for equipment or devices that do not allow valve seat leakage.
*This product has valve seat leakage within the allowable value and cannot be completely closed (zero valve seat leakage).

(2) This product cannot be used for equipment or devices that generate excessive vibration.
*Vibration may cause malfunction of the product.

(3) The set pressure cannot be adjusted (changed).
*This may cause damage to the equipment or device.

(4) If the fluid is steam, there is a possibility that the fluid may be blown out from the ⑧cap part. Please install it in a location where it is safe, even if a blowout occurs.
*This may cause surrounding areas becoming contaminated, and there is also a possibility of burns or injuries due to fluid blown out.

(5) For applicable fluids, adhesive fluids that can cause the bonding of the ④Valve / Valve・P and ③Valve Seat cannot be used.
*Safety relief valve does not operate properly if valve plug and seat is bonding.

⚠ Caution

Before using the product, please check the ⑭nameplate on the product against the specifications of the model you have ordered.
*If the content is different, do not use it and contact us.

2. Structure

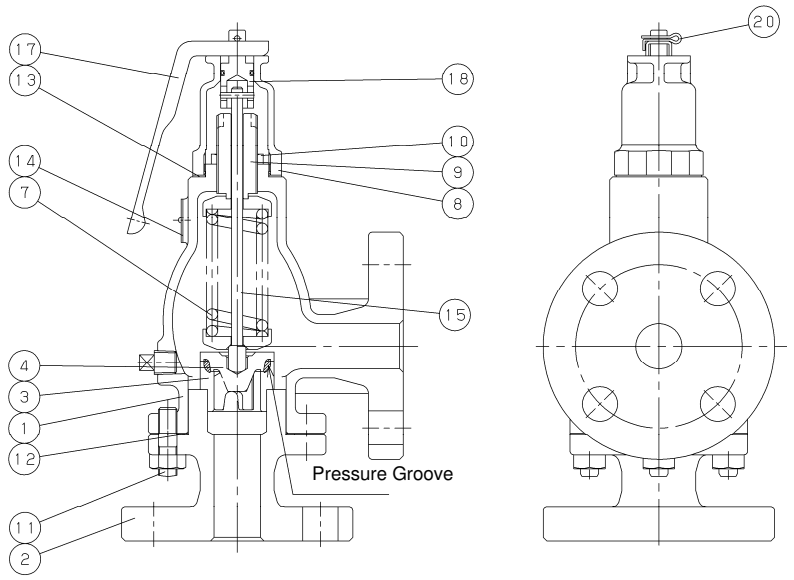


Figure 1 AL-400L

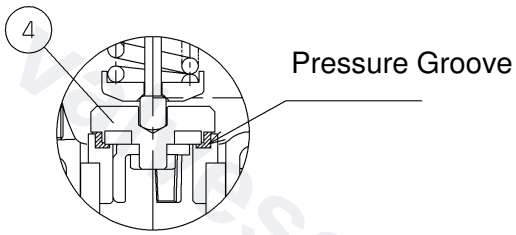


Figure 2 Valve Seat of AL-400TL (Same as Fig. 1 AL-400L except for the valve seat.)

No.	Name of Parts
1	Spring Case
2	Body
3	Valve Seat
4	Valve / Valve · P
7	Spring
8	Cap
9	Adjusting Screw
10	Lock Nut
11	Stud Bolt & Nut
12	Gasket
13	Gasket
14	Name Plate
15	Spindle
17	Lever
18	Connecting Rod
20	Pin

3. Operation

1. Initial closed state

When the pressure at the inlet side of the safety relief valve is lower than the opening pressure, ④the valve / valve · P are held down by ⑦spring force and the valve is closed.

2. Discharge

When the pressure on the inlet side of the safety relief valve increases and approaches the opening pressure, the force of the fluid trying to push up the ④valve / valve · P approaches the force holding down the ④valve / valve · P , causing start to discharge. This start to discharge causes a gradual buildup of pressure in the pressure groove, and when the predetermined opening pressure is reached, popping operation occurs vigorously.

3. Closing

When the ④valve / valve · P are popped and fluid is released to the atmosphere, the pressure on the inlet side of the safety relief valve decreases, and the force of the ⑦ spring prevails and closes the valve.

4. Installation

⚠ Warning

(1) Do not install any closing device such as a stop valve at the inlet or outlet side.
*Failure to follow this may result in damage to equipment due to insufficient discharge caused by resistance from the closing device.
(2) Connect a discharge pipe and a drain pipe to the outlet side of the product, and lead it to a place where there is no risk of physical damage even if the fluid blows out.
*Failure to follow this notice may result in injury and scales in case fluid blows out.
(3) Do not disassemble the product.
*Disassembling the product will leads to malfunction and dangerous.

⚠ Caution

(1) Thoroughly clean the flange connection surfaces, removing as much dirt as possible. Before installing, clean the inside of the piping thoroughly to remove debris, scale, etc.
*Inadequate cleaning of the piping can lead to improper operation due to debris. Please note that repairs caused by foreign object damage will be charged.
(2) When installing, ensure that the flow direction of the fluid matches the inlet and outlet directions of the product.
*Incorrect installation direction will prevent the product from functioning properly.
(3) The product should be installed in a vertical position with the ⑧cap facing upward.
*Incorrect installation orientation will prevent the product from functioning properly.
(4) If there are regulations regarding the piping of the safety relief valve, ensure that the piping meets these requirements.
(5) Since there is a risk of drain water or rainwater accumulating in the discharge pipe, be sure to install a drain at a location where it can be removed.
*Accumulation of drain water or rainwater in the discharge pipe can cause operational failure due to rust, etc.
(6) The outlet piping should be adequately supported to withstand the reaction force generated during discharge.
*Excessive piping stress may cause deformation of the valve, leading to failure in opening and closing.
(7) When using with high-temperature fluids, ensure that the outlet piping is installed so that the safety relief valve is not subjected to undue stress from thermal expansion of the device or thermal effects from the discharge of the safety relief valve.
(8) Ensure that the piping connections are secure.
*Inadequate connections may result in fluid leakage from the connection points.
(9) If fluid discharge activates an alarm or contaminates nearby equipment or devices, ensure that the discharge pipe directs the fluid to a safe location.
*There is a risk of contaminating surrounding equipment and devices.
(10) The location for installing the safety relief valve should be easily accessible, well-lit, and protected from the external environment. If installing outdoors, protect the valve from freezing and rain.
(11) The internal diameters of the mounting pipe stand and discharge pipe should be equal to or greater than the inlet and outlet diameters, respectively.
*Failure to do so may cause operational failure or insufficient discharge.
(12) Sudden pressure fluctuations, such as water hammer, can cause damage to the product or its components. Prevent shocks from sudden pressure changes.
(13) Ensure that piping does not transmit excessive load, bending, or vibration to the product.

●Mounting pipe stand for safety relief valve

(1) The mounting pipe stand should have sufficient strength, as it will receive a reaction force in the direction opposite to the discharge along the centerline of the outlet of the directly connected discharge pipe.

(2) Keep the mounting pipe stand as short as possible to minimize pressure loss. The mounting position should also allow for maintenance and inspection.

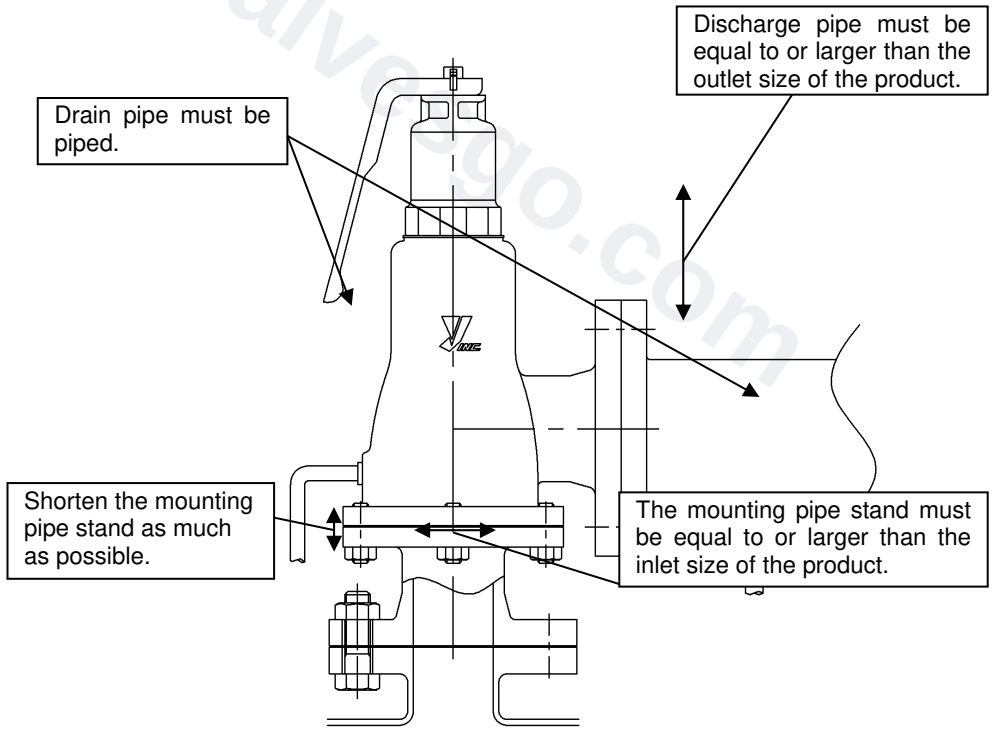
(3) The piping diameter of the mounting pipe stand should be equal to or greater than the inlet diameter of the product.

(4) When conducting pressure tests on piping, equipment, or devices, remove the safety relief valve and cover the mounting pipe stand.

●Discharge pipe for safety relief valve

(1) For steam applications, install the discharge pipe and expansion joints to ensure that the stress caused by the thermal expansion of the equipment and the thermal effects of the safety relief valve discharge does not affect the safety relief valve.

(2) The piping diameter of the discharge pipe should be at least equal to the outlet diameter of the product, and the piping should be designed to prevent back pressure.



5. Precautions for using

⚠ Warning

(1) Do not touch the product, piping, or operate the ⑰lever with bare hands.
*There is a risk of burns or injuries if handling high-temperature fluids.
(2) When checking the operation of the product, use appropriate protective gear and do not stand in front of the discharge pipe. Do not look into or reach towards the pipe.
*A loud discharge sound will occur when the product operates, and there is a risk of burns or injuries due to fluid discharge.
(3) Do not adjust (or change) the set pressure.
*There is a risk of damaging the equipment.
(4) Do not disassemble the product.
*If any abnormalities are observed, please contact us.

●Operation check method
The operation check can be performed using either method (1) or (2) in section 6.1●Periodic inspection of operation.

6. Maintenance

⚠ Warning

(1) Do not touch the product, piping, or operate the ⑰lever with bare hands.
*There is a risk of burns or injuries if handling high-temperature fluids.
(2) When checking the operation of the product, use appropriate protective gear and do not stand in front of the discharge pipe. Do not look into or reach towards the pipe.
*A loud discharge sound will occur when the product operates, and there is a risk of burns or injuries due to fluid discharge.
(3) Do not adjust (or change) the set pressure.
*There is a risk of damaging the equipment.
(4) Do not disassemble the product.
*If any abnormalities are observed, please contact us.

⚠ Caution

(1) When increasing the fluid pressure, confirm in advance that there are no issues with the equipment installed on the piping.
*There is a risk of damaging the equipment.
(2) If the system will be out of operation for an extended period, completely drain the fluid from the safety relief valve and piping.
*Foreign objects or scale may form inside the piping, causing the safety relief valve to malfunction.
(3) If the system has been out of operation for an extended period, perform an inspection before restarting.

6.1 Daily inspection and periodic inspection

To maintain the function and performance of the product, please carry out daily and periodic inspections. For abnormal situations, refer to "6.2 Troubleshooting and Countermeasures."

●Daily inspection (Once per day)

Inspections should be conducted during equipment operation.

Inspection Item	Inspection Standard
External Leakage	There should be no external leakage of internal fluid.
Valve Leakage	There should be no leakage from the outlet side of the safety relief valve at the normal pressure.

●Periodic inspection (Once per month)

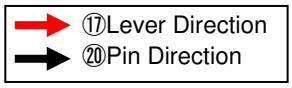
Conduct regular inspections.

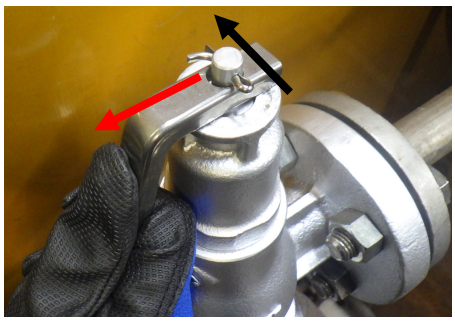
Inspection Item	Inspection Standard
Looseness of Piping and Components	There should be no looseness in the inlet and outlet piping, or in the ⑧cap and ⑪stud bolts & nuts assembled on the product.
Operation Check (1) *1	Increase the fluid pressure to the set pressure and confirm that the product operates.
Operation Check (2) *1	Increase the fluid pressure to 75% or more of the set pressure, lift the ⑰lever, and confirm that discharge occurs.

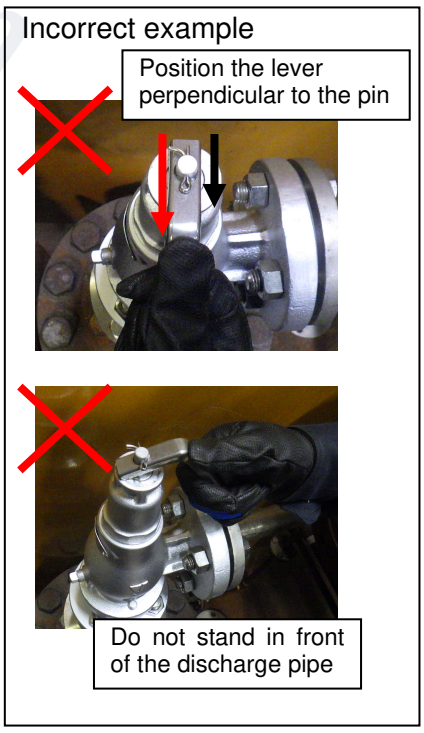
*1 Perform the operation check using either method (1) or (2).

＜Operation Check (2) Lever Lifting Procedure＞

1. ⑰Position lever perpendicular to ⑳pin. If the lever is in a horizontal position, it may not lift or could be damaged when lifted. Additionally, do not stand in front of the discharge outlet, as it is dangerous when fluid is discharged.







2. Lift the ⑰lever to initiate the discharge operation.

6.2 Troubleshooting

Fault Condition	Cause	Countermeasures/Actions
Leakage from the outlet side. *1	Debris or scale is lodged between the ④valve / valve・P and ③valve seat.	Follow the procedures in 6.1●Periodic Inspection, Operation Check (1) or (2) to operate the safety relief valve and remove the debris or scale. If leakage persists, contact us.
	The contact surface of the ③ valve seat is damaged.	The product needs to be replaced. Please contact us.
	Misoperation due to vibration in the piping where the product is installed.	This product cannot be used in equipment or systems with excessive vibration.
	Pulsation in the fluid causes momentary pressure spikes exceeding the set pressure.	Either increase the set pressure (recalibration required) or lower the normal pressure. Recalibration of the set pressure must be performed by Yoshitake.
	The difference between the set pressure and normal pressure is too small.	Increase the difference between the set pressure and normal pressure. Contact us for set pressure recalibration.
	Fluid is flowing into the outlet piping.	Review and modify the piping layout to prevent fluid from flowing into the outlet.
External leakage	⑫⑬Gaskets are deteriorated or damaged.	The gaskets need to be replaced. Please contact us.
Looseness in piping or components .	The piping at the inlet or outlet of the product is loose.	Retighten the connections.
	The ⑧cap and ⑪stud bolts & nuts are loose.	Fluid may discharge when the product operates, creating a hazard. Please contact us.
Operates at pressure lower than set pressure.	The product specification does not match the operating conditions.	Check the set pressure stamped on the nameplate. If the operating conditions differ, the product should be replaced.
	The pressure gauge is faulty.	Calibrate or replace the pressure gauge.
	The contact surface of the ③ valve seat is damaged.	The product needs to be replaced. Please contact us.
	There is a discrepancy in the product's set pressure.	Set pressure recalibration is required and must be done by Yoshitake.
Does not operate even at set pressure.	The product specification does not match the operating conditions.	Check the set pressure stamped on the nameplate. If the operating conditions differ, the product should be replaced.
	The pressure gauge is faulty.	Calibrate or replace the pressure gauge.
	There is a discrepancy in the product's set pressure.	Set pressure recalibration is required and must be done by Yoshitake.
	The sliding parts between the④ valve / valve・P and ③valve seat are not moving smoothly.	The product needs to be returned to Yoshitake, and disassembled and cleaned.
	There is back pressure in the outlet piping.	Remove the back pressure. Also, review and modify the piping layout to prevent back pressure.

Fault Condition	Cause	Countermeasures/Actions
Valve remains in a continuously discharged state.	Debris or scale is lodged between the ④valve / valve・P and ③valve seat.	The product needs to be returned to Yoshitake, and disassembled and cleaned.
	The sliding parts between the ④valve / valve・P and ③valve seat are not moving smoothly.	The product needs to be returned to Yoshitake, and disassembled and cleaned.
	Normal pressure is higher than the reseating pressure.	The difference between the set pressure and normal pressure needs to be increased. Contact us for set pressure recalibration.
	Installed on the secondary side of a pressure reducing valve, and the pressure reducing valve is malfunctioning (secondary pressure increases).	The pressure reducing valve needs to be repaired. If it is a product from our company, please contact us.
⑰Lever cannot be lifted.	Inlet side pressure is low.	Increase the inlet pressure to at least 75% of the set pressure.
	The sliding parts of the ⑮valve stem or ⑱connecting rod are not moving smoothly.	The product needs to be returned to Yoshitake, and disassembled and cleaned.
	⑰Lever is not perpendicular to ⑳pin.	Adjust the lever to a perpendicular position relative to the pin and lift it. For details, refer to 6.1 ●Periodic Inspection, Operation Check (2) Lever Lifting Procedure.
⑰Lever continues to discharge after being released.	Debris or scale is lodged between the ④valve / valve・P and ③valve seat.	Operate the lever again to remove the debris or scale. If the issue persists, the product needs to be returned to Yoshitake.
	The sliding parts between the ④valve / valve・P and ③valve seat are not moving smoothly.	The product needs to be returned to Yoshitake, and disassembled and cleaned.

*1 The product has allowable valve seat leakage and does not close completely. (Valve seat leakage cannot be zero.)