

ACTIVAL™

Three-Way Ball Valve with Threaded-End Connection

General

ACTIVAL Model VY5303A is a three-way ball valve with threaded-end connection (ISO 7-1: 1994). It proportionally controls chilled/hot water for HVAC (heating, ventilation, and air conditioning) applications.

Model VY5303A has bronze valve body, stainless-steel ball and stem, and the components exposed to process fluid are made of other corrosion resistant materials.

Cv value and size variation of Model VY5303A are best suited to HVAC control.

It combines with the actuator Model MY53X0A. Regarding the detailed information on the actuator, refer to Specifications/Instructions of ACTIVAL Model MY53X0A.



Features

- Compact and lightweight:
Valve can be installed in a restricted space such as inside of compact AHU (air handling unit).
- Bronze valve body applicable to PN16.
- Easy assembly with Model MY53X0A actuator using no tool, and no adjustment required.
- Linear flow characteristic.

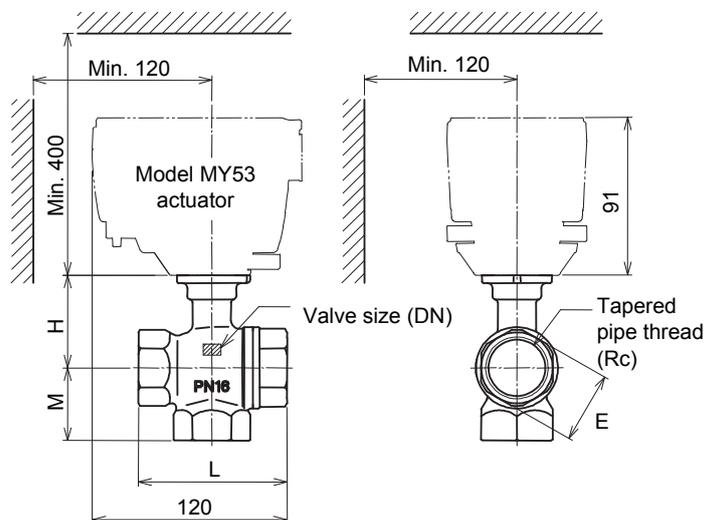
IMPORTANT:

To control ACTIVAL with a third-party controller, please consult with Azbil Corporation's sales personnel.

Model Numbers

Base model number	Material	—	Size/CV	Description
VY53				Three-way valve with threaded-end connection
	0			Bronze
		3A00		Fixed
			21	DN20 (3/4") / 4 in Cv
			22	DN20 (3/4") / 6.3 in Cv
			23	DN25 (1") / 10 in Cv
			31	DN32 (1 1/4") / 16 in Cv
			41	DN40 (1 1/2") / 25 in Cv

Dimensions



Model number	Dimension					
	DN	Rc*	L (mm)	H (mm)	E (mm)	M (mm)
VY5303A0021	20	Rc 3/4	72	50	33	36
VY5303A0022	20	Rc 3/4	72	50	33	36
VY5303A0023	25	Rc 1	85	54	40	42
VY5303A0031	32	Rc 1 1/4	99	69	49	50
VY5303A0041	40	Rc 1 1/2	109	72	55	52

* Rc: Internal tapered pipe thread complying with ISO 7-1:1994.

Figure 2. Dimensions and maintenance (mm)

Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual near by for ready reference.

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact Azbil Corporation's sales representative. Azbil Corporation will not bear any responsibility for the results produced by the operators.

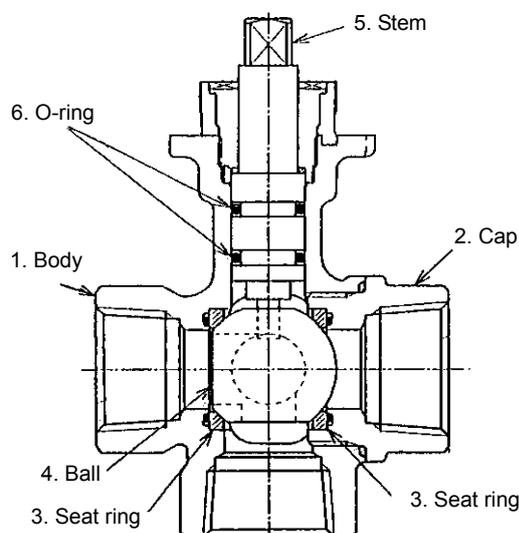
 CAUTION

-  • Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
-  • Avoid using ACTIVAL (valve, actuator to combine with, and other components) in an atmosphere containing corrosive gas, explosive gas, etc. since it may damage the ACTIVAL.
-  • This product must be operated within its rated operating ranges specified in this manual. Failure to comply will cause equipment damage.
-  • This product must be operated under the operating conditions (power, temperature, humidity, vibration, shock, installation position, atmospheric condition, etc) specified in this manual to prevent equipment damage.
-  • Operate the product within the service life, and avoid application that keeps product operating cycle excessively frequent so as not to shorten its service life.
-  • Install the valve in the position as specified in this manual. Excessively tight connection of the valve to a pipe and improper installation position may damage the valve.
-  • After installation, make sure no fluid leaks from the connecting parts of valve and pipes. Incorrect piping may cause fluid leakage.
-  • Do not allow any foreign substance inside the piping. Flush the piping so that no foreign substance remains. Attach a strainer (with 40 or more meshes) in a pipe on the inflow side of the ACTIVAL to prevent equipment damage.
-  • When connecting the valve to the piping, do not excessively screw the pipe into the valve. The inner valve may get damaged or deformed, causing the fluid leakage and equipment malfunction.
-  • Do not leave the controlled fluid frozen to prevent equipment damage or fluid leakage.
-  • Do not install the product in a location close to a steam coil or a hot-water coil. High temperature radiation may result in malfunction of the combined actuator.
-  • Avoid touching the installed valve. When being used to control hot water, valve body reaches high temperature and may cause burn injury.
-  • Do not disassemble the product. Disassembly may result in electrical shock or equipment damage.
-  • Dispose of this product as an industrial waste in accordance with your local regulations. Do not reuse all or part of this product.

Specifications

Item	Specification			
Type	Three-way ball valve with threaded-end connection (internal), proportional control			
Applicable actuator	Model MY53X0A			
Pressure rating	PN16 (Max. working pressure: 1.6 MPa)			
Valve size, Cv, Close-off rating	Model number	Size	Cv	Close-off rating
	VY5303A0021	DN20 (3/4")	4.0	0.5 MPa
	VY5303A0022	DN20 (3/4")	6.3	0.5 MPa
	VY5303A0023	DN25 (1")	10	0.5 MPa
	VY5303A0031	DN32 (1 1/4")	16	0.3 MPa
	VY5303A0041	DN40 (1 1/2")	25	0.3 MPa
Mounting orientation	Horizontal or vertical mounting			
Materials	Body	Cast bronze (equivalent to: - CuAn5An5Pb5-C (DIN EN1982) for global standard - CAC406 (JIS) for Japanese standard)		
	Seat ring	PTFE		
	Ball	Cast stainless steel		
	Stem	Stainless steel		
	O-ring	EPDM		
End connection	Internal threaded-end (equivalent to ISO 7-1: 1994)			
Applicable fluid	Chilled/hot water, brine (ethylene glycol solutions, 50 wt.% max.)			
Allowable fluid temperature	0 °C to 100 °C (non-freezing)			
Flow characteristics	Linear characteristic			
Rangeability	30 : 1			
Seat leakage in fully closed position	0.01 % of rated Cv value (0.0006 Cv or less for Model VY5303A0021)			
Mounting position	On vertical / horizontal pipe			
Weight * Actuator to combine is excluded.	Model VY5303A0021	0.7 kg		
	Model VY5303A0022	0.7 kg		
	Model VY5303A0023	0.9 kg		
	Model VY5303A0031	1.4 kg		
	Model VY5303A0041	1.7 kg		

Parts Identification and Materials



No.	Part name	Material
1	Body	Cast bronze (equivalent to: - CuAn5An5Pb5-C (DIN EN1982) - CAC406 (JIS))
2	Cap	Cast bronze (equivalent to CuAn5An5Pb5-C (DIN EN1982))
3	Seat ring	PTFE
4	Ball	Cast stainless steel
5	Stem	Stainless steel
6	O-ring	EPDM

Figure 2. Parts identification and materials

Flow Characteristic

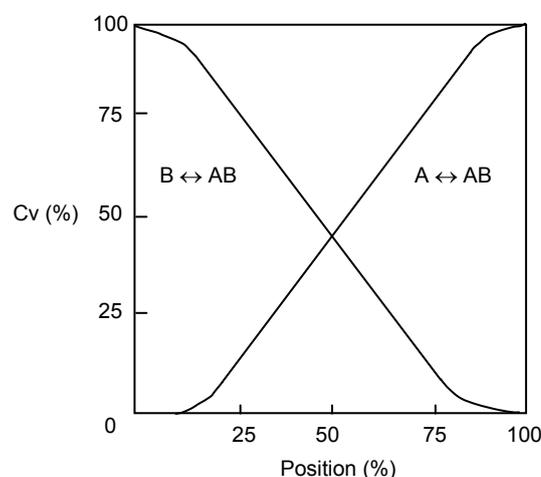


Figure 3. Flow characteristic diagram

Installation

Precautions for installation

CAUTION	
	• Disconnect power from the assembled actuator before performing any wiring to prevent equipment damage.
	• Install the ACTIVAL in the position as specified in this manual. Excessively tight connection of piping and improper installation position may damage the valve.
	• After piping installation, make sure no fluid leaks from the connecting parts of valve and pipes. Incorrect piping may cause fluid leakage.
	• Do not allow any foreign substance inside the piping. Flush the piping so that no foreign substance remains. Attach a strainer (with 40 or more meshes) in a pipe on the inflow side of the ACTIVAL to prevent equipment damage.

- To remove foreign substances inside the pipes, install a strainer on the inflow side of each valve. In case that the strainers cannot be installed on the inflow side of each valve, install it on the pipe diverting sections (sections diverting from main piping system to sub piping system).
- Install the valve so that the flow direction of process fluid agrees with the arrow indicated on the valve body.

Installation location

CAUTION	
	• Avoid using ACTIVAL (valve, actuator to combine with, and other components) in an atmosphere containing corrosive gas, explosive gas, etc. since it may damage the ACTIVAL.
	• The actuator may malfunction if being exposed to high heat radiation. Do not install it near by steam coil or hot water (in high temperature) coil.

- Install the ACTIVAL (valve and the assembled actuator) in a position allowing easy access for maintenance and inspection. Fig. 1 shows the minimum clearance for maintenance and inspection. When installing the ACTIAL in a ceiling space, provide an access hole within the 50 cm radius of the ACTIVAL. And, place a drain pan under the valve.
- Do not mount the valve on a pipe where water hammer occurs, or where solid objects including slug may accumulate.

Mounting position

The valve (assembled with the actuator) can be mounted in any position ranging from upright to sideways (90° tilted). The valve should be installed with its actuator vertically positioned above the valve body. However, the valve must be installed always in upright position outdoors.

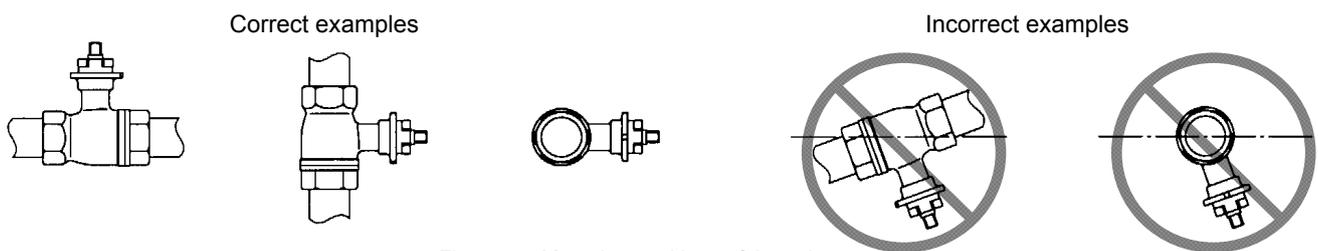


Figure 4. Mounting positions of the valve

Piping

- Install a bypass pipe and gate valves on the inflow, outflow, and bypass sides. Also, install a strainer (with 40 or more meshes) on the inflow side.
- When installing the valve to pipes, do not allow any object, such as chips, to get inside a pipe or valve. Valve cannot fully closes, or the valve seat may get damaged causing fluid leakage, due to an foreign object jammed inside the valve.
- When piping, do not apply too much sealing material, such as solidifying liquid and tape, to the pipe connection sections so that these materials flow into the valve. Valve cannot fully closes, or the valve seat may get damaged causing fluid leakage, due to the sealing material jammed inside the valve.

- When connecting the valve to pipes, hold the valve body (where a pipe is screwed) with a tool such as a wrench, and screw the pipe into the valve. (See Fig. 5.) Do not apply excessive torque to the pipe. Refer to the table in Fig. 5 for the recommended torque.

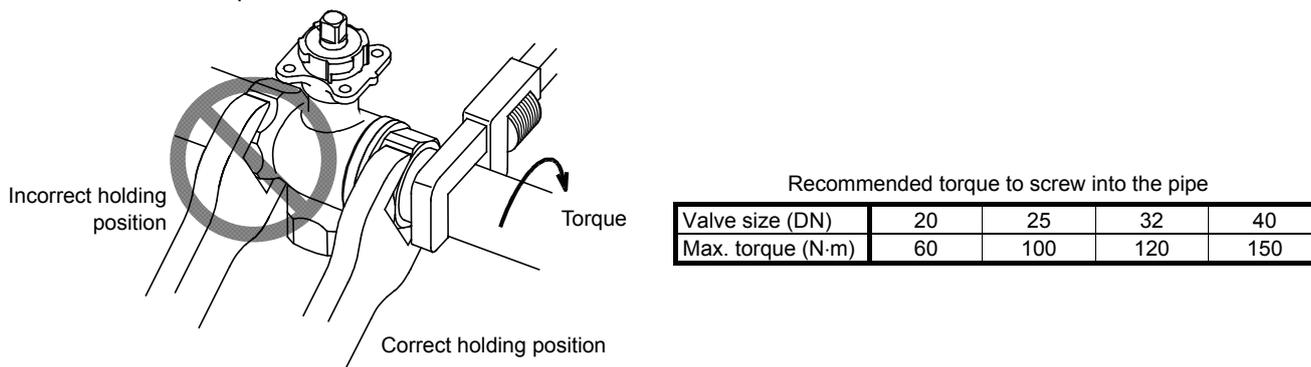
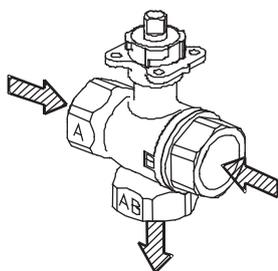


Figure 5. Valve connection to a pipe

- Before activating the ACTIVAL (valve with actuator), flush the pipes (with the ACTIVAL installed) at the maximum flow rate to remove all the foreign substances. Fully open (in 100 % position) the ACTIVAL to flush. (Factory preset position: Port A 100 %)

Flow direction

Mixing valve:
Port A/Port B → Port AB



Diverting valve:
Port AB → Port A/Port B

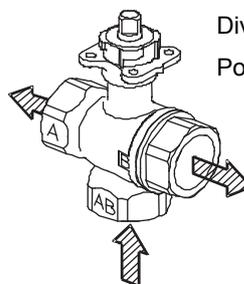


Figure 6. Flow direction

Identification of the ports A and B

Valve body without heat insulation material wrapped:

Identify the ports with the letters 'A' and 'B' embossed on the valve body.

Valve body with the insulation material wrapped:

Identify the ports with the tip of the valve joint surface, as shown in Fig. 7. The port on the side where the tip points is the port B.

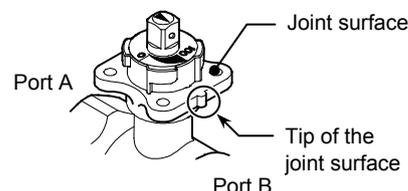


Figure 7. Identification of port A / B

Heat insulation

Do not apply heat insulation to the joint surface. Correctly apply heat insulation to the valve as shown in Fig. 8.

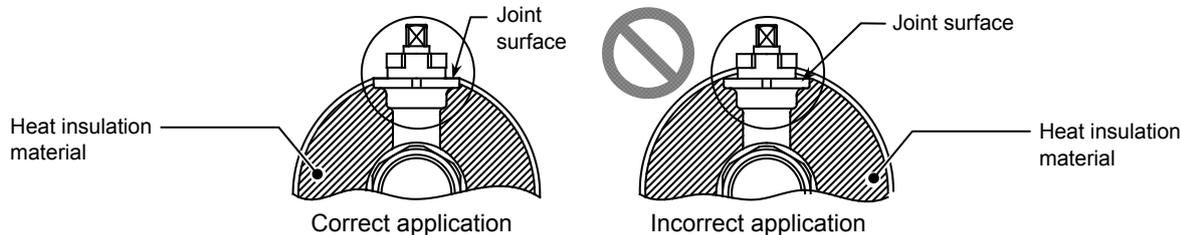


Figure 8. Heat insulation

Factory preset position

Port A of the ACTIVAL is set in 100 % (fully open) position for shipment.

Assembling the valve Model VY5303A with the actuator Model MY53X0A

IMPORTANT:

- Do not assemble the valve with any other actuator.
- The actuator can be horizontally rotated every 90 degrees to fit into the valve mounting position (4 mounting positions). Make sure the positions of the actuator and the valve as follows, referring to Fig. 8:
 - Actuator: Indicator/manual lever points at 100 (fully open position).
 - Valve: An arrow on the top of the stem points at 100 (fully open position).
 (Align the hole on the side of the stem with the tip at the joint surface as 'a' in Fig. 8 shows.)
- Set the ACTIVAL (actuator and valve) in 100 % position when changing the mounting position. If the valve in 0 % position is assembled with the actuator in 100 % position, the actuator put torque on the closed valve, and the gear of the actuator gets damaged.

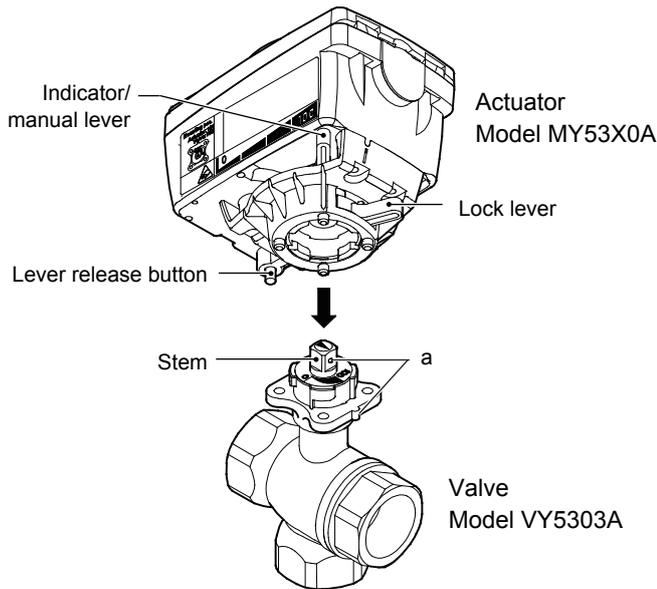


Figure 9. Mounting the actuator onto the valve

Mounting procedure

- 1) Manually turn the indicator/manual lever of the actuator to "100" with the lever release button pressed.

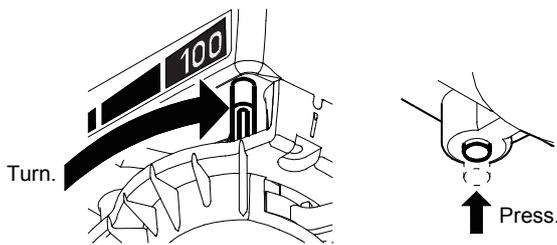


Figure 10. Indicator/manual lever at 100 % (fully open) position

- 2) Move the lock lever to right-end to unlock.

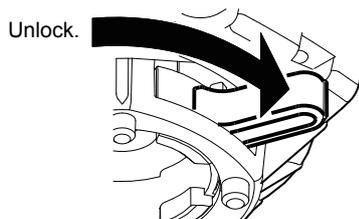


Figure 11. Unlocking the lock lever

- 3) Confirm that the arrow on the top of the valve stem points at "100". A hole on the side of the stem faces the same direction at which the tip of the valve joint surface (with the actuator) points when the valve position is fully open. (See 'a' in Fig. 9.)

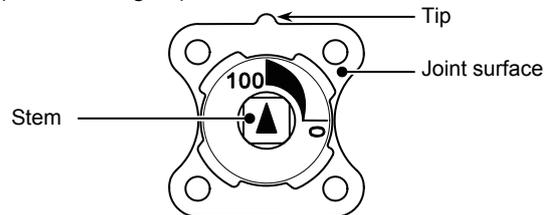


Figure 12. Valve stem pointing at 100 % (fully open) position

- 4) Assemble Model MY53X0A actuator with the valve. Engage 4 pins of the actuator with the mating holes on the valve joint surface.
- 5) Move the lock lever to left-end to lock. Locked position is indicated with the groove as shown in Fig. 13.

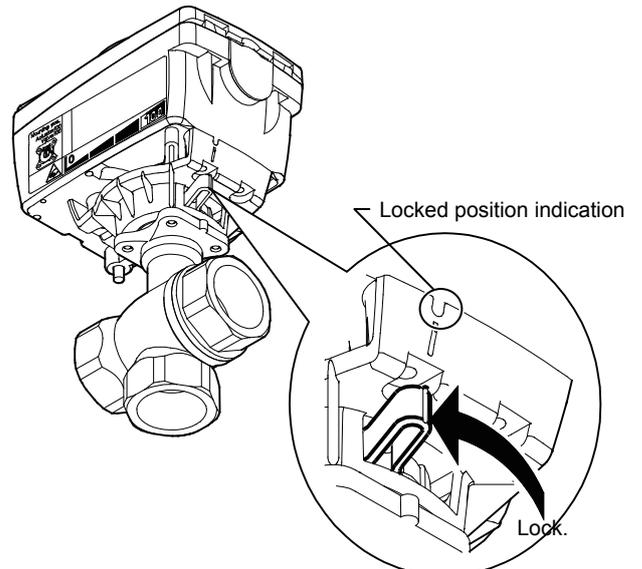


Figure 13. Locking the lock lever

Application Examples

Diverting application

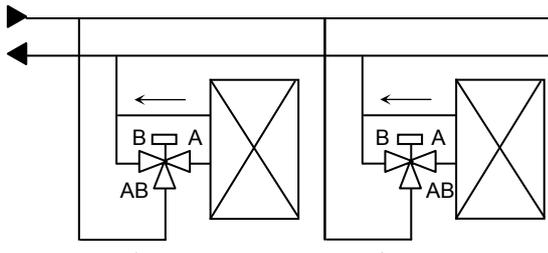


Figure 14. Application example: Diverting valve

Mixing application

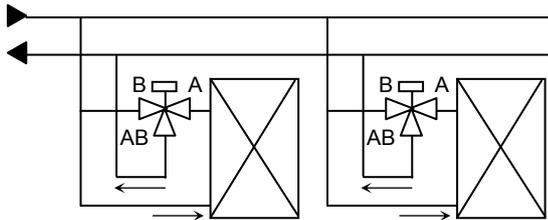


Figure 15. Application example: Mixing valve

Mounting Examples

Diverting application

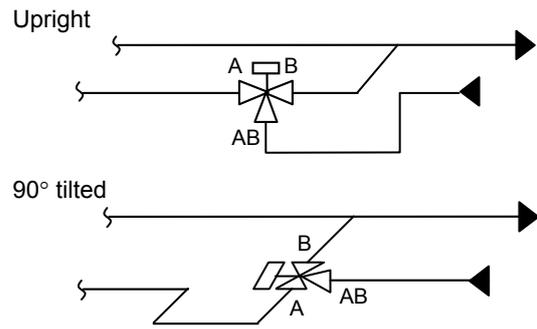


Figure 16. Mounting examples: Diverting valve

Mixing application

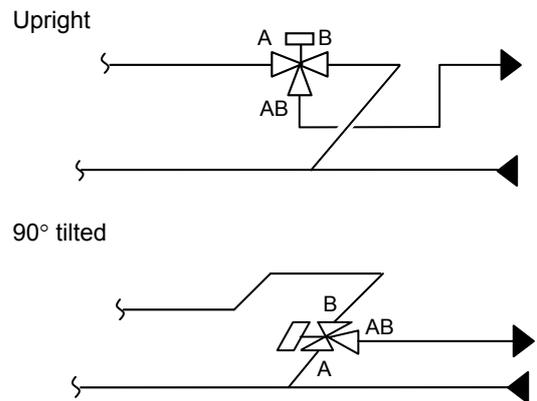


Figure 17. Mounting examples: Mixing valve

Inspection and Troubleshooting

 CAUTION	
	<ul style="list-style-type: none"> Avoid touching the installed valve. When being used to control hot water, valve body reaches high temperature and may cause burn injury.

- Inspect the ACTIVAL according to Table 1.
- Manually open/close the ACTIVAL at least once a month if it is left in inactive state for a long period after installation.
- Visually inspect the ACTIVAL (e.g., fluid leakage) every six months. If any of the problems described in Table 2 is found, take corresponding actions shown in the table.
If your problem is not solved by the corresponding action, please contact Azbil Corporation near you.

Table 1. Inspection items and details

Inspection item	Inspection interval	Inspection detail
Visual inspection	Semiannual	<ul style="list-style-type: none"> Loosened lock lever of the assembled actuator Valve and actuator damages Fluid leakage from the gland/pipe connecting part
Operating status	Semiannual	<ul style="list-style-type: none"> Unstable open/close operation Abnormal noise and vibration
Routine inspection	Any time	<ul style="list-style-type: none"> Abnormal noise and vibration Unstable open/close operation Valve hunting

Table 2. Troubleshooting

Problem	Part to check	Action
Valve does not operate smoothly / valve stops halfway / valve does not operate at all.	Conditions of the power applied and of the input signal applied to the actuator. Wiring condition/disconnected wires of the actuator. Foreign substance jammed.	Check the power supply and the controller connected to. Check the wiring. Remove foreign substance by manually opening the valve.
Fluid leaks to the outside of the valve when the valve is in fully closed position.	Confirm the mounting procedure referring to the section Assembling the valve Model VY5303A with the actuator Model MY53X0A .	Dismount and remount the actuator according to the correct mounting procedure.
The valve vibrates or produces an abnormal noise.	Primary pressure condition. Differential pressure condition. Control stability.	Reset and adjust the valve inlet/outlet pressure. Modify control parameter/PID setting of the controller.
The auxiliary switch of the actuator does not operate.	Auxiliary switch (cam switch) condition. Wiring condition/disconnected wires of the actuator.	Redo the cam switch setting. Check the wiring.
Connecting part between the valve and actuator vibrates or produces an abnormal noise.	Lock lever condition of the actuator. Yoke damages.	Lock the lock lever. Consult with our sales/service personnel.
Water flowing sound level is too high.	—	Consult with our sales/service personnel.
Actuator in operation produces an abnormal noise.	—	Consult with our sales/service personnel.

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