Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Motorized ball valve (MXB1.MXB1F.MXG1.MXB1D.MXB1DF.MXG1D.MSB1. MSB1F.MSB1D.MSB1DF.MHB4.MHG4)

Design/selection

⚠CAUTION

1 Fluid viscosity

Generally, the valve can be used with a fluid viscosity of up to 500 mm^2/s. However, the properties may differ according to the fluid, so contact CKD.

2 Fluid quality

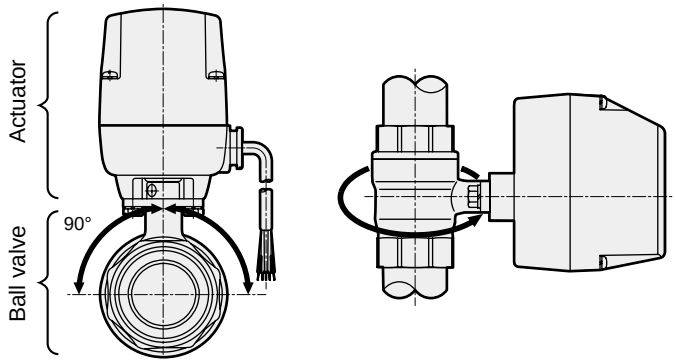
Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance.

Mounting, piping and wiring

⚠CAUTION

1 Mounting

(1) Always hold the body when handling or installing the product. Do not pull the lead wires or drop the product.
(2) Install the valve within the range between vertical position with actuator facing upward and horizontal position.
(3) Do not install the product outdoors.



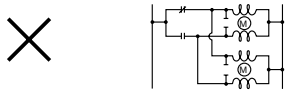
[Horizontal piping] [Vertical piping]

2 Piping

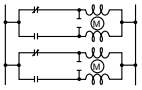
(1) Fix the product when tightening or reinstalling the piping. When piping to the body side, fix the body, and when piping to the cap side, fix the cap.
(2) Fix and support the pipes so that the weight and vibration of the pipes are not directly applied on the valves.
(3) Be sure to observe the specified direction for the increase in pressurization of the 3-way valve.
(4) When using heat insulating material, do not cover the actuator.

3 Wiring

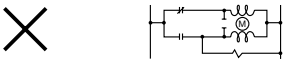
(1) Wiring diagram is on page 787 or pasted on the bonnet. Wire as shown in the wiring diagram.
(2) For the DC type, use a high-capacity power supply. A full-wave or half wave rectified bridge is affected by ripples, so always use a stabilized power supply. Since a stepper motor is used, noise will be generated at the power line. Thus, use noise filters on devices susceptible to noise, such as computers connected to the common power supply.
(3) Avoid using a changeover switch with red and black lead wires as the signals could be input simultaneously.
(4) Parallel operation of motor driven ball valves (excluding MXB1D/MXB1DF/MXG1D/MSB1D/MSB1DF) Do not operate more than one ball valve in parallel using the same contact. Otherwise, malfunction will occur.



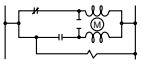
In parallel operation, insert a separate contact for each ball valve.

OK 

(5) Parallel operation with other valves (excluding MXB1D/MXB1DF/MXG1D/MSB1D/MSB1DF) Do not operate in parallel with other products having different resistance, such as a solenoid valve or contact protection element, using the same contact. Otherwise, malfunction will occur.



In parallel operation, insert a contact between the ball valve and solenoid valve, etc.

OK 

(6) When not using output lead wire, cut the exposed portion of the yellow and green core wires and insulate.
(7) When using the output lead wire for large capacity loads, minute loads, etc., observe the specification range of the micro switch.

Model No.	Manufacturer/model No.
MXB1/MXB1F.MXG1/MXB1D/MXB1DF/ MXG1D/MSB1/MSB1F/MSB1D/MSB1DF	OMRON SS-5
MHB4/MHG4	Panasonic Electric Works AH1680

(8) When using in a place where water splashes on the valve, take measures to protect the lead wire connection section.
(9) When wiring a terminal box with indicator lamp, do not remove the cover with force.
Otherwise, the crimp terminals inside could bend, and indicator lamp faults or insulation faults could occur.

When using the product

⚠WARNING

1 Frequency of use

Be sure to observe the frequency of use (motor load time factor). Otherwise, the thermal protector could operate and stop the valve. In the locked state, a continuously energized state could be created, placing a load on the gears and coils. Turn the power OFF immediately, and resolve the problem. If operation is continued, misoperations or reduced durability could result.

⚠CAUTION

1 Switching signals

Switch the valve signal so that the next signal is input after the valve operation ends.
If operation is stopped or if the signal is switched midway, operation failures may occur and the durability may decline.

2 Manual operation

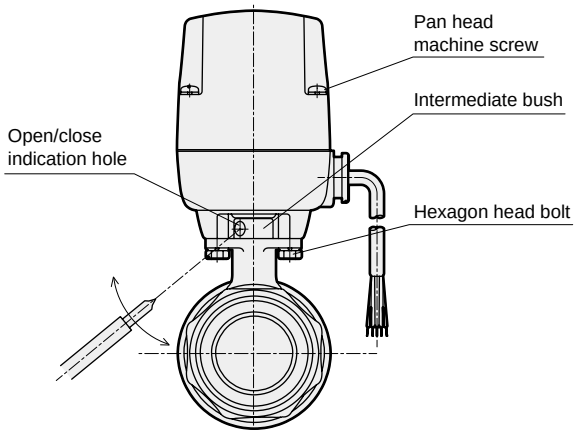
This applies to the MXB1, MXB1F, MXB1D, MXB1DF, MSB1, MSB1F, MSB1D and MSB1DF. For the large bore sizes (standard pore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½), this applies to valves with manual override "M".

[How to operate the manual override]

- For the small port sizes (standard bore: Rc3/8 to Rc1, full bore: Rc1/2 to Rc3/4), insert a hard tool such as a Phillips screwdriver into the open/close indication hole of the motorized valve intermediate bush and turn it slowly.
- For the large port sizes (standard bore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½) with manual override "M", insert a hard tool such as Phillips screwdriver under the connection key of the intermediate bush and turn it slowly with the clutch disengaged.
- Turn the knob from the closed to open position and then from the open to closed in about 20 seconds.
- For both the large and small port sizes, rotating in the counterclockwise direction looking at the valve from above will lead to "opening", and rotating in the clockwise direction will lead to "closing".

[Precautions for manual operation]

- Make sure to turn the power OFF before the operation.
- Do not apply sudden force when rotating the screwdriver. The gears could be damaged.
- For the large port sizes (standard bore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½) with manual override "M", always return the clutch after manual operation, and make sure that the clutch is securely engaged before starting operation.
- Only perform manual operation in emergencies.



Maintenance

⚠WARNING

1 Do not detach the bonnet.

Touching electrical parts inside may cause electric shock.

2 Do not disassemble the product.

If a fault occurs, do not disassemble the product. Contact your nearest dealer or CKD Sales Office.
Disassembling will prevent smooth investigation of the cause.

3 Precautions when replacing the ball valve and actuator

(1) Before replacement, be sure to shut off the power source, release the fluid pressure and check that internal pressure is not applied inside the ball valve.
(2) When replacing, check that the actuator axis and the ball valve axis are not mis-aligned.
(3) When tightening two hexagon socket head cap screws or hexagon head bolts, assemble carefully in several actions to ensure that the tightening is uniform. (Recommended tightening torque 5 to 7.5 N·m)

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Motorized proportional control ball valve (MXBC2, MXGC2)

Design/selection

⚠CAUTION

1 Power supply

Select power supply allowing for sufficient capacity (50 W class is recommended). Do not use a full-wave rectified bridge as it will be affected by ripples or zero voltage, etc., Instead, use a stabilized power supply.

2 Control method

Use a controller or thermostat having a PID function, and keep the motor load hour rate at 10% or less. When using for ON/OFF control or control with a high motor load hour rate, the service life will be shortened, and the thermal protector could be activated thanks to motor heating. This will temporarily shut off the motor power and prevent normal operation. Lowering the motor load hour rate will allow the durability of the entire device to be lengthened, so carefully consider the control methods and motor load hour rate. When the thermal protector is in operation, do not forcefully operate manually.

3 Durability

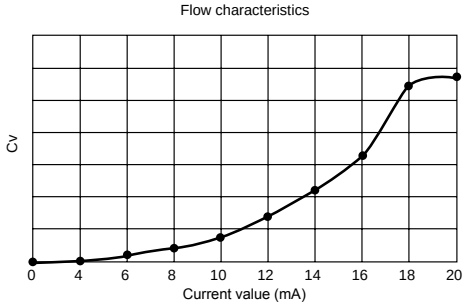
The seal performance of ball valve and durability of internal gear and other wearing parts largely depends on the control method (frequency of use).
As an example, if the equipment is active for 1 sec. and inactive for 10 secs. for 8 hours per day, the estimated service life is 1 to 1.5 years.

4 Input signal and Cv

The initial adjustment of the opening of ball valve and the input signal is as shown in the table below.

Input signal	Ball valve open/close position
0 mA	Fully closed position
20 mA	Fully opened position

As shown below, the Cv variation by 1 step will increase in the areas where the Cv is small or near the max. flow rate. Thus, avoid usage in these ranges, and obtain stability through control so that the expression max. Cv x 1/2 = required flow rate is satisfied.



As the angle for the ball valve to start opening and the Cv corresponding to the input signal differ depending on the unit, check the input signal and flow rate of individual units.

5 Noise

When using outdoor piping, use resin piping to prevent damage from lightning. Since a stepper motor is used, noise will be generated at the power line. Thus, use noise filters on devices susceptible to noise, such as computers connected to the common power supply.

6 Actual control

(1) Temperature control: When controlling the heating or cooling temperature, attention must be paid to the balance of the applied and lost heat. If the heat is not balanced, the control will not stabilize, and vibration could occur, causing a large error. Design the device with balance in mind, considering the required fluid flow rate and temperature with respect to the target temperature.
(2) Constant flow rate control: The resolution of the ball valve is 1.3% or less. Thus, it may not be possible to attain the required flow rate if more precise resolution is required. When using at high pressures, note that this resolution limit is particularly apparent.

7 Fluid viscosity

The valve can be used with a fluid viscosity of up to 500 mm^2/s. However, as the properties may differ according to the fluid, consult with CKD.

[Other] Refer to page 784 for the precautions regarding the motorized ball valve.

Mounting, piping and wiring

⚠WARNING

1 Wiring

Refer to page 784.

[Other] Refer to page 784 for the precautions regarding the motorized ball valve.

When using the product

⚠WARNING

[Other] Refer to page 785 for the precautions regarding the motorized ball valve.

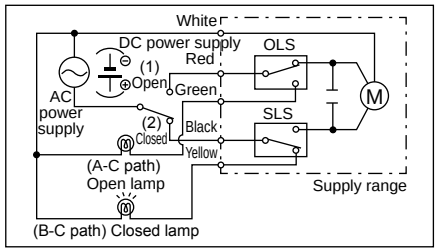
Maintenance

⚠WARNING

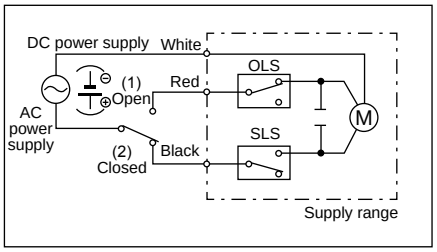
[Other] Refer to page 785 for the precautions regarding the motorized ball valve.

MX$^{B}_{G}$1 / MXB1F / MSB1 / MSB1F wiring diagram

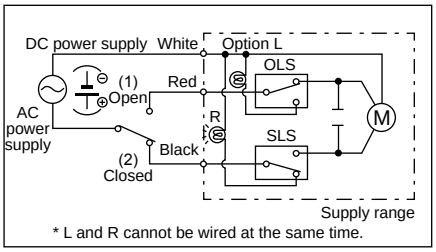
● Standard



● Option: T (3-conductor cable)



● Option: L, R (with lamp)

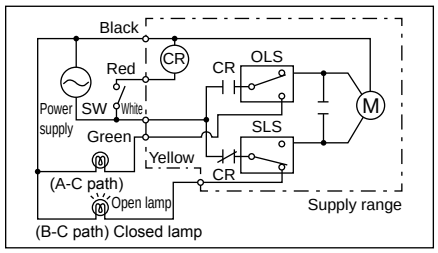


* L and R cannot be wired at the same time.

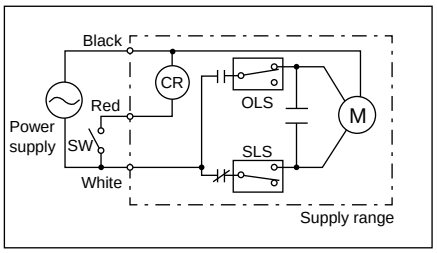
2-port valve	
Opening	(1) White - red After opening, the micro switch (OLS) functions and stops the motor.
Closing	(2) White - black After closing, the micro switch (SLS) functions and stops the motor.
3-port valve	
Lit when A-C path operates	(1) White - red After A-C path operation, the micro switch (OLS) functions and stops the motor.
Lit when B-C path operates	(2) White - black After B-C path operation, the micro switch (SLS) functions and stops the motor.

MX$^{B}_{G}$1D / MXB1DF / MSB1D / MSB1DF (with relay) wiring diagram

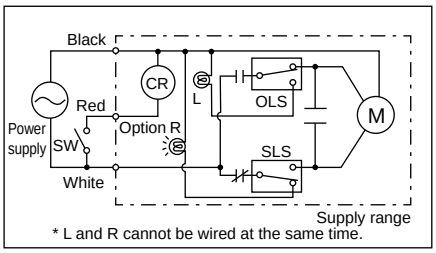
● Standard



● Option: T (3-conductor cable)



● Option: L, R (with lamp)

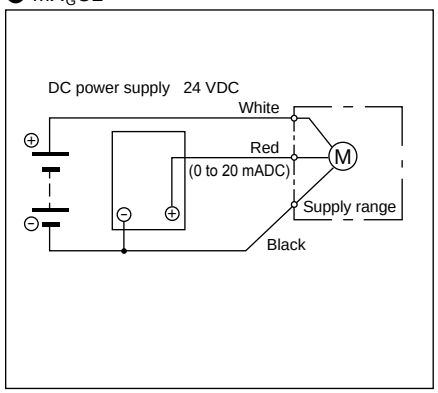


* L and R cannot be wired at the same time.

2-port valve	
Opening	SW: ON (black - white, red) After opening, the micro switch (OLS) functions and stops the motor.
Closing	SW: OFF (black - white) After closing, the micro switch (SLS) functions and stops the motor.
3-port valve	
Lit when A-C path operates	SW: ON (black - white, red) After A-C path operation, the micro switch (OLS) functions and stops the motor.
Lit when B-C path operates	SW: OFF (black - white) After B-C path operation, the micro switch (SLS) functions and stops the motor.

MX$^{B}_{G}$C2 (Motorized proportional control ball valve) wiring diagram

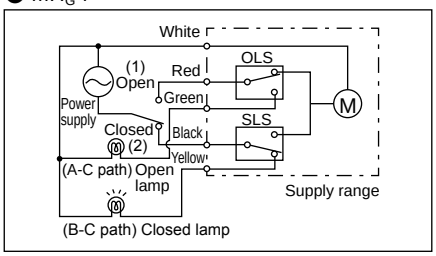
● MX$^{B}_{G}$C2



2-port valve	
Opening	20 mA
Closing	0(4) mA
3-port valve	
Lit when A-C path operates	20 mA
Lit when B-C path operates	0(4) mA

MH$^{B}_{G}$4 wiring diagram

● MH$^{B}_{G}$4



2-port valve	
Opening	(1): White - red
Closing	(2): White - black
3-port valve	
A-C path	(1): White - red
B-C path	(2): White - black