ASAHI YUKIZAI’s
ELECTRIC CONTROL VALVE

The electric actuator is made by M-System.

No time- and money-consuming air source equipment is required!

- Energy saving
- Space saving
- Shorter installation work time

Furthermore, many more advantages!

Electric control valve is ready to operate immediately after connecting signal and power supply!

Directly connected to various open networks to save wiring efforts to a great extent!

Open Network Supported
See Guidance 2 on page 8.

- CC-Link
- DeviceNet
- LONWORKS
- Modbus

(*1) (Contact us for details)

High function and high performance

- High thrust (5000 N)
- High resolution (1/1000)
- A battery-driven model is available as well.

ASAHI YUKIZAI CORPORATION
M-SYSTEM CO., LTD.
Introducing electric actuators to control valves eliminates:

- A compressor entails equipment costs as well as troublesome maintenance work! What is more, it results in high electricity bills!

- The pneumatic control valve requires complicated equipment and consumes plenty of power.

The electric control valve connects to various open networks directly.

- A number of electric control valves with open network capability connect in a daisy-chain layout, which saves wiring effort. Various operating information on electric control valves can be collected through a single network.

- No time- and maintenance work!

- Shorter installation and source equipment work time!

- Fewer time- and maintenance work.

For open networks, refer to Guidance 2 on page 8.

- CC-Link (1)
- DeviceNet (2)
- Modbus (2)
- LONWORKS (2)
- HART (2)

For open networks, refer to Guidance 2 on page 8. (*2) Contact us for details.

Option: CC-Link-supporting Model

M-System’s electric actuator
MSP / MRP
The stepping motor is adopted for the drive block.

### Digital control unit
- Features
  - Instant zero/span position setup
  - Flexible opening/closing speed settings
  - Opening position output
  - Lock alarm output

### Stepping motor
- High thrust 5000 N
- High resolution 1/1000

The stepping motor has high thrust and a resolution of 1/1000.

Battery for fail-safe operation is optional.

- Power outage emergency battery

Customers can choose models provided with a battery as well as functions of emergency actions (i.e., Full Closed, Full Open, Hold Position or Target Value) in times of loss of power.

The photo shows M-System’s PSN1 Electric Actuator.
ASAHI AV Series
High-performance and Compact Series of Electric Control Valve

Features of ASAHI AV Series

- ASAHI AV Series electric control valves are all-resin products made of unplasticized polyvinyl chloride (U-PVC) or polyvinylidene fluoride (PVDF), and are suitable for the control of corrosive fluid.

- With its unique plug shape, each control valve is rarely affected by the viscosity of the fluid and ensures high-precision flow rate control.

- Each control valve incorporates M-System’s high-reliability, high-performance electric actuator. The actuator has an overload protection circuit and an electronic limiter for the fully open and closed positions, thus protecting the resin-made control valve from unexpected damage.

- The electric control valve has a remarkably simple structure, as compared to pneumatic control valves. The actuator is compact, which makes it possible to save space between pipes run in parallel.

Body material: U-PVC  Body material: PVDF

- After installation, the control valve will be ready to work with a power supply and input signal (or network) cable connected.

Intermediate-caliber Control Valve (Electrically Actuated Type M) (with a nominal dia. of 50, 80, or 100 mm)
M-System
Electric actuator (Model: PSNx)

Yoke
Coupling
Control valve body

Small-caliber Control Valve (Electrically Actuated Type M) (with a nominal dia. of 15 or 25 mm)
M-System
Electric actuator (Model: MSPx)

Yoke
Coupling
Control valve body
### Application Examples of Electric Control Valve

#### Semiconductors

**Applications**
- LCD glass manufacturing facilities

**Reason for adoption**
- Compact / Open network communications

#### Water Purification Plant and Water Treatment

**Applications**
- Chemical injection equipment

**Reasons for adoption**
- Improved maintainability with no need of air supply equipment / Improved controllability with high resolution
- One of the reasons for adoption is the restoration of the electric control valve as soon as power is recovered in times of earthquake disasters.

#### Disposal Plants, Crushing Treatment Facilities, and Clean Centers

**Applications**
- Combustion control / Boiler feedwater control / Combustion exhaust gas control

**Reasons for adoption**
- Space saving / Improved maintainability with no need of air supply equipment / High functions (valve position and other status output signals)

#### Product Material, Building Material, Rubber, and Glass

**Applications**
- Temperature control of molding equipment / Utility equipment / Others

**Reasons for adoption**
- Improved maintainability with no need of air supply equipment / Improved controllability with high functions and high resolution
- A high resolution 1/1000 of the full-scale range was the deciding factor for adoption.

#### Beverage and Medical Facilities

**Applications**
- Sterile cleaning equipment / Carbon dioxide gas injection equipment

**Reasons for adoption**
- Space saving / Improved maintainability with no need of air supply equipment / High functions / No air leak

#### Power Plant

**Applications**
- Oxygen supply facility / Others

**Reasons for adoption**
- Energy saving / Improved maintainability with no need of air supply equipment / Improved controllability with high functions and high resolution

#### Car Manufacturers

**Applications**
- Environment test equipment / Wind tunnel experiment equipment / Exhaust gas combustion experiment equipment / Others

**Reasons for adoption**
- Improved maintainability with no need of air supply equipment

#### Pulp and Paper

**Applications**
- Paper machine / Bleaching chemical injection equipment

**Reasons for adoption**
- Energy saving / Improved maintainability with no need of air supply equipment

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*We have succeeded in drastically reducing wiring by utilizing a network connection over the CC-Link.*

*We adopted the electric control valve because it keeps the environment clean.*

*One of the reasons for adoption is the restoration of the electric control valve as soon as power is recovered in times of earthquake disasters.*

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*Reasons for adoption remains to be updated.*
Why is resin a good material?

• Corrosion resistance
Do you have to inspect and service metal valves on a monthly basis? By selecting a proper resin material, you can drastically reduce the burden of management and running costs. All of the wetted parts are corrosion-resistant, and there is no need to worry about the wear and tear of the lining and other parts.

• Weight
The specific gravity of a resin valve is about 1/7 of that of a metal valve. Users will experience great benefits from day-to-day operations, such as valve installation and maintenance. The weight reduction of the valve also contributes to an extension of the life expectancy of the entire pipeline and lower initial costs (e.g., a reduction in initial support costs).

Selection of Control Valve (Main Body)
Users can select one of two types of lightweight and compact resin control valves, both of which are excellent in chemical resistance and salt damage resistance. The main parts of these valves are made of either U-PVC or PVDF. Furthermore, three types of elastomer sealing materials (*) are available for users’ selection. A wide variety of port sizes are also available, which users can select according to their need.

Please inform ASAHI YUKIZAI of the following information in order to select the suitable material and size:
• Fluid information : Fluid name, fluid concentration, and fluid temperature
• Flow pressure information : Desired flow rate, primary pressure, and secondary pressure
• Ambient information : Ambient atmosphere (acidity, alkalinity, and salt damage), and ambient temperature (presence or absence of high-temperature equipment)

The Sales Department of ASAHI YUKIZAI will select a suitable model based on the information that you provide.

Intermediate-caliber Control Valve (Electrically Actuated Type M) (with a nominal dia. of 50, 80, or 100 mm)

Actuator type (M-System made): PSN1 (Valve nominal dia. of 50 or 80 mm) / PSN3 (Valve nominal dia. of 100 mm)

Body material: U-PVC

Standard Cv value specifications (Nominal dia. of 50, 80, and 100 mm)

<table>
<thead>
<tr>
<th>JIS Nominal dia. (mm)</th>
<th>H</th>
<th>H’</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>433.5</td>
<td>77.5</td>
<td>200</td>
</tr>
<tr>
<td>80</td>
<td>450.5</td>
<td>92</td>
<td>240</td>
</tr>
<tr>
<td>100</td>
<td>503.5</td>
<td>105</td>
<td>290</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANSI Class 150 Nominal dia. (mm)</th>
<th>H</th>
<th>H’</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>17.07</td>
<td>3.05</td>
<td>7.87</td>
</tr>
</tbody>
</table>

(*) See Guidance 3 on page 8.
**Small-caliber Control Valve (Electrically Actuated Type M) (with a nominal dia. of 15 or 25 mm)**

**Actuator type (M-System made): Valve nominal dia. of 15 mm (MSP6-x4) / Valve nominal dia. of 25 mm (MSP6-x6)**

**Body material: U-PVC  Body material: PVDF**

**Nominal dia.: 15 mm; Minute Cv value specifications**

<table>
<thead>
<tr>
<th>Nominal dia.</th>
<th>H</th>
<th>H'</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>335</td>
<td>372.5</td>
<td>51</td>
</tr>
<tr>
<td>25</td>
<td>354</td>
<td>366</td>
<td>63</td>
</tr>
</tbody>
</table>

**ANSI Class 150 Unit: Inch**

<table>
<thead>
<tr>
<th>Nominal dia.</th>
<th>H-PVC</th>
<th>H'</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>13.19</td>
<td>2.01</td>
<td>6.3</td>
</tr>
<tr>
<td>25</td>
<td>13.94</td>
<td>2.48</td>
<td>7.24</td>
</tr>
</tbody>
</table>

**Nominal dia. of 15 or 25 mm; Standard Cv value specifications**

**Port size: 6, 8, or 10 mm**

**Equal% characteristics**
- Nominal dia. (mm): 15
- Inner valve type: No.1 / No.2
- Cv value: 0.08 / 0.16
- Rangeability: 20:1
- Stroke (mm): 16

**Linear characteristics**
- Nominal dia. (mm): 15
- Inner valve type: No.1 / No.2 / No.3 / No.4
- Cv value: 0.0088 / 0.023 / 0.074 / 0.33
- Rangeability: 15:1
- Stroke (mm): 16

<table>
<thead>
<tr>
<th>Cv value</th>
<th>Port Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0088</td>
<td>6 / 8 / 10</td>
</tr>
<tr>
<td>0.023</td>
<td>15 / 20 / 25</td>
</tr>
<tr>
<td>0.074</td>
<td>25 / 15</td>
</tr>
<tr>
<td>0.33</td>
<td></td>
</tr>
</tbody>
</table>

**Port size: 15, 20, 25 mm**

**Equal% characteristics**
- Nominal dia. (mm): 25 / 15
- Port size [mm]: 6 / 8 / 10
- Cv value: 0.7 / 1.5 / 3
- Rangeability: 20:1 / 30:1 / 40:1
- Stroke Nominal dia. 15 mm: 17 / 16 / 17 (mm)
- Nominal dia. 25 mm: 17 / 16 / 16 (mm)

**Linear characteristics**
- Nominal dia. (mm): 25 / 15
- Port size [mm]: 6 / 8 / 10
- Cv value: 0.7 / 1.5 / 2.5
- Rangeability: 20:1 / 30:1 / 40:1
- Stroke Nominal dia. 15 mm: 17 / 16 / 17 (mm)
- Nominal dia. 25 mm: 17 / 16 / 16 (mm)

<table>
<thead>
<tr>
<th>Cv value</th>
<th>Port Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td>6 / 8 / 10</td>
</tr>
<tr>
<td>1.5</td>
<td>15 / 20 / 25</td>
</tr>
<tr>
<td>2.5</td>
<td>25 / 15</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Equal% characteristics**
- Nominal dia. (mm): 25 / 15
- Port size [mm]: 15 / 20 / 25
- Cv value: 4 / 8 / 14
- Rangeability: 40:1 / 50:1 / 50:1
- Stroke Nominal dia. 15 mm: 16 / 16 / 16 (mm)
- Nominal dia. 25 mm: 15 / 20 / 25 (mm)

**Linear characteristics**
- Nominal dia. (mm): 25 / 15
- Port size [mm]: 15 / 20 / 25
- Cv value: 4 / 8 / 14
- Rangeability: 40:1 / 50:1 / 50:1
- Stroke Nominal dia. 15 mm: 16 / 16 / 16 (mm)
- Nominal dia. 25 mm: 15 / 20 / 25 (mm)
**Guidance 1**  
**Stepping Motor**

A stepping motor rotates by a constant angle per pulse.

A stepping motor, also called a pulse motor, is a motor that rotates in synchronization with a command pulse signal. The principle of rotation of a simplified 2-phase, 8-pole stepping motor model is shown in the figure below. A stepping motor consists of a stator with windings and a rotor using a powerful neodymium magnet. Energizing the stator windings to generate a magnetic force is called excitation. By sequentially exciting the multiple stator windings based on the command pulse, the motor rotates stepwise, utilizing the action of attraction and repulsion between the magnetic poles of the stator and rotor. The rotation angle of a stepping motor is always determined by the constant mechanical accuracy (motor structure and machining accuracy) for each command pulse signal. Therefore, a stepping motor performs highly accurate positioning control.

**Guidance 2**  
**Open Network**

An open network is an industrial network, the specifications of which are made public and can be commonly used by many users and manufacturers.

Open networks are roughly divided into the following two types.

1. Those specified by organizations and associations in consultation and recognized as official standards.
2. Those developed by specific manufacturers and organizations and established as de facto standards as a result of promotion activities.

Both types have well-organized and integrated specifications and are available to everyone for many purposes. Either one can connect different manufacturers’ devices (multivendor devices) and brings many benefits to users.

Currently, many types of open networks are expanding their tempo of popularization according to the applicable field and country in the market.

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**Guidance 3**  
**Chemical Resistance (Simplified Chemical Resistance Table)**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Hydrochloric acid (HCl)</th>
<th>Sulfuric acid (H2SO4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Body material</td>
<td>U-PVC</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PVD</td>
<td>○</td>
</tr>
<tr>
<td>Sealing material</td>
<td>EPDM</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>FKM-F</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>FKM-C</td>
<td>○</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Sodium hydroxide/Caustic soda (NaOH)</th>
<th>Sodium hypochlorite (NaClO)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Body material</td>
<td>U-PVC</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PVD</td>
<td>○</td>
</tr>
<tr>
<td>Sealing material</td>
<td>EPDM</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>FKM-F</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>FKM-C</td>
<td>○</td>
</tr>
</tbody>
</table>

○: Never or little affected. ○: Somewhat affected. ●: Affected. ×: Significantly affected. - : No track records or open data.

The above table is not intended to guarantee the chemical resistance of the product.

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**Actuator Manufacturer**

**M-SYSTEM CO., LTD.**

**www.m-system.com**

Headquarters,  
5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN  
International Department & Factory  
Tel: +81-(0)6-6659-8201 Fax: +81-(0)6-6659-8510  
E-mail: info@m-system.co.jp