**MSP Series**
Open network capable electric actuators using stepping motors. Compact size, long life and high resolution of 1/1000.

- **MSP4**
  - Open network optional
  - Thrust: 150 N (33.7 lbf), 300 N (67 lbf), 500 N (112 lbf), 700 N (157 lbf), 600 N (139 lbf), 1200 N (270 lbf)

- **MSP5**
  - Open network optional
  - Thrust: 150 N (33.7 lbf), 300 N (67 lbf), 500 N (112 lbf), 700 N (157 lbf), 1200 N (270 lbf)

**MRP Series**
Open network capable electric actuators using stepping motors. Compact size, long life and high resolution of 1/1000.

- **MRP4**
  - Open network optional
  - Torque: 5 N•m (3.69 lbf•ft), 10 N•m (7.38 lbf•ft), 16 N•m (11.8 lbf•ft)

- **MRP5**
  - Open network optional
  - Torque: 10 N•m (7.38 lbf•ft)

- **MRP6**
  - Open network optional
  - Torque: 5 N•m (3.69 lbf•ft), 10 N•m (7.38 lbf•ft), 16 N•m (11.8 lbf•ft)

Consult M-System for other network options.
**PSN Series**
Stepping motor realizing high resolution of 1/1000. Opening/closing speed programmable. Brushless angle sensor.

**CSP Series**
Thrust range up to 12000 N (2698 lbf). High durability.

**PRP Series**
Stepping motor realizing high resolution of 1/1000. Opening/closing speed programmable (8.5 to 125 sec/90°).

### STEEL
**Water Flow Control in Continuous Casting Line**

- Ladle
- Tundish
- Mold

### CHEMICAL
**Batch Control**

- Batch controller 1
- Batch controller 2

### CEMENT
**Fuel Flow Control in Rotary Kiln**

- Material
- Rotary kiln

### PAPER
**Paper Profile Control**

- Paper machine
- Stock Box
- Headbox

**Basis Weight Control**

- Paper machine
- Stock Box
- Headbox

- Thick pulp
- Stock valve
- White Water
- Pulp dilution
- Pulp dilution outlet (jet)

**Network Capability**

- PLC
- CPU
- Single daisy chained cable only

- CP control unit
- Image by Kobayashi Engineering Works Ltd.
ENVIROMENTAL TEST CHAMBER

Brine Temperature Control in an Environmental Test Chamber

WATER TREATMENT

Chemical Injection Ratio Control

SHIP

Diesel Engine Cooling System

FOOD

Gas Flow Control in Combustion System for Roasting Machine
A Simple, Life-cycle Cost Saving Solution.

Pneumatic actuator requires a complex system and high electricity cost.

Before

Pneumatic actuator

Control signal 4-20 mA DC
Pressure reducing valve with filter
I/P positioner
I/P
20-100 kPa
Pneumatic actuator
Pressure reducing valve with filter
Stop valve
Stop valve
Control valve
Air header
Power source (high or low voltage)

After

Electric actuator

Model: PSN

Control signal 4-20 mA DC
Power source

Equipment cost ↓ 1/5 (+1)
Energy consumption ↓ 1/10 (+1)

(+1) The data surveyed by M-System.

Open network type is available for selected models.
Open networks including DeviceNet and CC-Link, are available. Consult with M-System for other network protocols.

Emergency failsafe operation at power loss can be chosen with selected models using a backup battery (full-open, full-close, hold or specific position).

Electric actuators consume less energy, without needing auxiliary equipment.

Mechanism that achieves high precision and high resolution control

High precision torque control

3-step Reduction Gear Mechanism

High precision gear system with minimum backlash

High resolution & precision

Micro-processor based
Electronic Motor Driver Circuit

Precisely tracking target position by feedback control in combination with predictive control.

High Precision Position Sensor

High torque

1/1000 high resolution

Stepping Motor

Motor rotation control resolution of 1.8 degrees per pulse

See Page 7

Compactly designed

Worm Gear Mechanism

High reduction ratio despite the compact size
### Features of Stepping Motor

#### Comparing to an induction motor

A stepping motor has the following advantages compared to an induction motor. It is most suitable as an actuating drive for small mechanisms including control valves.

- High torque for small size (approx. 10 times greater than an induction motor of the same mass)
- High torque at startup, with little torque variation during acceleration
- Variable rotating speed
- Rotating speed unaffected by load changes
- High precision positioning by acceleration/deceleration control
- Unaffected by voltage or frequency variations by the power source

#### Predictive control enabling the motor to stop without overshooting

Basic rotating step per pulse of the two-phase stepping motor employed by the electric actuators is 1.8 degrees, thus requiring 200 pulses to complete a full 360-degree rotation. The exact number of pulses is controlled by a micro-processor. The “Predictive Control” employed as a part of its control algorithm enables the actuator to smoothly stop at an exact position (angle) without overshooting.

### Mechanism of Stepping Motor

The below illustrations show cross section images of a stepping motor, called also “stepper motor” or “step motor.”

The rotor is a permanent magnetic rotating shaft, surrounded by eight electromagnets or coils of two phases (A and B). Each electromagnet is energized in turn, attracting and repulsing the rotor to rotate its shaft. The motor shaft is connected to a damper that enhances the torque characteristics of the motor at high speed.

### How Stepping Motor Works

The N pole and S pole toothed gears are engaged with an offset of half tooth. The bottom of a N pole tooth is aligned with the top of a S pole tooth. Each pulse moves the shaft by a quarter (1/4) tooth pitch while the N pole teeth and the S pole teeth are attracted and repulsed in turn. Each of those rotations is called a “step.” The motor has 50 teeth around the wheel, turning 1.8 degrees per step, requiring 200 pulses to make a complete rotation with an integer number of steps. In this way the motor can be turned by a precise mechanical angle in high resolution.

The motor shaft rotates more than 100 times while the actuator travels the entire stroke/span. The calculated resolution is greater than 1/20000(*)

(*) The nominal resolution described in the actuator data sheet is 1/1000, considering additional influencing factors such as the accuracy of the position detecting sensor, backlash of the reducing gear mechanism.

---

*Office Logo*
Compact Linear Motion Electric Actuators

**MSP Series**

**High Resolution of 1/1000**
**Long Life Operation**
**Open Network Capable Actuator**

- High resolution positioning for superior control
- Built-in feedback positioner and electric limiter
- Brushless stepping motor assures long-life operation
- 1/1000 resolution
- Optional network interface with CC-Link, DeviceNet

**Key Features**

- Brushless stepping motor assures long-life operation
- 1/1000 resolution
- Optional network interface with CC-Link, DeviceNet

**Specifications**

- **Linear Motion**
  - Max Thrust: 2500 N (562 lbf)
  - Max Stroke: 40 mm (1.57 in)
- **AC/DC Powered**
- **IP66**

**Control Circuit**

- Electronic limiter for full-open/closed positions for easy calibration
- Overload protection functions

**Stepping Motor**

**Network Terminal Box**

(network interface option)

**Screw**

- Spring mechanism for both extending and retracting directions
- Constant sealing pressure (MSP4 for single direction only)

**Seal-spring**

**Output Stem**

**Network Cable Connection**

**Power Input Connection**
Linear Motion Electric Actuators

PSN Series

High Resolution of 1/1000
Programmable opening/closing speed

Brushless Angle Sensor

- Brushless angle sensor eliminates problems with mechanical potentiometer feedback sensing
- Opening/closing speed, split range and failsafe position programmable by hand-held programmer
- Internal temperature sensor to control heater in cold climate and to prevent motor from overheating
- AC reversible motor type, CSP, is also available.

Environmentally Resistant CPU

RJ-45 Connector
For programming opening/closing speed, zero/span calibration and other features by PU-2A hand-held programmer.

M3 Screw Terminal

Brushless Angle Sensor
- Detecting relative positions of a moving coil to a fixed coil using electro-magnetic induction.
- High reliability and long life.

Wiring Conduit

Screw

Seal-spring
- Spring mechanism at both full-open and full-closed positions.
- Pre-loaded spring pressure ensures tight closure as soon as the stem touches the valve seat.

Stepping Motor

Temperature Sensor

Stem for manual operation

Stem Button

Indicator

Transparent image of PSN1
# Linear Motion Electric Actuators Specifications

<table>
<thead>
<tr>
<th></th>
<th>MSP4D (DeviceNet)</th>
<th>MSP5D (DeviceNet)</th>
<th>MSP6D (DeviceNet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
<td>MSP4, MSP4C, MSP4C2 (CC-Link)</td>
<td>MSP5C, MSP5C2 (CC-Link)</td>
<td>MSP6C (CC-Link)</td>
</tr>
<tr>
<td>Stroke</td>
<td>15 mm (0.59&quot;)</td>
<td>20 mm (0.79&quot;)</td>
<td>40 mm (1.5&quot;)</td>
</tr>
<tr>
<td>Position Detection</td>
<td>Potentiometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrust</td>
<td>700 N</td>
<td>700 N</td>
<td>2,500 N</td>
</tr>
<tr>
<td>Drive</td>
<td>Stepping motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sealing pressure</td>
<td>Spring at the full-closed position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Protection</td>
<td>Overload (lock) protection</td>
<td>Restart limiting timer</td>
<td></td>
</tr>
<tr>
<td>Operation Time @10 mm</td>
<td>5 sec. / 150 N, 9 sec. / 300 N, 18 sec. / 700 N</td>
<td>5 sec. / 150 N, 9 sec. / 300 N, 18 sec. / 700 N</td>
<td>5 sec. / 600 N, 8 sec. / 1,200 N, 15 sec. / 2,500 N</td>
</tr>
<tr>
<td>Resolution</td>
<td>1,000 or 0.015 mm (deadband set to 0.1 %)</td>
<td>1,000 or 0.02 mm (deadband set to 0.1 %)</td>
<td></td>
</tr>
<tr>
<td>Input Signal</td>
<td>4-20 mA or 1-5 V DC</td>
<td>DeviceNet for MSP×D, CC-Link for MSP×C</td>
<td></td>
</tr>
<tr>
<td>Position Signal</td>
<td>1-5 V DC</td>
<td>DeviceNet for MSP×D, CC-Link for MSP×C</td>
<td></td>
</tr>
<tr>
<td>Sequential Control Signal</td>
<td>“Full-open” and “full-closed” contact output</td>
<td>Limit switch: 125 V AC @0.75 A, 30 V DC @0.6 A</td>
<td></td>
</tr>
<tr>
<td>Forced Operation</td>
<td>Contact signal input: 5 V DC @2.5 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-5 to + 55 °C (23 to 131 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of Protection</td>
<td>IP66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Input</td>
<td>100 - 120 V AC, 200 - 240 V AC (not available for MSP×D or MSP×C)</td>
<td>24 V DC</td>
<td></td>
</tr>
<tr>
<td>Housing Material</td>
<td>Diecast aluminium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>1.2 kg (DC powered)</td>
<td>1.2 kg (DC powered)</td>
<td>2.7 kg (DC powered)</td>
</tr>
<tr>
<td>Weight</td>
<td>1.4 kg (AC powered)</td>
<td>1.4 kg (AC powered)</td>
<td>2.8 kg (AC powered)</td>
</tr>
<tr>
<td>Standards &amp; Approvals</td>
<td>CE</td>
<td>CE</td>
<td>CE</td>
</tr>
</tbody>
</table>

**Linear Motion Electric Actuators Overview**

- **MSP Series**: Linear Motion Electric Actuators
- **PSN Series**: Linear Motion Electric Actuators
- **MRP Series**: Rotary Motion Electric Actuators
- **PRP Series**: Position Sensors
- **Valve Positioners**: Manual Loading Stations

---

**MSYSTEM**

www.m-system.com
### Linear Motion Electric Actuators

#### MSP Series

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PSN1</th>
<th>PSN3</th>
<th>CSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>40 mm (1.57&quot;)</td>
<td>60 mm (2.36&quot;)</td>
<td>75 mm (2.95&quot;)</td>
</tr>
<tr>
<td>Position Detection</td>
<td>Brushless angle sensor</td>
<td>Potentiometer</td>
<td>—</td>
</tr>
<tr>
<td>Thrust</td>
<td>3,000 N</td>
<td>5,000 N</td>
<td>12,000 N</td>
</tr>
<tr>
<td>Drive</td>
<td>Stepping motor</td>
<td>AC motor</td>
<td>—</td>
</tr>
<tr>
<td>Sealing pressure</td>
<td>Spring at both full-closed and full-open positions</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Motor Protection</td>
<td>Overload (lock) protection by torque switches</td>
<td>Restart limiting timer</td>
<td>—</td>
</tr>
<tr>
<td>Operation Time @10 mm</td>
<td>34 sec. @20 mm (50 Hz) 29 sec. @20 mm (60 Hz) (for 10,000 N)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.04 mm</td>
<td>0.06 mm</td>
<td>Hysteresis 1 mm or less</td>
</tr>
<tr>
<td>Input Signal</td>
<td>4-20 mA or 1-5 V DC</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sequential Signal</td>
<td>“Full-open”, “full-closed” and “alarm” contact output</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Forced Operation</td>
<td>Contact signal input: 5 V DC @2.5 mA</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Failsafe Operation (optional)</td>
<td>Rechargeable Nickel-cadmium battery</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Manual Operation</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-25 to + 55 °C (-13 to + 131 °F)</td>
<td>-15 to + 55 °C (5 to 131 °F)</td>
<td>-10 to + 60 °C (14 to 140 °F)</td>
</tr>
<tr>
<td>Degree of Protection</td>
<td>IP66</td>
<td>IP56</td>
<td>—</td>
</tr>
<tr>
<td>Power Input</td>
<td>100 - 120 V AC, 200 - 240 V AC 24 V DC</td>
<td>100 V AC, 110 V AC 200 V AC, 220 V AC</td>
<td>—</td>
</tr>
<tr>
<td>Housing Material</td>
<td>Diecast aluminum</td>
<td>Aluminum alloy</td>
<td>Body: Aluminum alloy Cover: Steel</td>
</tr>
<tr>
<td>Vibration</td>
<td>2 G</td>
<td>2 G</td>
<td>2 G</td>
</tr>
<tr>
<td>Weight</td>
<td>5.9 kg</td>
<td>8.9 kg</td>
<td>15 kg</td>
</tr>
<tr>
<td>Standards &amp; Approvals</td>
<td>CE</td>
<td>CE</td>
<td>—</td>
</tr>
</tbody>
</table>
Compact Rotary Motion Electric Actuators

**MRP Series**

**High Resolution of 1/1000**

**Long Life Operation**

**Open Network Capable Actuator**

- High resolution positioning for superior control
- Built-in feedback positioner and electric limiter
- Brushless stepping motor assures long-life operation
- 1/1000 resolution
- Optional network interface with CC-Link, DeviceNet

**Compact Size**

- **33 N•m**
- **24.3 lbf•ft**
- **90°**
- **AC/DC POWERED**
- **IP66**

**Stepping Motor**

**Network Terminal Box**
(network interface option)

**Terminal Block**

**Station No. Setting**

**Zero/Span Adjustments**

**Forced Control Buttons**

**Potentiometer**

**Output Stem**

**Transparent image of MRP5C2**

[Image of MRP5C2 actuator]

**MSP Series**

Linear Motion Electric Actuators

**PSN Series**

Position Sensors

**PRP Series**

Valve Positioners

**Manual Loading Stations**

www.m-system.com
Rotary Motion Electric Actuators

**PRP Series**

High Resolution of 1/1000
Programmable opening/closing speed

- Opening/closing speed, split range and failsafe position programmable by hand-held programmer
- Internal temperature sensor to control heater in cold climate and to prevent motor from overheating
- Lloyd's Register type approved (PRP-0, PRP-1)

**PRP**

- MAX TORQUE: 600 N·m
- MAX ANGLE: 90°
- AC POWERED
- IP66

**PRP-2**

- Planetary gear mechanism realizing the compact package with the maximum torque of 600 N·m
- HART 7 Under development

**New**
### Specifications

#### Model No.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>MRP4</th>
<th>MRP5</th>
<th>MRP6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MRP4D (DeviceNet)</td>
<td>MRP5D (DeviceNet)</td>
<td>MRP6D (DeviceNet)</td>
</tr>
<tr>
<td></td>
<td>MRP4C, MRP4C2 (CC-Link)</td>
<td>MRP5C, MRP5C2 (CC-Link)</td>
<td>MRP6C (CC-Link)</td>
</tr>
</tbody>
</table>

#### Rotation Angle

<table>
<thead>
<tr>
<th></th>
<th>MRP4</th>
<th>MRP5</th>
<th>MRP6</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°, 180°</td>
<td></td>
<td>90°</td>
<td></td>
</tr>
</tbody>
</table>

#### Position Detection

- MRP4: Potentiometer
- MRP5: Potentiometer
- MRP6: Potentiometer

#### Torque

<table>
<thead>
<tr>
<th></th>
<th>MRP4</th>
<th>MRP5</th>
<th>MRP6</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 N⋅m</td>
<td>10 N⋅m</td>
<td>33 N⋅m</td>
<td></td>
</tr>
<tr>
<td>3.69 lbf⋅ft</td>
<td>7.38 lbf⋅ft</td>
<td>24.3 lbf⋅ft</td>
<td></td>
</tr>
</tbody>
</table>

#### Drive

- MRP4: Stepping motor
- MRP5: Stepping motor
- MRP6: Stepping motor

#### Motor Protection

- Overload (lock) protection
- Restart limiting timer

#### Operation Time @90°

<table>
<thead>
<tr>
<th></th>
<th>MRP4, MRP4C, MRP4C2</th>
<th>MRP5, MRP5C, MRP5C2</th>
<th>MRP6, MRP6C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 or 13 sec.</td>
<td>13 sec.</td>
<td>4, 7 or 13 sec.</td>
<td></td>
</tr>
<tr>
<td>MRP4D</td>
<td>MRP5D</td>
<td>MRP6D</td>
<td></td>
</tr>
<tr>
<td>12 sec.</td>
<td>22 sec.</td>
<td>7, 14, 18, 27 sec.</td>
<td></td>
</tr>
</tbody>
</table>

#### Resolution

1/1,000 or 0.09° (deadband set to 0.1 %)

#### Input Signal

- 4-20 mA or 1-5 V DC
- DeviceNet for MRP×D, CC-Link for MRP×C

#### Position Signal

- Potentiometer
- DeviceNet for MRP×D, CC-Link for MRP×C

#### Sequential Control Signal

- "Full-open" and "full-closed" contact output
- Limit switch: 125 V AC @0.75 A, 30 V DC @0.6 A
- "Overload" relay contact output: 250 V AC @1 A, 30 V DC @1 A

#### Forced Operation

- Contact signal input, 5 V DC @2.5 mA

#### Failsafe Operation (optional)

- Available

#### Manual Operation

- Available

#### Operating Temperature

-5 to + 55 °C (23 to 131 °F)

#### Degree of Protection

IP66

#### Power Input

- 100 - 120 V AC, 200 - 240 V AC (not available for MRP×D or MRP×C)
- 24 V DC

#### Housing Material

- Diecast aluminum

#### Vibration

0.5 G

#### Weight

<table>
<thead>
<tr>
<th></th>
<th>MRP4</th>
<th>MRP5</th>
<th>MRP6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 kg (DC powered)</td>
<td>1.5 kg (DC powered)</td>
<td>2.7 kg (DC powered)</td>
<td></td>
</tr>
<tr>
<td>1.3 kg (AC powered)</td>
<td>1.7 kg (AC powered)</td>
<td>2.8 kg (AC powered)</td>
<td></td>
</tr>
<tr>
<td>1.4 kg (MRP4D, MRP4C)</td>
<td>1.8 kg (MRP5D, MRP5C)</td>
<td>3.0 kg (MRP6D, MRP6C)</td>
<td></td>
</tr>
<tr>
<td>1.7 kg (MRP4C2)</td>
<td>2.0 kg (MRP5C2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Standards & Approvals

- CE
- CE
- CE
## Linear Motion Electric Actuators

### MSP Series
- **PRP-0**
- **PRP-1**
- **PRP-2**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MRP4</td>
<td>90°</td>
<td></td>
<td>100 N·m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4-20 mA</td>
<td>4-20 mA DC (300 Ω)</td>
<td>&quot;Full-open&quot;, &quot;full-closed&quot; and &quot;alarm&quot; contact output</td>
<td>Open collector: 30 V DC @100 mA max.</td>
<td>Contact signal input, 5 V DC @2.5 mA</td>
<td>Rechargeable Nickel-cadmium battery</td>
<td>10 turns @90°</td>
<td>-20 to + 55 °C (-4 to 131 °F)</td>
<td>Diecast aluminum</td>
<td>Baked acrylic resin coating</td>
</tr>
<tr>
<td>MRP5</td>
<td>90°</td>
<td></td>
<td>200 N·m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4-20 mA</td>
<td>4-20 mA DC (300 Ω)</td>
<td>&quot;Full-open&quot;, &quot;full-closed&quot; and &quot;alarm&quot; contact output</td>
<td>Open collector: 30 V DC @100 mA max.</td>
<td>Contact signal input, 5 V DC @2.5 mA</td>
<td>Rechargeable Nickel-cadmium battery</td>
<td>10 turns @90°</td>
<td>-20 to + 55 °C (-4 to 131 °F)</td>
<td>Aluminum alloy (type: ADC12)</td>
<td>Baked acrylic resin coating</td>
</tr>
<tr>
<td>MRP6</td>
<td>90°</td>
<td></td>
<td>600 N·m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4-20 mA</td>
<td>4-20 mA DC (300 Ω)</td>
<td>&quot;Full-open&quot;, &quot;full-closed&quot; and &quot;alarm&quot; contact output</td>
<td>Open collector: 30 V DC @100 mA max.</td>
<td>Contact signal input, 5 V DC @2.5 mA</td>
<td>Rechargeable Nickel-cadmium battery</td>
<td>10 turns @90°</td>
<td>-20 to + 55 °C (-4 to 131 °F)</td>
<td>Aluminum alloy (type: ADC12)</td>
<td>Baked acrylic resin coating</td>
</tr>
</tbody>
</table>
Position Sensors

Brushless Design for Long Lasting Reliability
Lightweight & Compact

- Detecting mechanical position of pneumatic and electric actuators to send a proportional 4-20 mA signal
- Linear motion type (±22.5°) or rotary motion type (±45°)

Remote Monitoring of Pneumatic Control Valve Position

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>MODEL</th>
<th>FEATURES</th>
</tr>
</thead>
</table>
| 2-WIRE POSITION TRANSMITTER | VOS2T | • Linear motion type, two-wire position transmitter (45-degree detection) incorporating a brushless angle sensor
| (linear motion type; 45 degrees) |       | • Sensing the position of a linear motion actuator and converting it into a proportional 4 to 20 mA signal
|                               |       | • Retransmitted position output for a pneumatic valve                   |
| 2-WIRE POSITION TRANSMITTER  | VOS2T-R| • Rotary motion type, two-wire position transmitter (90-degree detection) incorporating a brushless angle sensor
| (rotary motion type; 90 degrees) |      | • Sensing the angle of a rotary motion actuator or a rotating machine and converting it into a proportional 4 to 20 mA signal |
Valve Positioners

Positioning of Valve and Damper Can be Controlled with a Direct/Reverse Turn Motor

- Positioning of valve and damper can be controlled with a direct/reverse turn motor
- Remote 4-20 mA positioning input, SSR or 24 V AC dry contact switch output
- Adjustable deadband, timer, electronic limits and other additional functions depending upon models

**Positioning of a Damper**

- **Controller or PLC**
- **Potentiometer**
- **Motor**
  - **Power Input**
  - **Drive Output**: SSR × 2 (direct/reverse turn commands)
  - **Position Feedback**: 4-20 mA DC

**Circuit Diagram**

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>MODEL</th>
<th>FEATURES</th>
</tr>
</thead>
</table>
| **POSITIONER BACKUP STATION** (with bargraph/digital indicator) | ABM2 | • I/I positioner incorporated  
• Bargraph indicator for PV input  
• Digital display indicating PV/CAS/MV selectable  
Position setpoint input: 4 - 20 mA DC, 1 - 5 V DC, -10 - +10 V DC, -5 - +5 V DC  
Position feedback input: 4 - 20 mA DC, 1 - 5 V DC, Potentiometer  
Re-transmitted output: 4 - 20 mA DC  
Power input: 100 - 240 V AC, 24 V DC  
Degree of protection: IP65 (front panel) |
| **VALVE POSITIONER** | MEX Series | Position setpoint input: 4 - 20 mA DC, 1 - 5 V DC, Modbus, LonWorks  
Position feedback input: Potentiometer, 4 - 20 mA DC  
Re-transmitted output: 4 - 20 mA DC  
Control output: SSR (internal or external), 24 V AC dry contact  
Power input: 100, 110, 120, 200, 220, 240 V AC or 24 V DC |

---

Valve Positioners

Positioning of Valve and Damper Can be Controlled with a Direct/Reverse Turn Motor

- Positioning of valve and damper can be controlled with a direct/reverse turn motor
- Remote 4-20 mA positioning input, SSR or 24 V AC dry contact switch output
- Adjustable deadband, timer, electronic limits and other additional functions depending upon models

**Positioning of a Damper**

- **Controller or PLC**
- **Potentiometer**
- **Motor**
  - **Power Input**
  - **Drive Output**: SSR × 2 (direct/reverse turn commands)
  - **Position Feedback**: 4-20 mA DC

**Circuit Diagram**

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>MODEL</th>
<th>FEATURES</th>
</tr>
</thead>
</table>
| **POSITIONER BACKUP STATION** (with bargraph/digital indicator) | ABM2 | • I/I positioner incorporated  
• Bargraph indicator for PV input  
• Digital display indicating PV/CAS/MV selectable  
Position setpoint input: 4 - 20 mA DC, 1 - 5 V DC, -10 - +10 V DC, -5 - +5 V DC  
Position feedback input: 4 - 20 mA DC, 1 - 5 V DC, Potentiometer  
Re-transmitted output: 4 - 20 mA DC  
Power input: 100 - 240 V AC, 24 V DC  
Degree of protection: IP65 (front panel) |
| **VALVE POSITIONER** | MEX Series | Position setpoint input: 4 - 20 mA DC, 1 - 5 V DC, Modbus, LonWorks  
Position feedback input: Potentiometer, 4 - 20 mA DC  
Re-transmitted output: 4 - 20 mA DC  
Control output: SSR (internal or external), 24 V AC dry contact  
Power input: 100, 110, 120, 200, 220, 240 V AC or 24 V DC |
Manual Loading Stations

Holding Control Signals in Case of Computer or DCS Failure

- Holding control signals in case of computer or DCS failure
- ON/OFF signal input or analog signal input
- Manual control with an external Up/Down contact signal or with the front manual loader
- Ramp rate adjustable

Analog Backup Station
Model: ABF3

Backup and Manual Loading Station

**SM10**

- MV output (4 - 20 mA DC or other current/voltage signals) is used to track an external controller signal (CAS input) or for manual control.
- Custom bargraph scale and engineering unit at no extra charge
- Auxiliary panel operation instruments in the uniformed design with the SC Series Multi-function PID Controllers
# MANUAL LOADING STATIONS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>MODEL</th>
<th>FEATURES</th>
</tr>
</thead>
</table>
| ANALOG BACKUP STATION | JB2 | • Holding MV output signal from DCS, PLC or a controller and enabling manual control of a final control element  
  • CAS input signal passes through during auto operation.  
  • MV output modes in case of abnormality in the controller:  
    • Holding CAS input status  
    • Holding CAS input status of the moment reversing back for preset time  
    • Preset MV output  
    • Bumpless transition  
    • Isolated re-transmitted output |
| ANALOG BACKUP STATION (front configurable) | MXAB | • Holding MV output signal from DCS, PLC or a controller and enabling manual control of a final control element  
  • MV output in engineering unit display at the front  
  • Moving average selectable for MV output  
  • Loop test output function |
| ANALOG BACKUP STATION | AB2 | • Holding MV output signal from DCS, PLC or a controller and enabling manual control of a final control element  
  • Manual operation by the ST/STL terminal  
  • Wide selection of input and output ranges |
| COMPUTER BACKUP STATION (front configurable) | MXCB | • Enabling MV output control by contact signals from DCS or PLC  
  • Holding MV output signal in case of DCS/PLC failure or in the manual operation mode and enabling manual control by external UP/DOWN contact signals  
  • Manual operation by the ST/STL terminal  
  • MV output in engineering unit display at the front |
| COMPUTER BACKUP STATION | CB2 | • Holding MV output signal from DCS, PLC or a controller and enabling manual control of a final control element  
  • Manual operation by the ST/STL terminal  
  • Wide selection of output ranges |
| ANALOG BACKUP STATION (with bargraph/digital indicator) | ABF3 | • MV value can be manually controlled by using the front control buttons while monitoring PV value on the meter.  
  • Bumpless transition  
  • Custom bargraph scale and engineering unit at no extra charge |

# PARAMETER GENERATORS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>MODEL</th>
<th>FEATURES</th>
</tr>
</thead>
</table>
| PARAMETER GENERATOR (with digital displays) | ABS3 | • Two digital meters for measured value (PV) and setpoint value (SV)  
  • SV (4 - 20 mA DC or 0 - 5 V DC) can be controlled with UP/DOWN buttons while monitoring PV value.  
  • 1/16 DIN panel cutout  
  • IP66 front panel |
Final Control Components
Compact Linear Motion
Electric Actuators
MSP Series

Linear Motion
Electric Actuators
PSN Series

Compact Rotary Motion
Electric Actuators
MRP Series

Rotary Motion
Electric Actuators
PRP Series

Position Sensors
Valve Positioners
Manual Loading Stations

www.m-system.com
See Page
8

See Page
9

See Page
12

See Page
13

See Page
16

See Page
17

See Page
18