MSXX20 Series
175 LB-IN (20 NM) SPRING RETURN
DIRECT COUPLED ACTUATORS

MS4120, MS7520, MS8120 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating, and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation. Applications include:

- Volume control dampers, mounted directly to the drive shaft or remotely (with the use of accessory hardware).
- Quarter-turn rotary valves, such as ball or butterfly valves mounted directly to the drive shaft.
- Linear stroke globe or cage valves mounted with linkages to provide linear actuation.

SPECIFICATIONS

Torque Ratings:
- Typical Holding, Driving, Spring Return: 175 lb-in. (20 Nm).
- Stall Maximum (fully open at 75°F): 350 lb-in. (39.6 Nm).

Electrical Ratings:
- See Table.

Electrical Connections:
- Field wiring 14 to 22 AWG (2.0 to 0.344 mm sq) to screw terminals, located under the removable access cover.

Stroke:
- 95° ±3°, mechanically limited.

Controller Type:
- See Models.
- Modulating (Series 70) or Floating (Series 60); controlled by selector switch.
- Input Impedance: 95K ohms minimum.
- Feedback Signal: 0 or 2-10 Vdc; Driving current is 3 mA minimum.

Timing (At Rated Torque and Voltage):
- Drive Open (typical):
  - Floating, Modulating Models: 90 seconds.
  - Two-Position Models: 45 seconds ±5 seconds.
- Spring Close: 20 seconds typical.

Temperature Ratings:
- Ambient: -40°F to 140°F (-40°C to 60°C).
- Shipping and Storage: -40°F to 158°F (-40°C to 70°C).

Humidity Ratings:
- 5% to 95% RH noncondensing.

Design Life (at Rated Voltage):
- Two-position models: 50,000 full stroke cycles; 50,000 full stroke spring returns.
- Floating and Modulating models: 60,000 full stroke cycles; 1,500,000 repositions; 60,000 full stroke spring returns.

End Switches (Two SPDT):
- Dry Contact
- Settings (fixed): 7° nominal stroke, 85° nominal stroke.
- Ratings (maximum load): 250 Vac, 5A resistive.

Dimensions:
- See Fig. 1.

Device Weight:
- 6 lb (2.7 kg)

Mounting:
- Self-centering shaft adapter (shaft coupling).
- Round Damper Shafts: 0.375 to 1.06 in. (10 to 27 mm).
- Square Damper Shafts: 1/2 to 3/4 in. (13 to 19 mm).
- Actuator can be mounted with shaft in any position.

Minimum Damper Shaft Length:
- 1 in. (25 mm); 3 in. (76 mm) recommended.

SPECIFICATION DATA

FEATURES

- Brushless DC submotor with electronic stall protection for floating/modulating models.
- Brush DC submotor with electronic stall protection for 2-position models.
- Self-centering shaft adapter (shaft coupling) for wide range of shaft sizes.
- Models available for use with two-position, single pole single throw (spst), line- (Series 40) or low- (Series 80) voltage controls.
- Models available for use with floating or switched single-pole, double-throw (spdt) (Series 60) controls.
- Models available for use with proportional current or voltage (Series 70) controls.
- Models available with combined floating/modulating control in a single device.
- Models available with adjustable zero and span.
- Models available with line-voltage internal end switches.
- Models available with 3-foot, 18 AWG color-coded cable.
- Access cover to facilitate connectivity.
- Metal housing with built-in mechanical end limits.
- Spring return direction field-selectable.
- Shaft position indicator and scale.
- Manual winding capability with locking function.
- UL (cUL) listed and CE compliant.
- All Models are plenum-rated per UL873.

Cable Specification:
- 300 V, 75° C, Plenum Rated, 3 ft length from end of access cover, 18 AWG

Noise Rating at 1m (Maximum):
- Holding: 20 dBA (no audible noise).
- Two-position models:
  - Driving: 50 dBA.
  - Spring Return: 65 dBA.
- Floating and Modulating models:
  - Driving: 40 dBA.
  - Spring Return: 50 dBA.

Vibration:
- Not suitable for high vibration applications (Example installation environment: Truck Trailers or Railroad Cars)
- Acceptable Vibration Levels 0.6g at 30 to 300 Hz

Environmental Protection Ratings:
- NEMA2 (US Models) or IP54 (European Models) when mounted on horizontal shaft with access cover below shaft.

Approvals:
- UL/cUL
- UL873 Plenum Rating, File No. E4436; Guide No. XAPX
- CE
- C-TICK

Accessories:
- 27518 Balljoint (5/16 in.).
MSXX20 SERIES

- 103598 Balljoint (1/4 in.).
- 205860 Electronic Minimum Position Potentiometer.
- 3200085-001 Water-tight Cable Gland/Strain-relief Fitting (10 pack).
- 32003036-001 Weather Enclosure.
- 32004254-002 Self-Centering Shaft Adapter (supplied with actuator).
- 50001194-001 Foot Mount Kit.
- 50005859-001 NEMA4/4X Enclosure.
- 50006427-001 Anti-Rotation Bracket (supplied with actuator).
- SW2-US Auxiliary Switch Package.
- See also Form 63-2620.

Table 1. Model Selection (MS Series)

<table>
<thead>
<tr>
<th>Model(s)</th>
<th>Power Input</th>
<th>Power Consumption (VA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage</td>
<td>Frequency</td>
</tr>
<tr>
<td>41</td>
<td>120 Vac</td>
<td>50/60 Hz.</td>
</tr>
<tr>
<td>75</td>
<td>24 Vac</td>
<td>100</td>
</tr>
<tr>
<td>81</td>
<td>24 Vac</td>
<td>±20%</td>
</tr>
</tbody>
</table>

Table 2. Model Selection (S20 Series)

<table>
<thead>
<tr>
<th>Model(s)</th>
<th>Power Input</th>
<th>Power Consumption (VA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage</td>
<td>Frequency</td>
</tr>
<tr>
<td>20</td>
<td>175 lb-in.</td>
<td>20 Nm</td>
</tr>
<tr>
<td></td>
<td>24-2POS</td>
<td>24 Vac Two-Position Control</td>
</tr>
<tr>
<td>120-2POS</td>
<td>120 Vac Two-Position Control</td>
<td></td>
</tr>
<tr>
<td>230-2POS</td>
<td>230 Vac Two-Position Control</td>
<td></td>
</tr>
<tr>
<td>010</td>
<td>24 Vac Modulating and Floating Control</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Electrical Ratings.

<table>
<thead>
<tr>
<th>Model(s)</th>
<th>Voltage</th>
<th>Frequency</th>
<th>Driving</th>
<th>Holding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating, Modulating</td>
<td>24 Vac ±20% (Class 2), 24 Vdc</td>
<td>50/60 Hz.</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Two-Position, Low-voltage</td>
<td>24 Vac ±20% (Class 2), 24 Vdc</td>
<td>50/60 Hz.</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>Two-Position, Line-voltage</td>
<td>100-250 Vac</td>
<td>50/60 Hz.</td>
<td>60</td>
<td>13</td>
</tr>
</tbody>
</table>

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Automation and Control Solutions

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