**APPLICATION**

The MS4120F, MS8120F Fast-Acting, Two-Position Actuators are spring return direct coupled actuators (DCA) for on/off damper control designed to operate reliably in smoke control systems requiring Underwriter’s Laboratories Inc. UL555S ratings up to 350°F, if applicable. The actuator accepts an on/off signal from a single-pole, single-throw (spst) controller. Reversible mounting allows actuator to be used for either clockwise (cw) or counterclockwise (ccw) spring rotation.

**FEATURES**

- 175 lb-in. (20 Nm) minimum driving torque at 350°F (176°C).
- Reversible mounting facilitates use in either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Integral spring return ensures level of return torque.
- Stainless steel internal spring.
- Fifteen-second spring return timing.
- No special cycling required during long-term holding.
- No audible noise during holding.
- Patent pending design eliminates need for limit switches to reduce power consumption.
- Models available for 24 and 120 Vac applications.
- Ninety-five degree angle of rotation.
- Actuator holds rated torque at reduced power level.
- Die-cast aluminum housing.
- Housing design allows flush mounting to damper.
- Self-centering shaft adapter (SCSA), patent pending.
- High temperature Teflon® lead wires.
- Designed to operate reliably in smoke control systems requiring Underwriter’s Laboratories Inc. UL555S ratings up to 350°F.
- Non-UL model available.
- MODELS AVAILABLE WITH INTEGRAL HIGH TEMPERATURE (350°F) SPST POSITION-INDICATING SWITCHES (7°, 85° STROKE).

**SPECIFICATIONS**

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

**Dimensions:**
- See Fig. 1.

**Device Weight:**
- MS4120F: 7.5 lb (3.4 kg)
- MS8120F: 6.25 lb (2.8 kg)

**Temperature Ratings:**
- Ambient: -40°F to 130°F (-40°C to 55°C).
- Shipping and Storage: -40°F to 140°F (-40°C to 60°C).

**IMPORTANT**
- The actuator is designed to meet UL555S standards at 350°F (176°C) on applicable marked models. The actuator must be tested with the damper to achieve this rating.
- 5% to 95% RH noncondensing.
- 95° ± 3°, mechanically limited.

**Minimum Damper Shaft Length:**
- 1 in. (25 mm); 3-1/4 (83 mm) recommended.

**Mounting:**
- Self-centering shaft adapter.
- Round Damper Shafts: 0.5 to 1.06 in.
- Square Damper Shafts: 1/2 to 3/4 in.
- Actuator can be mounted with shaft in any position.

**IMPORTANT**
- 3/4 in. or greater shaft diameter recommended.

**Torque Rating (at rated voltage):**
- Typical Holding (minimum at 350°F): 175 lb-in. (20 Nm).
- Spring Return (minimum at 350°F): 175 lb-in. (20 Nm).
- Stall Maximum (fully open at 75°F): 350 lb-in (39.6 Nm).
- 350°F Minimum Driving: 175 lb-in. (20 Nm).

**Electrical Ratings:**
- Power Input:
  - MS4120F: 120 Vac ±10%, 60 Hz.
  - MS8120F: 24 Vac +20%, -10%, 50/60 Hz (Class 2).
- Power Consumption:
  - MS4120F: Driving: 0.35A, 35W. Holding: 0.15A, 10W.
  - MS8120F: Driving: 45 VA. Holding: 10 VA.

**Electrical Connections:**
- Lead Wires (both Power and End Switch): 1m Teflon wire.
- Two integral 3/8 in. flexible conduit connections.

**Timing (At Rated Torque and Voltage):**
- Drive Open: 15 seconds typical.
- Spring Close: 15 seconds typical.

**Controller Type:**
- MS4120F: Line voltage (120 Vac), 2-position, spst (Series 40).
- MS8120F: Low voltage (24 Vac), 2-position, spst (Series 80).

**Noise Rating at 1m (Maximum):**
- Driving or Spring Return: 70 dBA.
- Holding: 20 dBA (no audible noise).
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.

Models:

Table 1. Models Selection (MS Series).

<table>
<thead>
<tr>
<th>M</th>
<th>Electrical Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Fail Safe Function (Spring Return)</td>
</tr>
<tr>
<td>41</td>
<td>120 Vac 2-position Control; Reversible Mount Spring Return</td>
</tr>
<tr>
<td>81</td>
<td>24 Vac 2-position Control; Reversible Mount Spring Return</td>
</tr>
<tr>
<td>20</td>
<td>175 lb-in. (20 Nm)</td>
</tr>
<tr>
<td>F</td>
<td>Fire and Smoke (US)</td>
</tr>
<tr>
<td>1</td>
<td>No Feedback</td>
</tr>
<tr>
<td>2</td>
<td>Two Auxiliary Switches</td>
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<tr>
<td>XX</td>
<td>System Controlled Numbers</td>
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<tr>
<td>-</td>
<td>UL Marked</td>
</tr>
<tr>
<td>NM</td>
<td>No Marking</td>
</tr>
</tbody>
</table>

*Internal SPST switches are designed to pass UL555S requirements (at 350°F) if applicable.

Fig. 1. Dimensional drawing of actuator in in. (mm).

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Table 2. Approvals.

<table>
<thead>
<tr>
<th>MS4120F</th>
<th>MS8120F</th>
</tr>
</thead>
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<tr>
<td>UL/cUL (optional)</td>
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</tr>
<tr>
<td>UL873 Plenum Rating, File No. E4436; Guide No. XAPX.a (optional)</td>
<td>X</td>
</tr>
<tr>
<td>CE</td>
<td>X</td>
</tr>
<tr>
<td>C-TICK</td>
<td>X</td>
</tr>
</tbody>
</table>

* Plenum applications require that conductors be enclosed in conduit (see Wiring section for conduit details).