



# MSXX20F; S2024-F; S20230-F Series

175 LB-IN (20 NM) FAST-ACTING, SPRING RETURN,  
TWO-POSITION DIRECT COUPLED ACTUATORS FOR FIRE/  
SMOKE CONTROL APPLICATION



## SPECIFICATION DATA

### 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.

### 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.*

#### Humidity Ratings:

- 5% to 95% RH noncondensing.

#### Stroke:

- 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).

#### Design Life (at Rated Voltage):

- 30,000 full stroke cycles.

## 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).

#### 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:**

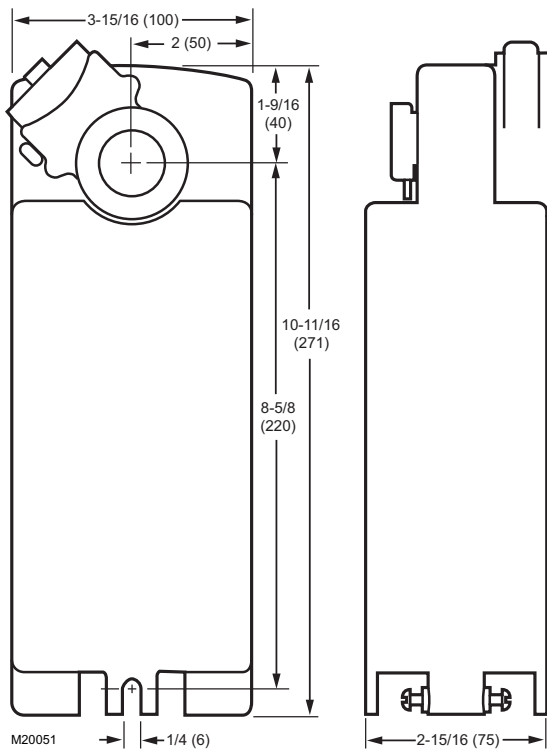
**Table 1. Models Selection (MS Series).**

<b>M</b>	Electrical Motor
<b>S</b>	Fail Safe Function (Spring Return)
<b>41</b>	120 Vac 2-position Control; Reversible Mount Spring Return
<b>81</b>	24 Vac 2-position Control; Reversible Mount Spring Return
<b>20</b>	175 lb-in. (20 Nm)
<b>F</b>	Fire and Smoke (US)
<b>1</b>	No Feedback
<b>0</b>	No Auxiliary Switches
<b>2</b>	Two Auxiliary Switches
<b>XX</b>	System Controlled Numbers
-	UL Marked
<b>NM</b>	No Marking

<b>M</b>	<b>S</b>	<b>41</b>	<b>20</b>	<b>F</b>	<b>1</b>	<b>2</b>	<b>XX</b>
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<sup>a</sup> 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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**TYPICAL SPECIFICATION**

**Power-fail return actuator shall be direct coupled type that requires neither crankarm nor linkage and be capable of direct mounting to a jackshaft of up to one inch diameter. The actuator shall connect to the shaft using a removable output hub with a self-centering shaft coupling that provides concentric mounting.**

**Actuators shall have integral conduit connections and Teflon leadwires for both power and end switch connections.**

**The actuator must provide two-position control. Upon power failure the hub must return by a string-type mechanism internal to the actuator. The actuator design must be for use in either clockwise or counterclockwise fail-safe operation.**

**Actuators shall have a minimum performance of 30,000 full stroke cycles documented in the product literature. Actuators shall be UL and cUL listed, manufactured under ISO 9001 International Quality Control Standards.**

**Cycling Requirements:**

- Prolonged holding-period (1 year) testing of these actuators has been performed with no spring return failures. The actuator and the internal spring are designed to require no special cycling during long-term holding.
- Honeywell recommends following all local, state and national codes for periodic testing of the entire smoke control system. Refer to National Fire Protection Association (NFPA) National Fire Codes<sup>®</sup>: NFPA90A, NFPA92A and NFPA92B for your application.
- NFPA recommends periodic examination of each fire/smoke damper (semi-annually or annually) to ensure proper performance.

**Environmental Protection Ratings:**

- NEMA2 and IP54 when mounted on a horizontal shaft and the base of the actuator below the shaft.

**Approvals:**

- See Table 2.

**Accessories (not supplied with actuator):**

- 205649 Mounting Bracket (not supplied with actuator).

**Table 2. Approvals.**

	<b>MS4120F</b>	<b>MS8120F</b>
UL/cUL (optional)	X	X
UL873 Plenum Rating, File No. E4436;	X	X
Guide No. XAPX. <sup>a</sup> (optional)		
CE		X
C-TICK		X

<sup>a</sup> Plenum applications require that conductors be enclosed in conduit (see Wiring section for conduit details).

