



## 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.
- ❑ 27520A-E,G,H-L,Q Pushrod (5/16 in. diameter).
- ❑ 32000085-001 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)**

<b>M</b>	Electrical Motor	
<b>S</b>	Fail Safe Function (Spring Return)	
<b>41</b>	120 Vac Two-Position Control; Reversible Mount	
<b>75</b>	24 Vac Modulating and Floating Control; Reversible Mount	
<b>81</b>	24 Vac Two-Position Control; Reversible Mount	
<b>20</b>	175 lb-in. (20 Nm)	
<b>A</b>	Standard U.S. Model	
<b>B</b>	Standard European Model	
<b>E</b>	Selectable control signal; Adjustable zero and span; Includes service and auto-adapt modes	
<b>H</b>		
<b>1</b>	No Feedback	
<b>2</b>	Voltage Feedback Signal	
<b>0</b>	No End Switches	
<b>2</b>	Two End Switches	
<b>XX</b>	System Controlled Numbers	

**M S 75 20 A 2 0 XX**

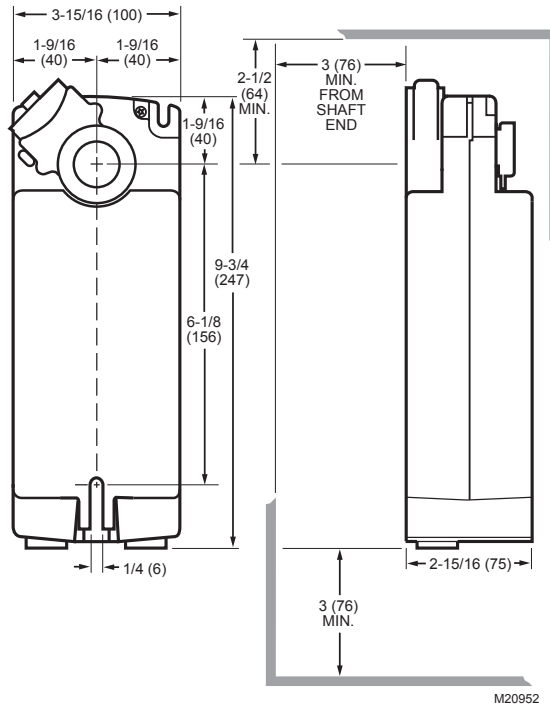
**Table 2. Model Selection (S20 Series)**

<b>S</b>	Spring Return Fail Safe Mode	
<b>20</b>	175 lb-in. (20 Nm)	
<b>24-2POS</b>	24 Vac Two-Position Control	
<b>120-2POS</b>	120 Vac Two-Position Control	
<b>230-2POS</b>	230 Vac Two-Position Control	
<b>010</b>	24 Vac Modulating and Floating Control	
	Fixed Zero/Span, No End Switches	
<b>-SW2</b>	Internal End Switches	
<b>-SER<sup>a</sup></b>	Enhanced Modulating; Adjustable Zero/ Span	

**S 20 24-2POS -SW2**

<sup>a</sup> Enhanced models include two internal end switches.

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

**TYPICAL SPECIFICATION**

Spring return actuators shall be direct coupled type requiring neither crankarm nor linkage and be capable of direct mounting to a jackshaft of up to 1.05 in. diameter. The actuator shall connect to the shaft using a removable output hub with a self-centering shaft coupling. This coupling shall provide concentric mounting and include an integral adjustable range-stop mechanism.

The actuator shall provide two-position, floating, or proportional control. Proportional control refers to direct acceptance of 0-10 Vdc, 2-10 Vdc or—with addition of a 500 ohm resistor—a 4-20 mA input signal. Proportional and floating control models provide a 2-10 Vdc feedback signal. Actuators shall provide wiring terminals located within an integral access cover with conduit connections. Proportional and floating actuators shall have a rotation direction control switch accessible on the cover. Proportional and floating actuators shall use a brushless DC submotor. Two-position actuators shall use a brush DC submotor with a microprocessor control protected from overload at all angles of rotation.

All spring return actuators must be designed for either clockwise or counterclockwise fail-safe operation with a continuously engaged mechanical return spring. This spring must return the actuator to a fail-safe position within 20 seconds of power loss. All actuators shall provide a means of manually positioning the output hub in the absence of power. All actuators shall be designed for a minimum of 50,000 full-stroke cycles at actuator rated torque and temperature, 50,000 spring-return cycles and 1,500,000 repositions as documented in the product literature. Run time shall be constant and independent of: load, temperature, and supply voltage (within specifications). All actuators shall be UL873 and cUL (CSA22.2) listed, have a five year warranty, and be manufactured under ISO 9001 International Quality Control Standards.

Actuators shall be as manufactured by Honeywell.

**Table 3. Electrical Ratings.**

Model(s)	Power Input		Power Consumption (VA)	
	Voltage	Frequency	Driving	Holding
Floating, Modulating	24 Vac ±20% (Class 2), 24 Vdc	50/60 Hz.	16	5
Two-Position, Low-voltage	24 Vac ±20% (Class 2), 24 Vdc	50/60 Hz.	40	8
Two-Position, Line-voltage	100-250 Vac	50/60 Hz.	60	13

**Automation and Control Solutions**

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