

MSXX10, MSXX20 Series

88 AND 175 LB-IN (10 AND 20 NM) SPRING RETURN DIRECT COUPLED ACTUATORS

MS4105A1002 (ONLY), MS7505A2008 (ONLY) MS8105A1008 (ONLY)

PRODUCT 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.
- 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.
- All Models are plenum-rated per UL873.
- Models available with 3-foot, 18 AWG color-coded cable.
- Features shown in Table 1.

APPLICATION

MS31XX, MS41XX, MS71XX, MS75XX, MS81XX 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.

Table 1. Features

Model Number	Model Number (including 3 ft. whip)	Torque	Power Supply		Drive ² (sec)	Control Input/Output Description	SPDT Aux Switch
			Voltage	VA Driving ¹			
MS7505A2008 ⁴		44 lb-in (5 Nm)	24 Vac/dc	13	90	Floating, Modulating ³ , Feedback	0
MS8105A1008 ⁴				25	45	Two-Position (SPST)	0
MS4105A1002 ⁴			100-250 Vac	45			0
MS7510A2008	MS7510W2008	88 lb-in (10 Nm)	24 Vac/dc	14	90	Floating, Modulating ³ , Feedback	0
MS7510A2206	MS7510W2206						2
MS7510H2209						Floating, Modulating ³ , Feedback, Adj. Zero & Span	2
MS8110A1008	MS8110W1008					Two-Position (SPST)	0
MS8110A1206	MS8110W1206			30	45		2
MS4110A1002			100-250 Vac	45	45	Two-Position (SPST)	0
MS4110A1200							2
MS7520A2007	MS7520W2007	175 lb-in (20 Nm)	24 Vac/dc	16	90	Floating, Modulating ³ , Feedback	0
MS7520A2205	MS7520W2205						2
MS7520H2208						Floating, Modulating ³ , Feedback, Adj. Zero & Span	2
MS8120A1007	MS8120W1007					Two-Position (SPST)	0
MS8120A1205	MS8120W1205			40	45		2
MS4120A1001			100-250 Vac	60	45	Two-Position (SPST)	0
MS4120A1209							2

¹ Number represents range² All spring return actuators have <25 second spring return time³ 0/2-10 Vdc⁴ Discontinued models. Refer to customer.honeywell.com for replacements.

SPECIFICATIONS

Models: See Tables 2 and 4.**NOTE:** This document also covers the MS7110K and MS7106K.**Dimensions:** See Fig. 1.**Device Weight:** 6 lb (2.7 kg).**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.**Electrical Connections:**

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

Electrical Ratings: See Table 3.**End Switches (Two SPDT):**

Dry Contact

Settings (fixed): 7° nominal stroke, 85° nominal stroke.

Ratings (maximum load): 250 Vac, 5A resistive.

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.

NOTE: For 175 lb-in. (20 Nm) models: 3/4 in. or greater shaft diameter recommended.**Minimum Damper Shaft Length:** 1 in. (25 mm); 3 in. (76 mm) recommended.**Cable Specification:**

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

Timing (At Rated Torque and Voltage):

Drive Open (typical):

Floating, Modulating Models: 90 seconds.

Floating, Modulating Models: 60 seconds.

Two-Position Models: 40 seconds ±10 seconds.

Spring Close: <25 seconds.

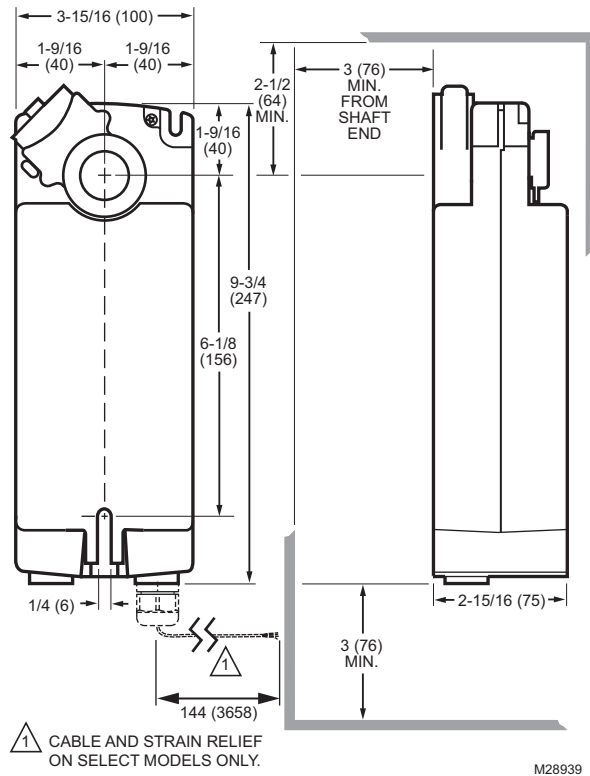


Fig. 1. Dimensional drawing of actuator in in. (mm).

Table 2. Model Selection.

M Electrical Motor									
S Fail Safe Function (Spring Return)									
31		24 Vac communicating							
41		120 Vac Two-Position Control; Reversible Mount							
71		24 Vac Modulating Control; Reversible Mount							
75		24 Vac Modulating and Floating Control; Reversible Mount							
81		24 Vac Two-Position Control; Reversible Mount							
10		88 lb-in. (10 Nm)							
20		175 lb-in. (20 Nm)							
A ^a		Standard U.S. Model							
B ^b		Standard European Model							
E ^b		Selectable control signal; Adjustable zero and span; Includes service and auto-adapt modes							
H ^a									
W ^c		Standard U.S. Model with Cable							
1		No Feedback							
2		Voltage Feedback Signal							
0		No End Switches							
2		Two End Switches							
XX		System Controlled Numbers							
M	S	75	20	A	2	0	XX		

^a Model manufactured for sale in the United States.

^b Model manufactured for sale in Europe.

^c Cables available on 75 and 81 Series only.

60 second models

MS7510A2016
MS7510A2214
MS7520A2015
MS7520A2213

Table 3. Electrical Ratings*.

Model(s)	Power Input		Power Consumption (VA)					
	Voltage	Frequency	44 lb-in. (5 Nm)		88 lb-in. (10 Nm)		175 lb-in. (20 Nm)	
			Driving	Holding	Driving	Holding	Driving	Holding
Floating, Modulating	24 Vac \pm 20% (Class 2), 24 Vdc	50/60 Hz.	13	5	14	5	16	5
Two-Position, Low-voltage	24 Vac \pm 20% (Class 2), 24 Vdc	50/60 Hz.	25	8	30	8	40	8
Two-Position, Line-voltage	100-250 Vac	50/60 Hz.	45	13	45	13	60	13

* Floating/Modulating 60 sec models
88 lb-in. (10 Nm) 18 VA Driving
175 lb-in. (20 Nm) 22 VA Driving
24 VAC \pm 20%

Stroke: 95° \pm 3°, mechanically limited.

Approvals: See Table 4.

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.

Input Impedance: 95K ohms minimum.

Feedback Signal: 0/2-10 Vdc;
Driving current is 3 mA minimum.

Torque Ratings:

Typical Holding, Driving, Spring Return:

MSXX05: 44 lb-in. (5 Nm).

MSXX10: 88 lb-in. (10 Nm).

MSXX20: 175 lb-in. (20 Nm).

Stall Maximum (fully open at 75°F):

MSXX05: 100 lb-in. (11.3 Nm).

MSXX10: 175 lb-in. (20 Nm)

MSXX20: 350 lb-in. (39.6 Nm).

Noise Rating at 1m (Maximum):

Holding: 20 dBA (no audible noise).

Two-position models:

Driving: 50 dBA.

Spring Return: 65 dBA.

Floating/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.

Table 4. Approvals.

	MS31XX, MS41XX, MS75XX, MS81XX	MS7110, MS7106
UL/cUL	X	X
UL873 Plenum Rating, File No. E4436; Guide No. XAPX.	X	X

Environmental Protection Ratings:

NEMA2 (US Models) or IP54 (European Models) when mounted on a horizontal shaft with access cover below the shaft.

Accessories:

27518 Balljoint (5/16 in.).

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.

** Floating/Modulating 60 sec models

20,000 full stroke cycles

100,000 repositions

Sizing

Required Torque

In lieu of data from a Specification Engineer or Manufacturer, required torque for a given damper load can be determined using the following method: $T_R = T_D \times A_D$

Where:

— T_R = Required torque for the damper load.

— T_D = Damper torque rating from the manufacturer, expressed in either (lb-in.)/(sq ft) or (Nm)/(sq m). the damper load.

— A_D = Damper area expressed in either sq ft or sq m.

Actuators Required

In lieu of data from a Specification Engineer or Manufacturer, the number of required actuators for a given damper load can be determined using the following method:

$$N = \frac{T_R}{T_A \times SF}$$

Where:

— N = Number of actuators.

— T_R = Required torque for the damper load. (See above.)

— T_A = Actuator torque rating.

— SF = Safety factor.

NOTE: The safety factor accounts for variables such as misalignments, aging of the damper, etc. 0.8 is a typical safety factor.