

# Spring-Return and Non-Spring Return Direct Coupled SmartX Actuators

## Spring Return Direct Coupled SmartX Actuators

### Value-Driven General Purpose Applications



#### Mx4D-703x and Mx4D-803x Series

- Two position models controlled by SPST controller
- Floating models controlled by SPDT floating controllers
- Jumper selectable control function direct/reverse action
- Floating and Proportional models automatically adjust input span to match the damper/valve travel

### Damp and Harsh Environment Applications



#### Mx40-717x Series

- Direct mount to round or square damper shaft
- 150 lb-in (17 N-m) torque rating, overload protection throughout rotation
- Oil immersed gear train provides continuous lubrication
- Automatic current sensing motor control provides extended reliability and repeatable timing
- Provides true mechanical clockwise or counterclockwise spring return operation for reliable positive close-off in airtight applications
- 5-year warranty, NEMA 4 housing (IEC IP56)
- Can be double mounted (gang mounting) to accommodate high torque application requirements (2 to 4 actuators)
- MS40-717x models provide position feedback signal

### High Performance HVAC Applications



#### Mx40-704x Series

- Direct mount to round or square damper shaft
- 35 lb-in (4 N-m) torque rating
- Overload protection throughout rotation
- Optional built-in auxiliary switches
- True mechanical clockwise or counterclockwise spring return operation for reliable, positive close-off in airtight applications
- Visual position indicator
- Direct acting or reverse acting control mode available on proportional models
- Rotation limiting available
- Rugged die-cast housing for NEMA 2/IP54 rating



#### Mx41-7xxx Series

- Direct mount to round or square damper shaft
- 60 lb-in (7 N-m) torque rating
- 133 lb-in (15 N-m) torque rating
- Overload protection throughout rotation
- Optional built-in auxiliary switches
- Provides true mechanical clockwise or counterclockwise spring return operation for reliable positive close-off in airtight applications
- Direct acting or reverse acting control mode available on proportional models
- Rotation limiting available
- Rugged die-cast housing for NEMA 2/IP54 rating
- Manual override

### High Torque HVAC Applications



#### Mx41-730x Series

- 270 lb-in (30 N-m) of torque with mechanical spring return, manual override, and Brushless DC Motor.
- Stall protected throughout rotation and reversible mounting.
- Models for Two Position 24 Vac/Vdc, and Two Position 100...230 Vac applications.
- Models for 2...10 Vdc input signal applications (field configurable for other input signals) with a position feedback signal and direct/reverse acting control mode selection switch on both sides.

- Models for auxiliary switch applications.
- Models for NEMA 4 / IP66 outdoor applications.
- 95° of rotation, adjustable with mechanical end stops and graduated position indicator showing 0°...95°.
- Can be double-mounted (gang mounting) to accommodate high torque application requirements.

# Spring Return Electronic Damper Actuators

	Torque lb-in minimum	Control Type					Power		Power Input		Running Time (sec)		Auxiliary Switch	Spring Return Position	
		Two-Position		Floating	Proportional			0...10 VDC Feedback	0...10 VDC Feedback	VA @60 Hz	Watts @ 60 Hz	Powered	Spring Return		
		0...10 VDC	2...10 <sup>a</sup> VDC	4...20 mA	6...9 VDC	24 VAC, 24 VDC	230, 240 VAC	120 VAC	100...240 VAC 100...125 VDC	Running	Holding				
MA4D-7030	30	■								7.8	5.0	2.5	<56	<23	CCW
MA4D-7033-100		■								5.1					CW
MA4D-8030		■								7.8	5.0	2.5			CCW
MA4D-8033-100		■								5.1					CW
MF4D-7033-100		■	■							6.8	4.2	1.9	85	21	CCW
MF4D-8033-100		■	■							6.1	3.4	1.4			CW
MS4D-7033-100		■	■	■											CCW
MS4D-7033-150		■	■	■											CW
MS4D-7033-160		■	■	■											CCW
MS4D-8033-100	35	■	■	■											CW
MS4D-8033-150		■	■	■											CCW
MA40-7040		■								4.3	3.4	1.2	<80	<40	1
MA40-7040-501										4.6	3.9	1.2			1
MA40-7041										4.4	2.9	0.8			1
MA40-7041-501										5.9	4.4	2.9			1
MA40-7043										5.6	4.2	2.4	<130	<25	1
MA40-7043-501										6.6	5.0	3.2			1
MF40-7043										5.6	3.6	1.2			1
MF40-7043-501										5.6	3.6	1.2			1
MS40-7043										5.6	4.2	2.4			1
MS40-7043-501	60									6.6	5.0	3.2	<80	<40	1
MS40-7043-MP										5.6	3.6	1.2			2
MS40-7043-MP5										5.6	3.6	1.2			2
MA41-7070		■								8.0	4.0	1.4			2
MA41-7070-502										4.8	3.2	0.8			2
MA41-7071										6.2	4.8	2.8	<195	<40	2
MA41-7071-502										7.5	2.8	2.8			2
MA41-7073										7.7	3.2	3.2			2
MA41-7073-502										7.4	2.9	2.9			2
MF41-7073										8.4					2
MF41-7073-502	133									8.5			<80	<40	2
MS41-7073										10.8					2
MS41-7073-502										7.4					2
MA41-7150		■								10.0	8.4	3.3			2
MA41-7150-502										10.6	8.5	5.0			2
MA41-7151										9.7	7.5	2.8	<190	<30	2
MA41-7151-502										9.7	7.7	3.2			2
MA41-7153										9.7	7.4	2.9			2
MA41-7153-502										8.4					2
MF41-7153										8.5					2
MF41-7153-502	150									10.8			<162	<65	2
MS41-7153										7.4					2
MS41-7153-502										8.1					2
MA40-7170		■								7.8					2
MS40-7170										16 <sup>1</sup>			75	<20	2
MS40-7171										21					2
MA40-7173										16 <sup>1</sup>					2
MF40-7173										16 <sup>1</sup>					2
MS40-7173										16, 21 w/ heater <sup>1</sup>	9.5, 21 w/ heater <sup>1</sup>	150 <sup>4</sup>			2
MA41-7303	270														
MA41-7303-502															
MA41-7300															
MA41-7300-502															
MS41-7303 <sup>3</sup>															
MS41-7303-502 <sup>3</sup>															
MS41-7303-W023															
MS41-7303-WH2 <sup>3</sup>															

a - Proportional models with a 2...10 VDC control signal accept a 4...20 mA signal with the use of a 500 ohm resistor.

1 - Class 2 power source.

3 - Also compatible with floating, pulse width modulating (PWM), and other DC signal inputs with use of the BEL-ZTH US Handheld Interface Module for Field Programming.

4 - Timing field adjustable from 60...150 seconds with use of the BEL-ZTH US Handheld Interface Module for Field Programming.

# Mx4D-703x and Mx4D-803x Series

## 30 lb-in Direct Coupled Damper Actuators

### Product Description

Designed for controlling air dampers in building systems that require fail safe return, with two position, floating or proportional control.

### Features

- Two position models controlled by SPST controller
- Floating models controlled by SPDT floating controllers
- Jumper selectable control function direct/reverse action
- Spring return models provide 30 in-lb (3.4 N-m) of torque
- Polymer housing rated for NEMA 2/IP54
- Overload protection throughout stroke
- Floating and proportional models automatically adjust input span to match the damper/valve travel
- Compact size allows installation in limited space
- Manual override allows positioning of dampers and valves
- Directly mounts to 1/2...3" Schneider Electric ball valves
- Polymer housing rated for plenum use



### Specifications

Control Signal	Refer to the tables for actuator models and control types.	Mechanical Outputs	Travel: 93° nominal. Manual Override: Allows positioning of damper or valve using manual crank. RA/DA Jumper: Permits reverse acting/direct acting control (MS4D models only).
Power Inputs	See table.	Ambient Temperature Limits	Shipping & Storage: -40...160°F (-40...71°C). Operating: -22...140°F (-30...60°C). Humidity: 15...95% RH, non-condensing.
Connections	3 ft (91 cm) appliance (see * in table below) or 10 ft. (3 m) plenum cables, enclosure accepts 1/2" (13 mm) conduit connector.	Location	NEMA 1. NEMA 2, UL Type 2 (IEC IP54) with customer supplied water tight conduit connectors. Enclosure is air plenum rated.
Electrical Outputs	Position Feedback Voltage (proportional or floating only): For voltage ranges, the feedback signal is the same range as the input signal. The 4...20 mA current range and floating actuators have a 2...10 Vdc feedback signal. The feedback signal can supply up to 0.5 mA to operate up to four additional slave actuators.	Agency Listings	UL 873: Underwriters Laboratories (File #E9429 Category Temperature-Indicating and Regulating Equipment). CUL: UL LISTED for use in Canada by Underwriters Laboratories. Canadian Standards C22.2 No. 24-93. This product fits in Installation Category (Overvoltage Category) II per EN 61010-1.

Part Number	Torque lb-in (N-m)	Spring Return	Actuator Inputs			Outputs		Approximate Timing in seconds @ 70°F		
			Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	Powered	Spring Return	
MA4D-7033-100	30 (3.4)	CCW	2 Position	24 Vac/dc	5.1	—	No	56	23	
MA4D-7030				120 Vac	7.8					
MA4D-8033-100		CW		24 Vac/dc	5.1					
MA4D-8030				120 Vac	7.8					
MF4D-7033-100		CCW	Floating	24 Vac/dc	6.8	2...10 vdc		85	21	
MF4D-8033-100					6.1					
MS4D-7033-100		CCW	2...10 vdc		0...10 vdc					
MS4D-7033-150			0...10 vdc		0...10 vdc					
MS4D-7033-160			4...20 ma		2...10 vdc					
MS4D-8033-100		CW	2...10 vdc		0...10 vdc					
MS4D-8033-150			0...10 vdc		0...10 vdc					
MS4D-8033-160			4...20 ma		2...10 vdc					

# Mx40-704x Series

## 35 lb-in Direct Coupled Damper Actuators

### Product Description

For spring return applications requiring floating, two-position, or proportional modulation control of dampers and valves in HVAC systems. Directly mounts to 1/2"…3" Schneider Electric ball valves.

### Features

- Direct mount to round or square damper shaft
- Overload protection throughout rotation
- Optional built-in auxiliary switches
- True mechanical clockwise or counterclockwise spring return operation for reliable, positive close-off in airtight applications
- Visual position indicator
- Direct acting or reverse acting control mode available on proportional models
- Rotation limiting available
- Rugged die-cast housing for NEMA 2/IP54 rating

### Specifications

Control Signal	On-off, SPST control contacts or Triacs (500 mA rated). Floating point control, 24 Vac. Proportional, 6...9, 2...10 Vdc or 4 to 20 mA dc with a 500 Ω resistor.
Power Inputs	See table.
Connections	MA40-704x and MA40-704x-501 — 3 ft. (91 cm) long, appliance cables, 1/2 in. conduit connector. For M20 Metric conduit, use AM-756 adaptor. MF40-7043 and MF40-7043-501, MS40-7043 and MS40-7043-501 — 3 ft. (91 cm) long, plenum-rated cables, 1/2 in. conduit connector. For M20 Metric conduit, use AM-756 adaptor.
Electrical Outputs	Position Feedback Voltage "AO": 2...10 Vdc (maximum 0.5 mA) output signal for position feedback or operation of up to four slave actuators. One auxiliary switch available (select models). SPDT 6a resistive @24 Vac or 250 Vac.



Mechanical Outputs	Travel Rotation is limited to 95° ± 5° maximum, adjustable from 40...95° with a mechanical stop. RA/DA Switch: selects direct acting or reverse acting for proportional models. Position Indicator: Visual indicator, 0...1 (0 is the spring-return position).
Ambient Temperature Limits	Shipping & Storage: -40 F...160°F (-40...71°C). Operating: -22...140°F (-30...60°C). Humidity: 5...95% RH, non-condensing.
Location	NEMA 2 (IEC IP54)
Agency Listings	UL 873: Underwriters Laboratories (File # E9429 Category Temperature-Indicating and Regulating Equipment). CUL: UL LISTED for use in Canada by Underwriters Laboratories. Canadian Standards C22.2 No. 24.

Part Number	Torque lb-in (N-m)	Spring Return	Actuator Inputs			Outputs		Approximate Timing in seconds @ 70°F						
			Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	Powered	Spring Return					
MA40-7040	35 (4)	CW/CCW	2 Position	120 Vac	4.3	—	—	<50	<28					
MA40-7040-501				230 Vac	4.6									
MA40-7041				24 Vac/dc	4.4									
MA40-7041-501					5.9	1-SPDT (24 Vac)	1-SPDT (24 Vac)	<130	<25					
MA40-7043			Floating											
MA40-7043-501			2...10 vdc											
MF40-7043			6...9 vdc	6.6	2...10 vdc	—	—	<130	<25					
MF40-7043-501														
MS40-7043														
MS40-7043-501														
MS40-7043-MP <sup>a</sup>														
MS40-7043-MP5 <sup>a</sup>														

a - For MP and MP5: Provides auxiliary power supply +20 Vdc 25 mA maximum.

# Mx41-7xxx Series

## 60 lb-in and 133 lb-in Direct Coupled Damper Actuators

Designed for controlling air dampers in building systems that require fail safe return, with two position, floating or proportional control.

### Features

- Direct mount to round or square damper shaft
- Overload protection throughout rotation
- Optional built-in auxiliary switches
- Provides true mechanical clockwise or counterclockwise spring return operation for reliable positive close-off in airtight applications
- Direct acting or reverse acting control mode available on proportional models
- Rotation limiting available
- Rugged die-cast housing for NEMA 2/IP54 rating
- 5-year warranty



### Specifications

Control Signal	On-off, SPST control contacts or Triacs (500 mA rated). Floating point control, 24 Vac. Proportional, 2...10 Vdc or 4 to 20 mA dc with a 500 Ω resistor.
Power Inputs	See table.
Connections	3 ft. appliance cables, 1/2 in. conduit connector.
Electrical Outputs	Position Feedback Voltage "AO": 2...10 Vdc (maximum 0.5 mA) output signal for position feedback or operation of up to four slave actuators. Two auxiliary switches available (select models). SPDT 7a resistive @24 Vac or 250 Vac.

Mechanical Outputs	Travel Rotation is limited to 95° ± 5° maximum, adjustable from 30...95° with a mechanical stop. Position Indicator: Pointer and scale are provided. Manual Override: manual adjustable rotation -5°...85°.
Ambient Temperature Limits	Shipping & Storage: -40 F...160°F (-40...71°C). Operating: -22...140°F (-30...60°C). Humidity: 5...95% RH, non-condensing.
Location	NEMA 1, NEMA 2 (IEC IP54) with conduit connector in down pos.
Agency Listings	UL 873: Underwriters Laboratories (File # E9429 Category Temperature-Indicating and Regulating Equipment). CUL: UL LISTED for use in Canada by Underwriters Laboratories. Canadian Standards C22.2 No. 24.

Part Number	Torque lb-in (N- m)	Spring Return	Actuator Inputs			Outputs		Approximate Timing in seconds @ 70°F			
			Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	Powered	Spring Return		
MA41-7070	60 (7)	CW/CCW	2 Position	120 Vac	5.6	— 2-SPDT (250 Vac) — 2-SPDT (250 Vac) — 2-SPDT (24 Vac)	<80	<40	<30		
MA41-7070-502				230 Vac	8.0						
MA41-7071				24 Vac/dc	4.8						
MA41-7071-502			Floating	120 Vac	10.0		<190	<195			
MA41-7073				230 Vac	10.6						
MA41-7073-502				9.7	—						
MA41-7150	133 (15)	CW/CCW	24 Vac/dc	6.2	2-SPDT (24 Vac)						
MA41-7150-502				9.7	—		<190	<190			
MA41-7151				5.8	2-SPDT (24 Vac)						
MA41-7151-502			2...10 vdc	9.7	—						
MA41-7153				5.8	2-SPDT (24 Vac)		<195	<195			
MA41-7153-502				9.7	—						
MF41-7073	60 (7)	CW/CCW	2...10 vdc	—	2-SPDT (24 Vac)	<190	<190	<190			
MF41-7073-502	—			2-SPDT (24 Vac)							
MF41-7153	—			2-SPDT (24 Vac)							
MF41-7153-502	—			2-SPDT (24 Vac)							
MS41-7073	60 (7)		2...10 vdc	—	2-SPDT (24 Vac)	<195	<195	<195			
MS41-7073-502	—			2-SPDT (24 Vac)							
MS41-7153	133 (15)	CW/CCW		—	2-SPDT (24 Vac)	<190	<190	<190			
MS41-7153-502				—	2-SPDT (24 Vac)						

# Mx40-717x Series

## 150 lb-in Direct Coupled Damper Actuators

Designed for controlling air dampers in building systems that require fail safe return, with two position, floating or proportional control.

### Features

- Direct mount to round or square damper shaft
- Overload protection throughout rotation
- Oil immersed gear train provides continuous lubrication
- Automatic current sensing motor control provides extended reliability and repeatable timing
- Provides true mechanical clockwise or counterclockwise spring return operation for reliable positive close-off in airtight applications
- Can be double-mounted (gang mounting) to accommodate high torque application requirements (2 to 4 actuators)
- MS40-717x models provide position feedback signal
- Linkage required for Globe Valve Assembly.



### Specifications

Control Signal	Two wire, SPST or Triacs. SPDT floating control output, Triacs (500 mA rated), or 2 SPST contacts.	Electrical Outputs	Travel: Electronically limited to 92° ±1° (MS). MF-MA Mechanically limited To 101° ±1°.
Power Inputs	See table.	Mechanical Outputs	Position Indicator: Pointer and scale are provided.
Connections	Class 1: 24 inch (61 cm) long appliance cables, 18 AWG color coded leads. 1/2 in. conduit connector. Class 2 Power and Control: 36 inch (91 cm) Long, 22 AWG color coded appliance cable pigtail leads. 1/2 in. conduit connector.	Ambient Temperature Limits	Shipping & Storage: -40 F...160°F (-40...71°C). Operating: -25...140 °F (-32...60 °C). Humidity: 5...95% RH, non-condensing.
Location	NEMA 1 (IEC IP10). NEMA 4 (IEC IP 56) with customer supplied water tight conduit connectors.	Agency Listings	UL 873, Underwriters Laboratories (File #9429 Category Temperature-Indicating and Regulating Equipment). Canadian Standards C22.2 No. 24-93.

Part Number	Torque lb-in (N-m)	Spring Return	Actuator Inputs			Outputs		Approximate Timing in seconds @ 70°F			
			Control	Voltage	VA @ 60Hz	Feedback	Aux. Sw.	Powered	Spring Return		
MA40-7170	150 (17)	CW/CCW	2-Position	120 Vac	8.4	—	No	162	82		
MA40-7173				24 Vac/dc	7.4						
MF40-7173			Floating	24 Vac/dc	8.1						
MS40-7170				120 Vac	8.5	2...10 vdc		147			
MS40-7171			2...10 vdc	240 Vac	10.8						
MS40-7173				24 Vac/dc	7.8						

# Mx41-730x Series

## 270 lb-in Direct Coupled Damper Actuators

Mx41-730x Series Spring Return SmartX Actuators are available with Two Position 24 Vac/Vdc, Two Position 100...230 Vac, and 2...10 Vdc input signal applications. It is possible to field configure the 2...10 Vdc input signal models for other input signals such as floating and pulse width modulating (PWM).

### Features

- Mechanical spring return, manual override, and Brushless DC Motor.
- Stall protected throughout rotation and reversible mounting.
- Models for auxiliary switch applications.
- Direct mount to 1/2"…3/4" round or 1/2"…11/16" square damper shafts or to 3/4"…1.05" round with the field removal of a clamp insert.
- 95° of rotation, adjustable with mechanical end stops and graduated position indicator showing 0°…95°.
- Can be double-mounted (gang mounting) to accommodate high torque application requirements.
- 5 Year warranty.

### Specifications

Control Signal	Two Position, 2-10 Vdc <sup>1</sup>
Optional Control Signal (MS41 models only)	Floating, Pulse width modulating (PWM), Adjustable start point, and Span DC signal inputs with use of the BEL-ZTH US handheld interface module for field programming
Power Inputs	See table.
Connections	3' appliance cable with 18 Ga. (0.9 mm) conductors and one 1/2" conduit connector -WO2-WH2 models: Removable terminal blocks
Electrical Outputs	Position Feedback: 2...10 Vdc, 0.5 mA max, adjustable with optional BEL-ZTH US Handheld Interface Module for Field Programming Auxiliary Switch: 2 SPDT 3 A (0.5 A) @ 250 Vac (see table)

Mechanical Outputs	Travel: Angle of rotation 95° max. Position Indicator: Graduated position indicator showing 0°…95° Manual Override: Actuators provided with 5 mm hex crank
Ambient Temperature Limits	Shipping & Storage: -40 … 176 °F (-40…80 °C) Operating: -22 … 122 °F (-30…50 °C) Operating Humidity: 0 … 95% non-condensing
Location	NEMA 2 and NEMA 4 (select models; see table)
Agency Listings	c-UL-us LISTED per UL 60730-1A & -2-14, and CAN/CSA E60730-1:02, CE compliant to directives 2014/35/EU [LVD], 2014/30/EU [EMC], and 2011/65/EU [RoHS2].

<sup>1</sup>Also compatible with other two position, floating, PWM, and proportional input signals, refer to the SmartX Actuators Spring Return Damper Mx-730x Series Installation Instructions, F-27870.



Part Number	Torque lb-in (N-m)	Spring Return	Actuator Inputs			Outputs		Approximate Timing in seconds @ 70°F											
			Control	Voltage	VA @ 60Hz	Feedback	Aux. Switch	Powered	Spring Return	NEMA 4	Heater								
MA41-7303	270 (30)	Two Position	24 Vac	16 VA	21 VA at 100 Vac, 29 VA at 240 Vac	—	75	<20	—	—	—								
MA41-7303-502																			
MA41-7300			100...240 Vac																
MA41-7300-502																			
MS41-7303		CW/CCW	2...10 Vdc	24 Vac	16 VA	2...10 Vdc	2	150	Yes	Yes	Yes								
MS41-7303-502																			
MS41-7303-W02																			
MS41-7303-WH2					16 VA and 21 W heater														

# Non-Spring Return Direct Coupled SmartX Actuators

Direct coupled easy to install, and available with torque ranges from 44 to 300 lb-in for floating or proportional control.



## High Performance HVAC Applications

### Mx41-60xx series

- 44 lb-in (5 N-m) and 88 lb-in (10 N-m) torque.
- Compact, lightweight design.
- Easy-to-see position indicator.
- Self-adapting capability for maximum flexibility in damper positioning.
- Quiet, low-power operation.
- Manual Override.



### Mx41-6153 series

- Synchronous motor technology with stall protection.
- Unique self-centering shaft coupling.
- Manual override.
- 133 lb-in (15 N-m) torque.
- 5° preload as shipped from factory.



## Damp and Harsh Environment Applications

### Mx41-63xx series

- 300 lb-in (34 N-m) torque.
- NEMA Type 4 housing (IEC IP56).
- Custom automatic current sensing motor control provides extended reliability and repeatable timing.
- Direct coupled to the damper shaft with dual industrial hardened universal mounting clamps.
- Integral wiring for proportional control by 2...10 Vdc or 4...20 mA dc.
- Clockwise or counterclockwise rotation is determined by actuator mounting position.

- Plenum cable standard.
- Independently adjustable dual auxiliary switches option available (Mx41-6083-502).
- Feedback position output signal available (MS41-6043/6083 series).
- c-UL-us LISTED and CE marked.

- Mechanical range adjustment capabilities.
- Independently adjustable dual auxiliary switches option available (MS41-6153-502).
- Built-in 1/2" conduit connection.
- c-UL-us LISTED and CE marked.

- Manual override for ease of installation and manual operation of damper.
- Accurate 92° travel digitally controlled.
- Integral position indication scale.
- Rugged die-cast housing.
- Oil immersed gear train provides continuous lubrication
- Rated for operating temperatures up to 140 °F (60 °C).
- Five year warranty.
- MS41-634x SmartX Actuators can be double mounted (gang mounting) to accommodate high torque application requirements (2 to 4 actuators).
- Position feedback signal.
- c-UL-us LISTED and CE marked.

Output Torque lb-in		Type of Control			Feed-back	Power	Power Input (@60Hz)		Running Time (sec)	Auxiliary Switch
Min	Max Stall	Floating	0...10 VDC	2...10 VDC <sup>a</sup>	4...20 mA		VA @60Hz	Watts @60Hz	Running	
MF41-6043	44						2.3			90
MS41-6043							3.3			90
MF41-6083										
MF41-6083-502							2.3			2
MS41-6083										
MS41-6083-502							3.3			2
MF41-6153							3			
MS41-6153								5	4	4
MS41-6153-502									1	2
MF41-6343							5.7	3.9	2.8	<162
MS41-6343	300	650					5.6	3.6	2.4	<145
MS41-6340							7.5	4.7	3.0	

a - Proportional models with a 2...10 VDC control signal accept a 4...20 mA signal with the use of a 500 ohm resistor.



# Mx41-60x3 Series

## 44 lb-in and 88 lb-in Direct Coupled Damper Actuators

These direct coupled 24 Vac Non-Spring Return rotary electric SmartX Actuators are designed for three position (floating) control of dampers.

### Features

- Compact, lightweight design.
- Easy-to-see position indicator.
- Self-adapting capability for maximum flexibility in damper positioning.
- Quiet, low-power operation.
- Plenum cable standard.
- Independently adjustable dual auxiliary switches option available (Mx41-6083-502).
- Feedback position output signal available (MS41-6043/6083 series).

### Specifications

Control Signal	MF41-60x3 — Floating three-position control, 24 Vac. MS41-60x3 — Proportional, 0 to 10 Vdc; input resistance 100 kW.	Mechanical Outputs	Travel: Normal angle of rotation is 90°, limited to a maximum of 95°. Field adjustable to limit travel on either end of stroke.
Power Inputs	See Table.	Ambient Temperature Limits	Shipping and storage: -40...158 °F (-40...70 °C) Operating: -25...130 °F (-32...55 °C) ambient. NOTE: Check the valve operating temperature limit. The minimum valve temperature limit is 20 °F (6.7 °C) 5...95% RH, non-condensing.
Connections	3 ft. (0.9 m) appliance cable, 18 AWG plenum-rated leads	Location	NEMA Type 2 (IEC IP54)
Electrical Outputs	Position feedback voltage for MS41-6043/6083: 0...10 Vdc, 1 mA. Auxiliary Switches: Dual auxiliary switches available with MF41-6083-502, MS41-6083-502 when these actuators are ordered as separate units. Auxiliary switches are not offered with factory ball valve assemblies.	Agency Listings	c-UL-us LISTED per UL 873 and CAN C22.2 No.24-93. CE compliant to directives LVD, EMC, and RoHS2.



Part Number	Torque lb-in (N-m)	Actuator Inputs			Outputs		Approximate Timing in sec. @ 70°F
		Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	
MF41-6043	44 (5)	Floating	24 Vac	2.3	—	—	90
MF41-6083	88 (10)					2-SPDT	125
MF41-6083-502					—		
MS41-6043	44 (5)	0...10 vdc		3.3	0...10 vdc	—	90
MS41-6083	88 (10)					2-SPDT	125
MS41-6083-502							

## Mx41-6153 Series

### 133 lb-in Direct Coupled Damper Actuators

The direct-coupled, 24 Vac, non-spring return electronic SmartX actuator is designed for modulating and three-position control of building HVAC dampers requiring up to 133 lb-in (15 N-m) torque.

#### Features

- Synchronous motor technology with stall protection
- Unique self-centering shaft coupling
- 5° preload as shipped from factory
- Mechanical range adjustment capabilities
- Independently adjustable dual auxiliary switches option available (MS41-6053-502).
- Built-in 1/2" conduit connection

#### Specifications

Control Signal	MF41-6153 — Floating three-position control, 24 Vac. MS41-6153, MS41-6153-502 — Proportional, 0 to 10 Vdc; input resistance 100 kW.	Mechanical Outputs	Nominal angle of rotation 90° Maximum angular rotation 95°
Power Inputs	See Table.	Ambient Temperature Limits	Operating: -25°F...130°F (-32°C...55°C) Storage: -40°F...158°F (-40°C...70°C) Ambient humidity: 95% rh (non-condensing)
Connections	3 ft. (0.9 m) long, 18 AWG leads	Location	NEMA 1/IP54 according to EN 60 529
Electrical Outputs	Position output signal (wires 9-2) MS41-6153 Series Voltage-output 0...10 Vdc Maximum output current ±1 mA	Agency Listings	c-UL-us LISTED per UL 873 and CAN C22.2 No.24-93. CE compliant to directives LVD, EMC, and RoHS2.

Part Number	Torque lb-in (N-m)	Actuator Inputs			Outputs		Approximate Timing in sec. @ 70°F
		Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	
MF41-6153	133 (15)	Floating	24 Vac	3	—	—	125
MS41-6153		0...10 vdc		5	0...10 vdc		
MS41-6153-502					2-SPDT		

## Mx41-634x Series

### 300 lb-in Direct Coupled Damper Actuators

Direct Coupled SmartX Actuators are designed to be used in both damper and valve control applications. The MS41-634x series actuators are over the shaft non-spring return actuators compatible with 2...10 Vdc or 4...20 mA dc<sup>1</sup> control signals.

#### Features

- Custom automatic current sensing motor control provides extended reliability and repeatable timing
- Direct coupled to the damper shaft with dual industrial hardened universal mounting clamps
- Clockwise or counterclockwise rotation is determined by actuator mounting position
- Accurate 92° travel digitally controlled
- Integral position indication scale
- Oil immersed gear train provides continuous lubrication
- Rated for operating temperatures up to 140 °F (60 °C)
- Five year warranty
- MS41-634x SmartX Actuators can be double-mounted (gang mounting) to accommodate high torque application requirements (2 to 4 actuators)
- Position feedback signal

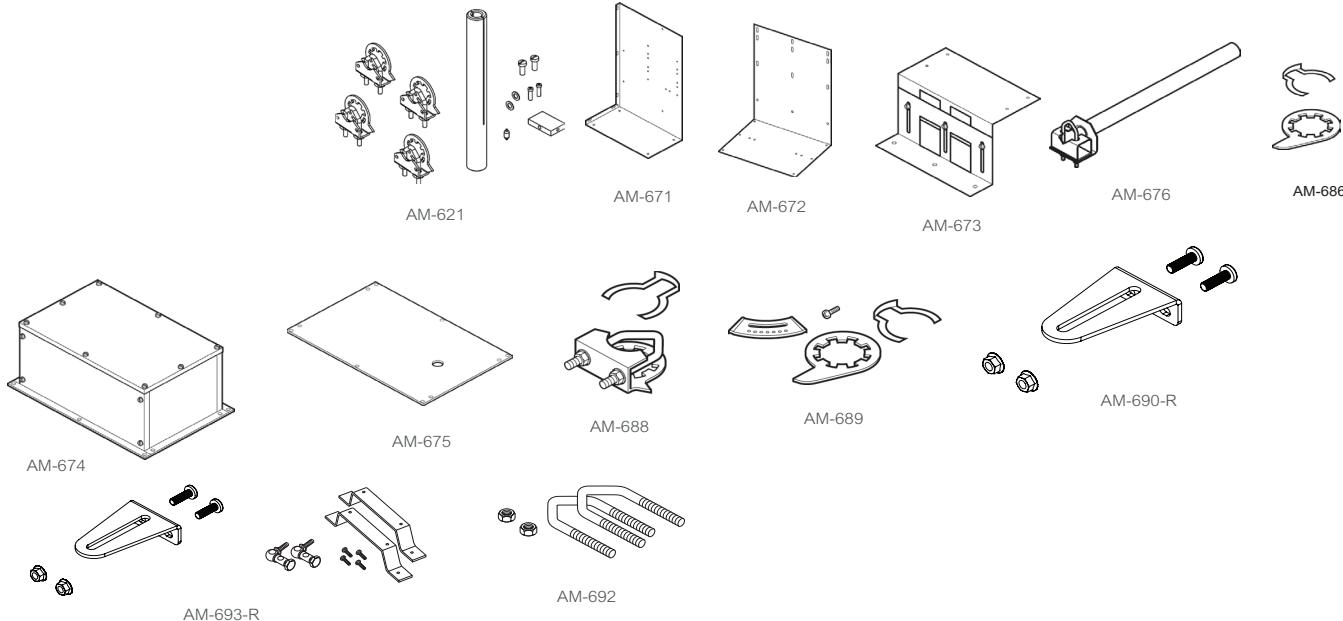
#### Specifications

Control Signal	SPDT floating control input; Triacs (500 mA rated) or 2 SPST contacts Floating: 24 Vac ± 20% Proportional: 2-10 Vdc 4-20 mA <sup>a</sup>	Mechanical Outputs	Overload Protection: Throughout rotation. Angle of Rotation: 93° nominal. Position Indication: Scale numbered from 0...95° Manual Override: Allows manual positioning.
Power Inputs	See table.	Ambient Temperature Limits	Shipping & Storage: -40...160°F (-40...71°C). Operating: -25...140°F (-32...60°C). Humidity 5...95% non-condensing
Connections	3 ft. (91 cm) Appliance cable, 1/2" conduit connectors	Location	NEMA Type 1. NEMA Type 4 (IEC IP56) with customer supplied water tight conduit connectors
Electrical Outputs	Travel: Mechanically limited to 101° ±1°	Agency Listings	c-UL-us LISTED per UL 873 and CAN C22.2 No.24-93. CE compliant to directives LVD, EMC, and RoHS2.

a - With the addition of a 500 ohm resistor (AM-708).

Part Number	Torque lb-in (N-m)	Actuator Inputs			Outputs		Approximate Timing in sec. @ 70°F
		Control	Voltage	VA @ 60Hz	Feedback	Auxiliary Switch	
MF41-6343	300 (34)	Floating	24 Vac/dc	5.7	—	No	162
MS41-6343		2...10 vdc		5.6	2...10 vdc		148
MS41-6340			120 Vac	7.5			

# Damper Accessories



Part Number	Description	Spring Return Actuators						Non Spring Return Actuators								
		MA40-7043 MF40-7043	MS40-7043	MA41-7073 MF41-7073	MS41-7073	MA41-7153 MF41-7153	MS41-7153	MA40-717X MF40-7173	MS40-7173	MS4D-x033	MF41-6043 MS41-6043	MF41-6083	MS41-6083	MF41-6153	MS41-6153	MF41-6343
AM-621	Round Shaft Extension															
AM-671abcd AM-672abcd AM-673 <sup>c</sup>	Mounting Bracket															
AM-674	Weather Shield & Base															
AM-675																
AM-676	Shaft Extension															
AM-686	Position Indicator															
AM-687 <sup>e</sup>	V-clamp															
AM-688	Replacement Universal Clamp															
AM-689	Rotation Limiter															
AM-690-R <sup>i</sup>	Crank Arm															
AM-692 <sup>f</sup>	V-bolt															
AM-693-R <sup>gh</sup>	Crank Arm Kit															

a - AM-693 crank arm required.

b - Cannot be used with Mx41-634x or Mx40-717x series actuators.

c - Drill appropriate mounting holes where needed.

d - The large "C"-shaped clamps included in AM-693 crank arm kit are required for mounting the actuator. Drill appropriate mounting holes where needed.

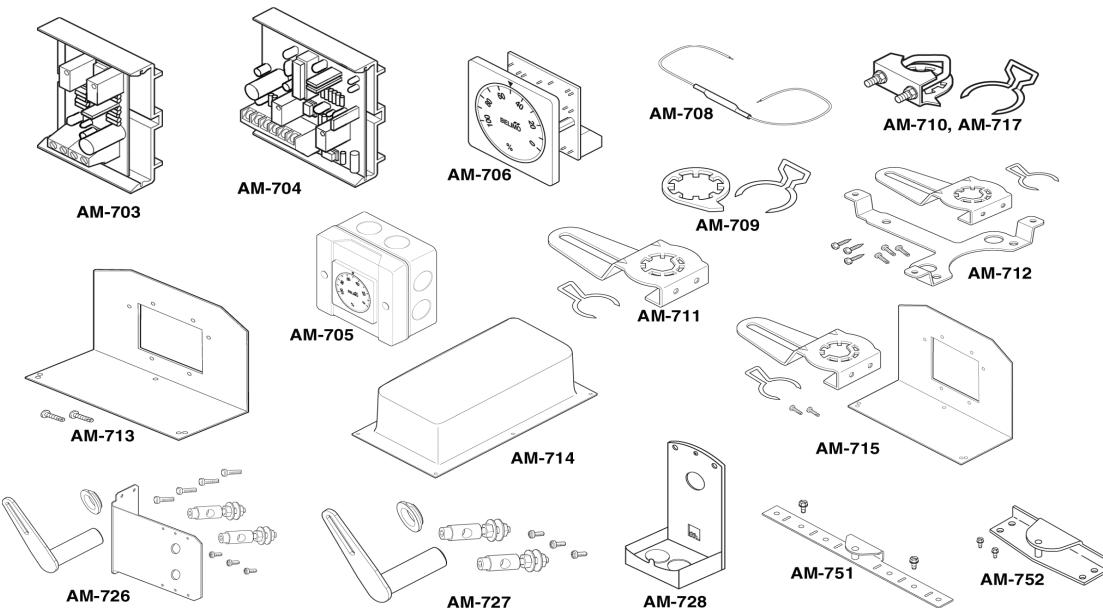
e - For shafts to 1.05" diameter or 5/8" square.

f - For shafts to 3/4" and 1.05" diameter (with AM-690 and AM-691, respectively).

g - Use the self-tapping screws and flat washers provided in kit to mount actuator.

h - AM-692 V-bolt required. The AM-693-R damper linkage kit is used in conjunction with the AM-687 or AM-688 universal clamps to provide a mechanical linkage between the damper actuator and the damper shaft when a direct coupling is not possible.

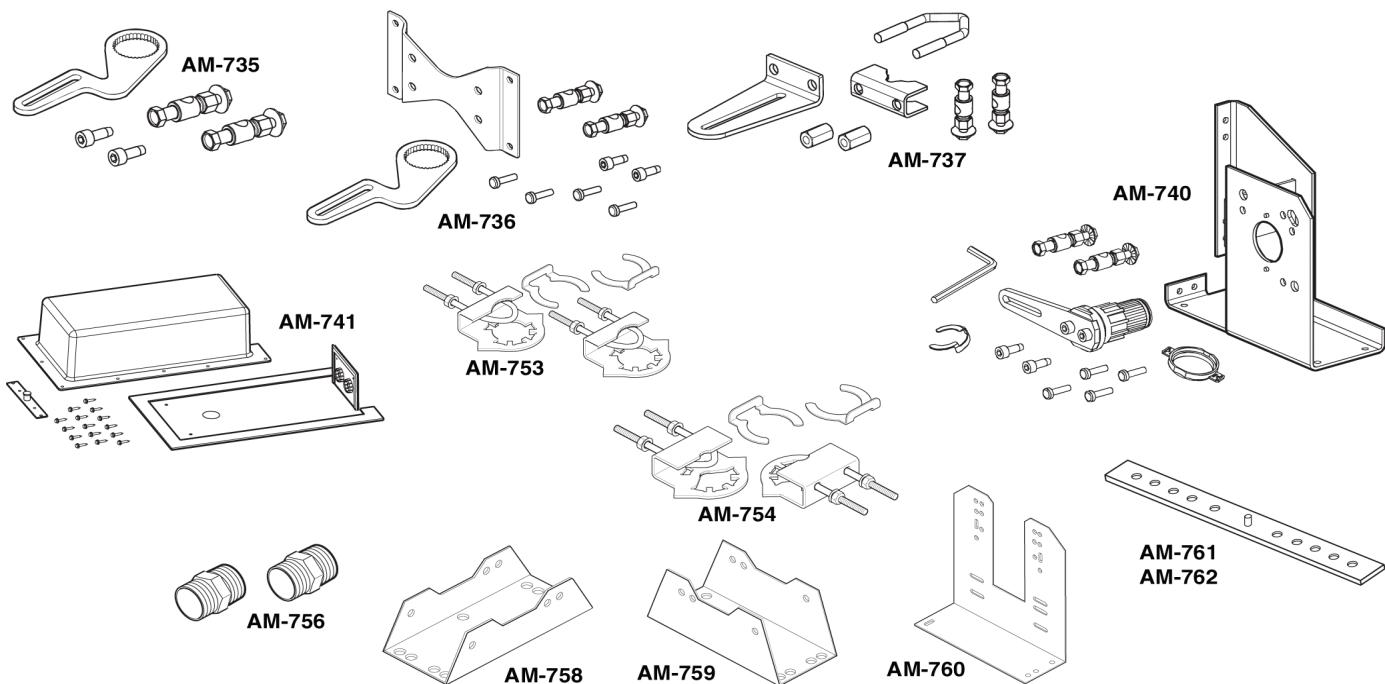
i - Used in conjunction with the AM-687 or AM-688 universal clamps for crankarm functionality in non-direct mounting applications.



Part Number	Description	Spring Return Actuators						Non Spring Return Actuators									
		MA40-7043 MF40-7043	MS40-7043	MA41-7073 MF41-7073	MS41-7073	MA41-7153 MF41-7153	MS41-7153	MA40-7173 MF40-7173	MS40-7173	MS4D-033	MF41-6043	MS41-6043	MF41-6083	MS41-6083	MF41-6153	MS41-6153	MF41-6343
AM-703	Span Adjustment																
AM-705	Positioner																
AM-706																	
AM-708	500 Ω Resistor																
AM-709	Position Indicator & Stroke Limiter																
AM-710 <sup>a</sup>	V-clamp																
AM-711	Crank Arm Adaptor Kit																
AM-712																	
AM-713	Bracket																
AM-714	Weather Shield																
AM-715	Crank Arm Adaptor Kit																
AM-717	Replacement Universal Clamp																
AM-726	Crank Arm Adaptor																
AM-727																	
AM-728 <sup>b</sup>	Conduit Adaptor																
AM-751	Anti-rotation Bracket																
AM-801	Mx41-730x-xxx Actuator Crank Arm Kit																
AM-802	Mx41-730x-xxx Actuator Crank Arm Kit with Actuator Mounting Bracket and Two Ball Joints																
AM-803	9-3/4" damper Shaft Extension for 5/16"…1" Diameter Round Shafts																
AM-804	Jackshaft Linkage (requires AM-805 Support Plate for Mx41-73xx Actuators)																
AM-805	Support Plate for Mx41-73xx Actuators																
BEL-ZTH	US Handheld Interface Module for Field Programming of the MS41-7303-xxx Models																

a - For shafts up to  $\frac{3}{4}$ " (19 mm) diameter round up to  $\frac{1}{2}$ " (13 mm).

b - Cannot be used when creating a linked valve/actuator assembly.



Part Number	Description	Spring Return Actuators								Non Spring Return Actuators										
		MA40-7043	MF40-7043	MS40-7043	MA41-7073	MF41-7073	MS41-7073	MA41-7153	MF41-7153	MS41-7153	MA40-717x	MF40-7173	MS40-7173	MS4D-x033	MF41-6043	MS41-6043	MF41-6083	MS41-6083	MF41-6153	MS41-6153
AM-735	Crank Arm Kit																			
AM-737	Universal Crank Arm <sup>a</sup>																			
AM-741	Weather Shield																			
AM-753 <sup>b</sup>	Mounting Clamp																			
AM-754 <sup>c</sup>																				
AM-756	Metric Conduit Adaptor																			
AM-758	Short "U" Mounting Bracket																			
AM-759	Tall "U" Mounting Bracket																			
AM-760	Slotted "L" Mounting Bracket																			
AM-761	7-inch Anti-rotation Bracket																			
AM-762	9-inch Anti-rotation Bracket																			

a - For Honeywell Floor Mount Mod. Motor.

b - For shafts  $\frac{3}{8}$ " (19 mm) round and  $5/8$ " (15.9 mm) square.

c - For shafts  $3/8$ "... $\frac{1}{2}$ " (10...13 mm) round and square.

d - Only used on Mx41-707x-xxx, Mx41-715x-xxx.

