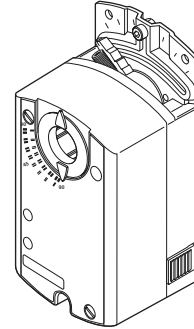


Non-Spring Return DuraDrive® Modulating Actuator

The DuraDrive direct coupled 24 Vac non-spring return rotary electric actuators are designed for modulating control of dampers.

Features:

- Compact, lightweight design.
- Self-adapting capability for maximum flexibility in damper positioning.
- Manual override.
- 5° offset from 0° as shipped from factory.
- Offset and slope (zero and span) adjustment models available.
- Independently adjustable dual auxiliary switches available.
- CUL and UL listed; CE certified.
- 0 to 10 Vdc feedback output.



Model Chart

Damper Actuators.

Model No.	Output Torque Rating lb.-in. (N-m)	Actuator Power Input		Slope/Offset Adjustable (Zero Span)	SPDT Auxiliary Switches	Approximate Timing in Seconds @ 70°F (21°C) with No Load		Shaft Size			
		Voltage	VA			50 Hz	60 Hz				
	Running VA										
MS41-6043	35 (4)	24 VAC +20%-15%	3.3	None	None	108	90	3/8" to 5/8" dia. 1/4" to 1/2" sq. 9/16" hex			
MS41-6043-520				Yes	None						
MS41-6043-522				Yes	Two						
MS41-6043-502				None	Two						
MS41-6083	70 (8)			24 VAC +20%-15%	3.3	None	None		150	125	3/8" to 5/8" dia. 1/4" to 1/2" sq. 9/16" hex
MS41-6083-520						Yes	None				
MS41-6083-522						Yes	Two				
MS41-6083-502						None	Two				

Valve Actuator/Linkages.

Model No. ^a	Linkage (Included)	Actuator Power Input 50/60 Hz.		SPDT Auxiliary Switches
		Voltage	VA Running	
MS41-6043-200	AV-603	24 Vac + 20% - 15%	3.3	No
MS41-6043-202				Yes
MS41-6083-200				No
MS41-6083-202				Yes

^a Refer to Valve Catalog, F-27384 for correct applications.

MS41-60xx Series

Specifications

Inputs	
Control signal	MS41-60x3: Proportional, 0 to 10 Vdc; input resistance 100K Ω . Control signal adjustment available with MS41-60x3-522 and MS41-60x3-522. Start point (offset): 0 and 50 Vdc (factory setting = 0 Vdc) Span 2 to 30 Vdc.
Power	24 Vac, +20%-15%, rated Class 2, Class III per EN60730. MS41-6083: 24 Vac +20%/-10% at 90 to 130°F (32 to 55°C) ambient. Half wave device.
Connections	3 ft. (0.9 m) long, 18 AWG leads, plenum-rated.
Outputs	
Electrical	Output voltage: 0 to 10 Vdc.
	Maximum output current: 1 mA.
	MS41-60xx-502 auxiliary switch contact rating: AC Rating: 24 Vac, 4A Resistive, 2A Inductive. DC Rating: 12 to 30 Vdc, DC 2A.
	Switching hysteresis: 2°. Switch range: Switch A: 0 to 90° range in 5° intervals; Recommended range usage: 0 to 45°; Factory setting: 5°. Switch B: 0 to 90° range in 5° intervals; Recommended range usage: 45 to 90°; Factory setting: 85°.
	Timing: See Model Chart.
Mechanical	Output torque rating: MS41-6043 , 35 lb-in. (4 N-m); MS41-6083 , 70 lb-in. (8 N-m).
	Stroke: Normal angle of rotation is 90°, limited to a maximum of 95°. Field adjustable to limit travel on either end of stroke. MS41-60x3-52x have adjustable start point and span. Position indicator: Adjustable pointer is provided for position indication.
Environment	
Ambient temperature limits	Shipping and Storage: -40 to 158°F (-40 to 70°C). Operating: -25 to 130°F (-32 to 55°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA 2, IP54 to EN60529.
Dimensions	5-7/16 H x 2-3/4 W x 2-3/8 D in. (138 x 70 x 60 mm).
Agency Listings	
UL	UL-873, Underwriters Laboratories.
European Community	EMC Directive (89/336/EEC). Emissions (EN50081-1). Immunity (EN50082-2).
CUL	Canadian Standards C22.2 No. 24-93.
General Instructions	Refer to F-27214.

Accessories

Model No.	Description
AM-726	Rotary to linear bracket.
AM-727	Rotary to linear crank arm adaptor.
AM-728	Conduit adaptor.
AM-729	3/8 in. shaft adapter.
AV-603	1/2 to 2 in. Vx-7xxx valve linkage.

Typical Applications

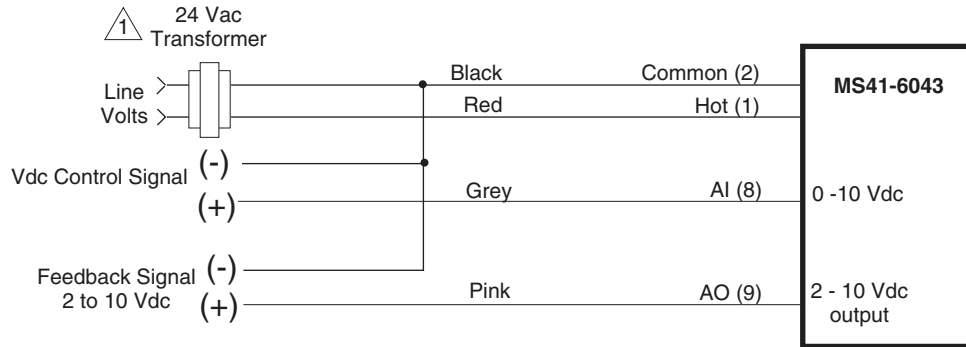


Figure 1 Typical Wiring for Proportional Control, 24 Vac, 0-10 Vdc Input.

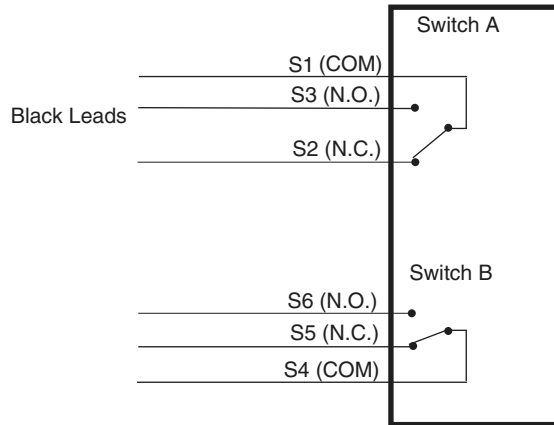


Figure 2 Typical Wiring for Auxiliary Switch Models MS41-60x3-502, -522, or -202.

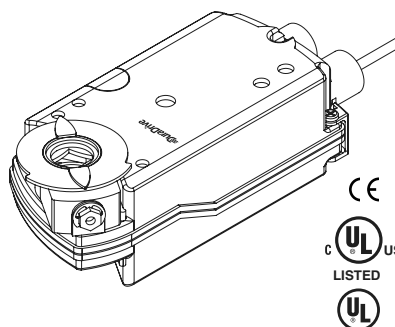
MS41-6153 Series

Non-Spring Return DuraDrive® Modulating Actuator

The DuraDrive direct-coupled, 24 Vac, non-spring return electronic actuator is designed for modulating control of building HVAC dampers.

Features:

- Synchronous motor technology with stall protection.
- Unique self-centering shaft coupling.
- Manual override.
- 133 lb-in (15 N-m) torque.
- 5° offset from 0° as shipped from factory.
- Mechanical range adjustment capabilities.
- Models with independently adjustable, dual auxiliary switches available.
- Built-in 1/2-in. conduit connection.
- UL and cUL listed, CE certified.
- 0 to 10 (factory set) or 2 to 10 Vdc input field selectable.
- 0 to 10 Vdc feedback output.



Model Chart

Damper Actuators.

Model No.	Output Torque Rating lb.-in. (N-m)	Power Input @ 50/60 Hz					SPDT Auxiliary Switches	Approximate Timing in Seconds @ 70°F (21°C) with No Load		Shaft Size
		Voltage	VA					50 Hz	60 Hz	
			Running		Holding					
			VA	W	VA	W				
MS41-6153	133 lb-in (15 N-m)	24 Vac ± 20%	5	4	1	1	No	150	125	1/4 to 3/4 in. dia. 1/4 to 1/2 in. sq.
MS41-6153-502							2			

Valve Actuator/Linkages.

Model No. ^a	Linkage (Included)	Actuator Power Input 50/60 Hz.			SPDT Auxiliary Switches
		Voltage	VA Running	Watts	
MS41-6153-200	AV-605	24 Vac ± 20%	5	4	No
MS41-6153-202					Yes
MS41-6153-220	AV-607				No
MS41-6153-222					Yes

^a Refer to Valve Catalog, F-27384 for correct applications.

Specifications

Inputs

Control signal	0 to 10 Vdc (factory set) or 2 to 10 Vdc input field selectable (max. 34 Vdc). Resistance: > 100K ohms.
Power	All 24 Vac circuits are Class 2. 24 Vac +20/-15% @ 50/60 Hz. Running VA: 5 @ 4 W, Holding VA: 1.2 @ 1 W. Half wave device.
Connections	3 ft. (0.9 m) long, 18 AWG leads.

Specifications (Continued)

Outputs	
	Position output signal wires 9 and 2.
Output voltage:	0 to 10 Vdc.
Maximum output current:	± 1 mA
Electrical	Dual auxiliary switches available on MS41-6153-502.
	Switch contact rating: 6A resistive, 2A inductive.
	Switch voltage: 24 Vac.
	Switching hysteresis: 2.
	Switch range: Switch A: 0 to 90° range in 5° intervals; Recommended range usage: 0 to 45°; Factory setting: 5°. Switch B: 0 to 90° range in 5° intervals; Recommended range usage: 45 to 90°; Factory setting: 85°.
	Timing: 150 seconds @ 50 Hz. 125 seconds @ 60 Hz.
Mechanical	Output torque rating: 133 lb-in. (15 N-m).
	Stroke: Normal angle of rotation is 90°, limited to a maximum of 95°. Field adjustable to limit travel on either end of stroke.
	Position indicator: Adjustable pointer is provided for position indication.
Environment	
Ambient temperature limits	Operation: -25 to 130°F (-32 to 55°C). Storage and transport: -40 to 158°F (-40 to 70°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA Type 1, IP54 according to EN 60 529.
Dimensions	8-3/8 H x 3-1/4 W x 2-2/3 D in. (213 x 83 x 68 mm).
Agency Listings	
UL	UL-873, Underwriters Laboratories. UL Listed to UL 60730.
European Community	EMC Directive (89/336/EEC). Emissions (EN50081-1). Immunity (EN61000-6-2).
CUL	Canadian Standards C22.2 No. 24-93.
General Instructions	Refer to F-27215.

Accessories

Model No.	Description
AM-674	Weather shield.
AM-675	Mounting base for weather shield.
AM-703	Span adjustment module.
AM-704	Pulse to 2 to 10 Vdc converter.
AM-705	Remote positioner surface mount for 0 to 10 Vdc control.
AM-706	Remote positioner flush mount for 0 to 10 Vdc control.
AM-726	Linear conversion kit with mounting bracket.
AM-727	Linear conversion kit.

MS41-6153 Series

Typical Applications

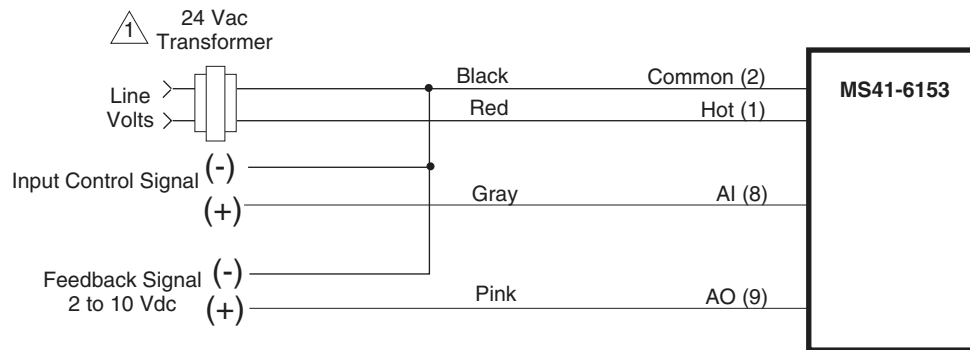


Figure 1 Typical Wiring for Proportional Control 24 Vac, 0-10 Vdc Input Standard.

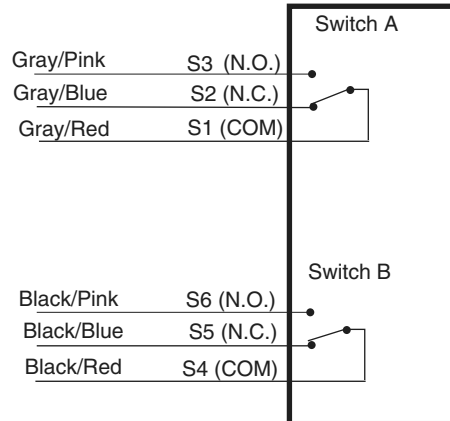


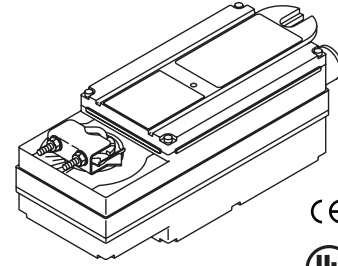
Figure 2 Typical Wiring for Auxiliary Switch Models MS41-6153-502, -505, or -222.

Non-Spring Return DuraDrive® Proportional Actuator

For non-spring return applications that require proportional modulation control of dampers and valves in HVAC systems.

Features:

- Direct mount to round or square damper shaft.
- 300 lb.-in (34 N-m) rated torque.
- Overload protection throughout rotation.
- Oil immersed gear train provides continuous lubrication.
- NEMA 4 housing (IEC IP56).
- Manual override to allow positioning for installation and manual operation.
- Automatic current sensing motor control provides extended reliability and repeatable timing.
- Proportional control compatible with 2 to 10 Vdc or 4 to 20 mAdc with integrated resistor.



Model Chart

Damper Actuators.

Model No.	Output Torque Rating lb.-in. (N-m)		Power Input @ 50/60 Hz				SPDT Auxiliary Switches	Approximate Timing in Seconds @ 70°F (21°C) with No Load	Shaft Size
	Minimum	Maximum Stall	Voltage	VA	Watts				
					Running	Holding			
MS41-6343	300 (34)	600 (68)	24 Vac ± 20%	8	10	NA	No	<145	1/2 to 1 in. diameter 1/2 to 5/8 in. square
MS41-6340 ^a			120 Vac ± 10%						
MS41-6341			240 Vac ± 10%						

^a The CE directive is not applicable to this model.

Valve Actuator/Linkages.

Model No.	Linkage (Included) ^a	Actuator Power Input 50/60 Hz.				SPDT Auxiliary Switches
		Voltage	VA	Watts		
				Running	Holding	
MS41-6043-200	AV-609	24 Vac ± 20%	8	10	N/A	No

^a AV-609: Use with 5 and 6 in. VB-9xxx and 6 in. VB-8xxx globe valves.

Specifications

Inputs

Control signal	Proportional, 2 to 10 Vdc or 4 to 20 mAdc with intergral 500 ohm resistor.
Power	Refer to Model Chart.
Connections	2 ft. (0.6 m) appliance cable. 1/2 in. conduit connectors. For M20 metric conduit, use AM-756 adaptor.

Outputs

Motor Type	Brushless DC.
Mechanical	Direction of rotation: CW or CCW rotation is available through reverse mounting. Dual shaft clamp: Direct coupled using a through hole output hub for 3/8 to 1/2 in. round included. Position indicator: Pointer and scale.

MS41-634x Series

Specifications (Continued)

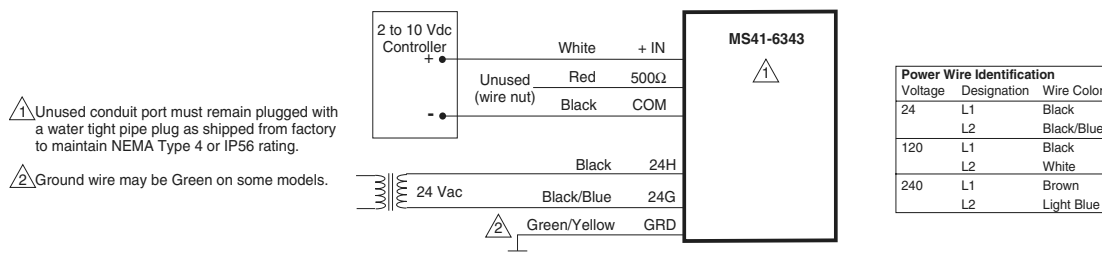
Environment

Temperature limits	Shipping and Storage: -40 to 160°F (-40 to 71°C) ambient. Operating: -25 to 140°F (-32 to 60°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA 1, NEMA 4 (IEC IP56) with customer supplied water tight connectors.
Dimensions	10-27/32 H x 4 W x 4 D in. (275 x 102 x 102 mm).
Agency Listings	
UL	UL-873, Underwriters Laboratories Listed (File #E9429 category: Temperature-Indicating and Regulating Equipment.)
European Community	EMC Directive (89/336/EEC). Low Voltage Directive (72/23/EEC).
CSA	Canadian Standards C22.2 No. 24-93.
Australia	This product meets requirements to bear the C-Tick mark according to the terms specified by the Communications Authority under the Radio Communications Act 1992.
General Instructions	Refer to F-26745.

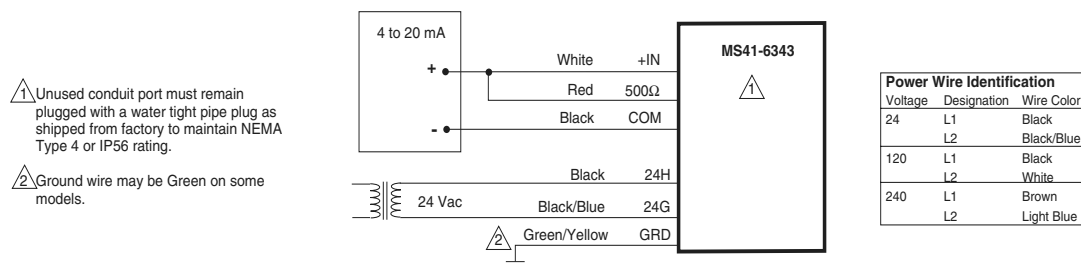
Accessories

Model No.	Description
AM-676	Universal shaft extension, approximately 9-1/2 in. long (242 mm) for use on 3/8 to 11/16 in. (10 to 17 mm) round shafts, 3/8 to 9/16 in. square shafts. (AM-753 clamps required).
AM-703	Span adjustment module mA/Vdc input to 2 to 10 Vdc output.
AM-704	Modulating interface pulse to 2 to 10 Vdc control.
AM-705	Positioner for 0 to 10 Vdc control.
AM-706	Positioner for 0 to 10 Vdc control.
AM-751	Standard anti-rotation bracket 9 in. long x 13/16 in. wide (229 x 21 mm), included with actuator.
AM-752	Optional anti-rotation bracket 4 in. long x 1-11/16 in. wide (102 x 43 mm), for narrow spaces.
AM-753	Damper shaft mounting clamps for 5/8 in. square shaft, 3/4 in. and 1 in. round shafts (two per package).
AM-754	Standard universal mounting clamps for 3/8 in. to 1/2 in. (10 to 13 mm) round and square shafts, two included with actuator.
AM-755	Manual override crank.
AM-756	Metric conduit adaptor M20 x 1.5 to 1/2 in. NPT (two per package).
AV-609	5 and 6 in. Vx-9xxx valve linkage or 6 in VX-8000.

Typical Applications



**Figure 1 Typical Wiring Diagram for 2 to 10 Vdc Controller with a 24 Vac Actuator
(See Power Wiring Identification for 120 or 240 V Power).**



**Figure 2 Typical Wiring Diagram for 4 to 20 mA Controller with a 24 Vac Actuator
(See Power Wiring Identification for 120 or 240 V Power).**