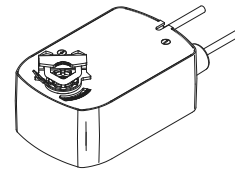
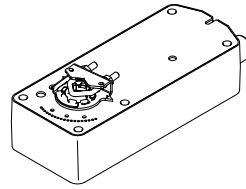


Spring Return DuraDrive® Proportional Actuator

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

Features:

- Proportional models controlled by 6-9 Vdc, 2-10 Vdc or 4-20 mA with the addition of a 500 ohm resistor.
- 35 lb.-in. (4 N-m), 60 lb.-in (7 N-m), 133 lb.-in (15 N-m).
- Direct mount to round or square damper shaft.
- Overload protection throughout rotation.
- True mechanical clockwise or counterclockwise spring return operation for 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.
- MS40-7043: plenum rated cables.
- MS41-7xxx equipped with manual override.



Model Chart																
Model No.	Output Torque Rating lb.-in. (N-m)		Stroke	Power Input						Approximate Timing in Seconds @ 70°F (21°C) ^a		SPDT Auxiliary Switches	Shaft Size	Auxiliary Power Supply	Input	
				Voltage	Running		DC Amps	Holding 50/60 Hz	Powered	Spring Return						
	50 Hz VA	60 Hz W			60 Hz VA	60 Hz W										
MS40-7043 ^c	35 (4)	120 (14)	95° ± 5° maximum, adjustable from 40 to 95° with mechanical stop	24 Vac ± 20% 22-30 Vdc	5.6	4.2	5.6	4.2	.15	2.4	<130	<25	No	5/8 in. dia. 1/2 in. sq.	None	2-10 Vdc or 4-20 mA w/500 Ω
MS40-7043-501 ^c					One ^d											
MS40-7043-MP					No											
MS40-7043-MP5					One ^d											
MS41-7073	60 (7)	160 (18)	95° ± 5° maximum, adjustable from 30 to 95° with AM-689 rotation limiter	24 Vac ± 20% 22-30 Vdc	5.8	4.6	5.8	4.6	.17	2.3	<195	<30	No	3/4 in. dia. 1/2 in. sq.	None	2-10 Vdc or 4-20 mA w/500 Ω
MS41-7073-502					Two ^e											
MS41-7153					No											
MS41-7153-502	133 (15)	300 (34)			9.8	7.4	9.7	7.4	.28	2.9	<190	<30	Two ^e			

^a Timing was measured with no load applied to the actuator.
^b De-rating required for spring return actuators at low temperatures.
^c With plenum-rated cable.
^d One adjustable from 0 to 95° rotation (0 to 1 scale).
^e One adjustable from 25 to 85° rotation and one set to operate @ 5° fixed.

Specifications	
Inputs	
Control signal	Proportional, 6 to 9 Vdc, 2 to 10 Vdc, or 4 to 20 mA with 500 ohm resistor.
Power	All 24 Vac circuits are Class 2. Refer to Model Chart for AC and DC ratings. Half wave device.
Connections	MS41-7073, MS41-7153: 3 ft. (0.9 m) long, appliance cables, 1/2 in. conduit connectors. For M20 metric conduit, use AM-756 adaptor. MS40-7043: 3 ft. (0.9 m) long, plenum-rated cables, 1/2 in. conduit connectors. For M20 metric conduit, use AM-756 adaptor. MS40-7043: 3 ft. (0.9 mm) plenum rated cable.
Outputs	
Motor Type	Brushless DC.
Electrical	Internal Power Supply: 20 Vdc, 25 mA. Control Mode: Switch provided for selection of direct acting or reverse acting control mode.
Mechanical	Position Indicator: MS40-7043: Visual indicator, 0 to 1 (0 is the spring return position). MS41-7073, MS41-7153: Pointer (-5 to 90°) and scale are provided for position indication (-5 is normal or spring return position). Direction of rotation: CW or CCW rotation is available through reversible mounting. Damper shaft clamp: Direct coupled using a through hole output hub.
Environment	
Temperature limits	Shipping and storage: -40 to 160°F (-40 to 71°C) ambient. Operating: -22 to 140°F (-30 to 60°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA 1, NEMA 2 (IEC IP54) with conduit in the down position.
Agency Listings	
UL	UL-873, Underwriters Laboratories Listed (File #9429 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. 4-93.
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-26645.

MS40-7043, MS41-7073, MS41-7153

Accessories

Model No.	Description
MS40-7043, MS41-7073, MS41-7153	
AM-673 ^a	Mounting bracket.
AM-674	Weather shield.
AM-675	Weather shield base.
AM-676	Universal shaft extension, approximately 9-1/2" long (242 mm) for use on 3/8" to 11/16" (10 to 17 mm) round shafts, 3/8" to 9/16" square shafts. (AM-753 clamps required).
AM-703	Span adjustment.
AM-704	Modulating interface.
AM-705	Positioner.
AM-706	Positioner.
AM-707	Digital indication.
AM-708	500 ohm resistor.
AM-756	Metric conduit adaptor M20 x 1.5 to 1/2" NPT (two per package).
AM-714	Weather shield.
AM-715 ^f	Crank arm adaptor kit.
AM-762	Replacement 9-inch anti-rotation bracket
MS41-7073, MS41-7153	
AM-671 ^{abcd}	Mounting bracket.
AM-672 ^{abcd}	Mounting bracket.
AM-686	Position indicator.
AM-687	V-clamp.
AM-688	Replacement universal clamp
AM-689	Rotation limiter.
AM-690	Crank arm.
AM-691	Crank arm.
AM-692	V-bolt.
AM-693 ^{ef}	Crank arm kit.
AM-758	Universal short "U" mounting bracket
AM-759	Universal long "U" mounting bracket
AM-760	Universal slotted "L" mounting bracket
VA-602	Vx-7xxx 1 to 2 in. valve linkage.
VA-607	Vx-9xxx 2-1/2 to 4 in. valve linkage.
MS40-7043	
AM-709	Position indicator and stroke limiter.
AM-710	V-clamp.
AM-711	Crank arm adaptor kit.
AM-712 ^f	Crank arm adaptor kit.
AM-713 ^f	Bracket.
AM-717	Replacement universal clamp
AM-761	Replacement 7-inch anti-rotation bracket
AV-605	Vx-7xxx 1/2 to 2 in. valve linkage.

^a Drill appropriate mounting holes where needed.

^b AM-693 crank arm kit required.

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

^d The large "C"-shaped clamps included in AM-693 crank arm kit are required for mounting the actuator.

^e AM-692 V-bolt kit required.

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

Typical Applications

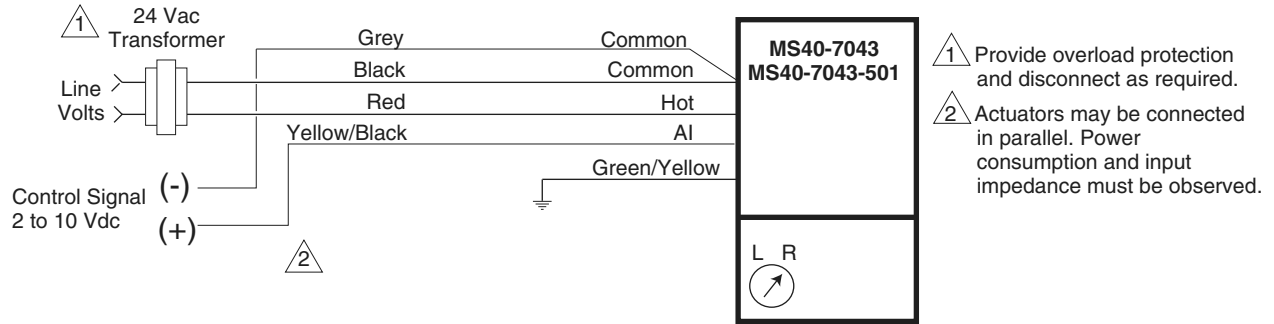


Figure 1 2 to 10 Vdc Control of MS40-7043 and MS40-7043-501 Actuator.

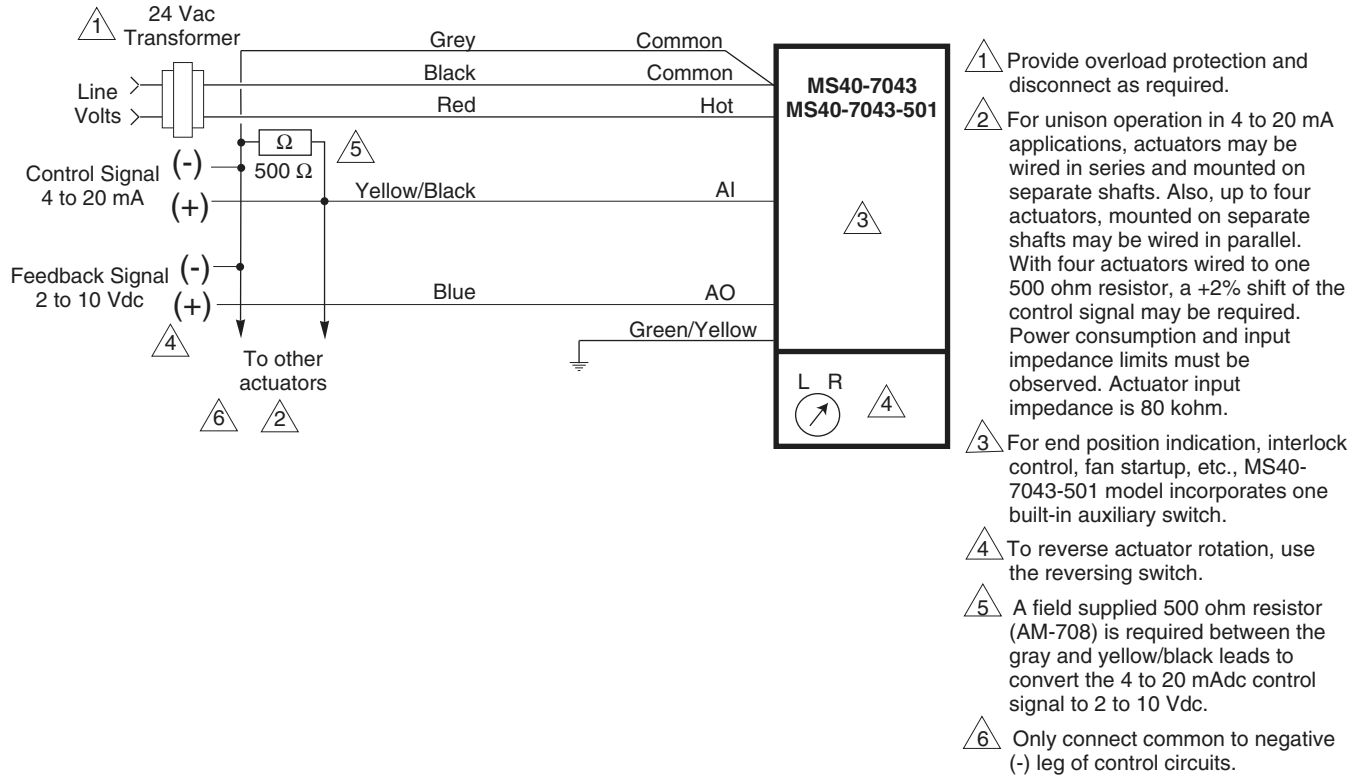


Figure 2 4 to 20 mA Control of MS40-7043 and MS40-7043-501 with 2 to 10 Vdc Feedback Control.

MS40-7043, MS41-7073, MS41-7153

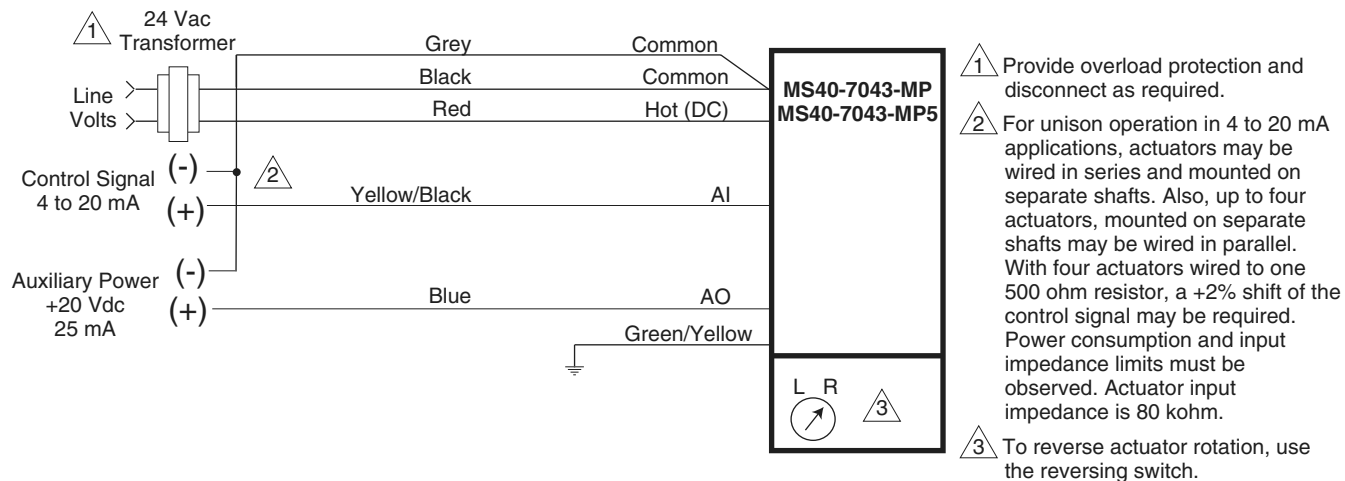


Figure 3 6 to 9 Vdc Proportional Control with 20 Vdc Power Output.

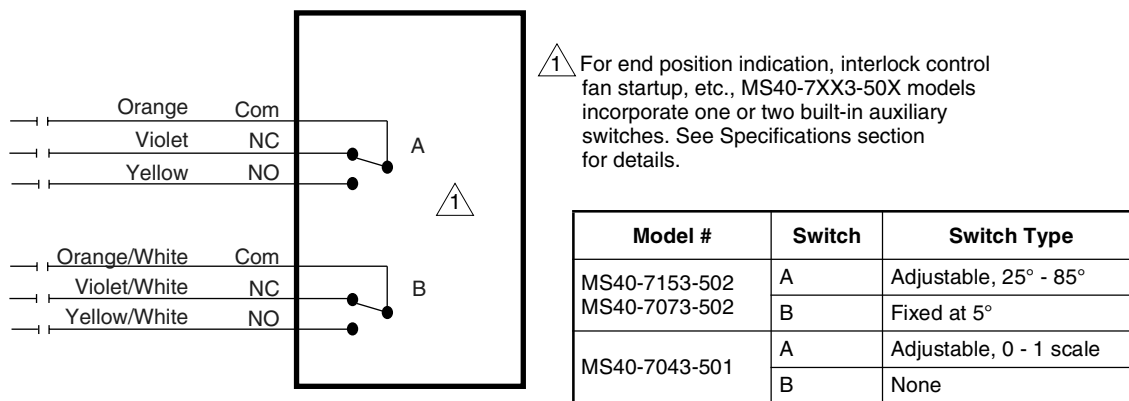


Figure 4 Optional Auxiliary Switches.

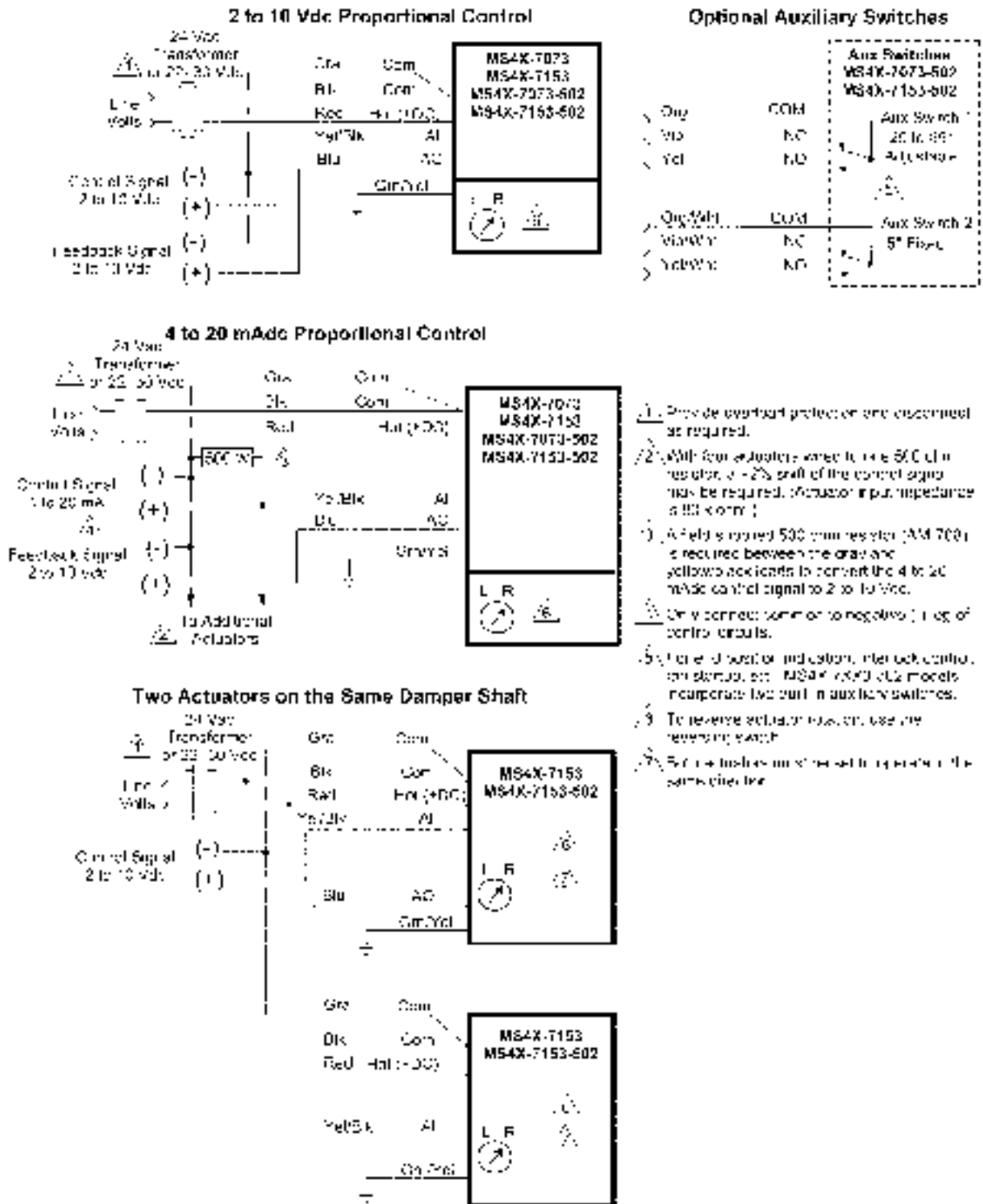


Figure 5 Typical Wiring Diagrams for Proportional Control 24 Vac Basic and Double Auxiliary Switch Models.

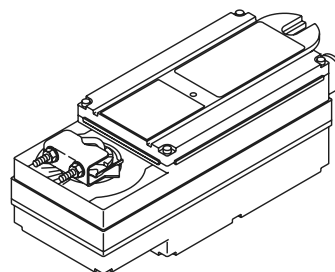
MS40-717x Series

Spring Return DuraDrive® Proportional Actuator

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

Features:

- 150 lb.-in. (17 N-m) rated torque.
- Direct mount to round or square damper shaft.
- Overload protection throughout rotation.
- True mechanical clockwise or counterclockwise spring return operation for positive close-off in airtight applications.
- Oil immersed gear train provides continuous lubrication.
- NEMA 4 housing (IEC IP56).
- Automatic current sensing motor control provides extended reliability and repeatable timing.
- Visual position indicator.
- Provide proportional control compatible with 2 to 10 Vdc or 4 to 20 mA dc with intergrated resistor.



Model Chart

Damper Actuators.

Model No.	Output Torque Rating lb.-in. (N-m)		Actuator Power Input 50/60 Hz.					SPDT Auxiliary Switches	Approximate Timing in Seconds @ 70°F (21°C) with No Load		Shaft Size
			Voltage	Watts	Stroke	VA			Powered	Spring Return	
	Minimum ^a	Maximum Stall				Running	Holding				
MS40-7173	150 (17)	450 (51)	24 Vac ± 20%	7.1	93° ± 1°	9.4	5.4	No	<145	1.05 in. dia. 5/8 in. sq.	
MS40-7170 ^b			120 Vac ± 10%	7.1		11.1	9.1				
MS40-7171			240 Vac ± 10%	7.2		11.8	10.1				

^a De-rating required for spring return actuators at low temperatures.

^b 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	Watts	VA		
				Running	Holding	
MS40-7173-200	AV-602	24 Vac ± 20%	7.1	9.4	5.4	No
MS40-7170-200 ^b		120 Vac ± 10%	7.1	11.1	9.1	
MS40-7171-200		240 Vac ± 10%	7.2	11.8	10.1	
MS40-7173-220	AV-607	24 Vac ± 20%	7.1	9.4	5.4	
MS40-7170-220		120 Vac ± 10%	7.1	11.1	9.1	
MS40-7171-220		240 Vac ± 10%	7.2	11.8	10.1	

^a AV-602: Use with 1-1/4 to 2 in. globe valves. AV-607: Use with 2-1/2 to 4 in. globe valves.

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

Specifications

Inputs	
Control signal	Proportional, 2 to 10 Vdc or 4 to 20 mA dc with integral 500 ohm resistor.
Power	Refer to Model Chart.
Connections	2 ft. (0.6 m) appliance cables, 1/2 in. conduit connector. 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.
	Position indicator: Pointer and scale are provided for position indication (0° is the normal, or spring return position).
	Stroke: 93° ± 1°
Environment	
Ambient Temperature limits	Shipping and storage: -40 to 160°F (-40 to 71°C). 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 connector.
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. 4-93.
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-26748 and F-27384.

Accessories

Model No.	Description
AM-674	Weather shield.
AM-676	Universal shaft extension, approximately 9-1/2 in. long (242 mm) for use on 3/8 to 1 1/16 in. (10 to 17 mm) round shafts, 3/8 to 9/16 in. square shafts. AM-753 clamps required).
AM-703	Span adjustment.
AM-704	Modulating interface.
AM-705	Positioner.
AM-706	Positioner.
AM-707	Digital indication.
AM-751	Standard anti-rotation bracket 9 in. long x 1 3/16 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 to 1/2 in. (10 to 13 mm) round and square shafts, two included with actuator.
AV-602	Vx-7xxx 1/2 to 2 in. valve linkage.
AV-607	Vx-9xxx 2-1/2 to 4 in. valve linkage.
M-756	Metric conduit adaptor M20 x 1.5 to 1/2 in. NPT (two per package).

MS40-717x Series

Typical Applications

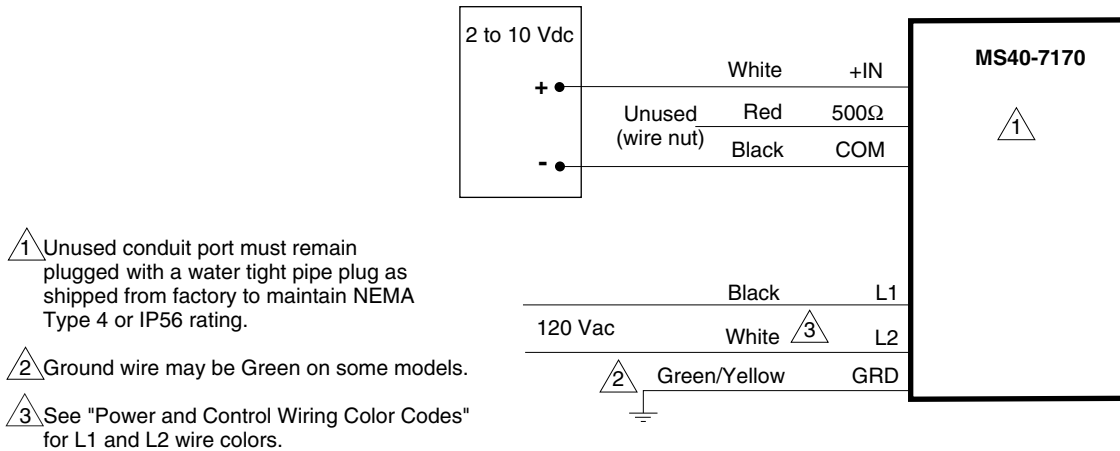


Figure 1 Typical MS40-7170 2 to 10 Vdc Wiring Diagram (120 Vac).

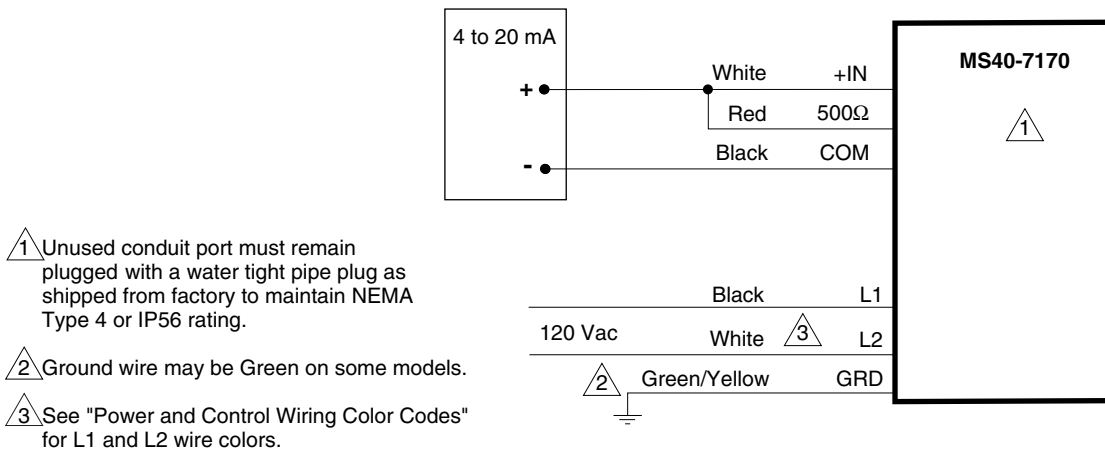


Figure 2 Typical MS40-7170 4 to 20 mA Wiring Diagram (120 Vac).

Power and Control Wiring Color Codes.

Model	Lead	Color	Voltage
MS40-7171	L1	Brown	240V
	L2	Light Blue	240V
MS40-7173	L1	Black	24 V H
	L2	Black/Blue	24 V G