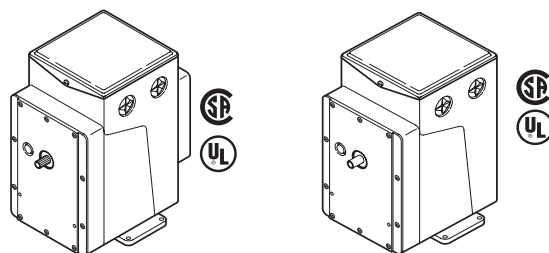


Reversible and Proportional Electric Actuators

The MP Series Actuators are used for two-position, floating, and proportional control of dampers, valves, and program switches in heating, ventilation, and air conditioning applications or similar applications.

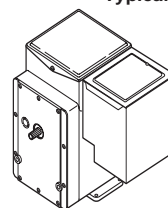
Features:

- Proportional actuators with built-in feedback potentiometers.
- Spring return and non-spring return models available.
- 24 Vac, 120 Vac, and 240 Vac models are available.
- Die cast housings with four 1/2 in. conduit openings.
- Oil-immersed motor and gear train.



Typical Spring Return

Typical Non-Spring Return



Typical -6XX Suffix
(CP-8301-XXX Installed,
CP-9301-XXX or
CP-9302-91X Installed)

Typical -691 or -692 Suffix
(CP-9301-XXX or
CP-9302-91X Installed)

Model Chart

MP-3XX Series.

Model No.	Application	Solid State Drive CP-8301-XXX CP-9301 CP-9302	Power Requirements			Output Shaft				Aux. Switch	Built-in Transformer ^a						
			Volts	Hz	Amps	Torque lb.-in. (N-m)	Timing Seconds (No Load)	Degrees of Rotation	Spring Return								
MP-361	Proportional	Available	24	60	2.5	50 (5.6)	90	180 (Adj. ^b)	CW	SPDT	—						
MP-361-600 ^c		CP-8301-024 Included															
MP-361-691 ^d		CP-9301 Included															
MP-367	Sequencing	—										2.5	220 (24.9)	130	180 (Adj. ^b)	—	SPDT
MP-371	Proportional	Available															
MP-371-600 ^c	Proportional	CP-8301-024 Included			2.2	130	180 (Adj. ^b)	CCW	No	SPDT							
MP-371-691 ^d		CP-9301 Included															
MP-377	Sequencing	—			2.5	220 (24.9)	130	180 (Adj. ^b)	No	SPDT							
MP-379	Five position	—															
MP-381	Proportional	Available			50	2.5	156	180 (Adjustable)	No	SPDT							
MP-382		Available															
MP-387	Sequencing	Available	50	2.5	156 to 1560 Adjustable	180 (Adjustable)	No	SPDT									
MP-389	Five position																
MP5-381	Proportional																
MP5-382		Available															

^a Units with a "-2" suffix, e.g. MP-XXXX-XXX-2-X, include a built-in transformer (used for Microtherm or with AE-504) with secondary loads wired externally to terminals seven and eight of the actuator. Red (24 Vac) to terminal eight and Blue (12 Vac) to terminal seven. When these actuators are used with controllers other than Microtherm or AE-504, disconnect the Red and Blue leads and tape off. Note: Models prior to "-2" suffix had transformer wired directly to potentiometer. To disconnect the transformer, remove the back plate of the actuator, disconnect, and tape the transformer leads.

^b Rotation adjustable 45 to 320°. Caution: On actuators with proportional input signals changing the rotation will affect the control, since the internal feedback potentiometer's travel is fixed.

^c Integral solid state drive CP-8301 accepts 6-9 Vdc voltage.

^d Integral solid state drive CP-9301 accepts 6-9 Vdc voltage.

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

MP-4XX Series

Model No.	Application	Solid State Drive CP-9301 CP-9302	Power Requirements			Output Shaft				Aux. Switch	Built-in Transformer ^a		
			Volts	Hz	Amps	Torque lb.-in. (N-m)	Timing Seconds (No Load)	Degrees of Rotation	Spring Return				
MP-421	Proportional	Available	120	60	0.65	60 (6.8)	25	180 (Adj. ^b)	No	SPDT	—		
MP-422							25 to 250 (Adj.)						
MP-423							13	90 (Adj. ^b)					
MP-424							13 to 130 (Adj.)						
MP-451						220 (24.9)	80	180 (Adj. ^b)					
MP-452							80 to 800 (Adj.)						
MP-453							40	90 (Adj. ^b)					
MP-454							40 to 400 (Adj.)						
MP-461-600	refer to footnote ^c	CP-8301-120 Included	120	60	0.5	50 (5.6)	90	180 (Adj. ^b)	CW	None	Yes		
MR-461-691	CP-9301												
MP-465	Proportional	Available											
MP-470	Five position	—											
MP-471-600	refer to footnote ^c	CP-8301-120 Included				0.5	220 (24.9)	130	180 (Adj. ^b)	180 (non-Adj.)	CCW	SPDT	—
MP-471-691		CP-9301 Included											
MP-475	Proportional	Available											
MP-480	Five position	—											
MP-481	Proportional	Available	0.95	450 (50.9)	130	180 (Adj. ^b)	180 (Adj. ^b)	No	None	Yes			
MP-481-600	refer to footnote ^c	CP-8301-120 Included											
MP-481-691 ^c		CP-9301 Included											
MP-483	Proportional	Available							50	15	220 (24.9)	65	90 (Adj. ^b)
MP-485			130	180 (Adj. ^b)									
MP-486			130 to 1300 (Adj.)										
MP-495 ^d			450 (50.9)	130									
MP5-483	—	—	50	15	220 (24.9)	90 (Adj. ^b)	No	SPDT	—				

^a Units with a "-2" suffix, e.g. MP-XXXX-XXX-2-X, include a built-in transformer (used for Microtherm or with AE-504) with secondary loads wired externally to terminals seven and eight of the actuator. Red (24 Vac) to terminal eight and Blue (12 Vac) to terminal seven. When these actuators are used with controllers other than Microtherm or AE-504, disconnect the Red and Blue leads and tape off. Note: Models prior to "-2" suffix had transformer wired directly to potentiometer. To disconnect the transformer, remove the back plate of the actuator, disconnect, and tape the transformer leads.

^b Rotation adjustable 45 to 320°. Caution: On actuators with proportional input signals changing the rotation will affect the control, since the internal feedback potentiometer's travel is fixed.

^c 6 to 9V proportional.

^d MP-495 is not rated for UL or CSA.

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

MP-2XXX Series.

Model No.	Application	Solid State Drive CP-9301 CP-9302	Power Requirements			Output Shaft				Aux. Switch	Built-in Transformer ^a
			Volts	Hz	Amps	Torque lb.-in. (N-m)	Timing Seconds (No Load)	Degrees of Rotation	Spring Return		
MP-2113-500	Proportional	Available	24	60	2.2	50 (5.6)	25	180 (non-Adj.)	No	SPDT	—
MP-2150-500			120		0.5						Yes
MP-2151-500			240		0.22						

^a Units with a “-2” suffix, e.g. MP-XXXX-XXX-2-X, include a built-in transformer (used for Microtherm or with AE-504) with secondary loads wired externally to terminals seven and eight of the actuator. Red (24 Vac) to terminal eight and Blue (12 Vac) to terminal seven. When these actuators are used with controllers other than Microtherm or AE-504, disconnect the Red and Blue leads and tape off. Note: Models prior to “-2” suffix had transformer wired directly to potentiometer. To disconnect the transformer, remove the back plate of the actuator, disconnect, and tape the transformer leads.

MP-4XXX Series.

Model No.	Application	Solid State Drive CP-9301 CP-9302	Power Requirements			Output Shaft				Aux. Switch	Built-in Transformer ^a
			Volts	Hz	Amps	Torque lb.-in. (N-m)	Timing Seconds (No Load)	Degrees of Rotation	Spring Return		
MP5-4651	Proportional	Available	240	50	0.25	50 (5.6)	108	180 (Adj. ^b)	CW	SPDT	Yes
MP-4701	Five position	—		60			90	180 (non-Adj.)	CCW	None	
MP5-4751	Proportional	Available		50			108			180 (Adj. ^b)	
MP-4851				60		130					
MP5-4851				50		220 (24.9)	156				

^a Units with a “-2” suffix, e.g. MP-XXXX-XXX-2-X, include a built-in transformer (used for Microtherm or with AE-504) with secondary loads wired externally to terminals seven and eight of the actuator. Red (24 Vac) to terminal eight and Blue (12 Vac) to terminal seven. When these actuators are used with controllers other than Microtherm or AE-504, disconnect the Red and Blue leads and tape off. Note: Models prior to “-2” suffix had transformer wired directly to potentiometer. To disconnect the transformer, remove the back plate of the actuator, disconnect, and tape the transformer leads.

^b Rotation adjustable 45 to 320°. Caution: On actuators with proportional input signals changing the rotation will affect the control, since the internal feedback potentiometer’s travel is fixed.

Part Numbers for Hazardous Locations Applications.

Hazardous Locations ^a	Hz	Listing
MP6-4XX	60	UL Listed and CSA Certified
MP7-3XX, MP7-4XX	50	

^a Class 1, Groups C and D, and Class 2, Groups E, F, and G Hazardous Locations; Ref. EN-56-2.

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

Specifications

Input Control signals	Refer to the Model Charts for input control signal capability versus specific actuator models.
Floating	Requires one Single Pole Double Throw (SPDT) switch with floating (center off) position rated at 0.9 amps at 24 Vac or two Single Pole Single Throw (SPST) switches rated at 0.9 amps at 24 Vac.
Two-position	SPDT: Requires snap acting switch rated at 0.9 amps at 24 Vac. SPST: Can be used with certain spring return actuators. Switch must be rated to handle actuator power requirements.
Microtherm®	Proportional electrical system with the following typical controllers: PP-22X Series, TP-1XX Series, TP-2XX Series, TP-3XX Series, TP-4XX Series, TP-1XXX Series, and TP-1XXXX Series. Standard: Control of a single actuator. Sequencing: Control of two actuators in sequence. Five-position: Used typically for adjustable minimum position (five positions) of an economizer actuator.
Slidewire and paralleling	Requires AE-504 paralleling relay. AE-504 accepts 100 Ω to 1000 Ω slidewires.
Voltage Vdc (System 8000)	Requires CP-8301-XXX or CP-9301-XXX Series of solid state actuator drives. Refer to the Model Charts.
Current mAdc	Requires CP-9302-XXX Series of solid state actuator drives. Refer to the Model Charts.
Connections	
MP-3XX, 4XX, 2XXX, 4XXX	Coded screw terminals.
Models -600 Suffix	Coded screw terminals except for input signal which are color coded pigtailed.
Power Requirements	Refer to the Model Charts to determine power requirements.
Torque	Refer to the Model Charts to determine the actuator torque rating.
Nominal damper area	Actuator sizing should be done in accordance with damper manufacturer's specifications.
Spring return	Refer to the Model Charts for models that are spring return.
Environment	
Ambient temperature limits	Shipping and storage: -40 to 160°F (-40 to 71°C). Operating: -40 to 136°F (-40 to 58°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA 1. NEMA 4 for non-spring return actuators with AM-363.
Dimensions	
MP-3XX, 4XX, 2XXX, 4XXX	7 H x 5-3/8 W x 6-5/16 D in. (178 x 136 x 160 mm).
Models -600 Suffix	7 H x 5-3/8 W x 8-1/8 D in. (178 x 136 x 206 mm).

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

Accessories

Model No.	Description
Damper linkage accessories	
AM-111	Crank arm for 5/16 in. (7.9 mm) diameter damper shaft.
AM-112	Crank arm for 3/8 in. (9.5 mm) diameter damper shaft.
AM-113	Crank arm for 1/2 in. (12.7 mm) diameter damper shaft.
AM-115	Crank arm for 7/16 in. (11.1 mm) diameter damper shaft.
AM-116	Splined crank arm for actuator.
AM-122	Linkage connector, straight type.
AM-123	Damper clip.
AM-125	5/16 x 20 in. (7.9 mm x 0.5 m) damper rod.
AM-125-048	5/16 x 48 in. (7.9 mm x 1.2 m) damper rod.
AM-132	Ball joint connector.
AM-161	Damper linkage kit.
AM-161-1	Damper linkage kit.
AM-301	90 degree mounting bracket.
Miscellaneous actuator accessories	
AM-321	Two step switch kit.
AM-332	Potentiometer kit.
AM-341	Four step switch kit.
AM-342	Two step switch and potentiometer kit.
AM-363	NEMA 4 gasket kit for non-spring return actuators only.
CP-8301	Electronic drive, voltage input 1 to 20 Vdc.
CP-9301	Electronic drive, voltage input 6 to 9 Vdc.
CP-9302	Electronic drive, voltage input 4 to 20 mAdc.
TOOL-201	Calibration kit for System 8000.
TOOL-209	135 Ω slidewire calibration kit.
Valve linkage for 50 lb.-in. minimum, 180° actuator.	
AV-391	Valve linkage for 1/2 to 2 in. VB-7XXX and 1/2 to 1-1/4 in. obsolete VB-9XXX.
AV-392	Valve linkage for 1-1/2 and 2 in. obsolete VB-9XXX.
AV-395	Valve linkage for 2-1/2 to 4 in. VB-9213 or VB-9313.
Valve linkage for 130 lb.-in. minimum, 180° actuator.	
AV-352	Valve linkage for 2-1/2 to 6 in. VB-9213 or VB-9313, 4 to 6 in. VB-9323.
AV-393	Valve linkage for 1/2 to 2 in. VB-7XXX and 1/2 to 1-1/4 in. obsolete VB-9XXX.
AV-394	Valve linkage for 1-1/2 and 2 in. obsolete VB-9XXX.
AV-396	Valve linkage for 2-1/2 to 4 in. VB-9213 or VB-9313.

Typical Applications

- 1 Terminals 1,5, & 6 are used for built-in auxiliary switch.
- 2 Rotates CW or Closes Valve (Lowers Stem).
- 3 Rotates CCW or Opens Valve (Raises Stem).
- 4 These terminal are marked L1 & L2 on line voltage actuators.
- 5 Remove green wire to unground actuator.
- 6 SPDT Neutral Off Switch may be used on manual positioning applications.
- 7 Switch control circuit is 0.5 amp at approx. 24 Vac on either low or line voltage actuators.
- 8 Install under cover of actuator.

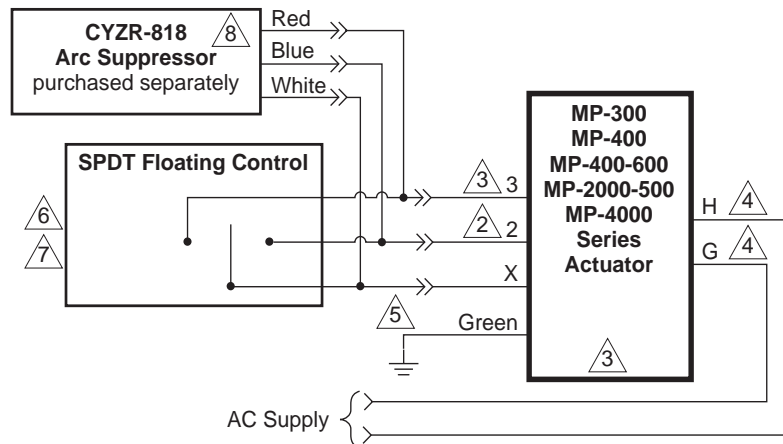


Figure 1 Control Type 1, Reversible Floating.

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

Max. Amp Rating	120V	240V
Running	5.8	2.9
Locked Rotor	34.8	17.4
Non-inductive	12	6

Figure 2 Adjustable Auxiliary Switch SPDT.

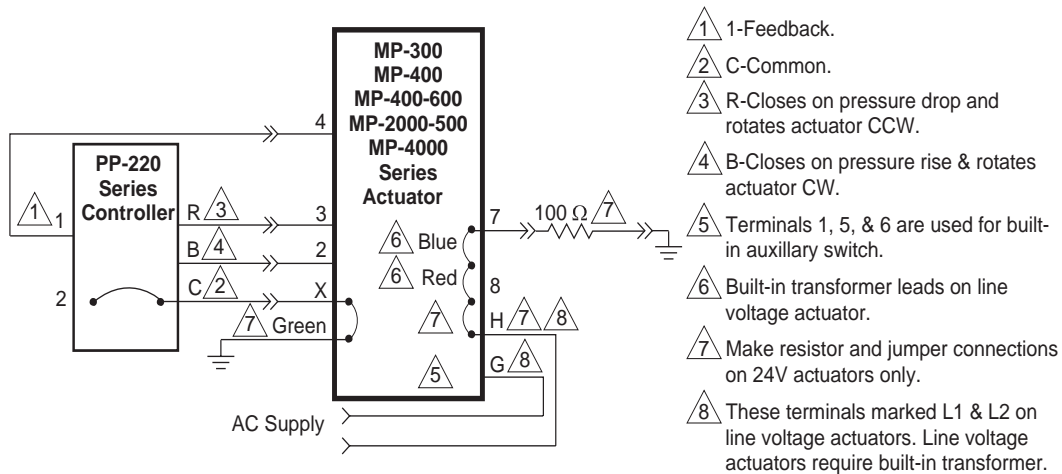


Figure 3 Control Type 2, PP-2XX.

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

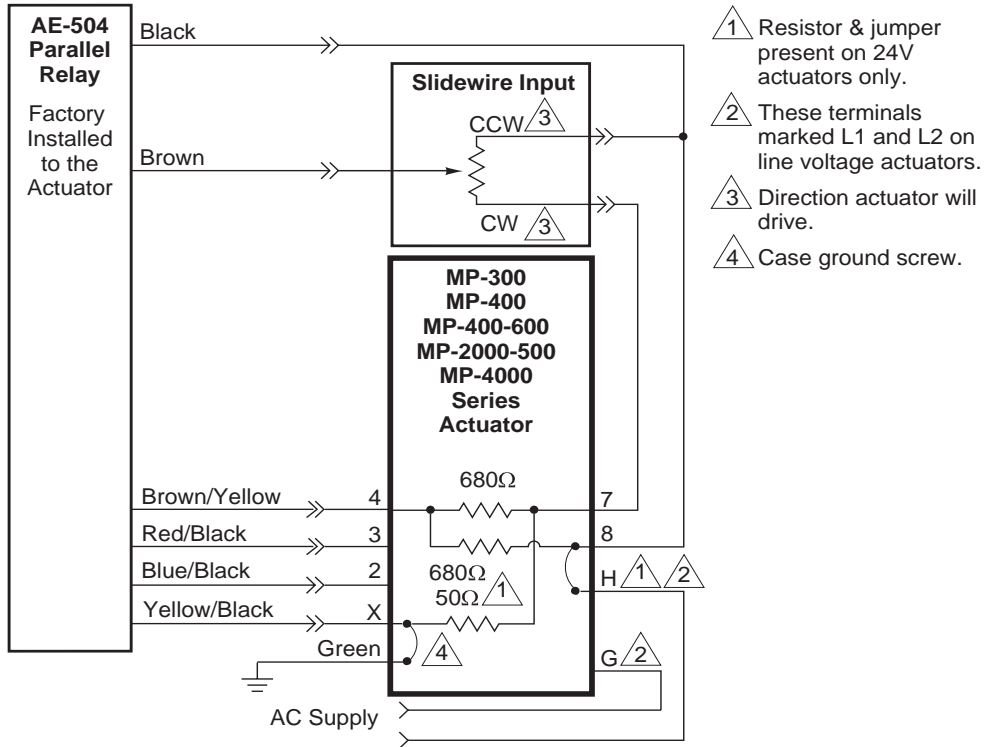
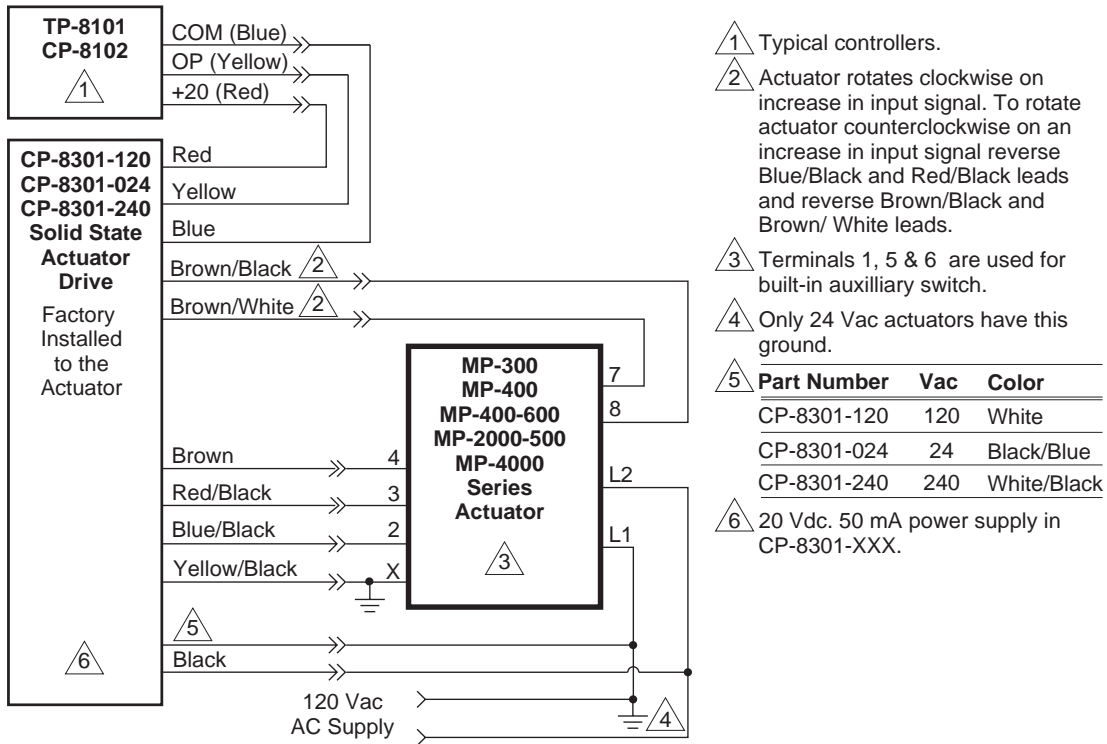
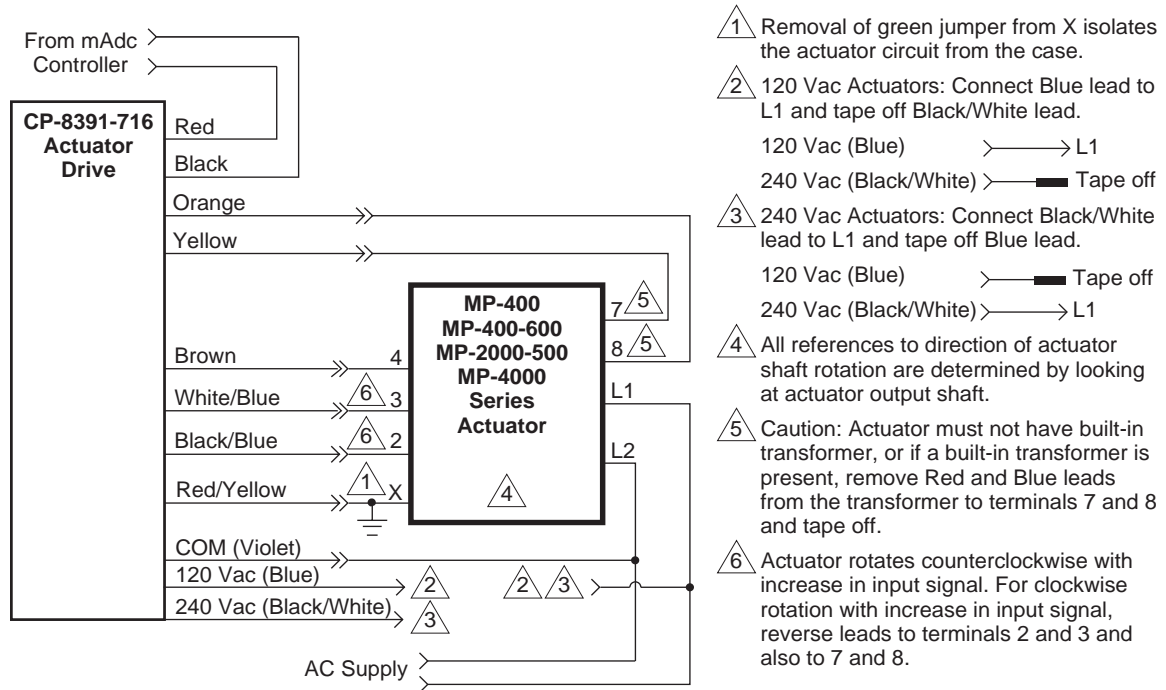


Figure 4 Control Type 3, Proportional Slidewire.

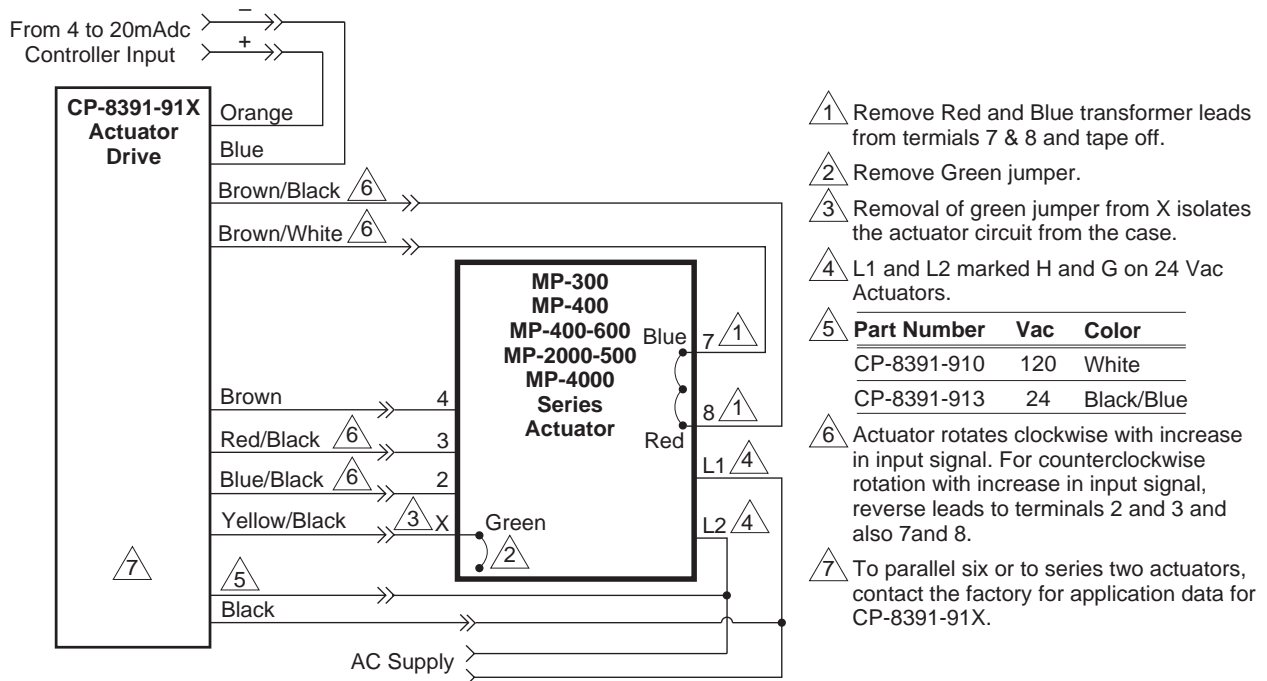


**Figure 5 Control Type 4, Proportional Electronic — Voltage.
Typical Wiring MP-461-600, MP-471-600, MP-481-600.**

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series



**Figure 6 Control Type 5, Proportional Electronic — Current
Typical Wiring CP-8391-716 to MP-4XX, MP-21XX-500 Actuators.**



**Figure 7 Control Type 6, Proportional Electronic — Current
Typical Wiring CP-8391-91X to MP-3XX, MP-4XX, and MP-21XX-500 Series Actuators.**

MP-3XX Series, MP-4XX Series, MP-2XXX Series, and MP-4XXX Series

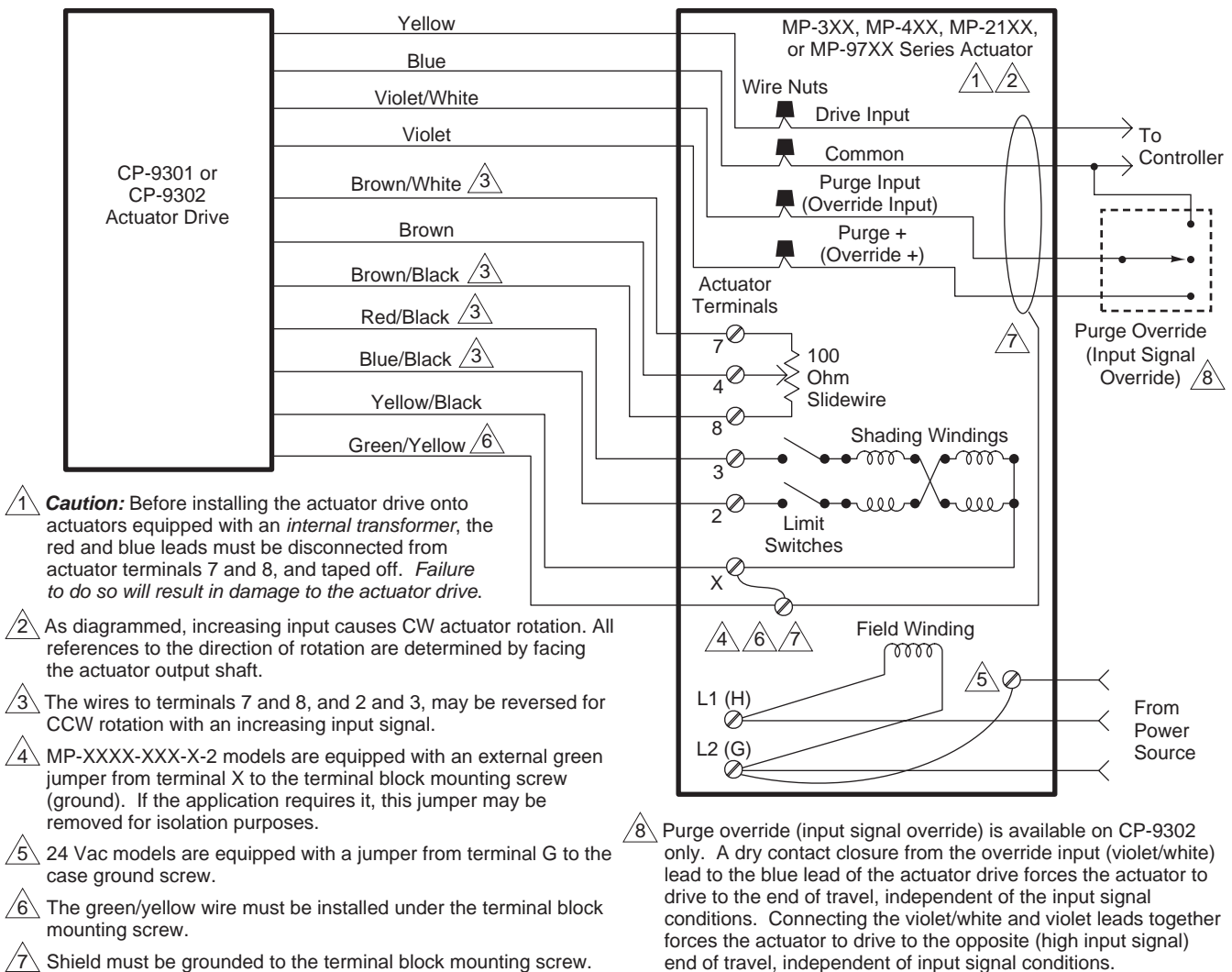


Figure 8 Service Application Wiring Diagram.