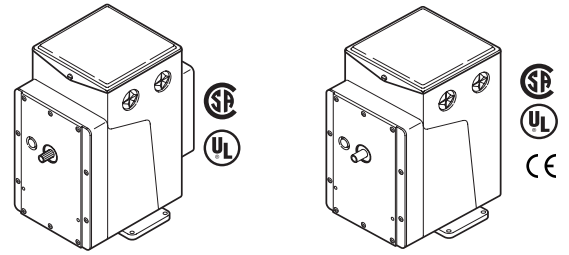


Reversible and Proportional Electric Actuators

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.

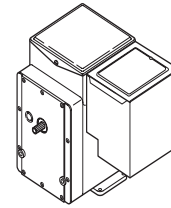
Features:

- 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	—										SPST
MP-371	Proportional	Available										
MP-371-600 ^c		CP-8301-024 Included										
MP-371-691 ^d		CP-9301 Included										
MP-377	Sequencing	—			SPST							
MP-379	Five position	—				None						
MP-381	Proportional	Available										
MP-382		Sequencing	Available	2.2	220 (24.9)	130	180 (Adj. ^b)	No	SPDT			
MP-387									SPST			
MP-389	Five position	Available	50	2.5	220 (24.9)	130	180 (Adj. ^b)	No	None			
MP5-381	Proportional	Available							156	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 Integral solid state drive CP-8301 accepts 6-9 Vdc voltage with 20 Vdc power supply included.

^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						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			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					180 (non-Adj.)	CCW	SPDT	—		
MP-471-691	CP-9301 Included											
MP-475	Proportional	Available										
MP-480	Five position	—										
MP-481	Proportional	Available	220 (24.9)	130			180 (Adj. ^b)	No	SPDT	—		
MP-481-600	refer to footnote ^c	CP-8301-120 Included										
MP-481-691 ^c	CP-9301 Included											
MP-483	Proportional	Available									65	90 (Adj. ^b)
MP-485			130									
MP-486			130 to 1300 (Adj.)	180 (Adj. ^b)								
MP-495			0.95				450 (50.9)	130				
MP5-483	—	—	50	0.5			220 (24.9)	78	90 (Adj. ^b)	No	SPDT	Yes

^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.

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-2130-500			120		0.5			90 (non-Adj.)			Yes
MP-2150-500			240		0.22			180 (non-Adj.)			
MP-2151-500											

^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				
MP-4851				60		220 (24.9)	130	180 (Adj. ^b)	No	SPDT	
MP5-4851				50		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 mA_{dc}	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 pigtails.
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) NSR.
Models -600 Suffix	7 H x 5-3/8 W x 8-1/8 D in. (178 x 136 x 206 mm) SR plus actuator drive housing.
Agency Listings	
UL 873	File E9429 Temperature Indicating and Regulating Equipment.
CUL	Canadian Standard #LR 3728.
European Community	EMC Directive 89/336/EEC and 92/31 EEC. Low voltage Directive 72/23EEC. Units with a "-xxx-x-2" suffix identify models that are in compliance with CE. Example: MP-xxxx-xxx-x-2.
General Instructions	Refer to F-15479.

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. discontinued VB-9XXX.
AV-392	Valve linkage for 1-1/2 and 2 in. discontinued 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. discontinued VB-9XXX.
AV-394	Valve linkage for 1-1/2 and 2 in. discontinued 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 Lowers Valve Stem.
- 3 Rotates CCW or Raises Valve 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.

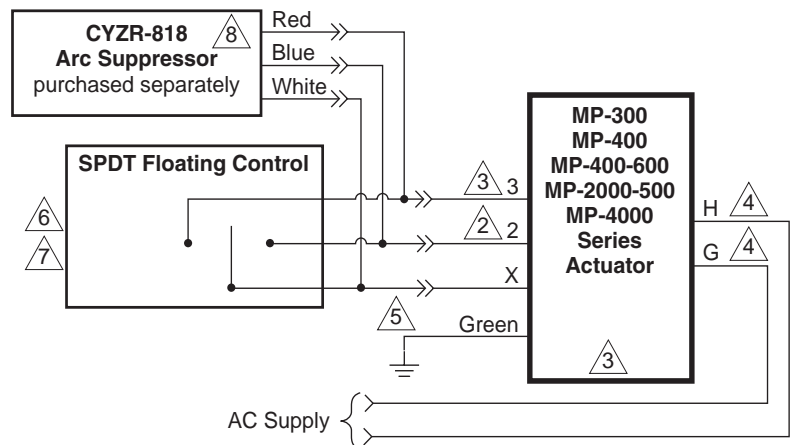


Figure 1 Typical Reversible Floating Wiring.

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

Terminal Identification

Cam Action
Factory Setting

CCW CW

Figure 2 Adjustable Auxiliary Switch SPDT.

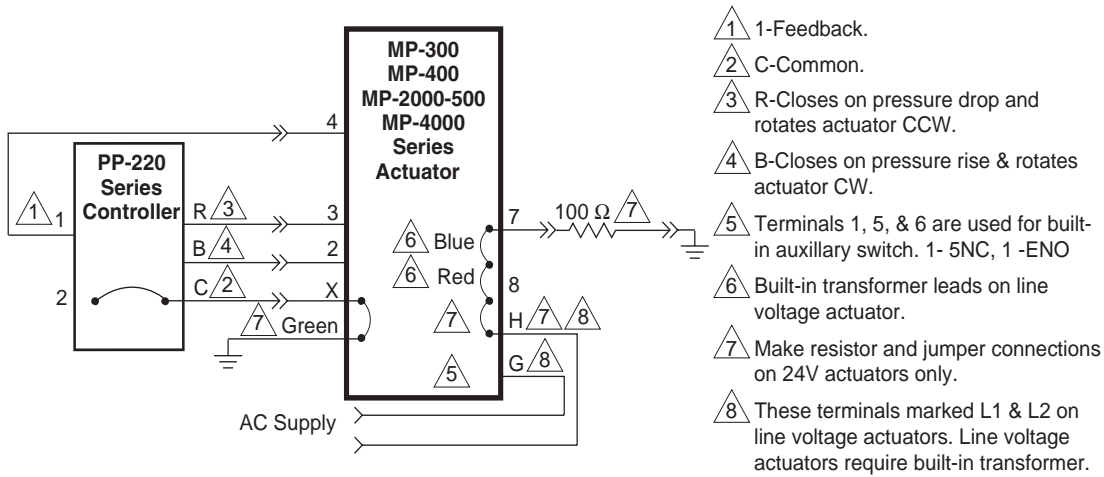


Figure 3 Typical PP-2xx Wiring.

MP-3xx Series, MP-4xx Series, MP-2xxx Series, and MP-4xxx Series

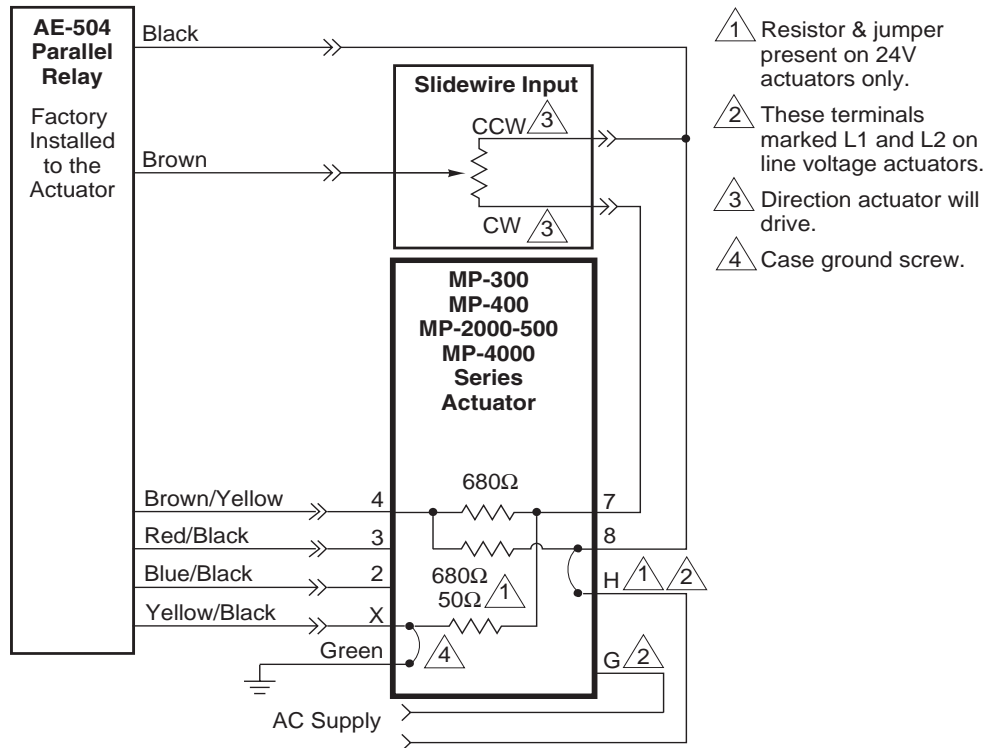


Figure 4 Typical for Proportional Slidewire.

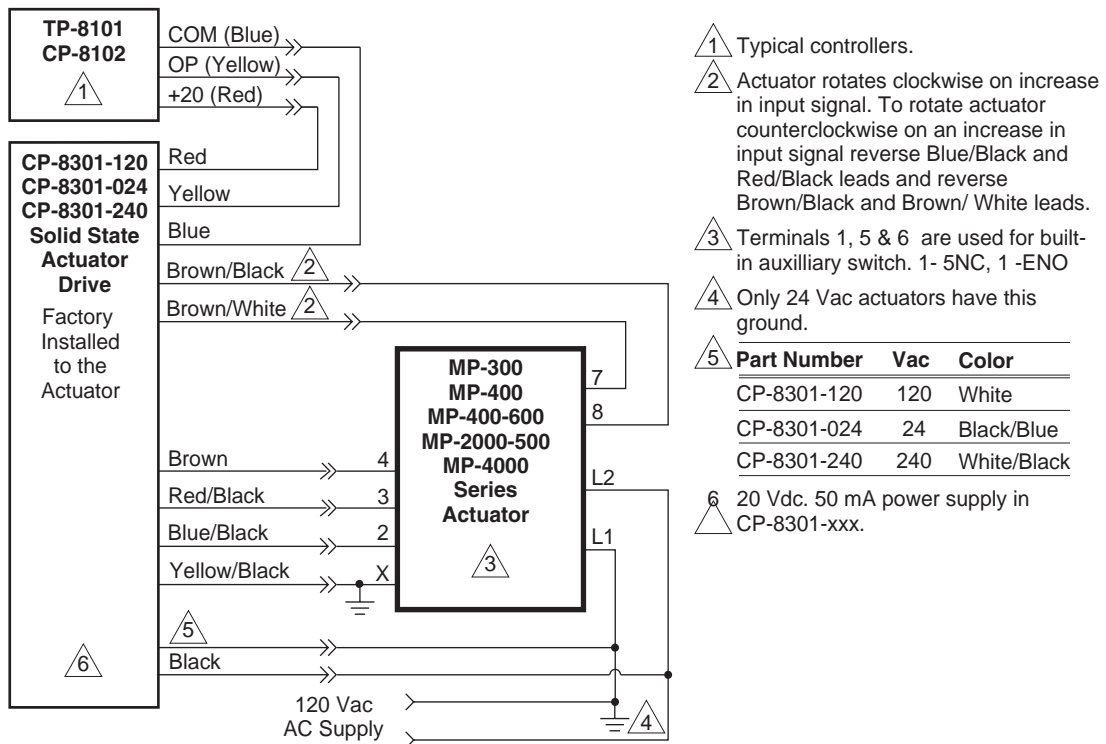


Figure 5 Typical Proportional Electronic — Voltage. Wiring for MP-461-600, MP-471-600, MP-481-600.

MP-3xx Series, MP-4xx Series, MP-2xxx Series, and MP-4xxx Series

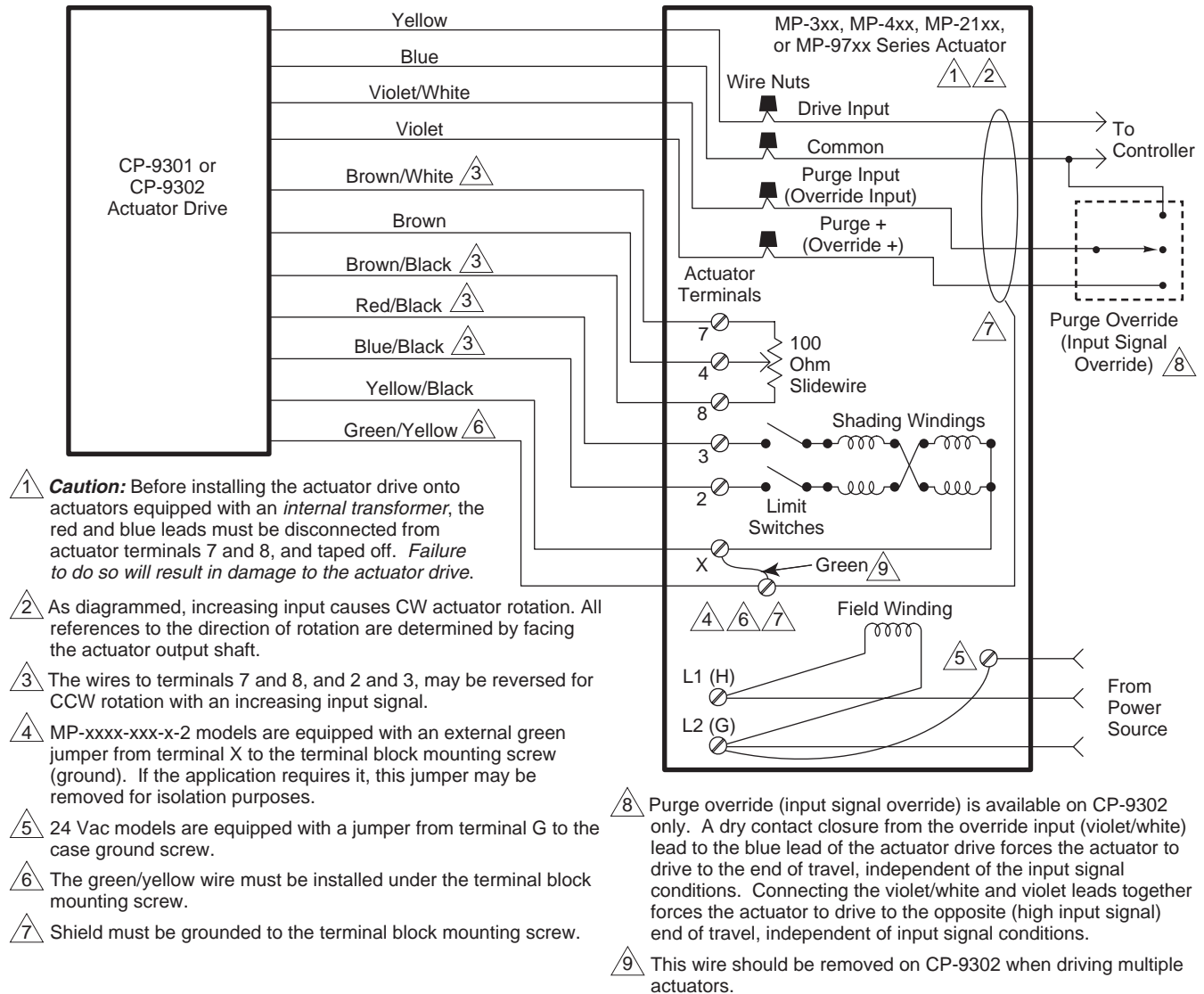


Figure 6 Typical Proportional Electronic - Current/Voltage Wiring for CP-930x to MP-3xx, MP-4xx, and MP-21xxx Series Actuators.