

Application

Electronic actuator drive is used to provide proportional control of an electric gear train actuator from a variable Milliamp/voltage DC signal or Slidewire input.

Features

- Accepts variable Vdc signal and drives certain MP-400, MP-4000, MP-2100, and MP-9000 series actuators in a proportional manner.
- Rugged steel case.
- Actuator Mount (CP-8391-456, CP-8391-716, CP-8391-717) NEMA 3R.
- Adjustable start point, span, and hysteresis.
- Typical controller can drive up to three actuator drives.
- New purge feature allows for override of control input of CP-8391-456 and CP-8391-716 models.



Applicable Literature

- General Instructions, F-15479 MP-2xxx, MP-4xxx Series Actuators.
- General Instructions, F-11331 MP-9xxx Actuators.

SPECIFICATIONS

Actuator Inputs

Compatible with Variable Vdc Input Signal (CP-8391-456):

Range, Factory set at 0 to 10 Vdc. Field adjustable to accept ranges such as 1 to 5, 2 to 10, 5.5 to 9.5, 2 to 15 Vdc.

Operating Span, Factory set at 10 Vdc. Field adjustable 3.5 to 16.5 Vdc.

Start Point, Factory set at 0 Vdc. Field adjustable from 0 to 10 Vdc.

Impedance, 10K ohms. Other input impedances can be obtained by adding series and/or parallel resistors.

Isolation, Optically.

Hysteresis, Factory set for 5% of 10 Volt span or .5 Vdc. Hysteresis is the difference between the input signal which will rotate the actuator shaft one way and the level which will drive it the other way. Recommended hysteresis adjustment .2 to .5 Vdc, care should be taken not to set the hysteresis at a point that allows the actuator to dither .5 Vdc factory set.

Compatible with Variable Milliamp Input Signal (CP-8391-716):

Range, Set at 4 to 20 mAdc. Field adjustable to accept ranges such as 2 thru 7, 2 thru 12, 4 thru 12, 12 thru 20 mAdc.

Operating Span, Factory set at 16 mAdc. Field adjustable 7 to 22 mAdc.

Start Point, Factory set use with 4 mAdc. Field adjustable from 2 to 16 mAdc.

Impedance, 250 ohms for use with constant current output controllers.

Isolation, Optically

Hysteresis, Factory set for 5% of 16 mA span. Hysteresis is the difference between the input signal which will rotate the actuator shaft one way and the level which will drive it the other way. Recommended hysteresis adjustment .3 to .8 mA, care should be taken not to set the hysteresis at a point that allows the actuator to dither .8 mA factory set.

Compatible with 100 to 1000 Ohm Slidewire Input (CP-8391-717):

Range, 100 to 1000 Ohm input.

Hysteresis, Factory set at 5% field adjustable from .1 to 8%.

ALL MODELS:

Grounding, Either or both input wires grounded will not cause damage.

Linearity, 0.15% of actuator rotation.

Power:

Requirements, 120 or 240 Vac, $\pm 10\%$, with fixed input signal offset of $\pm 1\%$ maximum. 24 Vac units not available.

Consumption, 7 VA at 120 or 240 Vac, 50 or 60 Hz.

Connections: See Table-1.

Table-1 Model Chart.

Part Number	Input	Wiring Diagrams
CP-8391-456-0-01	Vdc	Figures 1-4
CP-8391-716-0-01	mAdc	
CP-8391-717-0-01	Slidewire	Figures 5-8

Actuator Outputs

Electrical: Triac output compatible with actuators shown in Table-2.

Table-2 Typical Actuators.

Actuator Series	Volts (60 Hz)	Torque		Stroke (Deg.)	Spring Return	Input Wiring Diagrams	
		Lb.-in.	N-m			Vdc/mAdc	Slide-wires
MP-2130-500*	120	50	5.6	90	—	1 or 2	5 or 6
MP-2150-500*	120	50	5.6	180	—		
MP-485*	120	50	5.6	180	CW		
MP-475*	120	50	5.6	180	CCW		
MP-483*	120	220	24.9	90	—		
MP-485*	120	220	24.9	180	—		
MP-486*	120	220	24.9	180	—		
MP-495*	120	450	50.8	180	—		
MP-9750*	120	800	90.4	180	—		
MP-9810	120	1300	146.9	180	—	3 or 4	7 or 8
MP-9430-108*	120	550	62.	70			
MP-9630	120	1100	124.	90			
MP-9830	120	1300	146.9	90	—		
MP-9910	120	1600	179.2	180	—		
MP-4851*	240	220	24.9	180	—		

*CAUTION: Remove red and blue transformer wires from terminals 7 and 8 of actuator and tape.

Note: Comparable 50 Hz models are compatible as well as other MP geartrain actuators, contact the factory for specific applications.

Agency Listing: Certified to UL 873 and CSA C22.2 No. 24 (XAPX, XAPX7) by Underwriters Laboratories.

Environment

Ambient Temperature Limits:

Shipping, -40 to 140°F (-40 to 60°C).

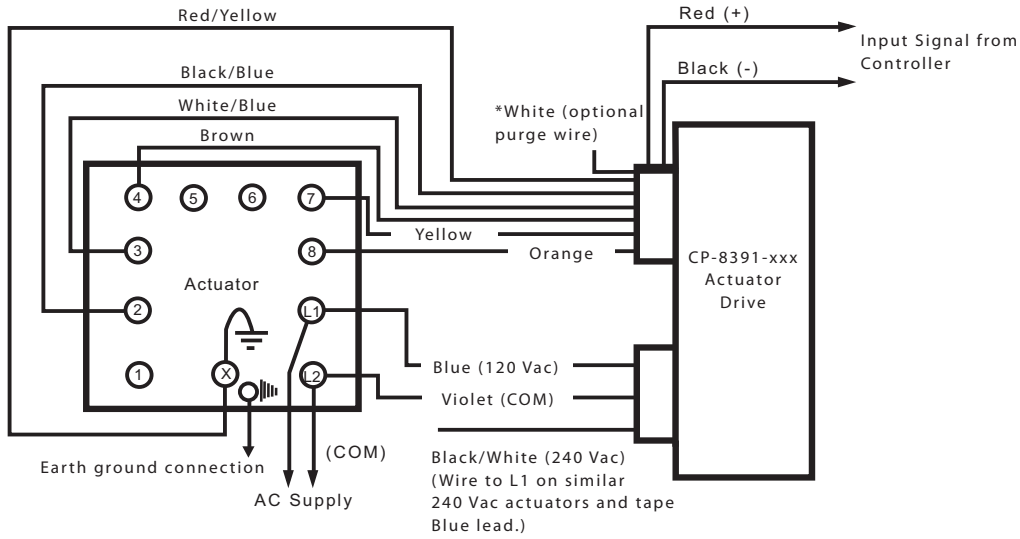
Operating, -13 to 140°F (-25 to 60°C).

Humidity: 5 to 95% RH, non condensing.

Locations: NEMA 3R (CP-8391-xxx).

TYPICAL APPLICATIONS (wiring diagrams)

CP-8391-716 / CP-8391-456 Wire



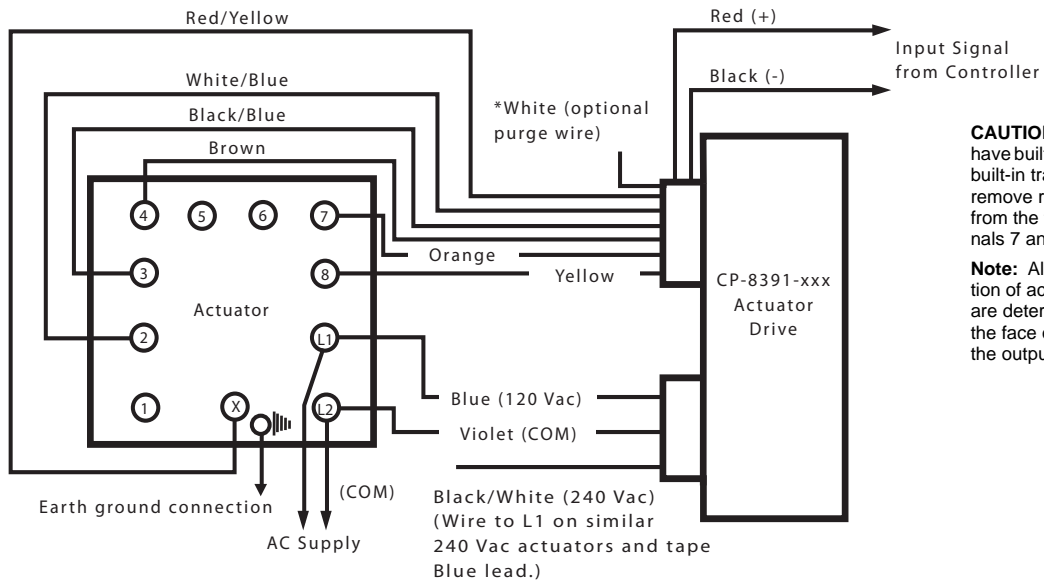
CAUTION: Actuator must not have built-in transformer; or if a built-in transformer is present, remove red and blue leads from the transformer to terminals 7 and 8 and tape off.

Note: All references to direction of actuator shaft rotation are determined by looking at the face of the actuator with the output shaft.

*Purge: Optional Dry Contact Closure, White Wire Makes to + Red, Drives Actuator Full CCW.

Figure-1 Typical Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-4xx & MP-21xx Series and MP-9750 Actuators, Increasing Input Signal, CCW Actuator Rotation.

CP-8391-716 / CP-8391-456 Wire



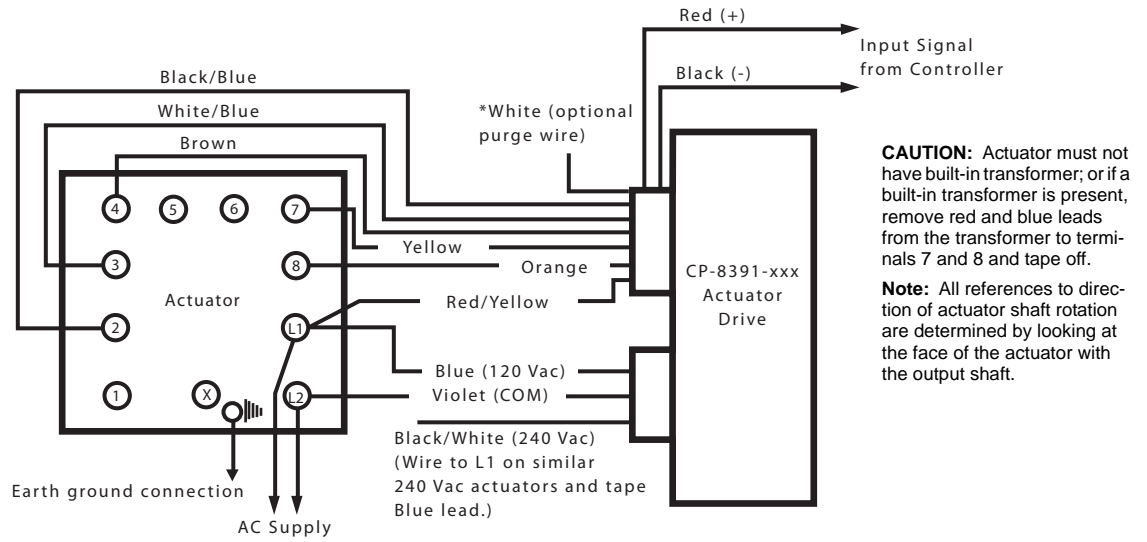
CAUTION: Actuator must not have built-in transformer; or if a built-in transformer is present, remove red and blue leads from the transformer to terminals 7 and 8 and tape off.

Note: All references to direction of actuator shaft rotation are determined by looking at the face of the actuator with the output shaft.

*Purge: Optional dry contact closure, White wire makes to + Red, drives actuator full CW.

Figure-2 Typical Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-4xx & MP-21xx Series and MP-9750 Actuators, Increasing Input Signal, CW Actuator Rotation.

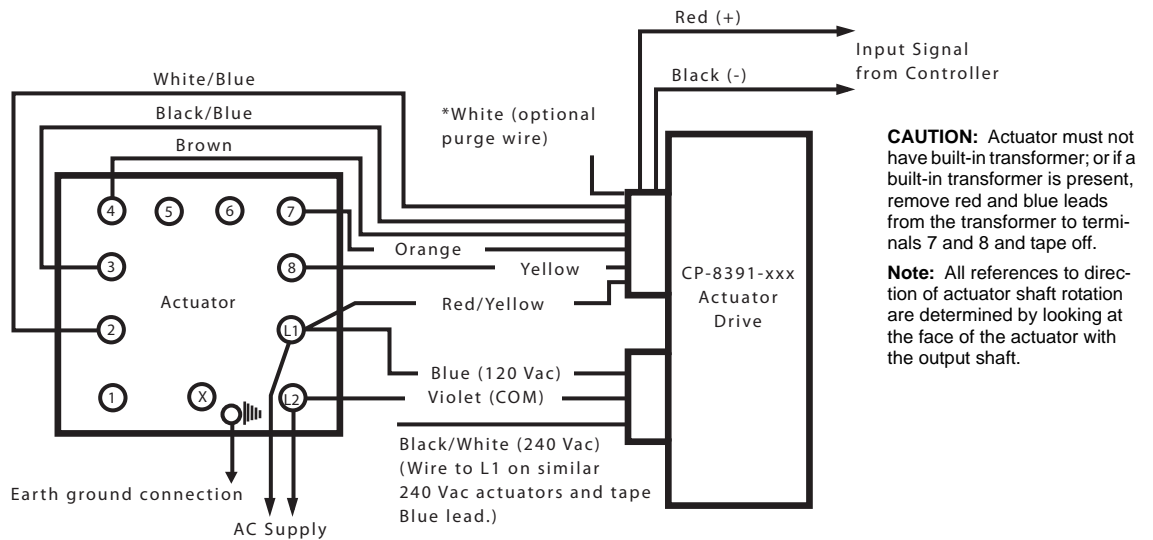
CP-8391-716 / CP-8391-456 Wire



*Purge: Optional dry contact closure, White wire makes to + Red, drives actuator full CCW.

Figure-3 Typical Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-9430-108, MP-9630, MP-98xx & MP-99xx Series Actuators, Increasing Input Signal, CCW Actuator Rotation.

CP-8391-716 / CP-8391-456 Wire Color



*Purge: Optional dry contact closure, White wire makes to + Red, drives actuator full CW.

Figure-4 Typical Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-9430-108, MP-9630, MP-98xx & MP-99xx Series Actuators, Increasing Input Signal, CW Actuator Rotation.

RESISTANCE INPUT: CP-8391-717

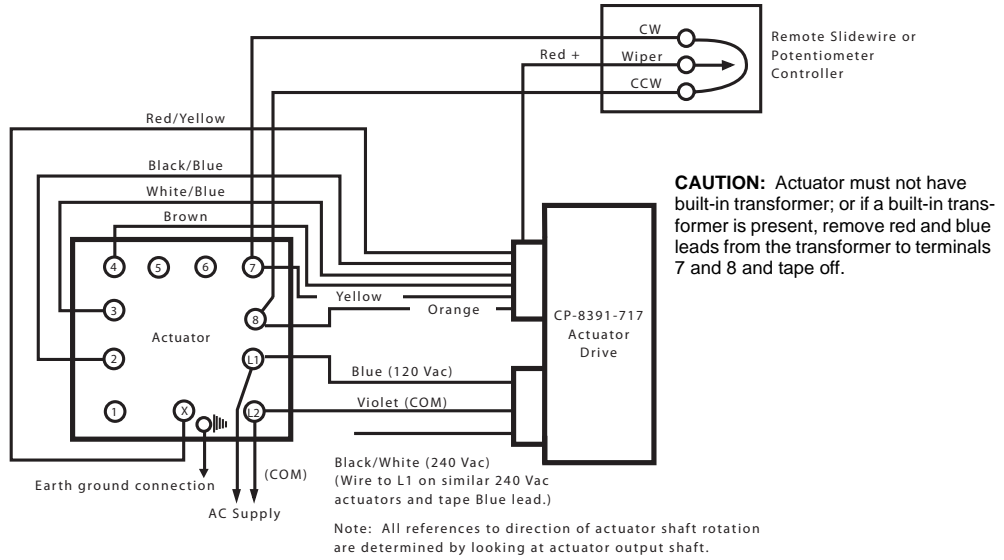


Figure-5 Typical Wiring Diagram, CP-8391-717 to MP-4xx Series, MP-21xx Series, and MP-9750 Series Actuators, Increasing Input Signal, CCW Actuator Rotation.

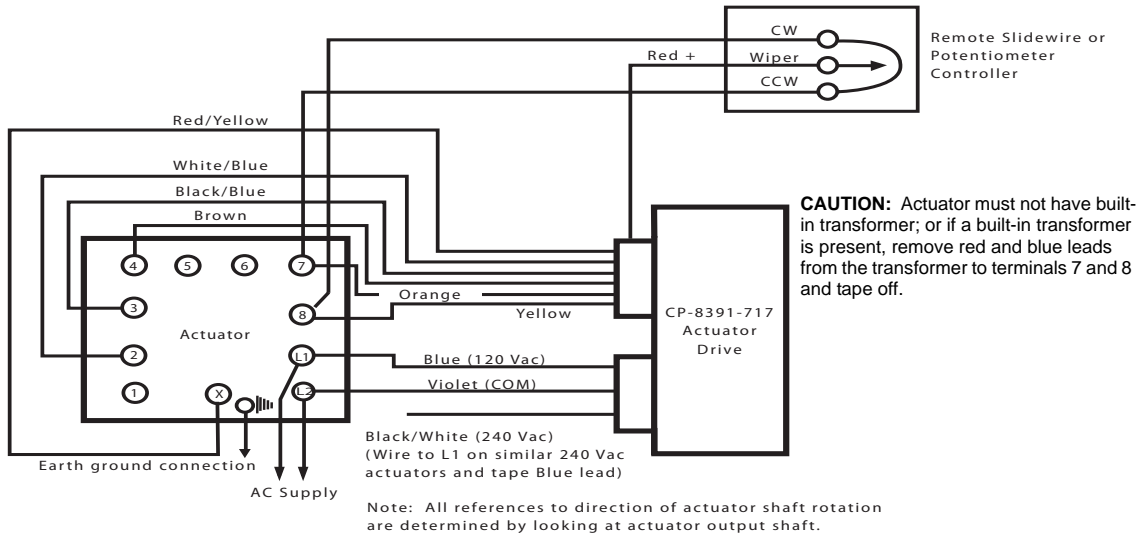


Figure-6 Typical Wiring Diagram, CP-8391-717 to MP-4xx Series, MP-21xx Series, and MP-9750 Actuators, Increasing Resistance Input Signal, CW Actuator Rotation.

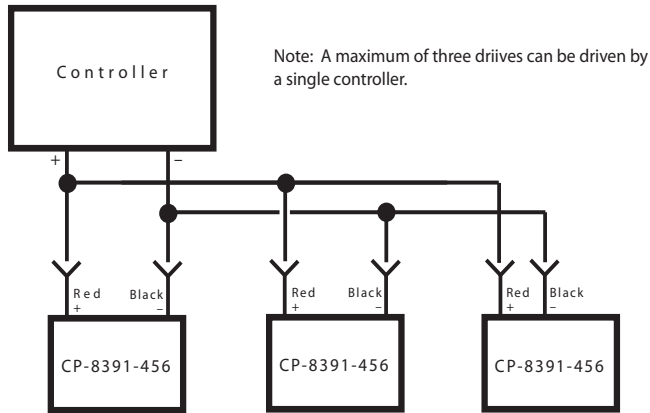


Figure-9 Control Input Signal Wiring for Parallel Application (Vdc Input).

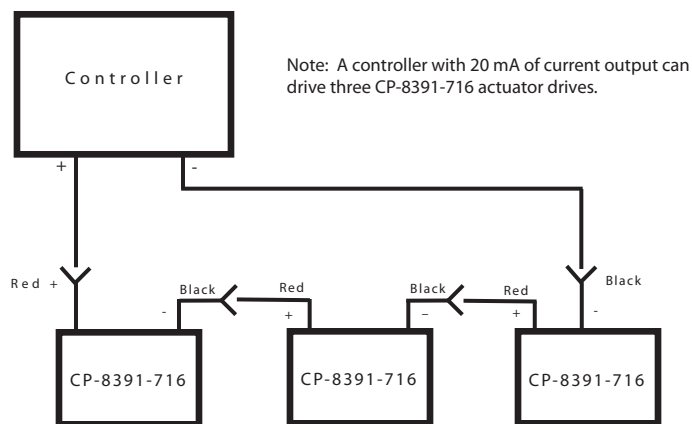


Figure-10 Control Input Signal Wiring for Typical Series Application (Milliamp).

INSTALLATION

Inspection

Inspect the carton for damage. If damaged, notify the appropriate carrier immediately. Inspect the device for obvious damage. Return damaged products.

Requirements

- Job wiring diagrams
- Tools (not provided):
Common, single slotted screwdriver
DVM Meter
CP-8391-xxx, wire cutters, ballpeen hammer, electrical tape
- Training: Installer must be a qualified, experienced technician

CAUTION

- Disconnect the power supply (line power) before installation to prevent equipment damage.
- Make all connections in accordance with the wiring diagram and in accordance with national and local electrical codes. *Use copper conductors only.*
- Do not exceed ratings of the device(s).
- Avoid locations where excessive moisture, corrosive fumes, or vibration is present.

PURGE OPTION (Only available on CP-8391-456 or 716)

A dry contact closure between the Purge Input (White wire) and the positive side of the Input Signal (Red wire) will drive the actuator to the (CW or CCW) full position based on how the actuator terminals 2/3 and 7/8 are wired, see Figures 1, 2, 3 and 4. The actuator will return to normal once the contact is open.

Note: A delay is required between the end of the Purge and the start of Ignition in order to allow the actuator to move to a safe operating point before activating the main gas valve.

Mounting

Locate the instrument to avoid dust or oil accumulations and moisture. If installed outdoors, the CP-8391-xxx must be kept within ambient temperature limits. Upright mounting of the CP-8391-xxx is preferred, but other positions are acceptable. (See Figure-11.) Make sure the O-Rings are between the actuator housing and the actuator drive enclosure to insure NEMA 3R rating is maintained.

Mount the CP-8391-xxx to either side of the actuator by inserting the two conduit connectors into the 1/2" knockouts on the actuator. Secure the drive with the two (2) locknuts provided. (See Figure-11)

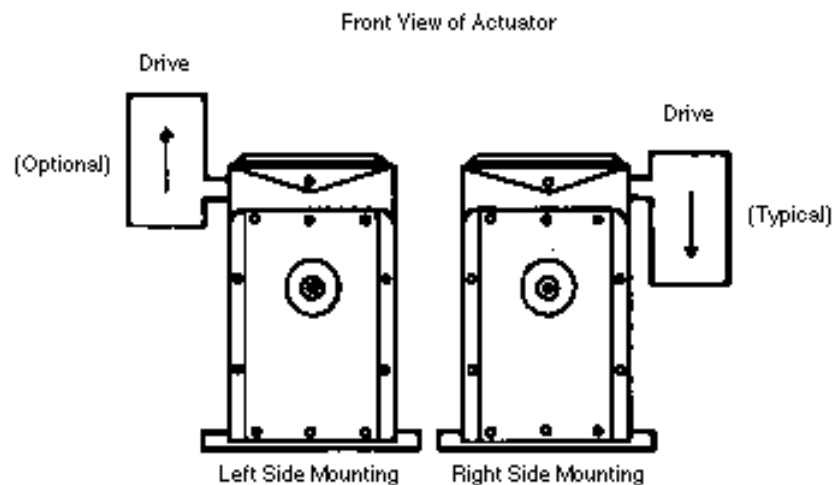


Figure-11 Typical Mounting for CP-8391-456, CP-8391-716, CP-8391-717.

Note: The MP-4xx, MP-21xx actuators have a divider in the wiring termination compartment, this divider helps keep the High voltage wiring separated from the low voltage wiring. When determining how to mount the actuator drive housing to the side of the actuator you should make sure the high voltage wires from the drive enter the wiring compartment on the high voltage side of the compartment.

Wiring Requirements

Control Leads

The two input wires of the CP-8391-456 or CP-8391-716 which must be connected to the controller are coded Black (-) and Red (+), respectively. (See Figure-1 through Figure 4.)

CAUTION

- Use three-conductor twisted shielded wire when it becomes necessary to install the control leads in the same conduit with power wiring or when RFI/EMI generating devices are near.
- Do not connect shield or conduit to earth ground.

Table-3 Control Wiring Data.

Wire Size (GA)	Maximum Wire Run in ft. (m)
18	1000 (304)
16	2250 (685)
14	4000 (1210)

Power Leads

CP-8391-456 / CP-8391-716 / CP-8391-717: When the CP-8391-xxx is mounted on an electric actuator, all power is supplied by the electric actuator. (See Figure-1 through Figure-4.) Unused line voltage wire of the CP-8391-xxx drive should be clipped and carefully insulated. (See Figure-1 through Figure-4.)

The Violet lead is power line common. The Blue lead is for 120 Vac. The Black/White lead is for 240 Vac.

Wiring Connections

CP-8391-456, CP-8391-716, CP-8391-717

1. Wire the appropriate eyelet pigtail leads, from the group of eight or nine from one side of the drive, to the screw terminals on the actuator.
2. Wire the appropriate eyelet pigtail leads, from the group of three from the drive, to the screw terminals on the actuator. Note: One of the leads will be taped-off; see Power Lead section.
3. Wire the Red (+) and Black (-) pigtail leads to the controller. (CP-8391-456 or CP-8391-716 Only.)
4. Wire the Red wire to the wiper of the remote slidewire or potentiometer.
5. Replace the actuator cover.

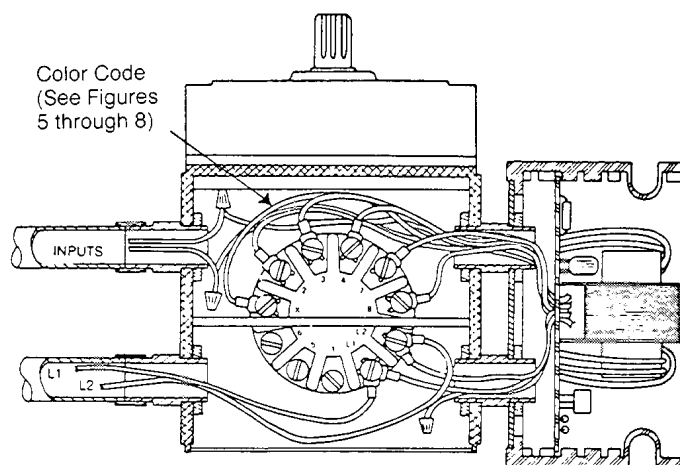


Figure-12 CP-8391-456 / CP-8391-716 / CP-8391-717 Wiring and Mechanical Arrangement (shown for MP-400, MP-2100 series and MP-9750 actuators).

Adjustments

Remove the cover of the CP-8391-456, CP-8391-716, CP-8391-717. (See Figure-13.)

Start Point and Span (CP-8391-456 and CP-8391-716)

1. Connect power to the actuator drive and the actuator.
2. Connect the driving controller providing the input voltage.
3. Connect the electric actuator.
4. Apply the minimum voltage signal for the new range from the controller to the input terminals.
5. Adjust the START POINT potentiometer (turning the Start Point potentiometer CW decreases the start point) so that the actuator slidewire drives to its minimum signal limit. (CP-8391-456 and CP-8391-716 only).
6. Apply the maximum signal for the new range from the controller to the input terminals.
7. Adjust the SPAN potentiometer (turning the Span potentiometer CW increases the span) so that the actuator slidewire drives to its maximum signal limit. (CP-8391-456 and CP-8391-716 only).
8. The adjustment potentiometers are interactive.
9. Reapply the maximum and minimum inputs and check the end points.

Hysteresis (CP-8391-456)

Hysteresis is adjustable by potentiometer (turning the Hysteresis potentiometer CW decrease hysteresis) (see Figure-13) to a maximum of 0.5 Vdc. Do not reduce the hysteresis so that the actuator oscillates. Factory setting is 5%.

Hysteresis (CP-8391-716)

Hysteresis is adjustable by potentiometer (turning the Hysteresis potentiometer CW decrease hysteresis). The maximum percentage of hysteresis depends upon the signal span. For the input span of 10 mAdc, the maximum is 8%. For the maximum span of 16 mAdc, the maximum is 5%. Factory setting is 5%.

Hysteresis (CP-8391-717)

Since the Actuator Drive tracks an external resistance, no calibration is available or required, but the hysteresis pot (R11) may need to be adjusted. Hysteresis is typically adjustable from approximately 0.1% with R11 fully CW to approximately 8% fully CCW. When shipped from the factory, hysteresis is set to approximately 5% of the actuator's slidewire (turning the Hysteresis potentiometer CW decrease hysteresis).

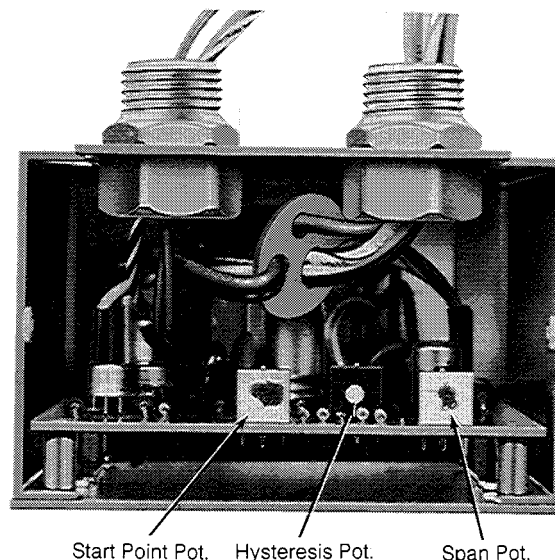


Figure-13 Adjustment Locations (CP-8391-xxx shown.)

CHECKOUT

After the entire system has been installed and powered, apply minimum and maximum input signals to CP-8391-456, CP-8391-716, CP-8391-717 and check for correct operation of the actuator.

MAINTENANCE

Regular maintenance of the total system is recommended to assure sustained optimum performance.

SERVICE

See Figure-14 and Figure-15 for wiring diagrams if additional wiring information is required on actuator/electronic drive combinations.

CAUTION

Actuator must not have built-in transformer; or if a built-in transformer is present, remove red and blue leads from the transformer to terminals 7 and 8 and tape off.

FIELD REPAIR

No field repair is possible.

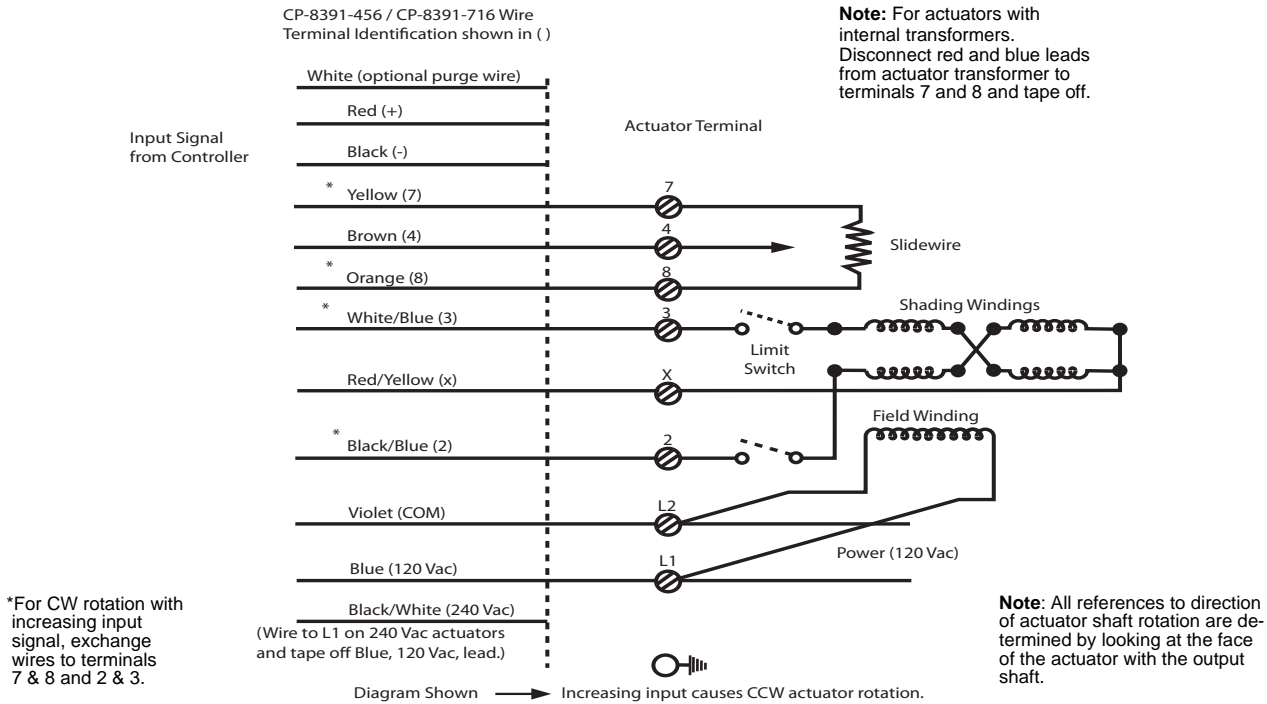


Figure-14 Service Application Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-4xx & MP-21xx Series and MP-9750 Actuator Connections (see Table-2 for specific actuators).

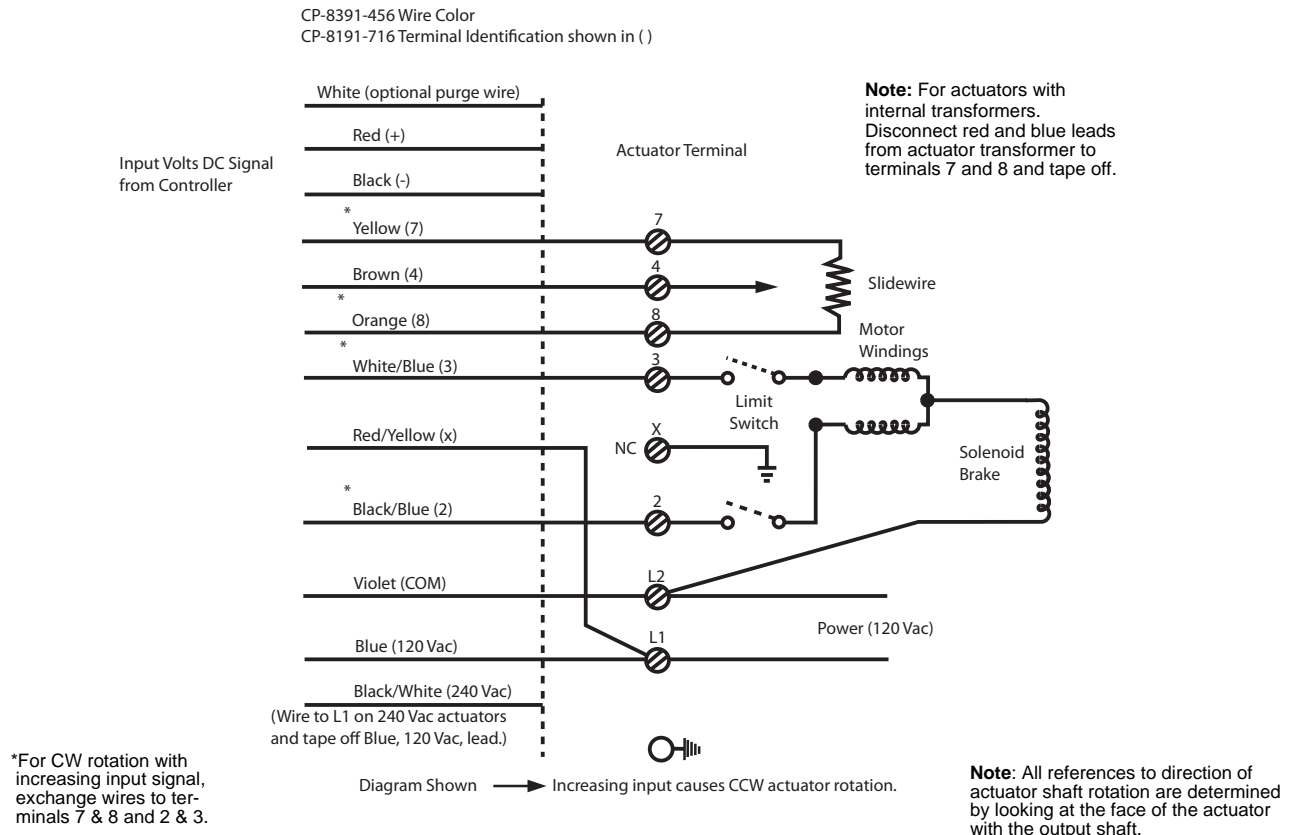


Figure-15 Service Application Wiring Diagram, CP-8391-456 or CP-8391-716 to MP-9430-108, MP-9630, MP-98xx & MP-99xx Series Actuator Connections (see Table-2 for specific actuators).

DIMENSIONAL DATA

All dimensions are in inches (millimeters in brackets).

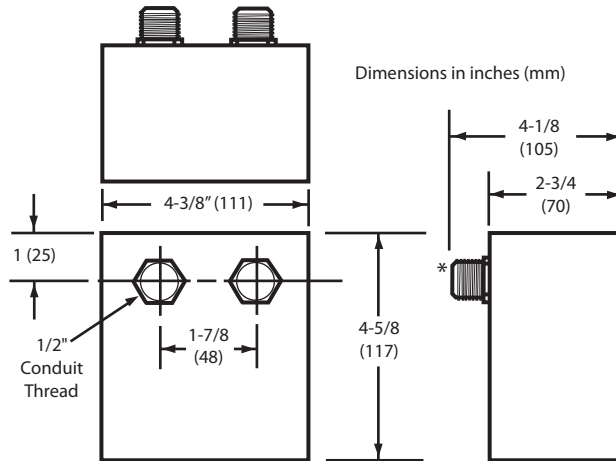


Figure-16 CP-8391-456, CP-8391-716 or CP-8391-717 Mounting Dimensions.

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