

**CP-9302-702 Actuator Drive  
Installation Instructions**

**SPECIFICATIONS**

The CP-9302-702 electronic actuator drive processes a variable input signal from a controller to provide proportional control of an electric actuator. The CP-9302-702 is preset for current input (4-20 mA) and has additional wiring for connection to an override switch for applications requiring an external override of the input signal. The CP-9302-702 is equipped with built in jumpers and adjustable potentiometers, so that the type of input signal, deadband, input span, and start point may be readjusted in the field when necessary.

**Electrical Ratings**

Power supplied by the actuator

Input: 4-20 mA

**Electrical Connection**

1/2" conduit knockout

**Deadband Adjustability (Hysteresis)**

Factory set at 5%, adjustable to 3%

**Grounded Input**

Grounding either or both input wires will not cause damage

**Ambient Temperature**

-40°F to +160°F (-40°C to +71°C)

**Environment**

NEMA TYPE 4 (weathertight)

**Open circuit Input**

Drives actuator to low

**Series Operation**

No offset in control point when operated in tandem

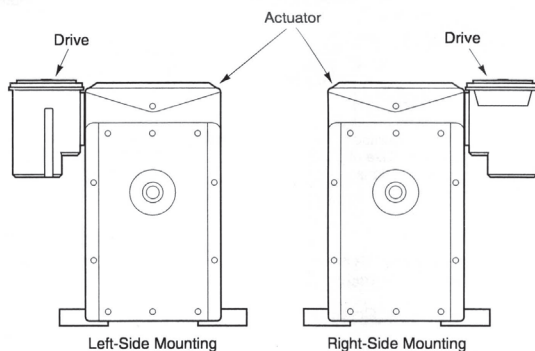
**Approvals**

UL Listed 

**ATTENTION**

- Read these instructions carefully.
- Failure to follow them and/or improper installation may cause explosion, property damage and injuries.
- Installation must be done with the supervision of a licensed burner technician.
- The system must meet all applicable national and local code requirements such as but not limited to NFPA 86, CSD-1, ANSI Z21.13, UL 795, NFPA 85, or CSA B149.3.
- Check the ratings in the specifications to make sure that they are suitable for your application.
- Never perform work if gas pressure or power is applied, or in the presence of an open flame.
- Once installed, perform a complete checkout.
- Verify proper operation after servicing.

- Inspect unit before installing, look for bent or broken parts or oil leaks from actuator.
- Use NEMA TYPE 4 compatible type connectors.
- Observe the barrier that separates the line voltage terminals from the low voltage which controls the actuator motor.
- All connections to the line voltage side of the barrier (L1 and L2, 1, 5 and 6 terminals) must be made with Class 1 wiring; connections to the remaining terminals can be Class 2 thermostat cable if desired.
- Allow 6 inches (152mm) clearance above the actuator wiring compartment.
- Disconnect all power to the valves before wiring to prevent electrical shock and equipment damage.
- Do not exceed the electrical ratings given in the specifications and on the actuator.
- Attach a flexible 1/2" conduit to the actuator.
- Route the wires through the conduit.
- Use 14 or 16 gauge wire for at least 75°C (167°F).
- Connect the wiring to the appropriate screw terminals.
- Remove the appropriate knock out on the side you wish to mount the sidebox.
- Insert the sidebox into the actuator and leaving the O-ring on the sidebox.
- Secure the sidebox to the actuator with the conduit locknut provided.



Installation must be done by a qualified, licensed technician. The system must meet all applicable codes. Improper system design or setup may cause explosions, property damage, and injuries.

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# INSTALLATION

Inspect unit before installing, look for broken parts or leaks. Use NEMA TYPE 4 compatible type connectors.

Observe the barrier that separates the line voltage terminals from the low voltage which operates the actuator motor. All connections to the line voltage side of the barrier (L1 and L2, 1, 5 and 6 terminals) must be made with Class 1 wiring; connections to the remaining terminals can be Class 2 thermostat cable if desired.

Allow 6 inches (152mm) clearance above the actuator wiring compartment.

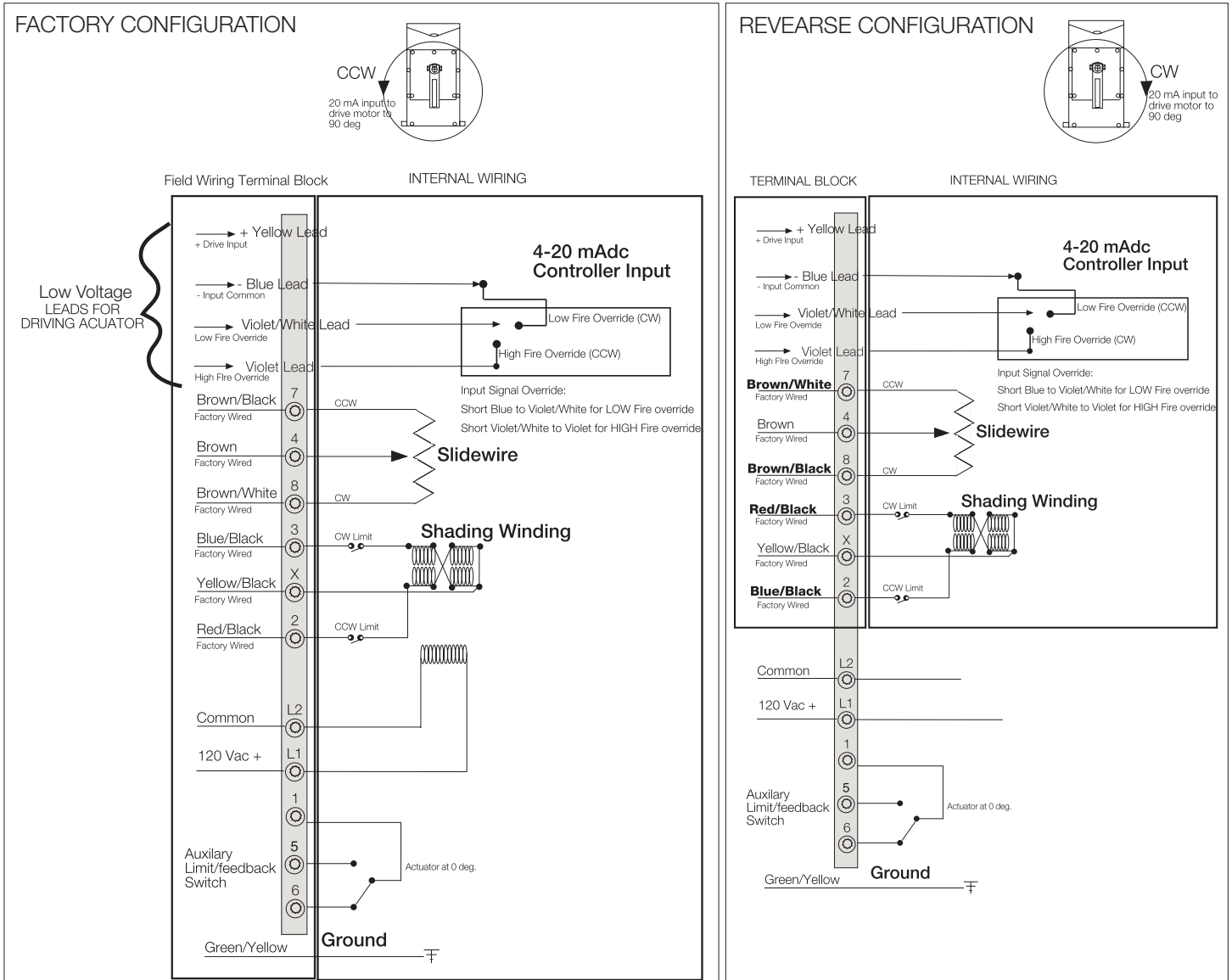
Do not adjust the limit switch beyond 90° unless the standard slidewire has been replaced with a 180° slidewire; do not adjust beyond 180° for proportioning control.

In some applications, a Flame Safeguard (FSG) may have one or two overriding circuits. One being a low fire purge start and the other a high fire pre-purge. The function of the violet/white and violet wires are to provide an electrical connection so that the FSG can override, the temperature controller and drive the air damper actuator without a 4mA signal. If such connections are not needed in the application, simply tape them off, and safely stow away.

# WIRING

- Disconnect all power to the valves before wiring to prevent electrical shock and equipment damage.
- Do not exceed the electrical ratings given in the specifications and on the actuator.

- Attach a flexible 1/2" NPT conduit to the actuator.
- Route the wires through the conduit.
- Use 14 or 16 gauge wire for at least 105°C (221°F).
- Connect the wiring to the appropriate terminals.



**WARNING:** Do not apply line voltage to terminals "X", 2,3,4,7 or 8 or the motor will be permanently damaged.

**WARNING:** Overriding the input signal will drive the actuator to the mechanical end of travel.

## ADJUSTMENT

If a CP-9302-702 requires adjustments to its startpoint, or input span, make adjustments according to the following:

### CP-9302-702 Adjustment (Preparation)

From the factory, the actuator is calibrated such that it drives to 90 degrees with 20mA applied and 0 degrees with 4mA applies. To reduce the 90 degree position or increase 0 degree position, following the procedure below.

#### Initial Setup

1. Turn off all power and input signals to the actuator.
2. Remove the metal cover. This allows access to the potentiometers and the input/deadband jumpers.
3. Disconnect the drive's yellow and blue leads from the controller.
4. Connect the drive's leads to the corresponding lead on an instrument capable of producing 4-20mA +/- 0.1mA (current calibrator).

#### Minimum Position Calibration

1. Apply power to the actuator, then turn on the "current calibrator".
2. Adjust the "current calibrator" until the mA input equals the desired zero point current. This is typically 4mA.

**NOTE:** The minimum position current input (zero point) potentiometer and maximum position current input (span) potentiometer can be physically turned indefinitely; but they have an effective limit of 25 turns. Relative to the start point (4 mA / 0 degrees), rotating the post CW causes the actuator to drive toward 90 degrees. Conversely rotating the pots CCW causes the actuator to drive back toward zero. This is true of both the START POINT and SPAN adjustments.

**NOTE:** There is a slight delay (approx. 3 seconds) in actuator movement when a potentiometer is adjusted. Make final adjustments slowly to prevent over adjusting. If adjusted properly, when the unit just begins to drive, it should stop within 5 degrees. Over adjusting will lower the actual start point.

3. With the desired current input for the minimum position applied (typically 4mA), adjust the zero point potentiometer so the actuator shaft drives to it's zero point (minimum position). It is best to adjust the start point potentiometer until the actuator shaft just starts to move off its zero point.

#### Maximum Position Calibration

1. Apply power to the actuator, then turn on the "current calibrator".
2. Adjust the "current calibrator" until the mA input equals the desired finish point (maximum position). This is typically 20mA.
3. With the desired current input for maximum position (typically 20mA), the actuator will drive towards 90 degrees. Once the actuator stops, adjust the span potentiometer so the actuator shaft drives to the maximum position. It is best to adjust the span potentiometer until the actuator shaft just moves to its finish point.
4. Remove the current calibrator and turn off power to the actuator. Then, reconnect the drive's leads to the controller.
5. Reinstall the cover.
6. Reapply power to the actuator and turn on the controller.

**NOTE:** Occasionally, an adjustment to the input span setting results in a change to the start point setting, due to a small interaction between these two settings. After adjusting the input span potentiometer, ensure that both settings meet requirements by repeating steps 7 - 9.

**NOTE:** When setting the potentiometers; only move the actuator shaft in one direction. If the shaft is moved in the opposite direction, the deadband will affect the setting.

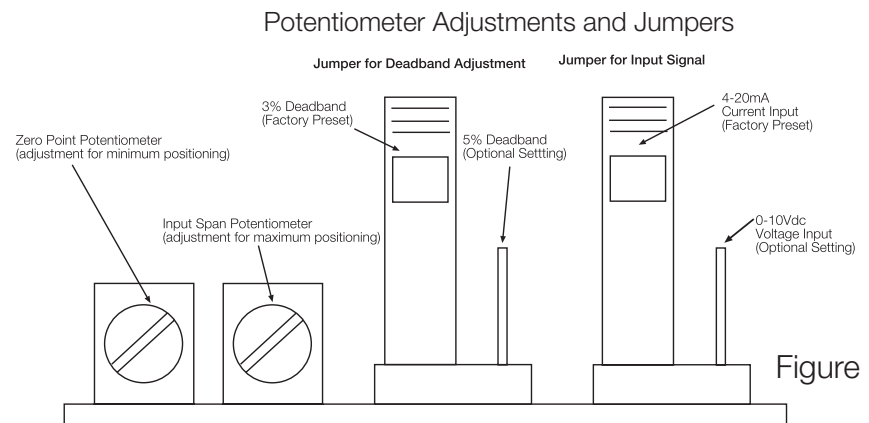
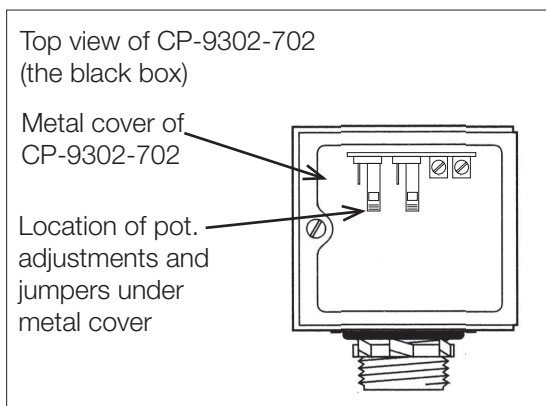


Figure 2



**CAUTION:** Do not apply a voltage source input to CP-9302 actuator drive that is configured for current input. Doing so may damage the drive.



**CAUTION:** Static charges produce voltages high enough to damage the electronic components. Follow static electricity precautions when servicing the device(s).

## TESTING

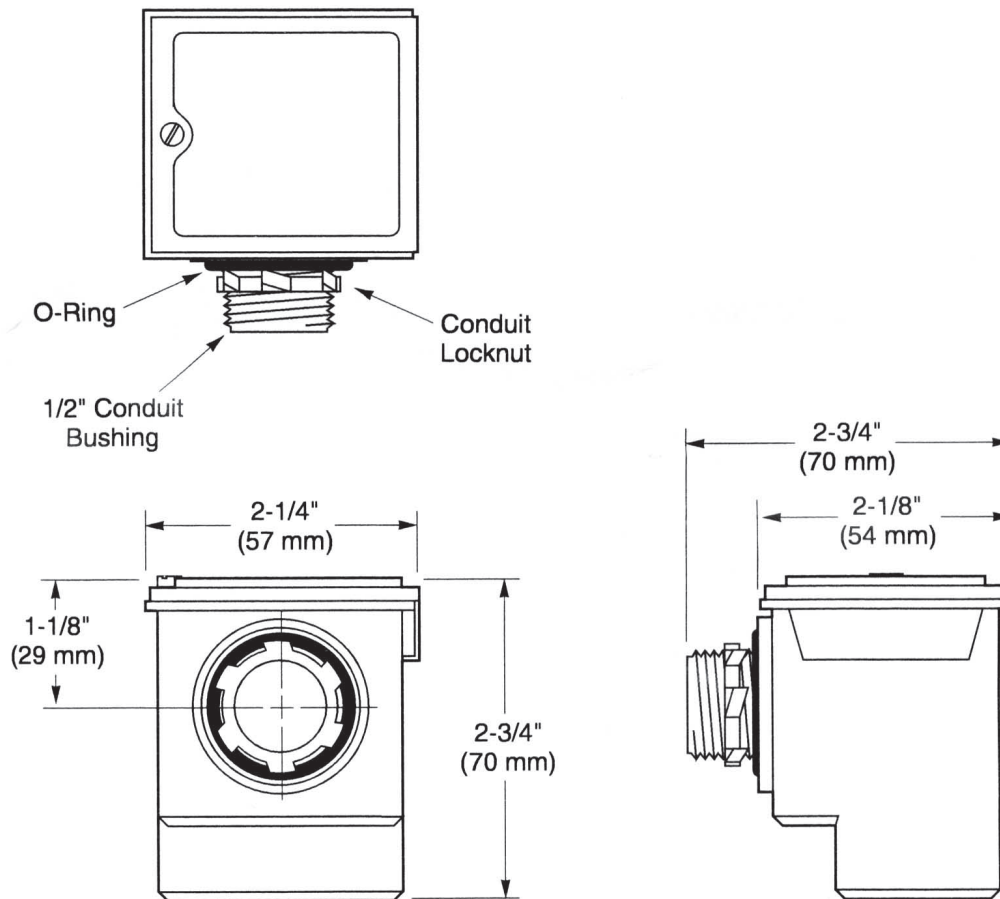
**Test 1:** Connect the drive's leads to the corresponding lead of a suitable current signal source (current calibrator). Apply power to the actuator, then turn on the current signal source (current calibrator). Adjust the current signal source (current calibrator) until the mA meter reading equals the desired zero point current (2 to 16 mA). Adjust the current signal source (current calibrator) until the mA meter reading equals the finish point current. With the desired finish point current applied, the actuator shaft should drive to the finish point. If the actuator fails this test repeat the **CP-9302-702 Adjustment** section. Short the Violet/White wire to the Violet wire; the actuator shaft should turn counterclockwise. Short the Violet/White wire to the Bluewire; the actuator shaft should turn clockwise. When you break the connection between the Violet/White and Violet wires, the shaft should return fully clockwise. If the actuator fails this test, perform Test 2.

**Test 2:** Disconnect the Yellow/Black wire from terminal "X". Jumper actuator terminal "X" to terminal 2; the actuator shaft should turn clockwise. When the connection between terminals "X" and 2 is broken, the shaft should remain stationary.

Then jumper terminal "X" to terminal 3; the shaft should turn counterclockwise. If the actuator passes this test, but failed Test 1, the side-mounted control box is defective and must be replaced.

If the unit failed both tests, the actuator itself is defective and must be replaced. Contact Dungs for replacement information.

## DIMENSIONS



When replacing a CP 8391-703 control unit with a CP 9302 702 in NEMA TYPE 4 applications a seal must be installed into the unused conduit knock out to maintain NEMA TYPE 4 rating.