

70/70R Series Actuator



Parker's 70 Series Electric Actuators are designed to provide reliable and efficient operation of 2 way and 3 way ball valves. The 70 Series Actuators are available in AC models with a 25% duty cycle and DC models with a 100% duty cycle.

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Options Information	Pages 9 - 11

PARTS LIST

- 1 - Limit Switches
- 2 - Cams
- 3 - O-ring

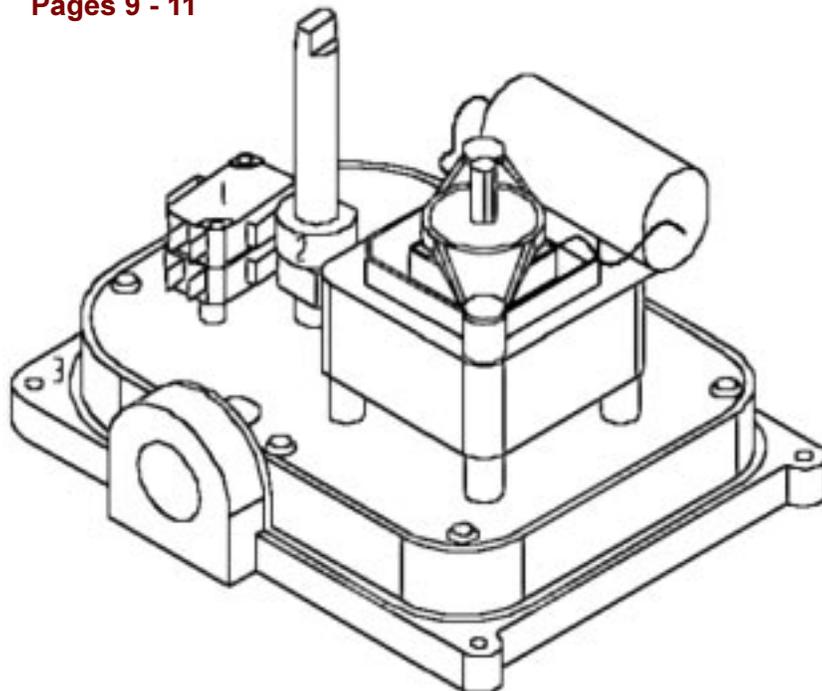


Figure 1: 70 Series Parts Identification

70 SERIES GENERAL TECHNICAL INFORMATION

70 Series AC voltage actuators use a split phase motor which internally steps up the applied 115 AC voltage and feeds it back to the off terminal. For example, when 115 VAC power is applied at terminals 1 and 4, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less than 230 VAC and it is suggested that relay outputs be used. Additionally, due to this feed back, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator. It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Tools Required: Phillips screwdriver, Flat blade screwdriver and 1/16 inch hex wrench.

Temperature Limits

Low ambient temperatures: The minimum recommended ambient temperature without the optional heater and thermostat is approximately 30 °F (-1 °C), although it varies with the frequency of use. With the optional heater and thermostat installed, the recommended minimum ambient temperature is -40 °F (-40 °C).

High ambient temperatures: The maximum recommended ambient temperature is 160 °F (71 °C).

High media temperatures: For media temperatures up to 200 °F (93 °C), additional precautions are not typically required. For media temperatures between 200 °F and 300 °F (93 °C and 148 °C), a shielding plate about one inch larger than the actuator in each dimension should be placed between the actuator and the mounting bracket. In addition, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300 °F (148 °C), a valve with an extended shaft mounting arrangement should be used.

Mounting the Actuator

First, verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

NOTE: A 25% duty cycle means for every operating cycle that the actuator is ON (to open or close the valve), the actuator must be OFF for a time equal to three operating cycles. For example, if the operating cycle time is 5 seconds, for every operating cycle that the actuator is ON, it must be OFF for 15 seconds. **Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor.**

Actuator Drive Output Requirements: Parker's 70 Series actuators have a male square drive output. Two industry standard bolt hole circle configurations are provided (See Figure 2).

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Bracket requirements: It is mandatory the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lockwashers must be used to secure the actuator to the bracket. There can be no flexibility in the bracket, and backlash (“play”) in the coupling should be minimized. In addition, the actuator output shaft must be in line (centered) with the valve shaft. This avoids side-loading the shafts (crossed-slot couplings are more tolerant of misalignment).

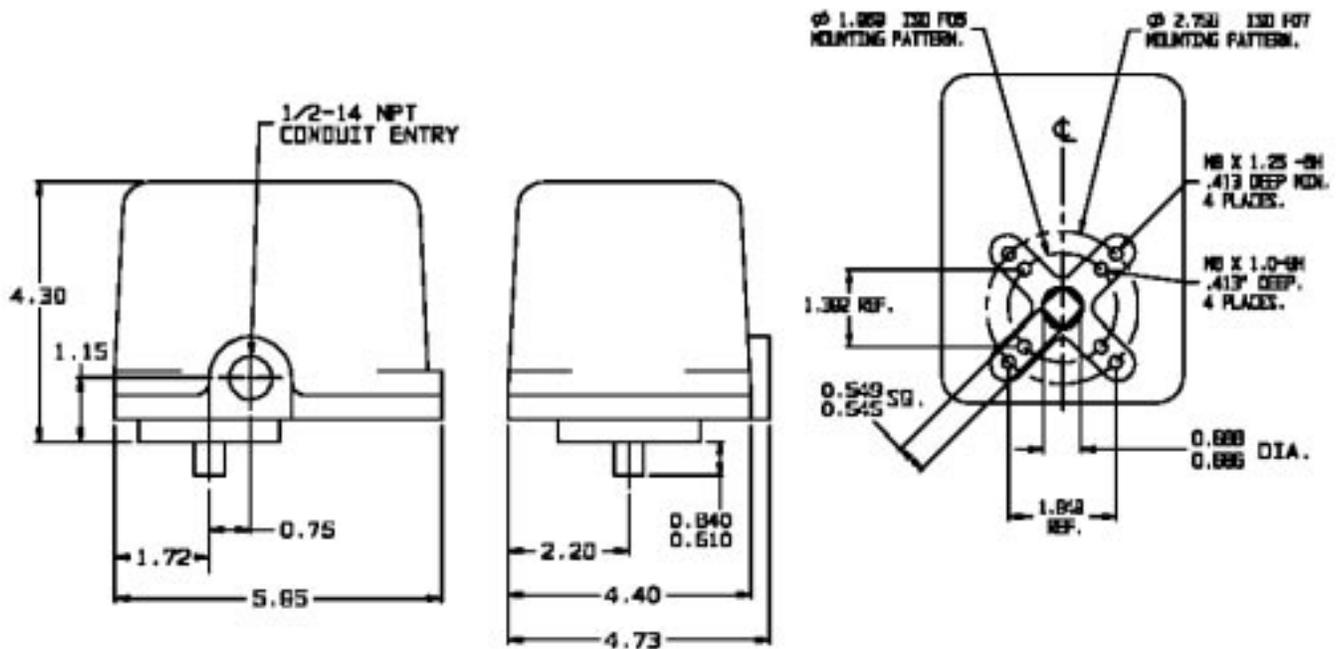


Figure 2: 70 Series Dimensions

Wiring

Adhere to local wiring codes.

The identification label on each actuator specifies the voltage and current requirements for the actuator. For convenience, Figures 3A & 3B show the standard power and control wiring connections for the actuator. The terminal strip is numbered from the bottom to the top. Since all Parker 70 series actuators travel in the clockwise direction in 90° stops, applying power between terminals 1 and 4 will stop the actuator at the 90° or 270° positions (closed) while applying power between terminals 1 and 3 will stop the actuator at the 0° or 180° positions (open)

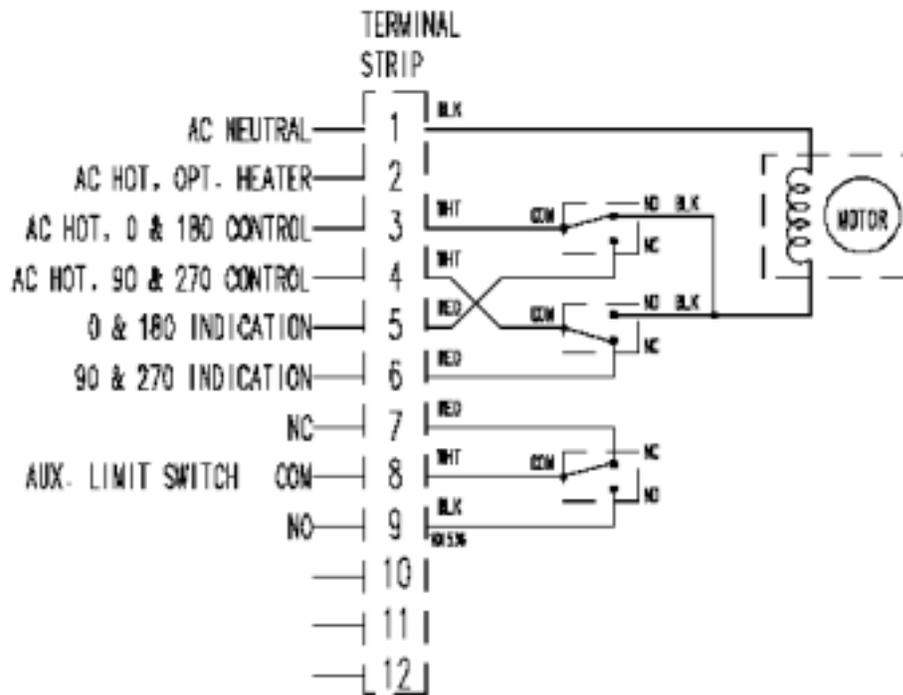


Figure 3A: 70 Series Wiring Diagram, AC Models

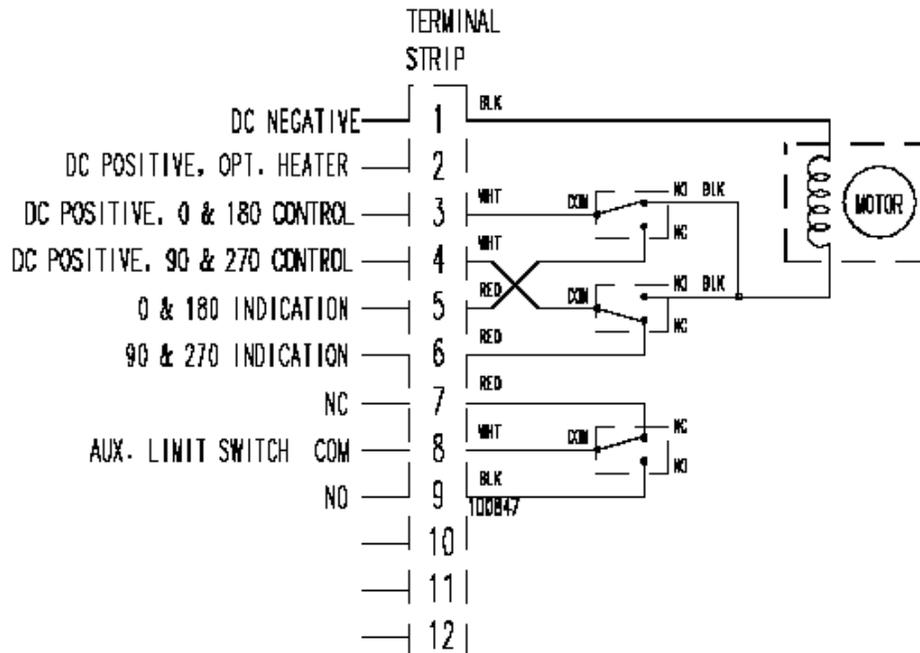


Figure 3B: 70 Series Wiring Diagram, DC Models

ADJUSTMENT OF THE 70 SERIES LIMIT SWITCHES

If adjustment of the open or closed position is required, proceed as follows:

A. Adjust the OPEN limit switch cam

1. Using a hex wrench, loosen the set screw in the OPEN limit switch cam (the second up from the bottom).
2. Apply power to terminals 1 and 3 (See Figures 3) to drive the actuator to the open position (counterclockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

B. Adjust the CLOSED limit switch cam

1. Using a hex wrench, loosen the set screw in the CLOSED limit switch cam (the bottom one).
2. Apply power to terminals 1 and 4 (See Figures 3) to drive the actuator to the closed position (clockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

70R SERIES GENERAL TECHNICAL INFORMATION

70R Series AC voltage actuators use a split phase motor which internally steps up the applied 115 AC voltage and feeds it back to the off terminal. For example, when 115 VAC power is applied at terminals 1 and 4, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less than 230 VAC and it is suggested that relay outputs be used. Additionally, due to this feed back, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator. It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Tools Required: Phillips screwdriver, Flat blade screwdriver and 1/16 inch hex wrench.

Temperature Limits

Low ambient temperatures: The minimum recommended ambient temperature without the optional heater and thermostat is approximately 30 °F (-1 °C), although it varies with the frequency of use. With the optional heater and thermostat installed, the recommended minimum ambient temperature is -40 °F (-40 °C).

High ambient temperatures: The maximum recommended ambient temperature is 160 °F (71 °C).

High media temperatures: For media temperatures up to 200 °F (93 °C), additional precautions are not typically required. For media temperatures between 200 °F and 300 °F (93 °C and 148 °C), a shielding plate about one inch larger than the actuator in each dimension should be placed between the actuator and the mounting bracket. In addition, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300 °F (148 °C), a valve with an extended shaft mounting arrangement should be used.

Mounting the Actuator

First verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

NOTE: A 25% duty cycle means for every operating cycle that the actuator is ON (to open or close the valve), the actuator must be OFF for a time equal to three operating cycles. For example, if the operating cycle time is 5 seconds, for every operating cycle that the actuator is ON, it must be OFF for 15 seconds. Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor.

Actuator Drive Output Requirements: Parker's 70R Series actuators have a male square drive output. Two industry standard bolt hole circle configurations are provided (See Figure 4).

Bracket requirements: It is mandatory that the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lockwashers must be used to secure the actuator to the bracket. There can be no flexibility in the bracket, and backlash (“play”) in the coupling should be minimized. In addition, the actuator output shaft must be in line (centered) with the valve shaft. This avoids side-loading the shafts (crossed-slot couplings are more tolerant of misalignment).

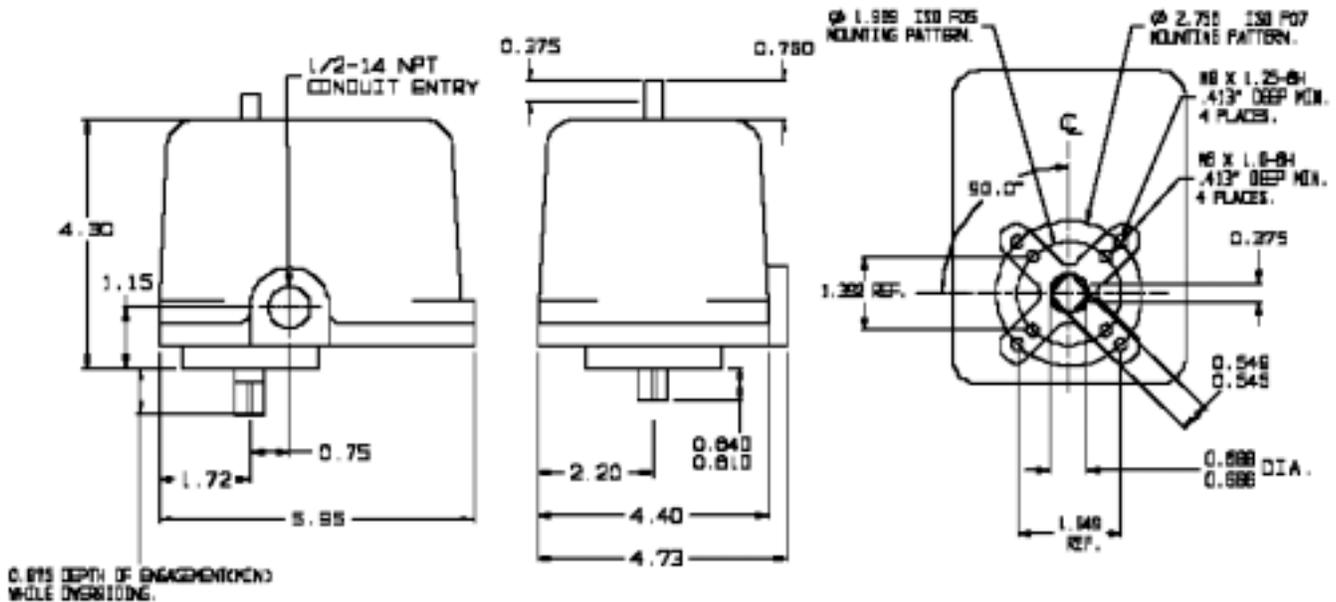


Figure 4: 70R Series Dimensions

Manual Override

To operate the actuator manually, push the override shaft down approximately 1/4 inch and use a wrench on the flats of the shaft to rotate the actuator. As noted in Figure 4, the coupling must be designed to accommodate this shaft movement. The override shaft may also be used to provide visual identification of valve position.

Wiring

Adhere to local wiring codes.

The identification label on each actuator specifies the voltage and current requirements for the actuator. For convenience, Figures 5A & 5B show the standard power and control wiring connections for the actuator. The terminal strip is numbered from the bottom to the top. To operate the 70R Series actuator, the user supplies power to the actuator’s motor through to limit switches. The limit switches control the actuator’s mechanical travel limits and are factory set at 90 degrees.

VAC - To drive the actuator counterclockwise, apply power to terminals 1 and 3. To drive the actuator clockwise, apply power to terminals 1 and 4. The actuator may be driven fully open or closed by maintaining power to the motor until the actuator trips the internal limit switches. Power may be disconnected at any point during the travel to position the actuator.

VDC - The 70R Series actuators require a reversing of the power polarity. To drive the actuator clockwise, apply power so that terminal 1 is negative and terminal 4 is positive. To drive the actuator counterclockwise, apply power so that terminal 1 is positive and terminal 4 is negative.

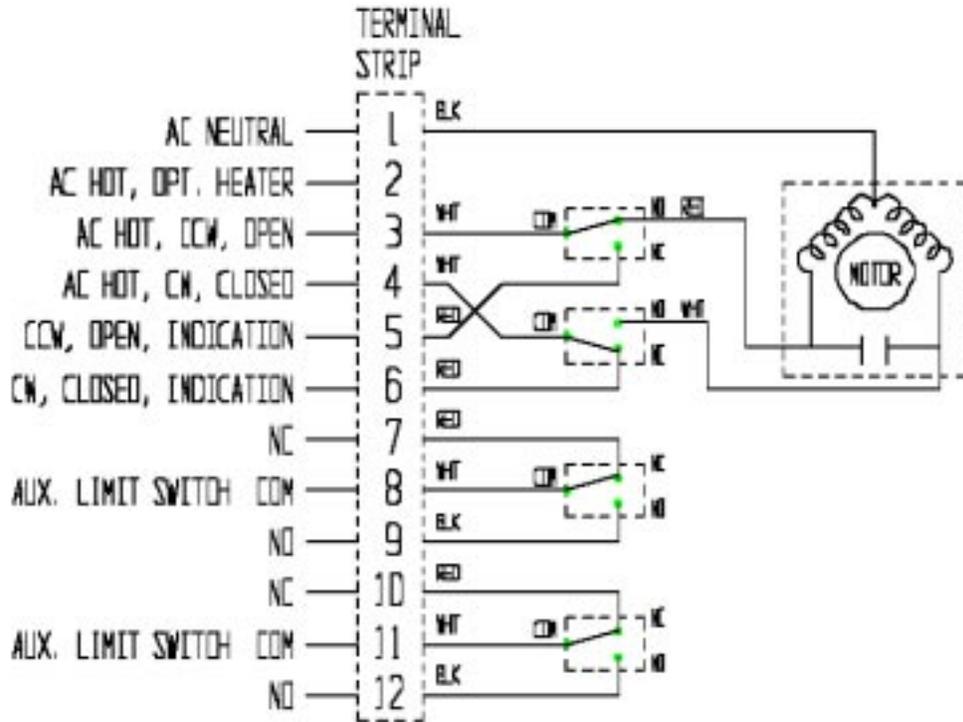


Figure 5A: 70R Series Wiring Diagram, AC Models

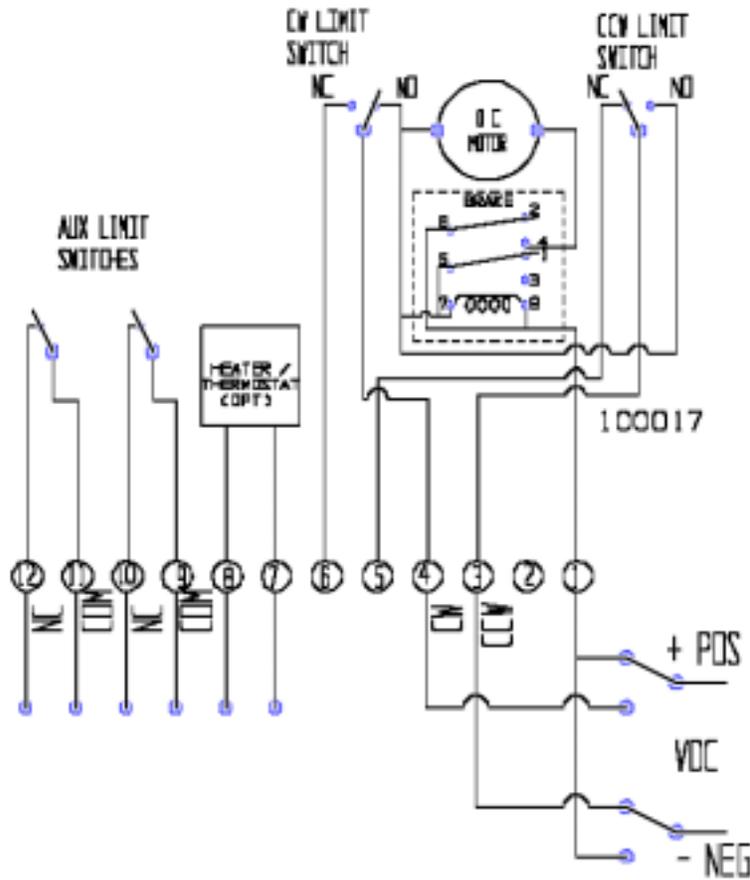


Figure 5B: 70R Series Wiring Diagram, DC Models

ADJUSTMENT OF THE 70R SERIES LIMIT SWITCHES

If adjustment of the open or closed position is required, proceed as follows:

A. Adjust the OPEN limit switch cam

1. Using a hex wrench, loosen the set screw in the OPEN limit switch cam (the second up from the bottom).
2. Apply power to terminals 1 and 3 (See Figures 5) to drive the actuator to the open position (counterclockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

B. Adjust the CLOSED limit switch cam

1. Using a hex wrench, loosen the set screw in the CLOSED limit switch cam (the bottom one).
2. Apply power to terminals 1 and 4 (See Figures 5) to drive the actuator to the closed position (clockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

70 SERIES LIMIT SWITCH KIT

70 Series Limit Switch Kits add additional limit switches to an actuator. Standard actuators are shipped from the factory with two limit switches installed—one to operate at the fully open position and one to operate at the fully closed position. Additional limit switches may be installed to operate at any actuator position.

PARTS LIST

Limit Switch kit consists of the following parts:

- 1· Limit Switch(es)
- 2· Cam
- 3· (2) #4-40 Studs
- 4· (2) #4-40 Nuts
- 5· (2) #4 Flat Nylon Washers
- 6· (3) Limit Switch Wires
- 7· Wire Tie

Tools Required: Small flat blade Screwdriver; 1/4 inch nut driver; Small Phillips blade Screwdriver; 1/16 inch hex wrench

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

A. Remove Actuator Cover

Remove the actuator cover by removing the screws securing the cover to the base.

B. Install Limit Switch

1. Carefully remove the #4-40 Limit Switch Screws which secure the existing Limit Switches in place.
2. Place one each of the #4 Flat Nylon Washers over each of the mounting holes of the existing upper limit switch.
3. Place the additional Limit Switch on top of the #4 Flat Nylon Washers.
4. Using the supplied #4-40 Studs and #4-40 Nuts, secure the Limit Switches in place. Do not over-tighten the fasteners.

C. Install Wiring Assembly

1. Attach the faston end of the White Wire to the Common (COM) connector on the Limit Switch. Connect the stripped end of the White Wire to terminal number 8 on the terminal strip.
2. Attach the faston end of the Black Wire to the Normally Open (NO) connector on the Limit Switch. Connect the stripped end of the Black Wire to terminal number 9 on the terminal strip.
3. Attach the faston end of the Red Wire to the Normally Closed (NC) connector on the Limit Switch. Connect the stripped end of the Red Wire to terminal number 7 on the terminal strip.
4. Using the supplied Wire Tie, secure the Limit Switch wires to avoid contact with any moving parts.

D. Install Cam

1. Slide the additional Cam down the actuator cam shaft on top of the existing Cams.
2. Drive the actuator to the desired trip point.
3. Rotate the cam counterclockwise until the limit switch lever passes through one of the flats on the cam and operates the limit switch (pushes the lever in). Now rotate the cam clockwise until the limit switch just clicks open.
4. Re-tighten the set screw in the limit switch cam. (Do not over-tighten the screws, use less than 8 in/lbs of tightening torque)
5. Operate the actuator to verify proper setting of the Cam.

D. Replace Actuator Cover

NOTE: When reinstalling the cover, follow the normal practice of tighten the cover screws in a cross pattern to insure that the cover is pulled down flat without over-stressing a corner.

70 SERIES HEATER/THERMOSTAT KIT

This Heater/Thermostat Kit is intended for use with any Parker's 70 Series Electric Actuator equipped with a 115 /230 VAC motor. Parker's Heater/Thermostat Kit is designed to provide a controlled means of heating the actuator motor and gear train in order to allow use of the actuator in environments where the ambient temperature is as low as -40 °F (-40 °C). The thermostat energizes at 40 °F (-40 °C) and de-energizes at 60 °F (15 °C).

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Installation of Heater/Thermostat Kit

A. Remove Actuator Cover

Remove the actuator cover by removing the screws securing the cover to the base.

1. Remove the white plastic backing from the heater element to expose the adhesive surface of the heater element.
2. Apply the adhesive surface of the heater element to the motor support plate between the motor and the limit switch posts.
3. Route the lead from the heater strip to the bottom of terminal position one (1).
4. Route the lead from thermostat to the bottom of terminal position two (2).
5. Using the supplied wire ties, secure the thermostat and heater element wires to keep them clear of any moving parts.

B. Wiring

1. Wire terminal 1 to 115 /230 NEUTRAL.
2. Wire terminal 2 to 115 /230 HOT.
3. Depending on the actuator option, AC power may already be connected at terminals 1 and 2. In this case NO additional wiring is required.

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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