

Installation, Maintenance and Operating Manual



LRF Series Reversing Electric Actuators

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READ THESE INSTRUCTIONS FIRST!

This instruction manual contains important information regarding the installation, operation and troubleshooting of Valve Control Limited's LRF-Series Electric Actuators. Please read these instructions carefully and save them for future reference.

1 General

1.1 Description

Valve Control Limited's LRF-Series Electric Actuators are designed to provide reliable and efficient operation of 1/4-turn valves.

The supported torque range for actuation is between 150 and 600 inch pounds. LRF-Series actuators are available in AC models with a 25% duty cycle and DC models with an 80% duty cycle.

1.2 Parts List

1. Limit Switches
2. Cams
3. O-Ring

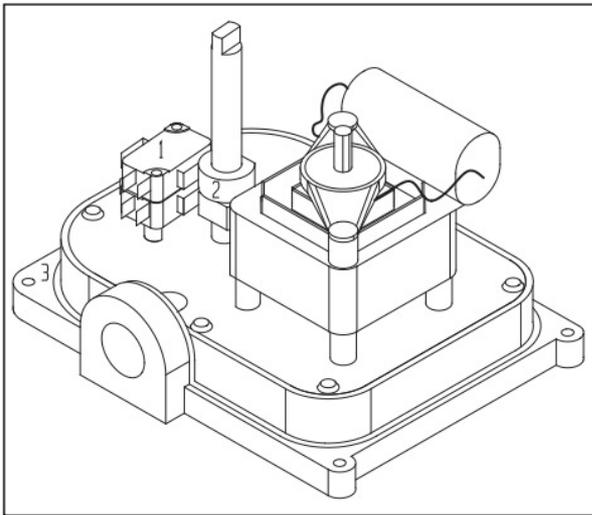


Figure 1 Parts Identification

1.3 General Technical Information

LRF-Series AC voltage actuators use a split phase motor, which internally steps up the applied 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.

2 Temperature Limits

2.1 Low ambient temperatures:

The minimum recommended ambient temperature without the optional heater and thermostat is approximately 30°F (although it varies with the frequency of use).

With the optional heater and thermostat installed, the recommended minimum ambient temperature is -40°F.

2.2 High ambient temperatures:

The maximum recommended ambient temperature is 150°F.

2.3 High media temperatures:

For media temperatures up to 200°F, additional precautions are not typically required.

For media temperatures between 200°F and 300°F, 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, a valve with an extended shaft mounting arrangement should be used.

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.

3 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.

3.1 Actuator Drive Output Requirements:

Valve Control Limited's LRF-Series actuators have a square output drive. ISO 5211 bolt circle configurations are provided (see Figures 2A and 2B).

3.2 Bracket Requirements:

It is mandatory that the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lock washers 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 (centred) with the valve shaft. This avoids side-loading the shafts (crossed-slot couplings are more tolerant of misalignment).

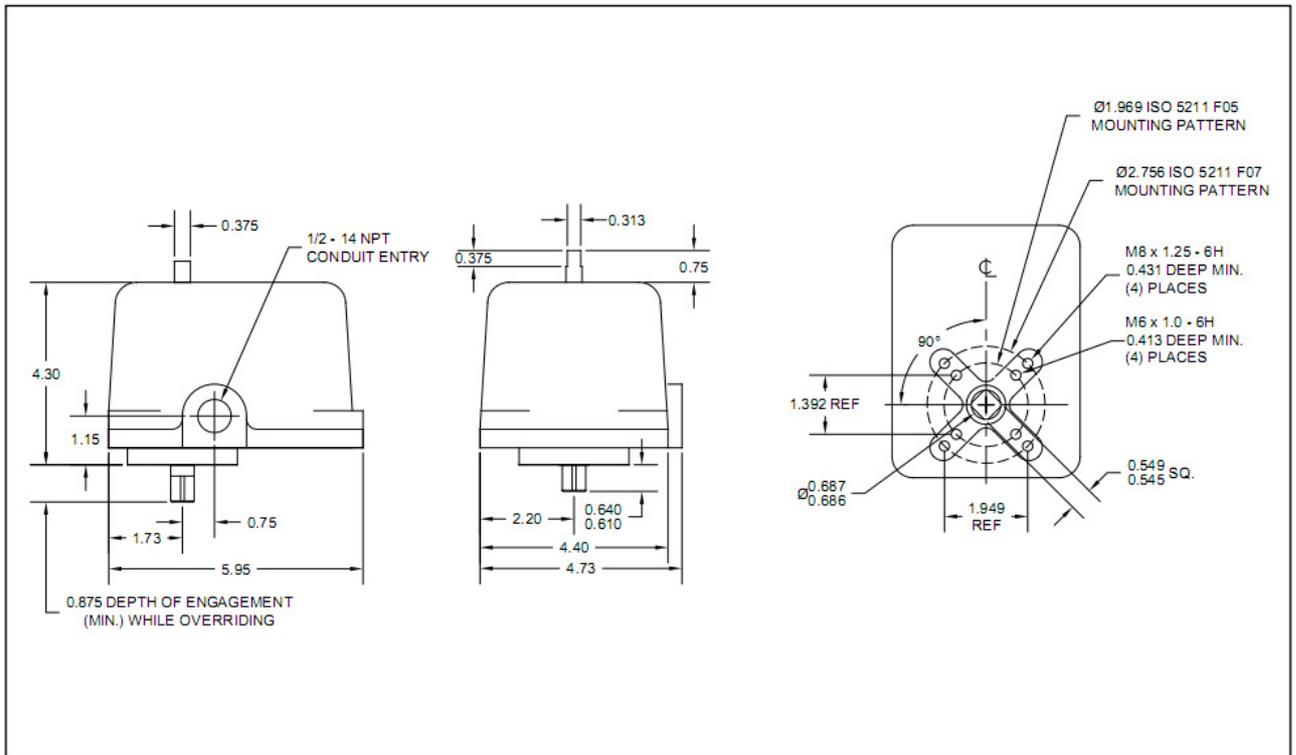


Figure 2A Dimensions, Male output

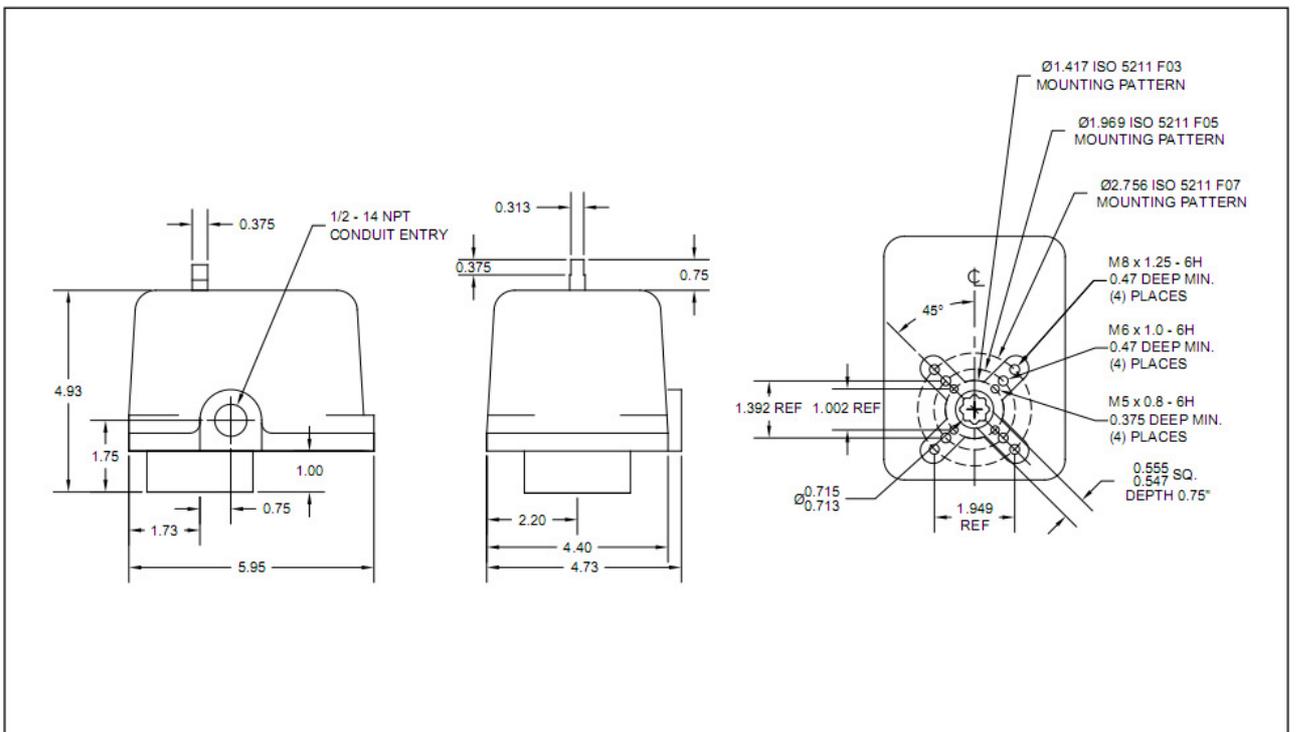


Figure 2B Dimensions, Female output (standard)

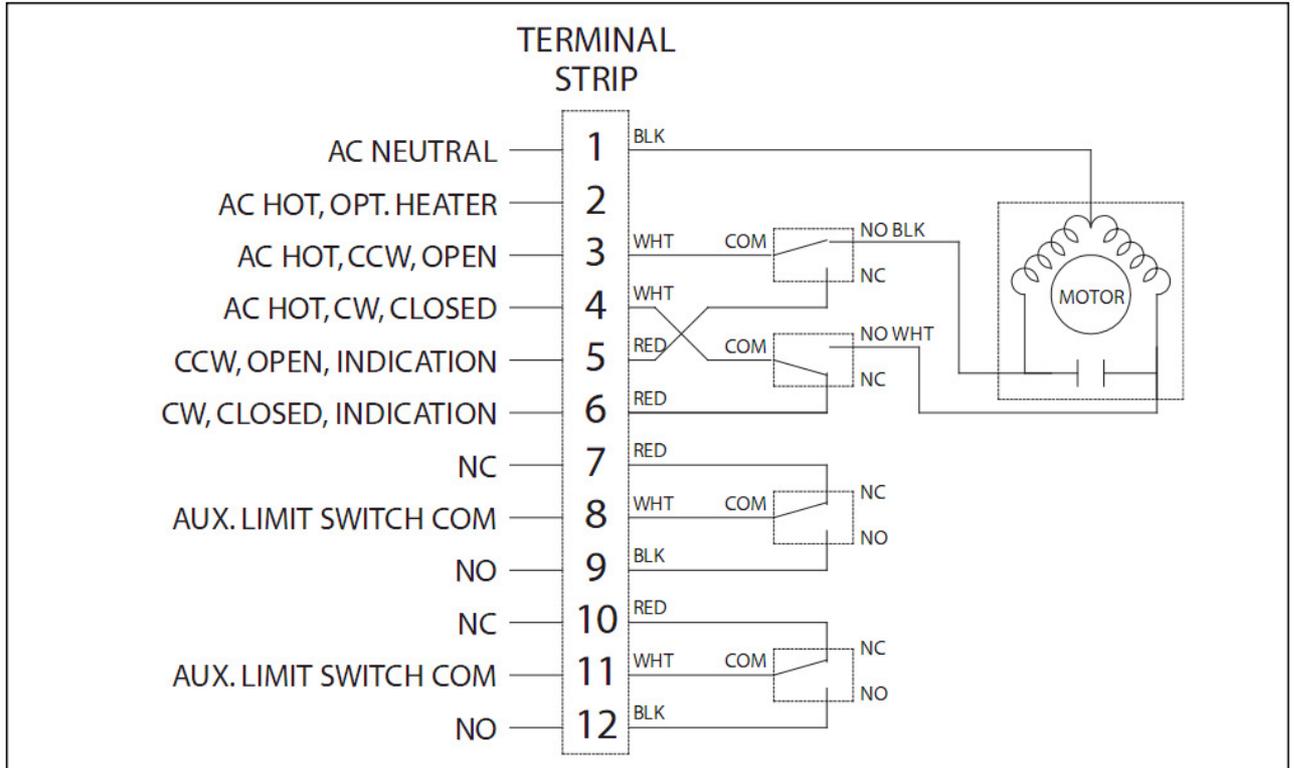


Figure 3A LRF Series AC Wiring

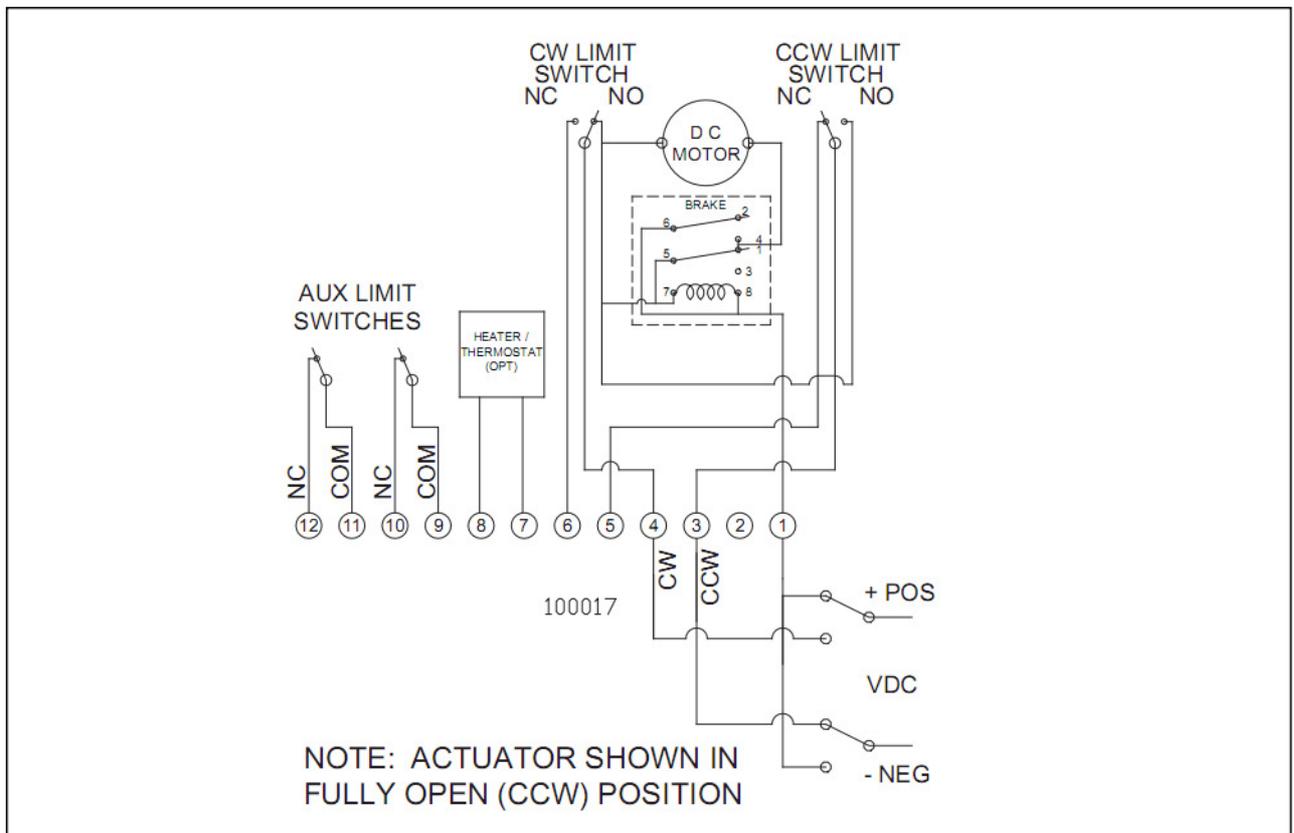


Figure 3B LRF Series DC Wiring

4 Manual Override

4.1 Male output:

To operate the actuator manually, push the override shaft down approximately 1/4", and use a wrench on the flats of the shaft to rotate the actuator.

As noted in Figure 2A, the coupling must be designed to accommodate this shaft movement. The override shaft can also be used to provide visual identification of the valve's position.

4.2 Female output:

To operate the actuator manually, push the override shaft down approximately 1/4", and use a wrench on the flats of the shaft to rotate the actuator.

The override shaft can also be used to provide visual identification of the valve's position.

5 Wiring

Note: Be sure to follow local wiring codes.

The identification label on each actuator specifies the voltage and current requirements for the actuator. Figure 3 shows the standard power and control wiring connections for AC and DC actuators.

To operate the LRF-Series actuator, the user supplies power to the actuator's motor through two limit switches. The limit switches control the actuator's mechanical travel limits and are factory set at 90 degrees.

5.1 AC

To drive the actuator counter clockwise (CCW), apply power to terminals 1 and 3. To drive the actuator clockwise (CW), apply power to terminals 1 and 4.

The actuator can be driven fully open (CCW) or closed (CW) by maintaining power to the motor until the actuator trips the internal limit switches. Power can also be disconnected at any point during the travel to position the actuator, (see Figure 3A)

5.2 DC

DC voltage actuators require a reversing of the power polarity. To drive the actuator CW, apply power so that terminal 1 is negative and terminal 4 is positive.

To drive the actuator CCW, apply power so that terminal 1 is positive and terminal 3 is negative, (see Figure 3B)

NOTE: LRF series actuators have a 25% duty cycle, which means that 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 duty cycle may cause the thermal overload switch to temporarily shut off power to the motor.

6 Adjustment of the Limit Switches

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

6.1 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 3A and 3B) to drive the actuator to the open position (counter 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.

6.2 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 3A and 3B) 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.

7 Other Options

Other options such as extra limit switches and heater/thermostats are available. For further details please consult Valve Control Limited.