

ML9184 Non-Spring Return Direct Coupled Damper Actuator

PRODUCT DATA



APPLICATION

The ML9184 Non-Spring Return Direct Coupled Damper Actuator provides Series 90 proportioning control of dampers in heating, ventilation, and air conditioning (HVAC) applications.

FEATURES

- Mounts directly on 3/8 in. to 5/8 in. (10 to 17 mm) round and square and 3/4 in. (19 mm) round damper shafts by using the appropriate insert. Most models are shipped with 1/2 in. insert.
- Provides 150 lb-in. (17 N•m) torque.
- Magnetic coupling eliminates the need for mechanical stops or limit switch adjustments by limiting stall torque to 250 lb-in. (28.3 N•m) maximum.
- 95° stroke provides necessary compression of rubber/neoprene gaskets commonly used on 90° low leakage dampers.
- Manual clutch allows for manual adjustment.
- 2 second synchronous timing can eliminate need for feedback position indication in closed-loop temperature control applications.
- Removable splined output hub permits premounting of hub on damper shaft, providing installation flexibility.
- Designed for both single-point and three-point mounting, to allow installation flexibility.
- Available with or without a time-out feature. Models without the time-out feature are designed to be used with intelligent building management system and/or controller.
- Standard models have two 8 mm by 12 mm long set screws for securing the damper shaft. Actuator models available for various shaft sizes that allow damper shaft to operate centered inside the output hub.

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SPECIFICATIONS

Models:

ML9184: Non-Spring Return Direct Coupled Damper Actuators.

ML9184A: High Torque (150 lb-in. [17 N•m]) Direct Coupled Damper Actuator without auxiliary switches or time-out function.

ML9184C: High Torque (150 lb-in. [17 N•m]) Direct Coupled Damper Actuator with two low voltage rated auxiliary switches and without time-out function.

ML9184D: High Torque (150 lb-in. [17 N•m]) Direct Coupled Damper Actuator without auxiliary switches and with time-out function.

ML9184F: High Torque (150 lb-in. [17 N•m]) Direct Coupled Damper Actuator with two low voltage auxiliary switches and with time-out function.

Electrical Ratings:

Power Input: 24 Vac \pm 20%, 50/60 Hz.

Power Consumption:

ML9184A-C: 6 VA at 24 Vac.

ML9184D,F: 6.5 VA at 24 Vac.

Auxiliary Switch Ratings: 24 Vac, 3 AFL, 18 ALR, 1A Pilot Duty.

Cable Ratings:

Control: Standard models include non-plenum UL/CSA rated, 30V, 60 μ C, 20 gauge cable.

Auxiliary Switch: UL/CSA rated 300V 90 μ C, 18 gauge.

Controller Type:

Series 90 control circuit, 135 ohm Series 90 proportioning controller.

Torque Ratings at Rated Voltages:

Lift and Hold Minimum: 150 lb-in. (17 N•m).

Breakaway Minimum: 150 lb-in. (17 N•m).

Stall Minimum: 150 lb-in. (17 N•m).

Stall Maximum: 250 lb-in. (28.3 N•m).

Torque Derating at 24 Vac \pm 20%:

150 lb-in. from -20°F to +95°F (-29°C to +35°C).

133 lb-in. from 95°F to 140°F (35°C to 60°C).

150 lb-in. from -40°F to -20°F (-40°C to -29°C) at 24 Vac +20% only.

Actuator Stroke:

95° Nominal \pm 3°, mechanically limited.

Actuator Timing at 90° Stroke:

92 \pm 2 seconds synchronous at 60 Hz from -4°F to 140°F (-20°C to +60°C).

110 \pm 2 seconds synchronous at 50 Hz from -4°F to 140°F (-20°C to +60°C).

Non synchronous below -4°F.

Ambient Temperature Range: -40°F to +140°F (-40°C to +60°C).

Storage Temperature: -30°F to 150°F (-35°C to 65°C).

Humidity:

5 to 95 percent relative humidity, noncondensing.

Mounting:

Mounts directly on 3/8 in. to 5/9 in. (12 to 17 mm) round or square and 3/4 in. (19 mm) round damper shaft. Minimum shaft length required:

- 2.5 in. (64 mm) when the shaft attachment is made on the side of the actuator opposite the duct;
- 0.65 in. (16 mm) when the hub is mounted on the shaft before the actuator is installed.

Most actuators are shipped with specifically sized hubs. Some models contain an assembly with assorted hub inserts.

Mounting bracket is included with most models.

Dimensions: See Fig. 1.

Device Weight: 3.0 lb (1.36 kg).

Noise Rating: 45 dBA maximum at 1m.

Position Indicator: Mounted on actuator hub.

Actuator Design Life: Full Stroke Cycles: 100,000.

Repositions:

2,000,000 minimum.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

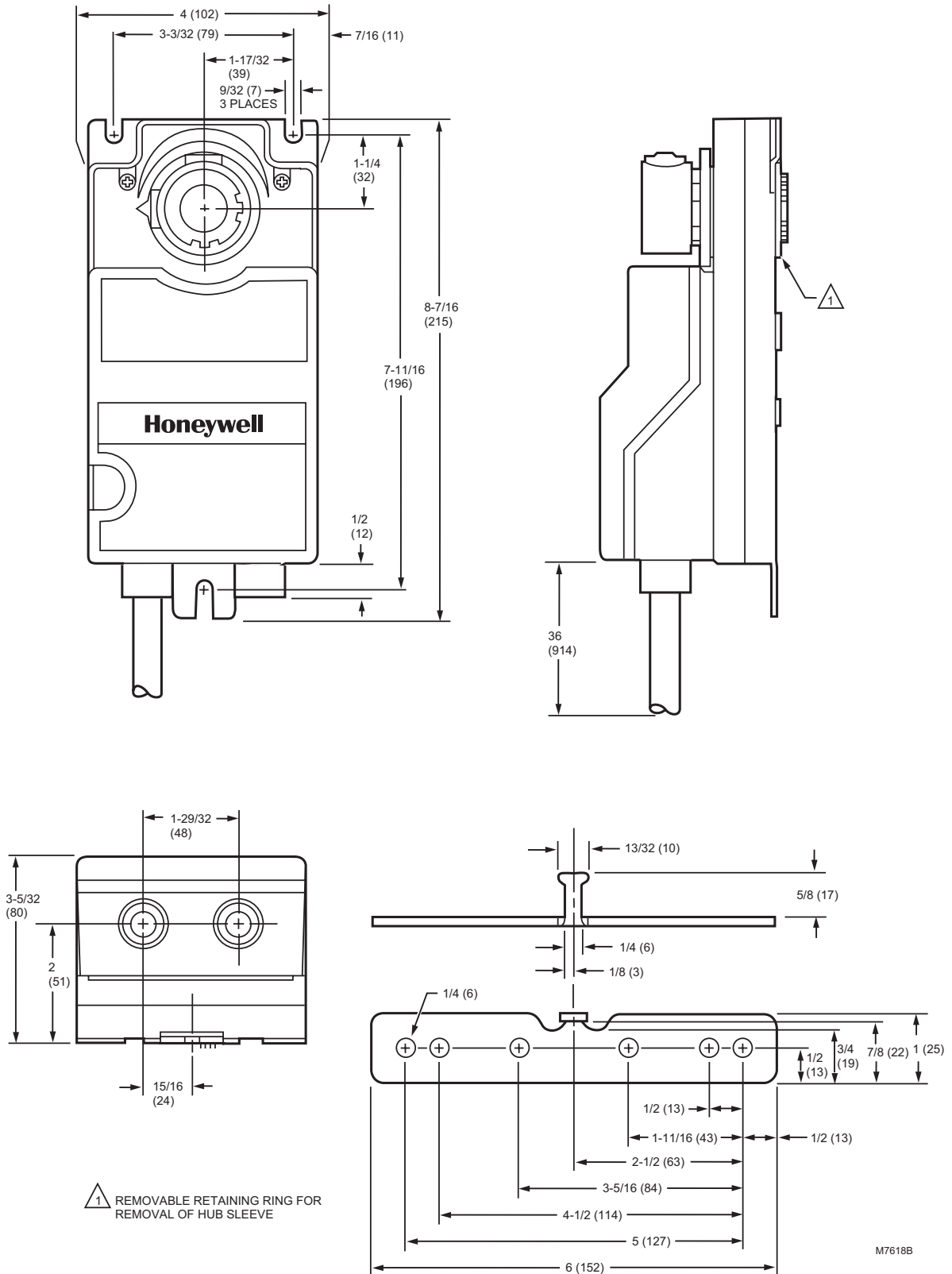


Fig. 1. Approximate dimensions of ML9184 Non-Spring Return Direct Coupled Damper Actuator and mounting bracket in in. (mm).

Approvals:

UL873 (UL94-5V Enclosure: Plenum rating).
 UL Listed: File number E4436, Guide number XAPX.
 CSA Listed: File number LR95329-17.

Environmental Protection Ratings: NEMA1 standard with damper shaft in horizontal position.

Accessories:

205617 Hub Insert, 3/4 in. round.
 205753 Hub Insert, 3/8 in.
 205758 Hub Insert, 5/8 in.
 205820A 3-Point Mounting Kit.
 205685 Crank-Arm Accessory.
 205850B End Stop Kit.

INSTALLATION

When Installing this Product...

1. Read instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check ratings and description given in the specifications to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

WARNING

Electrical Shock Hazard.
Can cause severe injury, death or property damage.

Disconnect power before installation to prevent electrical shock or equipment damage.

CAUTION

Equipment Damage Hazard.
Improper procedure or incorrect location can damage equipment.

1. Never turn motor output hub by hand or wrench, unless declutch button is fully depressed.
2. Do not install actuator in areas with acid fumes or other deteriorating vapors that might attack the metal parts of the actuator.

WARNING

Fire or Explosion Hazard.
Can cause severe injury, death or property damage.



Do not install actuator in areas with escaping gas or other explosive vapors that could be ignited by a spark from the actuator or attached accessories.

Location

Install the actuator in any location free from acid fumes or other deteriorating vapors that could attack the metal parts of the actuator. Make sure the location is not subject to escaping gas or other explosive vapors that could accidentally be ignited by a spark from the actuator or its attached parts.

Install the actuator in a location that allows enough clearance for mounting accessories and for servicing.

Mounting

The ML9184 Non-Spring Return Direct Coupled Damper Actuator is designed to operate a damper by driving the damper shaft either clockwise  or counterclockwise , depending on damper design. All actuators are shipped in the fully ccw position.

The ML9184 Non-Spring Return Direct Coupled Damper Actuator is designed with removable hub inserts to accommodate specific damper shaft sizes. Proper insert selection is necessary to avoid excessive strain on the output gear. Most ML9184 Actuators are shipped with a 1/2 in. hub insert. For field use, three hub insert sizes are available. See the Accessories listing in the Specifications section. Shaft sizes are stamped on the inserts.

The ML9184 Non-Spring Return Direct Coupled Damper Actuator is designed for single-point mounting when using a mounting bracket. Single-point mounting is typically used when the actuator is mounted on the damper shaft.

The ML9184 Non-Spring Return Direct Coupled Damper Actuator can be mounted directly on the damper shaft with the actuator in any position.

A mounting bracket (see Fig. 1) is provided with some models to aid in installing the actuator. The bracket can be bent to any shape to allow the bracket tab to be centered in the actuator slot. Install the mounting bracket so that the mounting bracket tab is centered in the actuator slot. See Fig. 2.

IMPORTANT

The mounting bracket must not bind or clamp the actuator to the duct. The mounting bracket only prevents the actuator housing from rotating.

The ML9184 Direct Coupled Actuator has a reversible output hub. The hub is factory mounted on the top of the actuator gear housing. When attaching to damper shafts less than 2.5 in. (64 mm) long, or for ease of mounting, the output hub may be mounted to the back of the actuator gear housing. See Fig. 4. Be careful when removing the retaining ring that secures the output hub sleeve to the actuator housing. Use a flat headed screwdriver to pry the ring loose.

Other possible mounting configurations and standard connections are shown in Fig. 4 through 8.

The ML9184 Non-Spring Return Direct Coupled Damper Actuator can also be three-point mounted using the three frame slots. Three point mounting is used for foot mounting the actuator or internally mounting the actuator in the duct when direct shaft coupling is not possible.

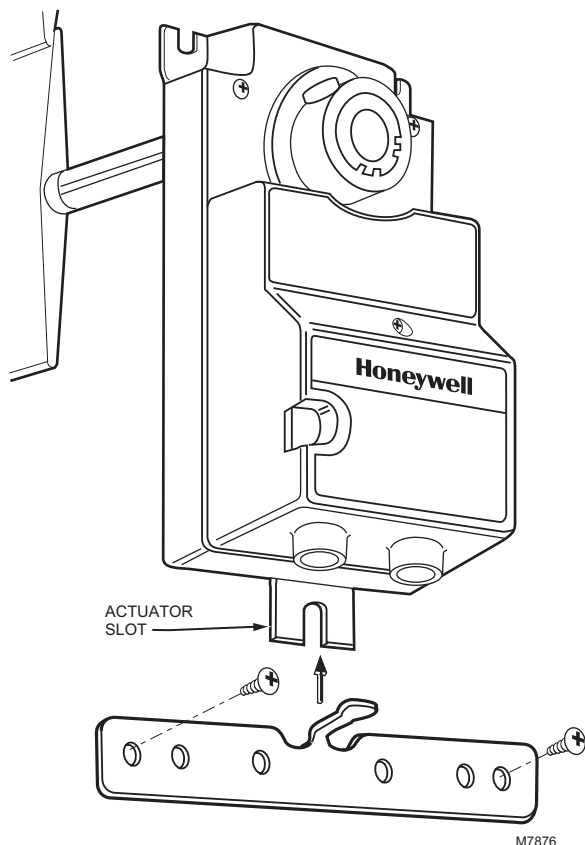


Fig. 2. Installing mounting bracket on ML9184 Non-Spring Return Direct Coupled Damper Actuator.

NOTE: Install mounting bracket so mounting bracket tab is centered in actuator slot.

! CAUTION

Equipment Damage Hazard.

Improper use of actuator will damage equipment.

Do not use the actuator as a shaft bearing. The actuator must be used only to supply rotational torque. To prevent damage to the actuator, avoid any side loads to the actuator output coupling bearings. Also, provide clearance for actuator sleeve on the back.

Preparation

Before installing the ML9184 on the damper shaft, determine the opening direction of the damper shaft (see Fig. 2) to correctly connect the wiring.

Installation

Installing Actuator and Mounting Bracket (Single Point Mounting)

1. Place the ML9184 Non-Spring Return Direct Coupled Damper Actuator over the damper shaft.
2. Position the actuator for best access to the actuator damper shaft locking screw.

3. Install the mounting bracket (see Fig. 2) and adjust it so the mounting bracket tab is centered in the actuator slot. Mark the screw holes for installing the mounting bracket on the damper housing.
4. Remove the mounting bracket and actuator.
5. Drill or center punch the starting holes for the mounting bracket screws (or use no. 10 self-tapping sheet metal screws—not provided).
6. Place the actuator and mounting bracket back into position over the damper shaft and install the mounting bracket screws.
7. Move damper shaft either fully clockwise ↻ or fully counterclockwise ↻.
8. Fully depress and hold disengage button while moving actuator hub either fully clockwise ↻ or fully counterclockwise ↻ to match damper shaft. Release disengage button.
9. Tighten the two 8 mm by 12 mm long set screws firmly against the damper shaft (80 to 100 lb-in.).

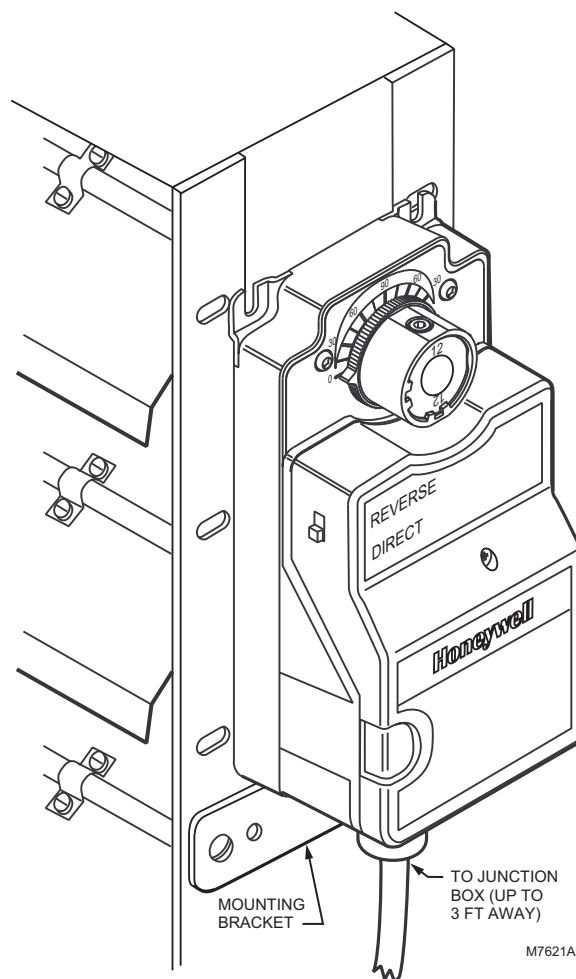


Fig. 3. ML9184 Actuator, typical mechanical connection.

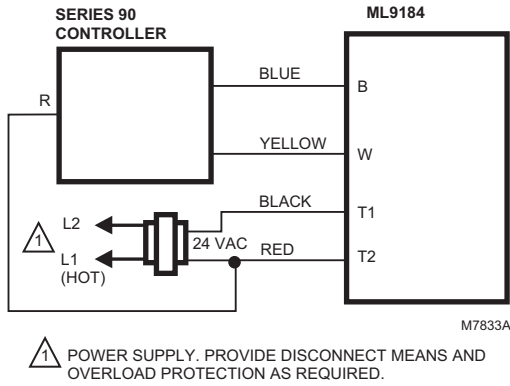


Fig. 5. ML9184 typical wiring diagram.

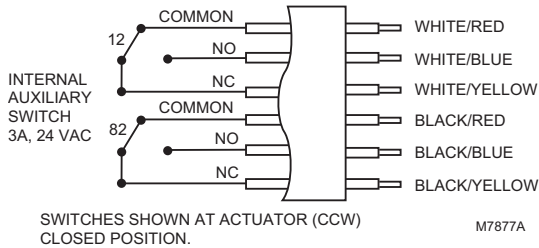


Fig. 6. ML9184 Actuator wiring for auxiliary switches. Switches shown at the actuator closed (fully counterclockwise) position.

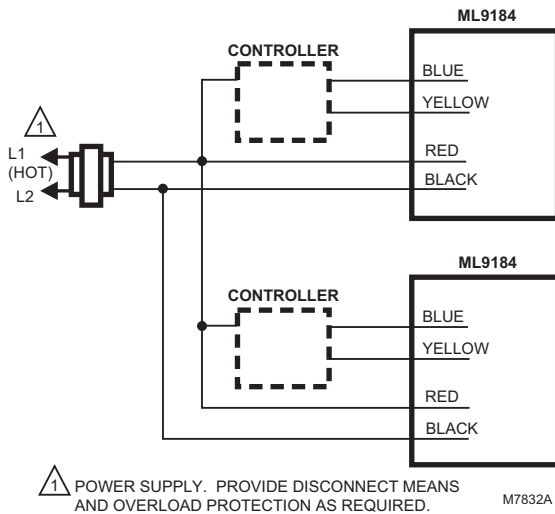


Fig. 7. Common transformer with two controller outputs and two actuators.

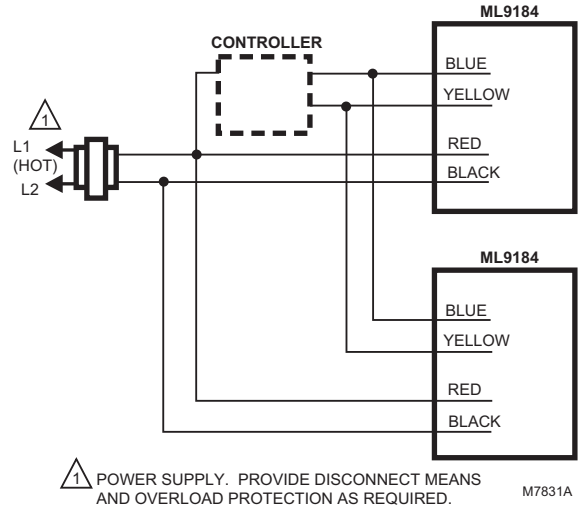


Fig. 8. Common transformer with one controller output and two actuators.

OPERATION

The ML9184 Non-Spring Return Direct Coupled Damper Actuator is designed to be used in ventilating and air conditioning installations to operate dampers, ventilation flaps and louvers requiring up to 150 lb-in. torque.

The ML9184 Non-Spring Return Direct Coupled Damper Actuator is operated by an electronic proportioning controller simulating a 135 ohm slide wire. The standard Series 90 controller has R, B and W terminals. As the controller reduces the resistance between terminals R and W, the motor drives closed. When the controller increases the resistance, the motor drives open.

IMPORTANT





The ML9184 can operate with a DDC Controller that emulates a 135 ohm resistance. Do not short-cycle the actuator. Short-cycling of the actuator can cause premature failure.

The actuator has a position indicator to show shaft position. As the indicator moves with the shaft, it gives an angular representation of the damper position. There are two distinct positions where the indicator can be placed. The indicator can be removed (by first removing the output hub) to provide proper damper position indication. The indicator can be indexed to show open or closed, using the detents that are 90° apart. See Fig. 3.

The ML9184D and ML9184F models provide a time-out function that removes power from the actuator submotor if the actuator remains in the fully open or fully closed position for longer than a nominal five minutes. This time-out function helps to extend actuator life.



CHECKOUT









Perform the following checkout procedure for the ML9184 NonSpring Return Direct Coupled Damper Actuator.

1. Check the actuator position indicator and damper shaft position to make sure they agree.
2. Apply 24 Vac to black (T1) and red (T2) leads.
3. Apply control signal, or adjust controller, to drive the damper open (clockwise ). Actuator should drive open (clockwise ).
4. Apply control signal, or adjust controller, to drive the damper closed (counterclockwise ). Actuator should drive closed (counterclockwise ).

TROUBLESHOOTING

If the actuator does not operate properly during Checkout, perform the following troubleshooting steps. Perform these steps before replacing the actuator.

1. Check the actuator label to make sure the power and control signal requirements are correct for your application.
2. Check for the presence of 24 Vac at the actuator black (T1) and red (T2) leads when the actuator should be driving. If the voltage is not present or is low, check the power supply.
3. Check the actuator as follows:
 - a. Connect the actuator blue (B) wire to the red (R) wire and leave the yellow (W) wire open. The actuator should drive the damper open (clockwise ).
 - b. Connect the actuator yellow (W) wire to the red (R) wire and leave the blue (B) wire open. The actuator should drive the damper closed (counterclockwise ).

- c. Connect the actuator yellow (W) and blue (B) wire to the red (R) wire. The actuator should drive the damper to the midway position.
- d. If the actuator operates properly, check the controller for proper output signals.
4. If the actuator does not drive in the direction desired when a control signal is applied, reverse the blue (B) and yellow (W) wires.
5. If the actuator does not drive, remove power and fully depress and hold the disengage button while trying to turn the damper shaft clockwise  and counterclockwise . If the damper shaft turns freely throughout the 90-degree stroke and the actuator is installed properly, replace the actuator.
6. If the damper shaft will not turn freely for the full 90 degrees, check for binding and verify that the actuator is loose on the mounting bracket. If necessary, adjust the mounting bracket to prevent binding.
7. If no binding is noticed in the actuator and damper assembly, remove the actuator and turn the damper shaft clockwise  and counterclockwise . If the damper does not turn freely, fix or replace the damper.
8. If the damper turns, fully depress and hold the actuator disengage button and turn the actuator hub clockwise  and counterclockwise . If the actuator does not turn, replace the actuator.
9. If the actuator and damper turn freely, remount the actuator to the damper per instructions in the Installation section. Make sure the actuator does not bind and that the actuator and damper are both at the same clockwise  or counterclockwise  end stop when they are assembled. Hook up the wires and repeat the checkout procedures. Troubleshoot if necessary.

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