

ML7275, ML7285 Spring Return Direct Coupled Actuators

PRODUCT DATA



FEATURES

- Mounts directly on horizontal 3/8, 1/2, and 5/8 in. round and square damper shafts by using the appropriate insert. Most models include 1/2 in. insert.
- Provides 25 lb-in. (ML7275) or 53 lb-in. (ML7285) running and spring return torque.
- Magnetic coupling eliminates need for mechanical stops or limit switch adjustments by limiting stall torque to 100 lb-in. (ML7275) or 135 lb-in. (ML7285) maximum.
- 95° stroke provides necessary compression of rubber/neoprene gaskets commonly used on 90° low leakage dampers.
- 88 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.
- Reversible mounting allows actuator use for either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Designed for both single-point and three-point mounting, providing installation flexibility.
- Available with or without a time-out feature. Models without this feature are designed for use with intelligent building management system and/or controller.
- Standard models have two 8 mm by 12 mm long set screws for securing damper shaft. Actuator models available for various shaft sizes that allow damper shaft to operate centered inside output hub.
- Standard one-meter cable with color-coded leadwires allows external wire connections with 1/2 in. conduit connectors.
- Two or more actuators can be mounted on one damper shaft to increase output torque for use on dampers larger than 8 square feet.
- Models available with 0-10 or 2-10 Vdc input signal.
- Models available with 4-20 mA input signal.
- All models have 2-10 Vdc feedback signal.

APPLICATION

The ML7275, ML7285 Spring Return Direct Coupled Actuators (DCA) are control actuators that provide proportional control for dampers. The actuator accepts a current or a voltage signal from any electronic controller to position a damper at any chosen point between fully open and fully closed.

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SPECIFICATIONS

Models:

- ML7275A: Low Torque (25 lb-in.) DCA without auxiliary switches and without time-out function.
 ML7275C: Low Torque (25 lb-in.) DCA with two line-voltage rated auxiliary switches and without time-out function.
 ML7275D: Low Torque (25 lb-in.) DCA without auxiliary switches and with time-out function.
 ML7275F: Low Torque (25 lb-in.) DCA with two line voltage auxiliary switches and with time-out function.
 ML7285A: High Torque (53 lb-in.) DCA without auxiliary switches and without time-out function.
 ML7285C: High Torque (53 lb-in.) DCA with two line-voltage rated auxiliary switches, without time-out function.
 ML7285D: High Torque (53 lb-in.) DCA without auxiliary switches and with time-out function.
 ML7285F: High Torque (53 lb-in.) DCA with two line voltage auxiliary switches and time-out function.

Dimensions: See Fig. 1.

Electrical Ratings:

- Power Input: 24 Vac \pm 20%, 50/60 Hz.
 Power Consumption: 12 VA maximum at 24 Vac.
 Auxiliary Switch Ratings:
 120, 240 Vac: 3 AFL, 18 ALR, 1A pilot duty.
 Cable Ratings:
 Control: Standard models include nonplenum UL/CSA rated, 30V, 60°C, 20 gauge cable.
 Auxiliary Switch: UL/CSA rated 300V 90°C, 18 gauge.

Control Inputs:

- 0 to 10 Vdc, 2 to 10 Vdc or 4 to 20 mA.
 All models have 2 to 10 Vdc feedback signal.

Torque Ratings (at Rated Voltages):

- Lift and Hold:
 ML7275: 25 lb-in. (3 N•m).
 ML7285: 53 lb-in. (6 N•m).
 Breakaway Minimum:
 ML7275: 25 lb-in. (3 N•m).
 ML7285: 53 lb-in. (6 N•m).
 Stall Minimum:
 ML7275: 25 lb-in. (3 N•m) spring return.
 ML7285: 50 lb-in. (6 N•m) spring return.
 Stall Maximum:
 ML7275: 100 lb-in. (11.3 N•m).
 ML7285: 135 lb-in. (15 N•m).

Actuator Stroke: 95° Nominal \pm 2°, mechanically limited.

Actuator Timing (at 90° Stroke):

- 88 \pm 2 seconds synchronous at 60 Hz from 0°F to 140°F.
 106 \pm 2 seconds at 50 Hz.
 Spring Wind Timing Upon Power Restoration Only:
 100 seconds nominal at 60 Hz, 120 seconds at 50 Hz.
 Spring Return Timing (at rated load):
 30 seconds maximum per 90° at 72°F.
 At -30°F:
 ML7275: 10 minutes maximum.
 ML7285: 5 minutes maximum.

Device Weight: 4.0 lb (1.82 kg).

Noise Rating (Driving Only): 45 dBA maximum at 1.0m.

Ambient Ratings:

- Temperature Range: -30°F to +140°F (-35°C to +60°C).
 Storage Temperature: -30°F to 150°F (-35°C to 65°C).
 Humidity:
 ML7275: 5 to 95 percent relative humidity, noncondensing.
 ML7285: 5 to 90 percent relative humidity, noncondensing.

Mounting:

- Mounts on horizontal 3/8 to 5/8 in. (12 to 16 mm) round or square damper shaft. (See Fig. 2 and 3.)
 Minimum shaft length required:
 3.5 in. (76 mm) when the hub is mounted on the side of the actuator away from the duct.
 0.65 in. (16 mm) when the hub is mounted on the side of the actuator towards the duct.
 Most actuators are shipped with specifically sized hubs.
 Some models contain an assembly with assorted hub inserts. Mounting bracket is included with most models.

Spring Rotation:

- Standard Mounting: Clockwise (cw).
 Reverse Mounting: Counterclockwise (ccw).

Position Indicator: Mounted on actuator hub.

Actuator Design Life:

- Full Stroke Cycles: 60,000.
 Repositions: 1,500,000.
 Spring Return Cycles: 7,500.

Approvals:

- UL94-5V Enclosure Plenum rating.
 UL873 Line voltage auxiliary switches.
 CSA: File Number: E4436; Guide Number: XAPX.

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 Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Relations
 Honeywell, 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.

Environmental Protection Ratings:

NEMA1 standard with shaft in horizontal position (see Fig. 2).

Mounting Tab: For use with Universal mounting bracket.

Accessories:

205617 Hub Sleeve Insert, 3/4 in.
 205753 Hub Sleeve Insert, 3/8 in.
 205755 Hub Sleeve Insert, 1/2 in.
 205758 Hub Sleeve Insert, 5/8 in.
 205784 Mounting Bracket.
 205820A 3-Point Mounting Kit.
 205830A Crank-Arm Accessory: includes 2 ball joints.
 205850 Rotation Limiter.
 205870 Shaft Adapter with crankarm for 1 in. shaft.
 205880 Shaft Adapter for 1 in. shaft.
 32002993-001 Tandem-Mount Kit.

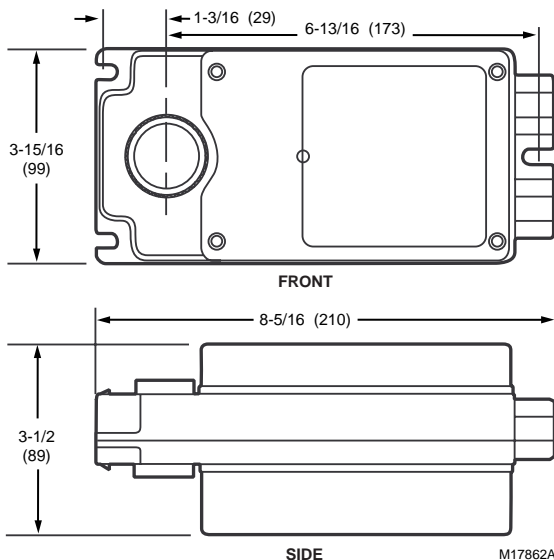


Fig. 1. Approximate actuator and mounting bracket dimensions in in. (mm).

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product 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.



CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.



CAUTION

Equipment Damage Hazard.

Can damage the actuator beyond repair.

Never turn the actuator shaft by hand or with a wrench. Forcibly turning the actuator shaft damages the gear train and stroke limit contacts.



CAUTION

Actuator Damage Hazard.

Deteriorating vapors and acid fumes can damage metal parts.

Install actuator in areas free of acid fumes and other deteriorating vapors.

IMPORTANT



All wiring must agree with applicable codes, ordinances and regulations.

Location

Install the actuator in any location free from acid fumes or other deteriorating vapors that might attack the actuator metal parts. 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 actuator is designed to operate a damper by driving the damper shaft clockwise  or counterclockwise  depending on damper design. All actuators are shipped in the fully closed (cw or ccw, depending on view) position.

The actuator is designed for single-point mounting when using an adapter bracket. Single-point mounting is typically used when the actuator is mounted on the damper frame.

A mounting bracket (see Fig. 1) is provided with some models to aid actuator installation. The bracket can be bent to any shape to support the actuator at the correct height.

The actuator can also be three-point mounted, using the two front-gear housing slots and the adapter bracket:

- Two screws are secured through the two gear housing slots near the hub.
- The adapter bracket is positioned to secure the far end of the actuator.



CAUTION

Actuator Damage Hazard.

Using actuator as shaft bearing causes device damage.

Use actuator only to supply rotational torque. Avoid any side loads to actuator output coupling bearings.

NOTE: Use three-point mounting for foot mounting or mounting the actuator internally in the duct, when direct shaft coupling is not possible.

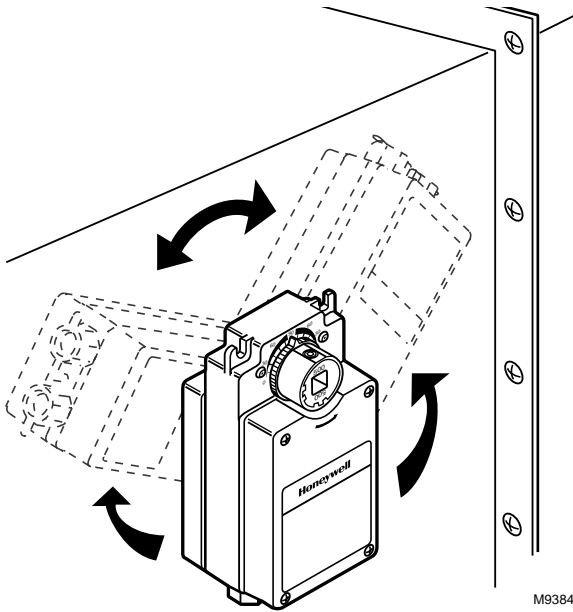


Fig. 2. Actuator can be mounted in any position.
(Note: NEMA rating applies only with damper shaft in the horizontal position.)

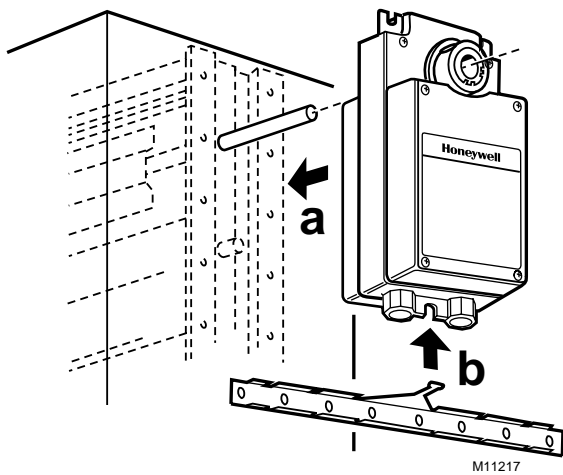


Fig. 3. Standard direct coupled mounting for applications with damper shaft of 3-1/2 in. long or longer.

NOTE: When attaching to damper shafts less than 3-1/2 in. (76 mm) long, or for ease of mounting, the output hub can be mounted to the bottom of the actuator housing (see Fig. 4.)

Preparation

Before installing the actuator on the damper shaft, determine the damper shaft opening direction to determine correct spring return rotation and wiring. The actuator can be mounted to provide clockwise or counterclockwise spring return. Reverse the actuator if necessary to provide the desired spring action. Arrows are molded into the covers to show the spring return direction. The deeper cover shows a counterclockwise (ccw) spring rotation the shallower cover shows a clockwise (cw) spring rotation.

Reversing the Output Hub (Fig. 4)

The actuator has a reversible output hub. The hub is factory-mounted on the top of the actuator housing. When attaching to damper shafts less than 3.5 in. (76 mm) long, or for ease of mounting, the output hub can be mounted to the bottom of the actuator housing:

IMPORTANT

Be careful when removing the retaining ring that secures the output hub to the actuator housing.

1. Pry the ring loose and set it aside.
2. Remove the hub from the housing top and set it aside.
3. Remove the indicator ring from the housing top and place it on the housing bottom.
4. Replace the hub in the housing bottom.
5. Replace the retaining ring to fix the hub and indicator in their new locations.

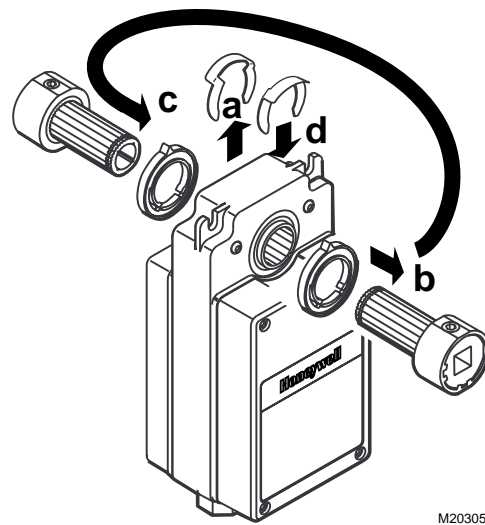


Fig. 4. Mounting hub to actuator bottom.

Adjusting the Position Indicator

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 four distinct positions where the indicator can be placed to provide proper damper orientation. To adjust the indicator:

1. Pry the ring loose and set it aside.
2. Remove the output hub and set it aside.
3. Index the indicator to show cw or ccw open or closed, using the detents that are 90° apart (see Fig. 5):
 - a. For spring return to the open position, rotate the indicator until it points to 90 on the scale.
 - b. For spring return to the closed position, rotate the indicator until it points to 0 (zero) on the scale.

NOTE: A detent can be felt at both stops. The detents maintain the indicator position.

4. Replace the output hub.
5. Replace the retaining ring to fix the hub and indicator in their new locations.

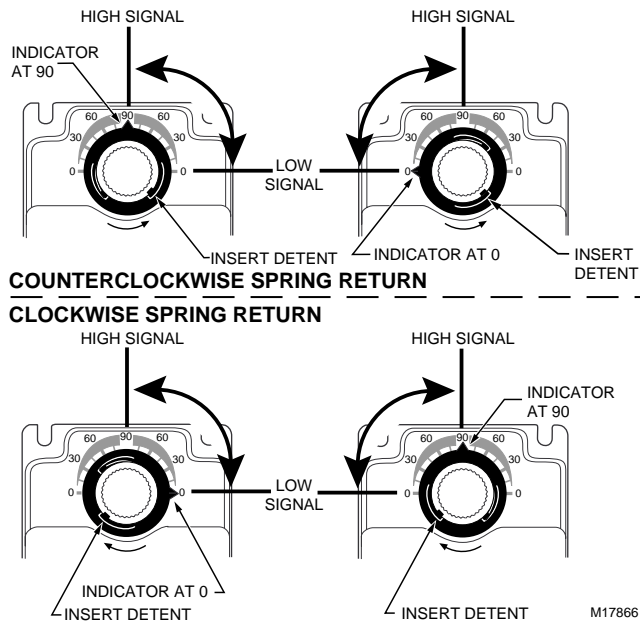


Fig. 5. Indicator positions with no power to actuator.

Single-Point Mounting

When the direction of the damper shaft rotation is determined (either clockwise ↻ or counterclockwise ↺), proceed as follows:

1. Place the actuator over the damper shaft.
2. Position the actuator for best access to the actuator damper shaft locking screw.
3. Position and adjust the mounting bracket to support the actuator at the correct height (see Fig. 6).
4. Mark screw holes for the mounting bracket on the damper housing.
5. Remove the mounting bracket and actuator.
6. Drill or center punch starting holes for mounting bracket screws (or use no. 10 self-tapping sheet metal screws).
7. Place actuator and mounting bracket back into position over damper shaft and install mounting bracket screws.
8. Tighten the two output hub set screws firmly against the damper shaft (maximum tightening torque is 100 lb-in.).

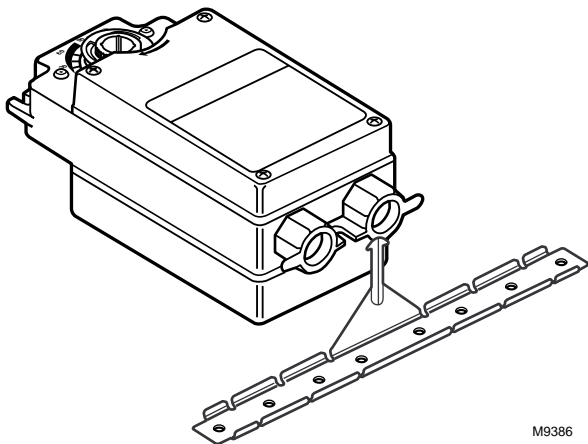


Fig. 6. Installing the mounting bracket.

The actuator can be mounted directly on the damper shaft in any position with the actuator housing parallel with the damper housing or frame. See Fig. 3.

Three-Point Mounting (See Fig. 7)

The actuator is designed with removable hub sleeves to accommodate specific damper shaft sizes. Proper sleeve selection is necessary when three-point mounting is used to avoid excessive strain on the output gear. Most actuators are shipped with a 1/2 in. hub sleeve. For field use, several hub sleeve sizes are available. See the Accessories listing in the Specifications section. Shaft sizes are stamped on the sleeves.

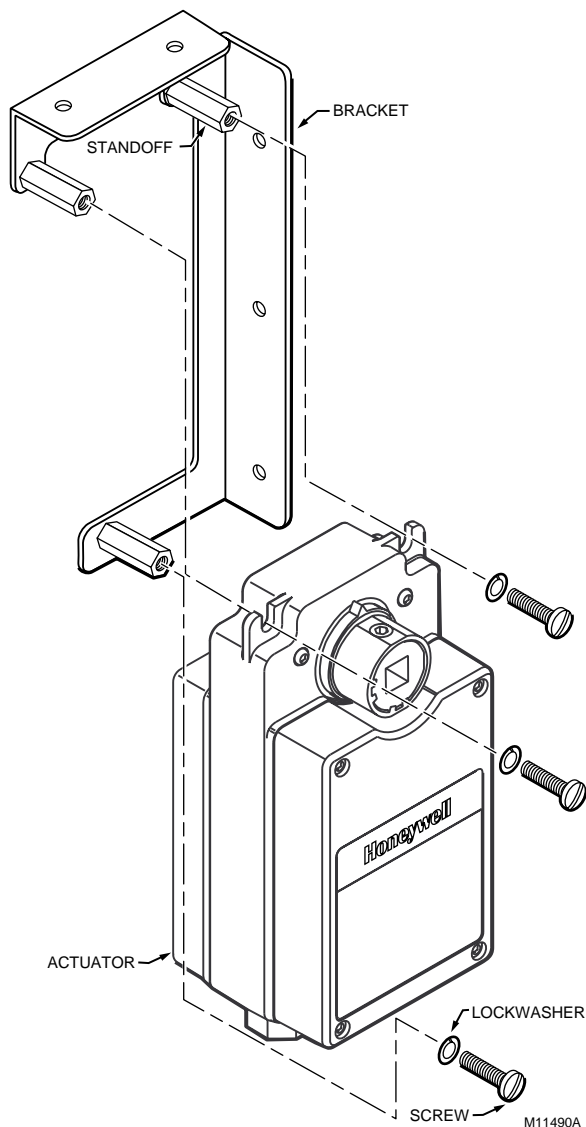


Fig. 7. Three-point mounting using foot-mount bracket.

WIRING

CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.

IMPORTANT

1. All wiring must agree with applicable codes, ordinances and regulations.
2. The actuator is designed for use with a Class 2 power supply.
3. Voltage and frequency of the transformer used must correspond to the characteristics of the actuator and those of the power supply.
4. See Fig. 8 for a typical wiring connection.

The actuator has an aluminum die cast housing with two integral cast bosses on the end of the device, tapped for 1/2 in. conduit fittings. Some models are shipped with a water seal in the conduit opening. When conduit is needed, remove the seal before routing the cable.

Models with Factory-Mounted Auxiliary Switches (Fig. 9)

ML7275C,F, ML7285C,F models have two nonadjustable line-voltage rated spdt auxiliary switches that are factory set to make common to normally open at 12° and 82° rotation from the counterclockwise stop. See Fig. 9.

IMPORTANT

Actuators driving in parallel can not be synchronized with each other. In normal operation, if all actuators are driven to the fully open or fully closed position, the actuators will again be synchronized.

Connecting Multiple Actuators

Actuators may be stacked on one damper shaft to increase the output torque required to drive dampers larger than 16 square feet.

CAUTION

Equipment Damage Hazard.
Stalling a actuator can damage the drive shaft.
Ensure installation of actuators and linkages allows the actuator to drive through full stroke without obstruction.

To ensure proper phasing, connect all four leadwires (red, black, brown and white) in parallel. The number of actuators that may be wired in parallel is dependent on the transformer VA rating. Make certain that the connected load does not exceed the current capacity of the controller/thermostat. See Fig. 10 through 12.

NOTES:

- Series-wired actuator power must come from a transformer other than controller power supply.
- The number of unison control, series-wired actuators is limited by control signal maximum drive voltage and actuator internal impedance.

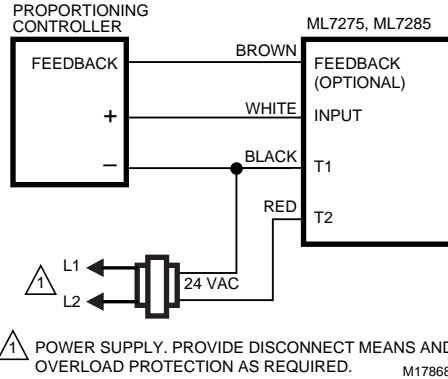


Fig. 8. Typical wiring.

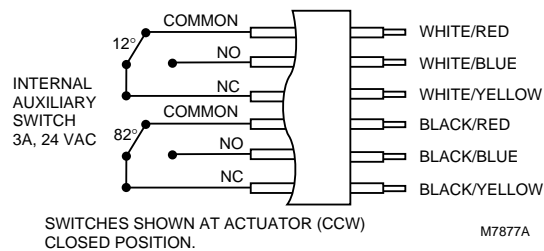


Fig. 9. ML7275C,F wiring for auxiliary switches.

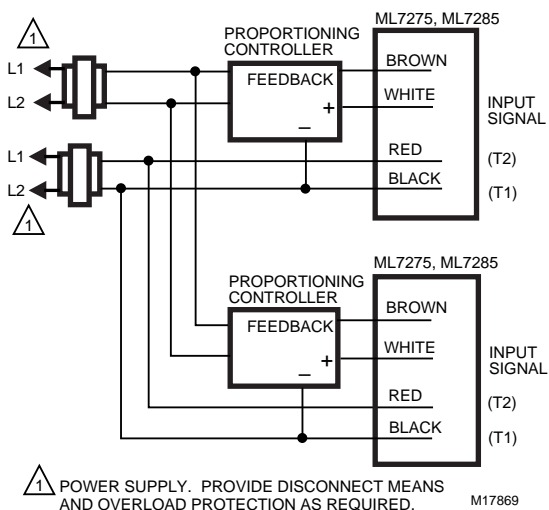


Fig. 10. Wiring two 0 to 10 Vdc, 2 to 10 Vdc or 4 to 20 mA controller outputs and two actuators with separate transformers.

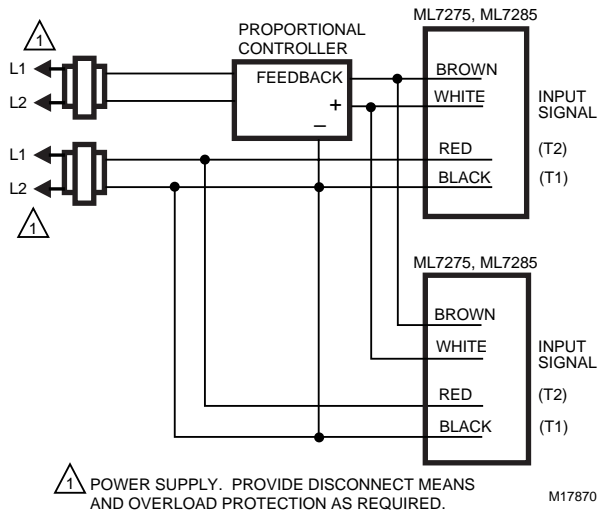


Fig. 11. Wiring one 0 to 10 Vdc or 2 to 10 Vdc controller output and two actuators.

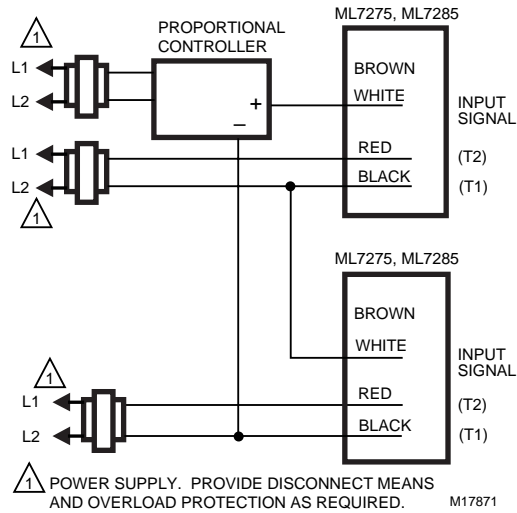


Fig. 12. Wiring two Actuators in series with a single 4 to 20 mA controller and separate transformers.

OPERATION

The actuator is designed to be used in ventilating and air conditioning installations to operate dampers, ventilation flaps and louvers requiring up to 25 lb-in. torque. If the power fails, the actuator will spring return to the start position.

The actuator is operated by a proportional controller. When using a proportional controller, the actuator drives toward its fully open position when the input signal increases; the actuator drives toward the fully closed position when the input signal decreases. The actuator stops when the input signal reaches the desired proportional control point.

IMPORTANT

The actuator is designed to respond to DDC Controller instantaneous contact closures. Take care not to short cycle the actuator. Unstable damper control can cause premature actuator failure.

The ML7275D,F and ML7285D,F models provide a time-out function that removes power from the actuator sub-motor if the actuator remains in one position (closed, open, or any intermediate position) for longer than a nominal 100 seconds. This time-out function helps to extend actuator life.

IMPORTANT

The actuator was designed to provide 7500 spring returns. Therefore, the actuator can be unpowered daily for night shutdown control. However, rapidly cycling the actuator by removing control voltage leads to premature spring failure.





CHECKOUT

The actuator can be checked out either directly or by using a controller.

IMPORTANT

When power is interrupted, the spring mechanism returns the actuator to the normal starting position. When power is restored, the controller input does not operate the actuator until the spring is fully wound and locked. The spring winding process takes approximately 100 seconds, depending on number of degrees of spring return remaining at power interrupt (e.g., 10° of spring return remaining takes 10 seconds). If actuator is not in the closed position, it runs to the closed position while the spring winds. Once the spring is locked in the fully wound position, the actuator responds to white leadwire inputs.

Direct Checkout

1. Mount actuator for required application (either clockwise  or counterclockwise  rotation to open the damper).
2. Check damper position and make sure that 24 Vac is present on the red and black leadwires.
3. Make sure the actuator spring is fully wound and locked by applying power for at least 100 seconds.
4. Apply control signal to appropriate leadwires (white, black) to move the damper to the opposite position. The actuator should drive the damper.
5. If actuator does not run, verify that the actuator is properly installed for either clockwise  or counterclockwise  rotation.
6. If actuator is correctly installed and still does not run, replace the actuator.

Controller Checkout

1. Adjust the controller setpoint to call for cooling. Observe the actuator.
2. If the damper is closed, it should begin to open.
3. If damper remains closed, move the controller setpoint farther below the room temperature.
4. If the damper still does not move, check for presence of 24 Vac on T1 and T2.
5. Make sure actuator spring is fully wound by applying power for at least 100 seconds.
6. If 24 Vac is present and actuator does not operate, reverse controller leadwires to determine if device was miswired.
7. If wiring is correct and 24 Vac is present on input terminals but actuator does not run, replace the actuator.

Honeywell

Automation and Control Solutions

Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario
M1V 4Z9

Honeywell International

Control Products
Honeywell Building
17 Changi Business Park Central 1
Singapore 486073

Honeywell Europe S.A.

3 Avenue du Bourget
1140 Brussels
Belgium

Honeywell Latin American Region

480 Sawgrass Corporate Parkway
Suite 200
Sunrise FL 33325

