

## ML6195, ML6295 Spring Return Direct Coupled Actuators

### PRODUCT DATA



### FEATURES

- Brushless DC motor achieves sophisticated control of speed, torque and braking.
- Provides 142 lb-in. (16 N•m) torque.
- Mounts directly on 3/8 in. to 1 in. (9 to 25 mm) round and 1/4 in. to 3/4 in. (6 to 18 mm) square shafts.
- Self-centering shaft coupling minimizes installation time.
- Spring return direction is field-selectable to simplify installation.
- Manual override permits unpowered positioning to simplify installation and troubleshooting. Deactivation of interlock is manual or automatic when power is restored.
- Highly-visible position indicator facilitates setup, checkout and troubleshooting.
- Rugged, lightweight all-metal alloy housing provides durability.
- Integral conduit connection.
- Integral adjustable range-stop.
- Models available with two fully adjustable line voltage auxiliary switches.

### APPLICATION

The ML6195 Spring Return Direct Coupled Actuator (DCA) is a floating control motor. Use with controls that provide switched or floating single-pole, double-throw (spdt) (Series 60) control output to operate dampers or valves in heating, ventilation, and air conditioning (HVAC) applications. For hydronic valve applications, a complete line of brackets and linkages are available for mounting Honeywell DCAs on globe valves and on Honeywell ball valves. The ML6295 includes an internal, electrically isolated feedback potentiometer. This potentiometer provides indication of the shaft coupling position and can be used for rebalancing an external control circuit.

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## SPECIFICATIONS

### Models:

- ML6195A: Spring Return DCA, high torque (142 lb-in. [16 N•m]), without auxiliary switches.
- ML6295C: Spring Return DCA, high torque (142 lb-in. [16 N•m]), with feedback potentiometer and two adjustable line-voltage auxiliary switches.

### Electrical Ratings:

- Power Input: 24 Vac +20%, -15%, 50/60 Hz.
- Power Consumption:
  - Running: 8 VA.
  - Holding: 5 VA.

### Feedback Resistor (ML6295 Only):

1000 ohm linear potentiometer.

### Cable Ratings:

- Control: Standard models include non-plenum, UL/CSA rated 30V, 140°F (60°C), 18-gauge color coded wires.
- Auxiliary Switch: UL/CSR rated 300V, 194°F (90°C), 18-gauge color coded wires.
- Integral connections for 3/8 in. flexible conduit.

### Controller Type:

Floating, spdt (Series 60).

### Torque Rating (at rated voltage):

- Lift and Hold: 142 lb-in. (16 N•m).
- Spring Return: 142 lb-in. (16 N•m).
- Stall Maximum: 354 lb-in. (40 N•m).

### Actuator Stroke:

95° ±2° , mechanically limited.

### Actuator Timing:

- 90° Stroke: 90 seconds.
- Spring Return: 15 seconds.

### Ambient Temperature Rating:

-25°F to +130°F (-32°C to +55°C).

### Storage Temperature:

-25°F to +158°F (-32°C to +70°C).

### Humidity:

5 to 95 percent relative humidity, noncondensing.

### Mounting:

- Mounts directly on a 3/8 in. to 1 in. (9 to 25 mm) round or 1/4 in. to 3/4 in. (6 to 18 mm) square shaft.
- Minimum shaft length required is 3/4 in. (20 mm).
- Mounting bracket is included.

### Dimensions:

See Fig. 1.

### Device Weight:

4.85 lb (2.2 kg)

### Noise Rating:

Maximum: 45 dBA at 1m

### Direction of Spring Return:

Field-selectable.

### Position Indicator:

Mounted on shaft coupling.

### Actuator Design Life (Full Stroke Cycles):

Minimum: 50,000.

### Repositions:

- 20% Load: 5,000,000.
- Full Load: 1,500,000.

### Approvals:

- UL873.
- CUL (CSA C22.2 No. 24-93).

### Environmental Protection Ratings:

NEMA1.

### Auxiliary Switches (ML6295C only):

- Ratings:
  - 24-240 Vac.
  - Resistive: 6A maximum.
  - AFL: 2A maximum.
- Setting interval: 5°.
- Switching hysteresis: 2°.

### Accessories:

- 210033 Frame mounting kit.
- 210034 Foot mounting kit.
- 210035 1.06 in. U-bolt coupling.

## 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 Logistics  
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In Canada—Honeywell Limited/Honeywell Limitée, 155 Gordon Baker Road, North York, Ontario M2H 3N7.  
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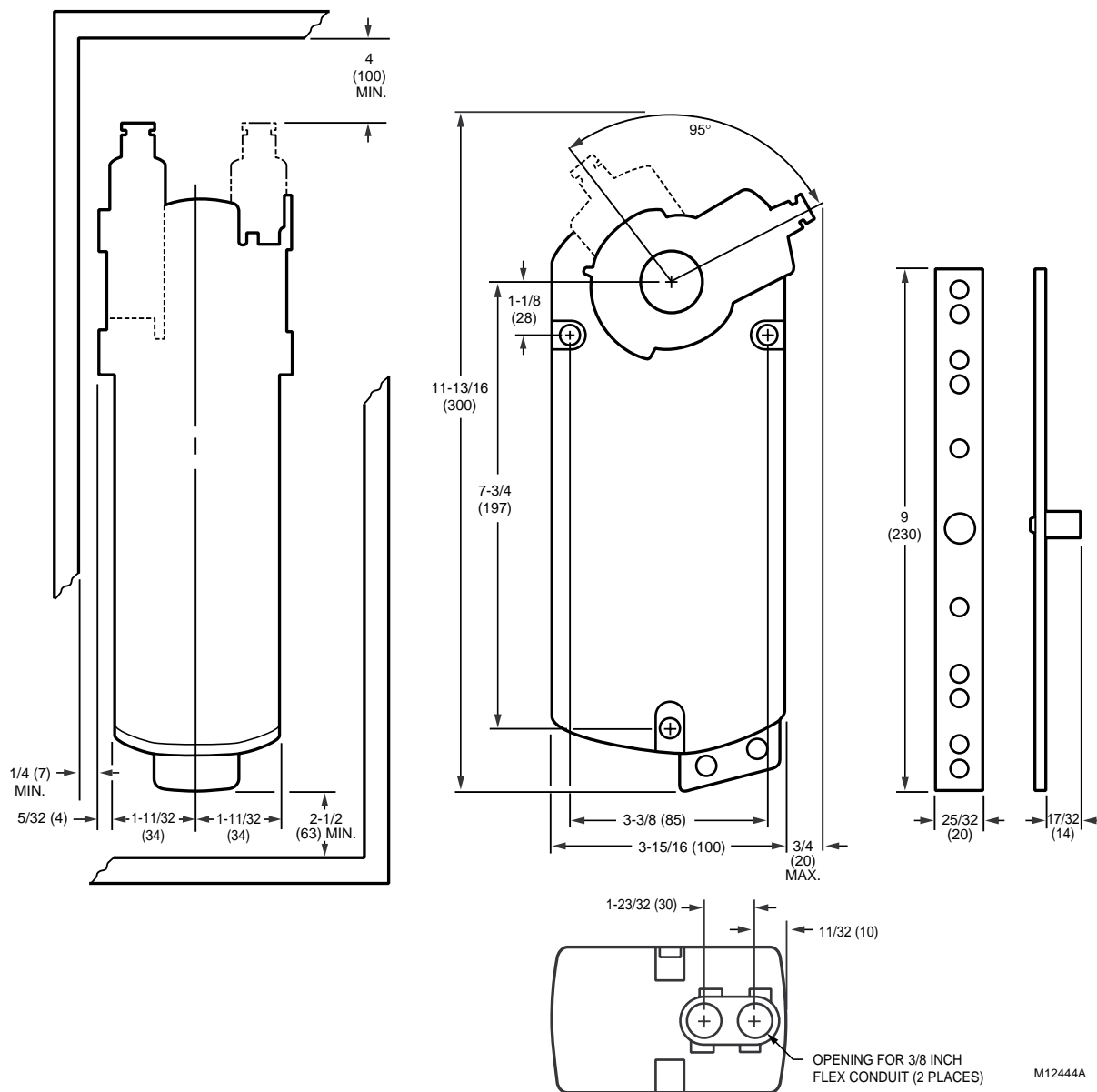


Fig. 1. Approximate dimensions of the ML6195/ML6295 Spring Return Direct Coupled Actuator and mounting bracket in in. (mm).

## 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 the installation is complete, check out the product operation as provided in these instructions.

## ⚠ WARNING

Installing the actuator near explosive vapors could result in serious injury or death.

A spark from the actuator or attached accessories could ignite escaping gas or explosive vapors. Install actuator in areas free of escaping gas and other explosive vapors.

## ⚠ CAUTION

Failure to disconnect power before installation can result in electrical shock or equipment damage.

Disconnect all power supplies before installation. Motors with auxiliary switches may have more than one disconnect to de-energize the device.

## CAUTION

**Deteriorating vapors and acid fumes can damage the actuator.**

Install actuator in areas free of acid fumes and other deteriorating vapors that can attack the metal parts of the actuator.

## Location

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

Refer to Warnings and Cautions (above) for locations to avoid.

## Mounting

The ML6195/ML6295 DCA has a self-centering shaft coupling to accommodate specific shaft lengths, sizes, and shapes. Proper actuator location and means of actuator rotation prevention are necessary to avoid excessive strain on the output gear.

The ML6195/ML6295 DCA operates a damper or hydronic valve by driving the shaft either cw or ccw, depending on the design. All actuators are shipped with a 5° preload on the spring. When power is applied to the actuator, the preload is released and the actuator spring-returns 5° for tight closeoff.

The ML6195/ML6295 DCA is designed for single-point mounting. Single-point mounting is typically used when the actuator is mounted on a damper frame. A mounting bracket (see Fig. 1) is provided for installing the actuator.

## CAUTION

**Avoid damage to the damper or actuator.**

Do not allow the mounting bracket to bind or clamp the actuator to the duct.

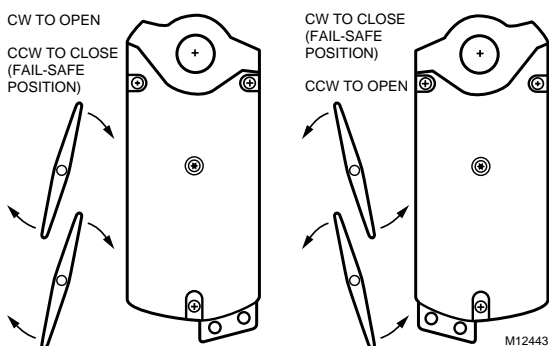
Use the mounting bracket only to prevent the actuator housing from rotating.

## Preparation

Before installing the ML6195/ML6295 on the shaft, determine the opening direction of the damper or valve for correct spring return rotation and wiring connections. The ML6195/ML6295 can be mounted to provide clockwise or counterclockwise spring return.

## Determine appropriate mounting orientation

See Fig. 2 for mounting orientation.



**Fig. 2. ML6195/ML6295 Spring Return Direct Coupled Actuator mounting orientation.**

## Measure shaft length

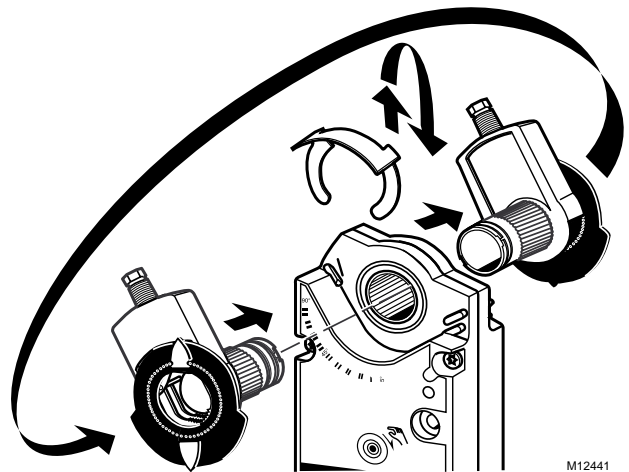
If the shaft is less than three inches in length, the shaft coupling must be located between the damper/valve and actuator housing. If the shaft length is more than three inches, the shaft coupling may be located on either side of the actuator housing.

If the coupling must be moved from one side of the actuator to the reverse, follow these instructions (see Fig. 3):

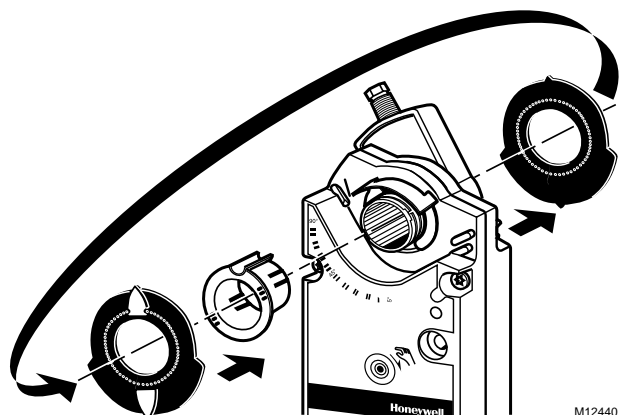
1. Remove the position indicator from the shaft coupling and set it aside for later use.
2. Remove the retainer clip from the shaft coupling and set it aside for later use.
3. Remove the shaft coupling from one side of the actuator.
4. Replace the shaft coupling on the opposite side of the actuator aligning it with the mark on the housing.
5. Replace the retainer clip on the shaft coupling using the inner groove of the coupling.
6. Replace the position indicator on the shaft coupling.

If the shaft coupling is located between the actuator housing and damper/valve, the position indicator holder must be attached to the other side of the actuator. If this is necessary, perform the following (see Fig 4):

1. Slide the position indicator holder onto the shaft coupling near the retainer clip and rotate it until it snaps into place.
2. Place the position indicator on the holder.



**Fig. 3. Mounting shaft coupling to opposite side of actuator.**



**Fig. 4. Adding position indicator holder.**



## CAUTION

**Manually turning the shaft coupling can damage the actuator.**

Never turn motor shaft coupling by hand or with a wrench.

## Range Stop Adjustment

The ML6195/ML6295 has an adjustable range stop feature. When the rotational mounting of the shaft coupling is changed, the actuator drives less than the full 95° stroke. The stroke is adjustable in 5° increments and once adjusted, the actuator drives until the shaft coupling reaches the mechanical stop, which is a part of the housing. The stop causes the motor to disengage and the shaft coupling drives no farther. When the actuator returns, it stops at the fail-safe position which is set as follows:

1. Remove the position indicator; and if applicable, the holder, and set aside for later use.

**NOTE:** If possible, leave the position indicator attached to the shaft coupling to aid in future steps.

2. Remove the retainer clip from the shaft coupling and set it aside for later use.
3. Remove the shaft coupling from the actuator.
4. Rotate the shaft coupling to the desired fail-safe position.
5. Install the shaft coupling at this position.

**NOTE:** The location of the shaft coupling determines the number of degrees of travel.

**Example:** Setting the shaft coupling at an approximate fail-safe position of 20° (as indicated on the housing), limits the stroke to 70°.

### IMPORTANT

*If the 5° preload was not released, see the Mounting section, the fail-safe position moves 5° when power is applied, increasing the stroke 5°.*

6. Replace the retainer clip on the shaft coupling using the inner groove of the shaft coupling.
7. If necessary, replace the holder and position indicator on the shaft coupling.

## Installation

### Installing Actuator and Mounting Bracket (Single Point Damper Mounting)

**NOTE:** For valve mounting, see the literature accompanying the mounting equipment or bracket.

With the direction of the damper shaft rotation determined (either cw or ccw), proceed as follows:

1. Place the ML6195/ML6295 DCA 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. 5). 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).
6. Turn the damper blades to the desired normal position, usually the closed position.
7. Place the actuator and mounting bracket back into position over the damper shaft and install the mounting bracket screws.
8. Tighten the shaft coupling set screw firmly by applying 7.5 lb-ft (10 N•m) of torque with a 13/32 in. (10mm) wrench.

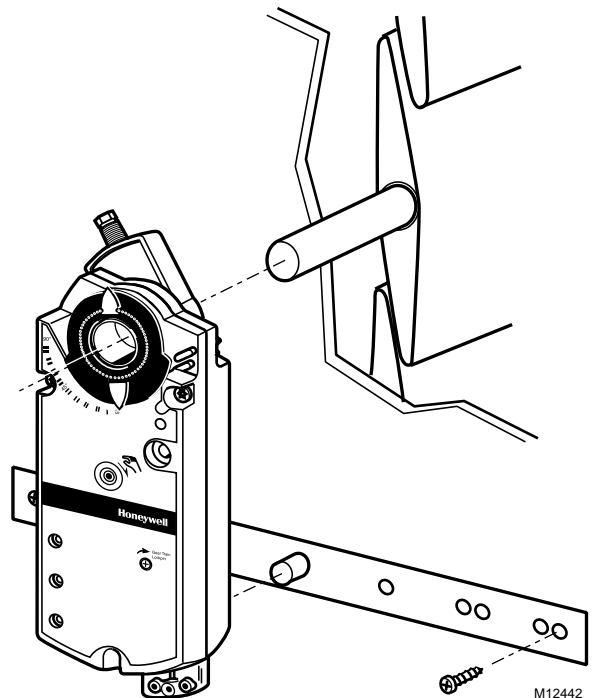


Fig. 5. Mounting bracket installation.



## CAUTION

**Using the actuator as a shaft bearing will damage the device, reducing the functional life span.**

In applications with side loads to the actuator shaft coupling, a different coupling (such as the one supplied with the foot mount kit) *must* be used.

## Wiring



## CAUTION

**Prevent electrical shock or equipment damage.**  
Disconnect all power supplies before wiring.

All wiring must comply with local electrical codes, ordinances and regulations. The ML6195/ML6295 is designed for use with a Class 2 power supply. Voltage and frequency of the transformer used must correspond with the characteristics of the motor and the power supply. See Fig. 6 and 7 for typical wiring connections.

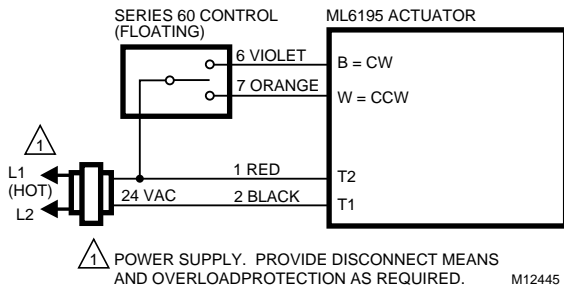


Fig. 6. ML6195 typical wiring diagram.

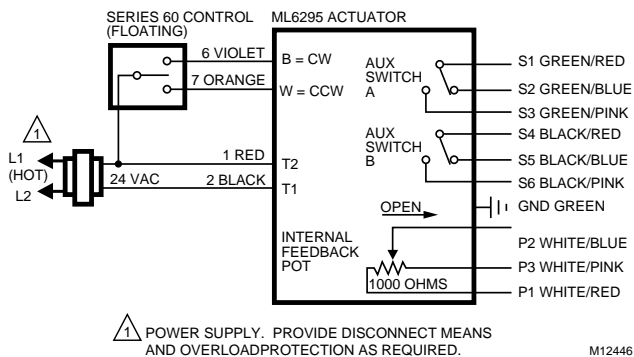


Fig. 7. ML6295 typical wiring diagram.

## OPERATION

The ML6195/ML6295 DCA is designed for use in HVAC installations to operate dampers, ventilation flaps, louvers and valves requiring up to 142 lb-in. (16 N•m) of torque. If the power fails, the actuator spring returns it to the fail-safe position. The actuator is designed for reversible mounting. The housing is asymmetrical to indicate the spring return direction (see Fig. 2). The actuator drives from  $-5^{\circ}$  to  $90^{\circ}$  (as indicated on the label) and spring returns back to  $-5^{\circ}$ .

The ML6195/ML6295 DCA is operated by an spdt floating (Series 60) controller (see Fig. 6 and Fig. 7). The actuator drives toward its fully open position when the controller makes T2 to B. When the controller makes T2 to W, the actuator drives toward its fully closed position. It stops when neither contact is made.

The actuator has a position indicator to show shaft position. As the indicator moves with the shaft, it is an angular representation of the shaft position; and it can be placed in numerous distinct positions. Remove the indicator by simply pulling it from the coupling. It can then be rotated and repositioned at  $5^{\circ}$  increments using the two sets of three pins on the coupling.

## Manual Override

The actuator can be operated with no power present. Use this feature during installation or to move and lock the damper or valve shaft position when there is no power.

To operate the manual override:

1. If the power is on, turn it off.
2. Insert the supplied key (Allen wrench) as shown in Fig. 8.
3. Rotate the key in the direction indicated on the cover.
4. Once the desired position is reached, hold the key to prevent the spring return from moving the actuator.
5. With the key held in place, use a screwdriver to turn the gear train lock pin in the indicated direction.

NOTE: No more than  $1/8$  turn of the lock pin is required to engage the lock; a slight click is heard and the pin resists further rotation.

6. Remove the key without rotating it further.

To release the manual override with no power present:

1. Insert the supplied key.
2. Turn the key  $1/4$  turn in the direction indicated on the cover.
3. Remove the key without engaging the gear train lock pin.
4. The spring will return the actuator to the fail-safe position.

Once power is restored, the actuator will return to normal automated control.

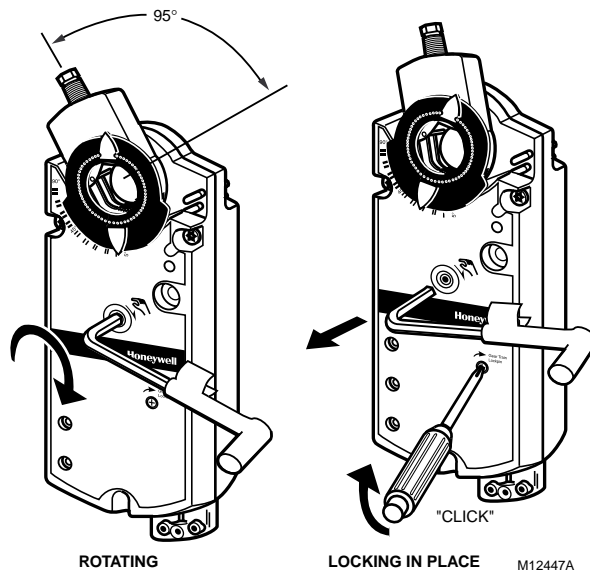


Fig. 8. Manual override of ML6195/ML6295 Spring Return Direct Coupled Actuators.

## Auxiliary Switches (ML6295C only)

The ML6295C models have line voltage, fully adjustable auxiliary switches. The switch setting interval (or differential) is 5°.

The switches are set as follows:

1. If the power is on, turn it off; the actuator will spring return to the 0° position.

### IMPORTANT

*If the shaft coupling has been adjusted according to the Range Stop Adjustment instructions, the position indicator must also be adjusted to indicate 0 at the fail-safe position. If this is not done, the position indicator will not correspond to the auxiliary switch adjustment settings, as shown on the label.*

2. Use a flat blade screwdriver to turn the switch adjustment dials to the desired settings.

NOTE: The numerical indication on the dials corresponds to the location of the shaft coupling at which a signal will be given by the switch (see Fig. 9).

Once power is restored, the actuator will return to normal automated control.

## CHECKOUT

To perform a checkout of the ML6195/ML6295 DCA, proceed as follows:

1. Check the damper or valve position and make sure that 24 Vac is present on the red and black leadwires.
2. Connect 24 Vac to the appropriate leadwires (red to violet or red to orange) to move the damper or valve to the opposite position. The ML6195/ML6295 should drive the damper or valve.
3. If the actuator does not run, verify that the actuator is properly installed for either cw or ccw rotation.
4. If the actuator operates in the opposite direction than desired, reverse the violet and orange leadwires.
5. If the actuator is correctly installed and still does not run, replace the actuator.

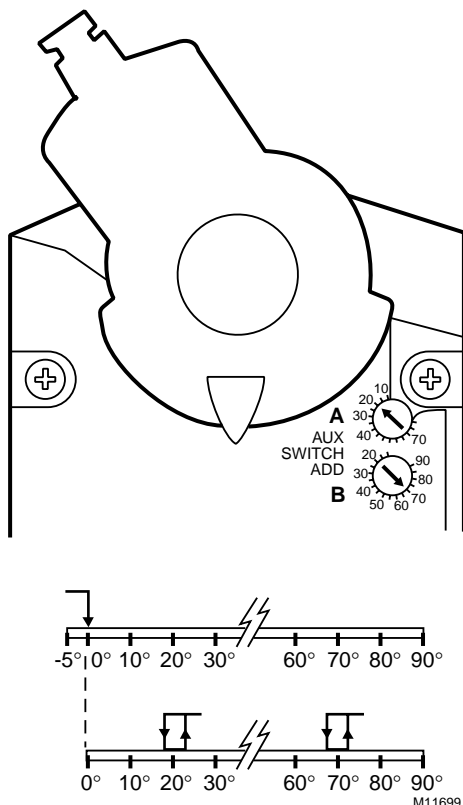


Fig. 9. Actuator rotary range and auxiliary switch signal locations.

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