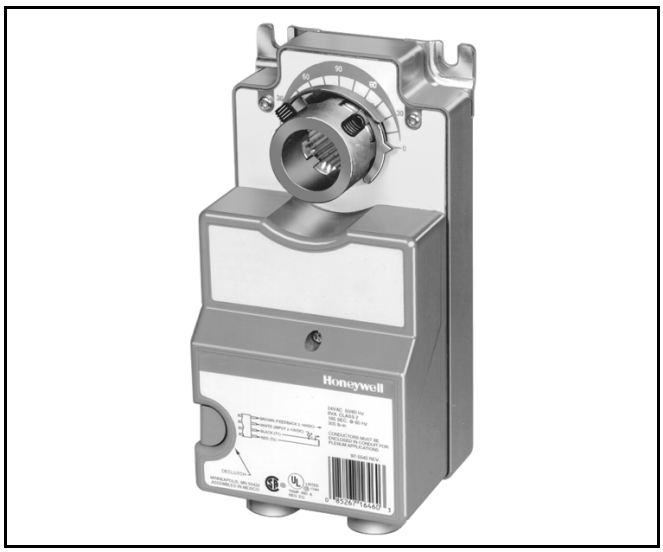
Honeywell

ML6194, ML6294 Non-Spring Return Direct Coupled Actuators

PRODUCT DATA



APPLICATION

The ML6194 and ML6294 Non-Spring Return Direct Coupled Actuators (DCA) provide floating single-pole, double-throw (spdt) control of dampers or valves in heating, ventilating, and air conditioning (HVAC) applications. The ML6294 has an internal, electrically isolated feedback potentiometer that can be used to provide indication of motor output hub position or slave a Series 90 actuator.

FEATURES

- **Mount directly on 1/2 in. to 3/4 in. (13 to 19 mm) round or square shaft. Mount on 1 in. (26 mm) round shafts with appropriate insert. All models shipped with 1 in. insert.**
- **300 lb-in. (34 N•m) torque.**
- **Magnetic coupling eliminates need for mechanical stops or limit switch adjustments by limiting stall torque, which is dependent on temperature. Nominal stall torque at room temperature of 68°F (20°C) is 410 lb-in.**
- **95° stroke provides necessary compression of rubber/neoprene gaskets commonly used on 90° low leakage dampers.**
- **Declutch feature allows manual adjustment.**
- **165 second synchronous timing can eliminate need for feedback position indication in closed-loop temperature control applications.**
- **Both single-point and three-point mounting compatibility to allow installation flexibility.**
- **Models available with or without time-out feature.**

Contents

SPECIFICATIONS

Models:
ML6194/ML6294 Non-Spring Return DCA:
ML6194A/ML6294A: High Torque (300 lb-in.) DCA without auxiliary switches or time-out feature.
ML6194C/ML6294C: High Torque (300 lb-in.) DCA with two low voltage rated auxiliary switches and without time-out feature.
ML6194D/ML6294D: High Torque (300 lb-in.) DCA without auxiliary switches and with time-out feature.
ML6194F/ML6294F: High Torque (300 lb-in.) DCA with two low voltage rated auxiliary switches and with time-out feature.

Electrical Ratings:
Power Input: 24 Vac, ± 20%, 50 or 60 Hz.
Power Consumption:
ML6194A,C/ML6294A,C: 5 VA at 24 Vac.
ML6194D,F/ML6294D,F: 6 VA at 24 Vac.
Auxiliary Switch Ratings: 24 Vac, 3 AFL, 18 ALR, 1A Pilot Duty.

Feedback Resistor (ML6294 only): 500 ohm linear potentiometer.

Cable Ratings:
Control: Standard models include nonplenum UL/CSA rated, 30V, 140¡F (60¡C), 20 gauge cable.
Auxiliary Switch: UL/CSA rated 300V, 194°F (90°C), 18 gauge cable.

Conduit Fittings: Plastic housing has two tapped holes for 1/2 in. (13 mm) conduit fittings.

Controller Type:
Floating, spdt.

Torque Ratings at Rated Voltages:
Lift, hold, and breakaway ratings are temperature dependent; from 250 lb in. to 350 lb-in. (28 N•m to 40 N•m). See Fig. 1.
Stall Maximum: Temperature dependent; 365 lb-in. to 495 lb in. (41 N•m to 56 N•m). See Fig. 1.

Torque Derating at 24 ±20% Vac: See Fig. 1.

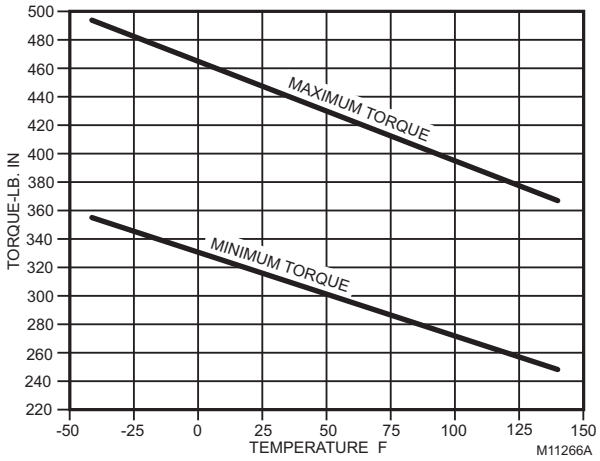


Fig. 1. Minimum and maximum torque versus temperature.

Voltage Requirements at Cold Temperatures: At -40°F to -20°F (-40°C to -29°C), minimum voltage is 24 Vac, +20%, -0%.

Actuator Stroke: 95° nominal ±3°, mechanically limited.

Actuator Timing at 90° Stroke:
165 ±3 seconds synchronous at 60 Hz from -4°F to +140°F (-20°C to +60°C).
200 ±3 seconds synchronous at 50 Hz from -4°F to +140°F (-20°C to +60°C).
Non-synchronous below -4°F (-20°C).

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

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

Humidity: 5 to 95 percent relative humidity, noncondensing.

Mounting:
Mounts directly on 1/2 in. to 3/4 in. (13 mm to 19 mm) round or square and 1 in. (26 mm) round shaft, using appropriate hub insert.

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.

Minimum shaft length required is 2.5 in. (64 mm).
Mounting bracket included with all models.
All actuators shipped with 1 in. (26 mm) hub insert. See Accessories section for additional hub sizes.

Dimensions: See Fig. 2.

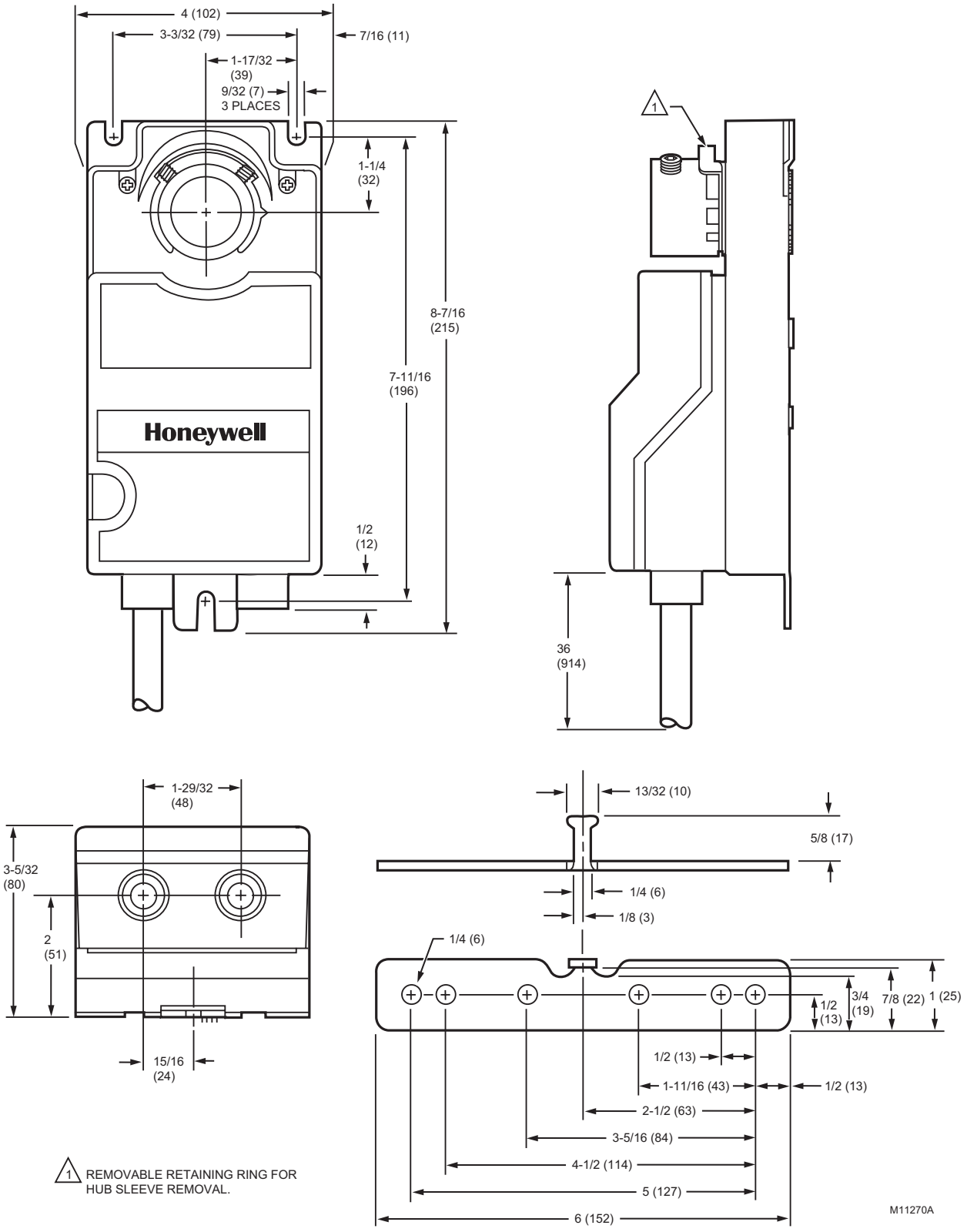


Fig. 2. Approximate dimensions of ML6194/ML6294 Non-Spring Return DCA and mounting bracket in in. (mm).

Device Weight: 3.0 lb (1.36 kg).

Noise Rating: 45 dBA maximum at 1 meter.

Position Indicator: Mounted on actuator hub.

Actuator Design Life: Full Stroke Cycles: 50,000.

Repositions: 1,500,000 minimum.

Approvals:
Underwriter's Laboratories Inc. Component Recognized: UL873, File No. E4436; Guide No. XAPX.
CSA Listed: File Number LR95329-17.
Meets UL94-5V plenum requirements.

Environment Protection Rating: IP54 standard with shaft in horizontal position.

Accessories:
205843B Hub Insert, 1 in. round, with retaining ring.
205856B Hub Insert, 3/4 in., round or square, with retaining ring.
205849A Hub Insert, 5/8 in., round or square, with set screws.
205820A Three-point Mounting Kit.
205846 Crank-Arm Accessory.
205860 Remote Minimum Position Potentiometer.
205860A Remote Minimum Position Potentiometer, NEMA IV rated.

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 descriptions given in specifications to make sure 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

Explosion or Fire Hazard.
Can cause severe injury, death or property damage.
A spark from the actuator or attached accessories could ignite escaping gas or vapors. Install actuator in areas free of escaping gas and other explosive vapors.

⚠ WARNING

Electrical Shock or Equipment Damage Hazard.
Can cause severe injury, death or property damage.
Disconnect power supply before installation. Actuators with auxiliary switches can have more than one disconnect.

⚠ CAUTION

Equipment Damage Hazard.
Wrong location or improper operation will damage the actuator.
1. Deteriorating vapors and acid fumes can damage actuator metal parts.
2. Install actuator in areas free of acid fumes and other deteriorating vapors.
3. Turning motor output hub by hand or wrench can damage internal gears.
4. Ensure declutch button is depressed while manually turning hub.

Mounting

The ML6194/ML6294 Non-Spring Return DCA is designed with removable hub inserts to accommodate specific shaft sizes. Proper insert selection is necessary to avoid excessive strain on output gear. All ML6194/ML6294 Actuators are shipped with a one-inch hub insert. For field use, two hub insert sizes are available (see Accessories section). A mounting bracket (see Fig. 2 and 3) is provided with all models to aid in installing actuator. The bracket can be bent to any shape to allow the bracket tab to be centered in actuator slot.

The ML6194/ML6294 Non-Spring Return DCA is designed for single-point mounting when using a mounting bracket. Single-point mounting is typically used when actuator is mounted on a shaft.

The ML6194/ML6294 Non-Spring Return DCA can also be three-point mounted using three-point mounting kit (see Accessories section). Three-point mounting is used for foot mounting actuator or internally mounting actuator in the duct when direct shaft coupling is not possible.

The ML6194/ML6294 Non-Spring Return DCA can be mounted directly on the shaft with the actuator in any position.

⚠ CAUTION

Actuator and Damper Damage Hazard.
Mounting bracket binding or clamping actuator to duct can damage actuator.
Use mounting bracket only to prevent actuator housing from rotating.

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

Changing Hub Inserts.

Change hub insert sizes by removing retaining ring and lifting hub insert from actuator. Put new insert in place and replace retaining ring. See Fig. 4. Be careful when removing the retaining ring that secures the output hub to actuator housing. Use a flathead screwdriver to pry ring loose.

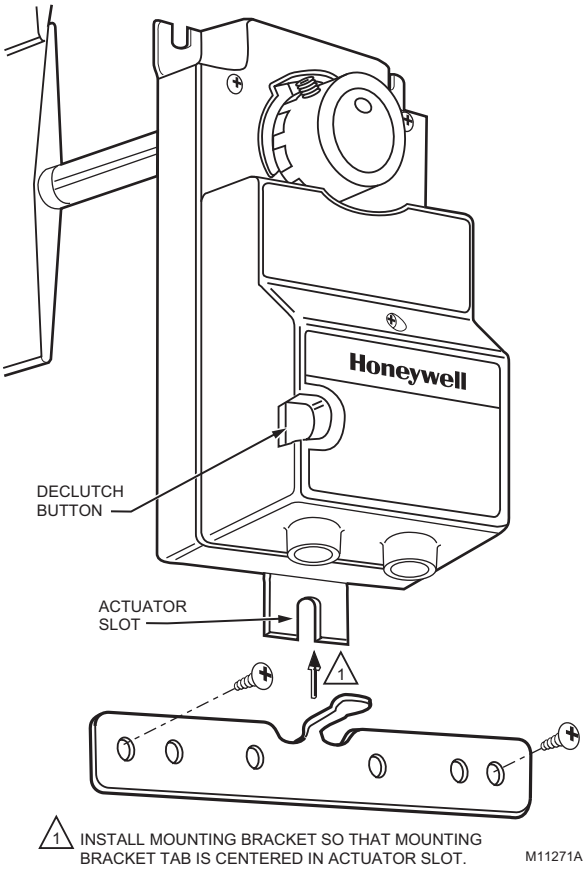


Fig. 3. Installing mounting bracket on ML6194/ML6294 Non-Spring Return DCA.

A typical actuator mechanical connection is shown in Fig. 5; see Fig. 6 through 13 for wiring diagrams.

⚠ CAUTION

Actuator Damage Hazard.
Using actuator as shaft bearing can damage actuator.
Use actuator only to supply rotational torque. Avoid any side loads to actuator output coupling bearings.

Preparation

Before installing actuator on shaft, determine opening direction of shaft to correctly connect wiring.

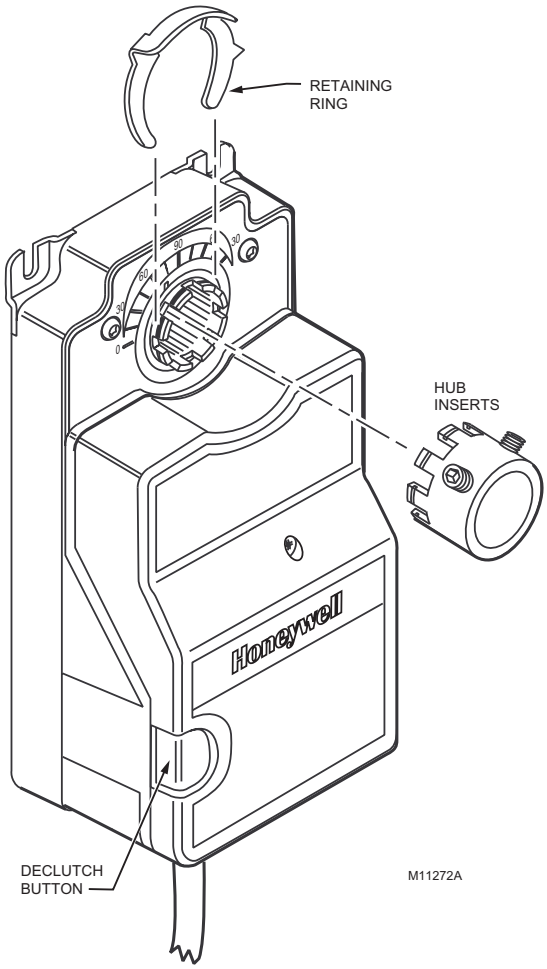


Fig. 4. Changing hub inserts.

Installation

Installing Actuator and Mounting Bracket (Single-Point Mounting)

1. Place ML6194/ML6294 Non-Spring Return DCA over shaft.
2. Position actuator for best access to actuator shaft locking screw.
3. Install mounting bracket (see Fig. 2) and adjust it to center mounting bracket tab in actuator slot. Mark screw holes for installing mounting bracket on housing.
4. Remove mounting bracket and actuator.
5. Drill mounting holes for screws (screws not provided).
6. Place actuator and mounting bracket back into position over shaft and install mounting bracket screws.
7. Move shaft either fully clockwise ↷ or fully counterclockwise ↶ .
8. Fully depress and hold declutch button while moving actuator hub either fully clockwise ↷ or fully counterclockwise ↶ to match shaft. Release declutch button.
9. Tighten the two set screws firmly (80 to 100 lb-in.) against shaft.

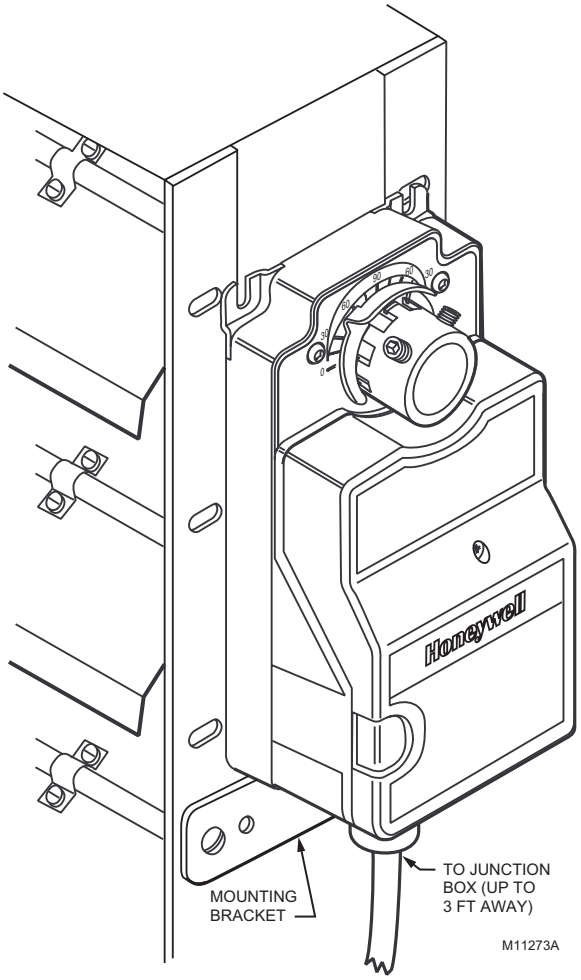


Fig. 5. ML6194/ML6294 Actuator standard mechanical connection.

WIRING

⚠ WARNING

Electrical Shock Hazard.
Can cause severe injury, death or property damage.
Disconnect power supply before installation. Actuators with auxiliary switches can have more than one disconnect.

All wiring must comply with local electrical codes, ordinances and regulations. The ML6194/ML6294 are designed for use with a Class 2 power supply. Voltage and frequency of transformer used must correspond with characteristics of motor and those of power supply. See Fig. 5 for standard mechanical connection. See Fig. 6 through 9 for typical wiring diagrams.

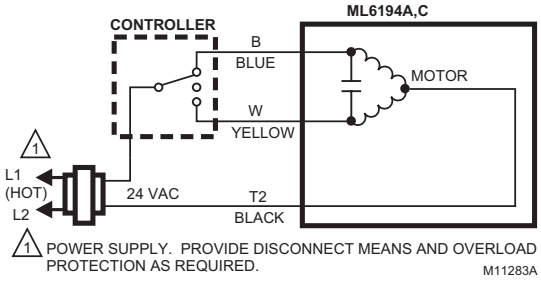


Fig. 6. ML6194A,C typical wiring diagram.

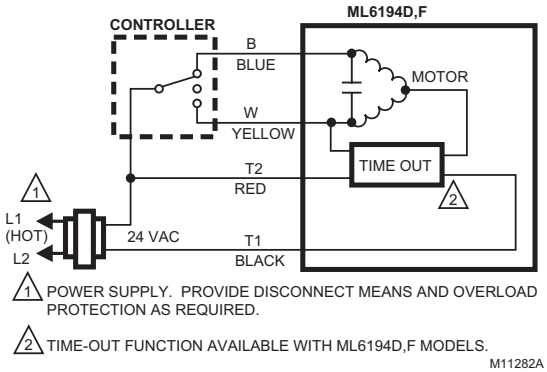


Fig. 7. ML6194D,F typical wiring diagram.

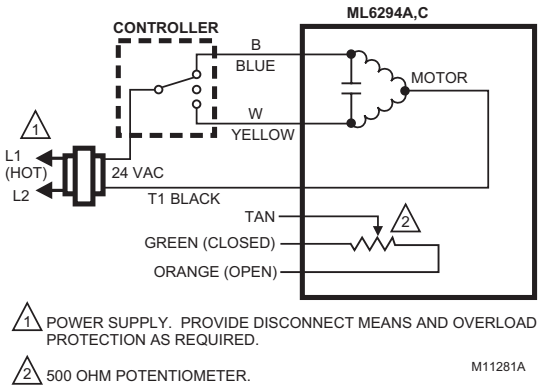


Fig. 8. ML6294A,C typical wiring diagram.

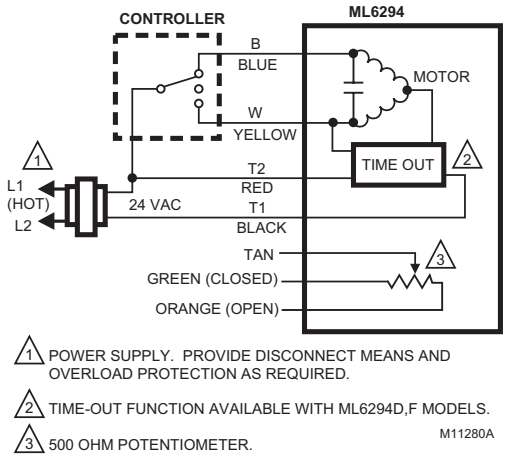


Fig. 9. ML6294D,F typical wiring diagram.

The ML6194/ML6294 has a plastic housing with two tapped holes for 1/2 in. (13 mm) conduit fittings.

ML6194 and ML6294 Models with Factory-mounted Auxiliary Switches (see Fig. 10)

ML6194C,F and ML6294C,F models have two nonadjustable low voltage rated spdt auxiliary switches that are factory set to make common to normally open at 12° and 82° rotation from closed (counterclockwise). See Fig. 10.

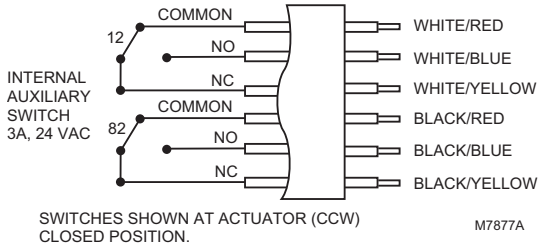


Fig. 10. ML6194C,F and ML6294 Actuator wiring for auxiliary switches.

ML6194 and ML6294 Wiring for Common Transformer

Fig. 11 through 13 show typical wiring for ML6194 and ML6294 Non-Spring Return DCA using a common transformer.

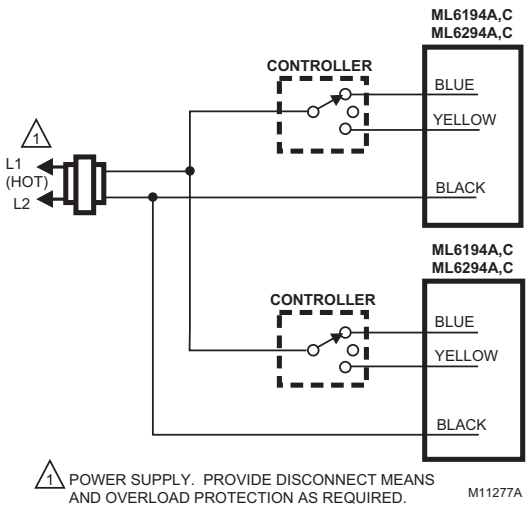


Fig. 11. Common transformer with two controller outputs and two ML6194A,C or ML6294A,C Actuators.

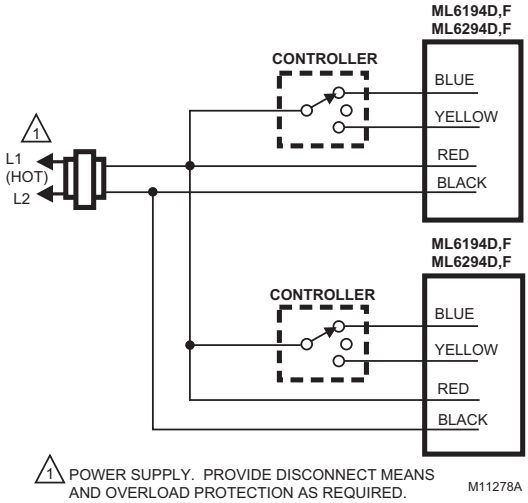


Fig. 12. Common transformer with two controller outputs and two ML6194D,F or ML6294D,F Actuators.

OPERATION

The ML6194 and ML6294 Non-Spring Return DCA are designed to be used in ventilating and air conditioning installations to operate dampers, ventilation flaps, and louvers requiring up to 300 lb-in. torque.

The ML6194 and ML6294 Non-Spring Return DCA are operated by an spdt floating controller. When using an spdt floating controller, actuator is driven toward fully open (clockwise) position when controller makes B contact and toward fully closed (counterclockwise) position when controller makes W contact. It stops when neither contact is made.

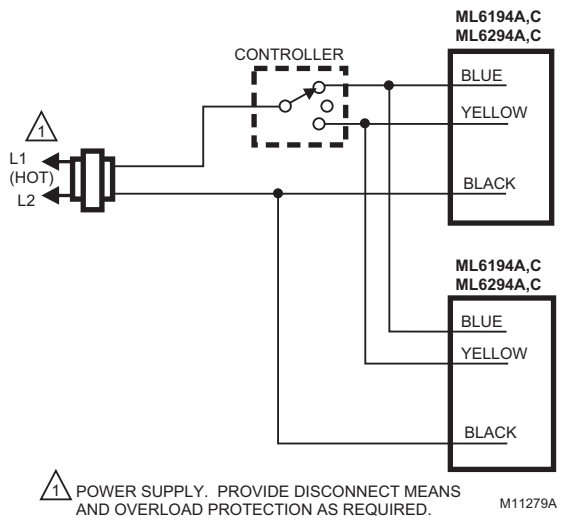


Fig. 13. Common transformer with one controller output and two ML6194A,C or ML6294A,C Actuators.

IMPORTANT

ML6194/ML6294 Actuators can operate with a DDC Controller that emulates an spdt break-before-make switch. Do not short-cycle actuator. Short-cycling 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 shaft position. The indicator can be rotated to show open or closed position.

ML6194D,F and ML6294D,F models provide a time-out feature that removes power from actuator submotor if the actuator receives the same signal or no call from controller for longer than a nominal five minutes. This time-out feature helps to extend actuator life.

CHECKOUT

Use following procedure to check out ML6194 and ML6294 Non-Spring Return DCA:

1. Check that actuator position indicator and shaft position agree.
2. If actuator has a time-out feature, apply 24 Vac to black (T1) and red (T2) leads (see Fig. 7 or 9).
3. Apply 24 Vac control signal to blue (B) lead with respect to black (T1) lead. The actuator should drive shaft open (clockwise).
4. Apply 24 Vac control signal to yellow (W) lead with respect to black (T1) lead. The actuator should drive shaft closed (counterclockwise).
5. If 24 Vac control signal is removed, actuator should stop.

TROUBLESHOOTING

If actuator does not drive, travel full stroke, or operate properly during checkout, perform following troubleshooting procedure before replacing actuator:

1. Check actuator label to make sure proper power and control signal requirements are met.
2. When actuator should be driving, check for 24 Vac at actuator wires:
   a. Black (T1) and yellow (W) or blue (B).
   b. Black (T1) and red (T2).
3. If voltage is not present or is low, check power supply and controller.
4. If actuator does not drive in correct direction when a control signal is applied, reverse yellow and blue wires.
5. Remove power and fully depress and hold down disengage button while trying to turn shaft clockwise and counterclockwise . If shaft turns freely through 90° stroke, and actuator is installed correctly, replace actuator.
6. If shaft does not turn freely for full 90° stroke, check for any binding and verify that actuator is loose on its mounting bracket to prevent binding. If necessary, adjust mounting bracket to prevent binding.
7. If no binding is present, remove actuator and turn shaft clockwise and counterclockwise . If shaft does not turn freely, repair or replace damper.
8. If shaft turns freely, fully depress and hold down disengage button and turn actuator hub clockwise and counterclockwise . If actuator hub does not turn, replace actuator.
9. If actuator and shaft turn freely, remount actuator following instructions in Installation section. Make sure actuator does not bind. Also, make sure that shaft and actuator are at the same clockwise or counterclockwise end stop when assembled. Hook up wires and repeat checkout. If necessary, troubleshoot again.

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