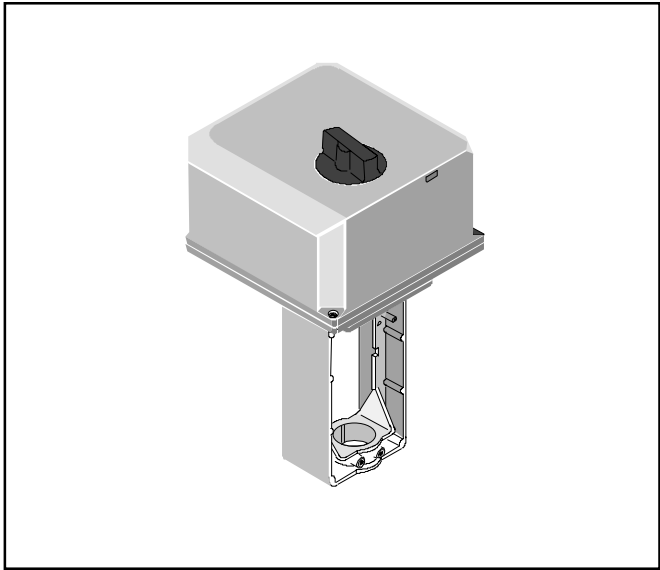


ML7421A,B

Electric Linear Valve Actuator

PRODUCT DATA



GENERAL

The ML7421A,B Electric Linear Valve Actuators for modulating control are equipped with a stepper motor for exact positioning. The direction of movement is reversible by means of an internal selector plug. These actuators operate standard Honeywell valves in heating, ventilating, and air conditioning (HVAC) applications.

FEATURES

- Quick and easy installation.
- No separate linkage required.
- 3/4 in. (20 mm) stroke on ML7421A;
1-1/2 in. (38 mm) stroke on ML7421B.
- No adjustments required.
- Accurate valve positioning.
- Selectable 0(2) to 10 Vdc/0(4) to 20 mA input signal.
- Position feedback.
- Force-limiting end switches.
- Manual operator.
- Direct or reverse acting.
- Synchronous motor.
- Corrosion resistant design.
- Maintenance free.
- Conduit connector knockout.

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SPECIFICATIONS

Models:

Model No.	Stroke in in. (mm)	Run Time in s at 60 Hz
ML7421A1032	3/4 (20)	95
ML7421B1023	1-1/2 (38)	175

Electrical Ratings:

Power Input: 24 Vac (+10%/-15%), 60 Hz
Power Consumption: 12VA max. at 24Vac

Signal Source Output Resistance:

1 kOhm max.

Load:

1 mA max.

Signal Input:

0 to 10 Vdc or 2 to 10 Vdc

Stem Force:

405 lbf (1800N)

Ambient Temperature Range:

14°F to 122°F (-10°C to +50°C)

Storage Temperature Range:

-40°F to 158°F (-40°C to +50°C)

Humidity:

5 to 95% relative humidity, non condensing.

Close-off Pressure Ratings:

See Tables 1. and 2.

Protection Standard:

IP54

Insulation:

Class II (24 Vac)

Approvals:

UL94-5V Flame retardant.
Meets CE requirements.

Cable Entry:

Two knockout holes for 1/2 in. and 3/4 in. conduit standard on actuator case.

Actuator Material:

Cover: ABS plastic
Yoke and Base: Diecast aluminium

Weight:

5.1 lb (2.3 kg)

Dimensions:

See Fig. 1.

Accessories:

43191680-102 Dual Auxiliary Switch for ML7421A,B
(for 24 Vac use only).

43196000-101 High Temperature Kit. Includes 1/4 in. and 3/8 in. stem extenders. The kit increases the temperature range to 428°F (220°C).

43196000-102 High Temperature Kit (2...3 in. valves). Includes 1/4 in. and 3/8 in. stem extenders. The kit increases the temperature range to 428°F (220°C).

Valve	Type	1/2 in.	3/4 in.	1 in.	1-1/4 in.	1-1/2 in.	2 in.	2-1/2 in.	3 in.	4 in. ^a	5 in. ^a	6 in. ^a
V5011A	Flange	N/A	N/A	N/A	N/A	N/A	N/A	77	53	29	18	12
V5011B	Flange	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	29	18	12
V5011F	Screw	150	150	150	150	150	150	100	61	N/A	N/A	N/A
V5011G	Screw	150	150	150	150	150	150	100	61	N/A	N/A	N/A
V5013B	Flange	N/A	N/A	N/A	N/A	N/A	N/A	77	53	29	18	12
V5013C	Flange	N/A	N/A	N/A	N/A	N/A	N/A	77	53	29	18	12
V5013F	Screw	150	150	150	150	150	150	N/A	N/A	N/A	N/A	N/A

Table 1. Close-off Ratings in psi for ML7421A,B Electric Linear Valve Actuators and V5011, V5013 Valves

^a For use only with ML7421B Actuator.

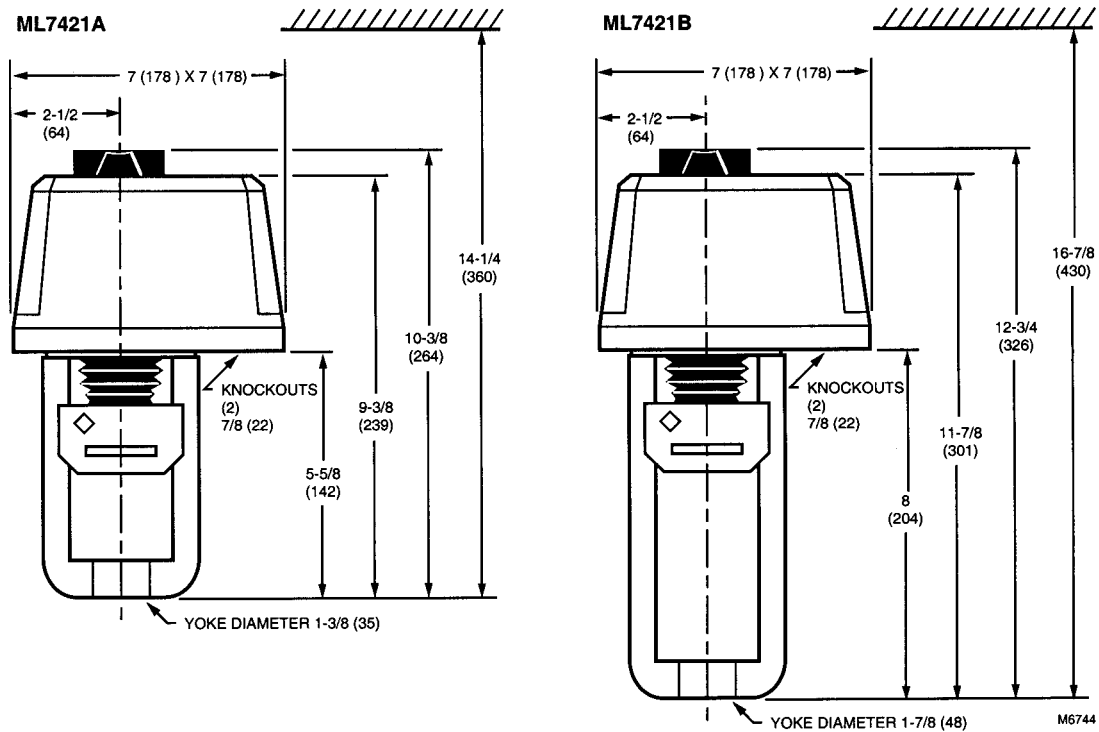


Fig. 1. Approximate dimensions of ML7421A,B Electric Linear Valve Actuator in in. (mm).

Valve Model	Valve Size in in.	Close-Off Rating psi (kPa) ^a
		404 lbf (1800N)
V3350, V3351, V3360, V3361,	2-1/2	63 (434)
V3450, V3451,	3	45 (310)
V3460, V3461	4 ^b	25 (172)
	5 ^b	16 (110)
	6 ^b	11 (76)

Table 2. Close-off Ratings in psi for ML7421A,B and V3350,1; V3360,1; V3451,1; V3461,1 Valves.

^a Represents max. pressure difference between outlet and inlet.

^b For use only with ML7421B Actuators.

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

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

Location

Install the actuator in a location that allows enough clearance for mounting accessories and for servicing. See Fig. 1.



CAUTION

Do not install the actuator in a position below horizontal to minimize the risk of damage to the actuator in the event of condensation or a valve gland leak.

Mounting

NOTE: Check for valve stem button adjustment dimension.

1. Attach the actuator to the valve collar and tighten the set screws with a 5/32 in. (4mm) hex wrench.

IMPORTANT:

When tightening the set screws, first tighten the right set screw. See Fig. 2.

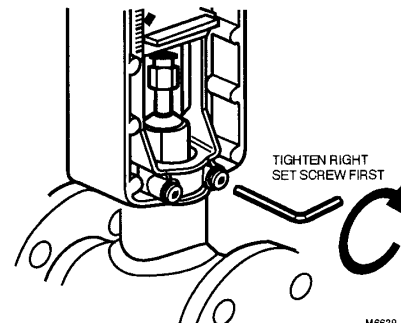


Fig. 2. Attaching actuator to valve collar.

- Push the stem button retaining clip and hold. See Fig. 3.

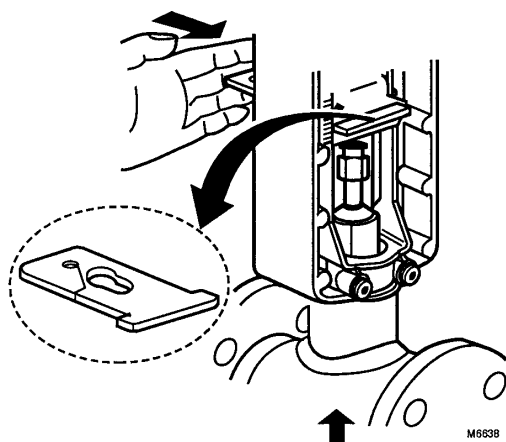


Fig. 3. Attaching actuator to valve stem.

- Lift the valve stem until the head of the valve stem button is inside the large slot of the stem button retaining clip.
- Release the stem button retaining clip to secure the stem button.
- Check to ensure that the retaining clip holds the stem button in place.
- Pull of the manual operation knob, loosen the cover screws, and remove the actuator cover.

Wiring

CAUTION

Disconnect the power supply before wiring to prevent electrical shock or equipment damage.

All wiring must comply with local electrical codes, ordinances and regulations. Voltage and frequency of the transformer used with the ML7421 must correspond with the characteristics of the power supply and those of the actuator.

- Feed the power and control wires through the opening on the bottom of the actuator case.
- Using the wiring diagrams in Fig. 4 through 6, connect the power and control wires to the ML7421. Make sure that all wiring is correct.
- When wiring and checkout are complete, replace the cover, tighten the cover screws, and replace the manual operator knob, see Fig. 7.
- Apply cover and control signals to the ML7421.

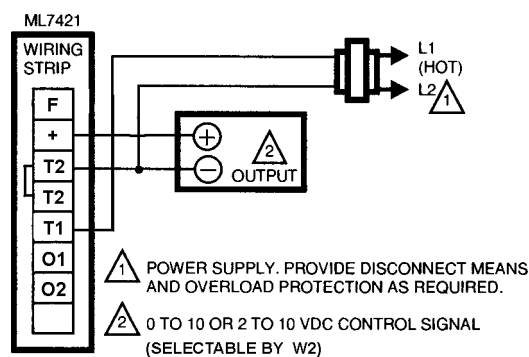


Fig. 4. ML7421 typical wiring diagram.

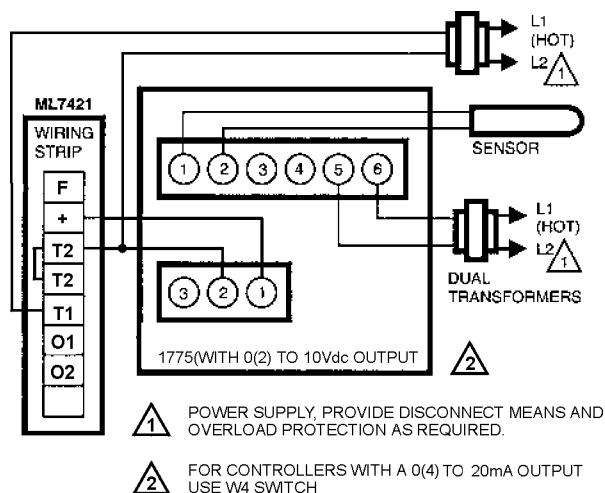


Fig. 5. ML7421 wiring diagram using a 0(2) to 10Vdc output control (e.g. T7759) with two transformers.

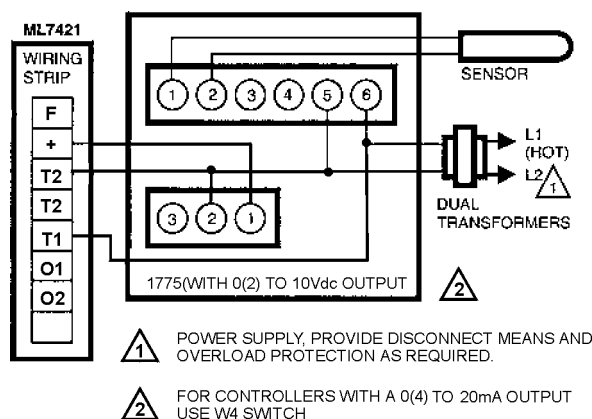


Fig. 6. ML7421 wiring diagram using a 0(2) to 10Vdc output control (e.g. T7759) with one transformer.

ACCESSORIES

Auxiliary switches

The 43191680 Dual Auxiliary Switch can be used on both the ML7421A and ML7421B Electric Linear Valve Actuators. Switching points are adjustable over the full length of the actuator stroke; for example, the switch can be used to switch pumps or to provide remote indication of any stroke position. See the Installation Instructions packed with the auxiliary switch.

IMPORTANT:

Use the 43191680 Dual Auxiliary Switch only with 24 Vac applications.

OPERATION

General

In the ML7421, the drive of a synchronous motor is converted into the linear motion of the actuator stem by using a worm gear transmission. A button retainer clip connects the actuator stem to the valve stem. The internal force sensor, using installed microswitches, turns off the actuator when the specified stem force is reached.

Manual Operation

The ML7421 is equipped with a manual operator knob (see Fig. 7) to open or close the valve in the event of power failure. Turn off or disconnect the power supply before manually operating the ML7421.

To operate, push down the manual operator knob and turn the knob counterclockwise to move the stem downward or clockwise to move the stem upward. If the actuator is returned to automatic control, the manual operator knob unlocks automatically.

NOTE: If the manual operator knob is not pushed in while turned, it turns only a short distance before it automatically disengages without power resumption.

IMPORTANT:

Manual operation allows a very high closing force that can jam the actuator spindle, exceeding the rating of the force switches, and stopping the motor.

After a manual valve close-off operation, release the spindle one turn by turning the the manual operator knob so the manual operator automatically disengages on power resumption.

Signal Input (+)

The analog input signal (+) range is set at the factory to 0 to 10 Vdc. Changing the position of the W2 selector plug sets the range to 2 through 10 Vdc.

Changing the W4 position to mA (see Fig. 8.) the ranges are 0(4) to 20 mA. Selector plugs W1, W2, W3 and W4 are positioned on the back side of the PCB protection sheet. See Fig. 8 for location of the selector plugs.

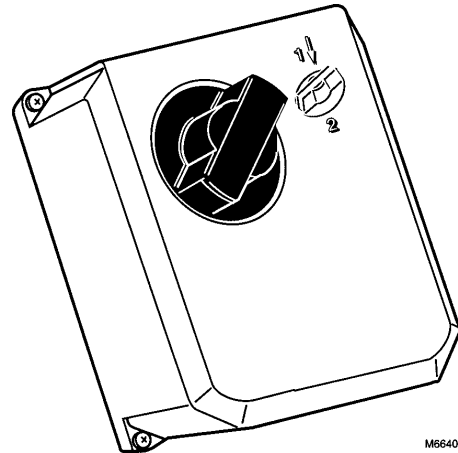


Fig. 7. ML7421A,B manual operator knob.

Signal Input Failure

Using selector plug W1, the actuator can be set to run to one of three positions in event of a signal failure:

1. 0% — Actuator position corresponds with 0 or 2 Vdc signal
2. 50% — Actuator stem in mid-position
3. 100% — Actuator position according to 10 Vdc signal

NOTE: W1 is factory set at 50% .
If W4 is set to mA-position, the actuator runs always to 0% .

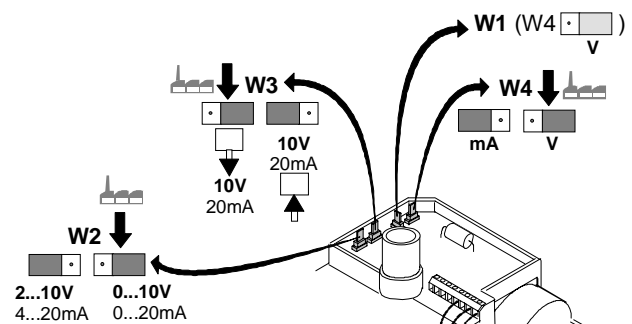


Fig. 8. Location of selector plugs W1, W2, W3 and W4.

Output Signal Feedback (F)

An analog output signal (2 to 10 Vdc) that represents the actual actuator stem position is available at Terminal F. It can be used for remote indication of the stem position. When the actuator stem is fully extended, the output signal is 10 Vdc.

The output of the signal does not change when the action of the actuator is reversed using W3 or W4, which is set to mA-position, see Direction of Action.

Actuator Override

The converter output signal override position can be used in freeze protection or similar applications. It forces the actuator into an end position, overriding the control signal. To exercise this function, connect the 24 Vac common (or T2) to either terminal O1 or O2. connecting to terminal O1 fully extends the actuator stem. connecting to O2 fully retracts the actuator stem.

The control signal is ignored when the override signal is applied to terminal O1 or O2. this override can be achieved with a switch or relay, see Fig. 9.

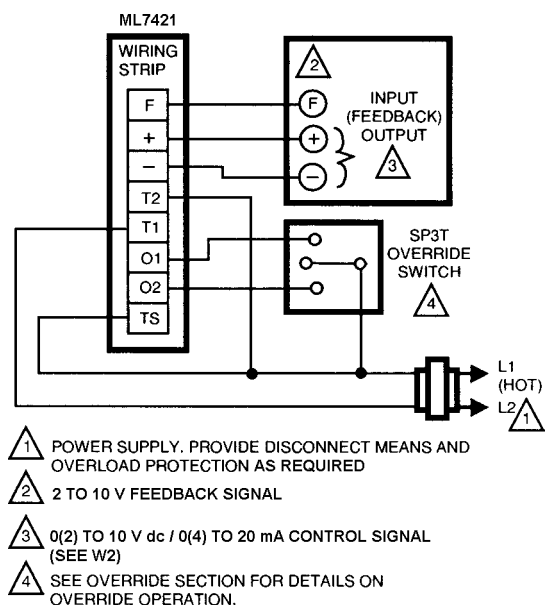


Fig. 9. Connection for overriding control signal to drive actuator to specific position.

Direction of Action

The direction of the actuator action can be changed by repositioning selector plug W3, which is factory set so that the stem extends on increasing signal and retracts on decreasing signal. When the actuator stem is fully extended the output signal from feedback (F) function is 2 Vdc.

CHECKOUT

The ML7421 Electric Linear Valve Actuator can be checked out either directly or using a controller.

Direct Checkout

1. Mount the actuator for the required application.
2. Check the valve position and make sure that 24 Vac is correctly applied to the actuator.
3. Apply the control signal to the appropriate leadwires to move the valve in the required direction.
4. If the actuator does not move, make sure the actuator is properly installed.
5. If the actuator is correctly installed and does not run, replace the actuator.

Controller Checkout

1. Adjust the setpoint of the controller to call for opening or closing the valve. Observe the actuator.
2. If the valve is closed, it should begin to open.
3. If the valve remains closed, move the setpoint further towards the open setting.
4. If the valve does not move, check for 24 Vac in the actuator power input.
5. If 24 Vac is present and the actuator does not operate, reverse the controller leadwires to determine if the device is miswired.
6. If the wiring is correct, 24 Vac is present on the power input terminals, and the actuator does not run, replace the actuator.