

ML7984B VALVE ACTUATOR

The ML7984B is a self-contained, self-adjusting, linear motorized linkage that mounts directly onto V5011 two-way or V5013 three-way valves and provides up to 19 mm (3/4") of linear travel (stem lift). For use with a Pulse Width Modulating or alternately a 2-10Vdc analog signal controller.



- Allows the use of one common transformer power supply for multiple actuators and controllers
- Field configurable DIP switches for 5 PMW modes and 2-10Vdc signal inputs.
- Field configurable DIP switches for Direct / Reverse action
 - One device for either Vac or Vdc power supply application
- Compatible with 3 -wire system (one common wire for both signal & power inputs)
- For 1/2" to 3" V5011 / V5013F &G valves
- Self-contained, motorized valve linkage.
- Linkage self-adjusts to valve stroke of up to 19 mm (3/4")
- Multipoise mounting
- Strong valve seat closing force 710 Newton (160 lbs.)
- Compact size for easy installation in confined areas
- Electronic current sensing provides internal protection and positive full closing force
- Field-addable auxiliary switches available

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Specifications

IMPORTANT:

The specifications given in this publication do not include normal manufacturing tolerances. Therefore, an individual unit may not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions and some minor differences in performance can be expected if those conditions are changed.

Ambient Rating:

Operating Temperature:
0°C to 55°C (32°F to 130°F)
Shipping Temperature:
-40°C to +65°C (-40°F to 150°F)
Relative Humidity:
15% to 95% at 40°C (104°F)

Acoustic Noise:

55 dBA max. Sound Pressure Level at 1 m (39") distance.

Electrical Ratings:

Power supply/consumption:
24V (Nominal), 50/60Hz or
24 to 28 Vdc
6VA(Running), 12VA(Valve seating)

Input Signal:

PWM: 10-24Vac or Vdc non-directional pulses
Analog: 2-10Vdc

Input Impedance:

20 KΩ

Shipping Weight:

Approx. 1 kg (2.2 lbs)

Accessories/Parts:

272630A--Auxiliary switch assembly (1-SPDT)
272630B--Auxiliary switch assembly (2-SPDT)
40003793-003--Mounting hardware bag assembly

Mechanical Ratings:

Stroke--19mm (3/4") or less
Stroke timing-- Approx. 63 seconds for 3/4" stroke
Closing Force-- 710N (160 lbs.) Nominal*

*Rating applies to both directions.

Performance Specifications:

Life Expectancy-- (at rated load and power conditions)
50,000 full stroke cycles plus
1,000,000 repositions at 10% stem travel or 10 years,
whichever occurs first.

Note: rapid repositioning will result in reduced service life of the actuator.

Ordering Information

When purchasing replacement and modernization products from your wholesaler or distributor, refer to the price sheets for complete ordering number, or specify--

1. Model number.
2. Valve body type and model number.
3. Accessories, if desired.

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 Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Service Department

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Scarborough, Ontario
Canada M1V 4Z9

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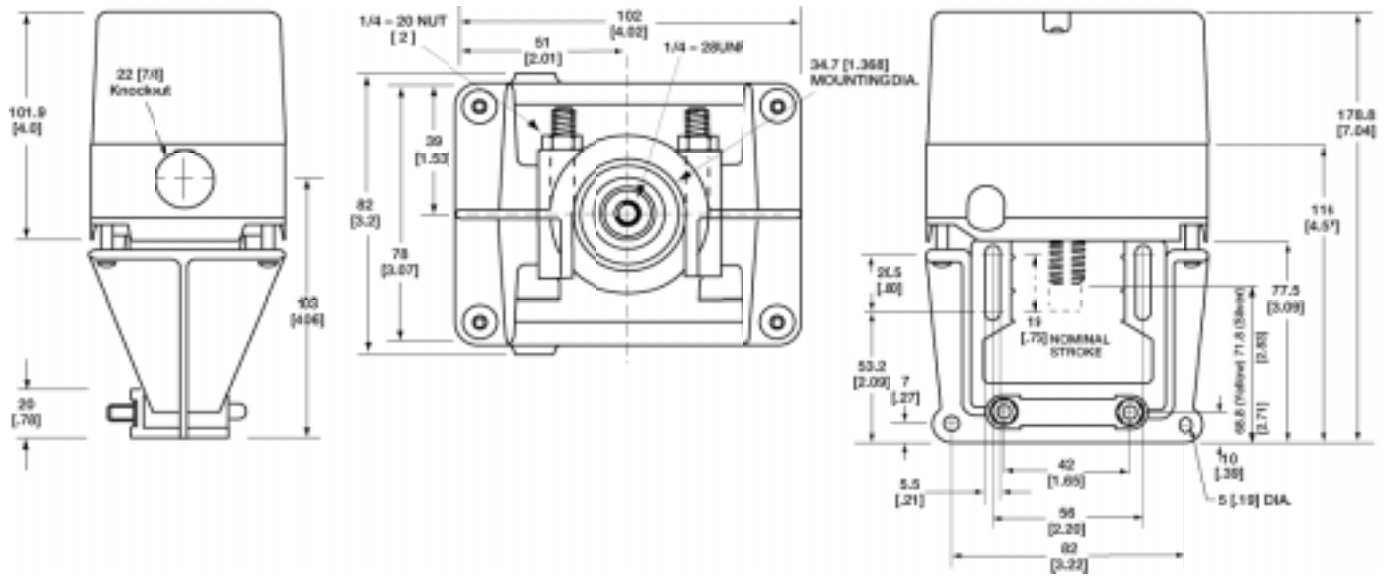


FIG. 1 -- DIMENSIONS OF ML7984 VALVE ACTUATOR IN MM (INCHES).

Installation

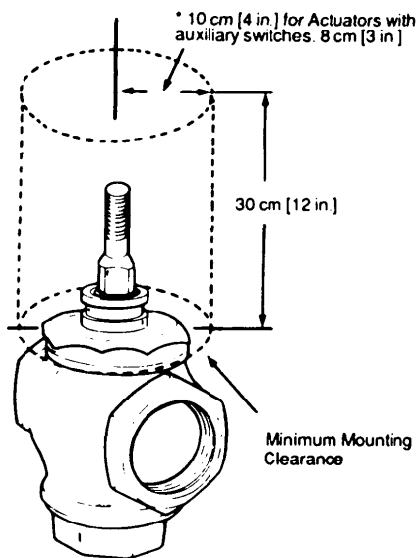


FIG.2 -- MINIMUM MOUNTING CLEARANCE.



CAUTION

1. Installer must be a trained service technician.
2. **DO NOT electrically operate the ML7984 before assembly to the valve because damage not apparent to the installer may occur.**

Mounting:

1. Ensure that the valve body is installed correctly, that is, the arrow points in the direction of the flow.
2. Although the actuator can be mounted in any position, it is preferable that the ML7984 is mounted above the valve body. This will minimize the risk of damage to the ML7984 in the event of condensation or a valve gland leak.
3. Remove the stem button (Fig. 3) from the valve stem.
4. Slide the position indicator (plastic disk or rubber O-ring) over the valve stem. (See inset, Fig. 3) Indicator will self-align to the marking on the yoke after one complete operating cycle.

Assembly of ML7984 to the valve:

1. The drive shaft of the ML7984 has a threaded hole to link with the valve stem. Slide the yoke over the valve bonnet (Fig. 4)
2. Thread the ML7984 drive shaft onto the valve stem **all the way**, until it is **completely attached (with no threads showing)**, by turning the valve actuator in a clockwise direction, as viewed from above (depending on the valve models, use a pin or wrench to keep valve stem from turning). Note that the valve actuator is shipped with drive shaft in the mid-position.
3. Care should be exercised when using the TOOLS on the valve stem during tightening. (Fig.4) **DO NOT** damage the threads or other parts of the stem.
4. Orient the conduit hole to the most desirable direction, then tighten the LOCKNUTS on the U-bolt.

ML7984B
 INSTALLATION

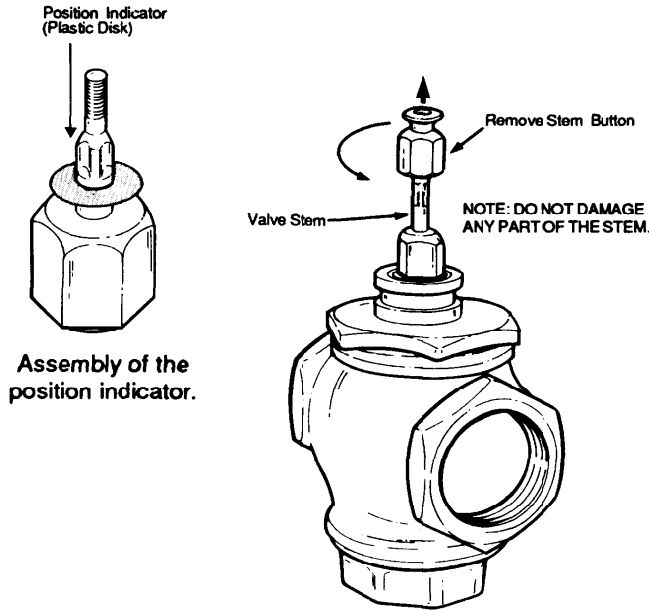


FIG.3 -- PREPARATION FOR VALVE ASSEMBLY.

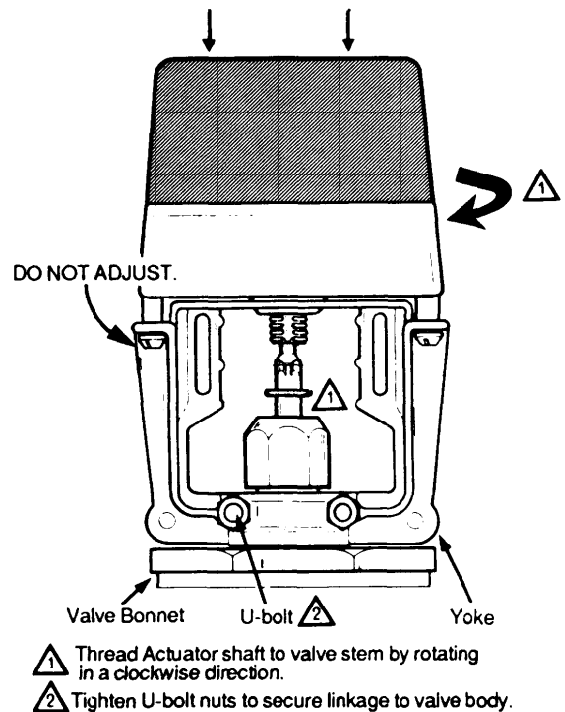


FIG. 4 -- ASSEMBLY OF ML7984 TO VALVE.

5. Remove the plastic cover from the ML7984 by loosening the two screws located on the top (Note: These screws are captive. Rotate three complete revolutions to remove cover). Drop either slot headed or Allen hex type of set screw (both are included in the plastic bag) into the top of the shaft, slot/hex side up.

6. With a 5 mm (3/16") Slotted screwdriver or 1/8"x 6" Allen wrench (included in the plastic bag), **tighten the set screw to lock valve stem in place** (Fig. 6).

! WARNING

For proper valve operation, valve stem must be **threaded into the actuator all the way (with no threads showing) and locked in place** with the set screw provided.

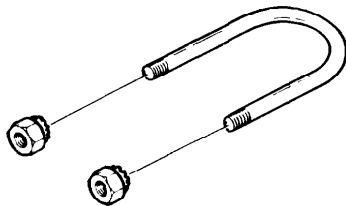


FIG. 5 -- U-BOLT ASSEMBLY.

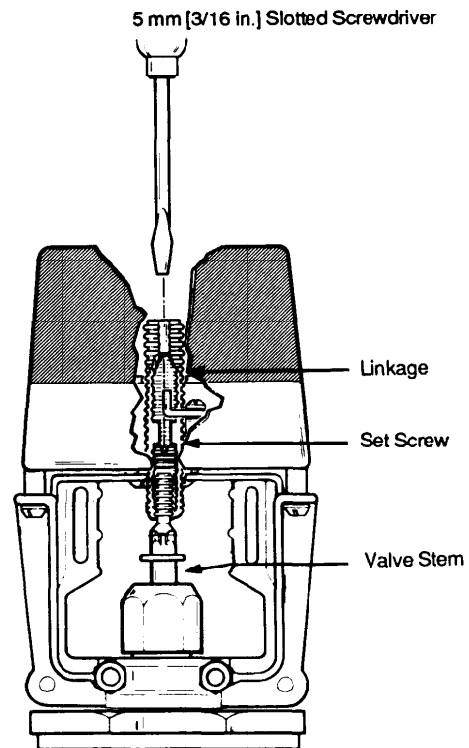
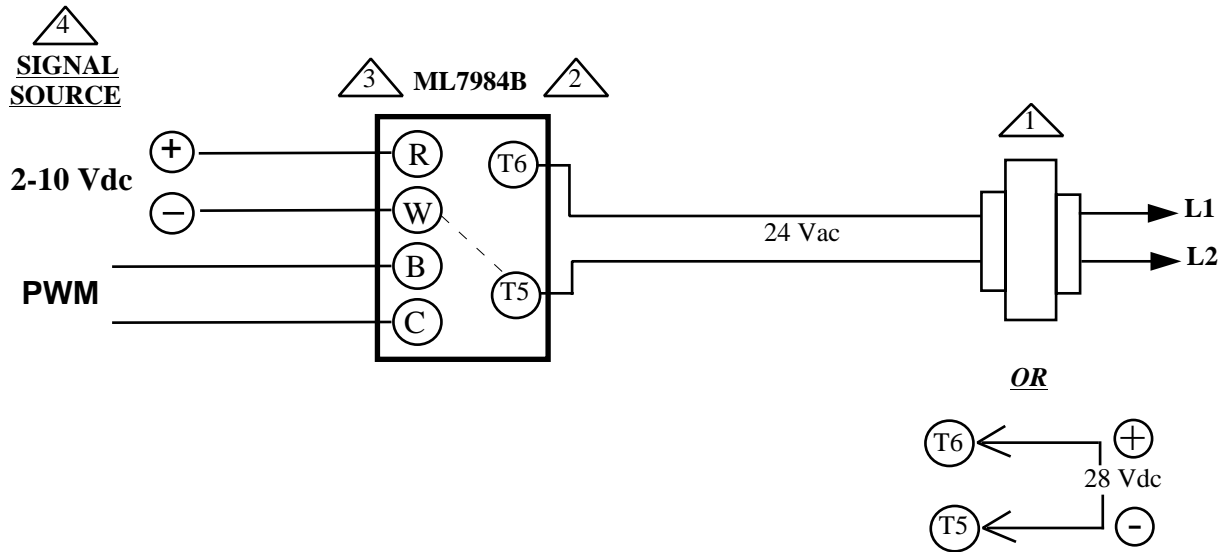


FIG. 6. -- LOCKING ML7984 DRIVE SHAFT TO VALVE STEM



- Allow 0.5 amps maximum for each device. Actuators and controller can share same transformer providing the VA rating of the transformer is not exceeded and proper phasing is observed.
- "T5" and "W" terminals are factory connected internally. Device is compatible with the 3-wire control system.
- Use configuration DIP switches to select device functions:** Direct acting function (actuator stem moves upwards with signal increases) or Reverse acting function (actuator stem moves downwards with signal increases).
- Use either one controller only

MODE	DIP SWITCH								
PWM: min. 0.1 sec + 0.01 sec increments (max. 2.65 sec)	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
off									
PWM: min. 0.1 sec + 0.02 sec increments (max. 5.20 sec)	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
off									
PWM: min. 0.1 sec + 0.05 sec increments (max. 12.85 sec)	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
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PWM: min. 0.1 sec + 0.10 sec increments (max. 25.6 sec)	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
off									
PWM: min. 0.59 sec + 0.00918 sec increments (max. 2.93 sec) NOVAR	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
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Analog: 2-10 Vdc	<table style="border: none;"> <tr><td>on</td><td></td><td></td><td></td></tr> <tr><td>off</td><td></td><td></td><td></td></tr> </table>	on				off			
on									
off									

on	
off	

Direct Acting

on	
off	

Reverse Acting

Configuration DIP switches located adjacent to the input terminal block

NOTE:
Turn power off before setting the DIP switches.

Fig. 7 Wiring for ML7984B actuators

Operation and checkout

Operation:

The recommended valve actuator power source is a class 2, 24V transformer or 28Vdc across terminals T5 & T6 (See Fig.7). The internal circuitry provides dc power for the electronic sensing and drive motor circuits. The sensing circuits respond to the signal across the input terminals based on the configuration DIP switches setting.

At the end of the valve stroke, the actuator continues to drive and gradually develops the necessary force for positive valve close-off. The actuator motor stops automatically when the motor current reaches the predetermined current & force level.

PWM mode:

The ML7984B is controlled by an intermittent voltage pulse whose width varies in proportion to the desired actuator position. This called pulse width modulation (PWM). The PWM signal has two parts: a fixed pulse of a set width to indicate a signal presence (e.g. 0.1 s) and a variable width portion incremented in proportional to the signal percentage. There are 255 increments available (e.g. 0.01 s). Thus, the pulse width will be the minimum width plus the number of increments times the incremental value (e.g. stroke mid position is: $0.1s + 128 \times 0.01s = 1.38 s$). The ML7984B supports 5 different PMW timebased modes.

2-10 Vdc mode:

Control signal between signal input terminals is compared to similar voltage across the actuator feedback potentiometer. When these voltages are equal, the drive motor and drive shaft are stationary.

As long as the value of controlled medium remains at the controller setpoint, the circuit is in balance, and the actuator does not run. When the value of the controlled medium changes, the controller output voltage is changed causing reference voltages in the circuit to be out of balance. As the actuator moves in the direction to correct the medium change, the feedback potentiometer also moves to rebalance the circuit, and stop the actuator.

GENERAL NOTE:

1. For correct valve operation, the ML7984 must be **field configured** with the DIP switches which are located beside the terminal block, see wiring diagram for details. **Turn power off before setting the DIP switches .**
2. There is a short delay in actuator response upon every signal change. It is to screen any unwanted incoming signals.
3. For proper operation, voltage on the T5 & T6 **must not be less than 22Vac** or 24Vdc during running or force generating stages.



CAUTION:

1. Disconnect power supply before beginning installation to prevent electrical shock and equipment damage.
2. All wiring must comply with applicable local electrical codes, ordinances and regulations.
3. Make certain that the voltage and frequency of the power supply correspond to the rating of the device.
4. **DO NOT electrically operate the ML7984 before assembly to the valve because damage not apparent to the installer may occur.**

Checkout:

1. Make sure the valve stem is completely screwed into the actuator drive shaft with no threads showing.
2. Make sure the valve stem is locked in place with the set screw.
3. Make sure the Configuration DIP switches are set correctly.
4. With 24Vac or 28Vdc power source connected to T5 & T6, actuator operation can be verified by connecting appropriate control signal (PWM or 2-10Vdc) from controller to the signal input terminals (Fig. 7).
For direct acting: A modulating action can be obtained simply by increasing the control signal width or level. The actuator will travel from a fully closed position (Stem down) to a fully open position (Stem up). For 2-10Vdc mode, actuator defaults to closed position on signal failure.
For reverse acting: Decreasing controller signal width or level will drive actuator from fully closed (Stem down) to a fully open position (Stem up). For 2-10Vdc mode, actuator defaults to open position on signal failure.
5. Operate the system (valve, actuator and controller) for several cycles to ensure proper installation.
6. When checkout is completed, return the controller to the desired setting.

NOTE: Device will ignore any input changes until it has completed its repositioning relative to the initial signal input.

Honeywell

Home and Building Control

Honeywell Limited/Limitée
155 Gordon Baker Road
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