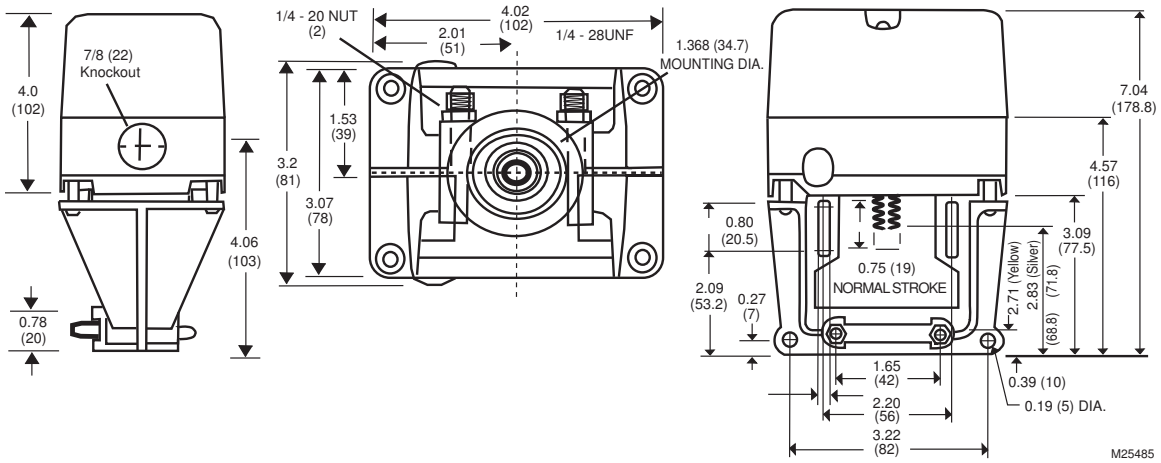


Fig. 1. ML6984 Valve Actuator Dimensions, in. (mm).

INSTALLATION

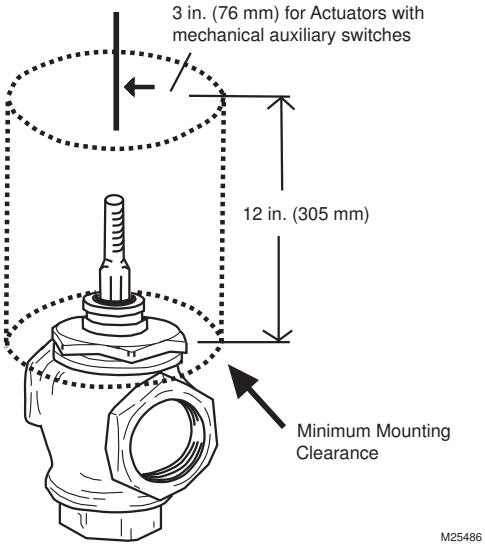


Fig. 2. Minimum Mounting Clearance.

⚠ CAUTION

Short and rapid cycling/repositioning may result in possible switch device lock-up or reduced service life.

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check ratings given in instructions and on the product to ensure the product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.
5. DO NOT electrically operate the actuator before assembly to the valve because damage not apparent to the installer may occur.

IMPORTANT

Before installing the valve, raise and lower the valve stem to make sure that the valve stem operates freely. Impaired stem operation can indicate that the stem was bent by rough handling. This condition can require repair or replacement of the valve.

Protect the stem from damage due to bending or scratching. Damage to the stem packing may result.

Proper Use

Valves are to be installed by skilled personnel and in strict accordance with installation instructions and local regulations. Honeywell assumes no responsibility for damages or injuries resulting from non-compliance with installation instructions or standard good practice when mounting, operating, or maintaining the valves, even if not explicitly mentioned in the installation instructions. Observe all safety practices when working with steam systems.

Mounting

1. Ensure that valve body is installed correctly, arrow pointing in the direction of flow.
2. Actuator can be mounted in any position; however, it is preferable that it is mounted above the horizontal plane of the pipe. This minimizes the risk of damage to the actuator in the event of condensation or valve gland leak. When controlling steam, rotate the valve body with the actuator beside the valve to avoid exceeding ambient temperature limits of the actuator. For the same reason, do not mount ML Actuators to steam valves in enclosed cabinets. For on-off control of steam in small pipe sizes, Honeywell recommends V8043J zone valves.

NOTE: NEMA 3R rainproof rating only applies to actuators mounted vertically. Cover has been treated with UV stabilizers for outdoor applications. Weather-proof conduit fittings approved for outdoor and wet locations must be used to maintain NEMA 3R rating.

3. Remove stem button (Fig. 3) from valve stem.
4. (Optional) Snap red position indicator (metal clip) over valve stem and position for best visibility (Fig. 3). Indicator will self-align to the marking on yoke after complete operating cycle. It is recommended that this is done after actuator installation.

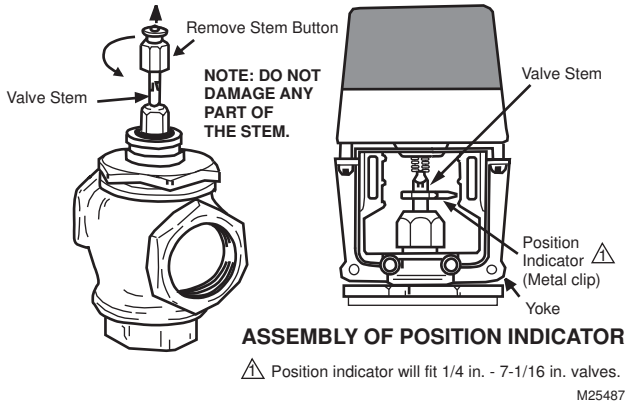


Fig. 3. Preparation for Valve Assembly.

Assembly of MLx984 Actuator to the Valve

1. The drive shaft of the MLx984 Actuator has a 1/4-28 UNF threaded hole to link with the valve stem. Slide the yoke over the valve bonnet (Fig. 4).
2. Thread the MLx984 Actuator 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 body, use a pin or wrench to keep the valve stem from turning. Note that the valve actuator is shipped with the drive shaft in the mid-position.
3. Care should be exercised when using 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.
5. Remove the plastic cover from the MLx984 by loosening the two captive screws located on the top. Drop the Allen (Hex) type of set screw (included in the plastic bag) into the top of the shaft, hex side up.
6. **Tighten the set screw to lock valve stem in place** (Fig. 6), using a 1/8 in. Allen wrench (included).

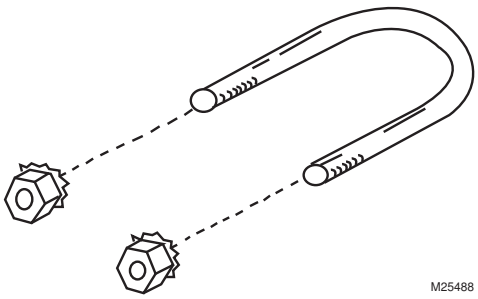


Fig. 4. U-bolt Assembly.

NOTE: Use the U-bolt supplied with the actuator. Do not replace with stainless steel U-bolt on chilled water valves. Condensation may cause corrosion of yoke with SS U-bolt.

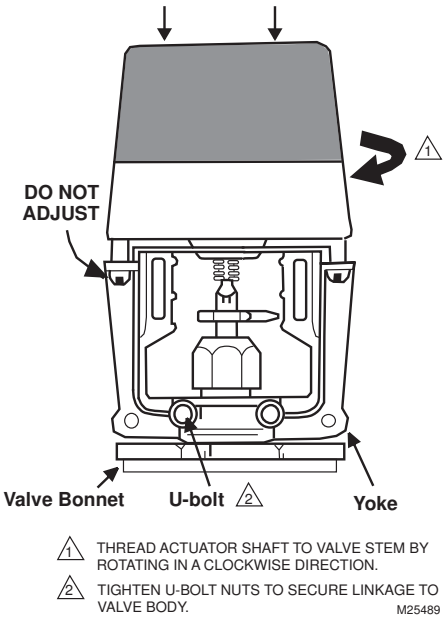


Fig. 5. Assembly of MLx984A to Valve.

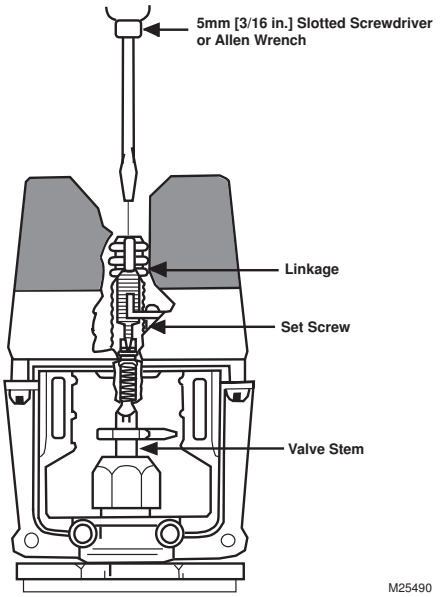


Fig. 6. Locking MLx984A Drive Shaft to Valve Stem.

⚠ CAUTION

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

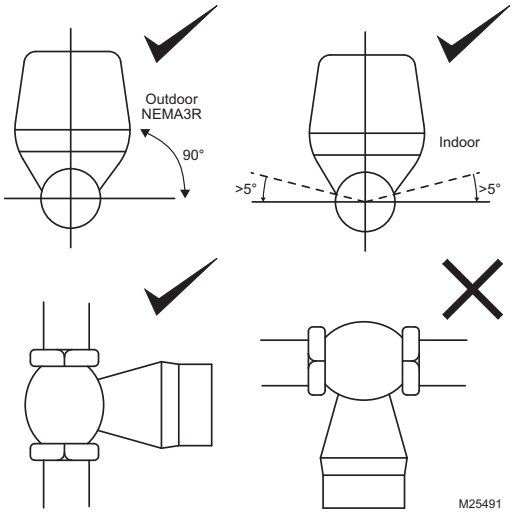


Fig. 7. Mounting Positions.

WIRING SCHEMATICS

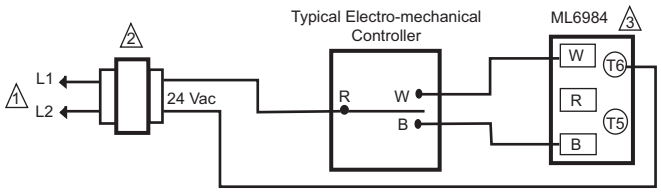
MLx984 actuators are designed to operate from a Safety Extra Low Voltage, Class II power source. A 7/8 in. (22 mm) wiring hole is provided for attaching a flexible conduit where required by local codes. When installing outdoors, weatherproof conduit fittings approved for outdoor and wet locations must be used.

⚠ CAUTION

Electrical Shock or Equipment Damage Hazard.
Can Shock Individuals or Short Equipment Circuitry.

Disconnect power supply to the actuator to prevent electrical shock and equipment damage, or remove and cap the air line to the actuator.

NOTE: In all cases when wiring multiple actuators, the power supply to all actuators must be connected in a “star” fashion to reduce excessive voltage drop. DO NOT “daisy chain” i.e. connect power to one actuator then branch to another.



1 POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.

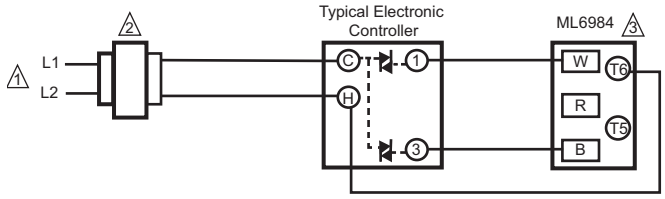
2 ALLOW UP TO 0.5 AMPS FOR EACH DEVICE. ACTUATORS AND CONTROLLER CAN SHARE SAME TRANSFORMER, PROVIDED THAT THE VA RATING OF THE TRANSFORMER IS NOT EXCEEDED AND PROPER PHASING IS OBSERVED. DO NOT MIX A.C. AND D.C. POWER SOURCES.

3 CONTROLLER CAN BE LOW VOLTAGE SPDT SERIES 20 “ON-OFF” OR SP3T SERIES 60 “FLOATING” (TRI-STATE) TYPE. TERMINALS R AND T5 ARE CONNECTED INSIDE THE ML6984. M25492

Fig. 8. 3-Wire Control of ML6984 with Series 60 Controller.

Operation

The recommended valve actuator power source is a Safety Extra-Low Voltage (SELV) Class II, 24 V transformer or regulated 28 Vdc across terminals T5 and T6. Internal circuitry provides dc power for the electronic sensing and drive motor circuits.



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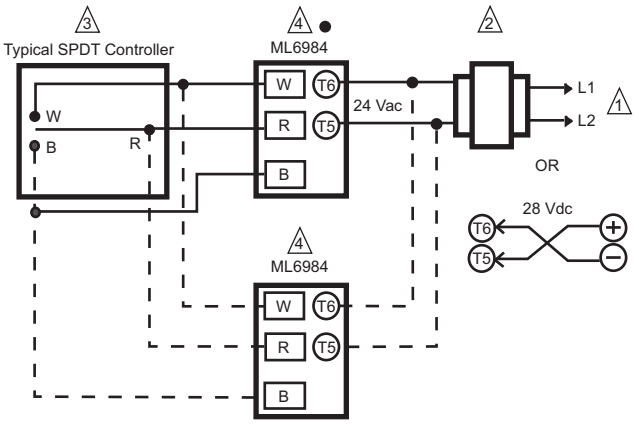
3 CONTROLLER CAN BE LOW VOLTAGE SPDT SERIES 20 “ON-OFF” OR SP3T SERIES 60 “FLOATING” (TRI-STATE) TYPE. TERMINALS R AND T5 ARE CONNECTED INSIDE THE ML6984. M25493

Fig. 9. 3-Wire Control of ML6984 with Electronic Controller.



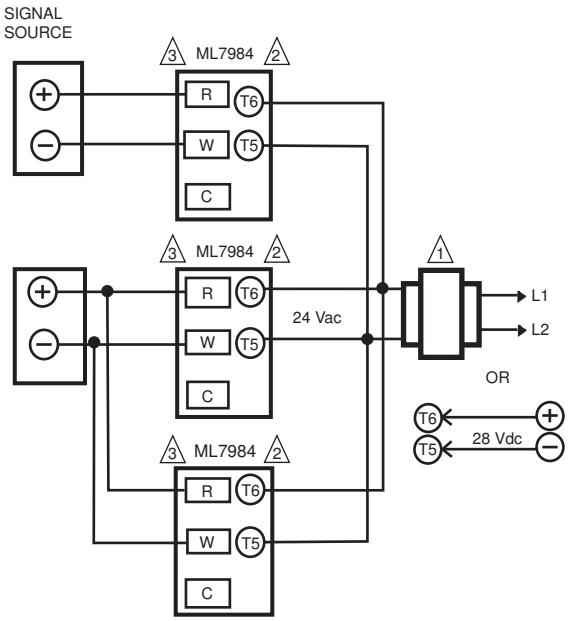
1 POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.

2 ALLOW UP TO 0.5 AMPS FOR EACH DEVICE. ACTUATORS AND CONTROLLER CAN SHARE SAME TRANSFORMER, PROVIDED THAT THE VA RATING OF THE TRANSFORMER IS NOT EXCEEDED AND PROPER PHASING IS OBSERVED. DO NOT MIX A.C. AND D.C. POWER SOURCES.

3 CONTROLLER CAN BE LOW VOLTAGE SPDT SERIES 20 “ON-OFF” OR SP3T SERIES 60 “FLOATING” (TRI-STATE) TYPE. TERMINALS R AND T5 ARE CONNECTED INSIDE THE ML6984.

4 MULTIPLE ACTUATORS CONTROLLED BY A COMMON CONTROLLER IN PARALLEL MUST BE WIRED SO THAT THEY ALL TRAVEL IN THE SAME DIRECTION. REVERSE ACTING ACTUATORS WILL NOT OPERATE RELIABLY IN COMBINATION WITH DIRECT ACTING UNITS DUE TO GEARBOX TOLERANCES. USE ML7984 MODULATING ACTUATORS, OR DEDICATED CONTROLLERS, OR SEPARATE CONTROLLER OUTPUTS FOR EACH GROUP INSTEAD. M25494

Fig. 10. 5-Wire Control of ML6984.

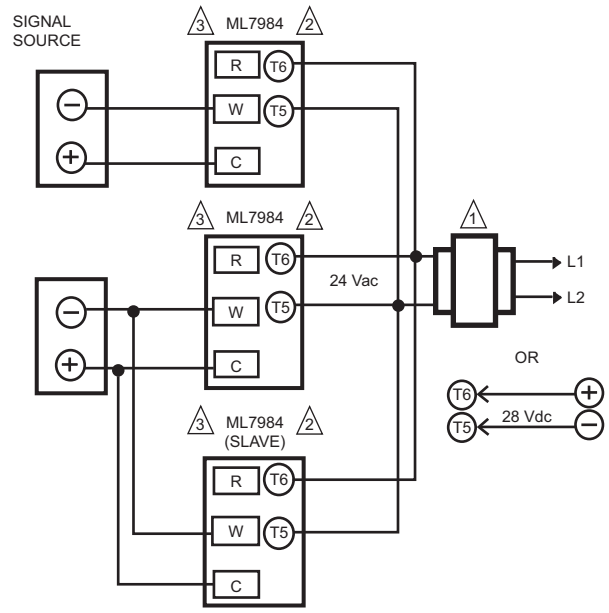


FUNCTION	DIP SWITCH CONFIGURATION
1000 2-10 Vdc Direct Acting	On (1) Off (0) 1 2 3 4
1010 10-2 Vdc Reverse Acting	On (1) Off (0) 1 2 3 4

1. POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.
2. ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.
3. IN ML7984, "T5" AND "W" TERMINALS ARE CONNECTED INTERNALLY. DEVICE IS COMPATIBLE WITH 3 CONDUCTOR WIRING.
4. USE CONFIGURATION DIP SWITCHES TO SELECT DEVICE FUNCTIONS: DIRECT ACTING FUNCTION (ACTUATOR STEM MOVES DOWNWARDS WITH SIGNAL INCREASES TO 10V/20MA) OR REVERSE ACTING FUNCTION (ACTUATOR STEM MOVES UPWARDS WITH SIGNAL INCREASES TO 10V/20MA).
5. ALWAYS TURN POWER OFF BEFORE SETTING ANY DIP SWITCHES.

M25495

Fig. 11. ML7984 Wiring with 10 Vdc Analog Control Signal.

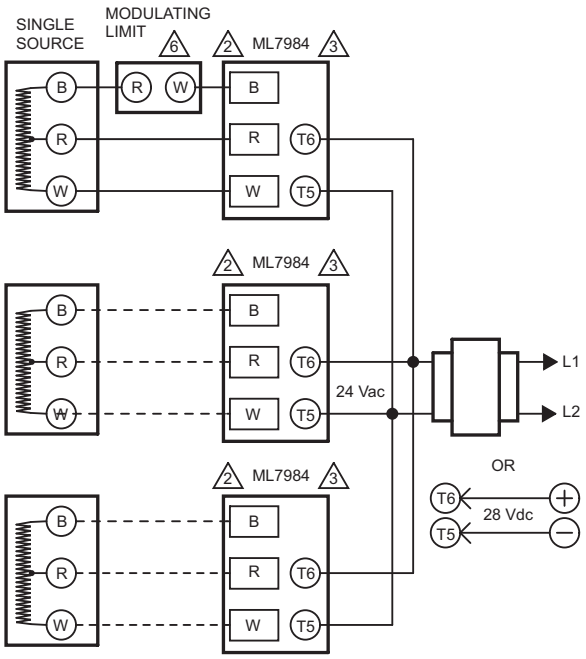


FUNCTION	DIP SWITCH CONFIGURATION
X000 4-20 mA Direct Acting	Master actuator Slave actuator On (1) Off (0) 1 1 2 3 4
X010 20-4 mA Reverse Acting	Master actuator Slave actuator On (1) Off (0) 1 1 2 3 4

1. POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.
2. ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.
3. IN ML7984, "T5" AND "W" TERMINALS ARE CONNECTED INTERNALLY. DEVICE IS COMPATIBLE WITH 3 CONDUCTOR WIRING.
4. USE CONFIGURATION DIP SWITCHES TO SELECT DEVICE FUNCTIONS: DIRECT ACTING FUNCTION (ACTUATOR STEM MOVES DOWNWARDS WITH SIGNAL INCREASES TO 10V/20MA) OR REVERSE ACTING FUNCTION (ACTUATOR STEM MOVES UPWARDS WITH SIGNAL INCREASES TO 10V/20MA).
5. ALWAYS TURN POWER OFF BEFORE SETTING ANY DIP SWITCHES.

M25496

Fig. 12. ML7984 Wiring with 20mA Analog Control Signal.

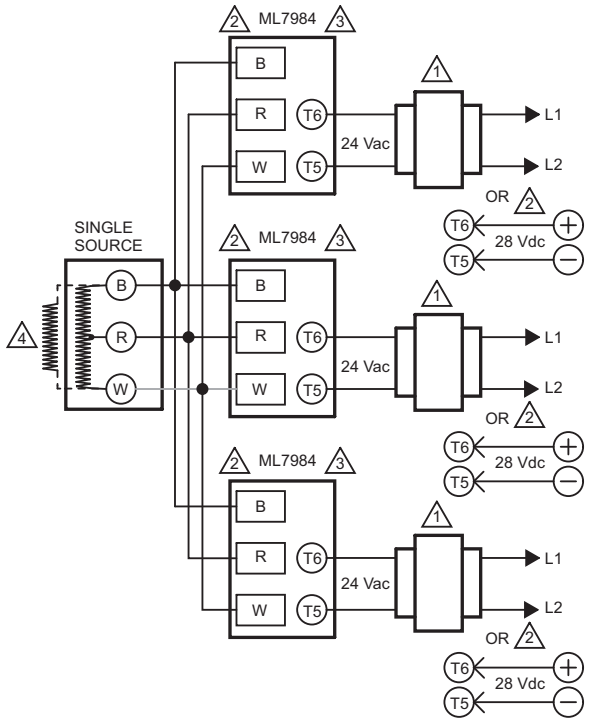


FUNCTION	DIP SWITCH CONFIGURATION	
1001 Mechanical Series 90 Direct Acting	1 2 3 4 — On (1) Off (0)	4
1011 Mechanical Series 90 Reverse Acting	1 2 3 4 — On (1) Off (0)	5

1. POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.
2. ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.
3. DO NOT MIX M984/6 OR MODUTROL MOTORS WITH THE ML7984 IN THE SAME CIRCUITRY.
4. USE CONFIGURATION DIP SWITCHES TO SELECT DEVICE FUNCTIONS: DIRECT ACTING FUNCTION (ACTUATOR STEM MOVES UPWARDS WITH SIGNAL INCREASE) OR REVERSE ACTING FUNCTION (ACTUATOR STEM MOVES DOWNWARDS WITH SIGNAL INCREASE).
5. TURN POWER OFF BEFORE SETTING ANY DIP SWITCHES. FOR COMMON TRANSFORMER AND COMMON CONTROLLER APPLICATION, PLEASE CONSULT THE FACTORY.
6. MAXIMUM RESISTANCE PER CONTROL CIRCUIT OF 280 OHM.

M25497

Fig. 13. ML7984 Wiring with Common Transformer, Individual Controllers.

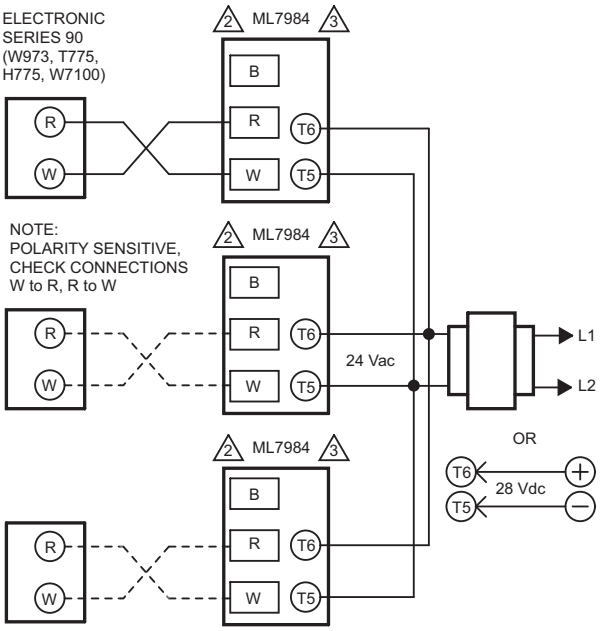


RESISTOR SELECTION CHART 4		
NO. OF ACTUATORS	RESISTOR VALUE	
1	RESISTOR NOT REQ'D.	ALL RESISTORS 1/4 WATT 1% METAL FILM
2	133 OHM	
3	68.1 OHM	
4	45.3 OHM	

1. POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.
2. ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.
3. DO NOT MIX M984/6 OR MODUTROL MOTORS WITH THE ML7984 IN THE SAME CIRCUITRY.
4. USE RESISTOR KIT PART NUMBER 272822.

M25498

Fig. 14. ML7984 with Individual Transformers, Common Controller.



FUNCTION	DIP SWITCH CONFIGURATION
1101 Electronic Series 90 Direct Acting	1 2 3 4 On (1) Off (0) △4
1111 Electronic Series 90 Reverse Acting	1 2 3 4 On (1) Off (0) △5

△1 POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.

△2 ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.

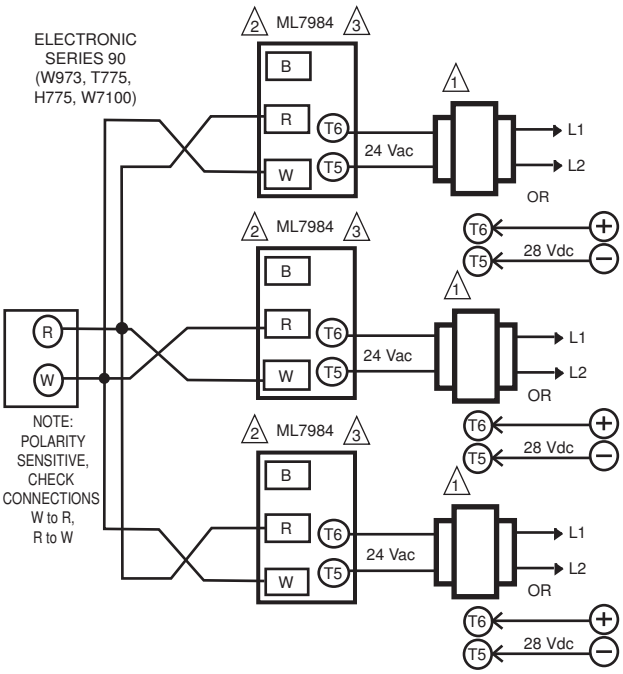
△3 DO NOT MIX M984/6 OR MODUTROL MOTORS WITH THE ML7984 IN THE SAME CIRCUITRY.

△4 USE CONFIGURATION DIP SWITCHES TO SELECT DEVICE FUNCTIONS: DIRECT ACTING FUNCTION (ACTUATOR STEM MOVES UPWARDS WITH SIGNAL INCREASES TO 10V/20MA) OR REVERSE ACTING FUNCTION (ACTUATOR STEM MOVES DOWNWARDS WITH SIGNAL INCREASES TO 10V/20MA).

△5 TURN POWER OFF BEFORE SETTING ANY DIP SWITCHES.

M25499

Fig. 15. ML7984 with Common Transformer, Individual Controllers.



FUNCTION	DIP SWITCH CONFIGURATION
1101 Electronic Series 90 Direct Acting	1 2 3 4 On (1) Off (0) △4
1111 Electronic Series 90 Reverse Acting	1 2 3 4 On (1) Off (0) △5

△1 POWER SUPPLY PROVIDES OVERLOAD PROTECTION AND DISCONNECT MEANS.

△2 ALLOW UP TO 0.5 AMPS 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. DO NOT MIX A.C. AND D.C. POWER SOURCES.

△3 DO NOT MIX M984/6 OR MODUTROL MOTORS WITH THE ML7984 IN THE SAME CIRCUITRY.

△4 USE CONFIGURATION DIP SWITCHES TO SELECT DEVICE FUNCTIONS: DIRECT ACTING FUNCTION (ACTUATOR STEM MOVES UPWARDS WITH SIGNAL INCREASES TO 10V/20MA) OR REVERSE ACTING FUNCTION (ACTUATOR STEM MOVES DOWNWARDS WITH SIGNAL INCREASES TO 10V/20MA).

△5 TURN POWER OFF BEFORE SETTING ANY DIP SWITCHES.

M25500

Fig. 16. ML7984 with Individual Transformers, Common Controller.