

M6415, M7405, M7415, M8405, M8415 Damper Actuators

M6415, M7405, M7415, M8405 and M8415 25 lb-in. spring return damper actuators provide two-position, three-position, floating, or modulating control of economizer systems, ventilation dampers and combustion air dampers used in residential or commercial HVAC equipment.



- M6415 Damper Actuator provides spdt floating control of economizer dampers from Direct Digital Control (DDC) Systems.
- M7405A Damper Actuator provides modulating control of economizer dampers from Direct Digital Control Signal. Use with Programmable Commercial Thermostats, either the T7400/W7401 Standard or T7400/W7411 Heat Pump System.
- M7415 Damper Actuator provides modulating control of economizer dampers from a thermistor mixed-air or discharge sensor to maintain 56° F air temperature.

- M8405A Damper Actuator provides three-position control: closed, adjustable mid-position, and open.
- M8415 Damper Actuator provides two-position control: open and closed.
- Quiet, high efficiency drive motor.
- High impact, glass-fiber reinforced plastic case is rugged, lightweight and corrosion resistant.

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Specifications

MODELS:

Model Number	Voltage (Vac) 50/60 Hz	Power (Vac)		Timing (sec) ^g	Stroke (deg)	Torque		Open Rotation (shaft end view)	Spring Return (shaft end view)
		(drive)	(hold)			(lb-in.)	(N•m)		
M6415A ^{a,b}	24	7	3	90	90	25	2.8	ccw	cw
M6415B ^{a,b}	24	7	3	90	90	25	2.8	cw	ccw
M6415C ^{a,b,c}	24	7	3	90	90	25	2.8	ccw	cw
M6415D ^{a,b,c}	24	7	3	90	90	25	2.8	cw	ccw
M7405A ^{b,d}	24	8	5	90	90	25	2.8	ccw	cw
M7415A ^{b,d}	24	8	5	90	90	25	2.8	ccw	cw
M7415B ^{b,d}	24	8	5	90	90	25	2.8	cw	ccw
M8405A ^{b,e}	24	7	3	90	90	25	2.8	ccw	cw
M8415A ^{b,f}	24	7	3	90	90	25	2.8	ccw	cw

^a Spdt Floating.

^b Spring return.

^c With thumbwheel auxiliary switch.

^d Modulating.

^e Three-position, with field-adjustable minimum position control.

^f Two-position, two-wire, with field-adjustable auxiliary switch; adjustable from 5° to 65° of shaft rotation.

^g Timing with 60 Hz power.

ACTUATOR ROTATION: Closed position is limit of clockwise rotation; open position is limit of counter-clockwise rotation as viewed from shaft end of motor.

These motors are shipped with shaft in closed position. See Fig. 2 for crank arm rotation limits.

AUXILIARY SWITCH RATING: (M8415A only): 24 Vac, 20 VA inrush, 10 VA run (R8222 or equivalent load).

AMBIENT TEMPERATURE RATING: -25° F to +125°

F [-32° C to +52° C].

DIMENSIONS: See Fig. 1.

TERMINAL CONNECTIONS: 1/4 in. [6 mm] male quick-connect terminals mounted on actuator. Terminal arrangement is dependent on model of actuator.

SHAFT: Single-ended drive shaft with crank arm supplied.

FLAMMABILITY RATING: Underwriters Laboratory Inc. UL94-5V.

APPROVAL: Underwriters Laboratory Inc. Component Recognized: File No. E4436, Guide No. XAPX2, Vol. 9, Section 1, 7-25-83.

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, or specify—

1. Order number.
2. Accessories, if desired.
3. Order additional system components and system accessories separately.

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 (please check the white pages of your phone directory).
2. Home and Building Control Customer Satisfaction
Honeywell, Inc., 1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386 (612) 951-1000

In Canada—Honeywell Limited/Honeywell Limitée, 740 Ellesmere Road, Scarborough, Ontario M1P2V9. 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.

Fig. 1—M6415, M7405, M7415, M8405, M8415 Damper Actuator dimensions in in. [mm].

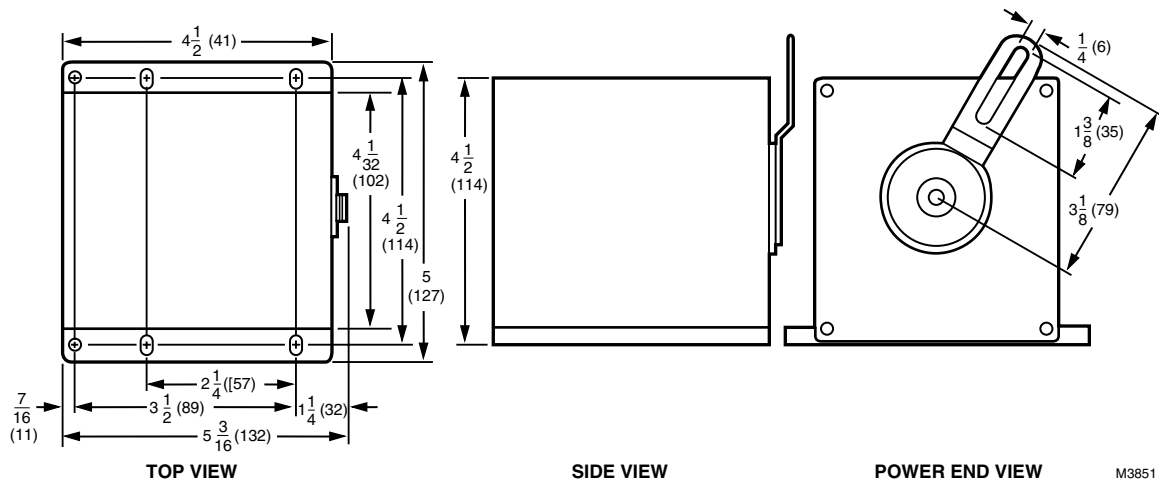
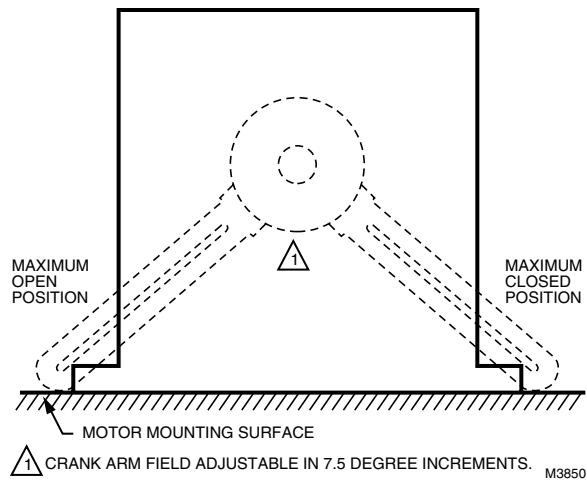
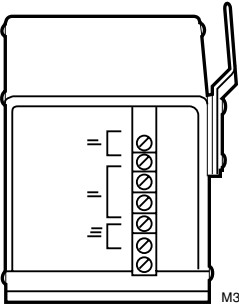
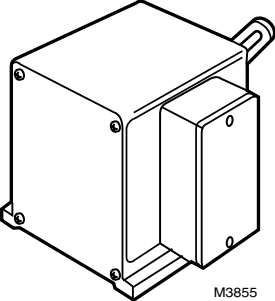
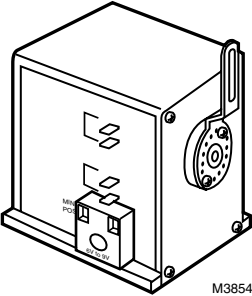
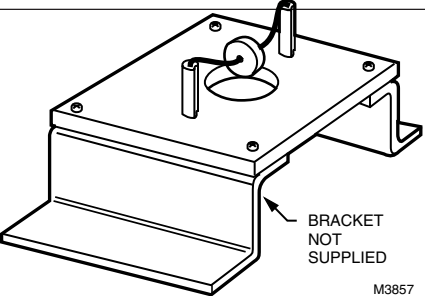
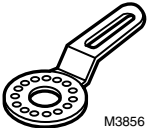


Fig. 2—Limits of crank arm rotation.



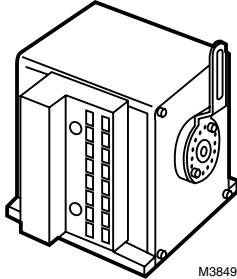
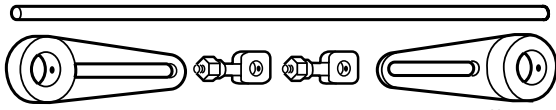
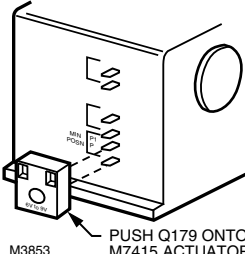
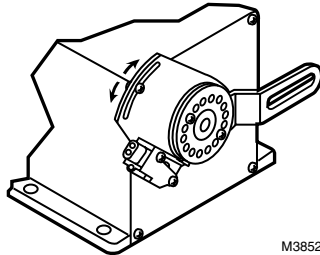
SPECIFICATIONS

ACCESSORIES:

1. 4074EHB Screw Terminal Adapter—converts quick-connect terminals to screw terminals. Adapter can be used with or without 7640QF Terminal Enclosure.	1.  M3858
2. 7640QF Terminal Enclosure—provides wiring enclosure for electrical terminal connections. Enclosure can be used with or without 40784EHB Screw Terminal Adapter. Bag assembly includes: terminal housing, cover plate and mounting screws.	2.  M3855
3. Q709A Actuator Mounted Minimum Position Potentiometer—permits adjustment of minimum damper position and provides quick-connect terminals for remote minimum position potentiometer connection for override. 4. S963B1136 Minimum Position Potentiometer—permits remote adjustment of minimum damper position; can be used with or without Q709A Actuator Mounted Minimum Position Potentiometer.	3.  M3854
5. C7150B1004 Mixed or Discharge Air Thermistor Sensor—use with M7415A proportioning actuator. C7406A Discharge Air Sensor—use in place of C7150B1004 if desired.	5.  BRACKET NOT SUPPLIED M3857
6. 4074EGR Crank Arm Assembly.	6.  M3856

(Continued)

ACCESSORIES (*Continued*):

7. W7459 Solid State Logic Module used with C7400 Solid State Enthalpy Sensor.	7.  M3849
8. Q298B Linkage Hardware—enables linking the actuator to an additional damper. Consists of two crank arm assemblies, two ball joint assemblies, and variable length push rods (in 10, 16, or 24 inch lengths)	8.  M3867
9. a. Q769A 6 to 9 volt Adapter for M7415A actuator—enables the actuator to be proportionately modulated with a 6 to 9 Vdc signal. The Q769A may also be used in lieu of a Q709A to control the minimum position of an M7415A with a 6 to 9 Vdc signal when a C7150B is used as a temperature sensor. b. Q769B 4 to 20 mA Adapter for M7415A actuator—enables the actuator to be proportionately modulated with a 4 to 20 mA signal. The Q769B may also be used in lieu of a Q709A to control the minimum position of an M7415A with a 4 to 20 mA signal when a C7150B is used as a temperature sensor.	9.  PUSH Q179 ONTO M7415 ACTUATOR M3853
10. 4074EKV Auxiliary Switch—provides switching capability for controlling auxiliary equipment. The switch acts as a function of the actuator shaft position.	10.  M3852

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 and description given in this specification 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 supply before connecting wiring to prevent electrical shock or equipment damage.



WARNING

Do not remove end covers from actuator; spring-return assembly can release and cause personal injury.

LOCATION AND MOUNTING

Location

Locate actuator as close as possible to the equipment to be controlled. Refer to Fig. 1 for mounting dimensions.

Mounting

Mount these actuators with the shaft horizontal to assure maximum life. However, operation in other positions is possible when required in specific applications.

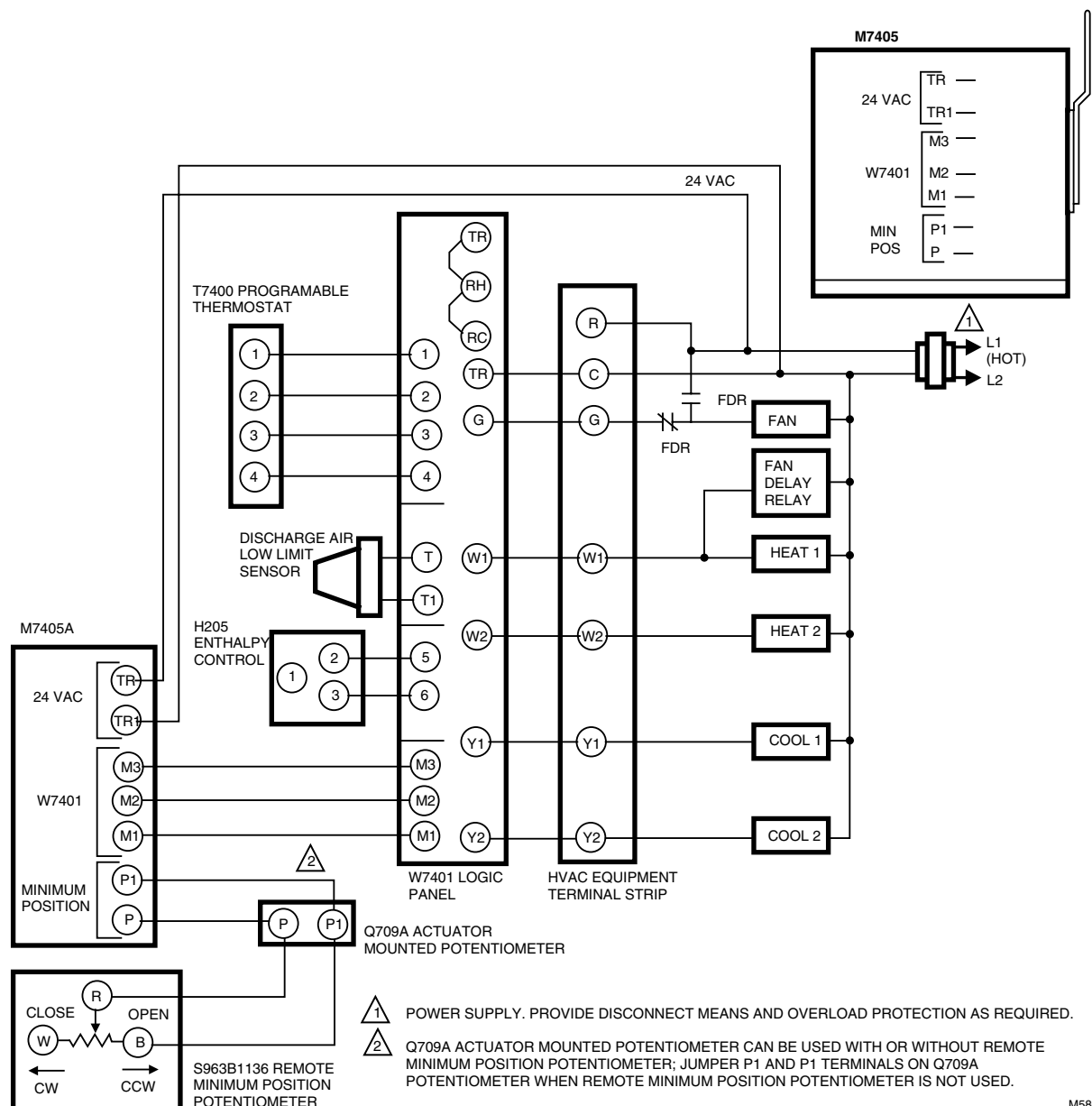
Remove Crank arm from actuator hub (secured with two screws) and reposition to accommodate specific damper requirements adjustable within eight angular degrees.

IMPORTANT: Position crank arm on actuator hub so that crank arm does not strike actuator mounting surface during any portion of full stroke. See Fig. 2.

WIRING

Disconnect power supply before connecting wiring to prevent electrical shock or equipment damage. All wiring must comply with applicable codes and ordinances. Refer to Figs. 3 through 20 for typical hookup diagrams.

Fig. 3—M7405A Damper Actuator connected in T7400/W7401 single zone HVAC system.



M5805

Fig. 4—Two M7405A Damper Actuators connected in parallel in T7400/W7401 HVAC system.

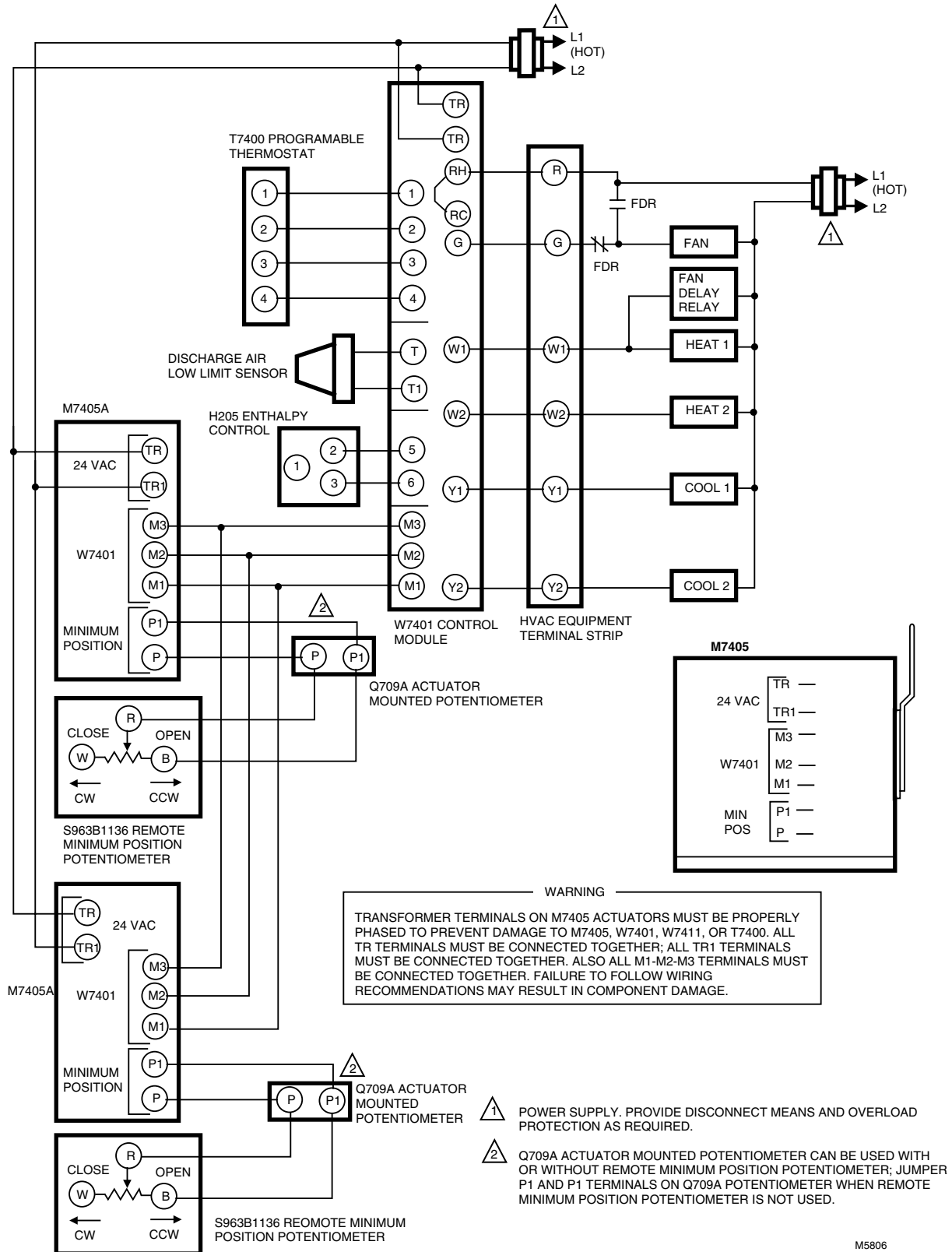
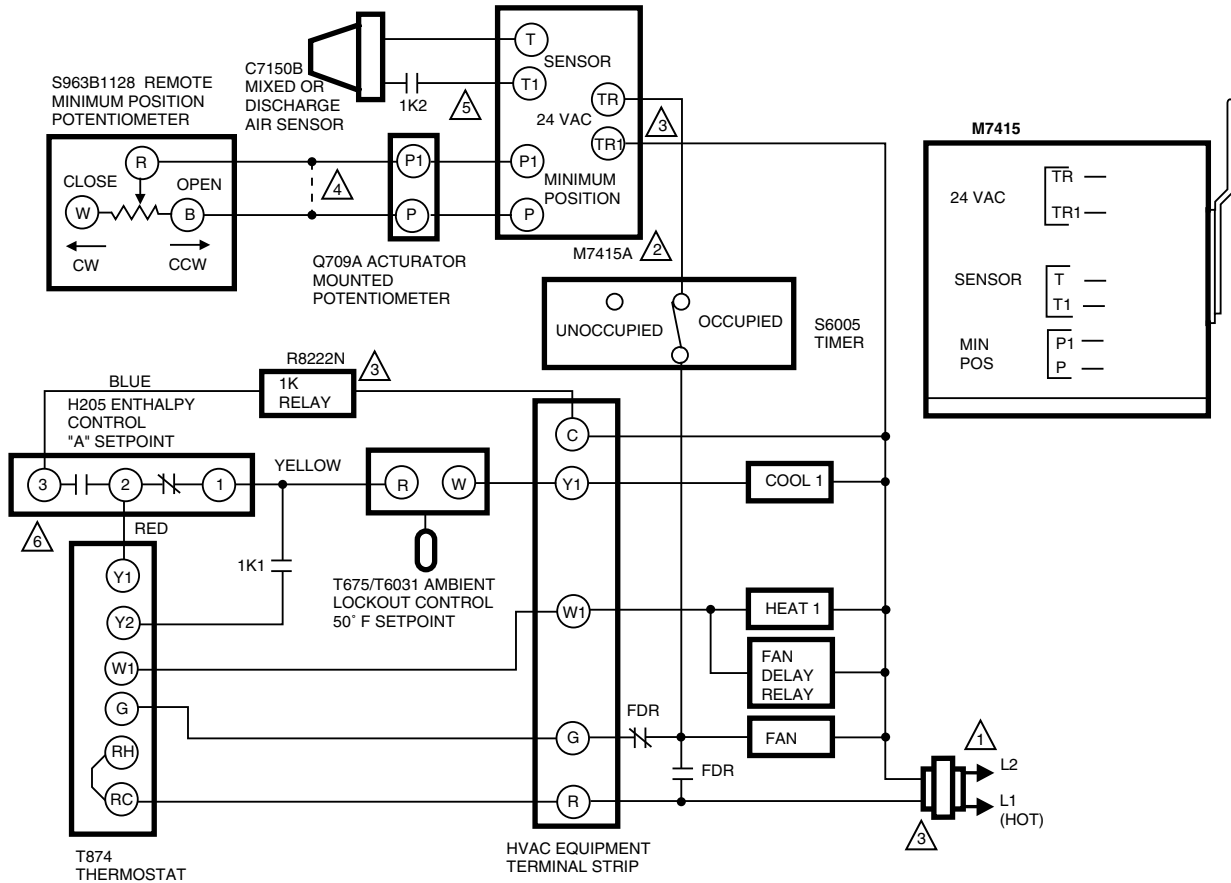


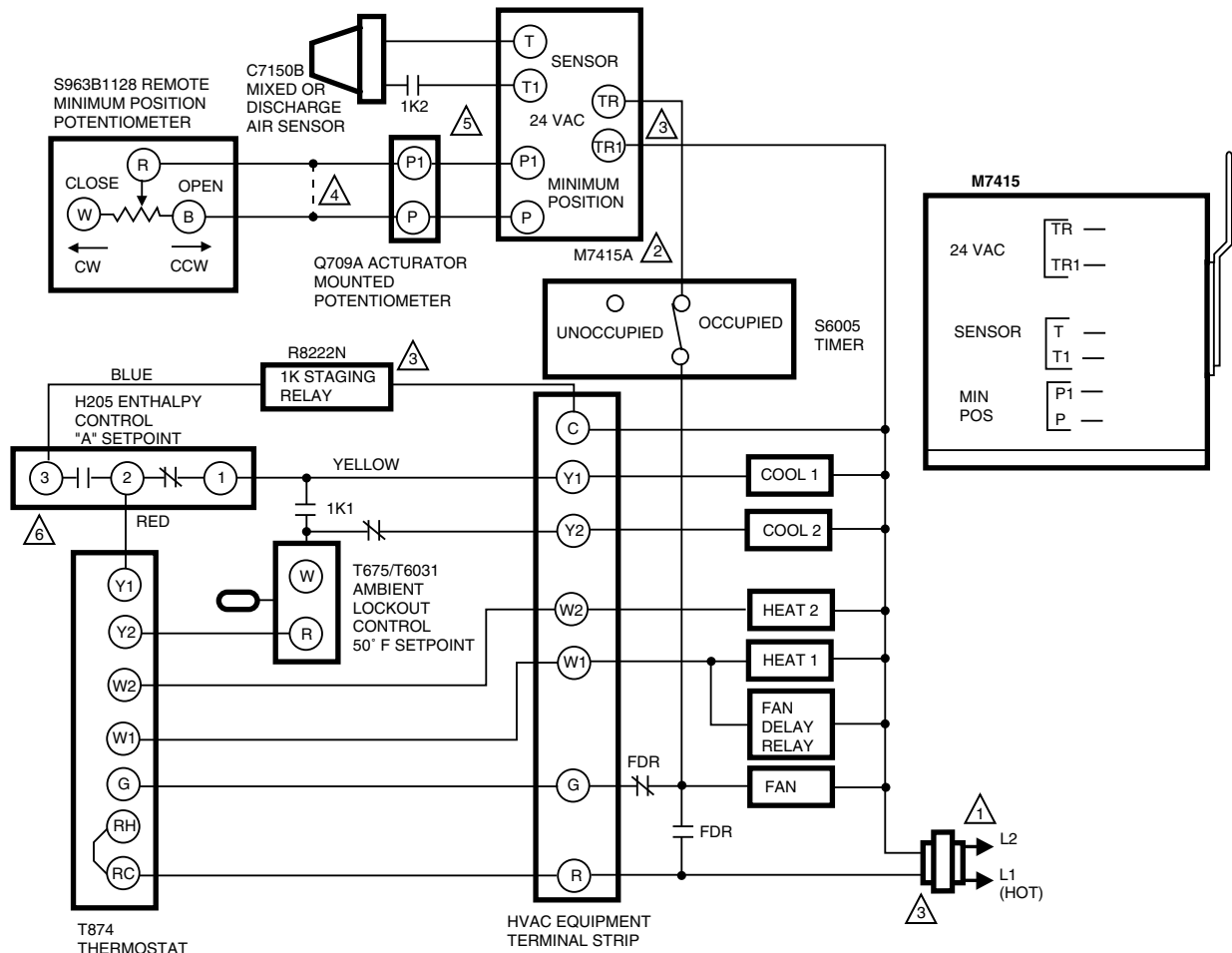
Fig. 5—M7415 Damper Actuator connected in single-stage cooling system with staging relay.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 MOTOR SPRING-RETURNS CLOSED WHEN FAN IS NOT RUNNING.
- 3 ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE EXTRA LOAD OF ECONOMIZER AND 1K RELAY LOAD. USE R8222N RELAY OR EQUIVALENT.
- 4 Q709A ACTUATOR MOUNTED MINIMUM POTENTIOMETER CAN BE USED WITH OR WITHOUT REMOTE MINIMUM POSITION POTENTIOMETER; ADD JUMPER WHEN REMOTE MINIMUM POSITION POTENTIOMETER IS NOT USED.
- 5 OPEN SENSOR LEADS AND USE MINIMUM POSITION POTENTIOMETER FOR POTENTIOMETER CONTROL.
- 6 H205 MAKES RED TO BLUE ON ENTHALPY FALL TO SETPOINT (A-D).

M5810

Fig. 6—M7415 Damper Actuator connected in two-stage cooling system with cooling relay.



M5809

Fig. 7—M7415 Damper Actuator and T7400/W7411 with separate transformer in two-stage heating/two-stage cooling system.

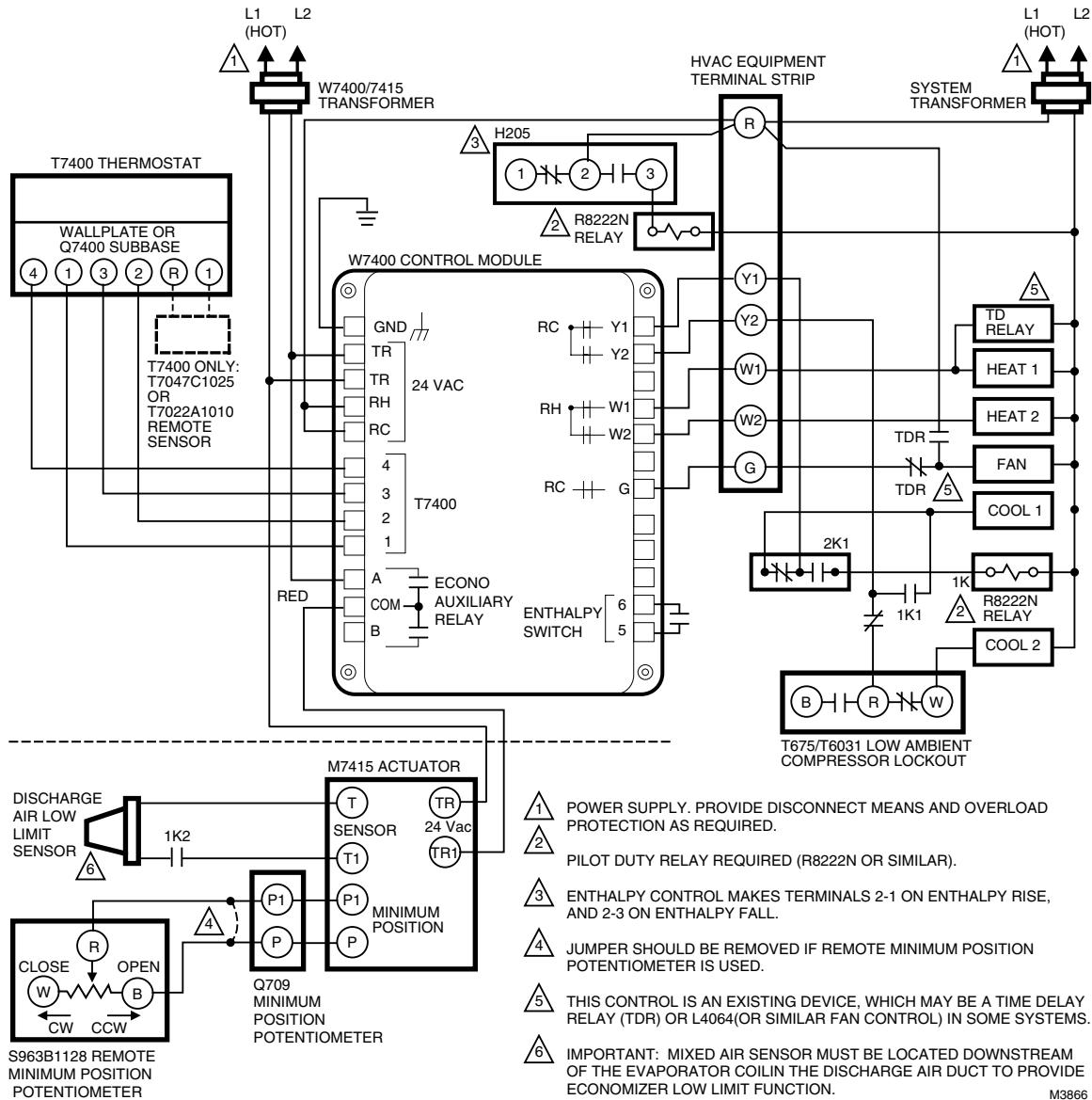
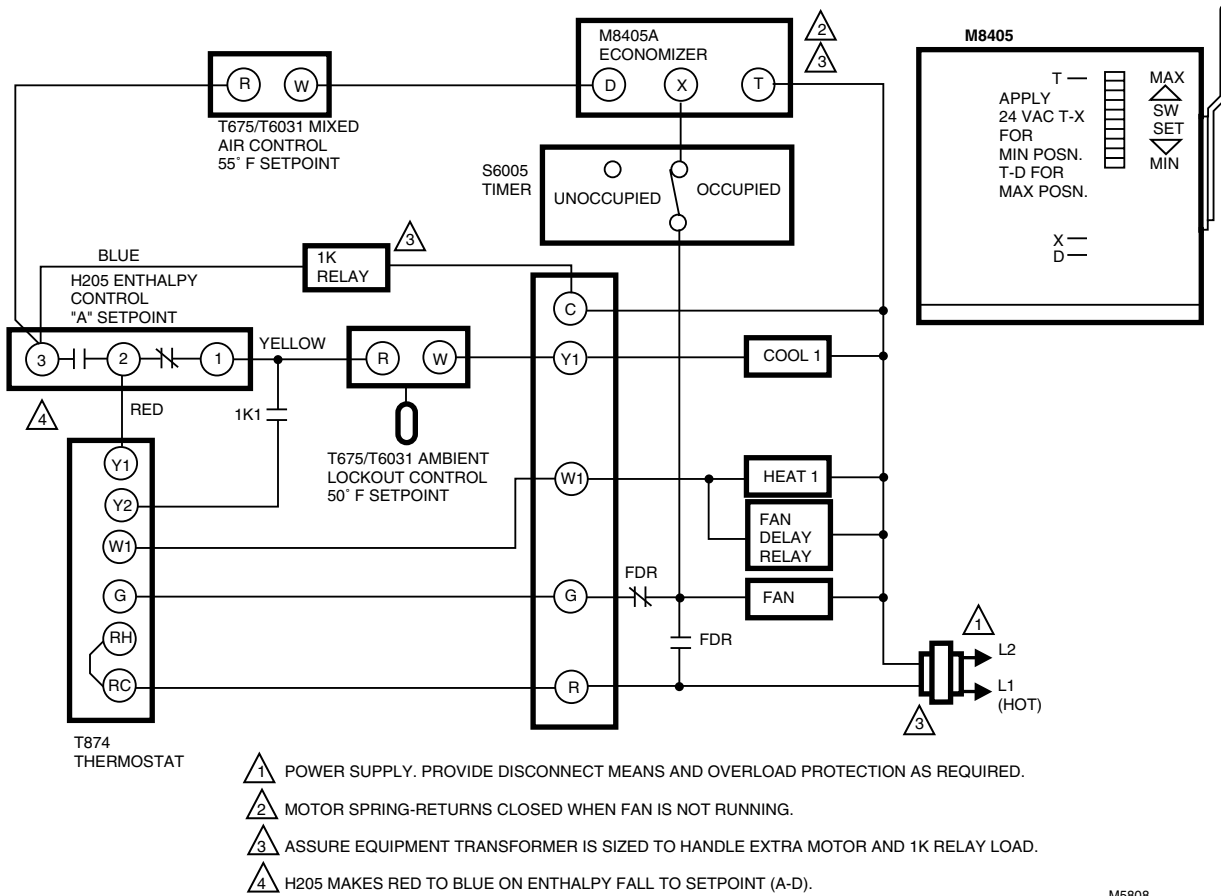


Fig. 8—M8405A Damper Actuator connected in single-stage cooling system.



M5808

Fig. 9—M8405A Damper Actuator connected in two-stage cooling system.

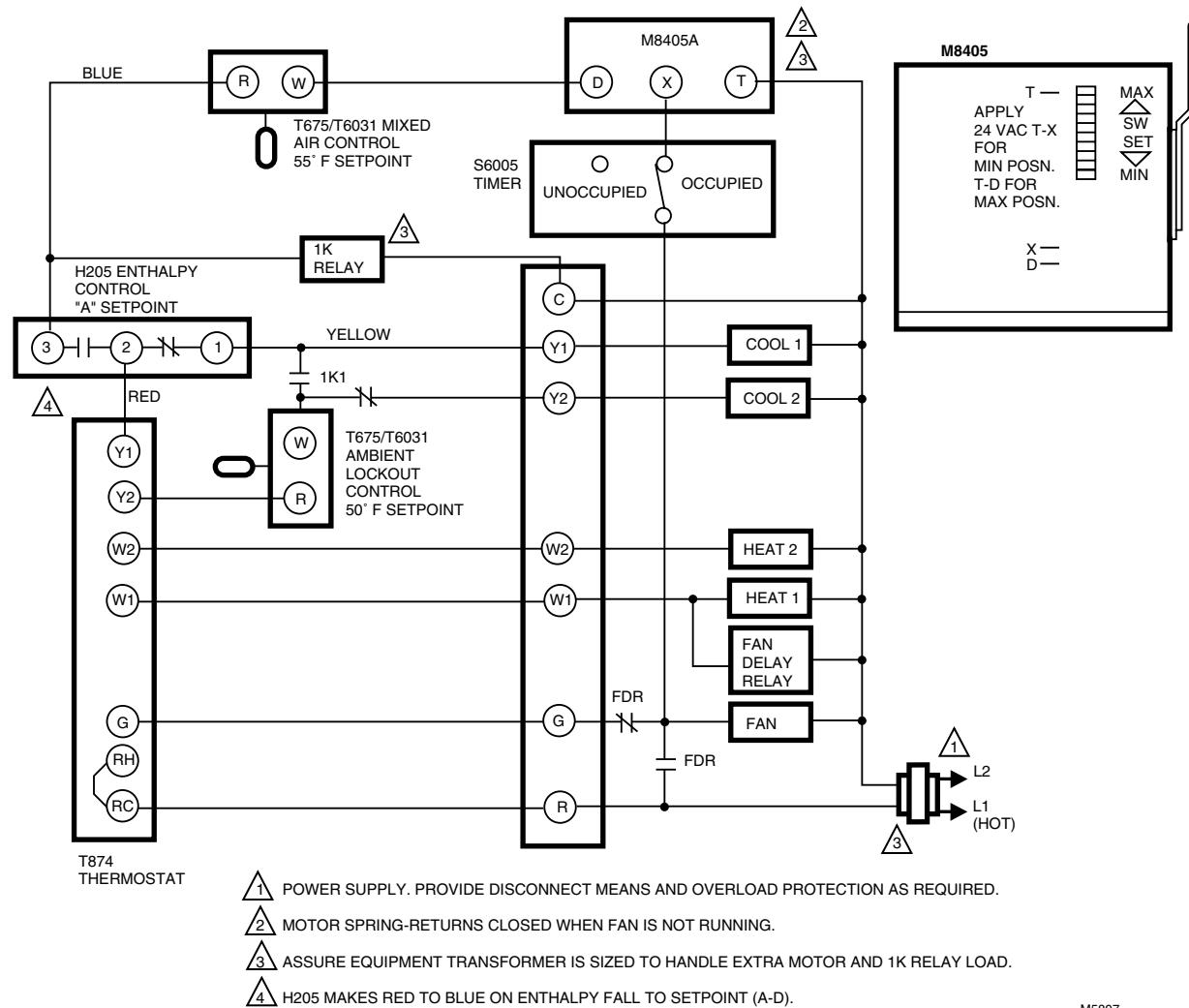
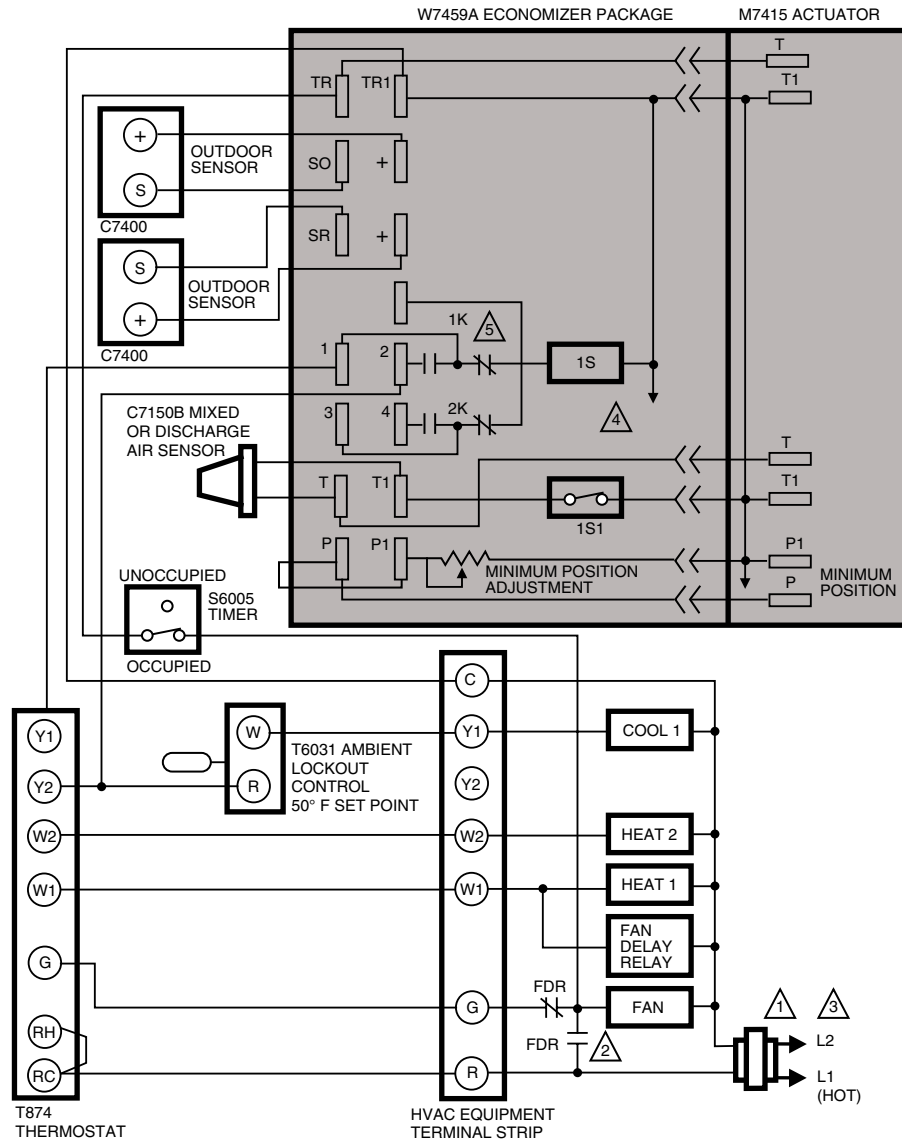


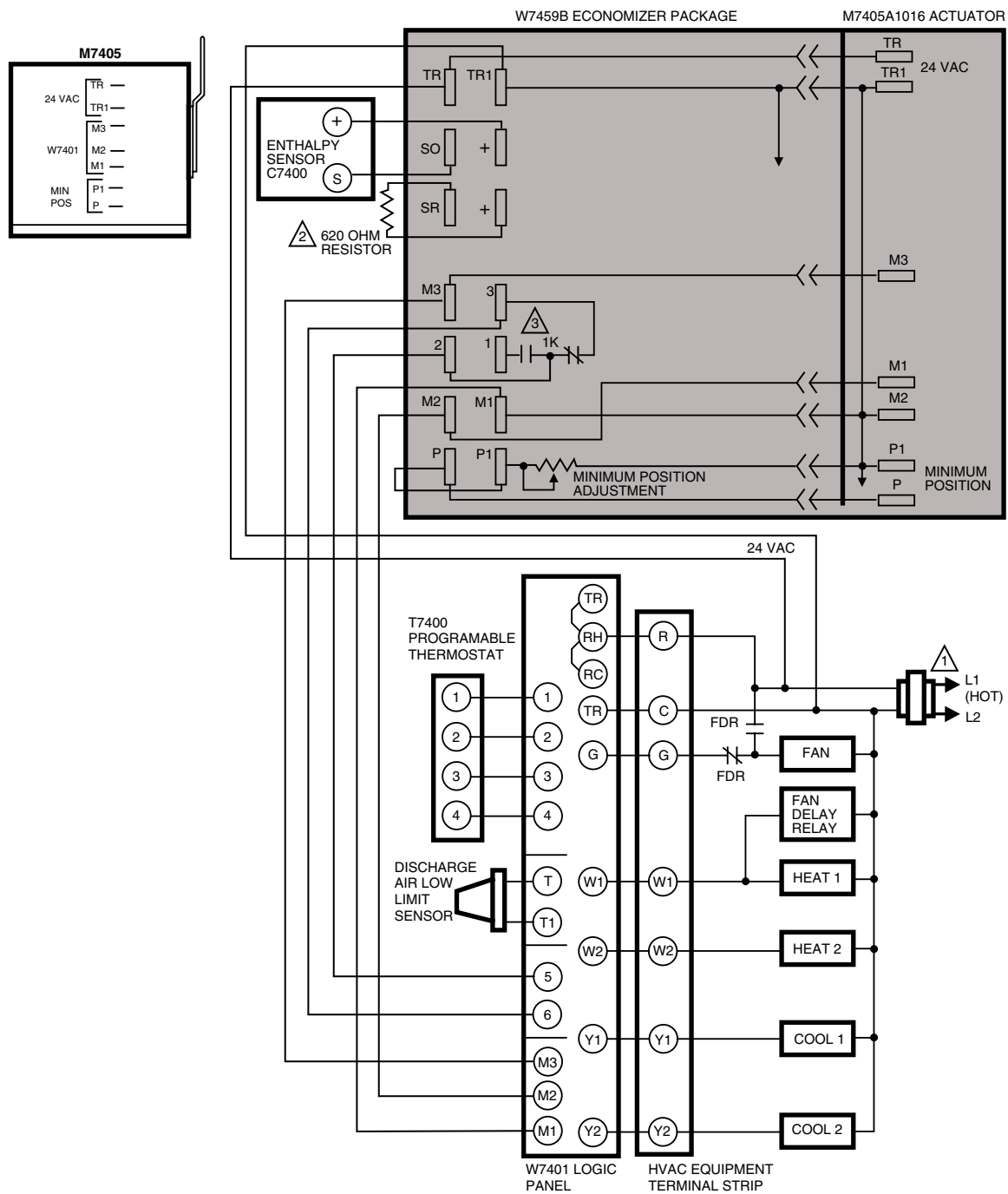
Fig. 10—M7415A Damper Actuator used in one-stage cooling system with differential enthalpy changeover and with W7459A Economizer.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 MOTOR SPRING-RETURNS CLOSED WHEN FAN IS NOT RUNNING.
- 3 ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER AND ACTUATOR.
- 4 1S IS AN ELECTRONIC SWITCH, WHICH CLOSURES WHEN POWERED BY A 24 VAC INPUT.
- 5 RELAYS 1K AND 2K ACTUATE WHEN THE OUTDOOR AIR ENTHALPY IS HIGHER THAN THE ENTHALPY SET POINT A-D.
- 6 FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY WHEN A C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.

M3865

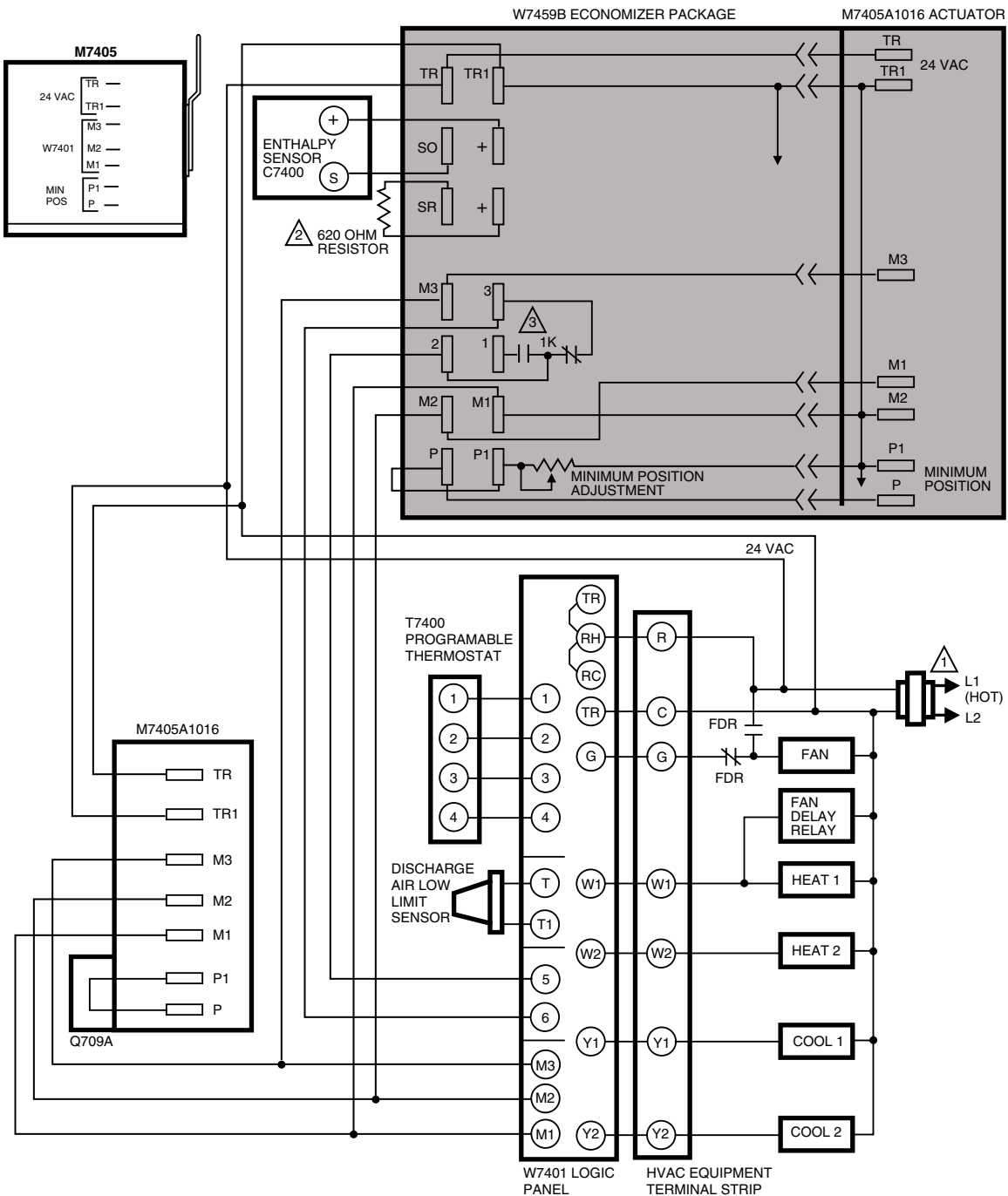
Fig. 11—M7405A Damper Actuator used in two-stage cooling system with single enthalpy changeover and with W7459B Economizer Package.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF A C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
- 3 RELAY 1K ACTUATES WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SET POINT A-D.

M3863

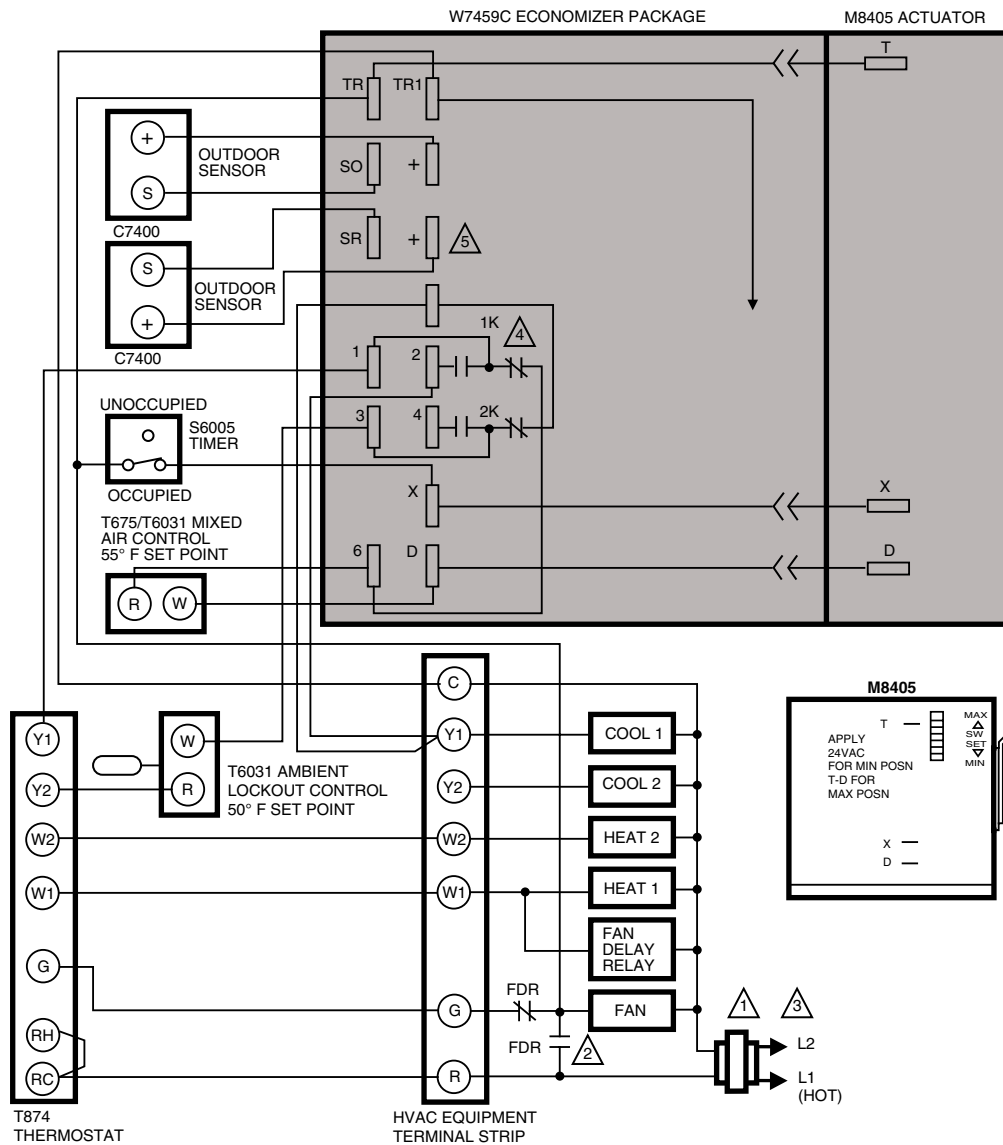
Fig. 12—Two parallel drive M7405A Damper Actuators used in two-stage cooling system with single enthalpy changeover and with W7459B Economizer.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF A C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
- 3 RELAY 1K ACTUATES WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SET POINT A-D.

M3862

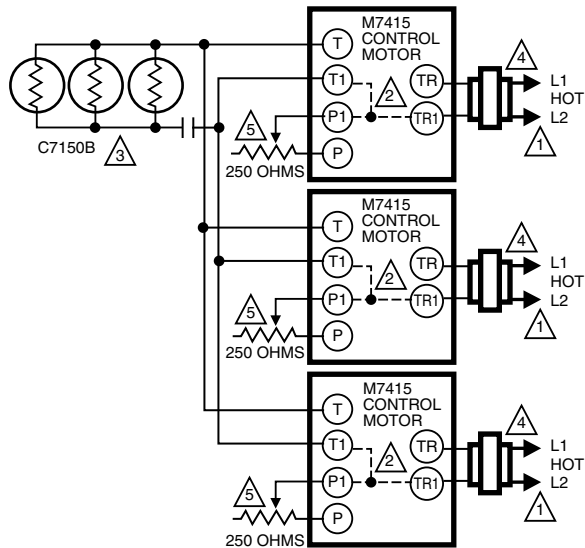
Fig. 13—M8405A Damper Actuator used in two-stage cooling system with single enthalpy changeover and with W7459C Economizer.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 MOTOR SPRING-RETURNS CLOSED WHEN FAN IS NOT RUNNING.
- 3 ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER AND ACTUATOR.
- 4 RELAYS 1K AND 2K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SET POINT A-D.
- 5 FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF A C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.

M3865

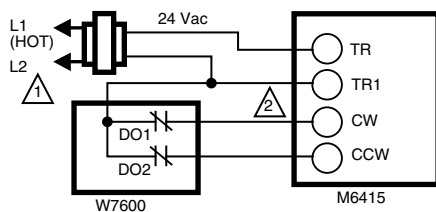
Fig. 14—Three M7415A,B Damper Actuators connected in parallel.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 DOTTED LINE REPRESENTS INTERNAL CONNECTIONS OF THE M7415 ACTUATOR.
- 3 FOR QUANTITY N MOTORS, QUANTITY N C7150B SENSORS ARE REQUIRED. MOUNT INSIDE DUCT.
- 4 A SINGLE TRANSFORMER MAY BE USED. MAKE SURE THAT ACTUATORS ARE WIRED IN PHASE TR TO TR AND TR1 TO TR1.
- 5 250 OHMS OR GREATER PROVIDE FULL CLOSE OF ACTUATOR. 0 OHMS PROVIDES FULL OPEN OF ACTUATOR.

M3861

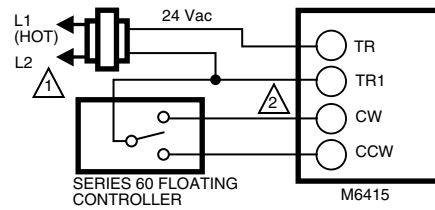
Fig. 15—M6415 Damper Actuator controlled by W7600 DDC System.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 DO NOT JUMPER POWER ACROSS TR1, CW, CCW. JUMPER ACROSS TR1, CCW, CW WILL RESULT IN ERRATIC CONTROL.

M1542

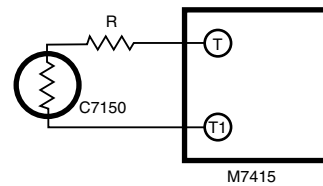
Fig. 16—M6415 Damper Actuator used with spdt floating controller.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 DO NOT JUMPER POWER ACROSS TR1, CW, AND CCW. JUMPER WILL RESULT IN ERRATIC AND POOR CONTROL.

M1543

Fig. 17—Increasing C7150B setpoint.



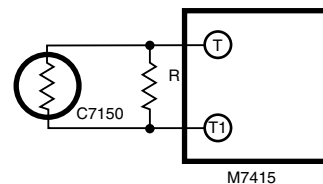
M7415

RESISTOR VALUE	C7150B SETPOINT
681 OHMS	54.5°F TO 61.5°F
2760 OHMS	68.4°F TO 80.1°F
3650 OHMS	87.4°F TO 110.3°F
4420 OHMS	104.7°F TO 150°F
4750 OHMS	116°F TO 194°F
4870 OHMS	120°F TO 300°F
NO RESISTOR	50° F TO 56° F

USE 1%, 1/8 W OR HIGHER RESISTOR

M1544A

Fig. 18—Decreasing C7150B setpoint.



M7415

RESISTOR VALUE	C7150B SETPOINT
18.2K OHMS	36° F TO 44° F
24K OHMS	39.5° F TO 47° F
30K OHMS	42° F TO 49° F
NO RESISTOR	50° F TO 56° F

USE 1%, 1/8 W OR HIGHER RESISTOR

M1545A

Fig. 19—M8415A Damper Actuator two-position wiring connections.

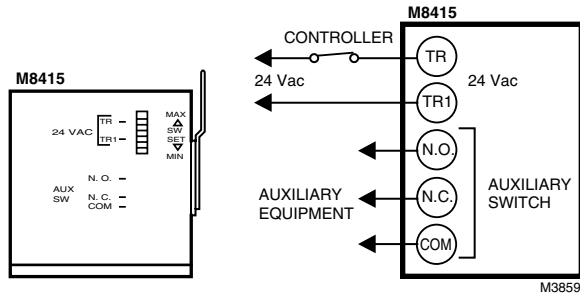
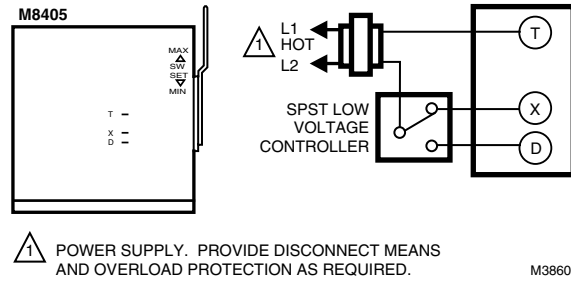


Fig. 20—M8405 Damper Actuator three-position wiring connections.



Settings and Adjustments

ADJUSTING MINIMUM POSITION (Ventilation)

M7405 and M7415 Actuators are adjusted for desired minimum position using a Q709 Actuator Mounted Minimum Position Potentiometer and/or a remote S963B 1136 Manual Potentiometer. M8405 Actuators have an integral thumbwheel for minimum position adjustment.

M7405 Minimum Position Adjustment.

1. Run motor to fully closed position and disconnect 24 Vac from terminals TR and TR1.
2. Connect minimum position potentiometer to terminals P and P1, and connect a jumper across terminals M1 and M3 (M2 is not connected).
3. Reconnect 24 Vac to terminals TR and TR1 and adjust potentiometer for desired minimum position.
4. When Q709A Actuator Mounted Minimum Position Potentiometer is used and a remote potentiometer is *not* connected in series, jumper terminals P and P1 on the Q709A.

M7415 Minimum Position Adjustment

1. Run actuator to fully closed position and disconnect 24 Vac from terminals TR and TR1.
2. Connect minimum position potentiometer to terminals P and P1 (T and T1 are disconnected).
3. Reconnect 24 Vac to terminals TR and TR1 and adjust potentiometer for desired minimum position.
4. When Q709A Actuator Mounted Minimum Position Potentiometer is used and a remote potentiometer is *not* connected in series, jumper terminals P and P1 on the Q709A.

M8405 Minimum Position Adjustment

1. Connect 24 Vac to actuator at terminals T and X (D is not connected).
2. Adjust thumbwheel on actuator for desired minimum position.

DISCHARGE AIR TEMPERATURE SETPOINT ADJUSTMENT—M7415 ONLY

The C7150B maintains the discharge or mixed air duct temperature between 50° F and 56° F. When the mixed air discharge temperature is outside the 50 to 56° F range, the actuator will proportion open or closed until the temperature returns between 50 and 56° F.

This temperature range can be adjusted either up or down by wiring a resistor in series or in parallel with the C7150B, depending on the application. See Figs. 17 and 18 for explanation.

AUXILIARY SWITCH ADJUSTMENT—M8415 ONLY

The internal auxiliary switch can be adjusted to operate at any point between 5° and 65° of actuator stroke. The actuator and auxiliary switch must be connected in the system, as shown in Fig. 9, before the switch can be adjusted as follows:

1. Run actuator from fully closed toward open and note position of crank arm when auxiliary device is first energized.

NOTE: Contact closure can be verified by continuity check of the auxiliary switch circuit.

2. To obtain auxiliary switch closure at the point desired, set the auxiliary adjustment knob (Fig. 19) for desired position of crank arm where auxiliary device is energized.

Operation

M6415 SPDT FLOATING CONTROL

A spdt floating controller or DDC system can be used to control the M6415. The M6415 will hold a given position or can be driven closed or open. On a loss of power, the output shaft is spring-returned to the closed position (cw or ccw depending on the model). Typical wiring diagrams for the M6415 are shown in Figs. 15 and 16.

M7405 DIRECT DIGITAL CONTROL ACTUATOR

Single M7405 Actuator accepts digital input directly from T7400/W7401 Programmable Commercial Thermostat System or T7400/W7411 Programmable Commercial Heat Pump Control System. See Fig. 3.

During the occupied period when outdoor air temperature or enthalpy conditions are low, the W7401/W7411 will control M7405 operation from the digital economizer output on a call for cooling based on the T7400 programmed economizer setpoint. The M7405 actuator is controlled open proportionally. If the current position does not satisfy the space demand, the M7405 actuator will be driven open one more position. Control change is one position per minute.

If the fully open M7405 Actuator cannot satisfy the space demand, mechanical cooling is sequenced on, controlled by the T7400 programmed occupied cool setpoint. With low enthalpy conditions, the M7405 Actuator must drive fully open before mechanical cooling can operate. On initial power-up or after a power failure, the delay is limited to about six minutes.

During the unoccupied period, the M7405 Actuator will override minimum position setting and drive fully closed. It will remain fully closed unless a call for cooling occurs when outdoor air temperature or enthalpy conditions are low. Under these conditions, the W7401/W7411 will control M7405 operation from the digital economizer output based on a setpoint fixed at 3° F [2° C] below the unoccupied cooling set point. When outdoor air temperature or enthalpy conditions are high, economizer operation is locked out and mechanical cooling is controlled to the T7400 programmed unoccupied cooling setpoint.

When in heating operation, or when the outdoor air temperature or enthalpy conditions are high during cooling operation, the M7405 Actuator is held at the minimum position.

M7415 ELECTRONIC PROPORTIONAL ACTUATOR

Single M7415 Actuator accepts thermistor sensor input from C7150B mounted in discharge or mixed air duct. See Figs. 5 and 6.

During the occupied period, on a call for cooling, when outdoor air temperature or enthalpy conditions are low, the M7415 economizer actuator will proportion to maintain between 50° F and 56° F at thermistor sensor.

If the mixed or discharge temperature is above 56° F, M7415 Actuator will open to admit additional outdoor

air until the temperature returns to the 50° to 56° F range. If the mixed or discharge air temperature is below 50° F, the actuator will proportion closed, shutting the outdoor air damper until the temperature returns to the 50° to 56° F range. During the occupied period, the actuator will not close past the minimum position.

If the fully open M7415 Actuator cannot satisfy the space demand, mechanical cooling is sequenced on.

During the unoccupied period, the M7415 Actuator will override minimum position setting and drive fully closed. On a loss of power, the actuator will spring return fully closed.

When in heating operation, or outdoor air temperature or enthalpy conditions are high, economizer operation is locked out, and M7415 Actuator is held at minimum position.

The staging relay is used when the first stage compressors must provide mechanical cooling when assisting the economizer.

The staging relay can be omitted when the second stage compressors can be used to assist the economizer with mechanical cooling.

The M7415 Actuator can also accept the Q769A 6 to 9 volt adapter. The Q769A is factory calibrated so that the motor drives open from the closed position at 6.2 Vdc. A nominal M7415A will drive closed from the open position at 8.8 Vdc.

If terminals P and P1 are jumpered, the M7415 will drive fully open. However, if terminals P and P1 are left open, the M7415 will drive fully closed. The M7415 minimum position adjustment will drive the motor open when the resistance across P and P1 is minimal. Increasing the amount of resistance across these terminals drives the actuator closed.

M8405 THREE-POSITION ACTUATOR

An spst low voltage controller is used to control the M8405 Actuator. See Figs. 8 and 9.

- Fully open—when controller is made to provide 24 Vac to D and T, actuator is energized and runs fully open.
- Fully closed—when controller circuit opens, power is removed from terminals D and T, and the actuator spring returns to the fully closed position.
- Mid-position—when controller is made to provide 24 Vac to T and X, actuator is energized to run to the adjustable mid-position (minimum position).

Adjustable minimum position can be reached from either the fully closed or fully open position. From fully closed, the actuator will drive open to minimum position; from fully open, the actuator spring returns to minimum position.

M8415 TWO-POSITION ACTUATOR

In an operational circuit an spst low voltage controller is wired in series with the actuator circuit. See Fig. 19. When the controller switch closes, the actuator is energized and runs fully open. When the controller opens, the actuator spring returns closed.

Checkout

Operate the actuator through its complete open-close stroke. If necessary, release one of the previously tightened linkage connections to prevent damage. Check for proper operation, making sure that the linkage does not bind and that the actuator travels smoothly throughout its cycle from fully open to fully closed. Tables 1 to 4 describe how to drive these actuators fully open and fully closed (with power connected). If there is an excess length of linkage rod, cut it to size. Make necessary minor adjustments until desired operation is obtained, then tighten all nuts and set screws. This motor checkout assures that:

1. The actuator operates the load.
2. The actuator responds properly to the controller.
3. There is no binding of the linkage or motor stalling at any point of travel.

If the actuator does not operate properly, check for proper voltage or mechanical binding in the linkage or damper.

If questions arise regarding this product, contact your distributor or local Honeywell representative.

TABLE 1—M6415 CHECKOUT.

Model	Drive Motor Open	Drive Motor Closed	Spring-Return
M6415A,C	Power to TR and TR1, jumper CCW to TR1	Power to TR and TR1, jumper CW to TR1.	Disconnect power at TR and TR1.
M6415B,D	Power to TR and TR1, jumper CW to TR1.	Power to TR and TR1, jumper CCW to TR1.	Disconnect power at TR and TR1.

TABLE 2—M7405 CHECKOUT.

M3-M1 Connection	M2-M1 Connection	P-P1 Connection	
		Open	Jumper
Open	Open	Drives closed	
	Jumper	Drives open	
Jumper	Open	Drives closed	Drives open
	Jumper	Holds	

TABLE 3—M7415 CHECKOUT.

T-T1 Connection	P-P1 Connection	
	Open	Jumper
Open	Drives closed	Drives open
Jumper	Drives open	Drives open

TABLE 4—M8405 CHECKOUT.

Drive Motor Open	Drive Motor Closed	Spring-Return
Power to T and D	(Spring-Return Only)	Disconnect power at T and D

TABLE 5—M8415 CHECKOUT.

Drive Motor Open	Drive Motor Closed	Spring-Return
Power to TR and TR1	(Spring-Return Only)	Disconnect power at TR and TR1

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