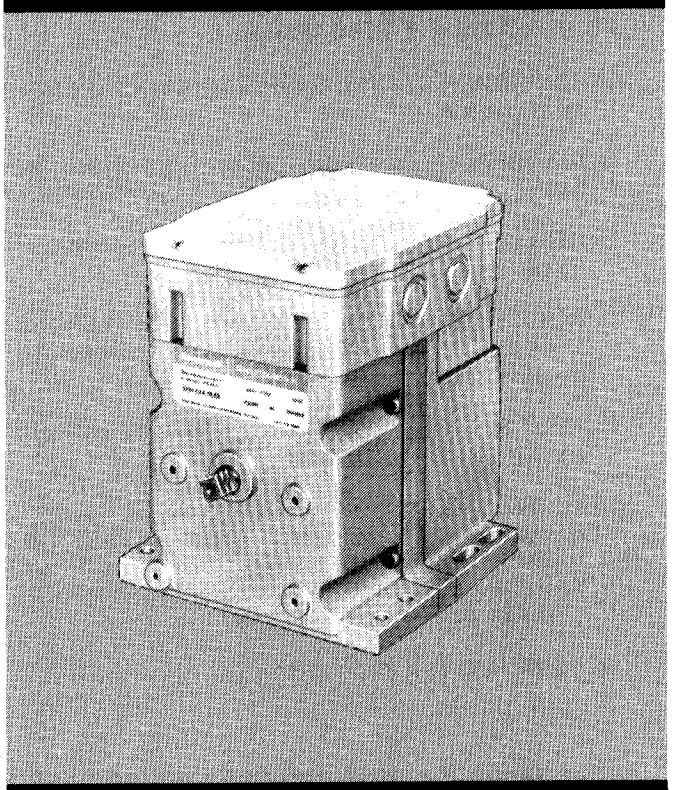
Honeywell

MODUTROL IV MOTORS



M7964A,B,C

THE M7964A,B,C ELECTRONIC MOTORS ARE USED IN PACKAGED MULTIZONE CONTROL SYSTEMS TO OPERATE ZONE DAMPERS.

- ☐ Replacement for M734A,B,C motors.
- ☐ Operates in response to signal from 2-wire, thermistor-type thermostat (T7047A).
- ☐ M7964A and M7964C drive counterclockwise and M7964B drives clockwise (as viewed from power end) on a fall in temperature (increase in thermostat resistance).
- ☐ M7964A and M7964C are available with 90° fixed stroke, M7964B available with 90° and 160° fixed stroke.
- ☐ Available for use on 120 Vac input.
- ☐ For W936 system applications, appropriate zone damper must be full open before load signal is sent to W936 Central Processor.
- ☐ Motor control circuit, when connected with other zone motors, ensures that only load signals from zones of greatest heating and greatest cooling demand will reach central processor.
- ☐ Solid state control circuit and motor drive circuit.
- ☐ Die-cast magnesium housing.
- ☐ Oil immersed motor and gear train.
- ☐ All models include integral transformer that provides 24V power for control and sensor circuits.
- ☐ Motor crank arm accessory available.
- ☐ Models available with plug-in connectors for thermostat power supply and logic circuit.
- ☐ Adaptor bracket for matching shaft height of older motor (except M7964A) is standard.

S.M.
Rev. 5-91

Form Number 63-2227—1

SPECIFICATIONS

MODEL	STROKE (DEG)	TIMING (SEC)	VOLTAGE (V)	CURRENT (AMPS)	POWER (WATTS)	THROTTLING RANGE (°F)	WIRING CONNECTIONS	ELECTRICAL NORMAL POSITION
M7964A1001	90	30	120	0.20	19	2.5	plugs	N.C.[a]
M7964B1009	90	30	120	1.0	19	1.0	screw terminals	N.O.[b]
M7964B1017	160	60	120	1.0	19	1.0	screw terminals	N.O.[b]
M7964C1007	90	30	120	0.20	19	1.0	plugs	N.C.[a]
M7964C1015	90	30	120	0.20	19	1.0	screw terminals	N.C.[a]

[a]Normally Closed—Motor rotates counterclockwise with increase in resistance signal.

[b]Normally Open—Motor rotates clockwise with increase in resistance signal.

POWER CONSUMPTION: 19 watts.

WIRING CONNECTIONS: Screw terminals or quick connects, per tab.

MOTOR STROKE: Fixed 90 or 160 degrees of rotation, per tab.

MOTOR TIMING: 30 sec. nominal for 90 degree stroke or 60 sec. nominal for 160 degree stroke.

THROTTLING RANGE: Nonadjustable: 2.5° F [1.5° C] or 1° F [0.6° C] temperature change in zone causes motor to operate through full stroke.

OUTPUT SIGNAL RANGE: 1.0 to 12-15 Vdc (heating or cooling). Applies to M7964B, C only.

SENSOR: T7047A Electronic Thermostat.
- Resistance—1715 ohms with set point at 70° F ambient.
- Sensitivity—15 ohms per degree F [0.6° C]. Resistance increases as temperature falls.

HOUSING: Die-cast magnesium.

MOTOR TORQUE: 35 pound-inches [3.96 N-m].

MAXIMUM DEAD WEIGHT LOAD ON SHAFT:
Auxiliary end—100 pounds [45.4 kilograms].
Power end—100 pounds [45.4 kilograms].

SHAFT: Double-ended, 3/8 in. [9.5 mm] square, 3/8 in. [9.5 mm] long.

AMBIENT TEMPERATURE RANGE: Minus 40 to plus 150° F [minus 40 to plus 66° C] at 25 percent duty cycle.

DIMENSIONS: See Fig. 1.

ACCESSORIES:
- 106013A Crank Arm Assembly.
- 221455A Motor Crank Arm—Infinitely adjustable. Can rotate through downward position and clear base of motor without requiring use of adapter bracket.
- 220741A Screw Terminal Adapter—converts the Standard quick-connect terminals to screw terminals.
- Transformers—mounted internally, provide 24 Vac power to motor
  - 198162JA—24 Vac; 50/60 Hz (for electrical isolation).
  - 198162EA—120 Vac; 50/60 Hz.
  - 198162GA—220 Vac; 50/60 Hz.
  - 198162AA—120/208/240 Vac; 50/60 Hz.

ORDERING INFORMATION

WHEN PURCHASING REPLACEMENT AND MODERNIZATIN PRODUCTS FROM YOUR AUTHORIZED DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE SHEETS FOR COMPLETE ORDERING NUMBER. OR SPECIFY—

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 RESIDENTIAL AND BUILDING CONTROLS DIVISION SALES OFFICE (CHECK WHITE PAGES OF PHONE DIRECTORY).**
2. **RESIDENTIAL AND BUILDING CONTROLS DIVISION CUSTOMER SATISFACTION. HONEYWELL INC., 1885 DOUGLAS DRIVE NORTH MINNEAPOLIS, MINNESOTA 55422-4386 (612) 542-7500**

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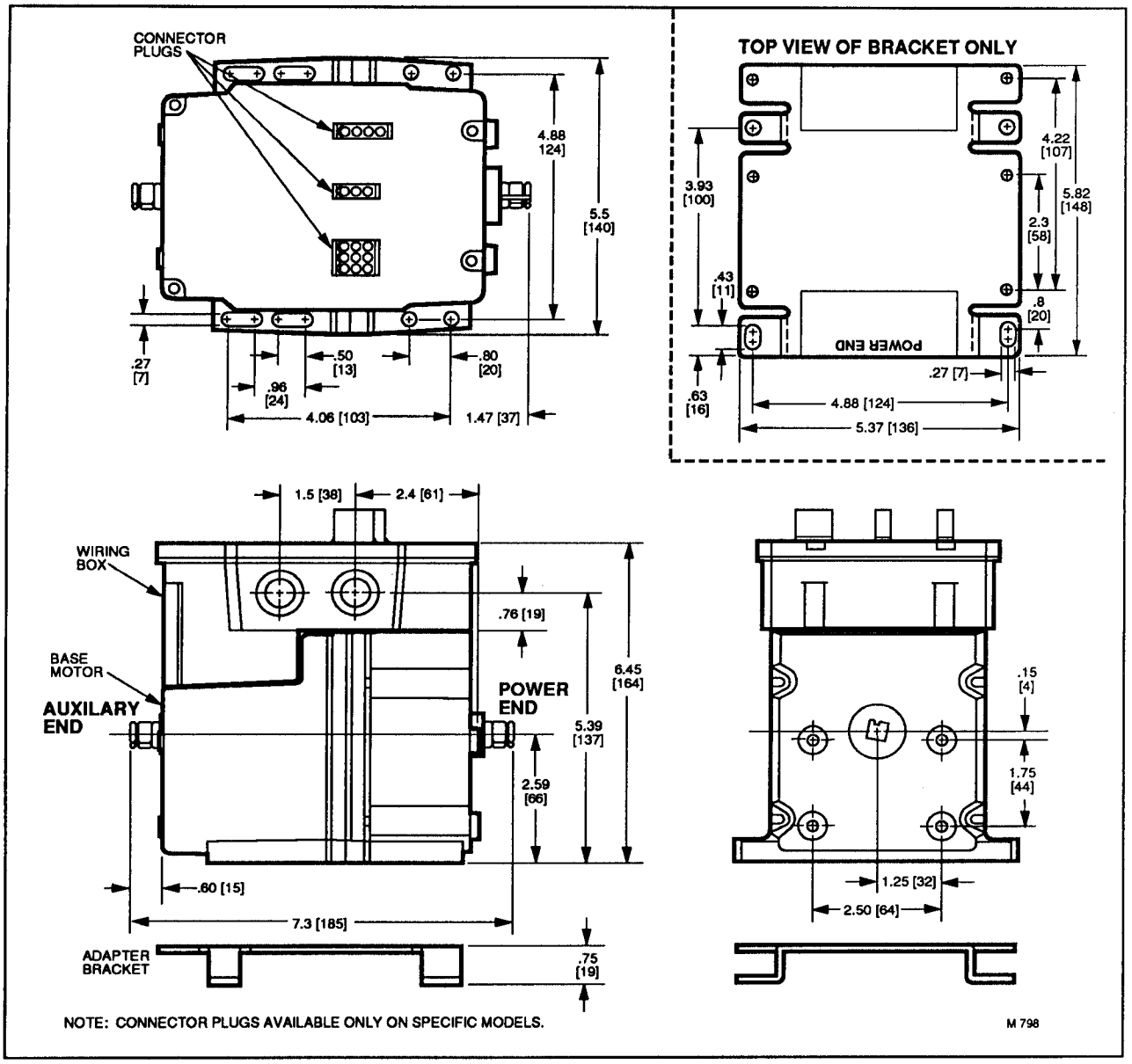

FIG. 1—M7964A,B,C APPROXIMATE DIMENSIONS, IN INCHES [MILLIMETRES SHOWN IN BRACKETS].

INSTALLATION

CAUTION

1. Only a trained, experienced serviceman should install or service this device.
2. Before starting the installation, disconnect the power supply to prevent electrical shock or equipment damage.
3. Do not attempt to turn the motor shaft with a wrench or by hand. Damage to the gear train may result.
4. This device must be installed where the temperature will remain between -40° and +150° F [-40 and +66° C].

LOCATION

Install the Modutrol motor in any location except where excessive moisture, acid fumes, or other deteriorating vapors might attack the exposed metal parts of the motor, or where escaping gases or other explosive mixtures might create a fire hazard.

Choose a location which allows enough clearance for servicing.

CAUTION

Do not attempt to remove mounting feet from M7964. Installation must be arranged to accept mounting feet as provided from the factory. Removal of feet will void warranty and cause motor irreparable damage

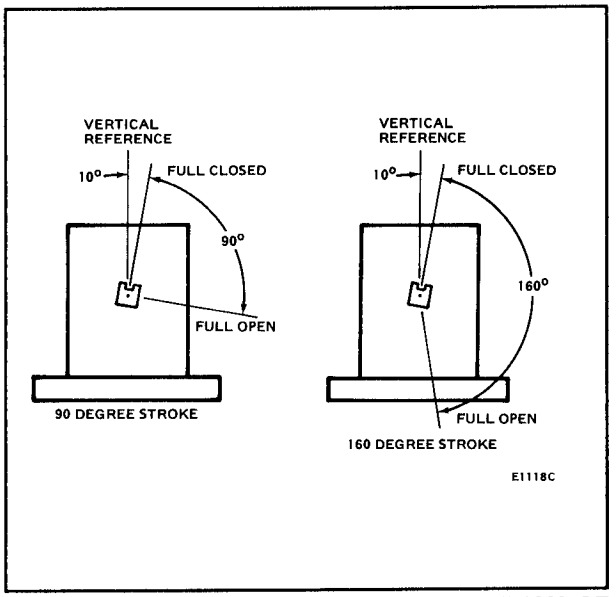

FIG. 2—FULL COUNTERCLOCKWISE POSITION OF THE MOTOR SHAFT, AS VIEWED FROM THE POWER END.

MOUNTING

Always install motors with the crankshaft horizontal.

Mounting flanges extending from the bottom of the motor housing are drilled for 1/4 inch [6.4 mm] machine screws or bolts. DO NOT remove mounting feet.

All M7964 motors are shipped from the factory in closed position (at the limit of counterclockwise rotation as viewed from the power end of the motor), as shown in Fig. 2.

ADAPTER BRACKET

The 220738A Adapter Bracket, positioned between the motor and the equipment, raises the shaft height of M7964 motors by 0.75 inch to match that of the M734 motors. This is required on all valve linkage applications, Q607 External Auxiliary Switch applications, and on some damper linkage applications (either to provide clearance for the crank arm to rotate through the downward position, or to allow the damper linkage to reach the shaft).

To mount the motor with the bracket:

1. Mount the bracket to the equipment with existing or standard length bolts using a socket or nut driver.
2. Mount the motor to the bracket using the short bolts (provided in the box) and threaded holes in the bracket (see Fig. 3).

NOTE: Additional provisions may be necessary to match the shaft height of the M734A. The M734A motor was mounted on a bracket which increased the normal shaft height of M734 type motors by approximately 3/8", otherwise the damper linkage will have to be adjusted to the new shaft location.

DAMPER LINKAGES

A 220738A Adapter Bracket is packed with M7964 motors. Use of this bracket is optional for many damper applications. The bracket is needed in damper applica-

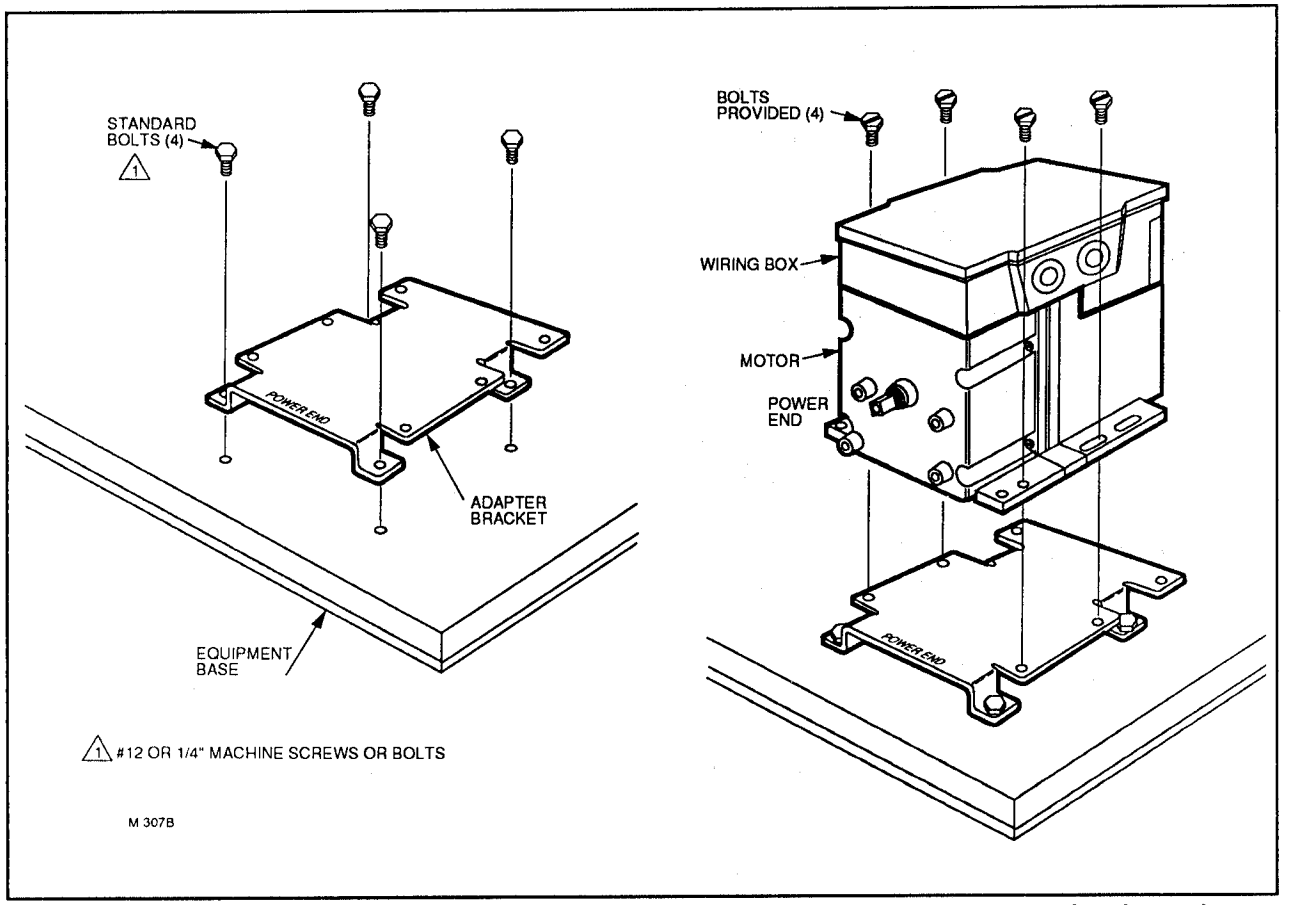

FIG. 3—MOUNTING THE MOTOR WITH AN ADAPTER BRACKET. The bracket is first mounted to the equipment with standard bolts. The motor is then mounted to the bracket using the bolts provided with the bracket, which thread into the threaded bracket holes.

tions requiring the crank arm to rotate through the bottom plane of the actuator. If the bracket is not used in a replacement application, the damper linkage will have to be adjusted to the new shaft location.

The motor comes without a crank arm. The crank arm is included in the Q605 linkage or may be ordered separately (see Accessories).

For detailed instructions on the assembly of specific linkages, refer to the instruction sheet packed with each linkage. In general, however, check the following points of operation when installing a motor and linkage.

1. Linkages for louver type dampers should be adjusted so that the damper moves through only the maximum required distance when the motor moves through its full stroke.
2. With modulating control, maximum damper opening should be no more than 60°. Little additional airflow is provided beyond this point.
3. The motor must be stopped at the end of its stroke by the limit switch and must not be stalled by the damper or valve. The motor will be damaged if it is not permitted to complete its full stroke.
4. Do not exceed the motor ratings in any installation.
5. Do not turn motor shaft manually or with a wrench—this will damage the motor.

WIRING

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

All wiring must comply with local codes and ordinances. See Fig. 4 for typical connections to the multizone system for models without plug-in connectors. See Figs. 5 and 6 for connections for models with plug-in connectors. Make certain that the voltage and frequency stamped on the motor correspond to the characteristics of the power supply.

Do not ground the T, T, H, C, or N terminals as damage to the motor circuit may result.

See Fig. 5 for connecting motor with plug-in connectors to the multizone system.

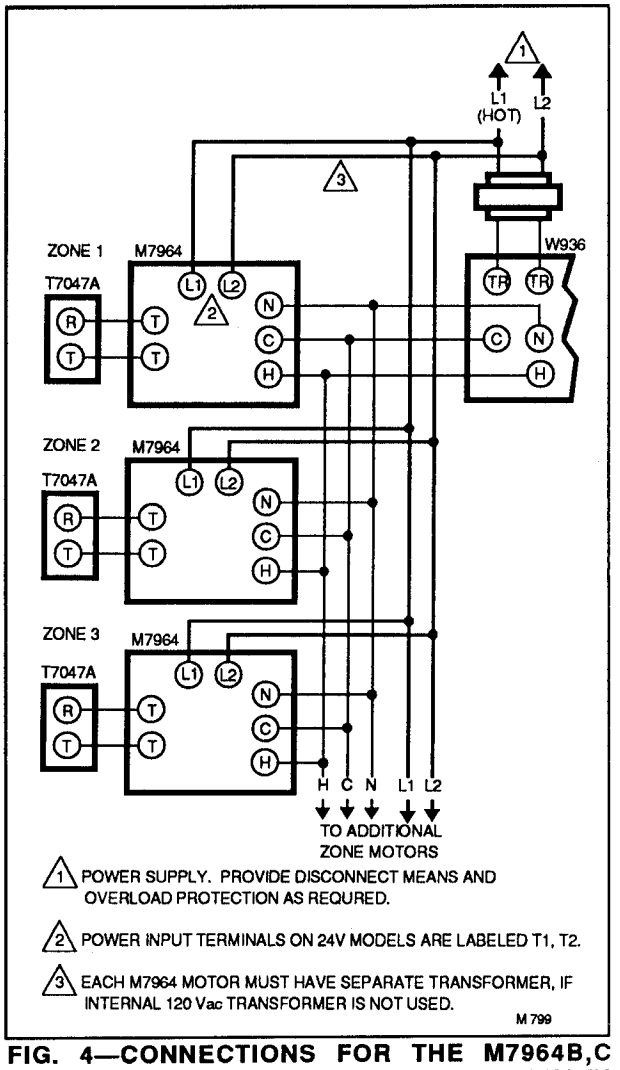

FIG. 4—CONNECTIONS FOR THE M7964B,C MODUTROL MOTORS WITHOUT PLUG-IN CONNECTORS.

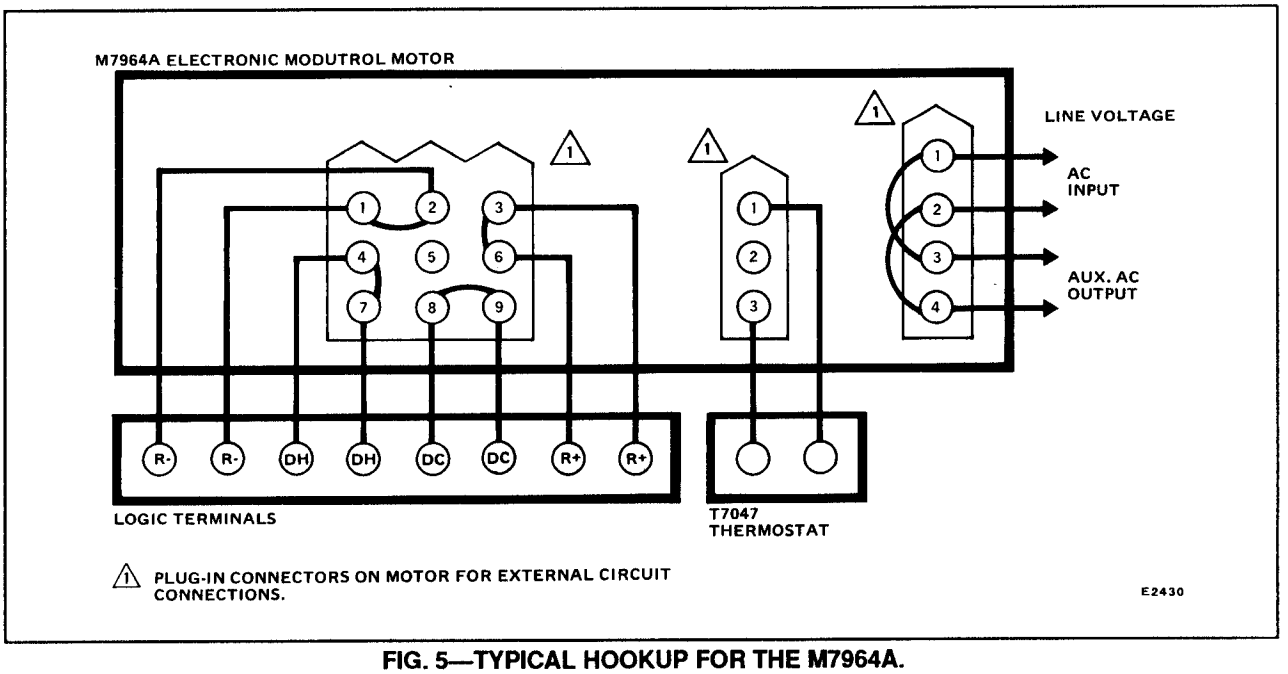

FIG. 5—TYPICAL HOOKUP FOR THE M7964A.

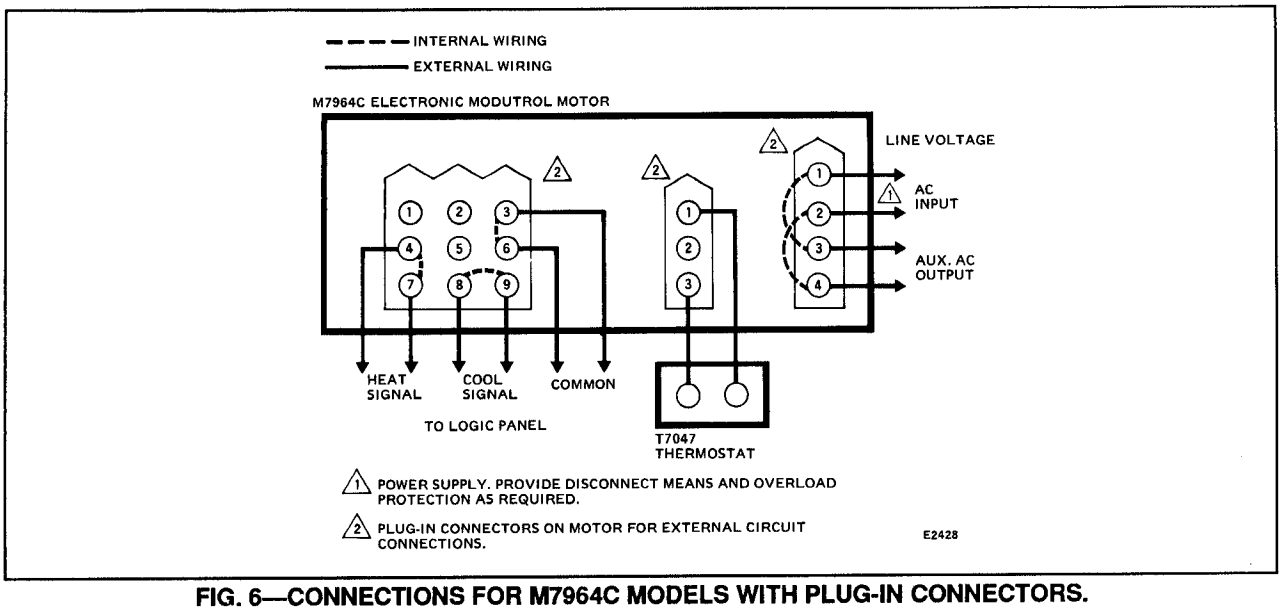

FIG. 6—CONNECTIONS FOR M7964C MODELS WITH PLUG-IN CONNECTORS.

OPERATION AND CHECKOUT

OPERATION

M7964A

The electronic control circuit within the M7964A is designed to be used with the T7047A Electronic Thermostat. The resistance of the thermostat, when set at room ambient, is 1715 ohms. With an input of 1700 ohms, the motor assumes a position approximately mid-stroke.

As the temperature rises, thermostat resistance decreases, causing the motor to open (clockwise rotation of the shaft as viewed from the power end).

M7964B,C

A demand signal from the T7047A zone thermostat causes the motor to position the hot and cold deck zone dampers to meet the zone requirement. If the motor reaches the limit of rotation without satisfying zone demand, a load signal produced by the motor is sent to the W936 Central Processor. The W936 then sequences heating or cooling equipment as required. If more than one motor is calling for heating or cooling, circuits in the zone motors ensure that only the largest signal will be presented to the W936. Depending on load requirements in the various zones, both a heating and a cooling signal may be sent to the W936 at the same time.

As the zone requirement is satisfied, the M7964B,C signal to the W936 Central Processor decreases and the heating or cooling equipment begins to sequence off. When zone temperature reaches the set point, the M7964B,C motor is positioned approximately midstroke.

CHECKOUT

CAUTION

Motor must be powered to make these checks. To avoid electrical shock, BE SURE TO DISCONNECT POWER BEFORE MAKING ANY TERMINAL CONNECTIONS.

M7964A

After the installation is completed, check for correct operation of the M7964A and connected damper. The motor and thermostat have a throttling range of 2.5° F. Adjusting the thermostat set point 2° F above the room ambient will run the motor full counterclockwise ↶ as viewed from the power end. Adjusting the thermostat set point 2° F below the room ambient will run the motor full clockwise ↷ as viewed from the power end.

M7964B,C

1. Remove power, then disconnect wires from terminals T,T,H,C, and N on the motor. Connect a dc voltmeter to terminals H (+) and N (-),
2. Restore power.
3. With terminals T and T open, simulating a call for heat, the M7964B will run to the full clockwise ↷ position and the M7964C will run to the full counterclockwise ↶ position, both as viewed from the power end of the motor. The voltage across terminals H and N should be 12 to 15 Vdc.
4. Move the voltmeter to terminals C (+) and N (-). The voltage should be less than 3.9 Vdc.
5. Connect a 1000 ohm resistor between terminals T and T. The M7964B will run to the full counterclockwise ↶ position and the M7964C will run to the full clockwise ↷ position, both as viewed from the power end of the motor. The voltage across terminals C (+) and N (-) should be 12 to 15 Vdc.
6. Move the voltmeter to terminals H (+) and N (-). Voltage should be less than 3.9 Vdc.
7. Remove jumper and reconnect motor.

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