

M9481, M9484, M9491, M9494 Modutrol IV™ Motors

SPECIFICATION DATA



APPLICATION

M9481, M9484, M9491 and M9494 Modutrol® Motors are low voltage, reversing proportional control actuators for valves, dampers and auxiliary equipment. They are especially designed for commercial or industrial oil or gas burner control systems.

FEATURES

- Replace M941 Motors.
- Oil immersed motor and gear train provide reliable performance and long life.
- Wiring box provides NEMA 3 weather protection.
- Quick-connect terminals standard—screw terminal adapter available.
- Adapter bracket for matching shaft height of older motors is standard with replacement motors.
- Die-cast aluminum housing
- Field addable interface modules can be mounted in wiring box to upgrade actuator to Series 70 (electronic) Control.
- Models available with tapped output shaft.



SPECIFICATIONS

M9481D,E,F M9484D,E,F M9491D M9494D	
Control Type 94 is Series 90	Suffix Letter D: Adjustable stroke (90° to 160°), No auxiliary switches E: Adjustable stroke (90° to 160°), 1 auxiliary switch F: Adjustable stroke (90° to 160°), 2 auxiliary switches
Power Rating 8 is high torque: 150 lb-in. at standard timing (60 sec for 160°) 9 is high torque: 300 lb-in. at 2 or 4 min timing	
Output Drive 4 is dual-ended shaft, non-spring return 1 is single-ended shaft, non-spring return	

NOTE: Some motors furnished to equipment manufacturers have no adapter bracket, a single-ended shaft and/or no wiring box.

Electrical Ratings:

	Voltage (V at 50/60 Hz)	Current Draw (A)	Power Consumption (W)
Without Transformer ^a	24	0.8	18
With Internal Transformer	120	0.24	23
	208	0.14	23
	240	0.12	23

^aInternal transformer can be field added.

Controller Type:

Series 90 Control Circuit: 135 ohm, Series 90 proportioning controller. Series 90 high or low limit controller with manual minimum position potentiometer (with a combined total resistance of up to 500 ohms) can also be used in the control circuit.

Motor Rotation:

Normally closed. (The normal position is the position the motor assumes with controller disconnected.) The closed position is the limit of counterclockwise rotation as viewed from the power end of the motor. Motor opens clockwise (as viewed from the power end). Motors are shipped in the closed position.

Stroke:

Field adjustable from 90° to 160°. Start position of shaft changes with adjustment of stroke. (Midpoint of stroke remains fixed as stroke is adjusted.) Stroke is adjusted using cams located in wiring compartment. Motors are shipped with stroke set at 90°.

Maximum Damper Rating:

Motor Torque lb-in.	B dim	
	in.	mm
75	100	2540
150	202	5131
300	258	6553

Dead Weight Load On Shaft:

Power or Auxiliary End: 200 lb (90.8 kg) maximum.
Maximum Combined Load: 300 lb (136 kg).

Ambient Temperature Ratings:

Maximum: 150°F (66°C) at 25% duty cycle.
Minimum: Minus 40°F (-40°C).

Crankshaft: 3/8 in. (9.5 mm) Square.

M9484, M9494 have dual-ended shaft.
M9481, M9491 have single-ended shaft.

Auxiliary Switch Ratings (Amperes):

M94XXE has 1 spdt switch.
M94XXF has 2 spdt switches.

One Contact ^a	120V	240V
Full Load	7.2	3.6
Locked Rotor	43.2	21.6

^a40 VA pilot duty, 120/240 Vac on opposite contact.

Dimensions:

See Fig. 1.

Underwriters Laboratories Inc. Listed:

File No. E4436, Guide No. XAPX.

Canadian Standards Association Certified:

General Listing File No. LR1620, Guide No. 400-E.

Timing And Torque:

NOTE: Motors with 2 min. timing at 90° stroke or 4 min. timing at 160° stroke contain on-off pulsing circuitry to achieve timing. Intermittent operation is normal.

Timing		Torque in lb-in (N•m)	
90° Stroke Motors	160° Stroke Motors	Normal Running	Breakaway Torque ^a
15 sec	30 sec	75 (8.5)	150 (17.0)
30 sec	1 min	150 (17.0)	300 (34.0)
1, 2 min ^b	2, 4 min ^b	300 (34.0)	600 (68.0)

^a Breakaway torque is the maximum torque available to overcome occasional large loads such as a seized damper or valve. *Motor must not be used continuously at this rating.*

^b Stalling of 4 minute motor may damage drive shaft.

Accessories:

- ES650117 Explosion-proof Housing: Encloses motor for use in explosive atmospheres. Not for use with Q601, Q618, and Q455 Linkages. Order from Nelson Electric Co. Requires Honeywell 7617DM Coupling.
- Q607 External Auxiliary Switch: Controls auxiliary equipment as a function of motor position.
- Q605 Damper Linkage: Connects motor to damper. *Includes motor crank arm.*
- Q618 Linkage: Connects Modutrol motor to water or steam valve.
- Q601 Bracket and Linkage Assembly: Connects Modutrol motor to water or steam valve.
- Q100A,B Linkage: Connects Modutrol motor to butterfly valve. Requires adapter bracket packed with motor.
- Q209E,F Potentiometer: Limits minimum position of motor.
- Q68 Dual Control Potentiometer: Controls 1 to 9 additional motors.
- Q181 Auxiliary Potentiometer: Controls 1 or 2 additional motors.
- 221455A Infinitely Adjustable Crank Arm: Approximately 0.75 in. (19 mm) shorter than the 4074ELY Crank Arm. Can rotate through downward position and clear base of motor without requiring use of adapter bracket.
- 7617ADW Adjustable Crank Arm: Approximately 0.75 in. (19 mm) shorter than the 7616BR Crank Arm. Can rotate through the 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.

Q7130A: Interface Module with selectable voltage ranges (4-7 Vdc, 6-9 Vdc, and 10.5-13.5 Vdc). Adapts motor to M71XX function.

Q7230A: Interface Module, selectable voltage or current control, with adjustable null and span. Adapts motor to M72XX function; 4 to 20 mA or 2 to 10 Vdc.

Q7330A: Interface Module, for W936 Economizer applications. Adapts motor to M73XX function.

Q7630A: Interface Module, 3-wire 14-17 Vdc control with minimum position capability. Adapts motor to M76XX function.

4074BYK: Controls up to 6 M91XX motors in unison from one Series 90 Controller.

4074EAU: Drives 2 or 3 M91XX motors from a W973 Single-zone Logic Panel or W7100 Discharge Air Controller.

4074EDC: Drives one M91XX motor from a 4-20 mA controller.

4074EED: Drives up to 4 M91XX motors from a 4-20 mA controller.

221508A Resistor Board—plugs onto quick-connect terminals in wiring box of M91XX motor. Can be used in place of 4074BYK, EAU, EDC, or EED resistor kits (functions described above).

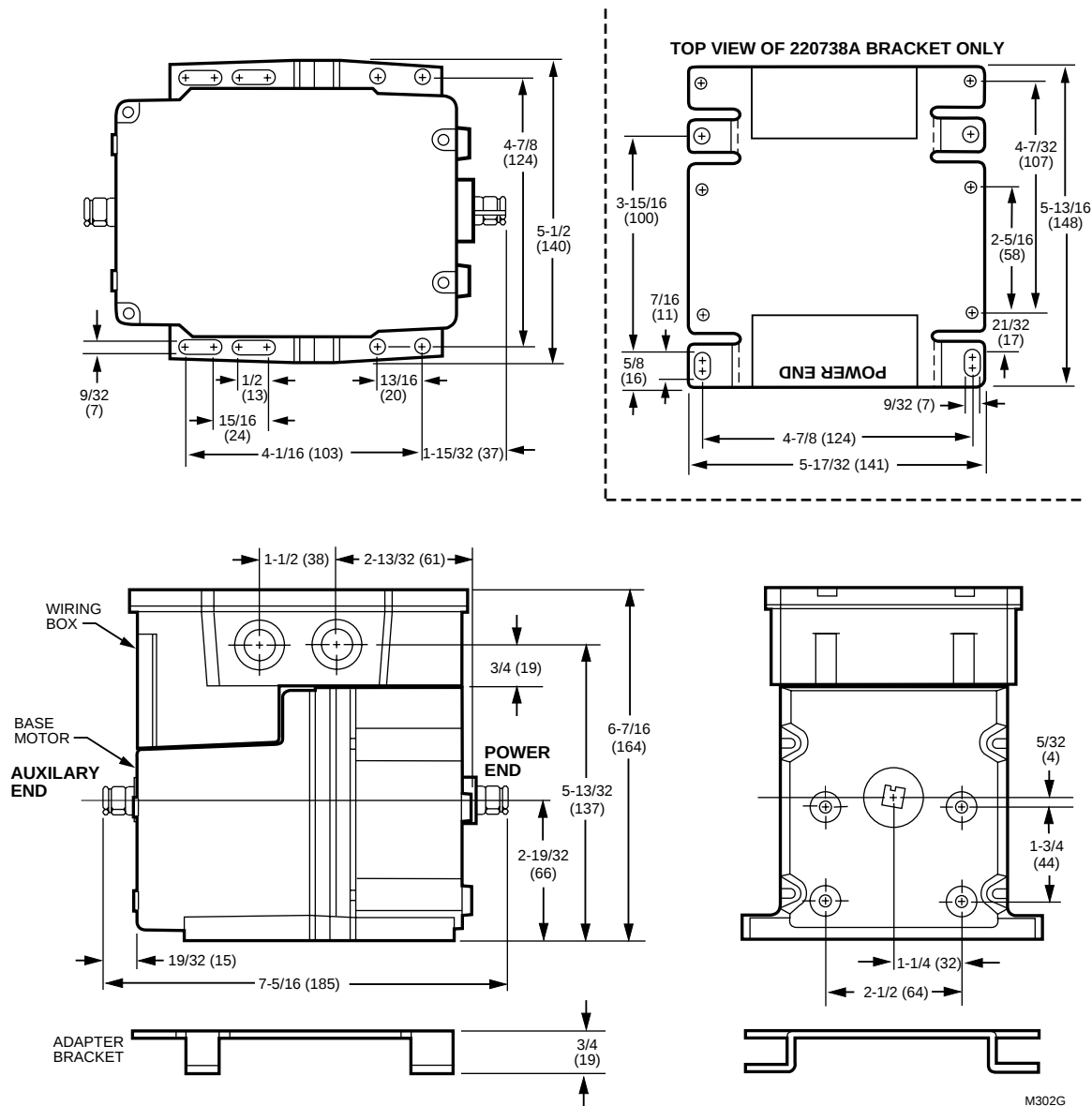


Fig. 1. Dimensions in in. (mm). Note: M9481, M9491 models do not have auxiliary shaft. All other dimensions are the same.

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