



General Instructions

ME-12313, ME-12323-002 Three-Position Electric Spring Return Gear Train Economizer Actuators

APPLICATION

For three-position operation of dampers and other equipment which require the return to normal position upon power interruption. Adjustable minimum position control 0° to 120°.

SPECIFICATIONS

Control Circuit: Two or three-wire.

Power Supply: 24 Vac, Class 2 (+10, -15% for 0 to 90° travel; +10, -10% for 90 to 180° travel), 60 Hz.

24 Vac, Class 2 (+10, -10%), 50 Hz.

VA:

Running, 14.4.

Holding, 9.6.

Watts:

Running, 12.7.

Holding, 7.3.

Torque:

Rated, 25 lb.-in. (2.8 N-m).

Limit, 40 lb.-in. (4.5 N-m) under stall conditions.

Maximum Damper Size:**

Parallel, 14 ft.² (1.3 m²).

Opposed, 18 ft.² (1.7 m²).

** Damper ratings are nominal and based on standard (not low leakage) dampers at 1" (25.4 mm) W.C. pressure and 2000 fpm (10 m/s).

Shaft Output: Dual 3/8" (9.5 mm) dia.; either or both shafts can be used as long as torque rating is not exceeded.

Shaft Rotation: CCW when power is applied. (The front of the actuator is defined as the right end when facing the field terminal connections.) Factory set at 90°; field adjustable 75°, 90°, 110°, 160°, 180°. When used with 50 Hz power supply, rotation is limited to 75° and 90° adjustments.

Minimum Position: Actuator shaft rotates CCW to 22°, factory set, when power is applied between terminals T and X. Lever adjustable 0° to 90°.

Timing:

Powered, 28 sec/90°.

Spring Return, 18 sec/90°.

Auxiliary Switch: On ME-12323-002 only, two SPDT snap acting, independently field adjustable within 180° of actuator rotation.

Environment:

Ambient Temperature Limits,

Shipping and Storage -40 to 160°F (-40 to 71°C).

Operating -40 to 140°F (-40 to 60°C).

Humidity, 5 to 95% RH, non-condensing.

Locations, NEMA Type 1 indoor only (NEMA 3R with AM-219 installed).

Vibration, Maximum 1G in any plane.

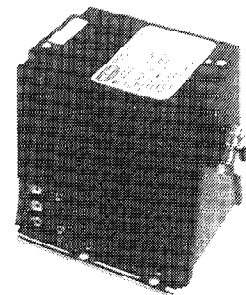
Connections: See Table 1.

Case: Glass reinforced thermoplastic (PET) cover, plated steel base.

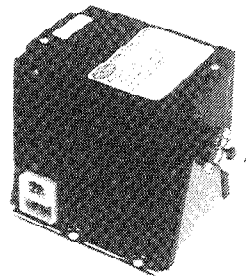
Mounting: Any position. Five 9/32" (7.1 mm) mounting holes provided.

Crank Arm for Actuator: AM-112 included with actuator. Slot (3/8") provides for adjustable radius from 7/8" (22 mm) to 3-1/8" (79 mm).

Dimensions: 5-1/2" high x 5" wide x 7-9/32" deep (140 mm x 127 mm x 185 mm). 3/8" (9.5 mm) shaft diameter.



ME-12313*



ME-12323-002*

* Front of actuator is defined as the right end when facing the field terminal connections.

TABLE 1. SPECIFICATIONS

Actuator Part Number	Auxiliary Switch	Connections	Direct Replacement for
ME-12313	No	Side Mounted #6 Self Tapping Screw/ 1/4" Tab	White Rodgers 3403-3 Honeywell M-8405A
ME-12323-002	(2) SPDT Snap Acting	Side Mounted, Molded†	Honeywell M-8415A

† Field wiring requires Barber-Colman AM-218 harness kit or:

Auxiliary switches use Molex type connector #03-09-1094 and female terminals #1381.

Power/ control wiring use AMP type connector #480003-5 using female terminals #60295-1.

TABLE 2. AUXILIARY SWITCH AMP RATINGS

24/120 Vac		240 Vac	
FLA	LRA	FLA	LRA
2	12	1	6

ACCESSORIES

Damper Linkage Accessories:

AM-111	Crank arm for 5/16" diameter damper shaft
AM-112	Crank arm for 3/8" diameter damper or ME-123X3 actuator shaft
AM-113	Crank arm for actuator or 1/2" diameter damper shaft
AM-115	Crank arm for 7/16" diameter damper shaft
AM-122	Linkage connector straight type
AM-123	Damper clip
AM-125	5/16" diameter x 20" damper rod
AM-125-048	5/16" diameter x 48" damper rod
AM-132	Ball joint connector
AM-218	Wiring harness kit, connectors have 18" (457 mm) leads
AM-219	Conduit cover kit
AM-221	1 SPDT switch kit
AM-222	2 SPDT switch kit
TOOL-16	Wrench for cam adjustment

THEORY OF OPERATION

Run

Closed Position: Open circuit between +24 Vac side of power supply and terminal T. The internal spring will return the output shaft CW to 0° if the actuator had been energized.

Minimum Position: Circuit between 24 Vac power supply and terminals T and X. The minimum position factory set at 22°, but may vary between 0 and 120° depending on minimum position lever adjustment.

Full Open: Circuit between 24 Vac power supply and terminals D and T will energize the actuator and rotate the output shaft CCW to the full end of the travel movement, factory set at 90°.

Torque Limiting The output torque will not exceed 40 lb.-in. (4.5 N-m) under stall conditions.

PRE-INSTALLATION

Inspection

Visually inspect the carton for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the carton and visually inspect the device for obvious defects. Return damaged or defective products.

Required Installation Items

- Wiring diagram
- Tools (not provided):
 - Volt-ohm meter
 - Appropriate screwdriver for mounting screws
 - Appropriate drill and drill bit for mounting screws
- Appropriate accessories
- Mounting screws (not provided)

INSTALLATION

CAUTION

1. Installer must be a qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and equipment damage.
3. Make all connections in accordance with the wiring diagram, and in accordance with national and local electrical codes. *Use copper conductors only.*
4. Do not exceed ratings of the device.
5. Avoid locations where excessive moisture, corrosive fumes or vibrations are present, i.e., NEMA Type 1 environments.

Mounting

LOCATION

The actuator can be mounted in any position in a weather protected area. Five 9/32" (7.1 mm) mounting holes are provided in the base of the actuator (see Figure 1). Two (2) mounting screws on right side and one (1) screw on left side of actuator are the minimum number of required fasteners. Locate the actuator as close to the damper as possible.

Wiring

TABLE 3. TERMINAL DESIGNATION

Terminal	Function	AM-218 Wiring Harness Color Code (ME-12323-002 only)
D	+24 Vac to go to full open position	Yellow
X	+24 Vac to go to minimum position	Wht/Blue
T	24G Vac	White
D1	To D of slave ME-12313 (Figure 4)	Gr/Yel
X1	To X of slave ME-12313 (Figure 4)	Gray

TABLE 4. AUX. SWITCH TERMINAL DESIGNATION (ME-12323-002 only)

Terminal	Function	AM-218 Wiring Harness Color Code
NO (SW. #1)	Normally open	Blue
NC (SW. #1)	Normally closed	Blk/Yel
C (SW. #1)	Common	Wht/Blk
NO (SW. #2)	Normally open	Brn/Wht
NC (SW. #2)	Normally closed	Brown
C (SW. #2)	Common	Red

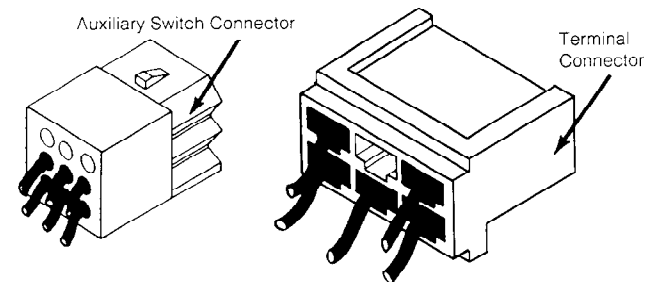


Figure 2. AM-218 Harness Kit

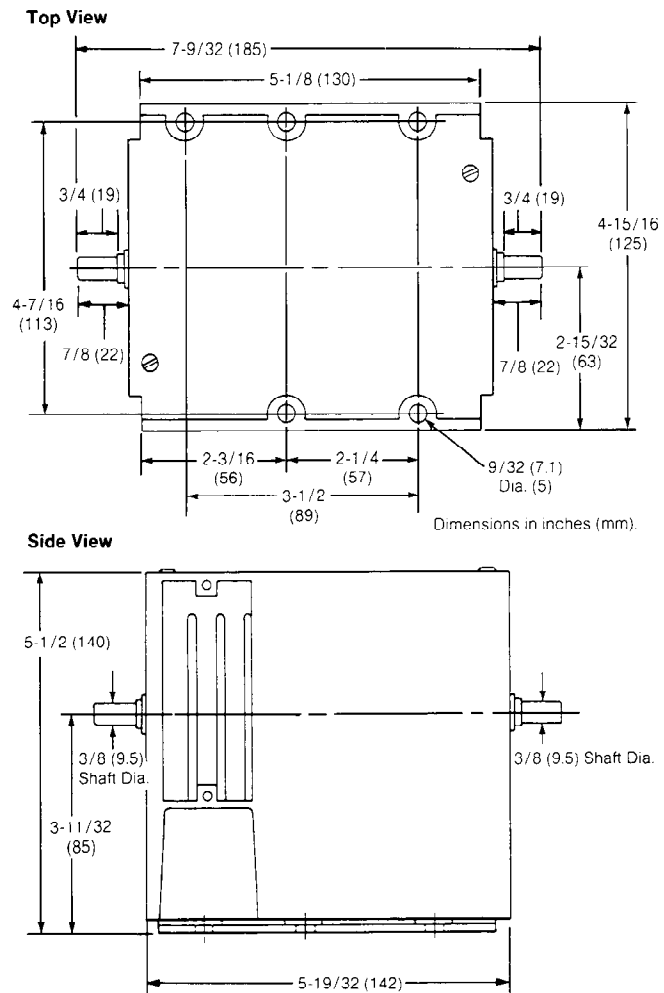


Figure 1. Mounting Dimensions for ME-123X3 Series

TYPICAL WIRING

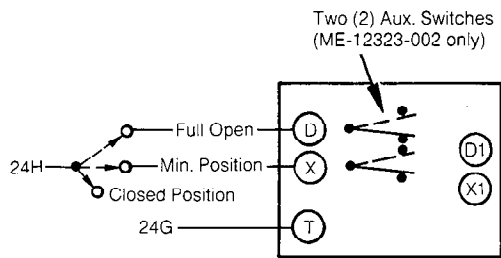


Figure 3. Typical Wiring for ME-123X3 Series

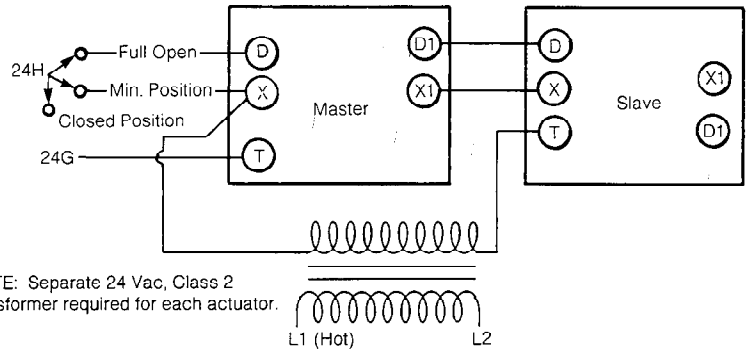


Figure 4. Parallel Wiring for ME-123X3 Series

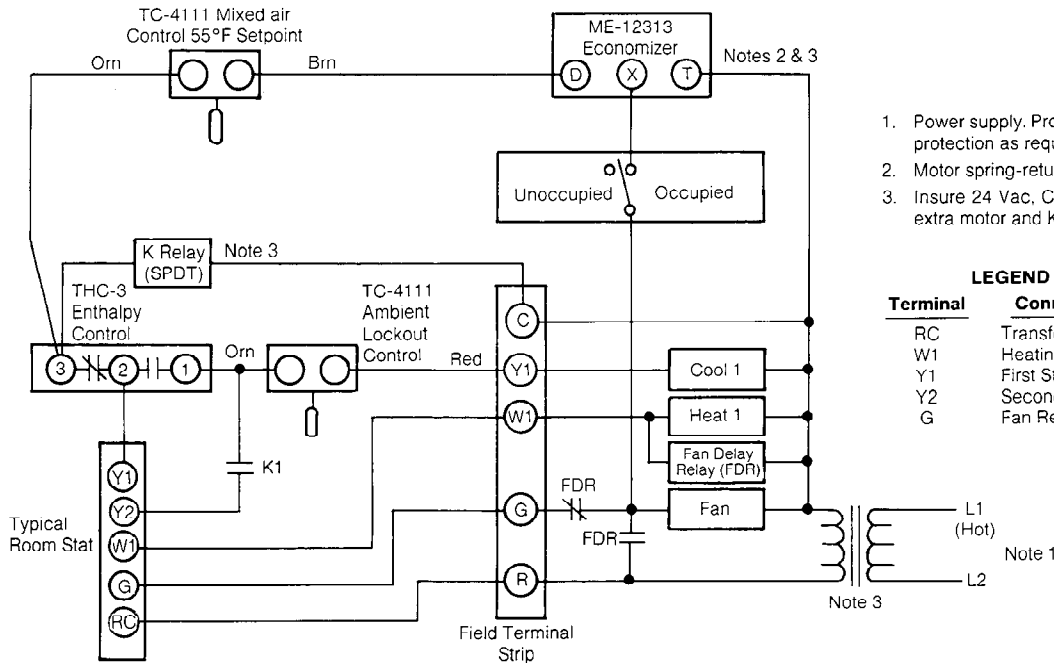


Figure 5. Single-Stage Cooling System with Three-Position Economizer

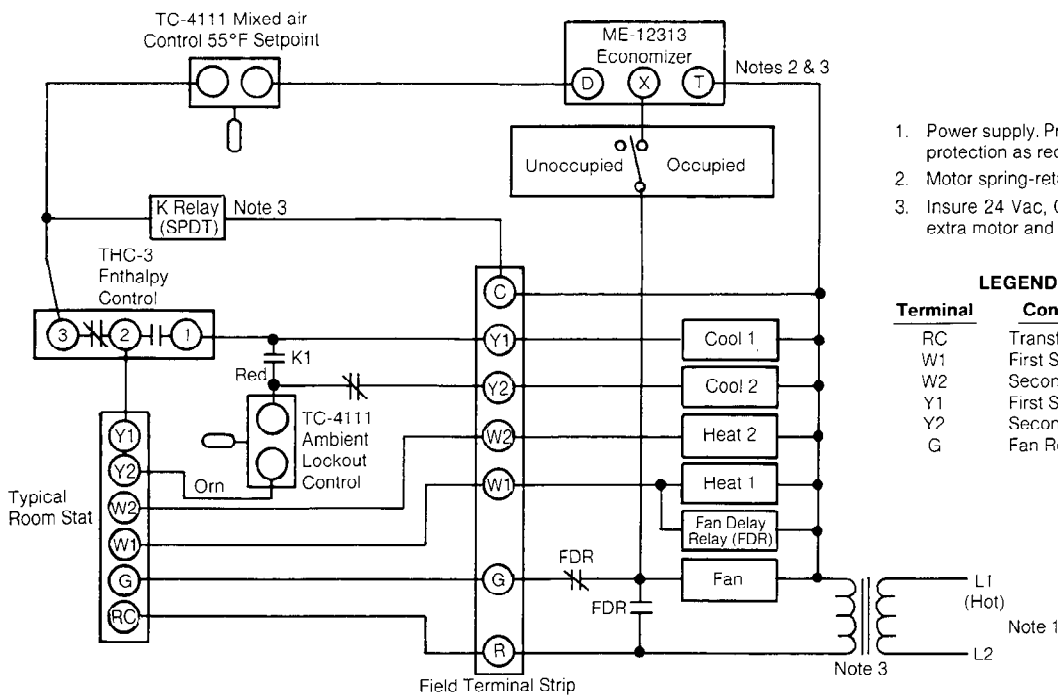


Figure 6. Two-Stage Cooling System with Three-Position Economizer

Damper Linkage

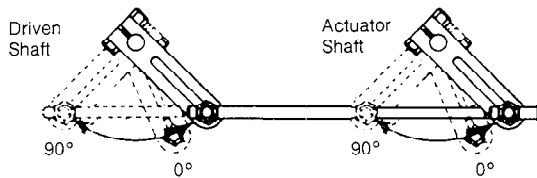


Figure 7. 90° Damper Linkage

Figure 7 illustrates linkage for 90° actuator shaft rotation operating an arm through 90° arc. To fasten linkage proceed as follows:

1. Fasten linkage connector at end of driven crank shaft arm.
2. Fasten linkage connector at end of slot of actuator crank arm.
3. Attach damper rod to connectors.

Normally Closed

1. Loosen crank arm from actuator shaft and swing linkage and damper shaft through entire rotation to insure the proper damper action.
2. Return damper to closed position.
3. Tighten crank arm on actuator shaft.
4. Loosen the connector on the actuator crank arm.
5. Pull damper rod through the crank arm connector until the damper is tightly closed.
6. Tighten clamp connecting link on actuator crank arm.

Normally Open

1. Move damper to approximately 85° of full open position and clamp connecting links to damper rod.
2. Check adjustment for proper operation by running actuator and driven shaft between limits of travel.

CAUTION

If crank arm does not provide proper travel, reset connecting link in linkage connector. NEVER ATTEMPT TO TURN THE ACTUATOR SHAFT WITH A WRENCH OR A CRANK. This will cause internal damage.

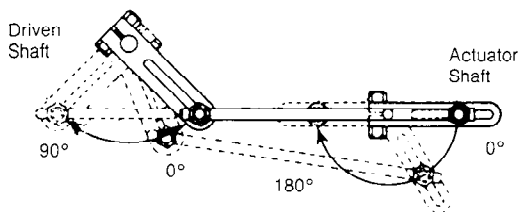


Figure 8. Linkage for 180° Actuator Shaft Rotation for 90° Damper

Figure 8 illustrates linkage for 180° actuator shaft rotation operating an arm through 90° arc (see Field Adjustment — Maximum Output Shaft Rotation on this page). To fasten linkage proceed as follows:

1. Fasten linkage connector at end of driven crank shaft arm.
2. Fasten linkage connector at punch mark on actuator crank arm (about .707 of the radius).
3. Attach damper rod to connectors.

Normally Closed

1. Loosen crank arm from actuator shaft and swing linkage and damper shaft through entire rotation to insure the proper damper action.
2. Return damper to closed position.
3. Tighten crank arm on actuator shaft.
4. Loosen the actuator crank arm connector.
5. Pull damper rod through the crank arm connector until the damper is tightly closed.
6. Tighten clamp connecting link on actuator crank arm.

Normally Open

1. Move damper to approximately 85° of full open position and clamp connecting links to damper rod.
2. Check adjustment for proper operation by running actuator and driven shaft between limits of travel.

CAUTION

If crank arm does not provide proper travel, reset connecting link in linkage connector. NEVER ATTEMPT TO TURN THE ACTUATOR SHAFT WITH A WRENCH OR A CRANK. This will cause internal damage.

FIELD ADJUSTMENTS

Maximum Output Shaft Rotation (See Figure 9)

CAUTION

Output shaft rotation must not exceed 90° for actuators with 50 Hz power supplies.

The factory set output shaft rotation is 90°. This setting may be changed by:

1. Removing the two single slotted screws on the top of the actuator cover.
2. Remove the cover.
3. Lift the stop lever away from the output gear until the lever can be rotated to a different setting.

NOTE

A small screwdriver may be needed to lift the stop lever away from the output gear when it is in the 110 or 180° position.

4. Move the stop lever to the required setting.
5. Replace cover and screws.

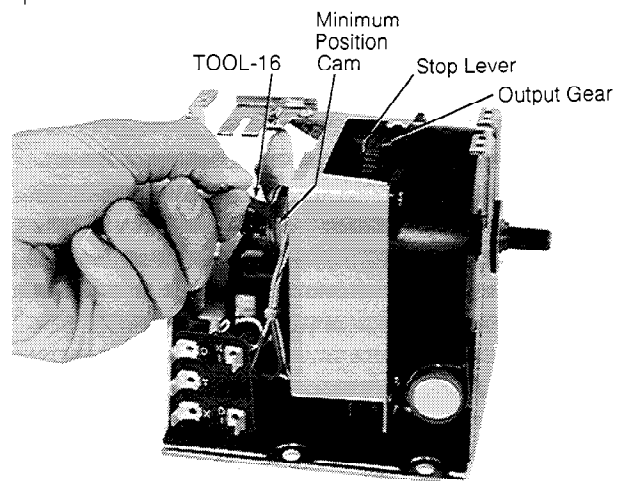


Figure 9. Maximum Output Shaft Rotation

Minimum Position (See Figure 10)

The minimum position lever is factory set at a nominal 22°. This setting may be adjustable by:

1. Removing the two single slotted screws holding the plate that is located just above the field wiring terminals.
2. Remove the adjustment lever cover.
3. Move the adjustment lever to the required position (each "click" on the movement of the lever is approximately 3°).
4. Replace the plate and screws.

NOTE

If minimum position between 90 and 120° is required, rotate switch cam 30° CCW (between short and long mark on cam) with TOOL-16. The cam is located under the actuator cover; see Figure 9. Minimum position is now lever adjustable 30 to 120°.

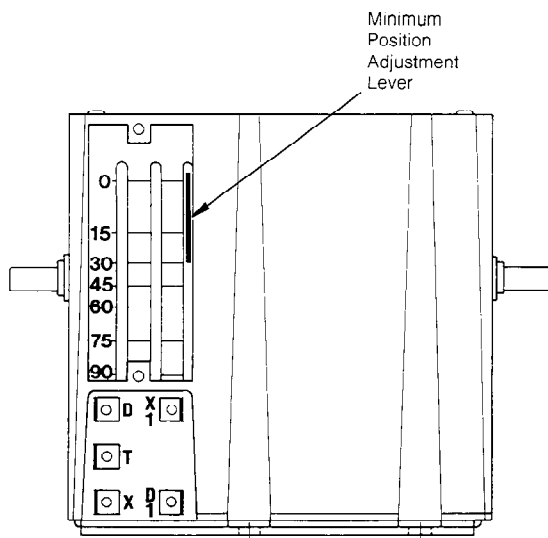


Figure 10. ME-12313 Adjustments and Terminal Configuration
(Shown with Minimum Position Adjustment Lever Cover Removed)

Auxiliary Switches (ME-12323-002 only) (See Figure 11)

Settings are field adjustable by:

1. Removing the two single slotted screws holding the plate that is located just above the output terminals.
2. Remove the adjustment switch plate.
3. Move the adjustment lever to the required position (each "click" on the movement of the lever is approximately 3°, 15° scale increments).
4. Replace the plate and screws.

NOTE

If switching action is required between 90 and 180°, rotate auxiliary switch cam 90° CCW with TOOL-16. The cams are located under the actuator cover next to the minimum position cam. Auxiliary switch cams are not shown in Figure 9. Switches are now lever adjustable between 90 and 180°.

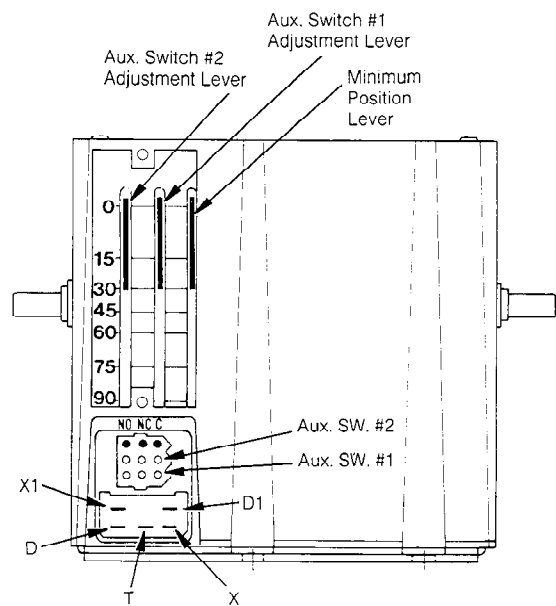


Figure 11. ME-12323-002 Adjustments and Terminal Configurations
(Shown with Adjustment Lever Cover Removed)

CHECKOUT

After the entire system has been installed, the following check for proper operation can be made (see Figures 3 through 6 for typical systems):

1. Be sure that the system power is connected and on.
2. Be sure control (manual or automatic) is operating properly per system requirements.
3. Between 24 Vac power supply and terminals when control system completes the circuit:
 - a. T & X the actuator will travel to the minimum position.
 - b. T & D the actuator will run to the maximum output shaft rotation.
4. Disconnect the +24 Vac power supply at terminal T. The actuator will CW spring return to 0°.

5. Action of auxiliary switch (on ME-12323-002 only):

- a. C made to N.C. when actuator is at de-energized and spring return to 0°.
 - b. C made to N.O. when actuator shaft rotation reaches auxiliary switch setting.
6. Be sure there is no binding of the linkage at any point in the stroke.
 7. If the motor fails to run, check the field wiring to insure proper voltage supply.

MAINTENANCE

Regular maintenance of the total system is recommended to assure sustained optimum performance.

FIELD REPAIR

None. Replace with a functional actuator.

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