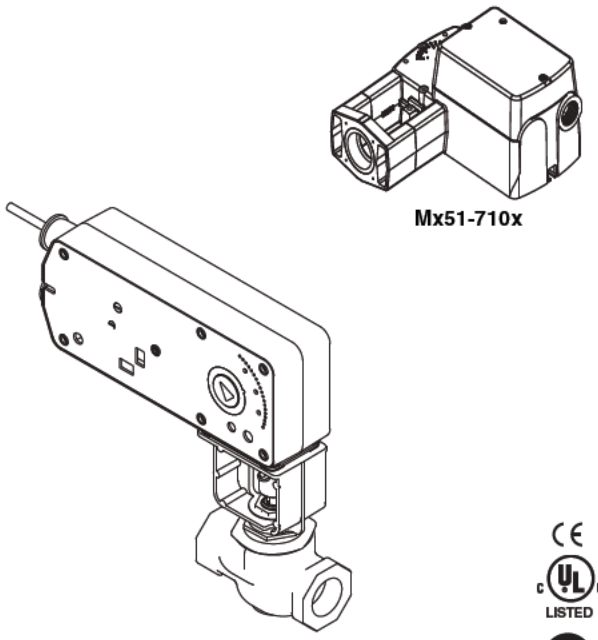
# Spring Return TAC DuraDrive® Two-Position Actuator

**TAC DuraDrive Linear Actuators are designed to mount directly onto two-way or three-way globe valves without the use of linkages. They provide linear travel to operate valves from 1/2 to 2 in. VB-7xxx valves and discontinued 1/2 to 1-1/4 in. VB-9xxx valves, 2-1/2 to 4 in. VB-9xxx valves and VB-8xxx**
**2-1/2 to 5 in. valves in chilled water, hot water and steam applications up to 366°F (186°C). Linear spring return actuators provide control of valves in HVAC systems.**



Mx51-710x

Features:

- Two position models controlled by SPST controller.
- 105 $lb_f$ (467 N) with 1/2 in. (13 mm) nominal linear stroke, 220 $lb_f$ (979 N) with 5/8 in. (16 mm) or 1-1/16 (27 mm) linear stroke.
- 24 Vac, 120 Vac, and 230 Vac models.
- Rugged die-cast or polymer housings rated for up to NEMA 2/IP54.
- Polymer housing rated for plenum use.
- Overload protection throughout stroke.
- Automatically sets input span to match valve travel.
- Compact size to allow installation in limited space.
- Manual override to allow positioning of valve and preload.
- Spring return operation, stem up.
- Direct mount to valves without separate linkage.

## Model Chart

| Part No. | Control Action | Actuator Power Input | | | | | | | Linear Stroke Inches | Approximate Stroke Timing in Seconds @ 70°F (21°C) | | Output Force Rating lb. (Newton) | | Valve Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage | Running | | | | | Holding | | | | | | |
| | | | 50 Hz | | 60 Hz | | DC Amps | 50/60 Hz | | | | | | |
| | | | VA | W | VA | W | | W | | Powered | Spring Return | Min. | Max. Stall | |
| MA51-7103-000 | Two Position SPST | 24 Vac ±20% 20-30 Vdc | 5.3 | 4.1 | 5.3 | 4.1 | 0.15 | 1.2 | 1/2 in. nominal | 44[a] | 19[a] | 105 | 215 | 1/2 to 2 in. |
| MA51-7103-100 | | | 5.3 | 4.1 | 5.3 | 4.1 | 0.15 | 1.2 | | | | | | |
| MA51-7100 | | 120 Vac ±10% 50/60 Hz | 7.9 | 6.2 | 7.9 | 6.2 | N/A | 2.1 | | | | | | |
| MA51-7101 | | 230 Vac ±10% 50/60 Hz | 7.4 | 5.4 | 7.4 | 5.4 | N/A | 2.1 | | | | | | |

[a] Timing was measured with the actuator mounted on a VB-7xxx valve.

## Model Chart(Continued)

| Part No. | Control Action | Actuator Power Input | | | | | | | Linear Stroke Inches | Approximate Stroke Timing in Seconds @ 70°F (21°C) | | Output Force Rating lb. (Newton) | | Valve Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage | Running | | | | | Holding | | | | | | |
| | | | 50 Hz | | 60 Hz | | DC Amps | 50/60 Hz | | | | | | |
| | | | VA | W | VA | W | | W | | Powered | Spring Return | Min. | Max. Stall | |
| MA51-7203 | 2 Position | 24 Vac ±20% 22-30 Vdc | 9.8 | 7.5 | 9.7 | 7.5 | .29 | 2.8 | 5/8 | <100[a] | <35 [a] | 220 (979) | 495 (2202) | 1-1/4 to 2 in.[b] |
| MA51-7200 | | 120 Vac ±10% | 11.7 | 8.8 | 10.0 | 8.4 | N/A | 3.6/5.0 | | | | | | |
| MA51-7201 | | 230 Vac ±10% | 15.5 | 9.5 | 10.6 | 8.5 | N/A | 4.6/3.3 | | | | | | |
| MA61-7203 | | 24 Vac ±20% 22-30 Vdc | 9.8 | 7.5 | 9.7 | 7.5 | .29 | 2.8 | 1-1/16 | <190 [a] | <40 [a] | | | 2-1/2 to 4 or 5 in.[c] |
| MA61-7200 | | 120 Vac ±10% | 11.7 | 8.8 | 10.0 | 8.4 | N/A | 3.6/5.0 | | | | | | |
| MA61-7201 | | 230 Vac ±10% | 15.5 | 9.5 | 10.6 | 8.5 | N/A | 4.6/3.3 | | | | | | |

[a] Timing was measured with no load applied to the actuator.

[b] Current VB-7xxx Series valves and discontinued VB-9xxx Series valves (1-1/4 in. only).

[c] Current VB-9xxx Series valves (2-1/2 to 4 in.), current VB-8xxx (2-1/2 to 5 in.) Series valves, and discontinued VB-9xxx (1-1/2 to 2 in.) Series valves.

## Specifications

| | | |
|---|---|---|
| **Inputs** | | |
| | **Control signal** | On-off spring return, SPST control contacts or Triacs (500 mA rated). |
| | **Power** | 24 Vac ± 20%, Class 2, 22 to 30 Vdc, 120 Vac ± 10%, 230 Vac ± 10%, 50/60 Hz. All 24 Vac circuits are Class 2. All circuits 30 Vac and above are Class 1. |
| | **Connections** | Models with -0xx have 3 ft. (91 cm) appliance wire connections. Models with -1xx have 3 ft. (91 cm) plenum wire connections. Enclosure accepts 1/2 in. (13 mm) conduit connectors. For M20 Metric connector, use AM-756 adaptor. |
| **Outputs** | | |
| | **Mechanical** | Motor Type: Brushless DC. |
| | | Linear Stroke: MA51-720x: 5/8 in. (16 mm). MA61-720x: 1-1/16 in. (27 mm). MA51-710x: 1/2 in. (13 mm) nominal. |
| | | Approximate Stroke Timing: See Model Chart. |
| | | Manual Override: Allows positioning of valve and preload using manual crank. |

## Specifications (Continued)

**Environment**

**Ambient temperature limits**

Shipping and Storage: -40 to 160°F (-40 to 71°C).
Operating: MA51-720x/MA61-720x: 0 to 140°F (-18 to 60°C). MA51-710x: -22 to 140°F (-30 to 60°C).
Temperature Restrictions: For maximum ambient 140°F (60°C) the maximum allowable fluid temperature should not exceed valve rating. See F-27252 Selection Guide for specific ratings.

| Actuator | Max. Allowable Ambient @ Max. Fluid Temperatures | Valve Body |
|---|---|---|
| MA51-720x | 140°F (60°C) @ 281°F (138°C) | VB-721x, 722x |
| | 120°F (49°C) @ 300°F (149°C) | VB-73xx |
| | 100°F (38°C) @ 340°F (171°C) | VB-725x, 726x |
| | 90°F (32°C) @ 366°F (186°C) | VB-727x, 728x |
| MA61-720x | 140°F (60°C) @ 300°F (149°C) | 2-1/2 to 4 in. VB-931x |
| MA61-720x | 140°F (60°C) @ 281°F (138°C) | 2-1/2 to 4 in. VB-92xx, 2-1/2 to 5 in. VB-8xxx |

**Humidity**

**MAx1-72xx:** 15 to 95% RH, non-condensing. **MA51-710x:** 5 to 95% RH, non-condensing.

**Locations**

NEMA 1. NEMA 2 (enclosure is air plenum rated), UL Type 2 (IEC IP54) with customer supplied water tight conduit connections.

**Dimensions**

**MA51-71xx:** 6-5/16 H x 6-49/64 W x 3-1/2 D in. (160 x 170 x 89 mm).
**MA51-72xx:** 7 H x 9-1/4 W x 2-33/64 D in. (178 x 235 x 64 mm).
**MA61-720x:** 9-1/2 H x 11-1/8 W x 2-33/64 D in. (241 x 283 x 64 mm).

**Agency Listings**

**UL 873**

Underwriters Laboratories (File #E9429 Category Temperature-Indicating and Regulating Equipment).

**CUL**

UL Listed for use in Canada by Underwriters Laboratories. Canadian Standards C22-2 No. 24-93.

**European Community**

EMC Directive (89/336/EEC). Low Voltage Directive (72/23/EEC).

**Australia**

This product meets requirements to bear the C-Tick Mark according to the terms specified by the Communications Authority under the Radio Communications Act 1992.

**Valve Size Chart.**

| Valve Body Part Number | P Code | Size inches | Close-Off Pressure PSI[a] | | | Required Retrofit Kit |
|---|---|---|---|---|---|---|
| | | | MA51-710x | MA51-720x | MA61-720x | |
| VB-721X-000-4-P<br>VB-7253-000-4-P<br>VB-7273-000-4-P | 1, 2,3 or 4 | 1/2 | 250 | | | |
| | 5 or 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 150 | | | |
| | 9 | 1-1/4 | 90 | 150 | | |
| | 10 | 1-1/2 | 60 | 100 | | |
| | 11 | 2 | 32 | 65 | | |
| VB-722X-000-4-P<br>VB-7263-000-4-P<br>VB-7283-000-4-P | 1,2,3 or 4 | 1/2 | 250 | | | |
| | 5 or 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 90 | | | |
| | 9 | 1-1/4 | 60 | 150 | | |
| | 10 | 1-1/2 | 35 | 100 | | |
| | 11 | 2 | 20 | 65 | | |
| VB-731X-000-4-P | 2 or 4 | 1/2 | 250 | | | |
| | 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 90 | | | |
| | 9 | 1-1/4 | 60 | 150 | | |
| | 10 | 1-1/2 | 35 | 100 | | |
| | 11 | 2 | 20 | 65 | | |
| VB-732X-000-4-P | 4 | 1/2 | 250 | | | |
| | 6 | 3/4 | 250 | | | |
| | 7 or 8 | 1 | 250 | | | |
| | 9 | 1-1/4 | 250 | 250 | | |
| | 10 | 1-1/2 | 250 | 250 | | |
| | 11 | 2 | 250 | 250 | | |
| VB-8213-000-5-P<br>VB-8223-000-5-P | 12 | 2-1/2 | | | 125 | |
| | 13 | 3 | | | 125 | |
| | 14 | 4 | | | 125 | |
| | 15 | 5 | | | 125 | |
| VB-8303-000-5-P | 12 | 2-1/2 | | | 35 | |
| | 13 | 3 | | | 35 | |
| | 14 | 4 | | | 35 | |
| | 15 | 5 | | | 35 | |
| VB-921X-000-4-P<br>VB-9253-000-4-P<br>VB-9273-000-4-P | 1,2,3 or 4 | 1/2 | 250 | | | |
| | 5 or 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 150 | | | |
| | 9 | 1-1/4 | 90 | 150 | | |
| | 10 | 1-1/2 | | | 100 | AM-733 or AM-734[b] |
| | 11 | 2 | | | 65 | AM-733 or AM-734[b] |
| VB-922X-000-4-P<br>VB-9263-000-4-P<br>VB-9283-000-4-P | 1, 2, 3, or 4 | 1/2 | 250 | | | |
| | 5 or 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 90 | | | |
| | 9 | 1-1/4 | 60 | 150 | | |
| | 10 | 1-1/2 | | | 100 | AM-733 or AM-734[b] |
| | 11 | 2 | | | 65 | AM-733 or AM-734[b] |

[a] Note: Maximum valve differential operating pressures MUST be observed. Please consult our Valve Products Catalog F-27384 to assure the operating differential for your application is followed.

[b] Use AM-733 with valves with date codes after 9404. Use AM-734 with valves with date codes before 9404.

**Valve Compatibility Table, Continued..**

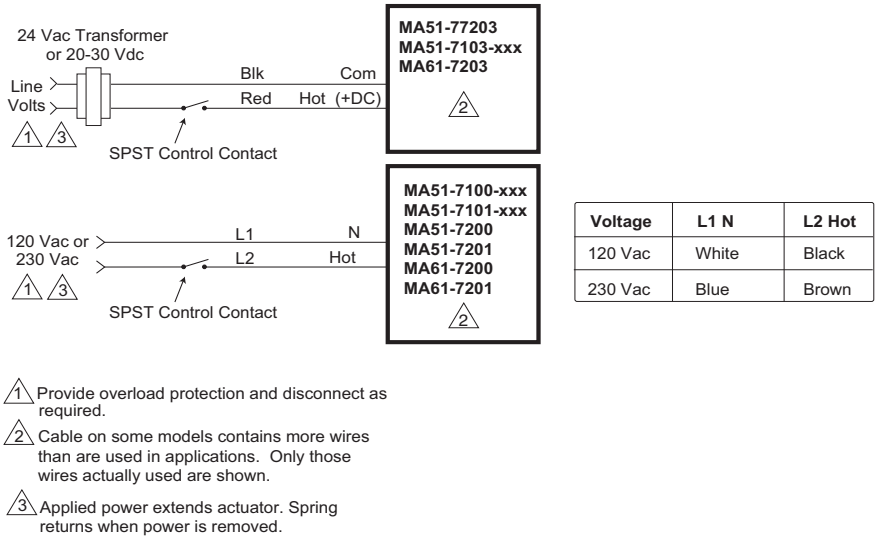
| Valve Body Part Number | P Code | Size inches | Close-Off Pressure PSI[a] | | | Required Retrofit Kit |
|---|---|---|---|---|---|---|
| | | | MA51-710x | MA51-720x | MA61-720x | |
| VB-931X-000-4-P | 2 or 4 | 1/2 | 250 | | | |
| | 6 | 3/4 | 200 | | | |
| | 7 or 8 | 1 | 90 | | | |
| | 9 | 1-1/4 | 60 | 150 | | |
| | 10 | 1-1/2 | | | 65 | AM-733 or AM-734[b] |
| | 11 | 2 | | | 65 | AM-733 or AM-734[b] |
| VB-9323-000-4-P | 2 or 4 | 1/2 | 250 | | | |
| | 6 | 3/4 | 250 | | | |
| | 7 or 8 | 1 | 250 | | | |
| | 9 | 1-1/4 | 250 | 250 | | |
| | 10 | 1-1/2 | | | 250 | AM-733 or AM-734[b] |
| | 11 | 2 | | | 250 | AM-733 or AM-734[b] |
| VB-92X3-000-X-P<br>VB-9313-000-X-P | 12 | 2-1/2 | | | 33 | |
| | 13 | 3 | | | 22 | |
| | 14 | 4 | | | 12 | |

[a] Note: Maximum valve differential operating pressures MUST be observed. Please consult our Valve Products Catalog F-27384 to assure the operating differential for your application is followed.

## Accessories

| Model No. | Description |
|---|---|
| **MA51-72xx, MA61-72xx** | |
| AM-731 | Mounting kit - Mx51 - 720x (included with actuator). |
| AM-732 | Mounting kit - Mx61 - 720x (included with actuator). |
| AM-733 | Retrofit kit - discontinued VB-9xxx 1-1/2 to 2 in. valves after 9404 date code. |
| AM-734 | Retrofit kit 1 - discontinued VB-9xxx - 1/2 to 2 in. valves prior to 9404 date code. |
| AM-756 | Metric conduit adapter M20 x 1.5 to 1/2 in. NPT. |
| AM-763 | 1/8 in. Hex crank for manual override. |
| **MA51-710x** | |
| AM-756 | Metric conduit adapter M20 x 1.5 to 1/2 in NPT. |
| AM-770 | Replacement valve linkage parts kit. |
| AM-764 | Linkage kit for damper applications. |

## Typical Applications




| Voltage | L1 N | L2 Hot |
|---|---|---|
| 120 Vac | White | Black |
| 230 Vac | Blue | Brown |

1 Provide overload protection and disconnect as required.

2 Cable on some models contains more wires than are used in applications. Only those wires actually used are shown.

3 Applied power extends actuator. Spring returns when power is removed.

**Figure 1 Typical Wiring Diagrams for Two Position Actuators.**