MEP-4200/4500/4900 Series

Fail-Safe, Direct-Coupled, Actuators (25/45/90 in-lb.)

Description and Application

These compact but powerful direct-coupled ControlSet® actuators provide two-position, tri-state, or proportional control for dampers or valves in HVAC systems. Efficient, durable, capacitor-driven fail-safe with switch-selectable direction provides consistent torque in both powered and fail-safe modes. A patented noise reducer provides whisper-quiet operation in both modes. A minimum torque of 25 (MEP-42xx), 45 (MEP-45xx), or 90 (MEP-49xx) in-lb. is available over the 95° angular rotation.

MEP-4xx2 **proportional** models accept either a 0–10 or 2–10 VDC control signal input from a thermostat, controller, or building automation system. **"Anti-jitter"** circuitry significantly reduces hunting and needless wear (from unnecessary miniscule position changes caused by undamped analog input signals) on the actuator, valve, or damper components. A user-initiated, **auto-mapping** feature provides more precise equipment control by reassigning the input signal range over a reduced rotation range. These models also feature a switch-selectable, 0–5 or 0–10 (or 1–5 or 2–10) VDC voltage **feedback** output that is proportional to the actuator position.

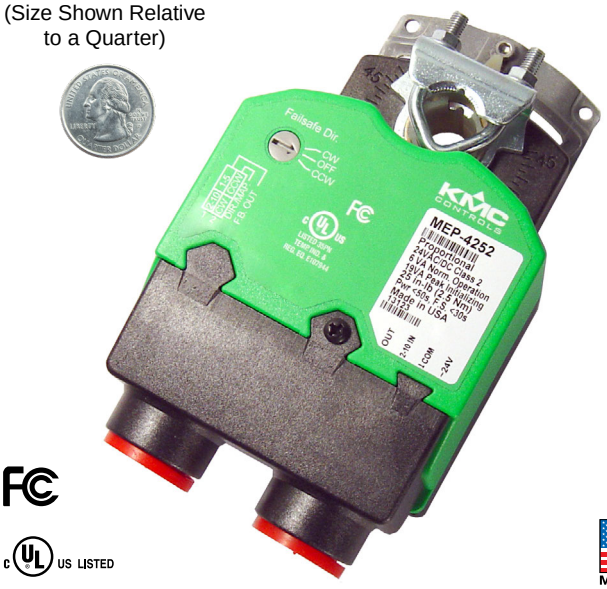
MEP-4xx1 **tri-state/two-position** (four-wire) models are designed for use with floating thermostats or controllers. MEP-4xx4/4xx5 **two-position** (two-wire) models are available in 24 VAC/VDC or 100–240 VAC models.

MEP-4x7x models also have one fully adjustable, built-in SPDT **auxiliary switch** for remote position indication or equipment interface. MEP-497x models include a second fixed switch at 10° from full CW direction. A three-foot cable is included with the switch(es).

MEP-4xxx**V** actuators have brackets with a patented quick-mounting mechanism. See *(Quick-Mounting) "V" Models Valve Cross-Reference on page 5* for more information.

All actuators mount directly to 1/4- to 5/8-inch (6 to 16 mm) round shafts or 1/4- to 7/16-inch (6 to 11 mm) square shafts, eliminating the need for expensive and complicated linkages. A non-rotation bracket, to prevent lateral movement, is included with each actuator. A gear disengagement button allows easy manual positioning of the actuator.

(Size Shown Relative to a Quarter)



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Features

- Efficient, durable, capacitor-driven fail-safe option with switch-selectable direction provides consistent torque in both powered and fail-safe modes
- The fail-safe option, on proportional and tri-state models, can be turned off temporarily for testing purposes or permanently if desired
- Proportional models include "anti-jitter" circuitry, optional auto-mapping of the full input signal range over a reduced actuator stroke, and switch-selectable 0/1–5 or 0/2–10 VDC feedback
- MEP-4x7x models have one fully adjustable, built-in SPDT auxiliary switches, and MEP-497x models include a second fixed switch at 10° from full CW direction
- Connections are made with prewired 3-foot, 18 AWG cable(s) or fixed terminals that accept 12–26 AWG wiring (see *Models on page 2*)
- Direct mounting to standard shaft sizes, gear disengagement button, and adjustable mechanical end stop
- Patented valve body quick-mount option on MEP-4xxxV models

NOTE: For similar actuators without fail-safe, see the **MEP-4000/4800 Series** and the **MEP-4201/4501/4901** data sheets.

Models

Model Number*	Torque, in-lbs. (N•m)	Control Type	Operating Voltage	Auxiliary Switches***	Voltage Feedback	Electrical Connections****	FCC and ICES-003	Powered and Fail-Safe Running Time (seconds/90°)
MEP-4254 (V)*	25 (2.82)	Two-Position (2-wire)†	24 VAC/ VDC**	0	None	Terminals	Class A	<35 and <30
MEP-4274				1 Adjustable		2 Cables		
MEP-4255 (V)*			100–240 VAC	0		1 Cable	Class B	<25 and <30
MEP-4275				1 Adjustable		2 Cables		
MEP-4251 (V)*		Tri-state/ 2-Position (4-wire)†	24 VAC/ VDC	0		Terminals		<35 and <30
MEP-4252 (V)*		Proportional 2–10 or 0–10 VDC			0/1–5 or 0/2–10 VDC			<50 and <30‡
MEP-4272				1 Adjustable		2 Cables		
MEP-4554 (V)*	45 (5)	Two-Position (2-wire)†	24 VAC/ VDC**	0	None	Terminals	Class A	<35 and <30
MEP-4574				1 Adjustable		2 Cables		
MEP-4555 (V)*			100–240 VAC	0		1 Cable	Class B	<25 and <30
MEP-4575				1 Adjustable		2 Cables		
MEP-4551 (V)*		Tri-state/ 2-Position (4-wire)†	24 VAC/ VDC	0		Terminals		<35 and <30
MEP-4552 (V)*		Proportional 2–10 or 0–10 VDC			0/1–5 or 0/2–10 VDC			<50 and <30‡
MEP-4572				1 Adjustable		2 Cables		
MEP-4954	90 (10)	Two-Position (2-wire)†	24 VAC/ VDC**	0	None	Terminals	Class A	<45 and <40
MEP-4974				1 Adj., 1 Fixed		2 Cables		
MEP-4955			100–240 VAC	0		1 Cable	Class B	<30 and <40
MEP-4975				1 Adj., 1 Fixed		2 Cables		
MEP-4951		Tri-state/ 2-Position (4-wire)†	24 VAC/ VDC	0		Terminals		<45 and <40
MEP-4952		Proportional 2–10 or 0–10 VDC			0/1–5 or 0/2–10 VDC			<80 and <40‡
MEP-4972				1 Adj., 1 Fixed		2 Cables		

*MEP-4xxx**V** models (e.g., MEP-4254V or MEP-4552V) have the quick-mount option. MEP-4**2**xxV are for use on 1/2" and 3/4" ball valves; MEP-4**5**xxV are for use on 1" to 3" ball valves. Only some models have the "V" option.

Two-position 24 VAC/VDC MEP-4xx4 models are FCC Class **A, Part 15, Subpart B and complies with Canadian ICES-003 Class **A**. All other models are Class **B**. For other approvals, which apply to all models, see ***Specifications on page 3***.

***One auxiliary switch is adjustable 0–90°. On MEP-497x models, the second switch is fixed at 10° from full CW direction (Blue is connected to Orange in the 0–10° range, and Blue is connected to Green 11–90°).

****Connections are made on either fixed terminals that accept 12–26 AWG wiring or (for line-voltage models and/or models with an auxiliary switch) prewired 3-foot, 18 AWG cable(s).

†For two-position and tri-state, the "control signal" is the same as the operating voltage.

‡After initial power-up, proportional models delay enabling motor operation approximately 30 seconds until the capacitors are charged. No actuator rotation will take place for at least the first 30 seconds.

NOTE: See also *(Quick-Mounting) "V" Models Valve Cross-Reference on page 5* for cross-reference information.

NOTE: The above chart lists the differences among models. Supply power, supply frequency, transformer sizing, fail-safe, angular rotation, noise level, mounting, dimensions, weight, enclosure material, position indication, servicing, quality standard, warranty, and environmental limits are the same for all models. See *Specifications on page 3*.

Specifications

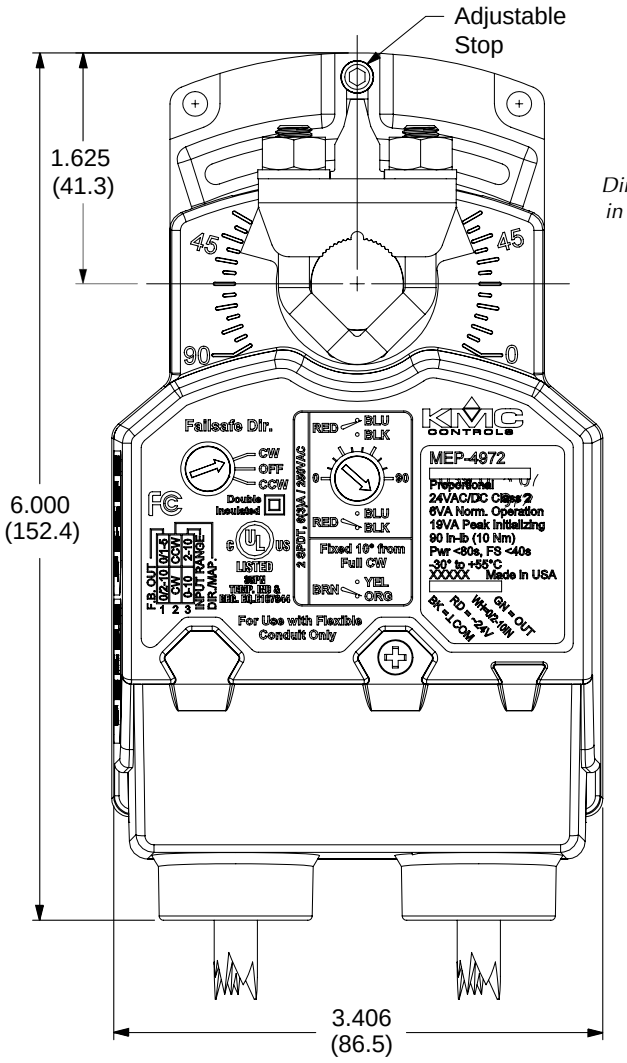
Control Signal	
Proportional	0 to 10 VDC or 2 to 10 VDC, switch selectable
Tri-state/2-Pos.	See Supply Voltage
Two-position	See Supply Voltage
Supply Voltage	
Low Voltage	24 VDC/VAC (+20%/–15%), Class 2 only (MEP-4xx1/4xx2/4xx4)
Line Voltage	100–240 VAC (MEP-4xx5)
Supply Frequency	50/60 Hz for VAC operation
Supply Power	6 VA normal operation, 19 VA peak initializing
Transformer Sizing	20 VA
Initialization Time	30 seconds (on power-up) for proportional models only
Feedback Output	0/1 to 5 VDC or 0/2 to 10 VDC (switch selectable, proportional models only)
Auxiliary Switches	
Rating	SPDT 6 A resistive load (3 A motor load) @ 250 VAC
MEP-427x/457x	1 switch, adjustable 0 to 90°
MEP-497x	2 switches; 1 adjustable 0 to 90° and 1 fixed at 10° from full CW direction
Fail-Safe Control	Switch selectable, CW/OFF/CCW on proportional and tri-state models, CW/CCW on 2-position models
Fail-Safe Type	(Electronic) capacitor driven
Angular Rotation	0 to 95°, fully adjustable with mechanical stop
Running Time	See *Models on page 2*
Torque	
MEP-42xx	25 in-lbs. (2.82 N•m)
MEP-45xx	45 in-lbs. (5 N•m)
MEP-49xx	90 in-lbs. (10 N•m)
Noise Level	< 45 dBA max. at 1 meter
Mounting	Direct to 1/4 to 5/8 inches (6 to 16 mm) round or 1/4 to 7/16 inches (6 to 11 mm) square shaft by adjustable "V" bolt and supplied non-rotation bracket; minimum recommended damper shaft length is 1-5/8 inches
Brackets	Non-rotation bracket **HMO-4001** (supplied with MEP-4x7x and all MEP-49xx models) or **HMO-4002** (supplied with MEP-425x and MEP-455x); **HPO-5073** or **HPO-5074** required for mounting to valves
Connections	
Power/Signal	Fixed wire clamp type terminal block, 12–26 AWG, copper, or prewired 3-foot, 18 AWG cable (see *Models on page 2*)
Aux. Switch(es)	3-foot 18 AWG cable
Dimensions	6.000 x 2.812 x 3.406 inches (152.4 x 71.4 x 86.5 mm)—see also *Dimensions on page 4*
Weight	1.5 lb. (0.68 kg)
Enclosure	Flame retardant polymer, NEMA 2 and IP54—to guarantee IP54, install an **HMO-4521** liquid-tight cord grip (all models) or an **HPO-4051** assembled wiring kit (MEP-4x51/4x52/4x54 models only)
Position Indication	Visual indicator, 0° to 95°
Servicing	Maintenance free
Quality Standard	ISO 9001
Warranty	5 years (from mfg. date code)
Approvals	UL 873 Temperature Indicating and Regulating Equipment; FCC Class **B**, Part 15, Subpart B and complies w ith Canadian ICES-003 Class **B** (**except for MEP-4xx4** models, which are Class **A**)
Environmental Limits	
Operating	–22 to 131° F (–30 to 55° C)
Shipping	–40 to 176° F (–40 to 80° C)
Humidity	5 to 95% RH (non-condensing)

NOTE: See also *Dimensions on page 4*.

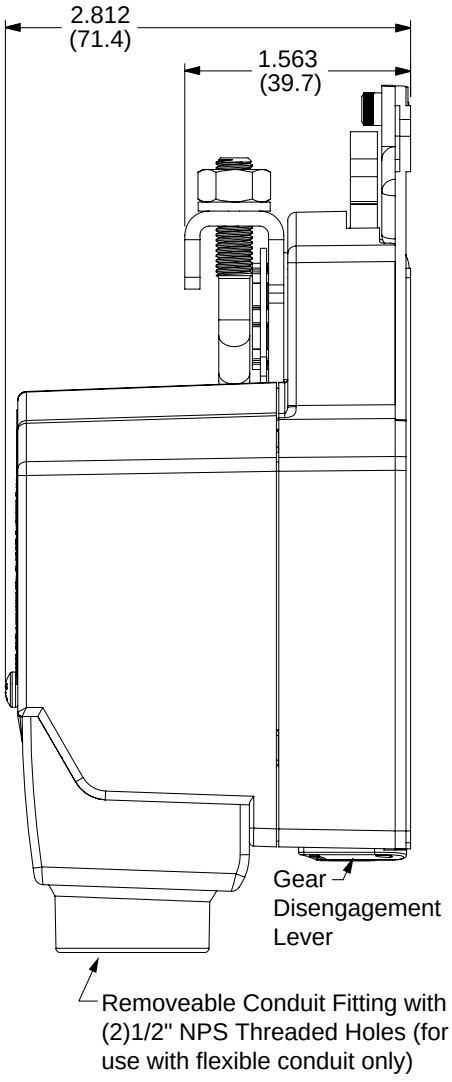
NOTE: Before August 2015 these actuators had **2–10** VDC inputs and **1–5 or 2–10** VDC feedback (only). Starting in August 2015, **0–10** VDC inputs and **0–5 or 0–10** VDC feedback were also available and switch-selectable.

NOTE: When the **0**–10 VDC input is selected, selectable feedback options are **0**–5 or **0**–10 VDC. When the **2**–10 VDC input is selected, feedback options are **1**–5 or **2**–10 VDC.

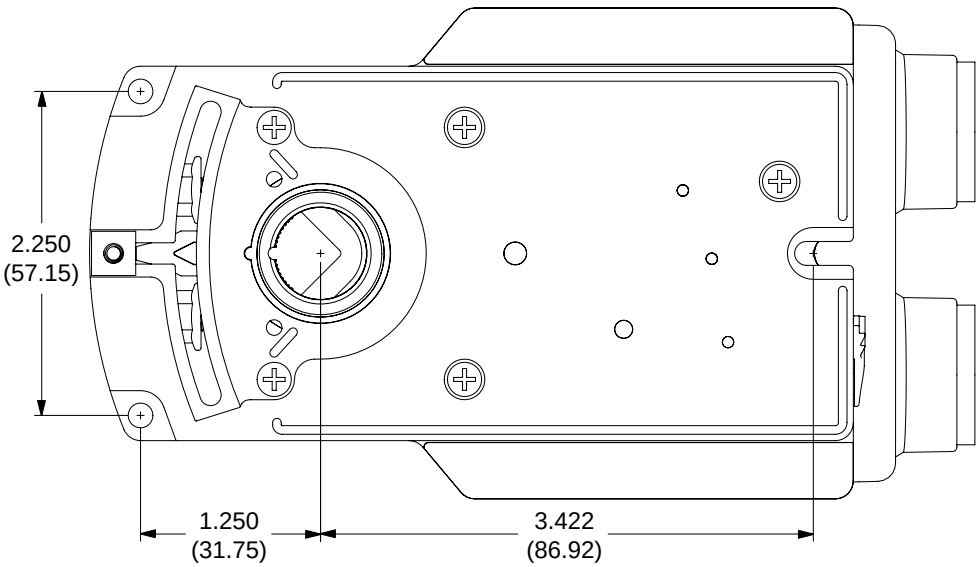
Dimensions



Dimensions are in inches (mm)



NOTE: **The two holes at the top of the actuator are NOT for use in direct-coupled applications.** (They are for **remote** mounting, such as with the optional HLO-4001 Crank Arm Kit.) **For mounting to valves, see the appropriate valve installation guide.**

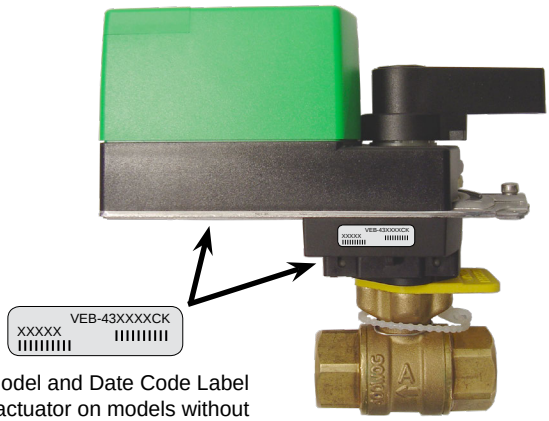


(Quick-Mounting) "V" Models Valve Cross-Reference

MEP-4xxx**V** actuators have brackets with a patent-pending, **quick-mounting** mechanism that mounts directly on VFB-43...BC and VFB-46...BC series valve bodies. **See the HPO-5074 installation guide and the VEB-43 and VEB-46 series data sheets for additional information.**

NOTE: "V" actuators were installed in VEB-43...CF, VEB-43...CK, VEB-46...CF, and VEB-46...CK valves starting in mid-June 2011 (date codes 11166 and later). Replacement (non-fail-safe) actuators for valves before this date code would be MEP-4002/4003.

"V" Actuator Installed on VEB-43 Series Valve Body with HPO-5074 Quick-Mount Adapter Kit



Valve Model and Date Code Label (below actuator on models without "V" actuators or on the side of the valve on models with "V" Actuators)

With the HPO-5074 kit, MEP-4xxx**V** actuators can be mounted on the following KMC and other valve bodies:

Typical Application	3-Way H/C Water	2-Way H/C Water	2-Way PIC-V H/C Water
KMC Valve Body	VFB-46__B**C***	VFB-43__B**C***	N/A
KMC Valve	VEB-46___B__	VEB-43___B__	
Valve Solutions (VSI)	UR3 Series	UR2 Series	SPV Series
Griswold	UR3 Series	UR2 Series	SPV Series
Delta Control Products	ST Series	ST Series	ATI Series
Honeywell	VBN3 Series	VBN2 Series	N/A
Siemens	599 Series	599 Series	
*VFB-4___B**C** valve bodies come with the HPO-5074 already installed.			

NOTE: When replacing a KMC MEP-5xxx actuator with an MEP-4xxx actuator on a ball valve, two options are:

- Using an MEP-4xxx**V** with an **HPO-5074** kit.
- Using an MEP-4xxx (non-V models) with an **HMO-4004** kit.

Accessories and More Information

For **mounting, wiring, auxiliary switches, feedback/direction selectors, actuator/signal range reset (auto-mapping)**, and other information, see the **MEP-4200/4500/4900 Series Installation Guide**.

For **torque selection, accessories, troubleshooting,** and other information, see the **MEP-4xxx Applications Guide**.

For **sample proportional single-zone heating/cooling valve applications using the CTE-5202** electronic thermostat, see the **CTE-5202 Applications Guide**.

NOTE: When replacing a KMC MEP-5xxx actuator with an MEP-4xxx actuator:

- If on a **damper**, use a non-V model of the MEP-4xxx.
- If on a **ball valve**, two options for replacement are: (1) the MEP-4xxx**V** with an **HPO-5074** kit **OR** (2) the MEP-4xxx (non-V models) with an **HMO-4004** kit.

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