CSP-4702

Analog Differential-Pressure VAV Controller/Actuator

Description and Application

The compact analog electronic CSP-4702 is a combination controller-actuator designed primarily for use on **pressure-independent VAV** (Variable Air Volume) terminal units. It also has applications as a **static pressure (bypass) controller**. (For sample applications, see **Applications and More Information on page 4**.)

Differential air pressure is sensed by an internal digital CMOS sensor connected via 1/4" FR tubing to an SSS-101x series airflow sensor. The **0 to 2" wc (0 to 500 Pa)** differential pressure sensor is internally linearized and temperature compensated for high accuracy down to very low pressures.

The CSP-4702 offers full-range flow control of VAV terminal units when used with the CTE-5202 electronic room thermostat. Air flow control limits may be set at the thermostat or internal to the CSP-4702. An adjustable mechanical stop is also included.

The CSP-4702 accepts a **2 to 10 VDC control signal** from the thermostat. "Anti-jitter" circuitry significantly reduces hunting and needless wear on the actuator and damper components (from unnecessary miniscule position changes caused by undamped analog input signals). It also provides a **16 VDC output supply** to **power** the thermostat and a **1 to 5 VDC voltage output** that is **proportional** to the **sensed** differential **pressure**.

The CSP-4702 mounts 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. (An HLO-4001 crank arm kit is available, however, for when direct mounting is impractical.) An HMO-4002 non-rotation bracket, to prevent lateral movement, is included. (An HMO-4001 non-rotation "T" bracket is also available for spanning open distances.) A gear disengagement button allows easy manual positioning of the actuator.

For troubleshooting and setup, internal status LEDs (under the cover) indicate green for opening and red for closing. Factory-set clockwise-to-close rotation can be reversed by changing a jumper position.

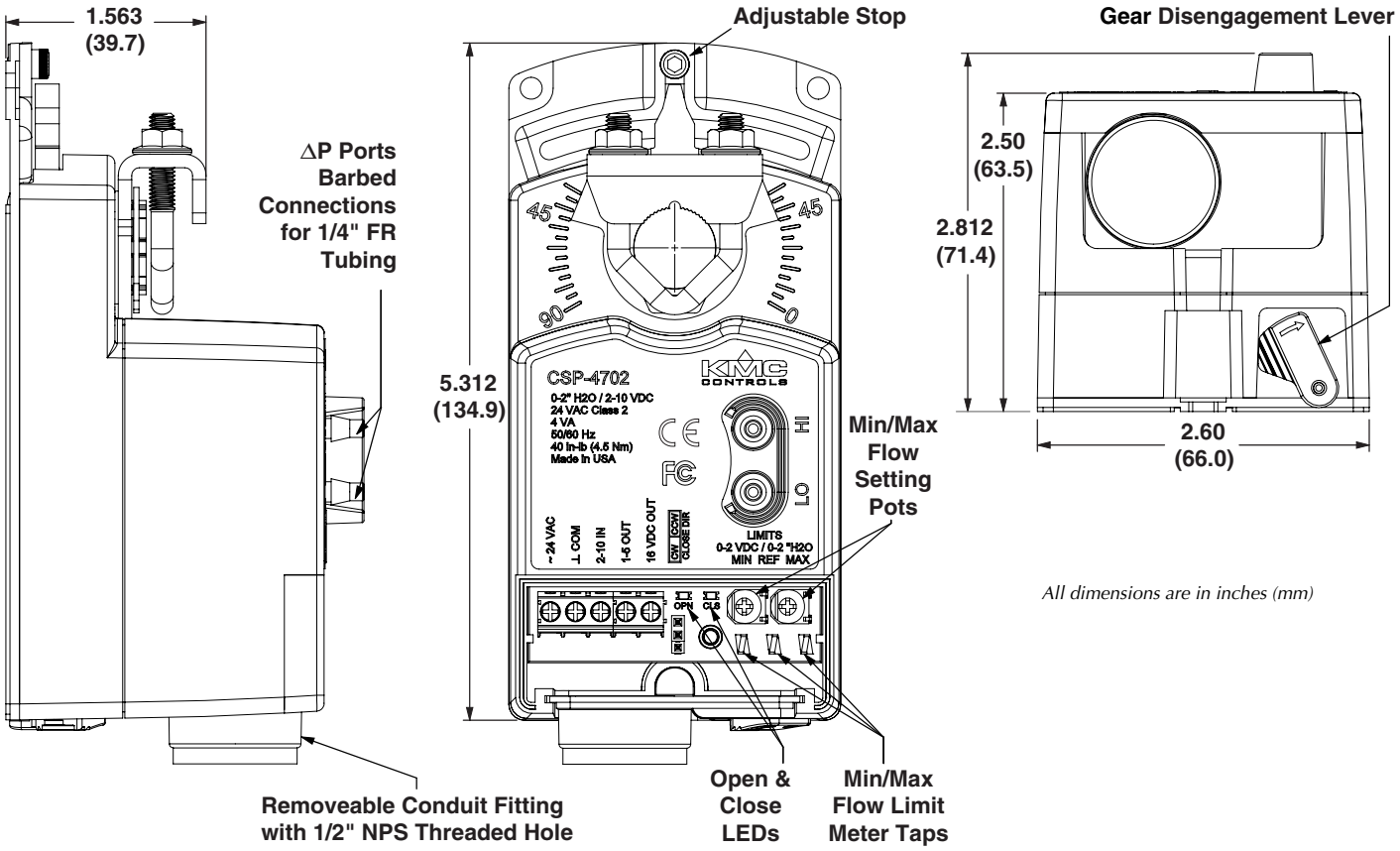
MADE IN USA

(Size Shown Relative to a Quarter)

Features

- Pressure-independent VAV (Variable Air Volume) or static pressure (bypass) control applications
- Onboard digital CMOS differential pressure sensor, internally linearized and temperature compensated, provides high accuracy down to very low pressures
- 1 to 5 VDC voltage output, proportional to the sensed differential pressure
- 16 VDC output to supply power to a thermostat, and input for 2 to 10 VDC control signal from a thermostat
- Adjustable mechanical end stop
- Internal LED rotation status indicators for troubleshooting and setup
- Rotation-to-close direction reversible via jumper
- Gear disengagement button for easy manual positioning
- Mounts directly to 1/4- to 5/8-inch round shafts or 1/4- to 7/16-inch square shafts, eliminating the need for expensive and complicated linkages

Specifications



Supply Voltage	24 VAC (–15/+20%) 50/60 Hz, Class 2 Only
Supply Power	4 VA
Output Supply	16 VDC (at up to 22 mA) to power thermostat
Output Torque	40 in-lb. (4.5 N•m)
Δ Pressure Range	0 to 2" wc (0 to 500 Pa)
Sensor Accuracy	±4.5% of the reading or (when near zero) 0.0008" wc (0.2 Pa), whichever is greater (@ 25° C)
Δ P Signal Output	1 to 5 VDC (proportional to 0 to 2" wc), 10K ohms max. load
Signal Input	2 to 10 VDC (from thermostat)
Min./Max. Limits	Adjustable, 0 to 2 VDC for 0 to 2" wc (500 Pa)
Angular Rotation	0 to 95°, fully adjustable with mechanical stop
Rotation Direction	Counterclockwise to close (default), selectable via jumper
Stroke Time	90 seconds for 90° @ 60 Hz, 108 seconds for 90° @ 50 Hz
Noise Level	< 35 dBA max. at 1 meter
Connections	Wire clamp type, 14 to 22 AWG, copper; differential air pressure ports for 1/4" FR tubing
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 non-rotational bracket HMO-4002 (supplied) or HMO-4001; minimum recommended damper shaft length is 1-5/8 inches
Material	Flame-retardant polymer, black housing with green cover
Weight	1.0 lb. (0.45 kg.)
Approvals	FCC Class B, Part 15, Subpart B; Complies with Canadian ICES-003 Class B; CE compliant

Environmental Limits

Operating	32 to 131° F (0 to 55° C)
Shipping	–40 to 176° F (–40 to 80° C)
Humidity	5 to 95% RH (non-condensing)

Accessories

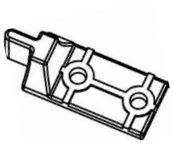
Air Flow Sensors

SSS-1012	1 sensing point, 3-5/32" length
SSS-1013	2 sensing points, 5-13/32" length
SSS-1014	3 sensing points, 7-21/32" length
SSS-1015	4 sensing points, 9-29/32" length

Thermostat and Miscellaneous

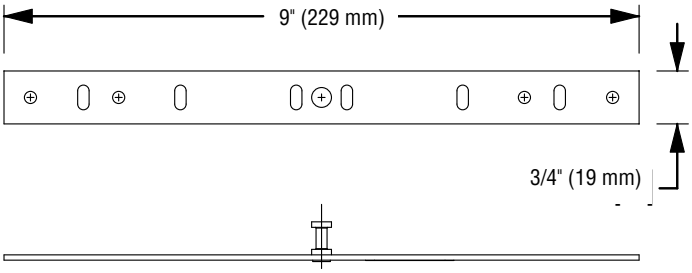
CTE-5202	Thermostat w/ LCD display
HCO-1151	Weather shield kit
HLO-4001	Crank arm kit
HMO-4001	Non-rotation "T" bracket
HMO-4002	Replacement non-rotation bracket

An **HCO-1151** enclosure, consisting of a metal mounting plate, plastic cover, non-rotation bracket, plug caps, and screws, is designed to protect actuators from inclement weather.



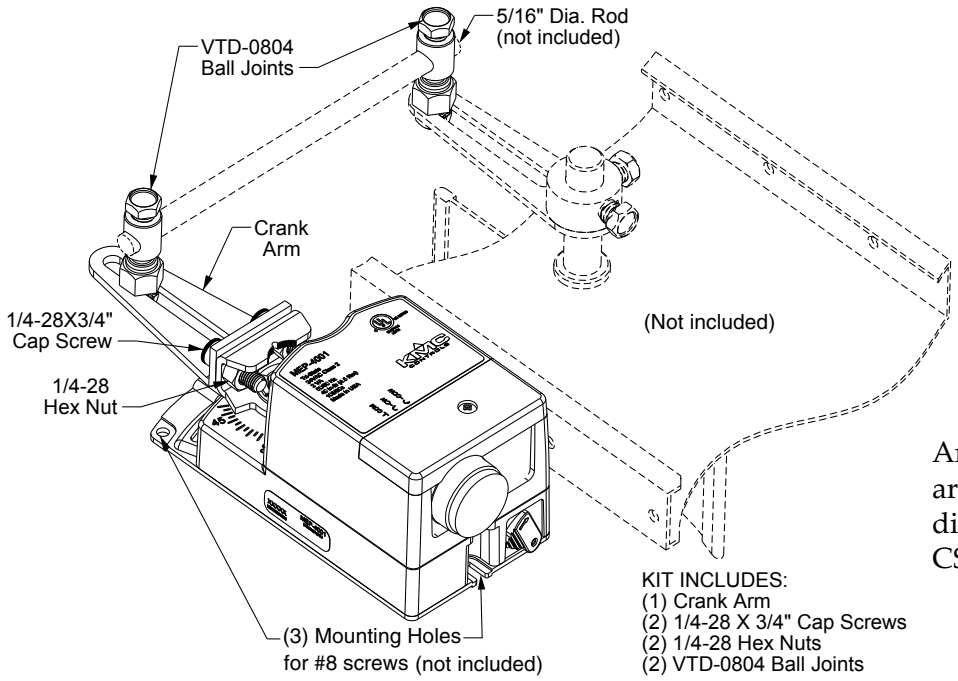
An **HMO-4002** non-rotation bracket is provided with the CSP-4702.

SSS-101x Series air flow sensors provide a means of measuring differential pressure inside a duct.



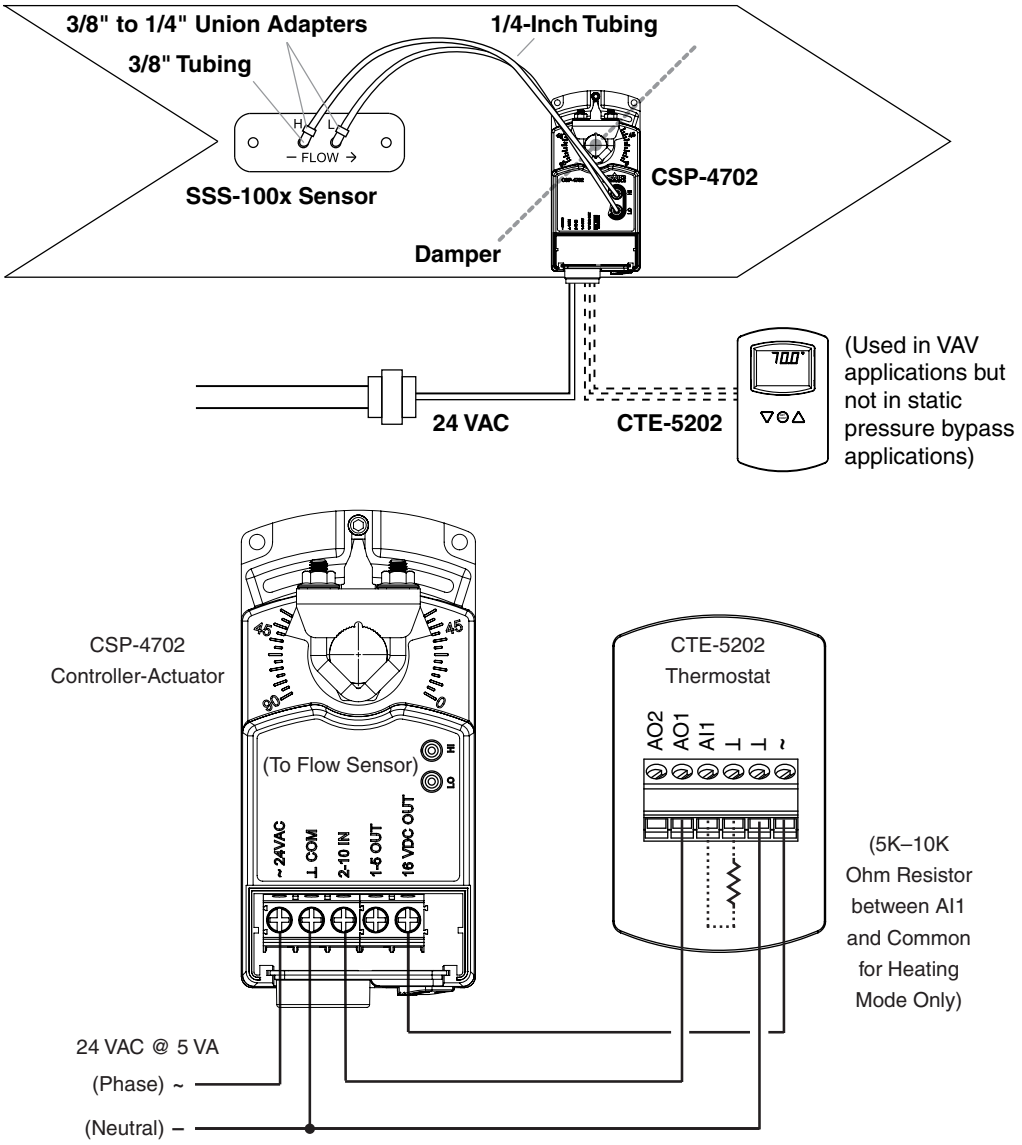
An **HMO-4001** non-rotation "T" bracket can be used instead to span an open distance.

For sample VAV applications using a **CTE-5202** electronic thermostat, see the **CTE-5202 Applications Guide**.



An **HLO-4001** crank arm kit is used when direct mounting of a CSP-4702 is impractical.

Applications and More Information



Pressure-Independent VAV Control with a CTE-5202 Thermostat Controllers

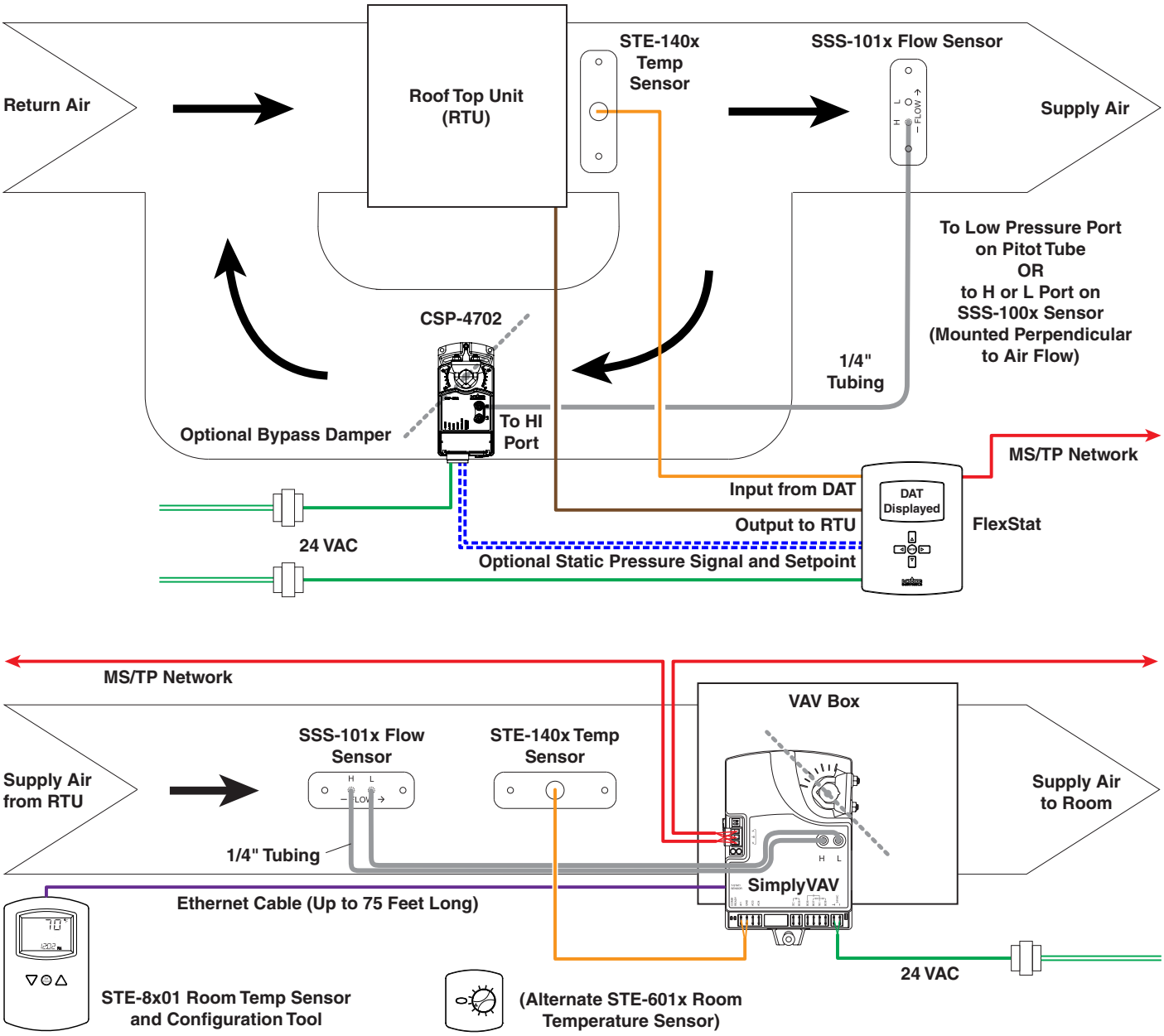
For sample applications with the CTE-5202 thermostat (such as the VAV example shown above), see the **CTE-5202 Applications Guide**.

NOTE: Air flow volume in VAV boxes (with supplied air flow sensors) is determined from the differential pressure by the formula **Volume** (cfm) = **K**√**ΔP** (the K factor of the VAV box multiplied by the square root of the differential pressure in "wc"). The K factor should be in the information supplied by the VAV box's manufacturer.

For CSP-4702 usage with KMC SSS-101x sensors, see the sensor K factors and other information in the **SSS-1000 Series Installation Guide**.

For use as a static pressure controller in AHU/RTU/HPU and zoning bypass applications, see the **CSP-4702 Static Pressure (Bypass) Control Application Guide** and the **VAV and IoT Retrofits for VVT Application Guide**.

A zoning system consists of a **BAC-120063CW-ZEC** FlexStat™ unitary controller along with KMC **SimplyVAV™** controllers for pressure-independent VAV control in their respective zones. The FlexStat can optionally be connected to an Internet of Things platform with a **KMC Commander™** that provides meaningful data in real-time to a PC or mobile device.



RTU Bypass Control with a BAC-120063CW-ZEC FlexStat and SimplyVAV Controllers

For information on mounting, wiring, and other information, see the **CSP-4702 Installation Guide**.

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