KMC ® CONTROLS

Description and Application

The KMC SSS-1000 series sensors are designed to sense differential pressure in the inlet section of VAV (Variable Air Volume) terminal units and fan terminal units. These sensors are most typically used in conjunction with VAV controllers for individual zone control in HVAC systems. They can also be used to sense differential pressure at other locations in the main or branch duct systems. The differential pressure read between the high "H" port and the low "L" port can be used to determine the air flow. Static pressure can also be measured using just one of the ports with the sensor rotated 90°. (See *Sample Applications on page 4*.)

Models offer up to four sensing points and sensing lengths of 3-5/32 to 9-29/32 inches to accommodate box size diameters of 4 to 16 inches.

For using SSS-100x sensors with **CSC-3000** series, **CSP-4000/5000** series, **KMD-7000** series, and **BAC-7000/8000/9000** series controllers, use a barb union adapter and appropriately sized polyethylene tubing to the sensor and controller. For maximum accuracy in the **CSP-5000** series, **KMD-7000** series, and **BAC-7000** series controllers, the 3/8" OD tubing between the sensor and the adapter should be as short as possible, and the 1/4" OD tubing from the adapter to the controller should be 24" long (on both the High and the Low sides). **Alternately,** use the equivalent SSS-101x sensor and just 1/4" OD tubing (no adapter is necessary).

To find the appropriate sensor "K" factor:

• For VAV controllers needing K_{CFM} for setup, see *"Cubic Feet Per Minute" K Factors on page 2*.

• For VAV controllers needing K_{FPM} for setup, see *"Feet Per Minute" K Factors on page 3*.

See the controller's documentation for details.

MADE IN USA

R⊙HS COMPLIANT

Models

SSS-100x (light gray) models have **1/4" connections for 3/8"** OD polyethylene **tubing**

SSS-1002	One sensing point, 3-5/32" (80 mm) length
SSS-1003	Two sensing points, 5-13/32" (137 mm) length
SSS-1004	Three sensing points, 7-21/32" (195 mm) length
SSS-1005	Four sensing points, 9-29/32" (252 mm) length

SSS-101x (light almond) models have **3/16" connections for 1/4"** OD polyethylene **tubing**
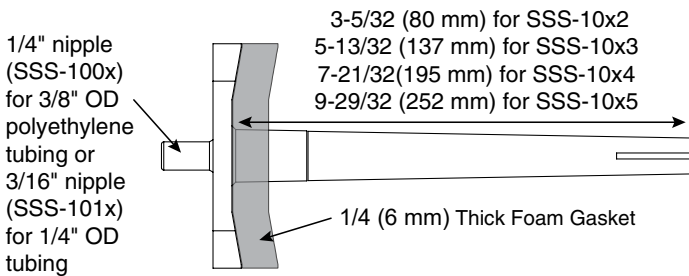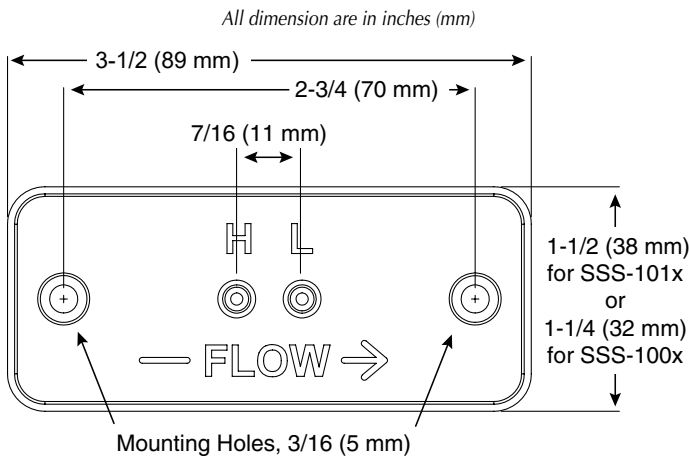
SSS-1012	One sensing point, 3-5/32" (80 mm) length
SSS-1013	Two sensing points, 5-13/32" (137 mm) length
SSS-1014	Three sensing points, 7-21/32" (195 mm) length
SSS-1015	Four sensing points, 9-29/32" (252 mm) length

NOTE: For maximum measurement accuracy, install the longest sensor that will fit in the duct.

Dimensions and Details

All dimension are in inches (mm)

3-1/2 (89 mm)
2-3/4 (70 mm)
7/16 (11 mm)

H L

— FLOW ⇒

1-1/2 (38 mm) for SSS-101x or 1-1/4 (32 mm) for SSS-100x

Mounting Holes, 3/16 (5 mm)

1/4" nipple (SSS-100x) for 3/8" OD polyethylene tubing or 3/16" nipple (SSS-101x) for 1/4" OD tubing

3-5/32 (80 mm) for SSS-10x2
5-13/32 (137 mm) for SSS-10x3
7-21/32 (195 mm) for SSS-10x4
9-29/32 (252 mm) for SSS-10x5

1/4 (6 mm) Thick Foam Gasket

Specifications

General

Material Light gray (SSS-100x) or al-mond (SSS-101x) ABS/polycar-bonate (UL94-5V)

Mounting Integral flange with gasket

Connection

    SSS-100x 1/4" (6.4 mm) nipple for **3/8"** (9.5 mm) OD polyethylene tubing

    SSS-101x 3/16" (4.8 mm) nipple for **1/4"** (6.4 mm) OD polyethylene tubing

Weight 1 oz. (28 grams)

Temperature Limits

    Operating 40 to 120° F (4 to 49° C)
    Shipping −40 to 140° F (−40 to 60° C)

Approvals RoHS compliant

"Cubic Feet Per Minute" K Factors

NOTE: For the appropriate sensor "K" factor:

- For VAV controllers needing K_{CFM} for setup, see the formulas under *"Cubic Feet Per Minute" K Factors on page 2*.

- For VAV controllers needing K_{FPM} for setup, see the formulas *"Feet Per Minute" K Factors on page 3*.

For Controllers Needing K_{CFM} for Setup				
Round Duct Size (Diameter)	K_{CFM} Factor (CFM)			
	SSS-10x2	SSS-10x3	SSS-10x4	SSS-10x5
4	301	NA	NA	NA
5	470	NA	NA	NA
6	677	648	NA	NA
7	922	882	NA	NA
8	1204	1152	1117	NA
9	1524	1458	1414	NA
10	1882	1800	1745	1745
12	2710	2592	2513	2513
14	3688	3528	3421	3421
16	4817	4608	4468	4468
18	6097	5832	5655	5655
22	9107	8711	8447	8447
24	10838	10367	10053	10053

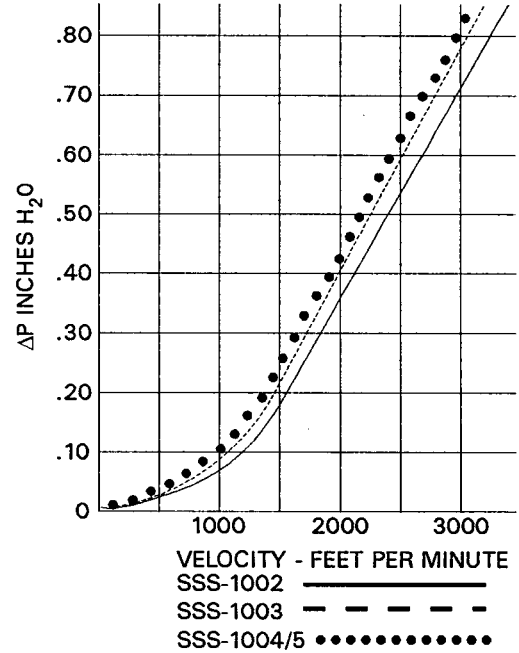For K_{FPM}, see *"Feet Per Minute" K Factors on page 3*.

For **rectangular** ducts, $K_{CFM} = K_{FPM} \times (W" \times H"/144)$ (with duct cross-section measurements in inches).

For **round** ducts, $K_{CFM} = K_{FPM} \times (\pi r^2/144)$ (with duct cross-section measurements in inches).

NOTE: To conveniently determine the radius of an installed round duct, measure the circumference with a string and tape measure and calculate radius = circumference/2π. The K_{CFM} values for the most common (diameter) sizes of round ducts are listed above. (Diameter = 2r.)
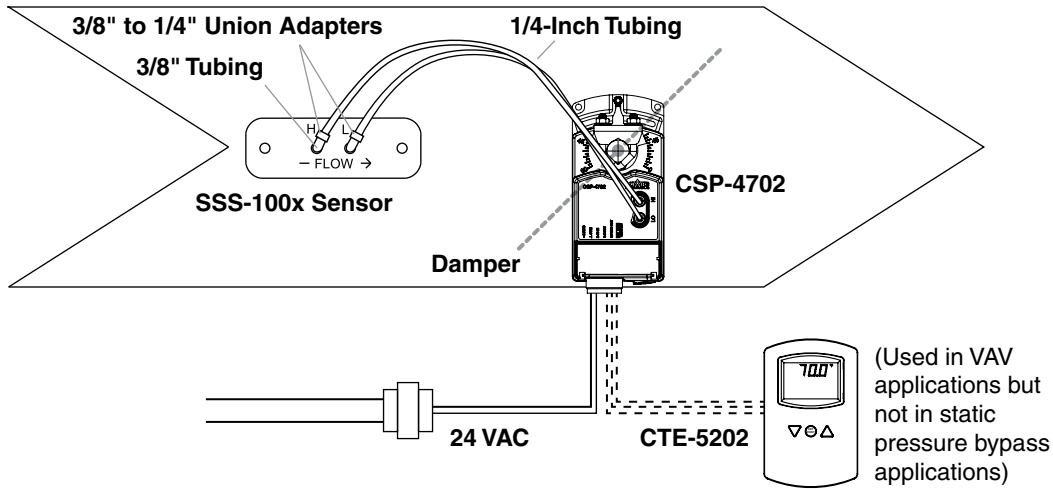
"Feet Per Minute" K Factors

"Feet Per Minute" K Factors	
Sensor Model	$\mathbf{K_{FPM}}$
SSS-10x2	3450
SSS-10x3	3300
SSS-10x4	3200
SSS-10x5	3200

VELOCITY - FEET PER MINUTE
SSS-1002 ————————
SSS-1003 — — — — —
SSS-1004/5 ●●●●●●●●●●●

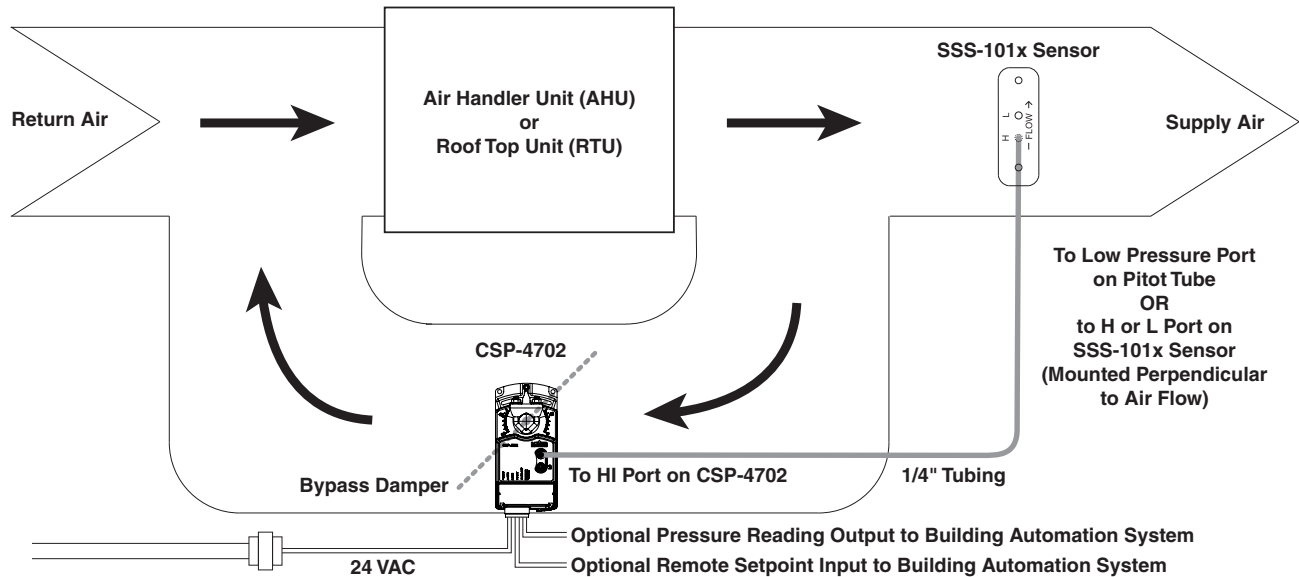| Formulas			
For Flow		**For Volume**	
$\Delta P = (FPM/K_{FPM})^2$	$FPM = K_{FPM} \times SQRT(\Delta P)$	$\Delta P = \left(\dfrac{CFM}{K_{FPM} \times Area} \right)^2$	$CFM = K_{FPM} \times SQRT(\Delta P) \times Area$
Feet Per Minute in a VAV box equals the (relevant model's) K factor times the square root of the differential pressure (in "wc").		Cubic Feet per Minute in a VAV box equals the relevant sensor model's K factor times the square root of the differential pressure (in "wc") times the cross-section area (in square feet).	
NOTE: These formulas are for VAV controllers with built-in "differential pressure" sensors. The CSP-5000, KMD-7000, and BAC-7000 measure velocity FPM directly—see their respective installation guides and application guides for more information.			
NOTE: CFM (cubic feet per minute) = FPM (feet per minute) times the duct cross-section area (in square feet).			

Differential Pressure Sensor for Pressure Independent VAV

3/8" to 1/4" Union Adapters **1/4-Inch Tubing**

3/8" Tubing

H   L

— FLOW →

SSS-100x Sensor

CSP-4702

Damper

24 VAC   **CTE-5202**

(Used in VAV applications but not in static pressure bypass applications)

For more information, see the **CTE-5202 Applications Guide**.

NOTE: Adapters and 3/8" tubing not needed for SSS-101x sensors.

Static Pressure Sensor for Static Pressure Bypass Control

SSS-101x Sensor

Return Air

Air Handler Unit (AHU)
or
Roof Top Unit (RTU)

Supply Air

L
H
— FLOW →

To Low Pressure Port on Pitot Tube
OR
to H or L Port on SSS-101x Sensor
(Mounted Perpendicular to Air Flow)

CSP-4702

Bypass Damper   **To HI Port on CSP-4702**   **1/4" Tubing**

Optional Pressure Reading Output to Building Automation System
Optional Remote Setpoint Input to Building Automation System

24 VAC

For more information, see the **CSP-4702 Static Pressure (Bypass) Control Application Guide**.

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