

“Bleed” Airflow Measurement Systems

System Features

- Bidirectional or Unidirectional dynamic pressure and airflow measurement.
- Measure between spaces for ultra low “dynamic” pressure control.
- Measure across intake louvers or fixed dampers to determine outside air flow rates.
- Measure across relief dampers to create an “electronic” gravity damper.
- Advanced Thermal Dispersion (TD) airflow measurement technology.
- Sensor and transmitter diagnostics with intelligent sensor detection system.
- Stable, hermetically sealed “bead in glass” thermistor sensors.
- Exclusive “plug and play” SMART sensor design.
- Microprocessor based digital circuitry with FLASH memory.
- Fully temperature compensated.
- Provides direct signal(s) to all B.A.S.
- Low price.



Application

Thermal dispersion technology can accurately measure airflow rates to determine bleed airflow or differential dynamic pressure across an obstruction or fixed orifice.

The **STA102-B** is ideal for measuring very small dynamic pressure between two spaces or between interior and exterior walls for space pressure control. (Dynamic pressure is determined by measuring the bleed airflow rate, neglecting frictional losses in the sensor).

The device is also well suited for the measurement of outside airflow rates. Outside airflow rates can be determined by measuring the “bleed” airflow developed across an intake louver or fixed damper using a field or laboratory-generated correction factor related to the intake louver flow coefficient.

Control of exhaust flow rates in supply/return fan systems can also be accomplished by measuring and maintaining positive dynamic pressure across a relief air damper. The application essentially creates an electronic “gravity” damper.

For detailed application information refer to **EBTRON** application design guides, available in your **EBTRON** catalog, online at ebtron.com or from your local **EBTRON Representative**.

Selection

The **STA102-B** has been developed with most “traditional” options included standard. Each transmitter serves a single location and can be configured to measure differential dynamic pressure or “bleed” airflow and direction. The transmitter requires 24 VAC and provides the host controls with a linear output signal in dynamic pressure or “bleed” airflow.


Each transmitter is fully independent of the sensor. “Smart” sensor technology embeds the calibration data of the sensor in the cable assembly. Each transmitter is provided with field selectable, isolated 4-20 mA and 0-10 VDC analog output signal for dynamic pressure or “bleed” airflow. Output scales can be configured easily in the field (see **Technical Specifications** for factory default settings).



Connection to the **STA102-B** sensor housing is provided by a 1/2 inch NPT connection. Several mounting kits are available for specific applications (see **Sensor Housing Installation**). The model **STA102-B** has a typical installed accuracy $\pm 2\%$ of reading for airflow ($\pm 4\%$ of reading for dynamic pressure) when installed in accordance with **EBTRON** installation guides.

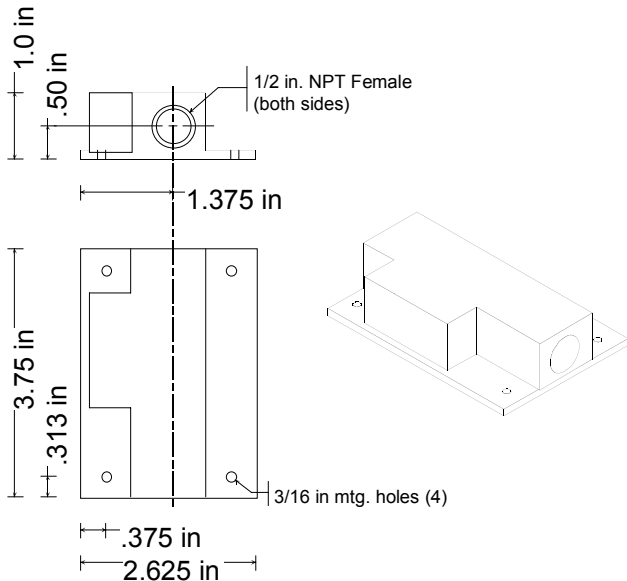
Sensor Housing Installation

Sensors are designed to be mounted across fixed obstructions which induce a differential airflow rate. All sensor housings have a standard 10 foot plenum rated cable (optionally up to 50 feet) for connection to the remotely located transmitter (required). The sensor housing is connected to the transmitter with a simple, positive locking, DIN connector. The connector is 5/8" O.D. The sensor housing should be installed with the airflow arrow pointing towards the direction of airflow for "bleed" airflow applications or the low pressure side for dynamic pressure applications. Fasten in place with suitable hardware.

 **The cable length ordered must be long enough to accommodate the distance between the transmitter and sensor.**

- Between spaces:** Install between two spaces to determine differential pressure. Provide a rain shield or mount the sensor housing vertically with at least 6 inches of vertical drop between the sensor housing and the exterior opening for applications exposed to exterior surfaces.
- Across intake louvers, hoods or dampers:** Install across an intake louver, hood or damper to measure outside airflow rates. The opening must be fixed and not have a filter between the inlet and outlet of the sensor. Provide a rain shield or mount the sensor housing vertically with at least 6 inches of vertical drop between the sensor housing and the exterior opening. Mount the sensor housing where it will not be exposed to direct rain or snow.
- Across relief dampers:** Install across a relief damper to create a precision electronic "gravity" damper.

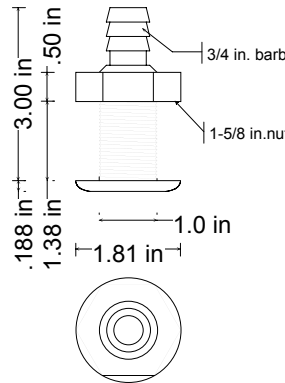
Sensor Head Dimensions



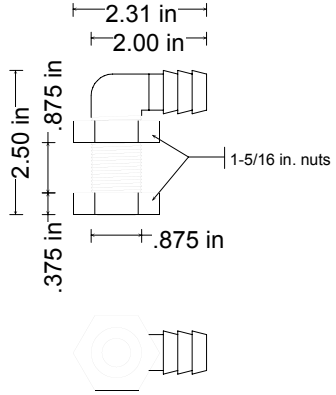
3/4" Tube Fitting Dimensions

Note: Fittings are provided with optional kits below

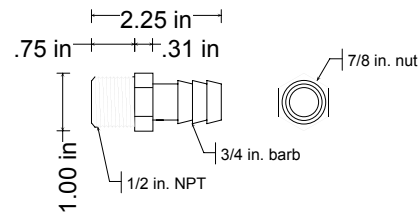
Straight Fitting



Right Angle Fitting

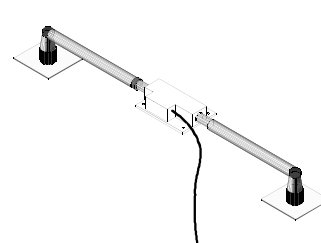


NPT to 3/4" Tube Sensor Housing Adapter

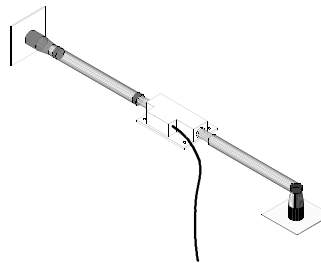


Mounting Kits (optional)

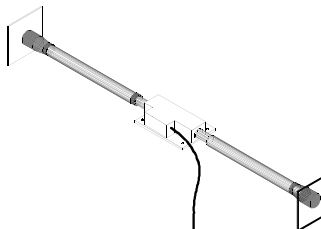
Kits are provided with 3' of Reinforced Vinyl Tubing



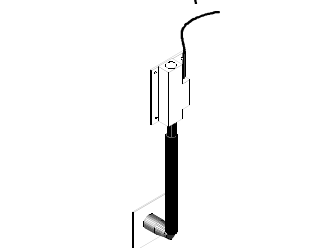
- /R: (dual right angle)**
 - Across Dampers.
 - Across Ceilings.



- /SR: (straight/right angle)**
 - Between walls and ceilings
 - Across dampers or louvers. (provide a rain shield, by others, if straight fitting is on an exterior wall).



- /S: (dual straight)**
 - Between walls (provide a rain shield, by others, if fitting is on an exterior wall).





- /L: (single right angle)**
 - Between walls and ceilings
 - Across dampers or louvers. (provide at least 6" of vertical tube to prevent rain penetration).

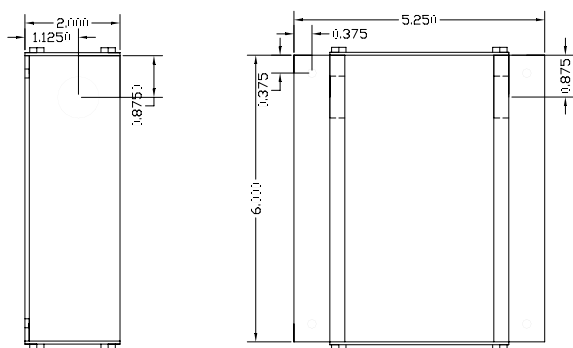
Transmitter Installation

The STA102-B transmitter aluminum chassis has been designed for use in a protected environment between -20° F and 120° F where it will not be exposed to rain or snow. If the transmitter must be installed outside, a NEMA4 enclosure with heater may be required. Consult the factory for enclosure availability and application requirements.

The transmitter should be mounted **upright** in a field accessible location. The enclosure chassis is designed to accept 3/4" conduit fittings for power and signal wiring at the top left and right of the enclosure. The transmitter should be located such that the connecting cable from the sensor probe reaches the receptacle on the bottom of the transmitter enclosure.

-  Do not expose the transmitter to rain or snow without providing a NEMA4 enclosure.
-  Do not drill into the transmitter chassis since metal shavings could damage the electronics.


STA102-B Transmitter Dimensions



Electrical Connections

After mounting the sensor and transmitter, connect the sensor cable plug to the 8 pin circular DIN receptacle located at the bottom of the STA102-B transmitter enclosure.

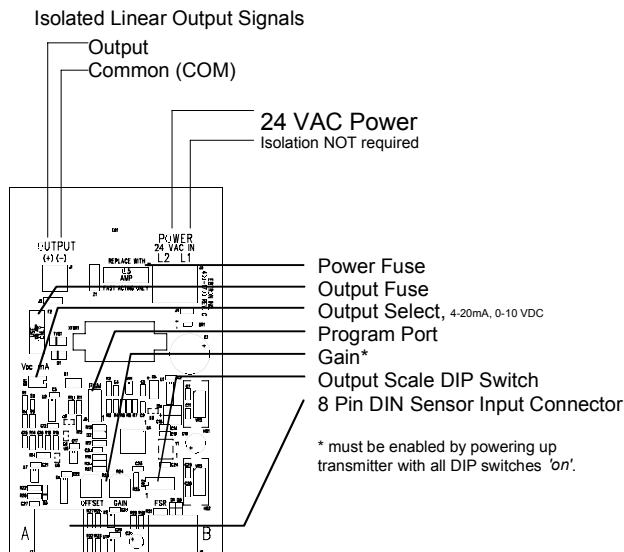
To wire the output signal and power, slide the cover plate up and out of the extruded chassis. Signal wires should be connected to the small, three position output terminal labeled "OUTPUT" on the upper left hand side of the main circuit board.

-  When configured for a 4-20 mA output, the STA102-B is "4-wire" device. The host controls should not provide an excitation voltage to the output of the STA102-B.

Make sure that the 24 VAC power source is not energized. 24 VAC power should be connected to the large, two position power input terminal labeled "POWER" on the upper right hand side of the main circuit board. Since the output signals are isolated from the power supply, it is not necessary to provide an isolated (secondary not grounded) power source.

-  Multiple STA102-B transmitters wired on a single transformer must be wired "in-phase".

STA102-B Transmitter Wiring and Circuit Board Functions



Start-up

To assure a successful startup, check that the STA102-B is installed in accordance with this document.

-  Check the physical installation, power connections, and signal wiring prior applying 24 VAC power

The transmitter is factory shipped with the analog output signals set to the 4-20mA default. If a 0-10 VDC output is desired, simply move the switch SW1 to the 0-10 VDC position prior to power-up. The output signal is linear to either airflow or dynamic pressure. To change the factory default scaling, refer to the DIP switch diagram below.

Output Scale DIP Switch Settings

DIP Switch Position				Output 1
1	2	3	4	
off	off	off	off	Output = null
off	off	off	on	0-250 FPM
off	off	on	off	0-500 FPM
off	off	on	on	0-1,000 FPM
off	on	off	off	0-1,250 FPM
off	on	off	on	0-1,500 FPM
off	on	on	off	0-2,000 FPM
off	on	on	on	0-3,000 FPM
on	off	off	off	+/- 0.005 in.wg.
on	off	off	on	+/- 0.01 in.wg.
on	off	on	off	+/- 0.05 in.wg.
on	off	on	on	+/- 0.10 in.wg.
on	on	off	off	+/- 0.15 in.wg.
on	on	off	on	+/- 0.25 in.wg.
<u>on</u>	<u>on</u>	<u>on</u>	<u>off</u>	<u>+/- 0.50 in.wg.</u>
on	on	on	on	Output = 1/2 F.S.

Underlined items indicate the factory default settings.

Energize the 24VAC power source. The transmitter executes a complete self-check each time that power is applied. Check that scaling in the host control system returns an output that matches the output of the STA102-B.

Maintenance

In most HVAC environments, periodic maintenance or recalibration is neither required nor recommended¹.

Standard Limited Warranty

If the **STA102-B** fails within 36 months from from shipment, **EBTRON** will repair/replace the device free of charge as described in the company's warranty contained in **EBTRON's Terms and Conditions of Sale**. Defective equipment shall be shipped back to **EBTRON**, freight pre-paid, for analysis.

¹In extremely dirty environments, periodic inspection of the sensor element is advised. Carefully remove any excessive buildup of material with compressed air or with a small brush. Recalibration is not required.



Thermal Dispersion Airflow Measurement

1663 Hwy. 701 S., Loris, SC 29569 USA
Toll Free: 800-2EBTRON (232.8766) Fax: 843.756.1838
Internet: www.ebtron.com e-mail: ebtron@ebtron.com

STA102-B Technical Specifications

System Performance

STA102-B Installed Accuracy (typ. \pm of reading):

Airflow: 2%

Dynamic Pressure: 4%

Repeatability (\pm of reading): 0.25%

Sensor Probe Specifications

Sensor Assembly Model: SB1

Construction: Glass-filled Polypropylene

Sensor Assembly: Three hermetically sealed "bead-in-glass" thermistors in an engineered thermoplastic housing

Pipe Connections to Sensor Head: 1/2 inch NPT

Cable Assembly:

Type: Plenum Rated

Length: 10' std. (50' opt.)

Connection to Transmitter: 5/8" Circular DIN connector

Number of Air Velocity Calibration Points (each direction): 16

Number of Temperature Calibration Points: 3

Sensor Accuracy (\pm of reading):

Airflow: 2%

Dynamic Pressure: 4%

Calibrated Range:

Airflow: \pm 0- 3,000 FPM

Dynamic Pressure: \pm 0.5 in.wg.

Sensor Temperature Range

0-1,500 FPM: -20° F to 160° F

0-3,000 FPM: 30° F to 160° F

Humidity range: 0 to 99% RH, non-condensing

Transmitter Specifications

Transmitter Model: STA102

Maximum Number of SB1 Sensors per Transmitter: 1

A/D Converter: 12 bit

Sensor Independent Electronics: Yes

Power Requirement: 24 VAC @ 8 VA max. (fused and protected on transmitter, isolation not required)

Chassis (enclosure): Aluminum (protect from water and condensation)

Output Signal Adjustments: Field adjustable digital airflow gain

Analog Output protection: Fused and protected, ISOLATED analog output

Analog Output Signal: Field selectable, linear analog output signal of 4-20mA and 0-10 VDC for airflow or dynamic pressure

Analog Output Scaling: Field selectable airflow or dynamic pressure

Factory Default: \pm 0.5 in.wg.

Transmitter Temperature Range: -20° F to 120° F

Analog Output Resolution (full scale output): 0.1%

Warranty

Standard Warranty: 36 months from shipment.

Underlined items indicate *Factory Default* settings.