

BLEED AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY



PRODUCT HIGHLIGHTS

- “Plug and Play” operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- Detect ΔP as low as 0.0002” H₂O
- Uni- or bi-directional measurement
- Airflow (or ΔP) and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Dry contact relay
- Three mounting kits available
- 1/2” NPT female pipe connections
- Remote transmitter with LCD display
- Smart Sensor Detection System (SDS) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Ultra-low pressure detection
- Parking garage pressurization
- Construction zone contaminant containment
- Stairwell pressurization
- Relief and exhaust damper control
- Airflow across a louver or other fixed opening

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON’s thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The EF-x2000-B is a unique measurement device that can detect very small pressure differentials (as low as 0.0002” H₂O) between two adjacent spaces by sensing the airflow rate induced by the pressure gradient. The EF-x2000-B can be used to determine the airflow rate across fixed openings when a reference airflow rate is provided.

EF-x2000-B TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configuration

1 bi-directional, dual 1/2" NPT female bleed sensor housing

Installed Accuracy

Airflow through an opening or across an obstruction: Requires field measurement of a reference airflow of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.

Equivalent pressure between two adjacent spaces: Requires field measurement of a reference pressure to correct the default flow coefficient of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.

Listings and Compliance

UL: 60730-1, 60730-2-9; CAN E60730-1, E60730-2-9 (EF-A2000-B Only)

FCC: This device complies with Part 15 of the FCC rules

RoHS: This device is RoHS2 compliant

Environmental Limits

Temperature:

Sensor -2,000 to 2,000 fpm [-10.16 to 10.16 m/s];
-20 to 160 °F [-28.9 to 71.1 °C]

Sensor -3,000 to 3,000 fpm [-15.24 to 15.24 m/s];
0 to 160 °F [-17.8 to 71.1 °C]

Transmitter: -20 to 120 °F [-28.9 to 48.9 C]

Humidity: (non-condensing)

Probes: 0 to 100%

Transmitter: 5 to 95%

Bleed Sensor Assembly

Sensing Node Sensors

Self-heated sensor: Two precision, hermetically sealed, bead-in-glass thermistor probes

Temperature sensor: One precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing

Material: Glass-filled Polypropylene

Sensor Potting Materials: Waterproof marine epoxy

Airflow Measurement

Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)

Calibrated Range: -3,000 to 3,000 fpm [-15.24 to 15.24 m/s]

Calibration Points: 9

Temperature Measurement

Accuracy: ±0.15°F [0.08 °C] to NIST-traceable temperature standards (includes transmitter uncertainty)

Calibrated Range: -20 to 160 °F [-28.9 to 71.1 °C]

Calibration Points: 3

Probe to Transmitter Cables

Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 °F [-55 to 150 °C], UV tolerant

Standard Lengths: 10, 25 and 50 ft. [3.1, 7.6 and 15.2 m]

Connecting Plug: 0.60" [15.24 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A

User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options

EF-A2000 Transmitter: Two field selectable (0-5/1-5/0-10/2-10 VDC*), scalable and protected analog output signals (AO1=airflow or equivalent ΔP, AO2=temperature or alarm)

* The VDC output circuit of the EF-A2000 transmitter can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.

EF-N2000 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network (provide individual 24 VAC transformers for each EF-N2000 transmitter for applications requiring isolated RS-485)

Relay

Type: Dry Contact w/ onboard jumper to drive a remote LED (R1=alarm)

Status: N.O. or N.C. via user setup configuration

Rating: 30 VDC or 24 VAC @ 3 amp. max.

Airflow (or Pressure) Alarm

Type: Low and/or high user defined setpoint alarm

Tolerance: User defined % of setpoint

Delay: User defined

Reset Method: Manual or automatic

Visual Indication: Yes, LCD display

Network Indication: Yes (EF-N2000 only)

Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)

Contact Closure Relay: Yes, on R1 assignment

System Status Alarm

Type: Sensor diagnostic system trouble indication

Visual Indication: Yes, LCD display

Network Indication: Yes (EF-N2000 only)

Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)

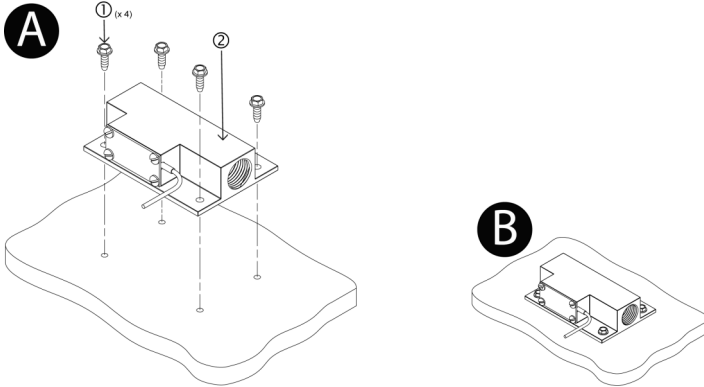
Contact Closure Relay: Yes, on R1 assignment

SENSOR PROBE INSTALLATION

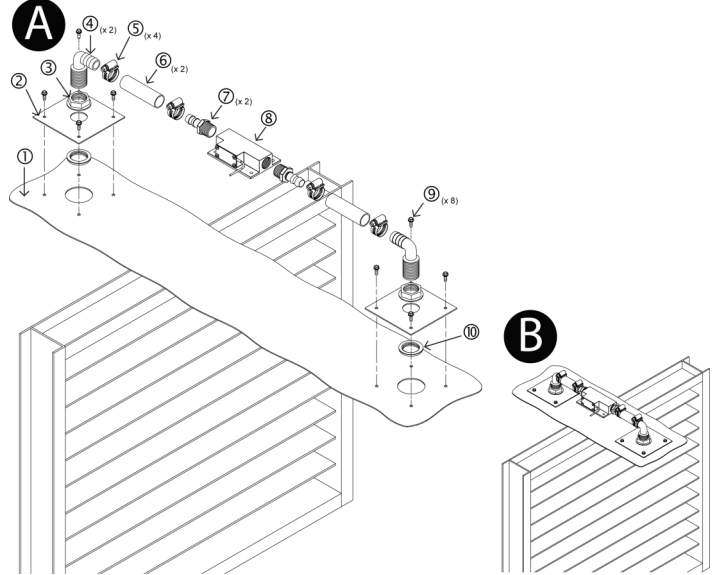
Detailed installation guidelines for probes are provided in the O&M Manual for the following mounting styles.

Sensor Probe Installation Diagrams

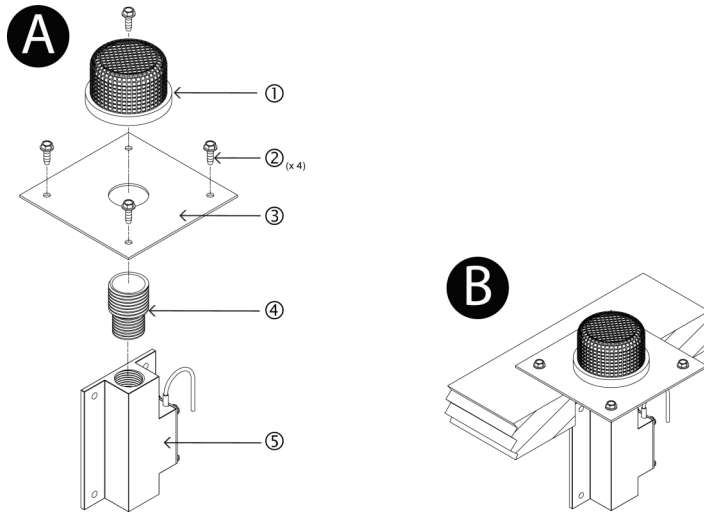
-B Probe Installation (No-Kit Mounting)



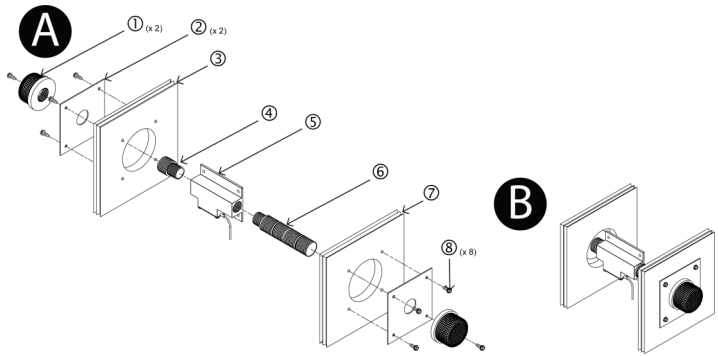
-B Probe Installation (Damper Mounting)



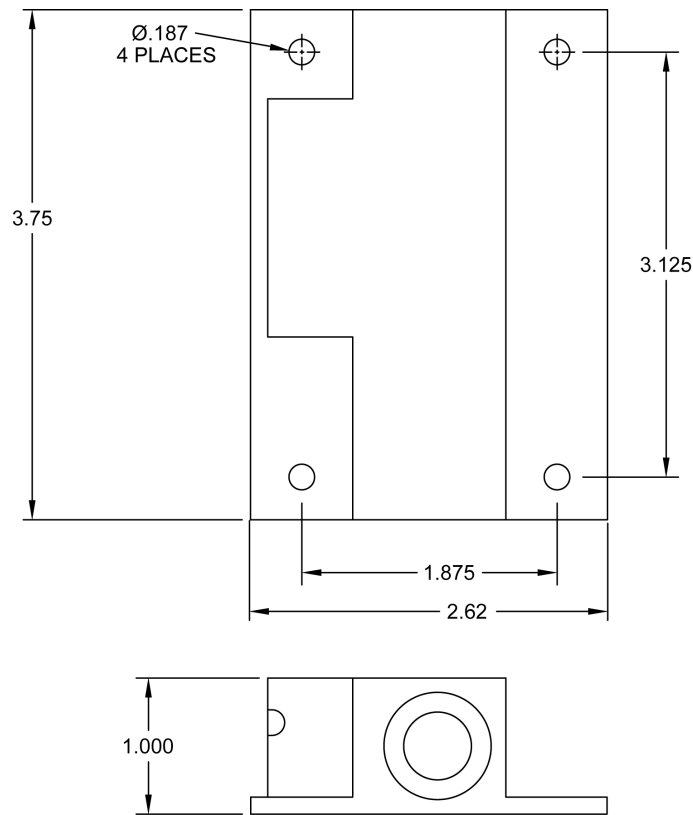
-B Probe Installation (Under-Floor Mounting)



-B Probe Installation (Wall Mounting)



Bleed Sensor Dimensions



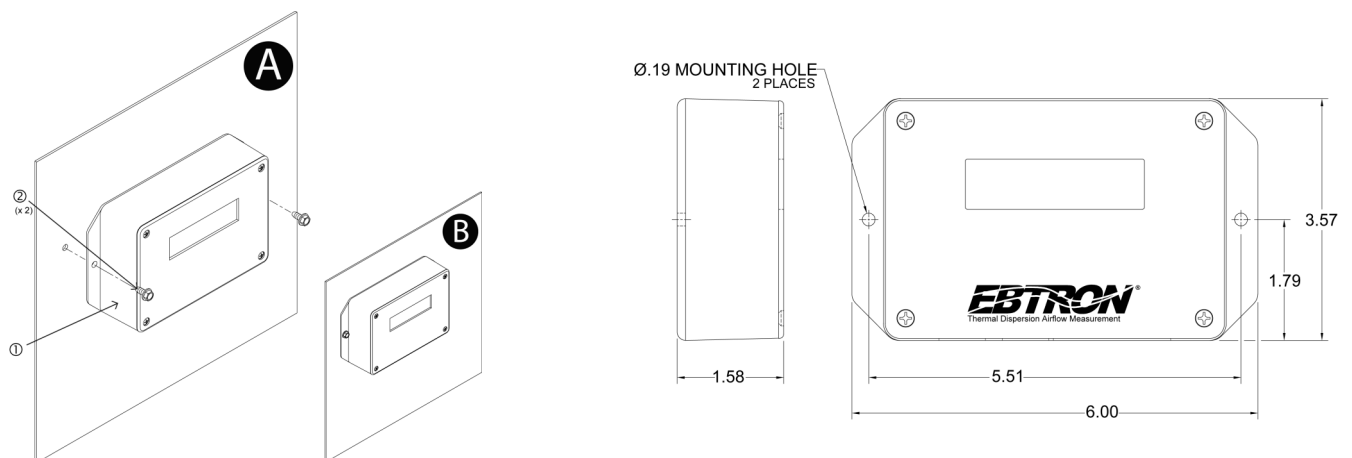
TRANSMITTER INSTALLATION AND WIRING

Detailed installation guides for transmitters are provided in the O&M Manual for the connectivity options that follow. All EF-x2000 transmitters are provided with either an analog ($x = A$) or a RS-485 ($x = N$) output.

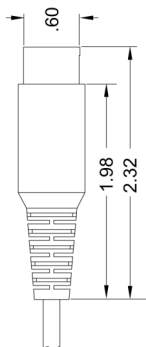
Locate the transmitter where all of the sensor probe connecting cables will reach the transmitter and it is protected from moisture, rain, and snow.

Transmitter Mounting Diagram and Dimensions

EB-Flow II EF-x2000 Series Transmitter Installation



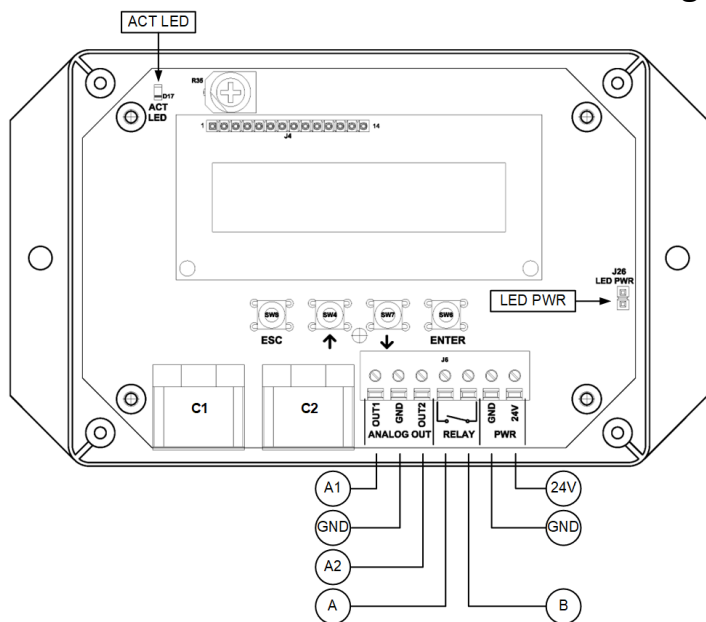
All Models - Probe Connector



⚠ Push in **keyed** connector plugs (sensor data is stored in serial memory chip in connector plug). **DO NOT TWIST!**

ⓘ Cables have an FEP plenum rated jacket that are UV tolerant and suitable for operation over the entire operating temperature range of the device.

EF-A2000-B - Wiring and Probe Connections



TRANSMITTER CONNECTIONS

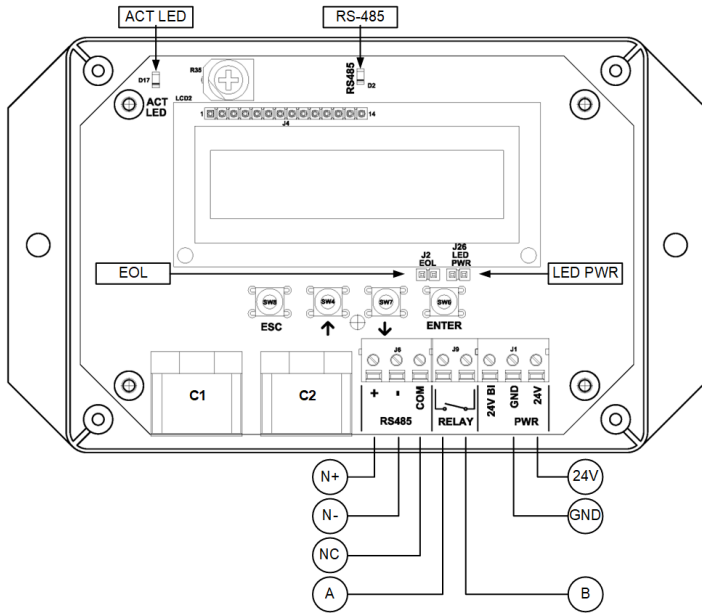
| Power | | Analog Out (non-isolated) | | | Contact Closure | | Connector | |
|--------------|------------------|---------------------------|------------------------|---------------|-----------------|----|--------------|----------|
| 24V | GND | A1 | A2 | GND | A | B | C1 | C2 |
| 24 VAC (hot) | 24 VAC (neutral) | Airflow (or Pressure) + | Temperature or Alarm + | Signal Common | OUT | IN | Bleed Sensor | Not Used |

Connect each analog output signal required to the host B.A.S. using shielded twisted-pair wire. Properly terminate the shield (typically at the B.A.S.).

⚠ If twisted pair wire and/or shielded cable is not used, extraneous electrical noise can be picked up between the transmitter and host control panel.

ⓘ Transmitters are preconfigured for 2-10VDC. Consult the Startup Guide for the appropriate model to change the output to either 0-5 VDC, 0-10 VDC or 1-5 VDC.

EF-N2000-B - Wiring and Probe Connections



TRANSMITTER CONNECTIONS

| Power | | RS-485 (non-isolated) | | | Contact Closure | | Connector | |
|------------------|-----|-----------------------|-----------|----------------|-----------------|----|--------------|----------|
| 24V | GND | N+ | N- | NC | A | B | C1 | C2 |
| 24 VAC (hot) | | Network + | Network - | Network Common | OUT | IN | Bleed Sensor | Not Used |
| 24 VAC (neutral) | | | | | | | | |

Use a 3-conductor network cable meeting the corresponding BACnet or Modbus standards. Ensure that all three connections, N+, N- and NC are connected.

- i* Refer to the O&M Manual for information regarding network configuration, BACnet objects, and Modbus registers.
- i* Transmitters are preconfigured for BACnet MS/TP. Consult the Startup Guide for the appropriate model to change the output to Modbus RTU network protocol.
- !** If a 2-conductor network cable or other non-conforming cable is used, network speed, length and reliability may be compromised or network failure may occur.
- i* If the transmitter is the first or last device on the network run, place the shunt jumper across the EOL posts (J2).

STARTUP

Detailed startup guides are provided in the O&M Manual.

VERIFICATION, TROUBLESHOOTING, AND MAINTENANCE

Verification and troubleshooting is discussed in detail in the O&M manual.

EBTRON airflow monitoring devices are factory calibrated and should not require periodic maintenance or recalibration in most HVAC environments. If the sensor probes are installed in a location that is subject to excessive dust, lint, or other airborne debris accumulation, filtration at the source or access for cleaning should be provided. Please note that this issue is not specific to EBTRON or EBTRON technology. Consult EBTRON to discuss specific concerns or suggested remedies if airborne particulates are a concern.

APPLICATION REVIEW REQUESTS

EBTRON and/or your local representative will review the application and make recommendations on the proper use of this device prior to requesting a quotation or placing an order. Provide as much of the following information as possible to facilitate the review process:

- √ Service: SA, RA, OA, EA, Other (specify)
- √ Duct or opening size where the probes will be installed
- √ Minimum and maximum expected airflow rates
- √ Minimum and maximum expected airstream temperatures
- √ Immediate up and downstream disturbance and the distance between disturbances
- √ Mechanical drawings or sketches
- √ Sequence of operation
- √ Control schematic

QUOTATIONS AND ORDERING

Use the model code below to request a quote or place an order. Quotations and orders are provided by your local EBTRON representative.

