

AIRFLOW MEASUREMENT WITH TEMPERATURE CAPABILITY



PRODUCT HIGHLIGHTS

- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Cost effective single probe
- Velocity pressure output option
- Temperature output models available
- Analog and RS-485 output models
- Duct insertion mounting
- Integral transmitter
- Velocity-weighted temperature measurement between -20° F to 120° F
- Smart *Sensor Detection System (SDS)* continuously monitors for sensor and transmitter faults
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- High performance CV/VAV terminal box measurement
- Small duct outdoor air delivery monitoring
- Small duct airflow tracking
- Hospital pressurization
- Laboratory pressurization

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-x1000-T (ELF) is EBTRON's economical measurement solution for round ducts between 4 and 16 inches in diameter. Ideal for most small duct airflow measurement and airflow tracking applications. Low flow performance, temperature capability and connectivity options make this a better choice than traditional differential pressure averaging arrays, rings and crosses.

EF-x1000-T TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations

- 1 probe x 1 sensor node/probe (4 inch [101.6 mm] probe)
- 1 probe x 2 sensor nodes/probe (5 to 16 inch [127.0 to 406.4 mm] probes)

Installed Airflow Accuracy¹

±3% of reading

Sensor Node Averaging Method

- Airflow:** Independent arithmetic average
- Temperature:** Independent, velocity weighted average

Listings and Compliance

- UL:** 60730-1; CAN/CSA-E60730-1 (EF-A1000-T/ELF-F0x Only)
- FCC:** This device complies with Part 15 of the FCC rules
- RoHS:** This device is RoHS2 compliant

Environmental Limits

Temperature:

- Probes 0 to 2,000 fpm** [0 to 10.16 m/s]:
-20 to 120 °F [-28.9 to 48.9 °C]
- Probes 0 to 3,000 fpm** [0 to 15.24 m/s]:
0 to 120 °F [-17.8 to 48.9 °C]
- Transmitter:** -20 to 120 °F [-28.9 to 48.9 °C]

Humidity: (non-condensing)

- Probes:** 0 to 100%
- Transmitter:** 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors

- Self-heated sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe
- Temperature sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing

- Material:** Glass-filled Polypropylene (Kynar® with /SS option)
- Sensor Potting Materials:** Waterproof marine epoxy

Sensing Node Internal Wiring

Type: Kynar® coated copper

Airflow Measurement

- Accuracy:** ±3% of reading to NIST-traceable volumetric airflow standards (includes transmitter uncertainty)
- Calibrated Range:** 0 to 3,000 fpm [0 to 15.24 m/s]
- Calibration Points:** 7

Temperature Measurement

- Type:** Velocity-weighted average
- Accuracy:** ±0.15°F [0.08 °C] to NIST-traceable temperature standards (includes transmitter uncertainty)
- Calibrated Range:** -20 to 120 °F [-28.9 to 48.9 °C]
- Calibration Points:** 3

Sensor Probe Assembly

Tube

Material: Mill finish 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets

Material: 304 stainless steel

Mounting Options & Size Limits

Insertion: 4, 5, 6, 7, 8, 9, 10, 12, 14, & 16 inch round [101.6, 127.0, 152.4, 177.8, 203.2, 228.6, 254.0, 304.8, 355.6 & 406.4 mm]

Integral Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @5V-A

User Interface: DIP switch

B.A.S. Connectivity Options

EF-A1000 Transmitter: One field selectable (0-10/2-10 VDC* or 0-5/1-5 VDC* - specify at time of order), scalable and protected analog output signal (AO1=airflow)

EF-A1001 Transmitter: Two field selectable (0-10/2-10 VDC* or 0-5/1-5 VDC* - specify at time of order), scalable and protected analog output signals (AO1=airflow, AO2 = temperature)

* The VDC output circuit of the EF-A1000 and EF-A1001 transmitters can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.

EF-N1000 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 at each EF-N1000 transmitter for applications requiring isolated RS-485)

System Status Alarm

Type: Sensor diagnostic system trouble indication

Visual Indication: Yes, LED on circuit board

Network Indication: Yes (EF-N1000 only)

¹ Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes when installation meets or exceeds placement guidelines.

SENSOR PROBE PLACEMENT

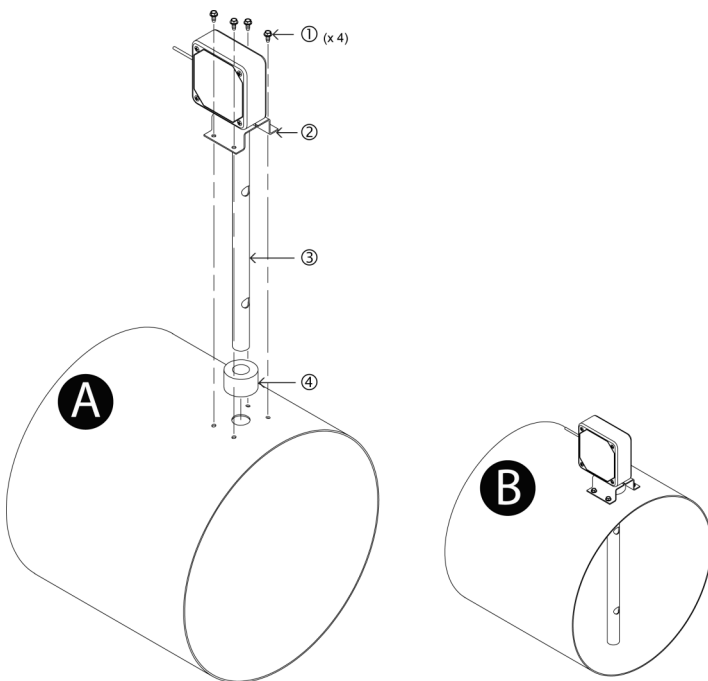
Determine the location where the sensor probes will be mounted. Refer to the Duct and Plenum Probe Placement Guide or contact EBTRON or your local EBTRON representative for assistance. A selection software tool is available at EBTRON.com that creates a placement schedule.

SENSOR PROBE INSTALLATION

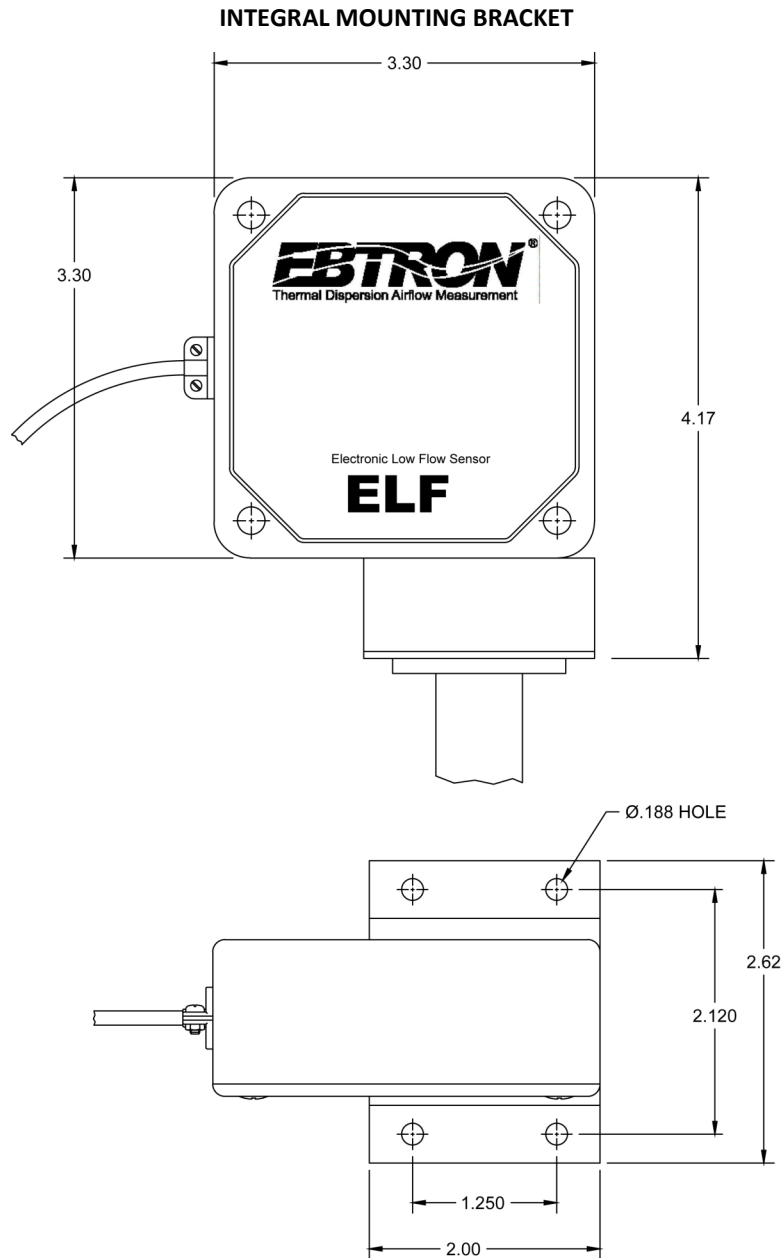
Detailed installation guidelines for transmitters and probes are provided in the Installation Guide for the following duct configurations.

Sensor Probe Installation Diagrams

EF-x1000-T Probe Installation (Insertion Mounting—Round Ducts)



Sensor Probe Mounting Bracket Dimensions

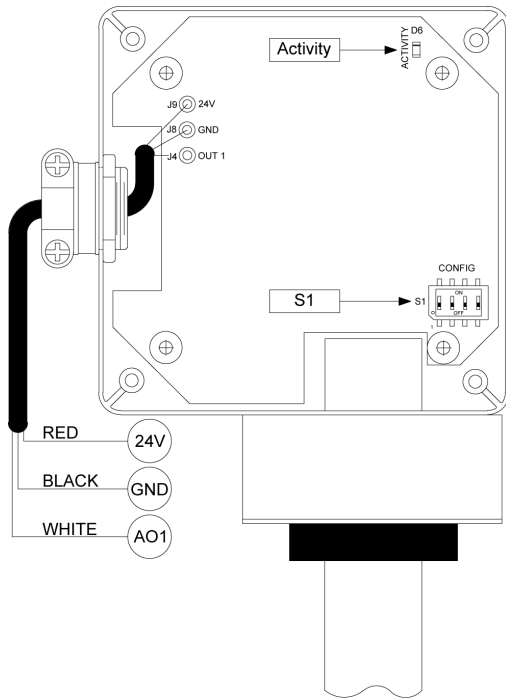


INTEGRAL TRANSMITTER/PROBE INSTALLATION AND WIRING

Detailed installation guides for transmitters and probes are provided in the Installation Guide for the connectivity options that follow. All EF-x1000 transmitters are provided with either an analog (x = A) or a RS-485 (x = N) output.

Locate the transmitter where it is protected from moisture, rain, and snow.

EF-A1000-T - Wiring Connections



TRANSMITTER CONNECTIONS

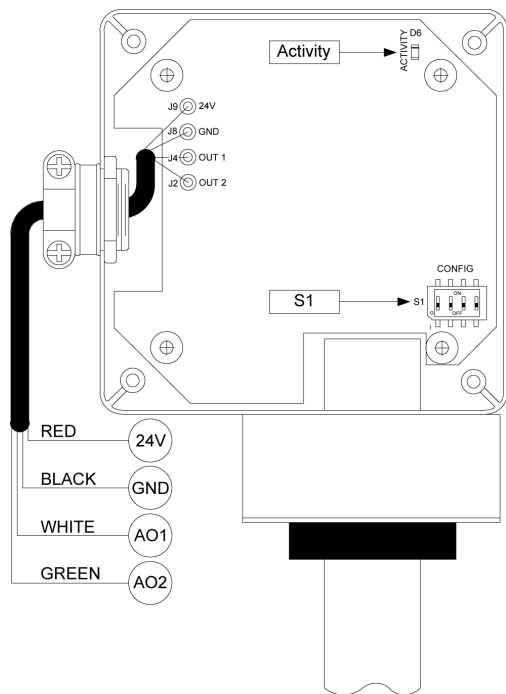
Power		Analog Out (non-isolated)	
24V (Red)	GND (Black)	AO1 (White)	
24 VAC (hot)	24 VAC (neutral) and Signal Common	Airflow +	

Connect each analog output signal to the host B.A.S. using the 3ft 18AWG interconnecting cable provided. If additional cable is required for output signal connections, use 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.

i Transmitters are preconfigured for 0-10VDC or 0-5VDC, depending on model. Consult the Installation Guide to change the output to either 2-10 VDC, 1-5VDC, or velocity pressure option.

EF-A1001-T - Wiring Connections



TRANSMITTER CONNECTIONS

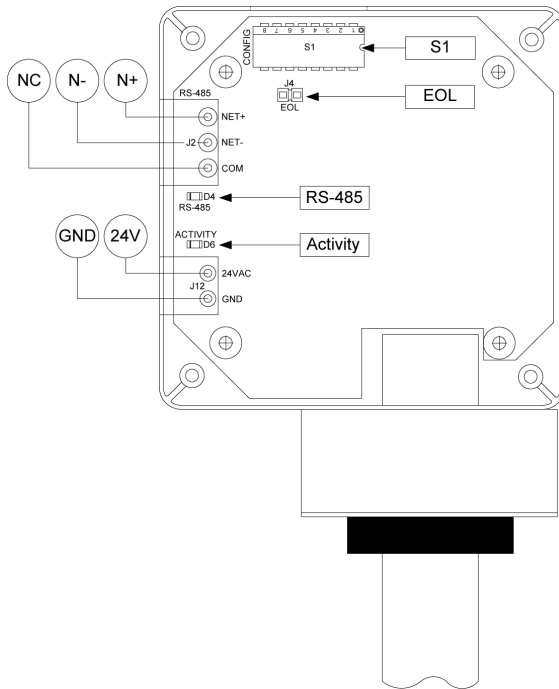
Power		Analog Out (non-isolated)	
24V (Red)	GND (Black)	AO1 (White)	AO2 (Green)
24 VAC (hot)	24 VAC (neutral) and Signal Common	Airflow +	Temperature +

Connect each analog output signal to the host B.A.S. using the 3ft 18AWG interconnecting cable provided. If additional cable is required for output signal connections, use 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.

i Transmitters are preconfigured for 0-10VDC or 0-5VDC, depending on model. Consult the Installation Guide to change the output to either 2-10 VDC, 1-5VDC, or velocity pressure option.

EF-N1000-T - Wiring Connections



TRANSMITTER CONNECTIONS

Power		RS-485 (non-isolated)		
24V	GND	N+	N-	NC
24 VAC (hot)	24 VAC (neutral)	Network +	Network -	Network Common

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 *Installation Guide* 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 (J4).

STARTUP

Detailed startup instructions are provided in the Installation Guide.

VERIFICATION, TROUBLESHOOTING, AND MAINTENANCE

Verification and troubleshooting is discussed in detail in the Installation Guide.

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.

