AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- 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

- 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 HTx104-T is EBTRON's measurement solution for round ducts between 4 and 16 inches in diameter when a remote display is desired. Ideal for small duct airflow measurement and airflow tracking applications. The HTx104-T transmitter has isolated outputs with a true 4-20mA output option (HTA104-T).

HTx104-T DataSheet (R1D)

HTx104-T TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations (max.)
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 Accuracy[1]
±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
CE: Yes
UKCA: Yes
BACnet International: BTL Listed (HTN104 transmitter)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Probes: -20 to 160 ºF [-28.9 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-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 ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]
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, and 16 inch round [101.6, 127.0, 152.4, 177.8, 203.2, 228.6, 254.0, 304.8, 355.6 & 406.4 mm]

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 3, 10, 25 and 50 ft. [0.9, 3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] circular DIN

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
PCB Connections: Gold-plated PCB interconnects and test points
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
HTA104 Transmitter: Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm)
HTN104 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection- Individual sensor node airflow rates and temperatures are available via the network

Airflow Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 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 O&M Manual for Duct and Plenum Probe Placement 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 probes are provided in the O&M Manual for the following duct configurations.
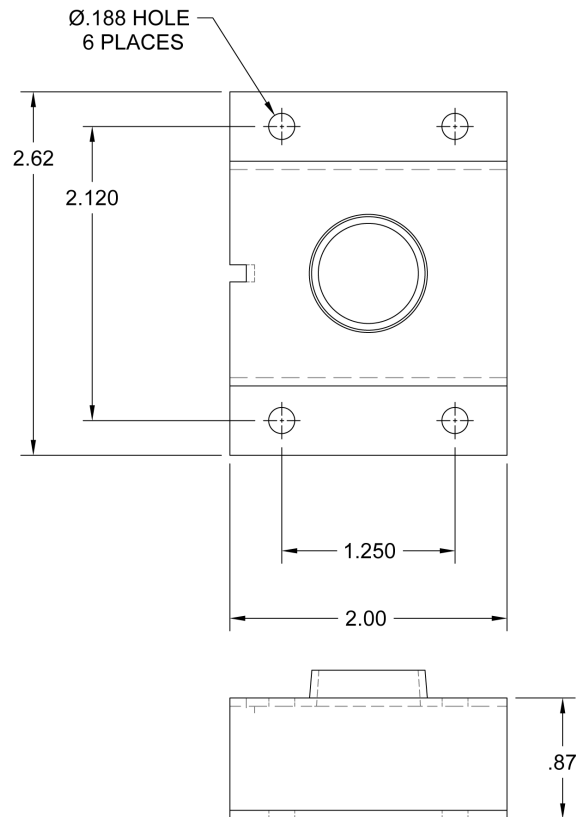
Sensor Probe Installation Diagrams

-T Probe Installation (Insertion Mounting—Round Ducts)
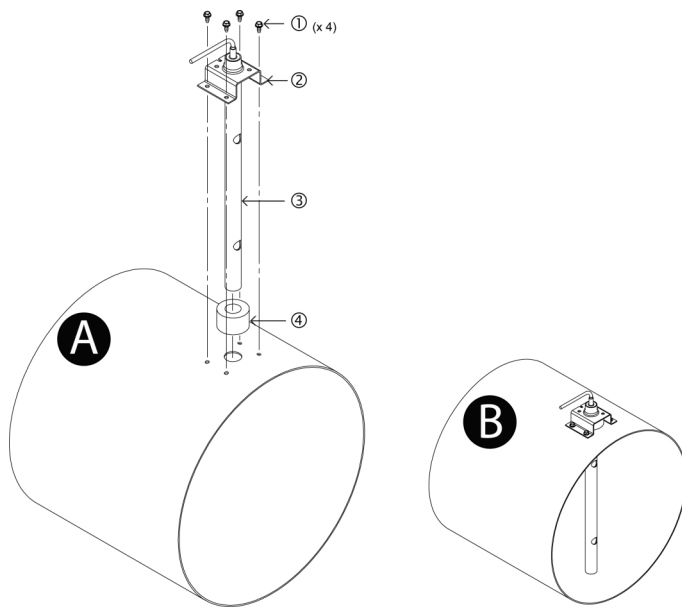
Sensor Probe Mounting Bracket Dimensions

**INSERTION MOUNTING BRACKET - Insertion Side**

TRANSMITTER INSTALLATION AND WIRING

Detailed installation guides for transmitters are provided in the O&M Manual for the connectivity options that follow. All HTx104 transmitters are provided with either an analog (x = A) or a RS-485 (x = N) output.
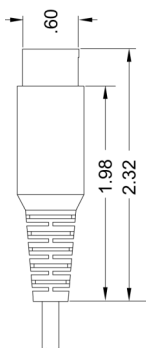
Locate the transmitter where all of the sensor probe connecting cables will reach the transmitter and it is protected from moisture, rain, and snow.

Transmitter Mounting Diagram and Dimensions

**Advantage IV Hybrid Series Transmitter Installation**
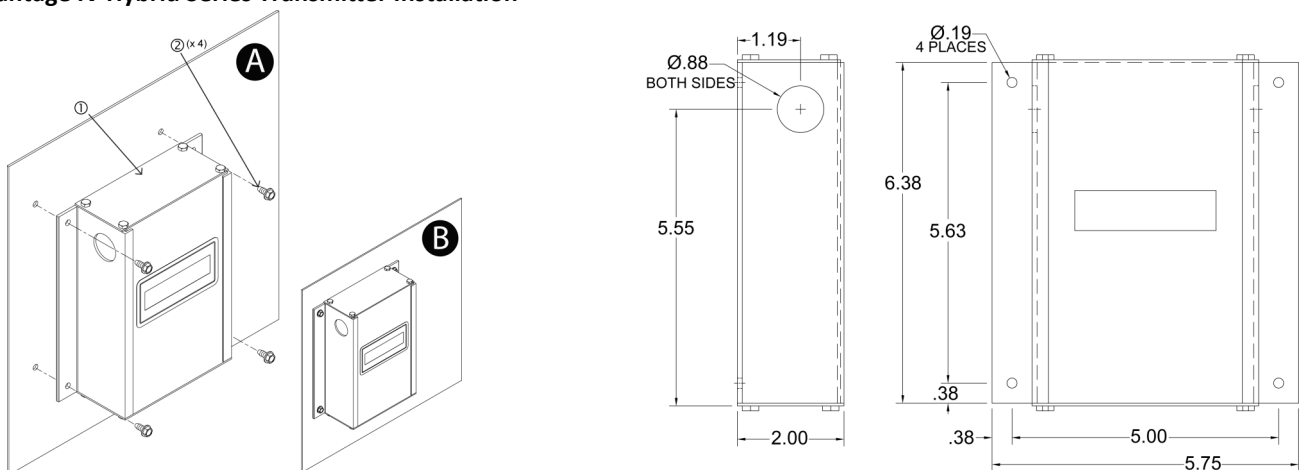
All Models - Probe Connector

⚠ *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.*

HTA104-T - Wiring and Probe Connections
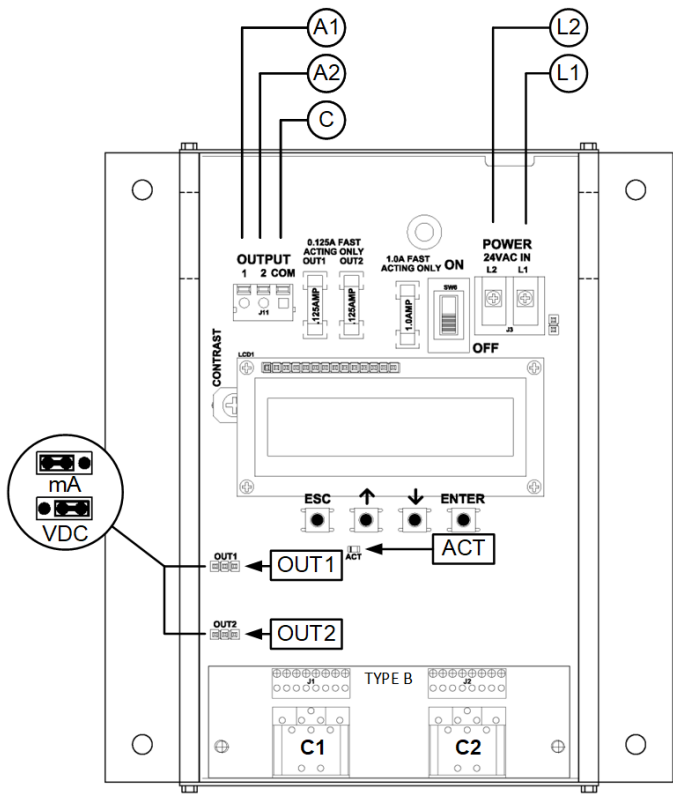
TRANSMITTER CONNECTIONS

Power		Analog Out (isolated)			Connector Type B	
L1	L2	A1	A2	GND	C1	C2
24 VAC (hot)	24 VAC (neutral)	Airflow +	Temperature or Alarm +	Signal Common	1 probe x 2 sensors/probe	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.*

ⓘ *Analog output signals are electrically isolated from the main circuit board and power supply.*

ⓘ *Transmitters are preconfigured for 4-20mA. Consult the Startup Guide for the appropriate model to change the output to either 0-5 VDC or 0-10 VDC.*

HTN104-T - Wiring and Probe Connections
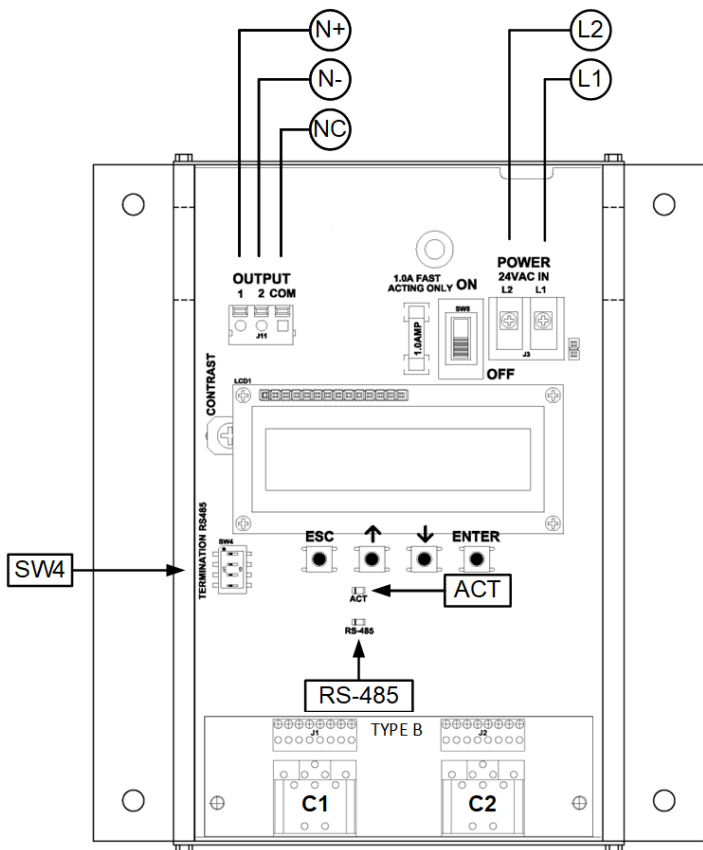
TRANSMITTER CONNECTIONS

Power		RS-485 (isolated)			Connector Type B	
L1	L2	N+	N-	NC	C1	C2
24 VAC (hot)	24 VAC (neutral)	Network +	Network -	Network Common	1 probe x 2 sensors/probe	Not Used

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.*

SW4—RS-485 TERMINATION DIP SWITCH POSITIONS

1	2	3	4	TERMINATION
OFF	OFF	OFF	OFF	No termination (default)
OFF	ON	ON	OFF	End of Line
ON	OFF	OFF	ON	Fail-Safe Bias

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.

H T _ 1 0 4 - T / _ :

Cable length
03 = 3 ft., 10 = 10 ft., 25 = 25 ft., 50 = 50 ft.
Duct diameter
04 = 4", 05=5", 06=6", 07=7", 08=8", 09=9", 10=10", 12=12", 14=14", 16=16"
Tube Material
{leave blank} = Aluminum, SS = 316 Stainless steel w/Kynar sensor nodes
Connectivity
A = isolated analog outputs (AO1 = airflow, AO2 = temperature or alarm)
N = RS-485 field selectable BACnet MS/TP or Modbus RTU