

SWSI & DWDI AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY



PRODUCT HIGHLIGHTS

- “Plug and Play” operation
- EBTRON exclusive bead-in-glass thermistor sensors
- Sensor nodes are individually calibrated at 16 airflow rates to NIST traceable standards
- 0 to 10,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Four mounting styles
- 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

- Fan airflow tracking
- Air change verification and monitoring
- Fan performance monitoring

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-F/SI and HTx104-F/DI are EBTRON’s most economical solution for accurate and repeatable airflow measurement in SWSI and DWDI fans. Airflow, temperature and/or airflow alarming are available on all models. Does not affect fan performance. The HTx104-F transmitter has isolated outputs with a true 4-20mA output option (HTA104-F).

HTx104-F TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations

SWSI and DWDI fans: 2 probes x 1 sensor node per probe in each fan inlet

Installed Airflow Accuracy¹

±(3% to 10%) of reading, depending on fan type and installation. May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference.

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 °F [-28.9 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%

Individual Sensing Nodes

Sensing Node Sensors

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

Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor

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: 0 to 10,000 fpm [0 to 50.8 m/s]

Calibration Points: 16

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 160 °F [-28.9 to 71.1 °C]

Calibration Points: 3

Sensor Probe Assembly

Mounting Rods

Material: Zinc plated steel

Mounting Brackets (Throat, Forward, Face, Flare)

Material: 304 stainless steel

Mounting Options & Size Limits

Throat: 6 to 66 inches [152.4 to 1676.4mm] (throat diameter)

Forward: 6 to 64 inches [152.4 to 1625.6 mm] (diameter at inlet entrance)

Face: 11 to 77 inches [279.4 to 1955.8] (diameter at inlet entrance)

Flare: 6 to 57 inches [152.4 to 1447.8 mm] (opening size at backdraft damper inlet)

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] circular DIN

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @11V-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)

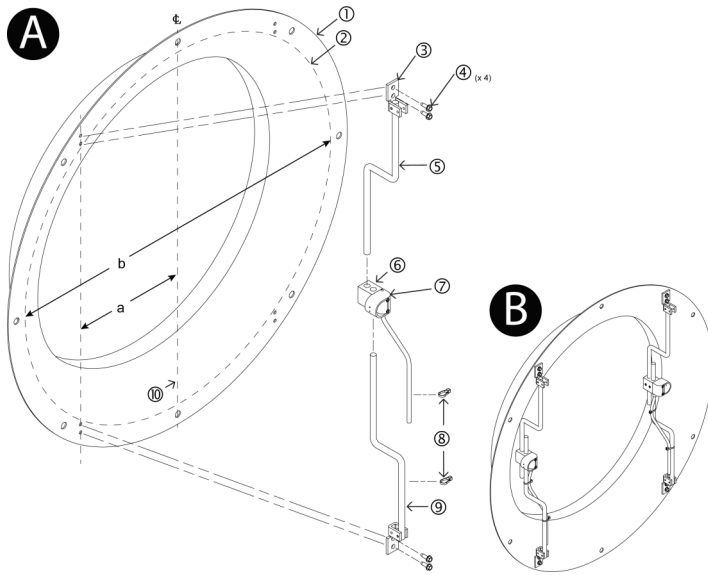
¹ Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes.

SENSOR PROBE INSTALLATION

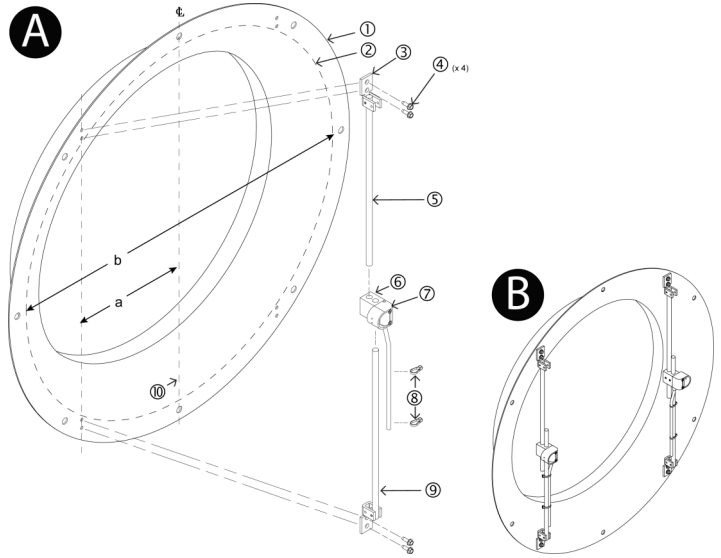
Detailed installation guidelines for probes are provided in the O&M Manual for the following mounting styles.

Sensor Probe Installation Diagrams

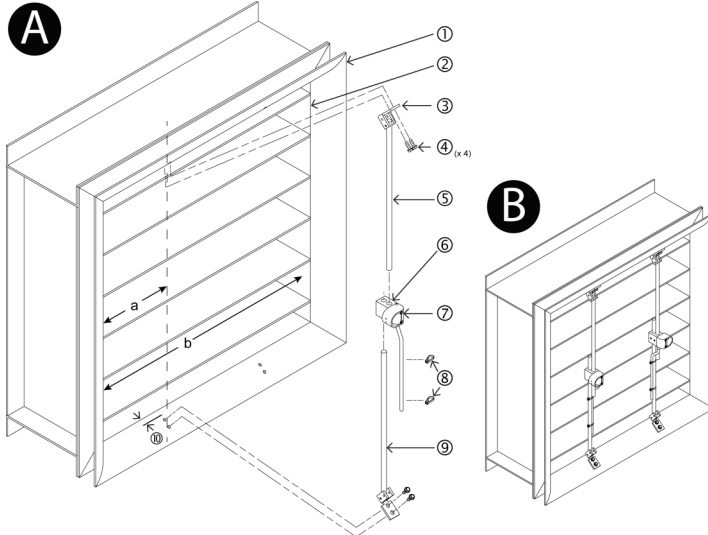
-F Probe Installation (Face Mounting Rods)



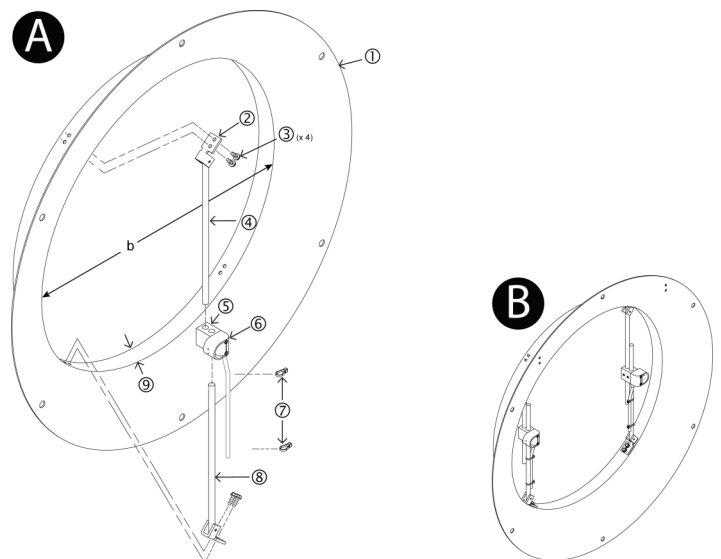
-F Probe Installation (Forward Mounting Rods)



-F Probe Installation (Flare Mounting Rods)



-F Probe Installation (Throat Mounting Rods)



Inlet Probe Size and Mounting Style

	Inlet Size Range (Diameter at mounting location)						Damper Opening	
	Throat		Face		Forward		Flare	
Size Code	Min. (inches)	Max. (inches)	Min. (inches)	Max. (inches)	Min. (inches)	Max. (inches)	Min. (inches)	Max. (inches)
000	≥ 6	≤ 7	NA	NA	NA	NA	NA	NA
00	≥ 7	≤ 8	NA	NA	NA	NA	NA	NA
0	≥ 8	≤ 12	NA	NA	≥ 6	≤ 9	≥ 6	≤ 9
1	≥ 10	≤ 15	≥ 11	≤ 13	≥ 7	≤ 13	≥ 8	≤ 11
2	≥ 14	≤ 23	≥ 13	≤ 18	≥ 10	≤ 18	≥ 10	≤ 15
3	≥ 18	≤ 32	≥ 18	≤ 25	≥ 14	≤ 25	≥ 12	≤ 20
4	≥ 27	≤ 49	≥ 25	≤ 35	≥ 19	≤ 35	≥ 16	≤ 27
5	≥ 35	≤ 66	≥ 34	≤ 50	≥ 27	≤ 50	≥ 21	≤ 38
6	NA	NA	≥ 47	≤ 77	≥ 40	≤ 64	≥ 31	≤ 57

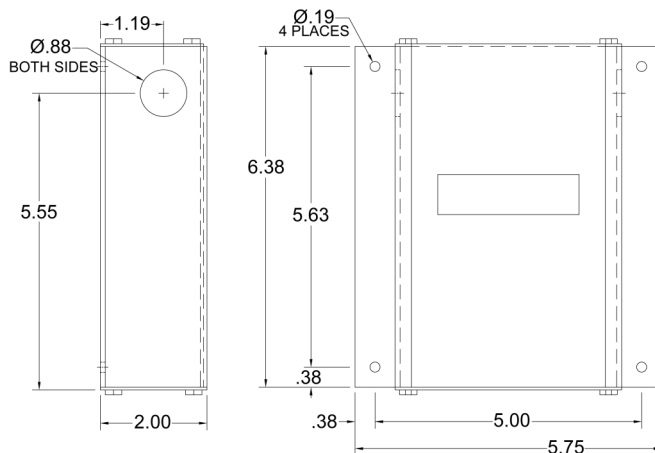
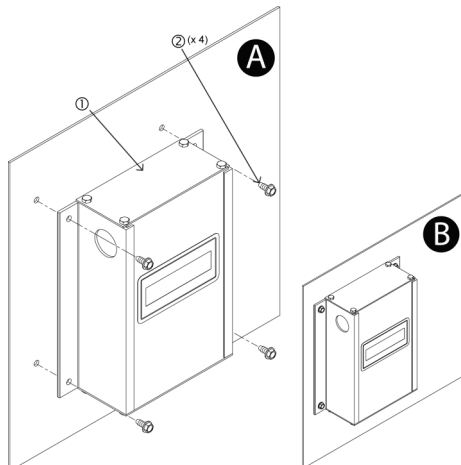
Transmitter Installation and Wiring

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.

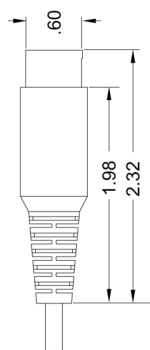
Locate the transmitter where all of the sensor probe connecting cables will reach the transmitter and it is protected from moisture, rain, and snow.

Transmitter Mounting Diagram and Dimensions

Advantage IV Hybrid Series Transmitter Installation

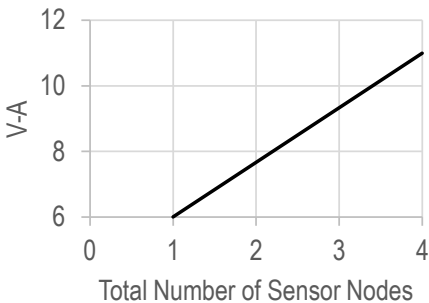


All Models - Probe Connector and Power Requirement

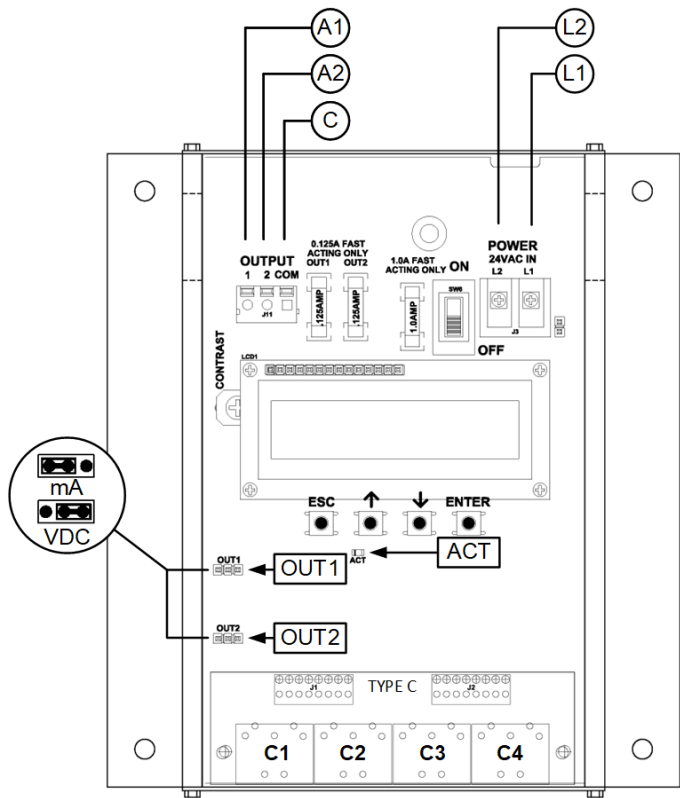


- ⚠ Push in **keyed** connector plugs (sensor data is stored in serial memory chip in connector plug). **DO NOT TWIST!**
- i Cables have an FEP plenum rated jacket that are UV tolerant and suitable for operation over the entire operating temperature range of the device.

V-A REQUIREMENT @ 24 VAC



HTA104-F - Wiring and Probe Connections



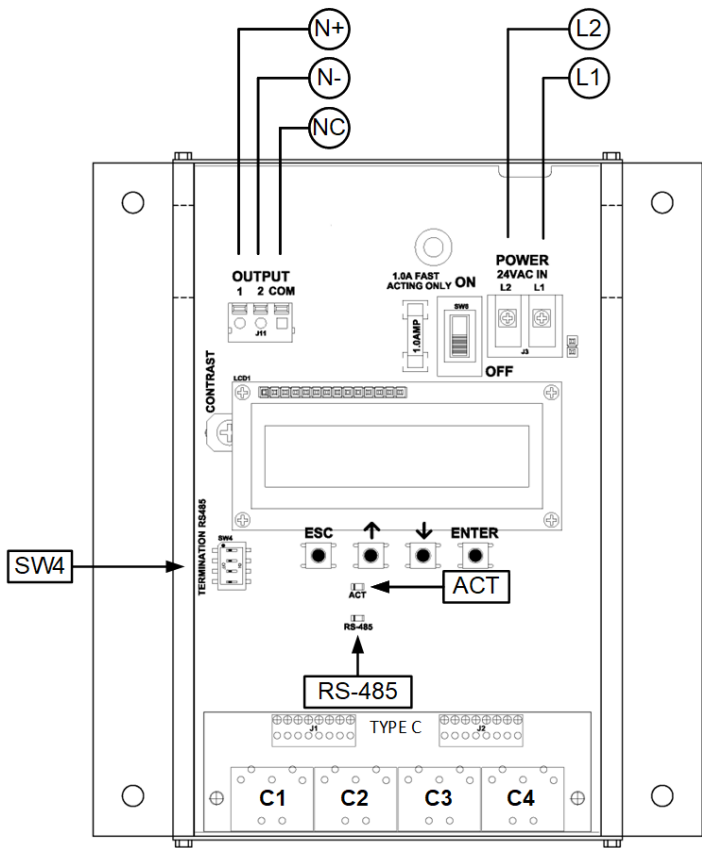
TRANSMITTER CONNECTIONS

Power		Analog Out (isolated)			Type
L1	L2	A1	A2	C	C
24 VAC (hot)	24 VAC (neutral)	Airflow +	Temperature or Alarm +	Signal Common	4 probes x 1 sensor/probe

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.
- i Analog output signals are electrically isolated from the main circuit board and power supply.
- i 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-F - Wiring and Probe Connections



TRANSMITTER CONNECTIONS

Power		RS-485 (isolated)			Type
L1	L2	N+	N-	NC	C
24 VAC (hot)	24 VAC (neutral)	Network +	Network -	Network Common	4 probes x 1 sensor/probe

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

- Refer to the O&M Manual for information regarding network configuration, BACnet objects, and Modbus registers.
- 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) | ✓ Immediate up and downstream disturbance and the |
| ✓ Duct or opening size where the probes will be installed | distance between disturbances |
| ✓ Minimum and maximum expected airflow rates | ✓ Mechanical drawings or sketches |
| ✓ Minimum and maximum expected airstream | ✓ Sequence of operation |
| temperatures | ✓ 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.

HT 104 -F / :

