

HIGH SENSOR DENSITY MULTI-POINT AIRFLOW AND TEMPERATURE MONITORING DEVICE WITH ALARM



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 5,000 FPM calibrated range with percent-of-reading accuracy
- 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
- Independent test data demonstrates resistance to saltwater and chemical exposure
- Standard FEP plenum rated cable between sensor probes and transmitter
- No compromise construction uses gold plated interconnects
- Unsurpassed connectivity options
- *EB-Link* BLE interface to phone or tablet provides real-time monitoring and diagnostics
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Outdoor airflow monitoring and control
- Advanced CO₂-DCV airflow reset and limit control
- Population-based DCV control
- Air change verification and control
- Differential airflow tracking and pressure control
- System 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 HTx116-P is an airflow monitoring system that also provides velocity-weighted temperature, thus providing a turn-key solution for today’s high-performance buildings. Multiple sensor nodes provide accurate measurements of critical airstream parameters. Unsurpassed connectivity options and a “no-compromise” design makes this your best choice for today’s high-performance buildings.

HTx116-P TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configuration (max.)

Transmitter: 4 probes x 4 sensor nodes/probe

Installed Airflow Accuracy

Ducts/Plenums: $\pm 3\%$ of reading

Non-ducted OA Intakes: better than or equal to $\pm 5\%$ of reading

Sensor Node Averaging Method

Airflow: Independent, arithmetic average

Temperature: Independent, velocity weighted average

Listings & Compliance

UL: 60730-1; CAN/CSA-E60730-1

BACnet International: BTL Listed (HTB116, HTC116, HTM116, and HTS116)

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 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: $\pm 2\%$ of reading to NIST-traceable airflow standards (includes transmitter uncertainty)

Calibrated Range: 0 to 5,000 fpm [25.4 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

Tube

Material: Gold anodized 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets

Material: 304 stainless steel

Mounting Options & Size Limits

Insertion: 6 to 191in. [152.4 to 4851 mm]

Stand-off: 6 to 190 in. [152.4 to 4826 mm]

Internal: 10 to 194 in. [254.0 to 4928 mm]

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, 15, 20, 25, 30, 40 and 50 ft. [3.1, 4.6, 6.1, 7.6, 9.1, 12.2, 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) @20V-A max.

PCB Connections: Gold-plated PCB interconnects, and test points

User Interface: 2 line x16-character backlit LCD display and 4 button interface

B.A.S. Connectivity Options

All Transmitters: Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm).

HTA116 Transmitter: No additional connectivity to B.A.S.

HTC116 Transmitter¹: One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network

HTB116 Transmitter¹: One additional isolated RS-485 and one additional isolated Ethernet network connections field configurable as follows:

- Single RS-485 connection to B.A.S. with field selectable BACnet MS/TP or Modbus RTU, and
- Single Ethernet connection to B.A.S. with simultaneously supported BACnet IP or BACnet Ethernet, Modbus TCP, and TCP/IP, or
- Single Ethernet connection to *EB-Bus* device(s)

HTM116 Transmitter¹: One additional isolated Ethernet network connection field configurable as follows:

- Single connection to B.A.S. with simultaneously supported BACnet IP or BACnet Ethernet, Modbus TCP, and TCP/IP, or
- Single connection to *EB-Bus* device(s)

HTS116 Transmitter¹: Two additional isolated Ethernet network connections field configurable as follows:

- Single connection to B.A.S. and single connection to *EB-Bus* device(s), or
- Daisy-chain connection to B.A.S., or
- Daisy-chain connection to *EB-Bus* device(s)

Note: B.A.S. network connections can simultaneously support BACnet IP or BACnet Ethernet, Modbus TCP, and TCP/IP.

HTU116 Transmitter: One additional USB connection for thumb drive data-logging of sensor node airflow rates and temperatures

Alarms

Airflow: Low and/or high user defined setpoint alarm

System Status: Sensor diagnostic system trouble indication

EB-Link Bluetooth® low energy Interface for Android® and iPhone®: Display real-time airflow, velocity-weighted temperature, individual sensor node airflow/temperature data, settings and diagnostics².

¹ Individual sensor node airflow rates and temperatures are available via the network.

² Order with the /NR option when RF devices are not permitted.

SENSOR DENSITY

Sensor density refers to the number of sensor nodes located in the sensing plane where the probes are mounted. Typical HVAC applications have limited straight run between up and downstream disturbances. Those disturbances can create a significant velocity profile. As a result, the installed accuracy is based not only on the sensor node accuracy, but the ability of sensor nodes to average the velocity profile sufficiently. Most instrumentation manufacturers dismiss the effect of sampling error and only publish laboratory sensor accuracy.

The number of sensor nodes provided depends on the sensor density suffix D, C, +, B, or A that follows the probe type description of "P" in the model code. A custom sensor density, Z, is also available for applications that do not fall into standard installation tables. The transmitter provides the average velocity of the sensor nodes for the true volumetric or mass airflow of the airstream. When installed in accordance with EBTRON placement guidelines, the HTx116-PC provides a measurement accuracy of better than or equal to $\pm 3\%$ of reading ($\pm 5\%$ of reading on close-coupled outdoor air intakes) without field adjustment. The HTx116-P can be configured for up to sixteen independent sensor nodes for unsurpassed measurement accuracy.

EBTRON placement guidelines are based on tests conducted on C sensor density (i.e., HTx116-PC) probes. Although EBTRON recommends its C sensor density for most applications, it can provide alternate sensor density when less probes are desired for the same sensor density (+). Other sensor density options, D, B, and A, are provided depending on application. Laboratory measurement or compromised placement applications may require the highest density D, whereas applications for fan tracking (field matching pairs) or airflow monitoring, a lower density B or A may be suitable. Refer to the sensor density tables below for the specific information on the number of probes and sensors per probe for a given sensor density designation.

PD SENSOR DENSITY TABLE

PD SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe)																						
	Probe Length (inches)																					
	6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120
Round ➤	1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/4	2/4	2/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Flat Oval ➤	All flat ovals are custom. Contact EBTRON or your representative for information on flat ovals.																					
Square/Rectangle Adjacent Side Length (inches)	6	1/1	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	8	1/1	1/1	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	10	2/1	2/1	1/2	1/2	1/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	2/4	2/4
	12	2/1	2/1	1/2	1/2	2/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	14	2/1	2/1	1/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4	3/4	3/4
	16	2/1	3/1	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	18	2/1	3/1	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	3/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4
	20	3/1	3/1	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4
	22	3/1	3/1	2/2	2/2	3/2	2/3	2/3	2/3	2/3	3/3	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	24	3/1	3/1	2/2	3/2	3/2	3/2	2/3	2/3	3/2	3/3	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	30	4/1	3/1	3/2	3/2	3/2	3/2	3/3	3/3	3/3	3/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	36	4/1	4/1	3/2	3/2	3/2	3/2	4/2	4/2	4/3	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	42	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/3	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	48	4/1	4/1	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	54	4/1	4/1	3/2	4/2	4/2	4/3	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	60	4/1	4/1	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	66	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	72	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	84	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	96	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	108	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	120	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4

NOTE

- Probe lengths greater than 120 in. will be P* custom sensor density.
- Items in red text cannot be manufactured as internal mount due to manufacturing limitations.

PC SENSOR DENSITY TABLE

PC SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe)																						
	Probe Length (inches)																					
	6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120
Round ➤	1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/4	2/4	2/4	2/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Flat Oval ➤	All flat ovals are custom. Contact EBTRON or your representative for information on flat ovals.																					
Square/Rectangle Adjacent Side Length (inches)	6	1/1	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	8	1/1	1/1	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	10	2/1	2/1	1/2	1/2	1/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4
	12	2/1	2/1	1/2	1/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4
	14	2/1	2/1	1/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4
	16	2/1	3/1	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4
	18	2/1	3/1	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	3/4	3/4	4/4	4/4
	20	3/1	3/1	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4
	22	3/1	3/1	2/2	2/2	3/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4
	24	3/1	3/1	2/2	3/2	3/2	3/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4
	30	4/1	3/1	3/2	3/2	3/2	3/2	3/2	2/3	2/3	2/4	2/4	2/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	36	4/1	4/1	3/2	3/2	3/2	3/2	3/2	3/2	4/2	2/4	3/3	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	42	4/1	4/1	3/2	3/2	3/2	3/2	4/2	4/2	4/2	2/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	48	4/1	4/1	3/2	3/2	3/2	3/2	4/2	4/2	4/3	4/3	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	54	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	60	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	66	4/1	4/1	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	72	4/1	4/1	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	84	4/1	4/1	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	96	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	108	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	120	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4

NOTE

- Probe lengths greater than 120 in. will be P* custom sensor density.
- Items in red text cannot be manufactured as internal mount due to manufacturing limitations.

P+ SENSOR DENSITY TABLE

P+ SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe)																							
		Probe Length (inches)																					
		6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120
Round ➤		1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/4	2/4	2/4	2/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Flat Oval ➤		All flat ovals are custom. Contact EBTRON or your representative for information on flat ovals.																					
Square/Rectangle Adjacent Side Length (inches)	6	1/1	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	8	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	10	2/1	2/1	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4
	12	2/1	2/1	1/2	1/2	2/2	2/2	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4
	14	2/1	2/1	1/2	2/2	2/2	2/2	2/2	2/2	1/4	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4
	16	2/1	3/1	2/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4
	18	2/1	3/1	3/1	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	3/4	3/4	4/4	4/4
	20	3/1	3/1	4/1	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4
	22	3/1	4/1	4/1	4/1	3/2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4
	24	3/1	4/1	4/1	3/2	3/2	3/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	4/4	4/4	4/4	4/4
	30	4/1	4/1	3/2	3/2	3/2	3/2	3/2	3/2	2/3	2/3	2/4	2/4	2/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	36	4/1	4/1	3/2	3/2	3/2	3/2	3/2	3/2	3/2	4/2	2/4	2/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	42	4/1	4/1	3/2	3/2	3/2	3/2	3/2	4/2	4/2	4/2	2/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	48	4/1	4/1	3/2	3/2	3/2	3/2	4/2	4/2	4/2	4/3	4/3	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	54	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
	60	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
66	4/1	4/1	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	
72	4/1	4/1	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	
84	4/1	4/1	4/2	4/2	4/3	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	
96	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	
108	4/1	4/1	4/2	4/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	
120	4/1	4/1	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	

NOTE

- Probe lengths greater than 120 in. will be P* custom sensor density.
- Items in red text cannot be manufactured as internal mount due to manufacturing limitations.

PB SENSOR DENSITY TABLE

PB SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe)																						
	Probe Length (inches)																					
	6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120
Round ➤	1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/4	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Flat Oval ➤	All flat ovals are custom. Contact EBTRON or your representative for information on flat ovals.																					
Square/Rectangle Adjacent Side Length (inches)	6	1/1	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	8	1/1	1/1	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
	10	2/1	2/1	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	2/3	2/3	2/3
	12	2/1	2/1	1/2	1/2	2/2	2/2	1/3	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	2/3	2/3	2/3	2/4
	14	2/1	2/1	1/2	2/2	2/2	2/2	2/2	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4
	16	2/1	3/1	2/2	2/2	2/2	2/2	2/2	2/2	1/4	1/4	1/4	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4	3/4
	18	2/1	3/1	3/1	2/2	2/2	2/2	2/2	2/2	2/2	1/4	1/4	1/4	1/4	2/3	2/3	2/3	2/3	2/4	2/4	3/4	3/4
	20	3/1	3/1	4/1	2/2	2/2	2/2	2/2	2/2	2/2	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4
	22	3/1	4/1	4/1	4/1	2/2	2/2	2/2	2/2	2/2	2/2	1/4	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4
	24	3/1	4/1	4/1	4/1	4/1	2/2	2/2	2/2	2/2	2/2	1/4	2/3	2/3	2/3	2/4	2/4	2/4	3/4	3/4	3/4	3/4
	30	4/1	4/1	4/1	4/1	4/1	4/1	2/2	2/2	2/2	2/3	2/3	2/3	2/4	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	36	4/1	4/1	4/1	4/1	4/1	4/1	4/1	4/1	3/2	2/3	2/3	2/4	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	42	4/1	4/1	4/1	4/1	4/1	4/1	3/2	3/2	3/2	2/3	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	48	4/1	4/1	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	2/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	54	4/1	4/1	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	60	4/1	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/3	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	66	4/1	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	72	4/1	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	84	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/3	4/3	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	96	4/1	4/1	3/2	4/2	4/2	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4	3/4	3/4
	108	4/1	4/1	3/2	4/2	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4
	120	4/1	4/1	4/2	4/2	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/3	3/4	3/4	3/4	3/4

NOTE

- Probe lengths greater than 120 in. will be P* custom sensor density.
- Items in red text cannot be manufactured as internal mount due to manufacturing limitations.

PA SENSOR DENSITY TABLE

PA SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe)																						
	Probe Length (inches)																					
	6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120
Round ➤	1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Flat Oval ➤	All flat ovals are custom. Contact EBTRON or your representative for information on flat ovals.																					
Square/Rectangle Adjacent Side Length (inches)	6	1/1	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/3	1/3	1/3	1/3
	8	1/1	1/1	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/4
	10	2/1	2/1	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/4	1/4	1/4
	12	2/1	2/1	1/2	1/2	2/1	2/1	1/2	1/2	1/2	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/4	1/4	1/4	2/3
	14	2/1	2/1	1/2	2/1	2/1	2/1	2/1	1/2	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/4	1/4	1/4	2/3	2/3	2/3
	16	2/1	2/1	1/2	2/1	2/1	2/1	2/1	2/2	1/3	1/3	1/3	1/3	1/3	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/4
	18	2/1	2/1	2/1	1/2	2/1	2/1	2/2	2/2	2/2	1/3	1/3	1/3	1/3	1/4	1/4	1/4	1/4	2/3	2/3	2/4	2/4
	20	2/1	2/1	2/1	1/2	2/1	2/1	2/2	2/2	2/2	1/3	1/3	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4
	22	2/1	2/1	2/1	2/1	2/2	2/2	2/2	2/2	2/2	2/2	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4	2/4
	24	2/1	2/1	2/1	3/1	3/1	2/2	2/2	2/2	2/2	2/2	1/3	1/4	1/4	1/4	2/3	2/3	2/3	2/4	2/4	2/4	2/4
	30	2/1	2/1	3/1	3/1	3/1	3/1	2/2	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	36	2/1	3/1	3/1	3/1	3/1	3/1	3/1	3/1	2/2	2/2	2/2	2/3	2/3	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	42	3/1	3/1	3/1	3/1	3/1	3/1	4/1	4/1	2/2	2/2	2/3	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	48	3/1	3/1	3/1	3/1	3/1	4/1	4/1	4/1	3/2	3/2	2/3	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	54	3/1	3/1	3/1	3/1	4/1	4/1	4/1	4/1	3/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	60	3/1	3/1	3/1	3/1	4/1	4/1	4/1	3/2	3/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	66	3/1	3/1	3/1	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	72	3/1	3/1	3/1	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	84	3/1	3/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4	2/4
	96	3/1	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4	2/4	2/4
	108	3/1	4/1	4/1	3/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4
	120	4/1	4/1	3/2	3/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	2/4	2/4	2/4	2/4

NOTE

- Probe lengths greater than 120 in. will be P* custom sensor density.
- Items in red text cannot be manufactured as internal mount due to manufacturing limitations.

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.

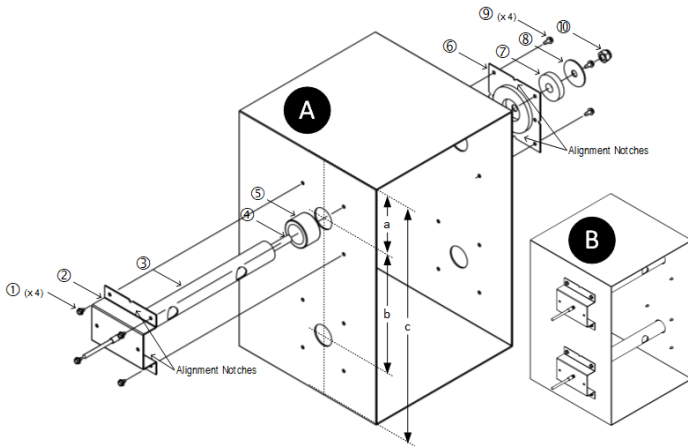
SENSOR PROBE INSTALLATION

Detailed installation guidelines for probes are provided in the O&M Manual for the following duct configurations.

⚠ Install sensor probes at location (if provided) indicated on probe hang tag to optimize implementation of the EB-Link Reader and IAQ Enforcer® accessories.

Sensor Probe Installation Diagrams

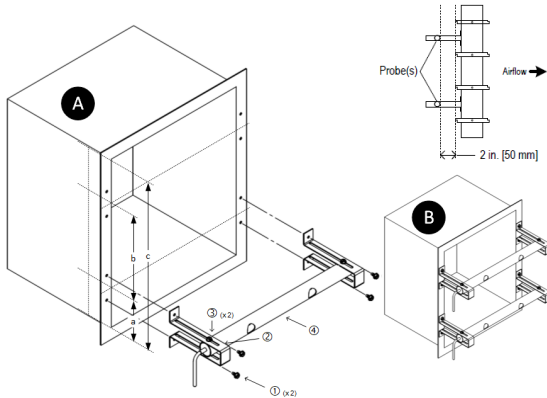
-P Probe Installation (Insertion Mounting—Rectangular Ducts)



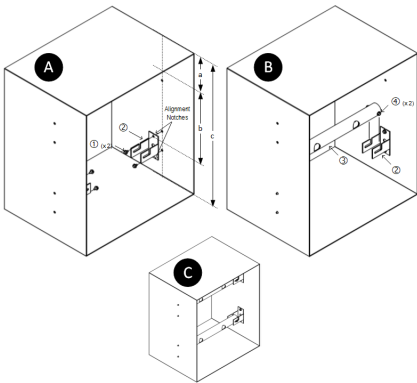
RECTANGULAR & OVAL TYPE C DUCTS

Number of Probes	a	b
1	c/2	
2	c/4	c/2
3	c/6	c/3
4	c/8	c/4

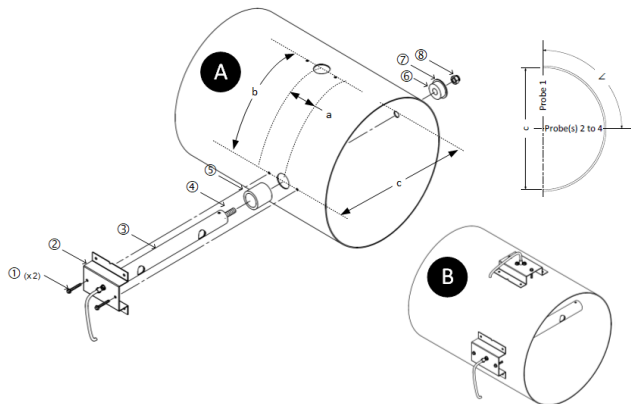
-P Probe Installation (Standoff Mounting—Rectangular Ducts)



-P Probe Installation (Internal Mounting—Rectangular Ducts)



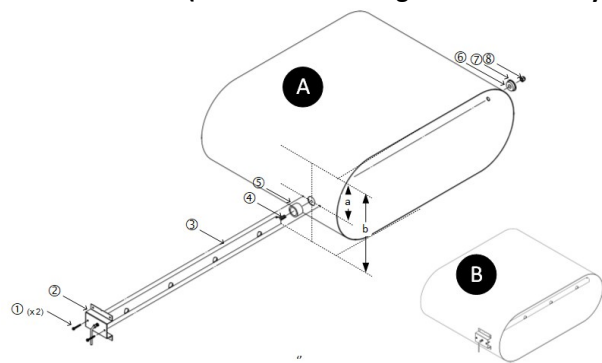
-P Probe Installation (Insertion Mounting—Round Ducts)



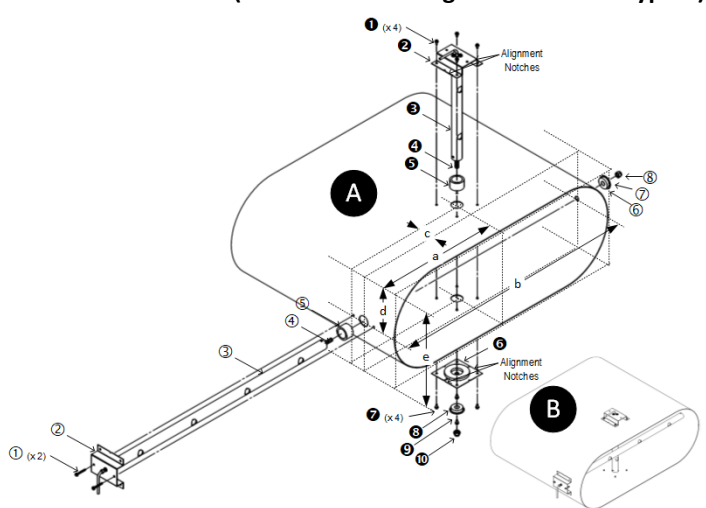
ROUND DUCTS

Number of Probes	a	b	∠ from previous
1			
2	2" [50mm]	0.79c	90°
3	2" [50mm]	0.52c	60°
4	2" [50mm]	0.39c	45°

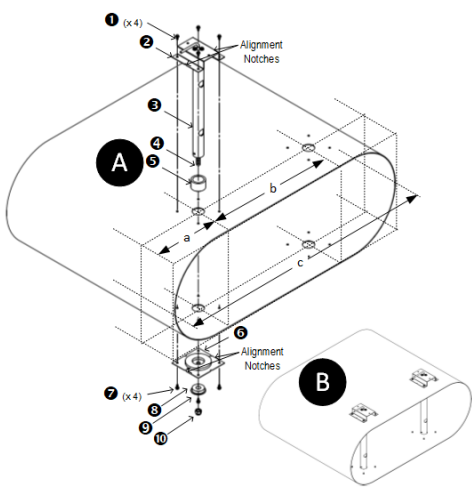
-P Probe Installation (Insertion Mounting—Oval Ducts—Type A)



-P Probe Installation (Insertion Mounting—Oval Ducts—Type B)

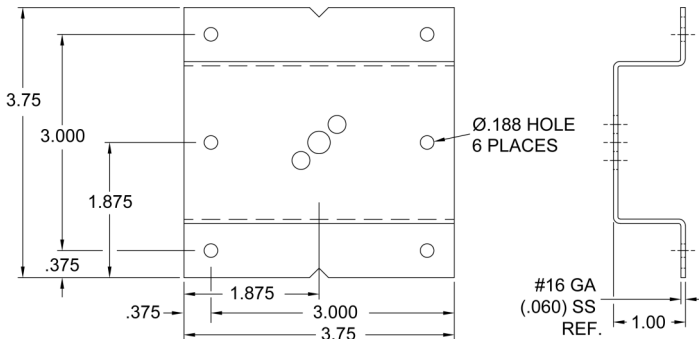


-P Probe Installation (Insertion Mounting—Oval Ducts—Type C)

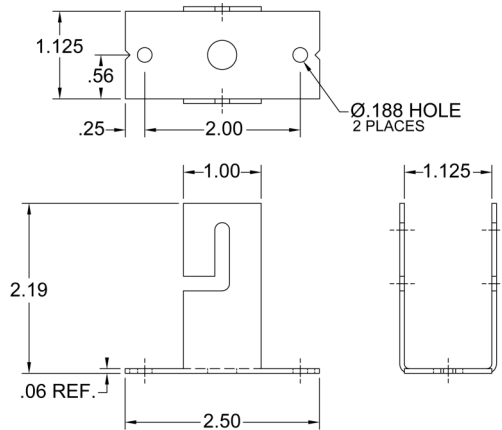


Sensor Probe Mounting Bracket Dimensions

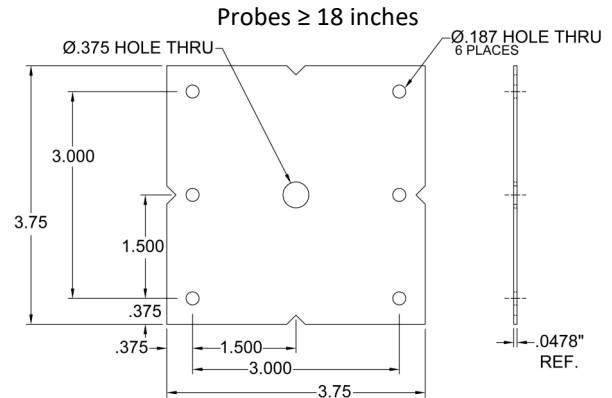
INSERTION MOUNTING BRACKET - Insertion Side



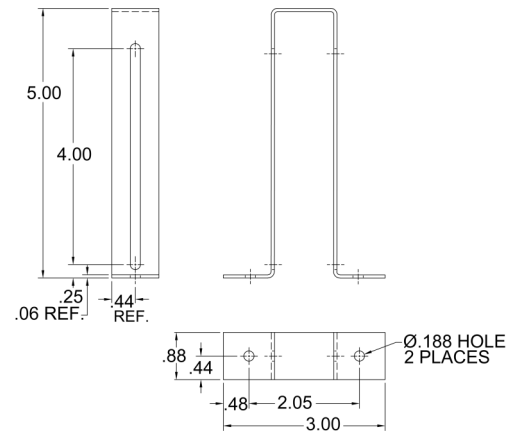
INTERNAL MOUNTING BRACKET (x2)



INSERTION MOUNTING BRACKET - Terminal Side



STANDOFF MOUNTING BRACKET (x2)



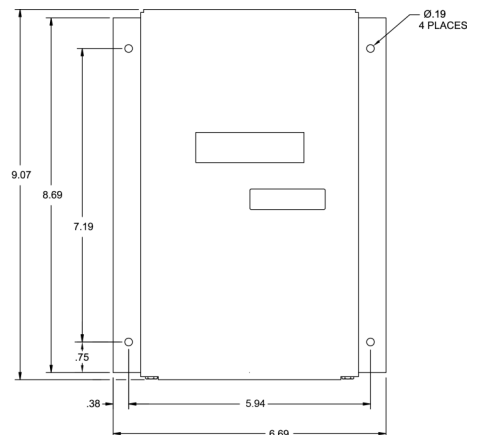
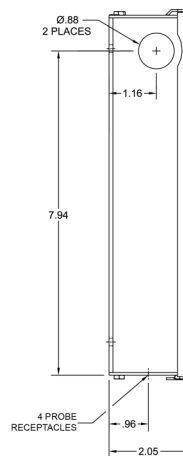
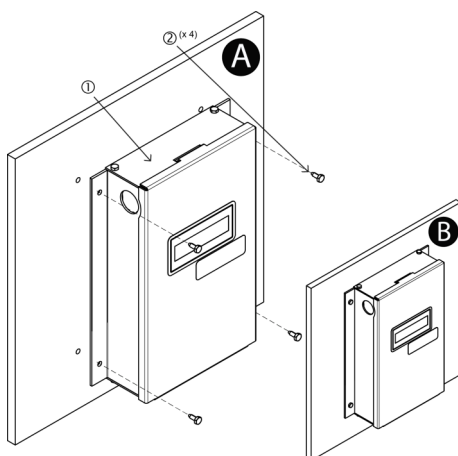
TRANSMITTER INSTALLATION AND WIRING

Detailed installation guides for transmitters are provided in the O&M Manual for the connectivity options that follow. All HTx116 transmitters are provided with the base analog output configuration (x = A). Additional connectivity may be obtained by an additional output card located below the display on the main circuit board.

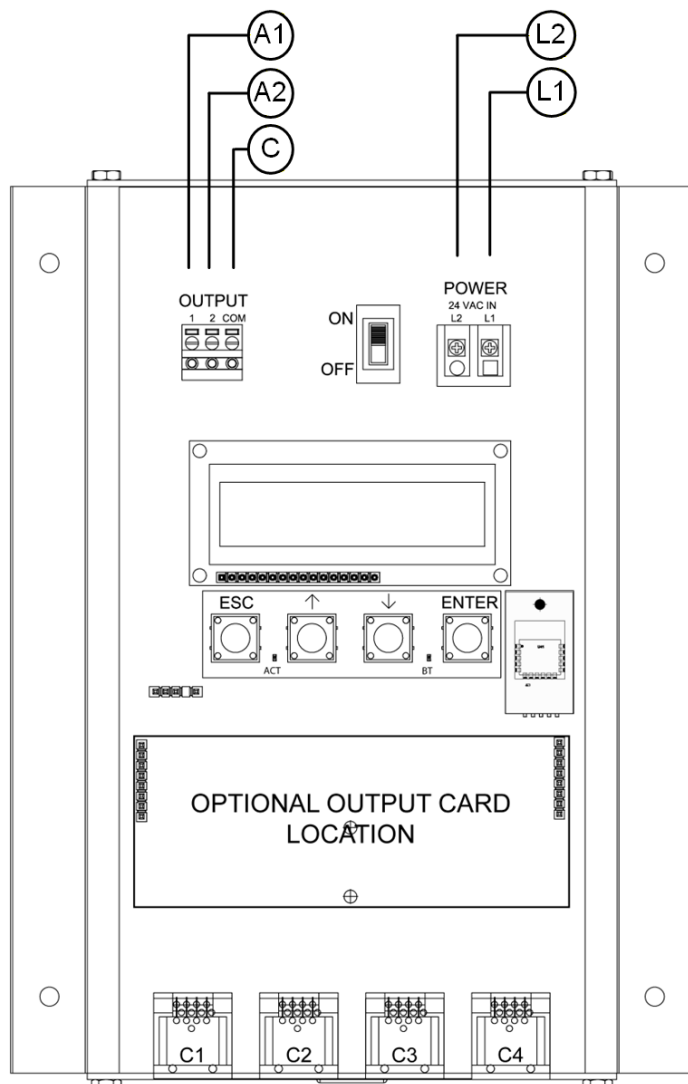
Locate the transmitter where all of the sensor probe connecting cables will reach the transmitter and it is protected from moisture, rain, and snow.

Transmitter Mounting Diagram and Dimensions

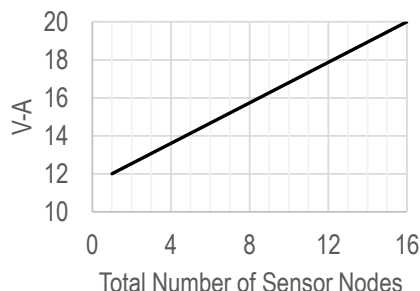
Advantage IV HTx116 Series Transmitter Installation



All Models - Power Requirement, Probe Connections, and Analog Output Connections



V-A REQUIREMENT @ 24 VAC



TRANSMITTER CONNECTIONS

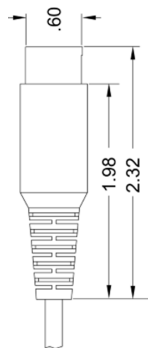
Power		Analog Out (isolated)			Connector
L1	L2	A1	A2	C	C1-C4
24 VAC (hot)	24 VAC (neutral)	Airflow +	Temperature or Alarm +	Signal Common	1 probe x 4 sensors/probe

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.

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

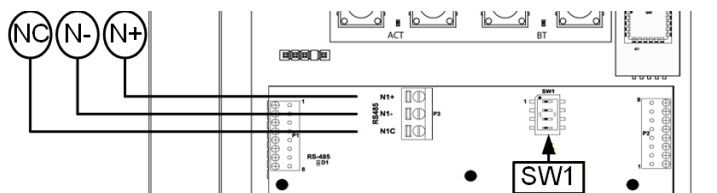
ⓘ Transmitters are preconfigured for 4-20mA. Consult the Startup Guide for the appropriate model to change the output to either 0-5 VDC or 0-10 VDC.



⚠ 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.

HTC116-P - RS-485 Connections



RS-485 (isolated)		
N+	N-	NC
Network +	Network -	Network Common

HTC116-P - RS-485 Connections (continued)

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.

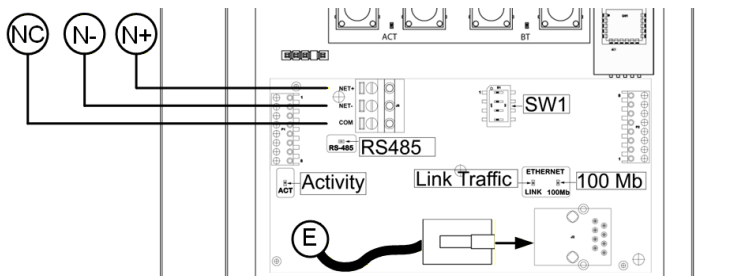
i Transmitters are preconfigured for BACnet MS/TP. Consult the Startup Guide for the appropriate model to change the output to Modbus RTU network protocol.

! 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.

SW1—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

HTB116-P - RS-485 and Ethernet Connections



RS-485 (isolated)			Ethernet
N+	N-	NC	E
Network +	Network -	Network Common	RJ-45 CAT5 or greater

If RS-485, 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.

SW1—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

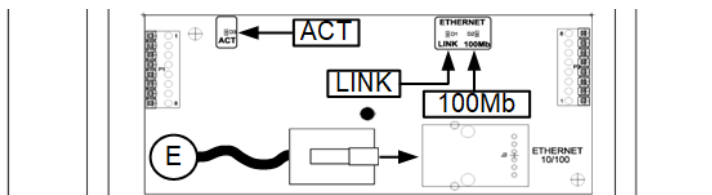
If Ethernet, use a standard RJ-45 Ethernet connection (T-568A or T-568B) and CAT-5 cable or higher.

i Refer to the O&M Manual for information regarding network configuration, BACnet objects, and Modbus registers.

i BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The HTB116-P supports simultaneous operation of all protocols.

i EB-Bus network configuration is set by EB-Bus Ethernet host. Refer to O&M Manual for information regarding EB-Bus network configuration.

HTM116-P - Ethernet Connection

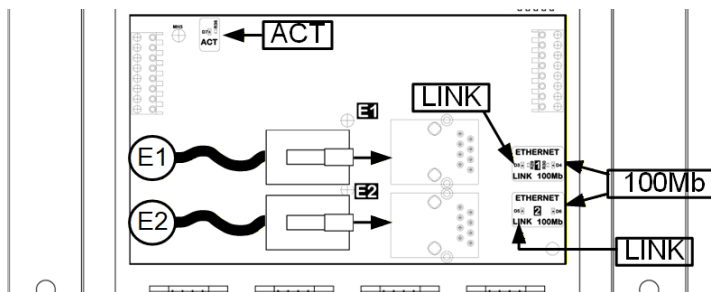


Ethernet
E
RJ-45 CAT5 or greater

Use a standard RJ-45 Ethernet connection (T-568A or T-568B) and CAT-5 cable or higher.

- ① Refer to the O&M Manual for information regarding network configuration, BACnet objects, and Modbus registers.
- ① BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The HTM116-P supports simultaneous operation of all protocols.
- ① EB-Bus network configuration is set by EB-Bus Ethernet host. Refer to O&M Manual for information regarding EB-Bus network configuration.

HTS116-P - Dual Ethernet Connection

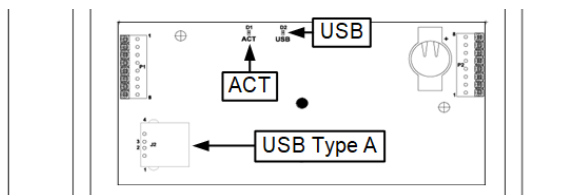


Ethernet	
E1	E2
RJ-45 CAT5 or greater	RJ-45 CAT5 or greater

Use standard RJ-45 Ethernet connections (T-568A or T-568B) and CAT-5 cable or higher.

- ① Refer to the O&M Manual for information regarding network configuration, BACnet objects, and Modbus registers.
- ① BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The HTS116-P supports simultaneous operation of all protocols.
- ① EB-Bus network configuration is set by EB-Bus Ethernet host. Refer to O&M Manual for information regarding EB-Bus network configuration.

HTU116-P - USB Datalogger



Transmitters with a USB data logger log the average airflow, average temperature, individual sensor node airflow and the individual sensor node temperature at 5-minute intervals using Universal Time Coordinated (UTC) based on an onboard real-time clock, whenever power is applied to the transmitter. Data files are automatically appended on power-up.

Enable the USB WRITE parameter to start logging data.

Disable the USB WRITE parameter stop logging data.

⚠ Always set the USB WRITE parameter to "OFF" before removing the USB memory device to avoid data loss/and or damage.

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. Provide a location name up to sixteen characters to facilitate use of the EB-Link Reader phone/tablet application and IAQ Enforcer® accessories. The location name is displayed on the EB-Link Reader and IAQ Enforcer Smart Display Panel SDX-1000 in lieu of the transmitter serial number.

