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

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
- Optional velocity-weighted humidity/enthalpy and dewpoint measurement
- 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

PATENTS

- US Patent Nos.: 12,066,199; 12,066,205
- CA Patent Nos.: 3,069,531; 3,169,641
- EP Patent No.: 4081741
- MX Patent No.: 417881

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
- Economizer switchover and fault detection

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 GTx116e-P is EBTRON's top-of-the-line airflow monitoring system that also provides velocity-weighted temperature and optional velocity-weighted psychrometric measurements, 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.

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GTx116e-P TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations (max.)
- **Type A Transmitter:** 2 probes x 8 sensor nodes/probe
- **Type B Transmitter:** 4 probes x 4 sensor nodes/probe

Installed Airflow Accuracy
- **Ducts/Plenums:** ±3% of reading
- **Non-ducted OA Intakes:** better than or equal to ±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
- **CE:** Yes (/NR option only)
- **UKCA:** Yes (/NR option only)
- **BACnet International:** BTL Listed (GTB116e, GTC116e, GTM116e and GTS116e transmitters)
- **FCC:** This device complies with Part 15 of the FCC rules
- **RoHS:** This device is RoHS2 compliant

Environmental Limits
- **Temperature:**
  - **Probes:** -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]
  - **Transmitter:** -20 to 120 ^{0}F [-28.9 to 48.9 ^{0}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:** ±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^{0}F [0.08 ^{0}C] to NIST-traceable temperature standards (includes transmitter uncertainty)
- **Calibrated Range:** -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]

Optional Relative Humidity Sensor (/H Option)

Type: Ruggedized capacitive polymer RH sensor

Accuracy @ 77 ^{0}F [25 ^{0}C]
- **20 to 80 %RH:** ±2% RH
- **0 to 20 and 80 to 100 %RH:** ±3.5% RH

Temperature Coefficient: 0.07%/^{0}F [0.13%/^{0}C]

Long Term Drift: 0.5% RH/year

Calculated Measurements: Velocity weighted relative humidity, velocity-weighted enthalpy and dew point using measured RH, velocity-weighted temperature and on-board barometric pressure sensor.

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]
- Note: The /H option is only available on probes >18 in.[457.2 mm]

Probe to Transmitter Cables
- **Type:** FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ^{0}F [-55 to 150 ^{0}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:** 13/16" [20.63 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @20V-A max.

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

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

B.A.S. Connectivity Options
- **All Transmitters:** Three field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm, AO3=%RH, enthalpy or dew point when /H option is provided).
- **GTA116e Transmitter:** No additional connectivity to B.A.S.
- **GTC116e Transmitter**[1]**:** One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network
- **GTB116e Transmitter**[1]**:** 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)
- **GTM116e Transmitter**[1]**:** 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)
- **GTS116e Transmitter**[1]**:** 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.
- **GTF116e Transmitter:** One additional isolated Lonworks Free Topology network connection
- **GTU116e 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, humidity, enthalpy, dew point, individual sensor node airflow/temperature data, settings and diagnostics[2].

[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 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 C or + 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 GTx116e-PC provides a measurement accuracy of better than or equal to ±3% of reading (±5% of reading on close-coupled outdoor air intakes) without field adjustment. The GTx116e-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., GTx116e-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 (+). 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.

PC SENSOR DENSITY TABLE

PC SENSOR DENSITY TABLE (# Probes/# Sensor nodes per probe) - /H not available with /SS option																							
		Probe Length (inches)																					
		/H Not Available																					
		Insertion/Standoff																					
				Internal 1																			
		6	8	10	12	14	16	18	20	22	24	30	36	42	48	54	60	66	72	84	96	108	120[1]
Round ➢		1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/2	2/2	2/4	2/4	2/4	2/6	2/6	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
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	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/8
	8	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/3	1/3	1/3	1/4	1/4	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8
	10	1/1	1/1	1/1	1/2	1/2	1/3	1/4	1/3	1/3	1/3	1/4	1/5	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8
	12	1/1	1/1	1/1	1/2	1/2	1/3	1/4	1/3	1/3	1/3	1/4	1/5	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
	14	2/1	2/1	2/1	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/4	2/4	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6
	16	2/1	2/1	2/1	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/8
	18	2/1	2/1	3/1	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	1/8	1/8	2/6	2/6	2/6	2/6	2/8	2/8
	20	2/1	3/1	3/1	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	1/8	2/6	2/6	2/6	2/6	2/8	2/8	2/8
	22	2/1	3/1	3/1	2/2	3/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	2/6	2/6	2/6	2/6	2/8	2/8	2/8	2/8
	24	2/1	4/1	4/1	2/2	3/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	2/4	2/4	2/6	2/6	2/6	2/6	2/8	2/8	2/8	2/8
	30	4/1	4/1	4/1	3/2	3/2	3/2	3/2	3/3	3/3	3/3	2/4	2/4	2/6	2/6	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8
	36	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	3/3	2/4	2/5	2/6	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8
	42	4/1	4/1	4/1	3/2	4/2	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	2/7	2/8	4/4	2/8	2/8	2/8	2/8	2/8	2/8
	48	4/1	4/1	4/1	3/2	4/2	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	4/4	4/4	4/4	4/4	4/4	2/8	2/8	2/8	2/8
	54	4/1	4/1	4/1	4/2	4/2	4/2	4/2	4/2	4/3	4/3	3/4	3/4	4/4	4/4	4/4	4/4	4/4	4/4	2/8	2/8	2/8	2/8
	60	4/1	4/1	4/1	4/2	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	2/8	2/8	2/8
	66	4/1	4/1	4/1	4/2	4/2	4/2	3/4	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	2/8	2/8
	72	4/1	4/1	4/1	4/2	4/2	4/2	3/4	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	2/8
	84	4/1	4/1	4/1	4/2	4/2	4/3	3/4	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
	96	4/1	4/1	4/1	4/2	4/2	4/3	3/4	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
	108	4/1	4/1	4/1	4/2	4/2	4/3	4/4	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
	120	4/1	4/1	4/1	4/2	4/2	4/3	4/4	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

NOTE

1. Probe lengths greater than 120 in. will be PZ custom sensor density.

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[2]
Round ➢		1/1	1/1	1/1	1/2	2/2	2/2	2/2	2/4	2/4	2/4	2/4	2/4	2/6	2/8	2/8	2/8	2/8	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	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/8
	8	1/1	1/1	1/1	1/2	1/2	1/2	1/2	1/4	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8
	10	1/1	1/1	1/1	1/2	1/2	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	2/6
	12	1/1	1/1	1/1	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	2/6	2/6
	14	2/1	2/1	2/1	2/2	2/2	2/2	2/2	2/2	2/3	2/3	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6
	16	2/1	2/1	3/1	2/2	2/2	2/2	2/2	2/3	2/3	2/3	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/7
	18	2/1	2/1	3/1	2/2	2/2	2/2	2/3	2/3	2/3	2/3	1/6	1/8	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8
	20	2/1	3/1	3/1	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8
	22	2/1	3/1	3/1	2/2	3/2	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
	24	2/1	4/1	4/1	2/2	3/2	2/3	2/3	2/3	2/3	2/3	2/4	2/4	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
	30	4/1	4/1	4/1	3/2	3/2	3/2	3/2	2/4	2/4	2/4	2/4	2/4	2/6	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8
	36	4/1	4/1	4/1	3/2	3/2	3/2	4/2	4/2	4/2	2/4	2/4	2/6	2/6	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8
	42	4/1	4/1	4/1	3/2	4/2	4/2	4/2	4/2	4/2	4/2	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
	48	4/1	4/1	4/1	3/2	4/2	4/2	4/2	4/2	4/2	4/2	3/4	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
	54	4/1	4/1	4/1	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	2/7	2/8	2/8	2/8	2/8	2/8	4/4	2/8	2/8	2/8	2/8
	60	4/1	4/1	4/1	4/2	4/2	4/2	4/2	3/4	3/4	3/4	4/4	4/4	2/8	2/8	2/8	4/4	4/4	4/4	4/4	2/8	2/8	2/8
	66	4/1	4/1	4/1	4/2	4/2	4/2	3/4	3/4	3/4	3/4	4/4	4/4	4/4	2/8	2/8	4/4	4/4	4/4	4/4	4/4	2/8	2/8
	72	4/1	4/1	4/1	4/2	4/2	4/2	3/4	3/4	3/4	3/4	4/4	4/4	4/4	2/8	4/4	4/4	4/4	4/4	4/4	4/4	4/4	2/8
	84	4/1	4/1	4/1	4/2	4/3	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	4/4	4/4	4/4	4/4
	96	4/1	4/1	4/1	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	4/4	4/4	4/4	4/4	4/4
	108	4/1	4/1	4/1	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	4/1	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

NOTE

1. **UNDERLINED** items cannot be manufactured as internal mount due to manufacturing limitations.
2. Probe lengths greater than 120 in. will be PZ custom sensor density.

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.

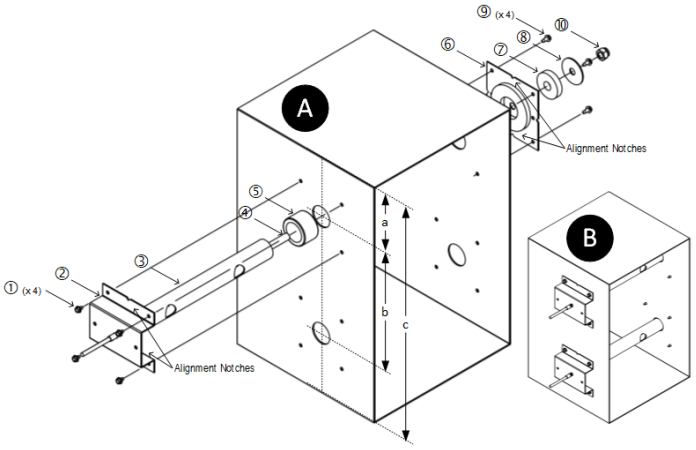
SENSOR PROBE INSTALLATION

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

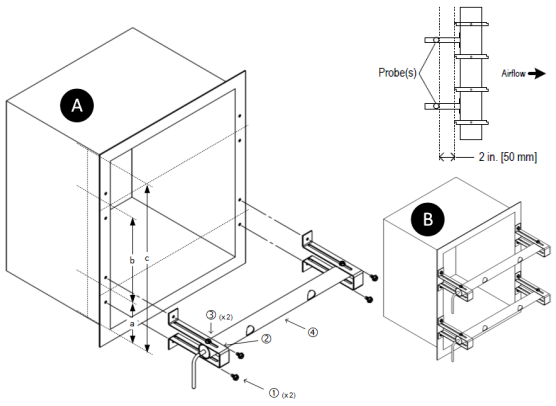
-P Probe Installation (Insertion Mounting—Rectangular Ducts)



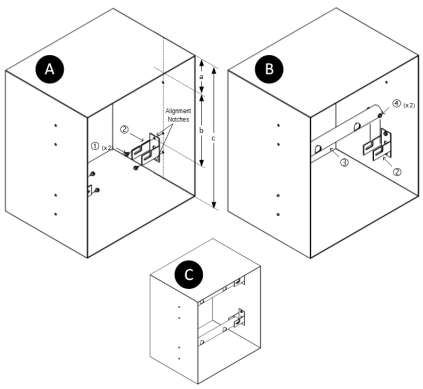
RECTANGULAR & OVAL TYPE C DUCTS

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

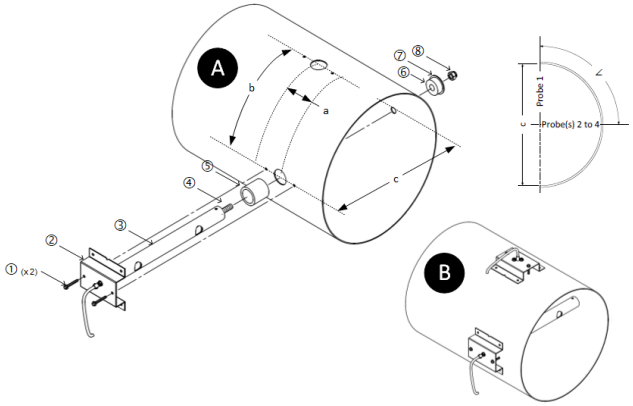
-P Probe Installation (Standoff Mounting—Rectangular Ducts)



-P Probe Installation (Internal Mounting—Rectangular Ducts)



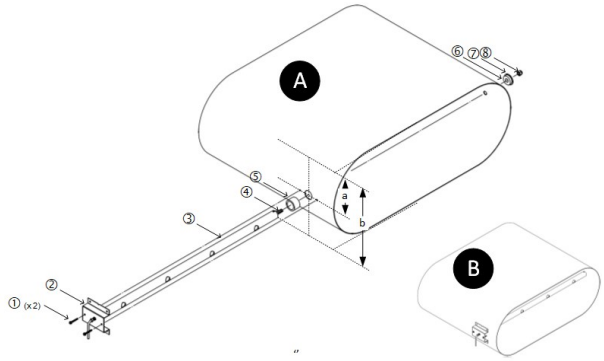
-P Probe Installation (Insertion Mounting—Round Ducts)



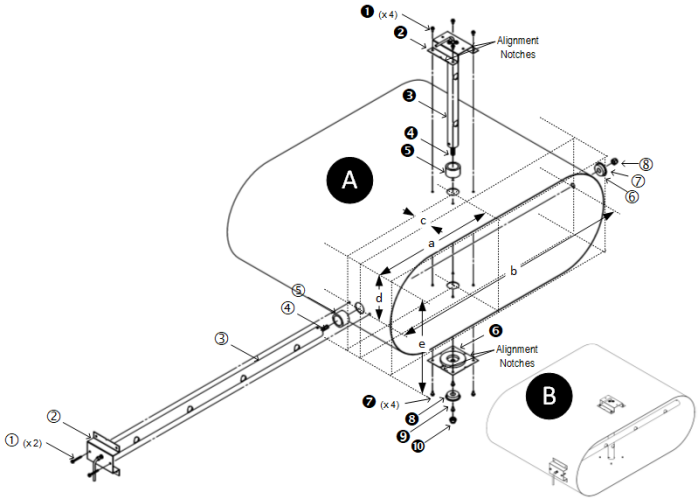
ROUND DUCTS

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°

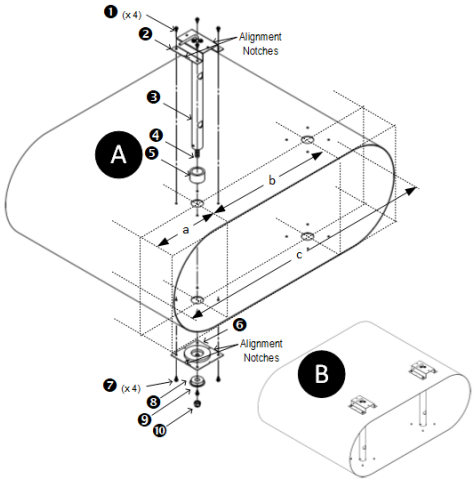
-P Probe Installation (Insertion Mounting—Oval Ducts—Type A)



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

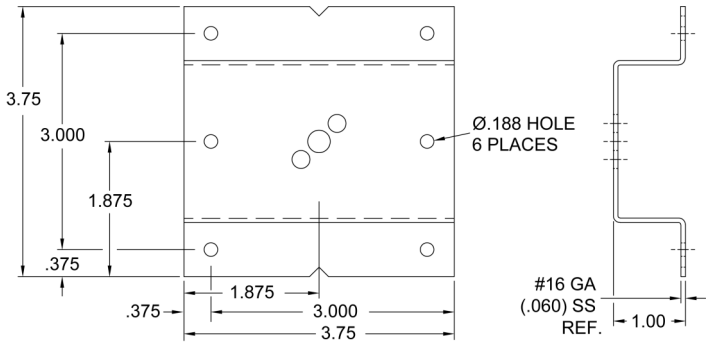


-P Probe Installation (Insertion Mounting—Oval Ducts—Type C)

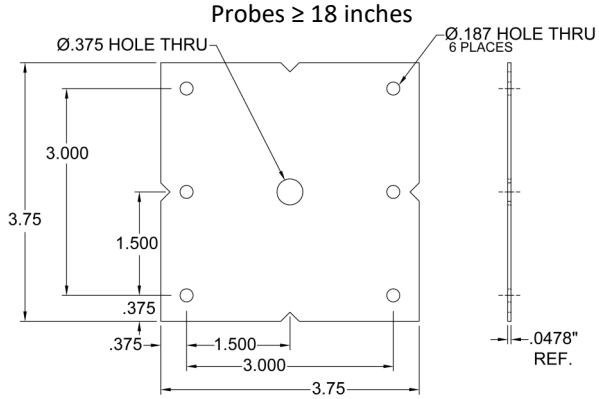


Sensor Probe Mounting Bracket Dimensions

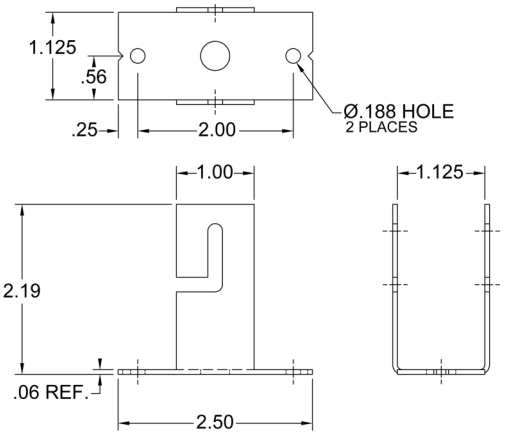
INSERTION MOUNTING BRACKET - Insertion Side



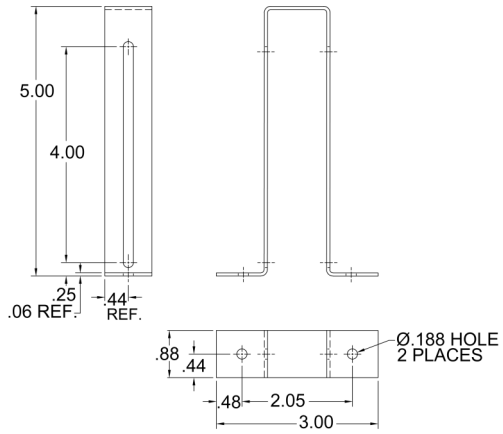
INSERTION MOUNTING BRACKET - Terminal Side



INTERNAL MOUNTING BRACKET (x2)



STANDOFF MOUNTING BRACKET (x2)



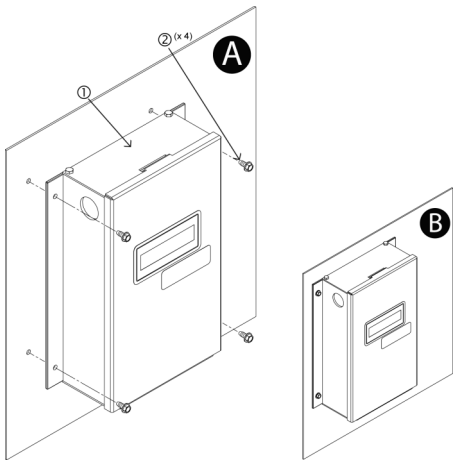
TRANSMITTER INSTALLATION AND WIRING

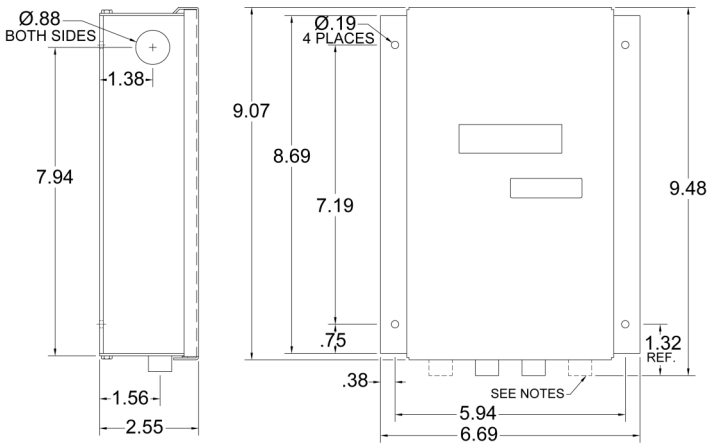
Detailed installation guides for transmitters are provided in the O&M Manual for the connectivity options that follow. All GTx116e transmitters are provided with the base analog output configuration (x = A). Additional connectivity may be obtained by an additional output card located below the display 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.

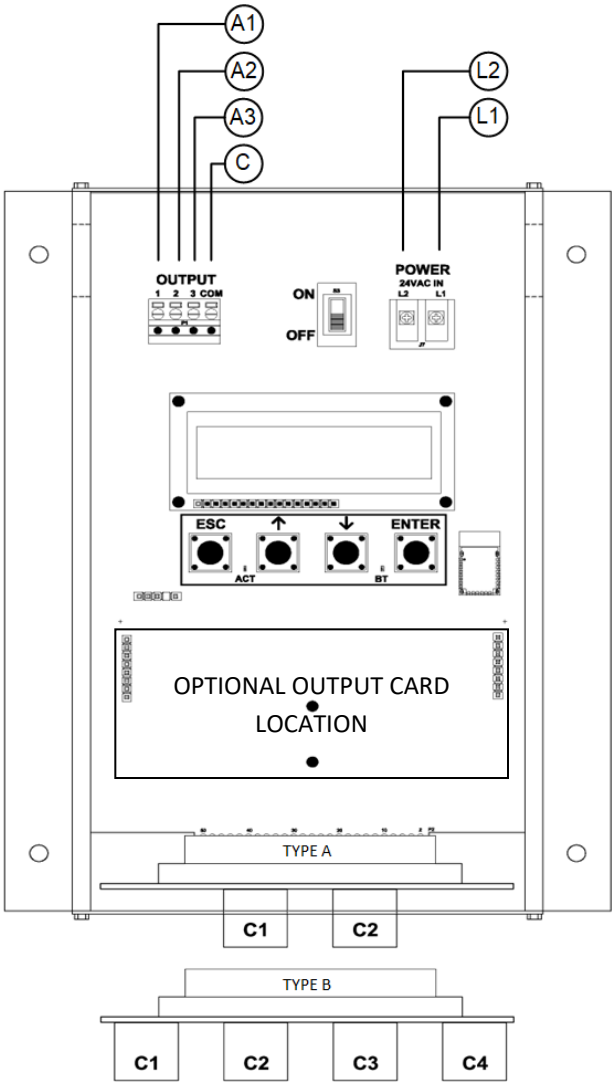
Transmitter Mounting Diagram and Dimensions

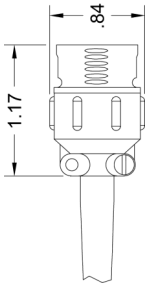
Advantage IV Gold Series Transmitter Installation





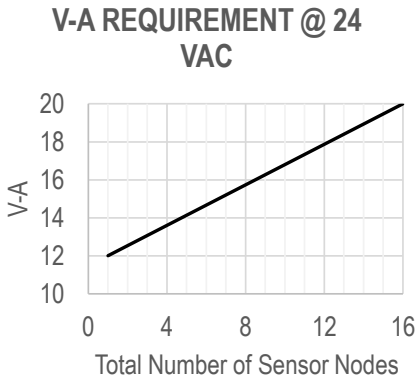
All Models - Power Requirement, Probe Connections, and Analog Output Connections





⚠ *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.*



TRANSMITTER CONNECTIONS

Power		Analog Out (isolated)				Type	
L1	L2	A1	A2	A3	C	A	B
24 VAC (hot)	24 VAC (neutral)	Airflow +	Temperature or Alarm +	Psychrometric Property+	Signal Common	2 probes x 8 sensors/probe	4 probes x 4 sensors/probe

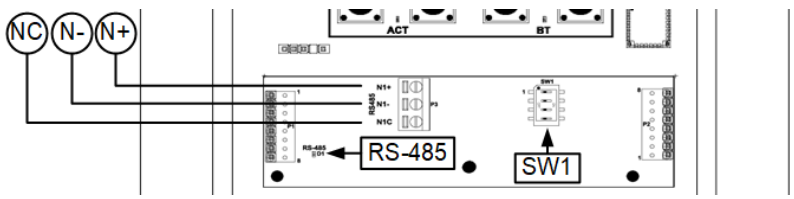
Connect each analog output signal required to the host B.A.S. using shielded twisted-pair wire. Properly terminate the shield (typically at the B.A.S.).

⚠ *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.*

GTC116e-P - RS-485 Connections



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

GTC116e-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.

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

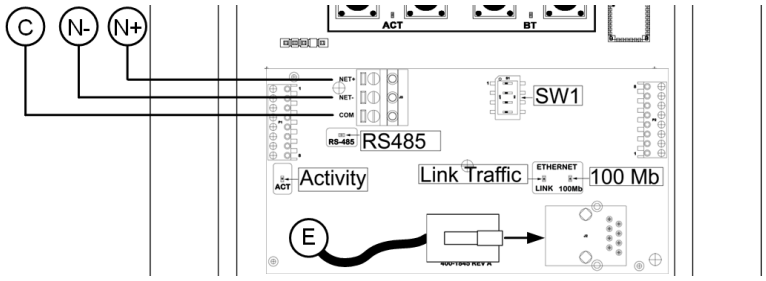
ⓘ *Transmitters are preconfigured for BACnet MS/TP. Consult the Startup Guide for the appropriate model to change the output to Modbus RTU network protocol.*

⚠ *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.*

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

GTB116e-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.

ⓘ *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.*

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

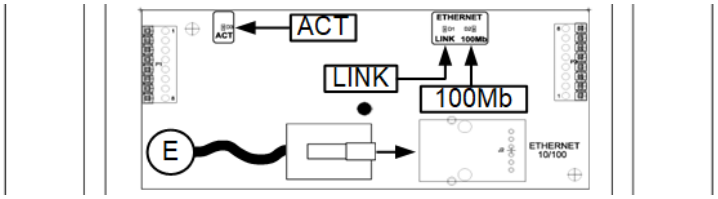
If Ethernet, use a standard RJ-45 Ethernet connection (T-568A or T-568B) and CAT-5 cable or higher.

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

ⓘ *BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The GTB116e-P supports simultaneous operation of all protocols.*

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

GTM116e-P - Ethernet Connection



Ethernet
E
RJ-45 CAT5 or greater

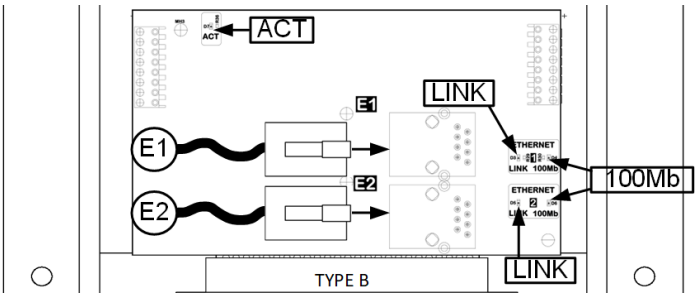
Use a standard RJ-45 Ethernet connection (T-568A or T-568B) and CAT-5 cable or higher.

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

ⓘ *BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The GTM116e-P supports simultaneous operation of all protocols.*

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

GTS116e-P - Dual Ethernet Connection



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

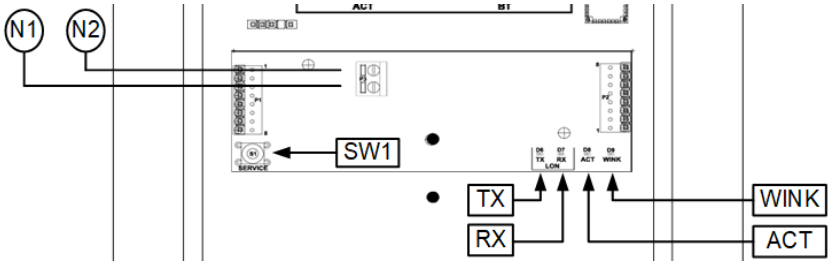
Use standard RJ-45 Ethernet connections (T-568A or T-568B) and CAT-5 cable or higher.

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

ⓘ *BACnet Ethernet, BACnet IP, Modbus TCP or TCP/IP protocols are set during network configuration. The GTS116e-P supports simultaneous operation of all protocols.*

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

GTF116e-P - LON Connection



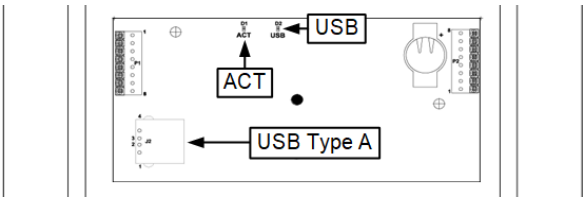
Lon Network	
N1	N2
Network Pair (1 of 2)	Network Pair (2 of 2)

ⓘ *Refer to the O&M Manual for information regarding network configuration and LON objects.*

ⓘ *The network termination is polarity insensitive.*

⚠ Use the network cable specified by Echelon (typically Beldon 8471 cable or equivalent).

GTU116e-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)
- √ 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. 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.

GT 116e-P __ / __ : _____ x ___ / ___ : ___

Custom Configuration Z Only

Custom Layout
{blank} = standard, C = custom

Number of Sensors/Probe
1 or 2 Probes: 1, 2, 3, 4, 5, 6, 7, 8
3 or 4 Probes: 1, 2, 3, 4

Number of Probes
1, 2, 3, 4

Internal Insulation
{leave blank} = none, Enter internal insulation thickness of one side

Adjacent Side Length (including internal insulation of both sides if applicable)
Enter the opening dimension of the side the probe is inserted or connected to

Probe Length (including internal insulation of both sides if applicable)
Enter the opening dimension that the probes are mounted parallel to
Note: Standoff probes are built 2 inches larger than the Probe Length entered

Probe Cable Length
10 = 10 ft., 15 = 15 ft., 20 = 20 ft., 25 = 25 ft., 30 = 30 ft., 40 = 40 ft., 50 = 50 ft.
Note: Custom lengths between 3 ft. and 50 ft. are available

Mounting Style
1 = Insertion, 2 = Internal, 3 = Stand-off

Shape
1 = Rectangle, 2 = Round, 3 = Oval (Type A), 4 = Oval (Type B), 5 = Oval (Type C)

Option list: Separate options with additional /

Tube Material
{leave blank} = Aluminum, SS = 316 Stainless steel w/Kynar sensor nodes

Humidity Sensor
{leave blank} = Not provided, H = Single humidity sensor provided

Bluetooth Radio for EB-Link Reader
{leave blank} = Provided, NR = No radio

Units of Measure for Dimensions
{leave blank} = I-P, SI = metric

Sensor Density
Standard Densities: C or +
Custom Density: Z (fill in custom section)

Connectivity
A = isolated analog outputs (AO1 = airflow, AO2 = temperature or alarm, AO3 = psychrometric value if provided)
B = isolated analog outputs plus RS-485 field selectable BACnet MS/TP or Modbus RTU plus Ethernet field selectable BACnet Ethernet, BACnet IP, Modbus TCP, or *EB-Bus*
C = isolated analog outputs plus RS-485 field selectable BACnet MS/TP or Modbus RTU
M = isolated analog outputs plus Ethernet field selectable BACnet Ethernet, BACnet IP, Modbus TCP, or *EB-Bus*
S = isolated analog outputs plus dual Ethernet field selectable BACnet Ethernet, BACnet IP, Modbus TCP, or *EB-Bus*
F = isolated analog outputs plus Lonworks Free Topology
U = isolated analog outputs plus USB thumb drive datalogger