

Advantage

Hybrid Series by Ebtron

Installation, Operation and Maintenance Technical Manual

HE1

Energy Recovery Ventilator ERV Airflow Sensors

For use with Hybrid HTx104 Transmitters

Analog output model: HTA104-E and

RS-485 output model: HTN104-E

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TM_HE1_R1A

LIST OF EFFECTIVE AND CHANGED PAGES

Insert latest changed pages (in bold text); remove and dispose of superseded pages.
Total number of pages in this manual is **8**.

Page No	Revision *	Description of Change	Date
1 - 8	R1A	Initial document release	07/16/2010

* R1A indicates an original page without change

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OVERVIEW

EBTRON's Hybrid Series HE1 Energy Recovery Ventilation (ERV) probes (Figure 1) are used with the HTx104-E transmitter (Figure 2) for ERV airflow measurement in suitable desiccant wheel type ERV enthalpy systems. The highly accurate HE1 probes are installed on both sides of the desiccant wheel to ensure accurate, repeatable airflow and temperature measurement over the entire operating range of zero flow through 2,000 fpm (10.16 m/s). HE1 probes with the HTx104-E transmitter comprise an ERV air flow measurement station (AFMS) that permits extremely accurate control of outside air intake and ERV exhaust, resulting in higher ERV efficiency, greater economy of operation and improved indoor air quality.

The HTx104-E ERV AFMS with HE1 probes can be used to precisely control space pressure and outside air delivery to achieve compliance with the ventilation rate procedure of ASHRAE 62.1-2007. The HE1 probes represent a competitively priced and technologically superior alternative to legacy pressure-based instruments which are inherently less accurate at the low face velocities present in modern ERV systems. HE1 probes with the HTx104-E AFMS produce "percent-of-reading" accuracy that is ensured by sensor characterization in wind tunnels calibrated to NIST-traceable volumetric airflow standards.

EBTRON uses only precision "bead-in-glass" thermistors within each sensor to determine airflow rate and temperature. One HTx104-E ERV AFMS monitors two separate HE1 sensor probes serving a single ERV system.

The HTx104-E with HE1 probes is available in analog or RS-485 network versions for virtually all modern BAS interfaces and is designed for years of trouble free operation. Periodic field calibration and maintenance are not required in most environments¹.



Figure 1. HE1 ERV Probe

ADVANCED TECHNOLOGY

- **EBTRON** Advanced Thermal Dispersion (TD) airflow measurement technology ensures accurate, repeatable measurement down to zero fpm (still air).
- Each sensor is factory calibrated to **NIST-traceable** volumetric airflow standards.
- Superior alternative to differential pressure based pitot arrays and flow rings at typical low ERV wheel face velocities.
- Highest quality and stability hermetically sealed "bead-in-glass" thermistors.
- Exclusive "Plug and Play" SMART sensor design.
- Flexible field mounting installation options.

APPLICATIONS

- Control space pressure and outside air delivery to achieve compliance with the ventilation rate procedure of **ASHRAE 62.1-2007**.
- Contribute towards acquisition of **LEED Credits**:
 - EA - **Energy and Atmosphere**
 - Minimum Energy Performance
 - Optimize Energy Performance
 - Measurement and Verification
 - IEQ - **Indoor Environmental Quality**
 - Outdoor air delivery monitoring
 - Increased Ventilation
- Precise airflow and temperature measurement for ERV enthalpy desiccant wheel systems from 0 through 2,000 fpm for improved efficiency, control and energy conservation.



Figure 2. HTx104-E Transmitter

¹ In certain applications where large amounts of airborne, fibrous material such as lint is present, pre-filtering of the return air may be required to ensure optimum instrument performance. If no pre-filtering is provided in these applications, periodic inspection and cleaning of sensors using compressed air or a small brush is recommended. Factory performance returns immediately after cleaning, and recalibration is NOT required. Periodic inspection of sensors is always advised, and accessibility must be considered.

SPECIFICATIONS

HE1 Probe Accuracy

- Airflow rate: $\pm 3\%$ of reading typical (4% maximum), $\pm 0.25\%$ repeatability
- Temperature: $\pm 0.15^\circ\text{ F}$ (0.08° C)

HE1 Measurement Range

- Airflow rate: 0 to 2,000 fpm (0 to 10.16 m/s)
- Temperature: -20° to 160° F (-28.9° to 71.1° C)
- Humidity: 0 to 99% RH, non-condensing

HE1 Probe Configuration

- Type B for HTx104 Transmitter:
2x2 (two HE1 probes x two sensors/probe)

Sensor Assembly (each sensing point)

- Heated Element:
One bead-in-glass, hermetically sealed thermistor sensor
- Temperature Sensor:
One encapsulated precision thermistor sensor
- Sensor Housing:
Glass-filled polypropylene
- Sensor Potting Material:
Marine grade, waterproof epoxy
- Internal wiring: Kynar[®] coated copper

Probe Dimensions:

- Probe Length: 8 inches (203.2 mm)
- Probe Diameter: 0.75 inches (19.05 mm)

Tube Construction

- Aluminum: 6063 aluminum alloy (standard)
Type 316 stainless steel (optional)
- Universal Mounting Bracket: Type 5052 Aluminum

Cable Assembly

- UL[®] Plenum Rated, PVC jacket; 10 feet [std.] (3.05 m); optional up to 50 feet (15.24 m) with integral 0.625 inch (15.86 mm) circular DIN plug

"Plug and Play" Sensor Probes

- Probes do not require matching to transmitter

Compatible ERV Transmitter:

- HTA104, HTN104

HE1 SENSOR PROBE PLACEMENT

HE1 ERV sensor probes are computer calibrated between 0 and 2,000 fpm (0 and 10.16 m/s) in individual wind tunnels to volumetric airflow standards. Placement of the HE1 sensor probe is critical for proper operation and accuracy of the HTx104-E ERV airflow measurement station. Figure 3 shows minimum placement requirements for the HE1 sensor probe in a typical application.

CAUTION

Placement of the HE1 probes is critical for proper performance of the HTx104-E ERV airflow measurement station.

Minimum Placement Considerations and Guidelines

Two HE1 probes are provided with the HTx104 ERV AFMS. Since each ERV enclosure design is unique, specific installation instructions for all ERV systems is beyond the scope of this document. HE1 probe placement must be carefully determined in the field by the installer based upon the specific ERV system internal construction. When planning HE1 probe installation, the installer must consider routine maintenance of the ERV desiccant wheel, which can require removal of the media wheel for periodic cleaning or replacement as recommended by the ERV manufacturer. In addition, placement of HE1 probes must consider ERV system enclosure internal compartment/slide mechanical clearances and ERV air gaskets to ensure that system efficiency is not compromised. Figure 2 shows a typical installation and the critical dimension from probe to media face. The following section of this document provides general guidance in the installation of HE1 ERV probes.

As always, you can contact your local **EBTRON** sales representative or the **EBTRON** application engineering team at 1-800-2-EBTRON for any questions or concerns regarding installation of the HE1 probes.

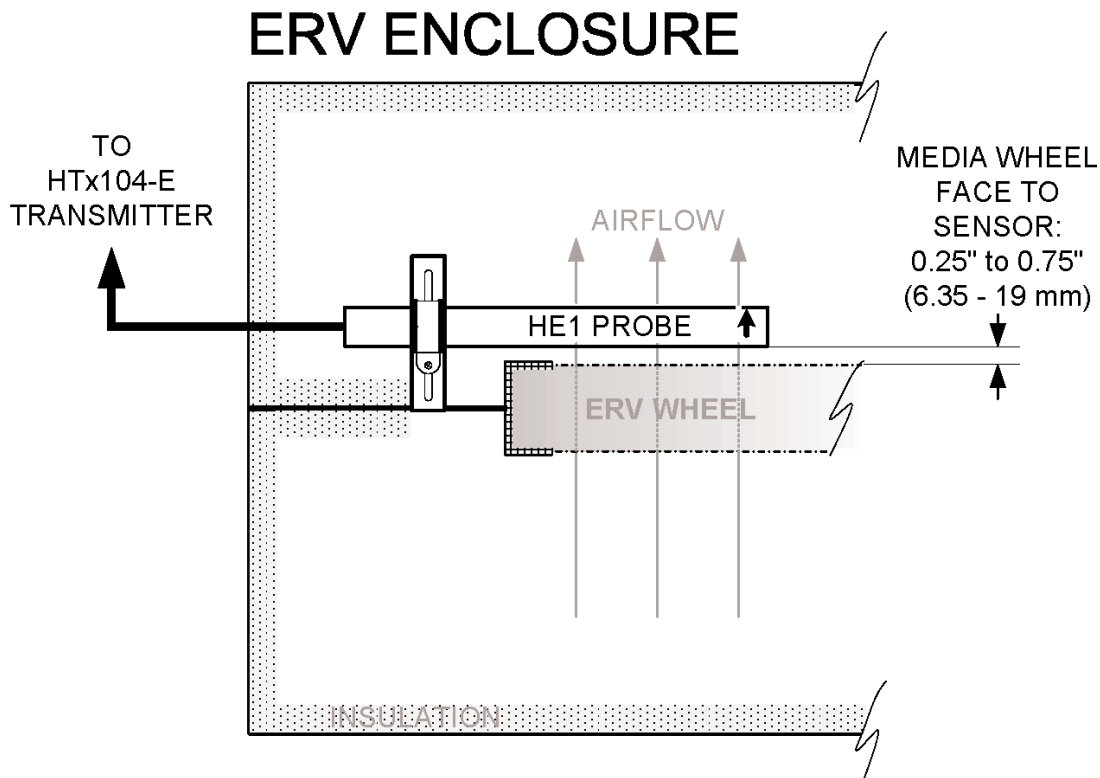






Figure 3. Typical HE1 ERV Sensor Installation and Minimum Placement Guideline Dimensions

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HE1 INSTALLATION

HE1 probes are designed for mounting at approximately 0.25 to 0.750 inches (6.35 to 19.05 mm) from the face of the desiccant wheel media as shown previously in Figure 3. Each HE1 probe is supplied with a universal adjustable mounting bracket to permit installation in a wide range of suitable desiccant wheel type ERV enthalpy systems. Figure 4 shows detail of the HE1 probe, the universal adjustable mounting bracket and the integral adjustable clamp. Observe the following precautions when installing HE1 ERV probes:

CAUTION

-  To ensure proper performance of the HTx104-E AFMS, maintain the minimum distance guidelines between the face of the ERV media and the HE1 probe as shown in Figure 3.
-  Ensure that adequate clearances exists during installation to prevent damage to the ERV system and all moving parts and to permit future routine maintenance of the ERV media.
-  External insulation that interferes with mounting should be temporarily removed prior to installation.
-  HE1 probes must be installed so that air flows first through the media, and then through the HE1 probe, and in the direction indicated on the printed label on the probe. Do not install probes in the opposite direction.

Proceed to install the HE1 probes as follows:

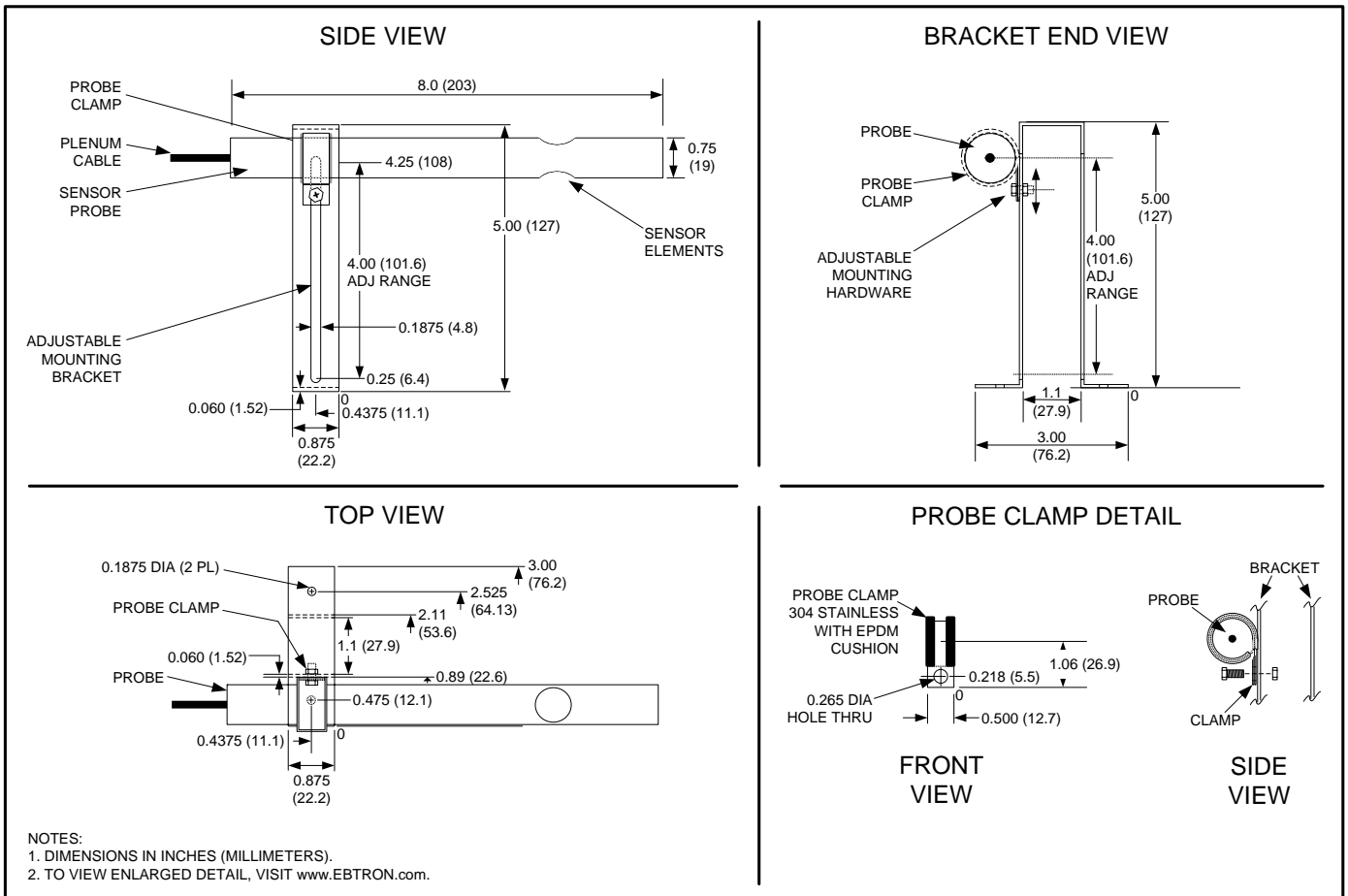


Figure 4. HE1 ERV Probe and Mounting Bracket Installation Dimensions

1. HE1 probes must be mounted on the outside air intake and at the exhaust air faces of the ERV system desiccant wheel. Airflow must always pass first through the media wheel, and then through the HE1 probe.
2. Install the supplied universal adjustable mounting brackets on the intake and exhaust sides of the desiccant wheel as shown in Figures 3 and 4. The brackets can be adjusted to suit a wide variety of ERV enclosure applications.
3. Use suitable hardware in two places at each of the brackets to secure them to the ERV enclosure.
4. Adjust the brackets and probe clamp as shown in details of Figure 4 in order to establish 0.25 to 0.75 inch (6.35 to 19 mm) clearance between the ERV media wheel face and the HE1 probe.
5. Confirm that airflow is in the direction as printed on the HE1 probe body, and that flow is first through the media and then through the HE1 probe.
6. Confirm that the installation will not interfere with the normal operation of the ERV system, and to ensure that future routine maintenance as required by the ERV system manufacturer can be achieved. Check that all cabinet covers do not interfere with the probes.
7. Connect sensor probe to the HTx104-E transmitter. Refer to the separate transmitter Technical Manual, TM_HTx104 under separate cover for information on set up and operation of the airflow measurement system.

HE1 MAINTENANCE

In most HVAC environments, periodic maintenance and calibration is not required or recommended*.

*In certain applications where a large amount of airborne particulate is present, especially fibrous material such as lint, pre-filtering of the return air (using MERV 5 or equivalent filter) may be required to ensure optimum instrument performance. If no pre-filtering is provided, it may be necessary to periodically inspect and clean sensors using compressed air or a small brush. Factory performance returns immediately after cleaning. Recalibration is NOT required. Periodic inspection of the sensors is always advised, and accessibility must be considered in these applications.

HE1 STANDARD LIMITED PARTS WARRANTY

If any **EBTRON** product fails within 36 months from shipment, **EBTRON** will repair/replace the device free of charge as described in the company's warranty contained in **EBTRON's** Terms and Conditions of Sale. Defective equipment shall be shipped back to **EBTRON**, freight pre-paid, for analysis.

