

Technical Note

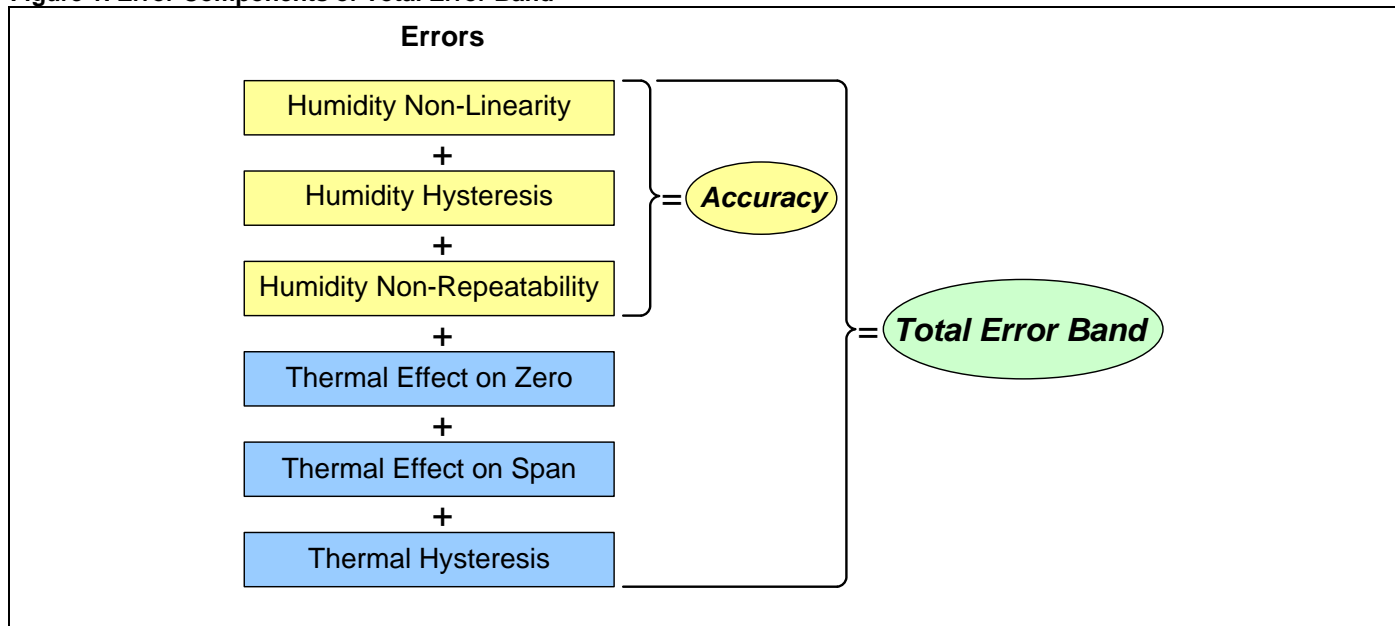
Total Error Band Specification for Honeywell Digital Humidity/Temperature Sensors

Total Error Band Definition

The Total Error Band (TEB) specification on a humidity/temperature sensor product data sheet can often be confusing.

TEB is a single specification that includes **all** possible sources of error. TEB should not be confused with accuracy, which is actually a component of TEB (see Figure 1).

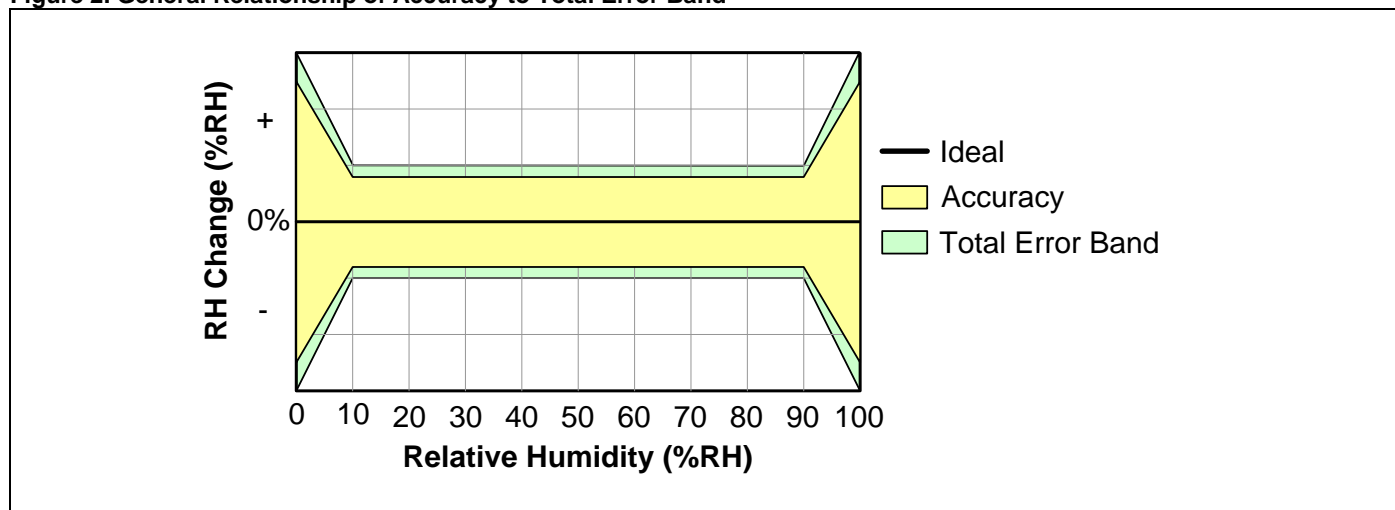
Figure 1. Error Components of Total Error Band



TEB is the maximum deviation from the ideal transfer function of relative humidity over the compensated temperature range and from 10 %RH to 90 %RH (see Figure 2).

In other words, TEB is the worst error that the sensor could see.

Figure 2. General Relationship of Accuracy to Total Error Band



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Total Error Band and Product Data Sheet Specifications

Honeywell uses the TEB specification in its Digital Humidity/Temperature Sensor product data sheet because it is the most comprehensive, clear and meaningful measurement of a sensor's true accuracy (see Figure 3).

Many competitors do not use TEB. They simply specify the "accuracy" of their device. This specification, however, may exclude hysteresis and temperature effects. Instead, the errors are listed individually. When added up, the total error (or what would be the TEB) can be significant (see Figure 4).

This specification may also be calculated over a very narrow range, at only one point in the range, or at the absolute best accuracy level. It is then up to the customer to calibrate the device to make sure it has the accuracy needed for the life of the application.

Honeywell also lists the accuracy specification on its product data sheets in order to provide a common comparison specification with competitors' literature that does not use the TEB specification.

Figure 3. Honeywell Digital Humidity/Temperature Sensor Product Data Sheet

Total Error Band = ± 5 %RH

Characteristic	Condition	Min.	Typ.	Max.	Unit
Supply voltage variation	2.3 Vdc to 5.5 Vdc	–	0.1	0.5	%RH
Compensated humidity range	–	10	–	90	%RH
Compensated temp. range	–	5 [41]	–	50 [122]	°C [°F]
Resolution	14 bit ADC resolution	–	–	0.04	%RH
Accuracy	–	–	–	± 4	%RH
Total error band	–	–	–	± 5	%RH
Response time	airflow minimum 20 l/min	–	6	8	s
Operating range	non-condensing	0	–	100	%RH
Long term stability	50 %RH for 5 years	–	± 0.05	± 1.2	%RH

Figure 4. Sample Competitor Humidity/Temperature Sensor Product Data Sheet

Total Error Band = ± 6.2 %RH

Characteristic	Condition	Minimum	Typical	Maximum	Units
Resolution	8 bit	–	–	0.7	%RH
Accuracy Tolerance ¹	–	–	–	± 3.0	%RH
Non-Linearity	–	–	–	± 0.2	%RH
Thermal Hysteresis	–	–	–	± 2.0	%RH
Response time	tau = 63%	–	6	8	sec
Thermal Effect on Span	–	–	–	± 0.5	%RH
Thermal Effect on Zero	–	–	–	<0.5	%RH
Operating Range	non-condensing	0	–	100	%RH
Long Term Drift	normal	–	± 0.5	–	%RH

Note 1: Value excludes hysteresis.

Total Error Band Benefits

Honeywell's industry-leading Total Error Band provides the following benefits to the customer:

- Eliminates individually testing and calibrating every sensor, helping to reduce manufacturing time and process.

- Supports system accuracy and warranty requirements.
- Helps to optimize system uptime.
- Provides excellent sensor interchangeability—the customer can remove one sensor from the tape, remove the next sensor from the tape, and there is no part-to-part variation in accuracy.

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WARNING

PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this technical note sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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