

MicroPressure Board Mount Pressure Sensors, MPR Series

Figure 1. TEB Components for the MPR Series

Total Error Band (TEB) is a single specification that includes the major sources of sensor error. TEB should not be confused with accuracy, which is actually a component of TEB. TEB is the worst error that the sensor could experience.

Honeywell uses the TEB specification in its datasheet because it is the most comprehensive measurement of a sensor’s true accuracy. Honeywell also provides the accuracy specification in order to provide a common comparison with competitors’ literature that does not use the TEB specification.

Many competitors do not use TEB—they simply specify the accuracy of their device. Their accuracy specification, however, may exclude certain parameters. On their datasheet, the errors are listed individually. When combined, the total error (or what would be TEB) could be significant.

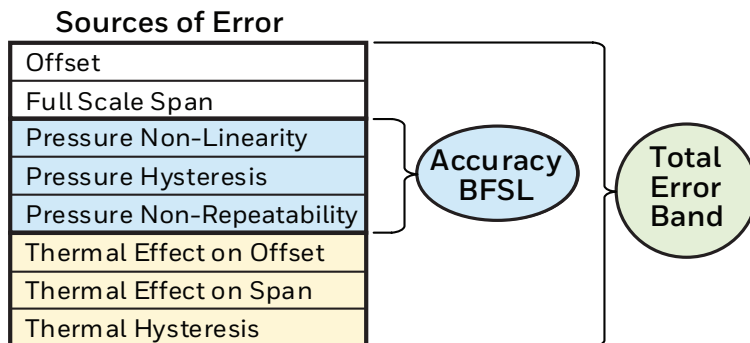


Table 1. Absolute Maximum Ratings¹

Characteristic	Min.	Max.	Unit
Supply voltage (V_{supply})	-0.3	3.6	Vdc
Voltage on any pin	-0.3	$V_{supply} + 0.3$	V
ESD susceptibility (human body model)	—	2	kV
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering peak reflow temperature and time	15 s max. at 250°C [482°F]		

¹Absolute maximum ratings are the extreme limits the device will withstand without damage.

Table 2. Environmental Specifications

Characteristic	Parameter
Humidity: all external surfaces internal surfaces of Liquid Media Option (S,F, L) internal surfaces of Dry Gases Option (N)	0 %RH to 95 %RH, non-condensing 0 %RH to 100 %RH, condensing 0 %RH to 95 %RH, non-condensing
Vibration	15 g, 10 Hz to 2 Hz
Shock	100 g, 6 ms duration
Solder reflow	J-STD-020-D.1 Moisture Sensitivity Level 1 (unlimited shelf life when stored at $\leq 30^{\circ}\text{C}/85\% \text{RH}$)

Table 3. Wetted Materials

Component	Non-Gel Version	Gel Protected Version
Ports and covers	304 stainless steel	304 stainless steel
Substrate	FR4	—
Adhesives	epoxy	gel
Electronic components	silicon, glass, copper, gold	—

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Table 4. Sensor Pressure Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in vacuum reference.
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure.

Table 5. Operating Specifications

Characteristic	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply}): ^{1,2}	3.0	3.3	3.6	Vdc
Supply current at 3.3 Vdc:				
standby mode	—	0.0005	—	mA
active mode	—	1.7	—	
Power consumption	—	10	—	mW
Operating temperature range ³	-40 [-40]	—	85 [185]	°C [°F]
Compensated temperature range ⁴	0 [32]	—	50 [122]	°C [°F]
Startup time (power up to data ready)	—	—	0.3	ms
Data rate	—	200	—	samples per second
I ² C/SPI voltage level:				% V_{supply}
low	—	—	20	
high	80	—	—	
Pull up on MISO, SCLK, SS, MOSI	1	—	—	kOhm
Total Error Band after customer zero	—	—	±1.5	%FSS BFSL ⁶
Accuracy ⁵	—	—	±0.25	%FSS BFSL ⁶
Resolution	13.0	—	—	bits

¹**Ratiometricity of the sensor (the ability of the device output to scale to the supply voltage):** Achieved within the specified operating voltage.

²The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.

³**Operating temperature range:** The temperature range over which the sensor will produce an output proportional to pressure.

⁴**Compensated temperature range:** The temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits (Total Error Band).

⁵**Accuracy:** The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.

⁶**Full Scale Span (FSS):** The algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 2 for pressure ranges.)