

An inexpensive NPN transistor is an ideal temperature sensor for applications calling for disposable sensors, or those that require a large number of sensors.

barometric pressure sensor measured by channel x configured for a differential input. Full-scale output is 20mV per volt of excitation voltage, at 100kPa barometric pressure (pressure at sea level is approximately 101.325kPa).

The LTC2991 can also measure its own supply voltage (which in our circuit is the same supply rail used to excite the pressure sensor). Thus it is easy to calculate a ratiometric result from the pressure sensor, removing the error contribution of the excitation voltage.

ERROR BUDGET

The LTC2991 remote temperature measurements are guaranteed to be accurate to $\pm 1^\circ\text{C}$. Figure 2 shows the error in indicated humidity that results from a 0.7°C error in the worst-case direction, and the error in indicated humidity that results from a 0.7°C error in the worst-case direction combined with worst-case error from the pressure sensor. This error falls within the range of accuracy of the psychrometric equations themselves. Should higher accuracy be required, a lookup table with the psychrometric charts would need to be implemented.

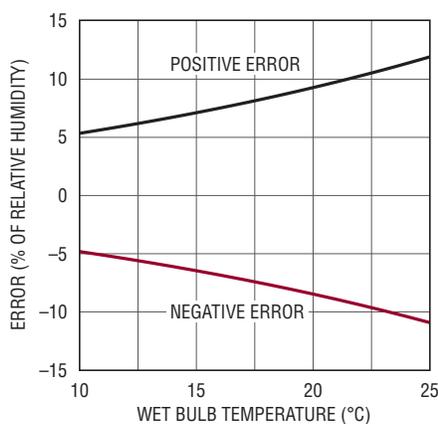


Figure 2. Worst-case error

TRY IT OUT!

A psychrometer readout is implemented as an Easter egg in the LTC2991 (DC1785A) demonstration software, available as part of the Linear Technology QuikEval™ software suite.

The demo board should be connected as shown in Figure 1. To access the readout, simply add a file named “tester.txt” (without the quotes) in the install directory of your DC1785A software. The contents of this file do not matter. On software start-up, the message “Test mode enabled” should be shown in the status bar, and a Humidity option will appear in the Tools menu. Relative humidity readings can then be compared to sensors of similar accuracy grade, such as resistive and capacitive film. ■

Figure 3. A psychrometer readout is implemented as an Easter egg in the LTC2991 (DC1785A) demonstration software, available as part of Linear's QuikEval software suite.

