

WATER & SOIL

Calculating DataHog Offsets for Tensiometer Height

If a tensiometer is installed vertically or even slightly off the horizontal, the hydrostatic pressure of the column of water inside the tensiometer shaft must be subtracted from the measured reading.

$$1 \text{ mm H}_2\text{O} = 0.0984 \text{ hPa or mbar}$$

E.g. for a 300 mm tensiometer installed vertically, the influence if the column of water on the measurement may be as high as:

(Also allow for half the height of the ceramic bulb, 25 mm for a field size tensiometer, 12.5 mm for a mini tensiometer)

$$325 \times 0.0984 = 32 \text{ hPa or mbar}$$

The DataHog can be set up to automatically subtract the water column offset from the measured reading, to give the true soil suction measurement.

Each tensiometer has an electronic offset in mV, e.g. - 0.11 mV

Each tensiometer also has a sensitivity in hPa per mV, e.g. 27.507

For the above example, the offset in mV due to the 300 mm water column is

$$32 \text{ (hPa)} / 27.507 \text{ (hPa/mV)} = 1.16 \text{ mV}$$

Add this to the electrical offset

$$1.16 + (- 0.11) = 1.06 \text{ mV}$$

Calculate the DataHog zero offset as:

$$\text{Offset count} = \text{sensor offset (mV)} * \text{gain} * 9.5$$

Gain is usually 10 for a tensiometer, so in the example above

$$\text{Offset count} = 1.06 * 10 * 9.5 = 100.7$$

Enter this in the DataHog as +0101

