

## Engineering Note: EN0047 Commissioning a Hydro-Probe with a Command Alkon EZCal Station

Summary: Commissioning a Hydro-Probe with a Command Alkon EZCal Manual Station

Products affected: Hydro-Probe – Model number HP02 onwards

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## 1 Summary

A Hydronix Hydro-Probe digital moisture sensor can substitute a Command Alkon 7102 moisture sensor when connected to the EZCal Manual Station.

There are two ways in which to integrate the Hydro-Probe with the EZCal system. Whilst electrically both methods are the same, they differ in how the material calibration is performed.

### Option A) Using the Existing Spectrum EZCal Material Calibration Routine

The Hydro-Probe is configured to output a Filtered Unscaled (US) value.

Once installed, there will be no difference in operation compared to the Alkon sensor; hence, no re-training is required. The output from the Hydro-Probe is converted to a moisture percentage using the Manual Station's own calibration procedure. This procedure allows the operator to adjust the offset, but not the gradient of the calibration line. In this instance, the Hydro-Probe will act in exactly the same manner as the Alkon sensor but with added benefits such as advanced temperature compensation, linearity, and identical sensor characteristics.

Existing users of the Command Alkon system will already be familiar with the EZCal and the PWS calibration routine, therefore this is not referred to in this document.

### Option B) Using the Hydro-Probe Material Calibration Routine

The Hydro-Probe is configured to output an absolute Moisture (%M) value and is calibrated using material-specific calibration parameters.

The material calibration can be performed using a Hydro-Hub/Hydro-View device or Hydro-Com software (Hydro-Com is available for free download from the Hydronix website).

This allows the operator to adjust both the offset and the gradient of the calibration line. This will give the best possible accuracy and reliability across all moisture ranges. Once calibrated correctly in this manner, the sensor should not require adjustment or recalibration for a given material.

This document describes:

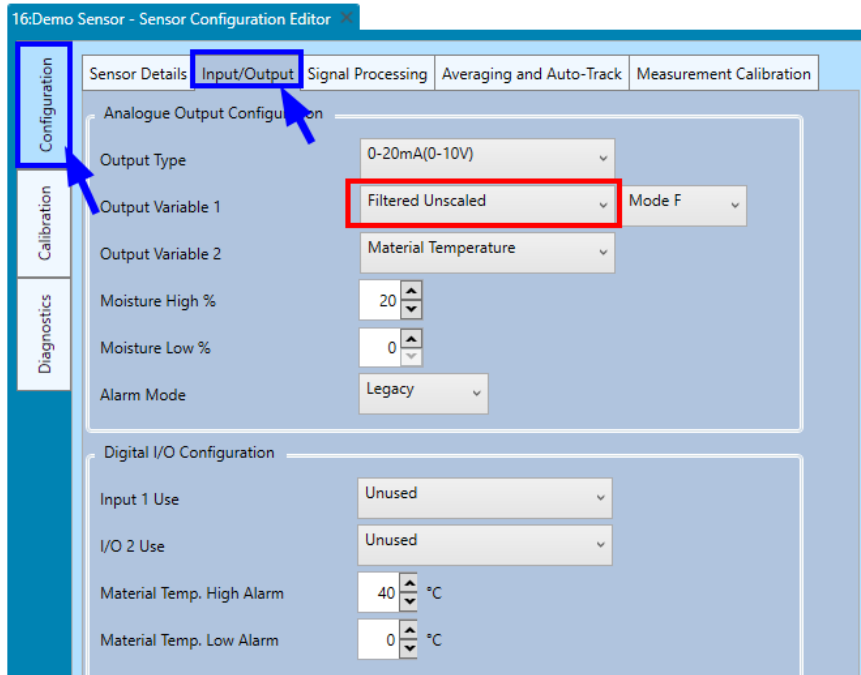
- Sensor Configuration, for option A or B
- Sensor Connection to the EZCal Manual Station, common to both option A & B
- Material Calibration, for option B (for option A this is done in the EZCal Manual Station)

## 2 Hydro-Probe Configuration

The sensor configuration can be performed using a Hydro-Hub/Hydro-View device or Hydro-Com software.

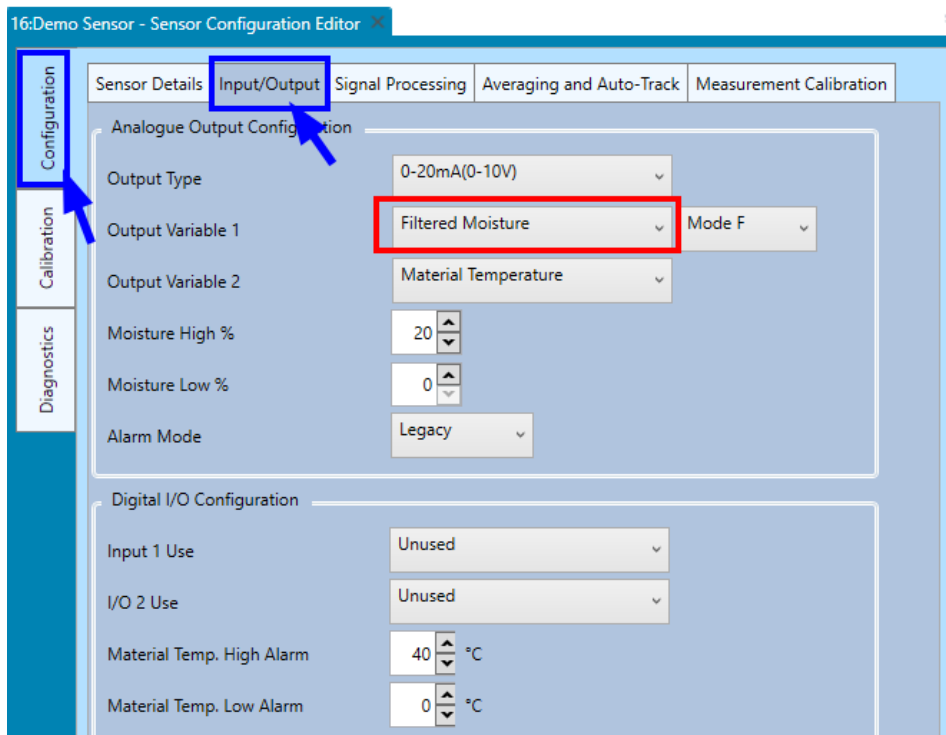
**Note: All references to Hydro-Com in this user guide refer to software version 2.0.0 and higher. The sensor can be configured using older versions of Hydro-Com, however some features will not be available. See the relevant Hydro-Com user guide for more details.**

## 2.1 For option A using Hydro-Com



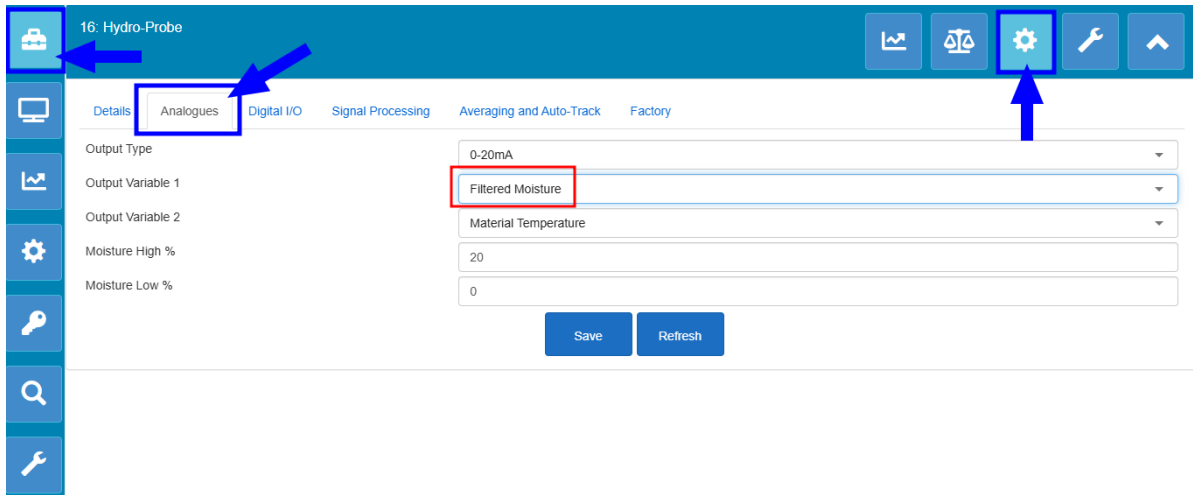
**Figure 1: Sensor Output Configuration in Hydro-Com**

## 2.2 For option B using Hydro-Com



**Figure 2: Sensor Output Configuration in Hydro-Com**

### 2.3 For option B using the Hydro-View (HV05) or Hydro-Hub (HH01)



**Figure 3: Sensor Output Configuration in Hydro-Net software**

## 3 Connection to latest EZCal Manual Station, 7 pin terminal connector

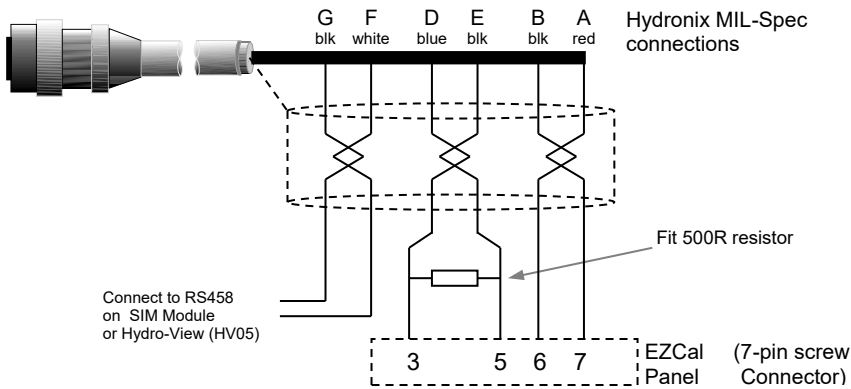
On the latest EZCal Manual Station, the Command Alkon MPI Card is connected via a 7-pin screw terminal. The Hydro-Probe can be connected to this terminal arrangement as shown in Figure 4.

Only three twisted pairs from Hydronix cable 0975A are required for connection and calibration of the sensor. Two twisted pairs are connected to the 7-pin moisture terminal board: one pair for the power supply and one pair for the analogue moisture output (0–10 V). The third twisted pair is used for the RS485 communication lines, which can be connected to a PC running Hydro-Com software using a Hydronix Serial Interface Module (SIM) for sensor configuration and material calibration.

**Important:** The Hydronix supplied 500-Ohm resistor must be wired as shown, to convert the current loop output to a voltage input to the EZCal Manual Station.

Hydronix Sensor Cable (Part # 0975A)				EZCal Panel Connection# / Label
Twisted Pair #	MIL-Spec pins	Cable colour	Signal Description	
1	A	Red	Supply +15-30Vdc	7 / +12VDC
1	B	Black	Supply 0V	6 / -12 VDC
3	D	Blue	Analogue Positive (+)	3 / SIG +
3	E	Black	Analogue Return (-)	5 / SIG GND
4	F	White	RS485 A	-
4	G	Black	RS485 B	-

**Table 1: Hydronix Sensor Cable to EZCal Panel Interconnections**



**Figure 4: Hydronix sensor cable connection to EZCal panel**

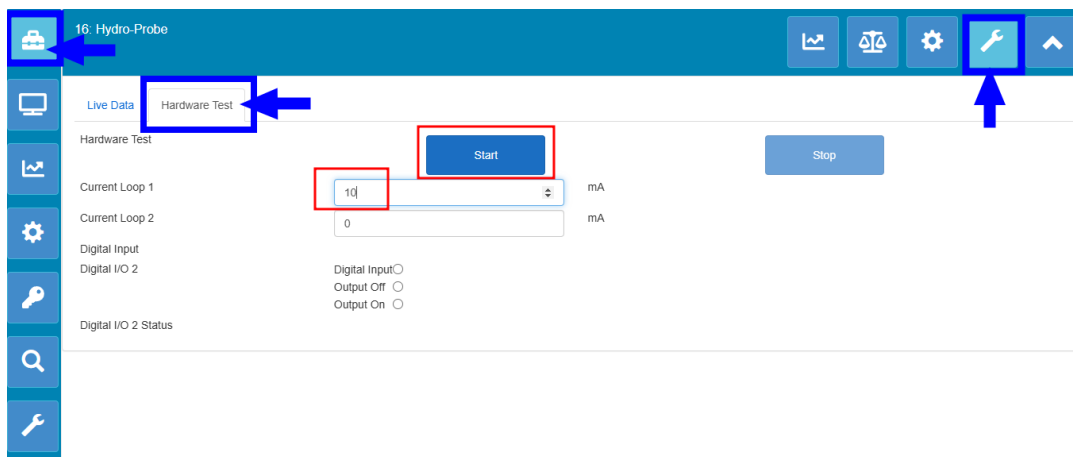
## 4 Scaling the EZCal station input to the sensor output (option B only)

### 4.1 Using Hydro-Hub / Hydro-View

On the Hydro-View HV05: open Diagnostics > Hardware Test (see Figure 5) and use the Current Loop 1 field to set a fixed current loop output from the connected Hydro-Probe. Enter 10 mA and press Set. This is used to scale the EZCal Manual Station input to the Hydro-Probe output.

On the EZCal Station: step through the calibration sequence, set the calibrated moisture to 10% and the probe slope factor to 1.21, then press Enter. The EZCal display should then read approximately the same value as the Hydro-Probe output: 0.01% at 0 mA, 10.02% at 10 mA (5 V) and 15.03% at 15 mA (7.5 V).

Note: the EZCal Manual Station is set for a range of 20% and cannot go any higher despite the output from the Hydronix Hydro-Probe sensor being able to output higher values.

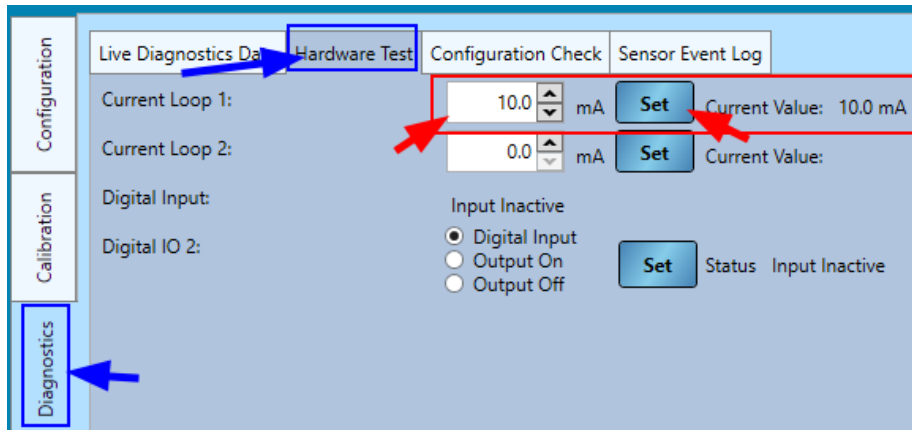


**Figure 5: Activating the sensor's analogue output using Hydro-Net software**

## 4.2 Using Hydro-Com

On Hydro-Com: open Diagnostics > Hardware Test (see Figure 6: Activating the sensor's analogue output using Hydro-Com and use the Current Loop 1 field to set a fixed current loop output from the connected Hydro-Probe. Enter 10 mA and click Set. This is used to scale the EZCal Manual Station input to the Hydro-Probe output.

On the EZCal Station: step through the calibration sequence, set the calibrated moisture to 10% and the probe slope factor to 1.21, then press Enter. The EZCal display should then read approximately the same value as the Hydro-Probe output: 0.01% at 0 mA, 10.02% at 10 mA (5 V) and 15.03% at 15 mA (7.5 V).



**Figure 6: Activating the sensor's analogue output using Hydro-Com**

## 5 Material Calibration (option B only)

To obtain an accurate moisture output from the sensor, it will be necessary to calibrate the Hydro-Probe to the material. The calibration simply correlates raw (unscaled) readings measured by the sensor, to actual moisture of the material determined in the laboratory by drying samples. The calibration calculates a set of coefficients which are stored in the sensor and used to output actual moisture. These coefficients are determined using the calibration page in the Hydro View V or Hydro-Com software.

The Hydro-Com calibration page is accessed from the configuration page. This page is similar to the dedicated Hydronix calibration utility 'Hydro-Cal'. There is no extra functionality in Hydro-Cal so Hydro-Com users do not need to download Hydro-Cal for calibration purposes.

For full details on the material calibration using Hydro-Com, refer to the User Guide HD0862.

For full details on the material calibration using Hydro-Net present in Hydro-Hub / Hydro-View, refer to the User Guide HD0864.

Note that if free moisture is required the SSD moisture should be filled in with the appropriate absorption moisture of the specific material.

### Averaging

Averaging the output of a sensor over a period of time is essential for representative sampling in most applications. The EZCal system averages the moisture signal from the sensor over the aggregate feed time; hence it is not necessary to average in the sensor during normal operation. For this reason the digital input as described above is set to 'Unused'. However, during any calibration sequence it is advisable to average the 'Filtered Unscaled' reading. This is possible using remote averaging. The 'Start'/'Stop' button on the 'Calibration' page of Hydro-Net or Hydro-Com can be used when aggregate is feeding so that an average reading is obtainable.