CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

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ONLINE

- HydroSense II - Now Released
- Training - 2012 Schedule Released
- Measures AC Power and Power Quality
- Case Study - Runoff Monitoring Sugar Cane Farms
- Tech Tip - Field Calibration

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News

A Message from Rob

Dear Campbell Scientific Australia Readers,

I am fortunate to be writing this column while attending the annual Campbell Scientific Group Companies conference in Logan Utah. All groups are reporting strong business and continued positive feedback from customers about our products and strong support capability.

This year the focus of the conference has been very much about new products. Over the coming months official product launches will provide further information, however, I can share several of the developments with you now.

A recent acquisition means we can now offer a range of water sampling products. These samplers are somewhat unique in that they utilize a vacuum pump mechanism versus the traditional peristaltic pump and can offer advantages in certain applications.

We also have new peripherals being released to improve telemetry and communication capability as well as a SW tool to assist programming our loggers in GeoTech applications.

At CSA we have now released the Hydrosense II for sale and are already reviewing what features can be rolled out on the Hydrosense II generic platform to allow other measurement capability.

In terms of process improvements, there is on going discussion on how to best collate forecast requirements for the global market and how CSA can benefit from access to production quantities to improve lead times.

I also see many of you are utilizing the Deskpro help desk and ticket system we introduced earlier this year to assist us in managing your sales and support needs. I would be very interested in your feedback in using this tool as we believe it has been very beneficial to our overall capability in responding to requests in a timely fashion.

Finally I appreciate your business and continuing support of Campbell Scientific products. Based on what I have seen in Utah, in terms of new products soon to be released, as well as ideas for the evolution to the next generation of Campbell products, I am confident we can continue to meet your product needs.

Regards,

Rob Kurz

New Datalogger Instruction Measures AC Power and Power Quality

Our dataloggers have powerful on-board instructions that support many, useful measurement capabilities. Because these instruction sets are expandible, we are continually adding new functionality that can be incorporated into existing dataloggers via operating system updates. (see www.campbellsci.com.au/downloads).

We recently included a new instruction, ACPower, that will be of interest to anyone needing to monitor their electrical system. The ACPower instruction allows a CR800, CR850, CR1000, or CR3000 datalogger to measure voltage and current transducers that are connected to an AC power source. Possible outputs are RMS voltage, RMS current, real power (watts), total real power (watts), frequency (Hz), phase angle (radians), voltage harmonic distortion ratio, and current harmonic distortion ratio.

The ACPower instruction provides three configuration options that support different applications. The single-phase configuration is for monitoring single or multiple loads and may be used for submetering applications. The split-phase configuration is for monitoring two hot conductors plus a neutral conductor, used in residential service-entry panels, as well as residential and commercial distribution panels. The three-phase Y configuration is for monitoring three hot conductors plus a neutral conductor, used in commercial entry and distribution panels.

New Products

Announcing the Release of the New Generation Hydrosense II

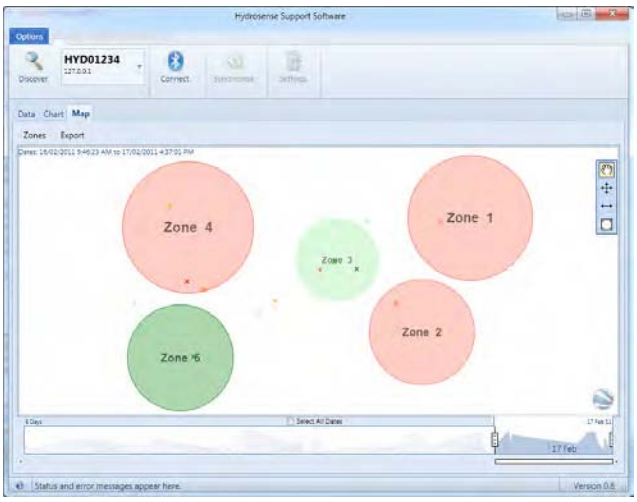
The Hydrosense II consists of a hand held display and portable soil moisture sensor. The Hydrosense II has been designed to replace the Hydrosense soil moisture system and features a new handheld display and a new probe design.

New Hand Held Display

The Hydrosense II hand held has been designed to be compact and portable with the layout of the buttons allowing for operation with one hand. A 3 inch LCD display and four navigation buttons have been added to make changing settings and taking measurements as easy as possible. An integrated GPS tags each measurement with a latitude and longitude. Zones can be created on the unit which group measurements together so that average soil moisture can be calculated for an area. The current position and zone are shown on the display so that measurements can be taken in the same zone. Data storage has been added to allow up to 1500 measurements to be stored on the device. The data can then be downloaded to a PC via Bluetooth for viewing and archiving.

New Soil Moisture Probe

The new soil moisture probe uses the same accurate measurement technique as the old probe, but the probe housing has been redesigned to aid insertion into and removal from hard soils. The probe rods are secured to the probe housing with ferrule nuts to provide extra stability during insertion. A moulded plastic grip connects the sensor cable to housing to provide a better hold.



New PC software has been developed to make the most of the data storage capability of the Hydrosense II. The software connects to the hand held via Bluetooth to avoid the need for extra cables.

The software will allow the user to:

- View data in table and chart views
- Edit zone positions and sizes
- Change device settings
- Export data as CSV to interface with 3rd party software
- View zones and measurements in Google Earth

Benefits / Features

- Compact, highly portable soil measurement
- Large LCD display for easy operation
- Onboard data storage for up to 1500 points
- Onboard GPS for geotagging measurements
- Bluetooth connection to PC software
- Export to Google Earth, GPX and CSV
- Probe redesign for easy insertion and removal from soil

The Hydrosense II ships with either a 12 or a 20 cm probe and retails for around $1200 regardless of the probe chosen.

Contact Dave Boadle (the guy on the cover) for a quick quotation

General Support Times - When submitting a support ticket from our website, please be aware:- We will reply to you within 2 business days. If you have not been contacted within this time frame, please call us on 07 4772 0444 or email info@campbellsci.com.au, as there may have been a problem receiving your initial inquiry.

HERBERT DEMONSTRATION FARM PROJECT

Project Location
Trebonne- Ingham (S18.62843 E146.06468)

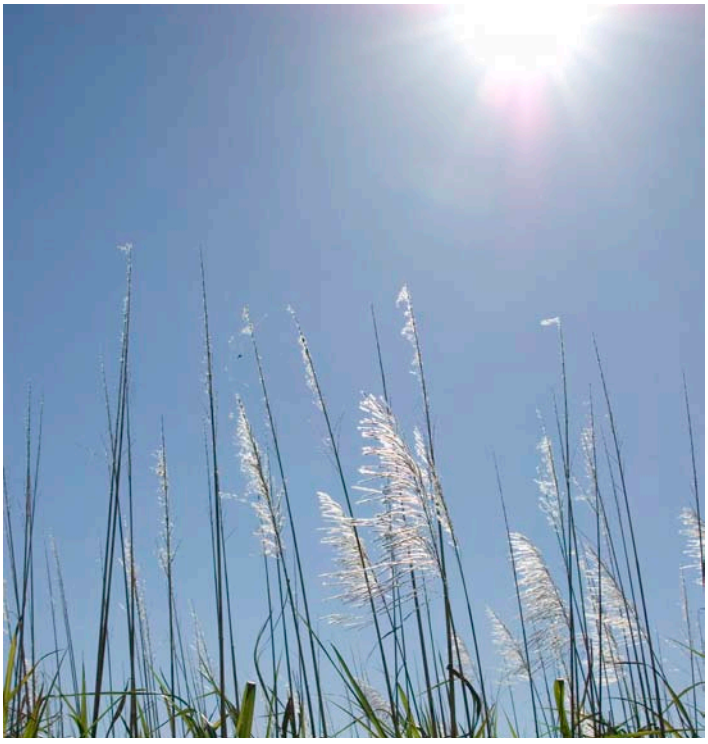
System Purpose
To monitor surface water runoff from 2 different cane farming systems. The focus being herbicides and nutrients.

Data Logger
Originally, the project used a CR200; however, additional project funds have allowed an up-grade to a CR800.

Sensors & Peripherals
- SSteel pressure transducer: CS450-2-L10m x 2
- ISCO 3700 portable samplers x 2
- Calibrated 9" Parshall Flumes x 2
- Telemetry
- Solar panel
- Box trailer

What parameters are being measured?
- Rainfall
- Depth -> Flow -> Discharge
- Analyte concentration

Communications & Networking
Data is being retrieved via a Modmax modem and relayed using a NextG data connection.



In December 2009, the Herbert Demonstration farm site was established in the Trebonne area on Orazio and Anthony Marino's farm. The project is supported by DEEDI, Terrain NRM, BSES and JCU staff. Combining environmental sustainability and profitable farming as the key drivers, this is a collaborative effort between growers, government, research and industry bodies and is part of the Queensland and Australian Government's Reef Plan to improve water quality entering the Great Barrier Reef lagoon. There are Demonstration farm sites also located in the Burdekin and Tully areas.

Above: Calibrated Flumes

The Herbert Demonstration farm site has been divided into 2 sections- one section planted on a 1.6m conventional farming system and one section planted on a 1.83m controlled traffic mound planted farming system. To date there has been 6 additional cultivations in the conventional farming system block compared to the controlled traffic mound planted block, which has attributed to a higher cost of establishment in the conventional block. All nutrient applications to date have been identical and are based on the BSES 6 Easy Steps guidelines and in accordance with government regulations.

Product in Action cont.

In the fallow period a legume was grown on both blocks, the legume mulched. The controlled traffic mound planted block was zonal tilled and the conventional block was conventionally and prepared. It is important to understand the fate of legume nitrogen under different farming practices; consequently the movement of nitrogen in the soil profile from the legume crop is being investigated for both treatments over a 12 month period.

The block has been soil mapped using electro-magnetic soils mapping equipment and ground truthed. This equipment identified 5 distictive soil types within the block and found areas of sodic soil not previously known. Within the 5 soil types, soil sampling to depths of 1m have occurred. It was found that 2 of the 5 soil types had low levels of phosphorus (P) present; below the government guidelines for P application. To date no P applications have occurred within the block because a routine soil test taken across the block indicated that no P fertiliser applications were required.

Water sampling for nitrogen, phosphorus and pesticides have occurred on the site since September, 2010. Water runoff from a number of rows in each treatment are diverted through a calibrated flume: as highlighted in the photo opposite. Sensors and monitoring equipment collect a water sample automatically every time a certain volume of runoff passes from the field and through the flume. The collected water samples are then sent to labs at James Cook University and Brisbane for analysis.

The cost effectiveness of the various "new" farming system practices will be assessed on the controlled traffic mound planted block and compared to the conventional block. Adopting a new farming system can bring significant capital expense. Through rigours monitoring, the Herbert demonstration farm project will assist industry gain a better understanding of the environmental, economic and social benefits of implementing new farming practices.

The site will be continued to be monitored over the next 2 years. Trial results will be made available to industry as they become available.

For more information please contact: Mark Whitten, DEEDI Project Officer

Training Schedule 2012

3 Day Programming Course		2 Day Advanced Course		Location
Gold Coast	12 - 14 Mar 2012	Gold Coast	15 - 16 Mar 2012	Vibe Hotel, Surfers Paradise, Gold Coast
Perth	14 - 16 May 2012	Perth	17 -18 May 2012	Medina Executive Barrack Plaza, Perth
Townsville	18 - 20 June 2011	Townsville	21 - 22 June 2011	Campbell Scientific Training Facilities
Melbourne	13 - 15 Aug 2012	Melbourne	16 - 17 Aug 2012	Vibe Hotel Carlton, Melbourne
Sydney	22 - 24 Oct 2012	Sydney	25 - 26 Oct 2012	Vibe Hotel, Goulburn St, Sydney

2012 is just around the corner and we are happy to be able to include Perth in our itinerary for training courses in the new year. Generally we head over to W.A each second year so if you're a Sandgroper, make sure to register early as our next training over there will be in 2014.

For the first time in living memory (mine at least), we've increased the prices of our course. The basic 3 day course will now be $1020 +gst and the advanced 2 day course is now $720 +gst. The cost of the course includes morning and afternoon tea as well as lunch on each of the days.

We are also moving into our new premises early 2012 and will be able to offer in-house training in our specially designed training room. Our special discounted package for the 3 day basic course in Townsville will be $840 +gst.

2012 Campbell Training Course Schedule and Registration Form

Not sure you're ready for the Advanced Course?

The main focus of the advanced course is communications:

- Writing code to send and receive SMS
- Writing code to connect to the internet via a cell phone modem
- Writing code to send FTP's and Emails

To get the most out of these topics, you will need to already have a good understanding of:

- The main scan, how to choose scan intervals, where to insert measurement, where to insert datatable call instructions
- Datatables, how to set datatable intervals, how to create new columns in a datatable for averages, maximums and minimums
- If statements, how to use if-then-elseif-else-endif, how expressions work (TRUE returns -1, (2 = 2) returns TRUE etc..)
- How to compile and send programs to a datalogger
- How to change datalogger comport settings (baud rate)

We teach all of these in the basic course. Also make sure that the advanced course topics will be beneficial to you, if you are not using cell phone modems or ethernet communications with our dataloggers, you will not get the best value out of the advanced course.

Register Today for the Next CRBasic Training Course

"Very valuable - wish I'd done it earlier"
"Trainer excellent - will be sending more people"
"Same as in the field - excellent subject expert"
"Very happy with what I'm going away with"
"Fantastic presenter"
"Outstanding knowledge"

Our next open training course will be on the Gold Coast March 12 - 16, 2012.
Simply complete the and return to tracy@campbellsci.com.au.

FieldCal() Example

Introduction

Calibration is used to increase the accuracy of a linear sensor by adjusting the multiplier and offset applied to the output of that sensor. For example, the multiplier and offset of the temperature measurement of the HMP50 is 0.1 and -40 respectively. So the sensor output starts at -40°C (0V) and will output an extra 1mV for each 0.1°C above -40°C. This is what the manual tells us, however this may be an old sensor which is suspected of falling out of calibration, or this may be a sensor we don't have a manual for and would like to determine the multiplier and offset. To determine the multiplier and offset we need another method of measuring the temperature (or any other parameter) to obtain a set of known temperatures. For each of these known temperatures we measure what our sensor is outputting and we can then use some maths to come up with a multiplier and offset. The FieldCal Instruction is used to calculate the multiplier and offset for us.

Usage

```
BeginProg
  Scan (1,Sec,1,0)
    VoltSe (Temperature,1,mV5000,1,1,0,250,MultV,OffsetV)
    FieldCal (2,Temperature,1,MultV,OffsetV,Mode,KnownValue,1,3)
  NextScan
EndProg
```

Above is a simple program which uses FieldCal(), the instruction is executed with every scan, but depending on the value of the Mode parameter, the FieldCal() will perform a different function with every scan. Two public variables named Mode and KnownValue have been declared for the program above, these can be edited in the numeric screen so the user can change their values at run time.

To start the calibration the user first takes a measurement of the temperature (or whatever parameter they are measuring) using another reference device, this is entered into KnownValue using the numeric screen.

Manual Calibration

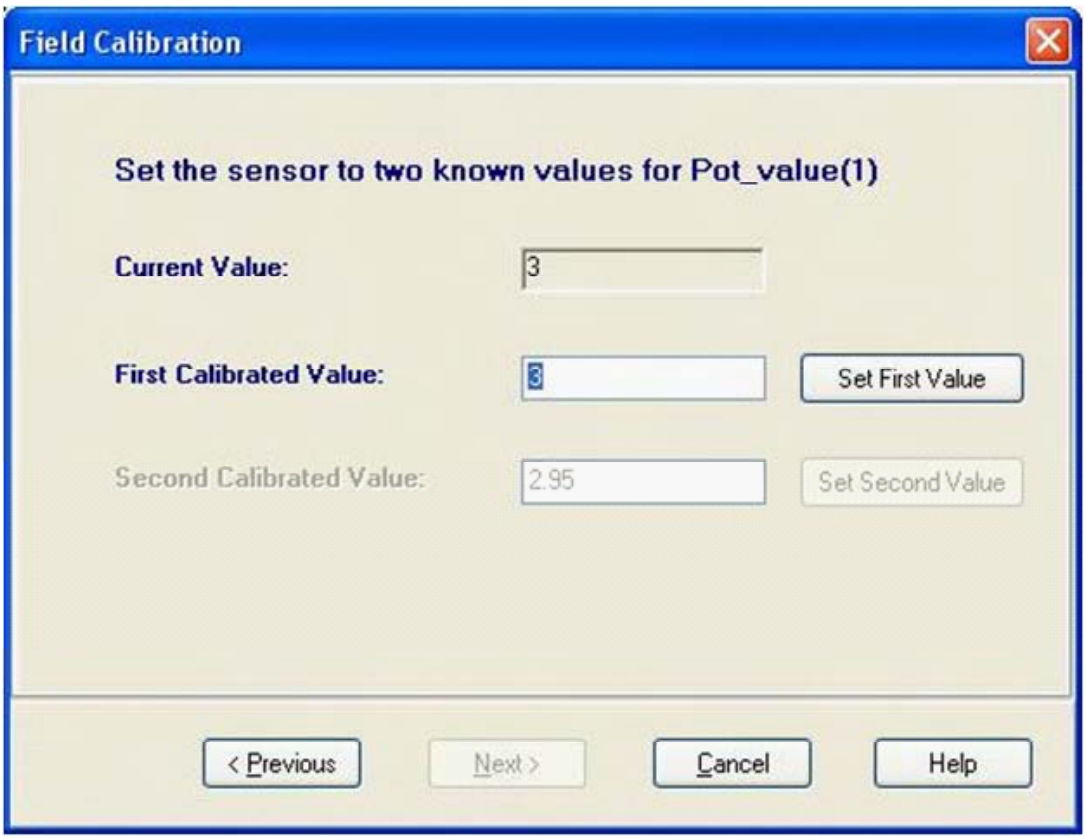
The user then enters the number 1 into Mode. On the next scan the FieldCal() instruction will measure the sensor, then compare it's output to the KnownValue the user entered. This is enough to calculate just an offset for the sensor, but another point is required to calculate the multiplier.

The program will change the Mode variable to 3 once the first point has been stored, the user then warms the probe (or tries to change the parameter they are measuring) and enters the new value from the reference sensor into KnownValue.

The user then changes Mode to 4 and on the next scan the FieldCal() instruction will calculate the multiplier and offset and enter them into MultV and OffsetV respectively. These can then be used as the Multiplier and Offset for the measurement instruction as in the VoltSe instruction above.

Wizard Calibration

The process above can also be completed using the Calibration Wizard in the connect screen, it can be found under Tools | Calibration Wizard.



The wizard will guide a user through the calibration process with explanations of each step, but behind the scenes it is performing the same steps as the manual calibration method.

Other Options

This calibration can be done with any number sensors using the Reps parameter and arrays for Temperature, MultV, OffsetV and KnownValue.

In addition to calculating the multiplier and offset, the FieldCal instruction will save a .CAL file to the CPU drive of the logger which contains all the multipliers and offsets calculated in the last calibration. This .CAL file can be loaded into another program (or the same program after a logger power failure) using the LoadFieldCal() instruction.

Once a calibration has taken place, the NewFieldCal boolean and SampleFieldCal instruction can be used to store the calibration in a datatable as below:

```
DataTable (CalTable,NewFieldCal,50)
  SampleFieldCal
EndTable
```

The table above will store directly after a calibration has been performed (setting NewFieldCal to TRUE), then SampleFieldCal will retrieve the multipliers and offsets from the calibration and store them in the datatable.

Ordering and Payment Tips for Customers

- **Please include your quote number when you place an order.**
- **Please ensure that bank transfers include the invoice number and/or company name as a transaction reference.**