Welcome to Monitor: I hope you find it useful.

If you wish to download our free data acquisition software please do so from http://www.windmill.co.uk/jsarrpsrr.htm. Should you wish to remove yourself from our mailing list, go to http://www.windmillsoft.com/daqshop/Monitor_Newsletter.html

You can download Monitor as a pdf file from http://www.windmill.co.uk/monitor/monitor196.pdf

Any questions, comments or application stories, get in touch via email, Twitter or Google+.

Contents

Accuracy and Precision- What's the Difference?

The words "accuracy" and "precision" are often used interchangeably, but they mean very different things.

Accuracy refers to how closely a measurement reflects the truth. If a substance has a temperature of 20 ^{o}C but your measurement reads 25 ^{o}C, it is not accurate as it is not close to the true value.

Precision refers to repeatability of the measurement. If you measure the 20 ^{o}C temperature as 25 ^{o}C ten times, then your measurement, although inaccurate, is very precise.

Not only is it possible to be precise but inaccurate, you can also be accurate but imprecise. For example, when your measurements are all quite close to the real value but are spread over and under it.

Imagine a darts player who aims at the treble 20 but every time tightly clusters the arrows in the treble 1 area. She is very precise but inaccurate.

Absolute Accuracy and Relative Accuracy

Taking our temperature measurement example - there are many factors that limit the accuracy of the final figure for the temperature.

Absolute Accuracy shows how closely the thermocouple- derived temperature mimics the actual temperature. The major errors usually arise from the thermocouple materials themselves. There are international standards that specify the amount by which sensors may deviate from ideal behaviour. These figures are reproduced at http://www.microlink.co.uk/tctable.html

Typically thermocouples are accurate to 1-2 degrees Celsius. As

thermocouples age their chemical and electro properties change, reducing their accuracy. This effect is quicker in harsh environments and when you regularly heat and cool the thermocouple to the limits of its range.

Relative Accuracy is how accurately a change in signal is measured. This is often the real purpose of thermocouple measurements. Here the effect of noise can be very important. This happens when the thermocouple leads act as aerials picking up environmental electrical activity. A lot of this is common to both signal wires and a differential amplifier will remove much common mode voltage.

Differences between the signal wires (for example if they are separated rather than twisted together) will lead to residual voltages being added to the signal, increasing noise. Keeping the signal wires as short as possible, and as far away from electrical machinery as possible, will help. It's good practice to place the data acquisition units as close to the thermocouples as possible. Distributed systems using, for example, RS485, Ethernet or Modbus networks allow you to do this.

Further Reading

For more on making temperature measurements with thermocouples (and RTDs), see
http://www.windmill.co.uk/thermocouple.html

Read about the differential connections at
http://www.windmill.co.uk/differential.html

For more definitions of data acquisition terms see our glossary
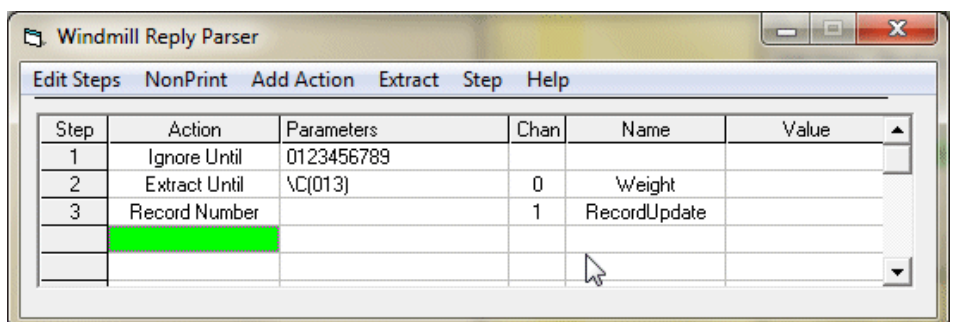http://www.windmill.co.uk/glossary.html

Questions on Using Windmill

Question

I'm working for a pharmaceutical company and we need data logging capability for our range of Sartorius balances used for weighing tasks in filling our raw materials into the respective containers. Please advise on how to connect these models to a single computer for logging of weighing data.

Answer

You can use an serial-USB converter to connect several RS232 Sartorius balances to a computer. Windmill software will log data from several balances (and other instruments) connected in this way. Use the ComDebug program to enter the settings for each balance. Do this one balance at a time. We've given example settings to use when connecting Sartorius balances at
http://www.windmill.co.uk/sartorius.html

Step	Action	Parameters	Chan	Name	Value
1	Ignore Until	0123456789			
2	Extract Until	\C(013)	0	Weight	
3	Record Number		1	RecordUpdate	

Further Reading

For more on using Serial-USB converters, see
http://www.windmill.co.uk/usb-serial.html

To buy a copy of Windmill for just £50, go to
http://www.windmillsoft.com/daqshop/rs232-modbus.html

DAQ News Round-up

Welcome to our round-up of the data acquisition and control news. If you would like to receive more timely DAQ news updates then follow us on Twitter - @DataAcquisition or Google+ - https://plus.google.com/107072683025496630222/

Radar net protects tigers and keeps them neighbourly
Wireless network of radars spots poachers who enter a reserve, or tigers leaving in search of cattle, and alerts the wardens.
Source: New Scientist
http://www.newscientist.com/

Panel-power boosts electric cars
A car powered by its own body panels could soon be driving on our roads, according to researchers at Queensland University of Technology (QUT).
Source: Queensland University of Technology
https://www.qut.edu.au/news/news?news-id=81659

Complex electronic circuits produced by common t-shirt printer
Researchers in Singapore have successfully printed complex electronic circuits using a common t-shirt printer. The electronic circuits are printed using unique materials in layers on top of everyday flexible materials such as plastic, aluminium foil and even paper.
Source: Nanyang Technological University
http://news.ntu.edu.sg/news/Pages/NR2014_Nov17.aspx

New magnetometer easier to integrate into measurement systems
Researchers have developed an extremely sensitive magnetometer which costs between 70 and 80 per cent lower than those of traditional technology and is easier to integrate into measuring systems.
Source: Phys.Org
http://phys.org/

Wi-Fi detection system sees through walls
New system uses existing Wi-Fi signals to track and monitor moving bodies through walls.
Source: The Engineer
http://www.theengineer.co.uk/

Demand skyrockets for collision-avoidance sensors
Global sales of anti-crash sensors will total $9.90 billion in 2020 -- up from $3.94 billion this year, predicts IHS Automotive.
Source: Automotive News
http://www.autonews.com/

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newsletter, and use extracts from it on your own web site or other publication, providing the above notice is included and a link back to our website is in place.

For previous issues by subject see
http://www.windmill.co.uk/monitorindex.html

FREE DATA ACQUISITION SOFTWARE
As a thank you for subscribing we offer you the ComDebug data logging and Com port trouble-shooting software for free. Log data over RS232, RS422, RS485 or Modbus. Also included is a free month's trial of the Windmill 7 logging, charting and control programs. To download go to
http://www.windmill.co.uk/jsarrpsrr.htm

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http://www.windmill.co.uk/newsletter.html and add or remove your e-mail address.

Windmill Software Ltd, PO Box 58, North District Office,
Manchester, M8 8QR, UK
Telephone: +44 (0)161 833 2782
Facsimile: +44 (0)161 833 2190
E-mail: monitor@windmillsoft.com
http://www.windmill.co.uk/
http://www.windmillsoft.com/
Google+