XEN-5320 LabView program
USB Burst-Tau communication software Version 3.0

For read-out of the XEN-5320 thermal conductivity sensor electronics via USB at high rates, also for time constant determination, a LabView program is available from Xensor Integration, for Windows 7.

This is a manual describing the installation and operation of this LabView software.

Contents

1   Installation

To run the LabView software, some programs have to be installed first, incorporated in the Installation package labview XEN-5320 v2.0 software:

- LVRTE2014_f1Patchstd.exe
- NI_VISA_5.2.0-runtime.exe
- atmel_devices_cdc.inf
- XEN-5320-Burst v3.0.exe (and 2 supporting files)

If you have done the first 3 files already for other LabView software, these can be skipped.
You only need to place the Burst LabView program somewhere on your PC and start it.

The first two programs have to be installed, and the computer has to be restarted. The third program is the driver for the USB port, and has to be installed via the configuration screen of the computer. This is done as follows:

- First plug in the XEN-5320 device to a USB port of the computer.
- Then in the configuration screen go to the device manager and update the driver of the XEN-5320 device. During installation Windows will give the following warning: "Windows can't verify the publisher of this driver software". Press "install the driver anyway" to continue the installation. This driver will make a virtual COM port for each connected XEN-5320 device.
- Then the Polling program will run.

2   Versions

Invalid version is Burst 1.4 for XEN-5320 for firmware version 2.0.
Currently the valid version is Burst 3.0 for XEN-5320 for firmware version 3.0.

3   The Burst Measurement

This program allows to measure the sensor output voltage (and no other parameters) at a high rate, with an interval of between 1 and 9 measurements of 1.28 ms each. If an interval of more than 1 measurement is chosen, the measurements are averaged.

When the Burst program opens, the only page comes up automatically, see Fig. 1.
The program records only a single device. In the **VISA resource name** window, the COM port of the desired device has to be chosen (if not clear which device has what COM port, use the general polling program to find out).

After this, choose a measurement interval in the **Select measurement interval** window, and click on the **Set measurement interval** button. It should light up for 0.5 s.

Then select a path and filename in the **Path** window. This can be a non-existing filename.

Then select the measurement mode: choose either the button **Set adjustable Rheater mode** or **Set Burst mode**. The button should light up for 0.5 s.

Finally, to measure, press the **Start** button, and finish by pressing the **Stop** button, also when the measurement has stopped of its own. The Running light indicates whether the measurement is still going on.
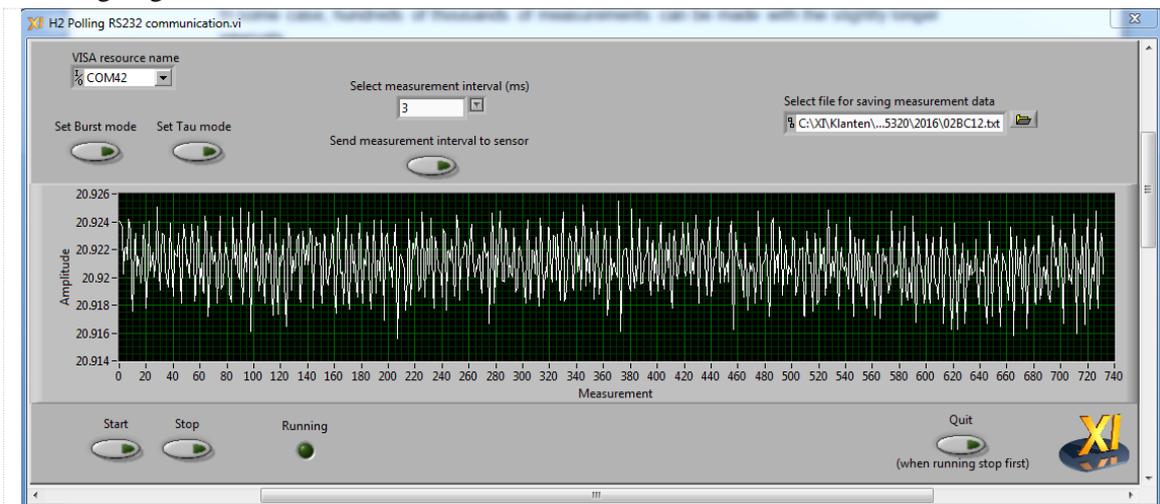

Figure 1: The Burst measurement, showing a measurement with 3 measurements = 3.84 ms interval (each measurement point is the average of the 5 previous measurements). Total measurements time almost 3 s.

The measurements will also be saved to a file as named in the **Path** window. The file contains the device time in ms en the output voltage in mV.

The program is aimed at getting the highest data rate, not aimed at the highest reliability. Therefore, it can sometimes get stuck. The best is to disconnect the XEN-5320 and/or shut down the Burst program. And then reconnect the XEN-5320 to USB and start up the Burst program again.

When an interval of 1-2 measurements is chosen, usually the measurement will stop on its own after 2000-4000 measurement (2-10 s). When a higher interval number is chosen, the measurement will continue for much longer. It depends on the individual computer and its USB communication, how long a measurement will carry on.

4   The Tau measurement

There is also the option to measure the time constant of the device for steps in the heating power. This is done by turning on and off the heater voltage every 45 ms, see Fig. 2.
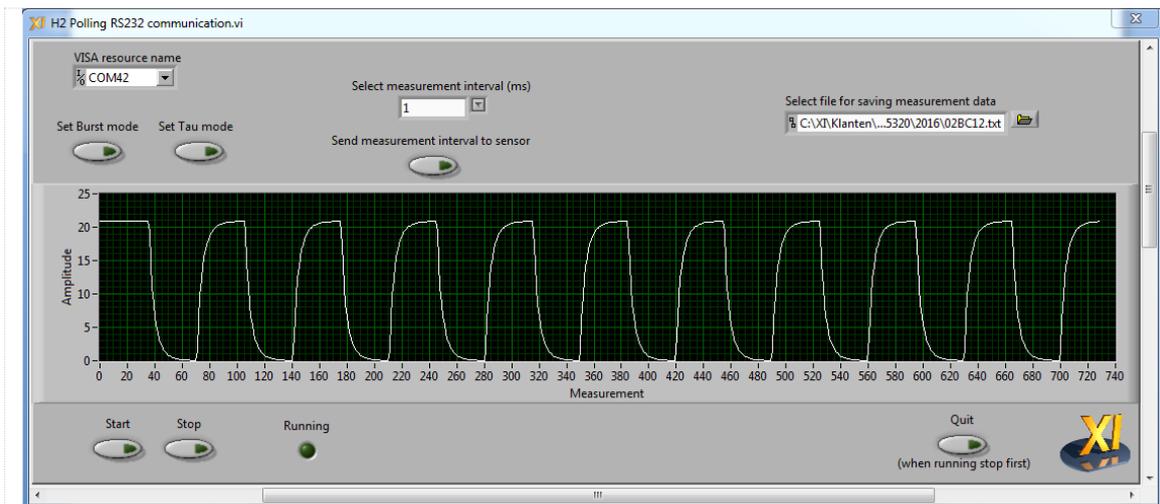
Figure 2: The Tau measurement, showing a measurement with 1 measurement interval (= 1.28 ms), and heating on/off every 45 ms.

By using a 45 ms step interval, good (for 60 Hz power line) to excellent (for 50 Hz power line) rejection of power supply interference can be obtained, when two succeeding measurements with 90 ms delay are added.

Fig. 2 shows such a Tau measurement, with a 1-measurement interval. Here it is essential to use the shortest interval, because the sensor's time constant for steps in the heating power ($t_{63\%}$) is of the order of 5 ms in air, and faster in helium or hydrogen. Maximum time resolution is therefore necessary.

In this version, no Tau calculation is done, and the user has to do this him/herself in EXCEL, for instance. Be sure to add the curve with itself, at 90 ms delay, to eliminate power supply interference.

This Tau measurements is different from the time constant measurement for steps in the gas composition. That usually takes much longer ($t_{63\%} \approx 30\text{-}300$ ms), depending on gas flow velocities and dead gas volumes that need to be refreshed by diffusion.