

Instruction Manual

for

**Connecting the gSKIN[®]-XM Heat Flux
Sensors to OM-DAQPRO-5300 read
out device**





1. INTRODUCTION

In this short report it will be shown how to connect a gSKIN heat flux sensor to the DAQPRO-5300 read out device. Initially there will be a short description on how to connect the sensor to the read-out device and then how to make use of the data recordings (store, access and process the data). Other commercially available dataloggers use a similar procedure, we reviewed also data loggers from other companies like National Instruments^a and Omni Instruments^b.

2. CONNECTING THE gSKIN heat flux sensor to OM-DaqPRO 5300

2.1 Description of hardware used

The heat flux sensor used for this experiment is the gSKIN-XM. In order to connect the sensor to DaqPRO 5300, the sensor type to be purchased is the one without a plug so that the ends of the cable are free to connect to the read-out device. The sensor with a plug is necessary only if the user wants to read-out the sensor signal with the gSKIN® DLOG Data Logger. The output of the gSKIN-XM sensor is voltage (uV signal, both polarities).

OM-DAQPRO-5300 is an eight-channel portable data acquisition and logging system with graphic display and built-in analysis functions for measuring voltage, current, temperature and pulses. Selectable ranges for each input are 0-24mA, 0-50mV, 0-10V, a large variety of NTC thermistors, PT-100 RTDs and thermocouple temperature sensors including internal temperature, pulse counter, frequency meter and up to 20 user defined sensors. The inputs use pluggable screw terminal blocks for easy connection.

In our case the best fitting option is voltage in the range of 0-50 mV, as the output signal of the sensor is in the range of microvolts to millivolts when measuring low heat fluxes. It is important to note that in this configuration, the DaQPro will correctly record negative voltages as well, down to approximately -5mV. However, for best accuracy, it is recommended to connect the Heat flux sensor in a way that the output voltage is positive.

^a For more details see: http://www.ni.com/data_logger/multichannel.htm

^b For more details see: <http://www.omniinstruments.co.uk/data-logger-multi-channel-programmable/multi-channel-universal-input-data-logger-range/sq2010-data-logger.html>

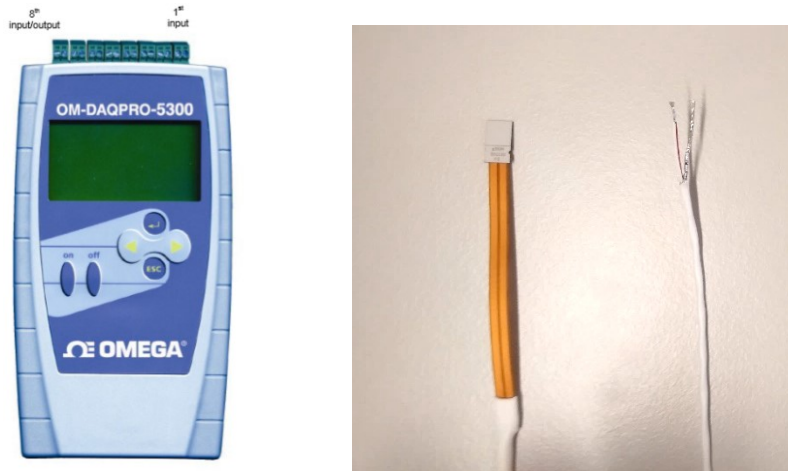
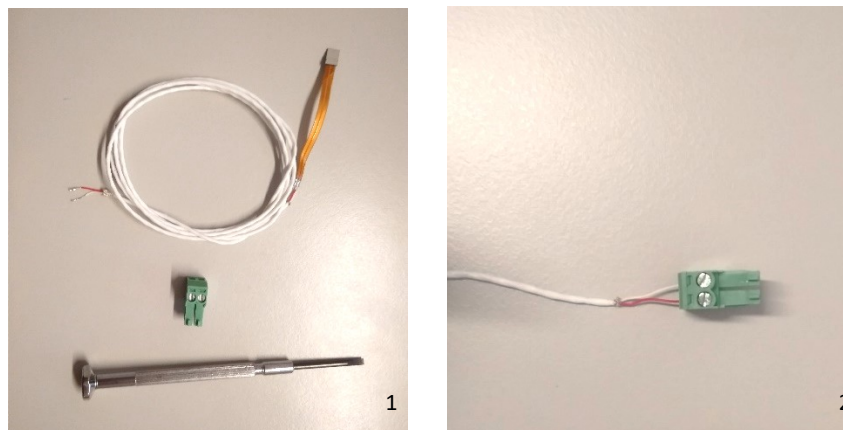


Figure 1. left: DaqPro-5300 read out device, right: gSKIN-XM sensor and sensor cable edge

2.2 How to connect gSKIN-XM sensor to the OM-DAQPRO-5300

The following paragraph describes how to connect the gSKIN-XM sensor to the OM-DAQPRO-5300 according to the guidelines also given by the OM-DAQPRO-5300 User`s Guide^c.

As it can be seen in Figure 2, on the top side of the device there is a pluggable screw terminal block (marked Input -1 to Input – 8 from right to left). To connect the XM heat flux sensor to the OM-DAQPRO-5300 the screw terminal was initially unplugged and the sensor`s wires were connected to the terminal. Then, the terminal was plugged back to the corresponding socket (input 1) (Figure 2). It is important to start always with the first input on the right. All eight inputs can be used simultaneously and in case you use more than one sensor, they must be added successively, starting with input 1. For example, if two sensors are used, they must be connected to Input 1 and Input 2.



^c OM-DAQPRO-5300 manual: http://www.ni.com/data_logger/multichannel.htm



Figure 2. 1,2 show how to connect the cables to the terminal and 3 how to plug it back to the socket

3. SENSOR READ OUT USING DaqPRO 5300

3.1 Getting Started

In this section it will be briefly described how to perform a measurement with the OM-DAQPRO-5300 device. For a detailed description on how to connect and perform a measurement with the specific device you can refer to the User's Guide manual.

The first step after the sensor is connected to the device is to identify the sensors and start recording. The user has to tell OM-DAQPRO-5300 what type of sensor is connected to each input. In our case the heat flux sensor cables were connected to the 1st channel (input 1) and an output voltage of 0-50 mV. The second step is to choose the display, and to do so the user can use the "Forward" and "Backward" arrow buttons to select the type of display and then press the "Enter" button. For this measurement the following settings were applied: RATE = Every sec, SAMPLES = continuous, DISPLAY = numeric. The final step is to start recording by pressing the "Forward" arrow button.

3.2 Displaying the data

After the measurement is complete, the recording can be stopped by pressing the "Escape" button. The data are automatically saved in the device memory and they can be viewed by going back to the main menu and clicking on the "Open File" option. Every time one starts a new recording then the logger creates a new project file. Each of these files contain all the data sets you collect with the OM-DAQPRO-5300, the analysis functions which were processed, specific graphs which were created, and the DaqLab settings for the recording.

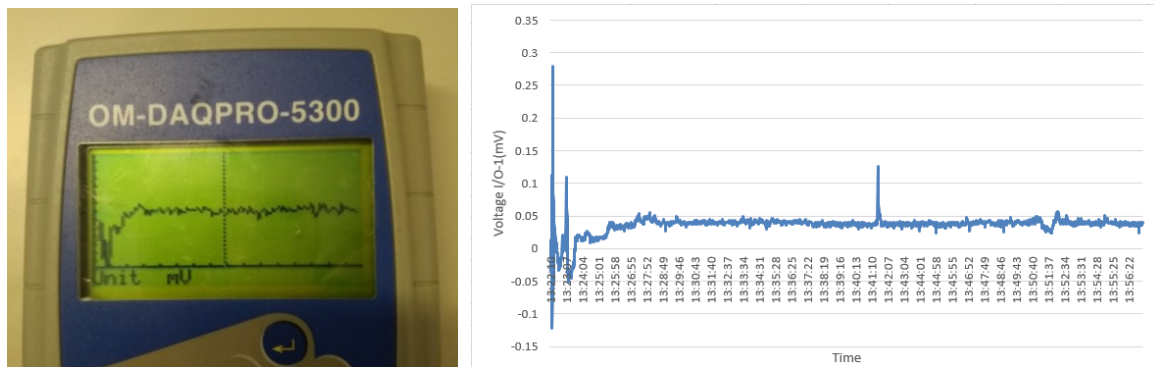


Figure 3. Left: low resolution graph preview with DaqPro 5300, right: graph generated with Excel software

Another way to perform the measurement is to connect the datalogger to the PC using the DaqLab software. When the OMDAQPRO-5300 is connected to a PC, live displays can be viewed at rates of up to 100/s, and automatic downloads can be carried out at higher rates^d. The software can display the data in graphs, tables or meters, can analyze data with various mathematical tools, or export data to a spreadsheet.

For this experiment the OM-DAQPRO-5300 device was connected to the PC and then the DaqLab software was used to retrieve and display the measured data. In the Logger tab the selective download option was used, and the recommended setting were also used to generate the graphic display of the data. The next step was to download the .csv file and open it in excel file (Figure 3).

4. CONCLUSION

The method described above can be followed similarly for all the gSKIN heat flux sensors and for the combined analog heat flux and temperature sensor (XO-Temp). This example shows that the gSKIN heat flux sensors are compatible with 3rd party read out devices and can be easily connected to the device and produce reliable results. The process might slightly differ for different read out devices that is why we recommend to follow the user guidelines manual provided by the specific 3rd party logger.

^d OM-DAQPRO-5300 manual: http://www.ni.com/data_logger/multichannel.htm