PDL

Data collector with Swiss SDP37 precision sensor that measures pressure difference and room air temperature and humidity.

Pressure measurement range:	-125 ... +125 Pa
Temperature measurement range:	-25 °C ... +60 °C
Air humidity measurement range:	20% ... 80% RH

CE

IOLIVING PDL DATA COLLECTOR

ioLiving PDL data collector measures, stores and transmits differential pressure, temperature and humidity data to ioLiving service, where the user can monitor the results in real time. Humidity and temperature sensors are integrated into the data collector device and a hoses attached to the device is for differential pressure measurement.

Figure 1. Differential pressure curve in the ioLiving service.

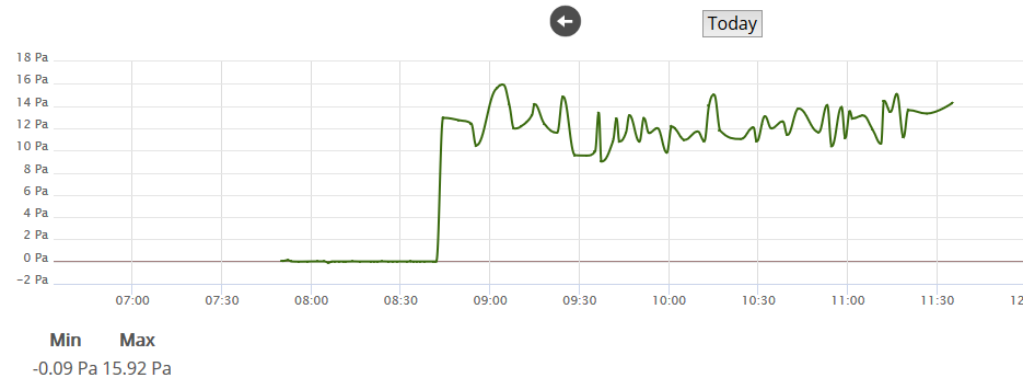


Figure 2. Temperature curve in the ioLiving service.

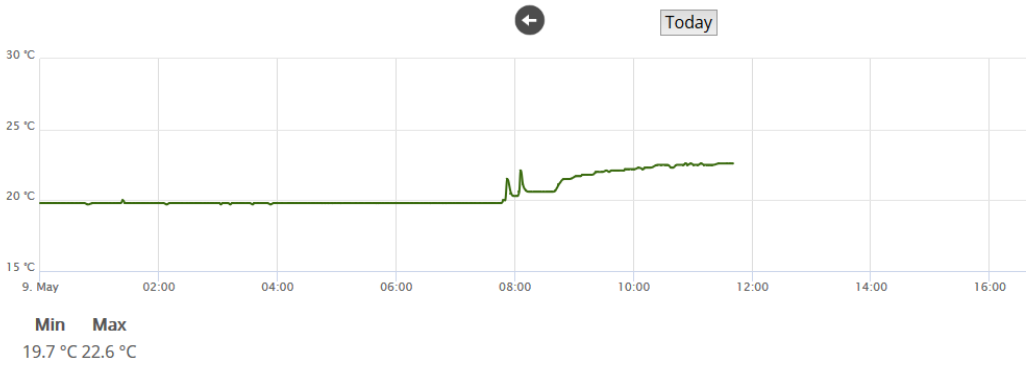
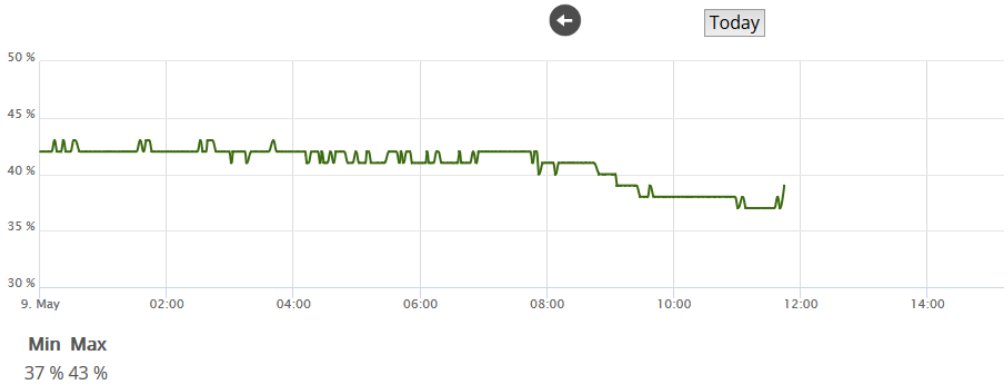


Figure 3. Air humidity curve in the ioLiving service.



In the construction industry environmental variables are usually measured with a hand-held meter for only couple of hours during the building phase and during the commissioning the building. ioLiving PDL data collector device and the service makes possible both continuous and long-term monitoring of the variables. With the PDL data collecting devices and ioLiving service, it is possible to measure the efficiency of the ventilation system or to monitor the risks of indoor air problems.

The PDL sensor's differential air pressure measurement is based on a flowmeter. Differential pressure flowmeter creates a cross sectional change in the flow tube, which causes the velocity of the flowing air to change. The flow velocity is measured and transferred to a pressure difference in the ioLiving service. The reference air pressure is conducted to the sensor with a hose, and the service is showing the pressure difference between the hose's open end and the sensor unit. The pressure measurement causes a slight air leakage between the hose's open end and the sensor unit. When linking a lengthening hose to the sensor's existing hose (15cm long), its internal cross section must be at least 3mm. The usage of a capillary tube is not possible. Hose extensions will be attached to the sensor's hose according to the Figure 4. the internal diameter of the extension hose shall be at least 3mm. The shorter the extension hose is, the better. The summarized length of the extension hoses is not recommended to be more than 3m. It the extension hose is longer the measurement will be slightly higher the actual. For example extension hose of 4m will make a 2Pa deviation.

Figure 4.
Linking the lengthening hose to the PDL data collector's hose.

When installing the conducting hose to a building, it must be sealed with a tape or a Blu-Tack. The measurement itself must not affect to the pressure difference under the measurement.

Also, the tight folding and dents of the hose are affecting in the measurement and should be avoided. The data collector must not be covered or sealed tightly, since its operation is based on analyzing the air flow through the device.

During the installation, the device and the hose must be kept clean from dust and dirt, which may cause malfunctioning of the device.

It is assumed that the hose marked with “-LOW” is placed to a location with lower pressure. The pressure difference will be then positive. However, if the “-LOW” marked hose is in a location with higher pressure the difference will be negative.

Figure 5.
Installing and sealing the hose into a wall.

In most cases, drilling a hole through the wall or window frame is not possible. Then the most useful method is taking the hose out from an opened ventilation window. Since the ventilation window is left ajar, it must be sealed with a plastic wrap and adhesive tape to prevent the unwanted air flow. Do the following:

1. Take the hose out.
2. Close the ventilation window slightly. Tight folding and dents of the hose must be avoided.
3. Cut a fitting size piece of the plastic wrap.
4. Tape the plastic wrap around the window frame.
5. Seal the hose with the tape.

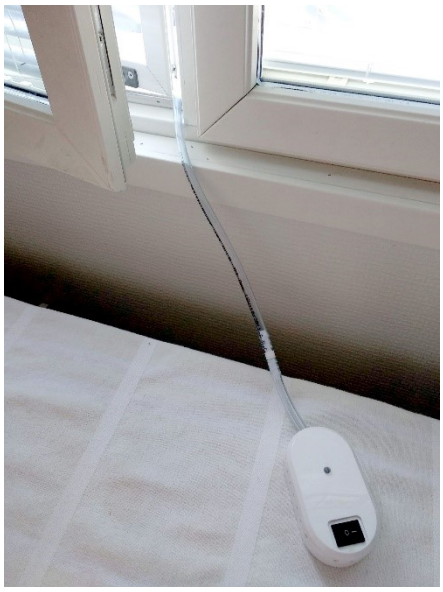


Figure 6.
Differential pressure measurement through the ventilation window

Device's functionality can be tested before the installation by taking the hose to a presumably different pressure and monitoring the results in the ioLiving service. It is important to identify the effect of normal variations in the measurement results from actual alarming results.

The purpose of the PDL data collector device and the ioLiving service is to help a real estate owner monitor the building's condition independently. If the measurement values are alarming and the effects of the normal variations are ruled out, the real estate owner must consult property maintenance professionals.

If the outdoor air pressure is used as a reference, the wind's effect on a pressure must be considered. The wind can increase or decrease the outdoor pressure by several tens of Pascals (Figure 6.), and measurements performed on windy weather are not reliable.

Temperature difference between the outdoors and indoors is also having an influence on air pressure deviation in the buildings; the greater the temperature difference is, the greater the pressure difference is as well. Indoors air pressure changes require air flows within the building. The air flows inside the building are affected by the air tightness of the construction and air flow channels where the air can move inside the building. Seals of the building, HVAC air ducts, service hatches and cracks of the building are usually functioning as the air flow channels.

Figure 6. Wind's effect on the measured pressure difference, which is actually –2 Pascals.

When performing the environmental variables measurements, building's ventilation system should be running with normal settings. If there are multiple settings which are in use intermittently, the setting values should be monitored as well to find their effect to the environmental variables. During the measurements, the windows and doors should be closed by default. The PDL data collector and ioLiving service must not be used as a personal safety alarm system under any circumstances. The device can only be used in dry indoor locations.

Table 1. Technical features.

Pressure:	Measurement range	-125 ... +125 Pa
	Precision	0,1 Pa + 5% of measured value
	Resolution	0,1 Pa
Temperature	Measurement range	-25 °C ... +60 °C
	Precision	±0,5 °C
	Resolution	0,1 °C
Air humidity	Measurement range	20% ... 80% RH
	Precision	±4 % RH
	Resolution	1 % RH
Saving	Measurement saving frequency	3 minutes
	Memory capacity	12 days measurements
Batteries	Lithium, interchangeable	2 x AA lithium
	Battery life	24 month
Warranty	Warranty time	12 month