Creative Product Design

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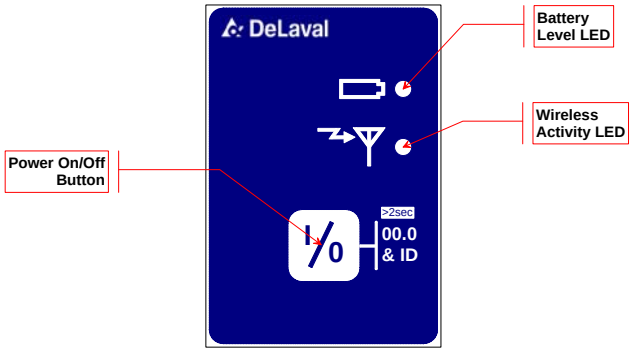
VPR100 Wireless Vacuum Sensor Operating Instructions.

This document is for use in field trials of the Sensors and as a basis for a formal user manual. It is not intended for use by the general public or to be supplied with production units. ***In particular error and calibration information should only be made available to DeLaval staff.***

Controls and Indicators.

The Sensor has only a single button and two LEDs for status indication. Detailed status information is displayed on the VPR100 Sensor Status screen.



The button is used to turn the sensor on/off and initiate various special functions by holding the button down.

The **Battery LED** normally shows the state of the batteries, but also shows special status indications in conjunction with the other LED.

The **Wireless LED** flashes when information is being received from the VPR100. It is primarily used to show that the Sensor is within range of the VPR100 and reception is not being blocked by metal objects nearby.

Turning the Sensor On.

1. Make sure fresh batteries are installed. It requires two ‘AA’ cells which can be normal 1.5V Alkaline or 1.2V NiCd/NiMH rechargables. DO NOT use 3V Lithium cells or mix different types in the same Sensor.

2. Press the button to turn the unit on. The **Battery LED** will give a long blink on startup (**Green** for 868MHz European units, **Orange** for 915MHz Nth/Sth American, Australian and NZ units), after which it should give a short blink every 2 seconds if the battery level is good.

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Registering the Sensor on the VPR100.

Before the Sensor can be used it must be *'registered'* on the VPR100. Registration is only done once when a new sensor is being used for the first time. Up to 9 sensors can be registered, but at this point only the first two are used. Readings from the first two sensors in the list are shown as "Ext 1" and "Ext 2" in Airflow and Vacuum Modes.

1. Turn on the VPR100 and select Setup - Sensor Setup  .
2. With the Sensor turned on, press and hold the button until the **Battery LED** shows **Orange**.
3. The VPR100 should beep and the sensor will appear on the screen with its type and ESN. A tick should be shown in the box on the left-hand side. The **Wireless LED** should be blink **Red** showing the Sensor is communicating with the VPR100.
4. The Sensor Information icon should appear  . Press it and a pop-up window shows status information about the Sensor such as Battery Voltage, software version, sensor temperature, etc.
5. Press the Info icon again to remove the window. It will also automatically clear after a few seconds.
6. Exit the Sensor Setup screen and the sensor will be saved into VPR100 memory.

Using the Sensor.

The sensors can be used in the VPR100's Vacuum and Airflow Modes only.

1. Connect the sensor port tubing to the desired location and turn it on.
2. Make sure the **Battery LED** is blinking **Green** and the **Wireless LED** is blinking showing the Sensor is talking to the VPR100.
3. In Vacuum and Airflow modes readings from the first two sensors in the Sensor Setup list will be shown under "Ext 1" and Ext 2" respectively.

Turning the Sensor Off.

The sensor can be manually turned off using the button. It will automatically go off if has not received any communications from the VPR100 after 10 minutes to conserve battery life.

Battery Level Indication.

The sensor's battery level is displayed on both the Sensor's Battery Level LED and the VPR100.

Batteries Good:
The Battery Level LED will blink **Green** each 2 seconds and readings on the VPR100 will be shown normally with the units (kPa or inHg) visible.

Batteries Low:
The Battery Level LED will change to **Orange** and blink faster (1 sec) to warn the user to change the batteries. The units next to the vacuum reading on the VPR will change to [BAT].

Replace Batteries.
When the battery level is too low for use the LED will blink **Red** twice per second. No reading will be displayed on the VPR100 and the units will change to [RPL]. The batteries must be replaced before the sensor can be used again.

Low Temperature Indication.

The sensor includes temperature measurement to check if it is too cold for accurate vacuum reading. The VPR100 shows the condition by replacing the units (kPa or inHg) next to the reading in Vacuum or Airflow Mode, with [°C]. There is no indication on the Sensor itself. If [°C] appears on the VPR100 the ***sensor*** should be warmed until the normal units returns. The actual temperature value is displayed in the Info window of Setup – Sensor.

Zero Adjustment.

If there is no vacuum on the port when the sensor it turned on it will automatically adjust its zero level to suit the atmospheric pressure at the time. If there was a small vacuum on the port when the unit was turned on, the atmospheric pressure has changed or the Sensor's temperature has changed significantly it may show a small pressure offset. Remove the tube from the port, press and hold the Button for more than 2 seconds (until the Battery LED shows orange) and the zero will be reset.

Reading the Software Version.

The software version number in the Sensor can be checked without using the VPR100.

1. With the Sensor turned off press ***and hold*** the Button.
2. The Battery LED will first blink showing identifying the frequency of the unit (see above) then both LEDs will flash the number of times equal to the software version then go off, i.e. flashing 4 times means the software is version 04.

Errors.

If the Sensor's software detects an error on startup it flashes the **Battery LED Red** the number of times equal to the error number. Some errors can be cleared by pressing the button allowing the sensor to still be used. At the time of writing defined errors are:

Flash # on Sensor LED	Error shown On VPR100	Description	Can be cleared
2	4000	Fault with ESN/Battery measurement circuit	No
3	2000	Sensor not calibrated (Gain/offset of 1.000/0.0 will be used)	Yes
4	1000	Fault with RF system. Frequency cannot be set.	No
5	0800	Watchdog reset has occurred. Hardware fault likely.	Yes

Calibration.

The sensors are calibrated via the VPR100 using the 'VPR100 Calibrator' PC software.

1. Make sure there are NO sensors registered in the VPR100 Sensor – Setup screen.
2. Plug the VPR100 into the PC start the 'VPR100 Calibrator' and press 'Connect'.
3. Turn on the sensor. The VPR100 should give a high-pitch beep to advise that the sensor has been auto-registered.
4. Select the sensor in the Calibrator's drop-down box and calibrate as normal.
5. Turn the Sensor off and wait 10 seconds. The VPR100 should give a lower-pitched beep indicating that the sensor has been automatically de-registered.
6. Get the next sensor and go to step 3.