

DVLS³ Simply, Smart Sensor Safely Detects Hydrogen Leaks in GC Systems

Hydrogen is an ideal alternative to helium as a carrier gas; it offers a faster analysis, a higher efficiency, reduced costs and a prolonged column life. Unfortunately the use of hydrogen could also be dangerous. To eliminate the risks in using hydrogen as a carrier gas Da Vinci Laboratory Solutions developed the DVLS³ Simply, Smart Sensor. By constantly monitoring the hydrogen concentration in the GC oven and automatically switching to an inert gas the DVLS³ Simply, Smart Sensor ensures the safe use of hydrogen in a GC analysis.

Monitor Hydrogen in GC Oven

The GC analysis evidently benefits from the use of hydrogen, but this carrier gas does have one disadvantage as it is an explosive gas! A broken GC column or a loose connection could leak hydrogen, which might result in an explosion in the GC oven. The robustness of the GC limits the risk for the staff, but the laboratory will need to replace its GC.



DVLS³ Simply Smart Sensor

If the sensor detects a user defined hydrogen concentration, typically between 25% and 50% LEL it will ensure the safety of the laboratory staff by several steps:

1. The LCD screen of the sensor controller starts flashing and the controller transmits an acoustic signal.
2. The optional sensor software alerts the lab staff by:
 - showing a red status on the dashboard
 - sending an alarm message by e-mail, text (SMS), Growl or Prowl
3. The sensor controller automatically switches the carrier gas to an inert gas and sends an automatic stop signal to the GC.



Controller of the DVLS³ Simply, Smart Sensor on top of the GC

The DVLS³ Simply, Smart Sensor is installed in the GC oven for continuous monitoring of the hydrogen concentrations in the oven air. The LCD screen of the external controller displays the measured gas concentration.



Optional DVLS³ Sensor Software showing the Alarm

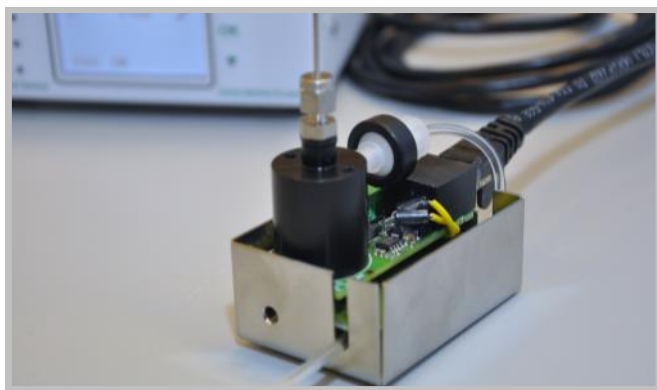
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Versatile Design

Due to the unique design of the DVLS³ Sensor you can combine up to four sensors in one controller. For example use four sensors for several GC's or connect several sensors to one GC. The sensor is compatible with all GC brands.

Next to the hydrogen leak detection Da Vinci Laboratory Solutions offers multiple sensors dedicated to the detection of:

- Hydrogen
- Temperature
- Barometric Pressure
- Level (liquid) weight



Hydrogen Sensor

Technical Specifications Hydrogen Sensor

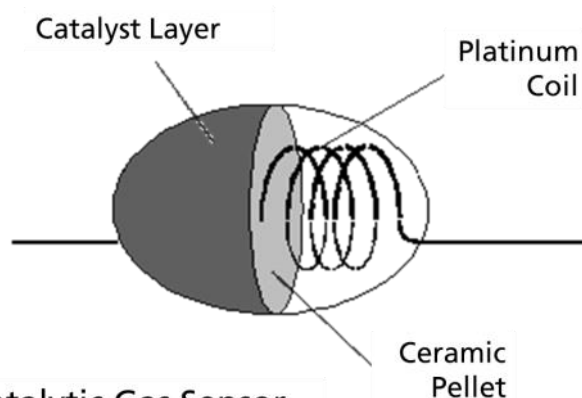
- Max 4 sensors individually controlled
- Detection range :
0-50% LEL (0 – 2.0% by vol.Hydrogen)
- Gas sensor integrated in GC oven, carrier gas switch and LCD display are installed in an external controller
- Catalytic pellistor gas sensor, linear range of 0-2% Hydrogen (0-50% LEL)
- User defined alarm level optical and/or acoustic alarm up to 50% LEL
- Instrument readings:
provide real time sensor readings with alarm levels, channel status
- User menu for configuration
- Valve : High pressure 3 way solenoid valve
- Oven operating temperature:
up to 450°C 24VDC power adapter
- Dimensions:
11 cm (W), 5,5 cm (H), 14 cm (D)



Connection for four sensors

Principle of Operation

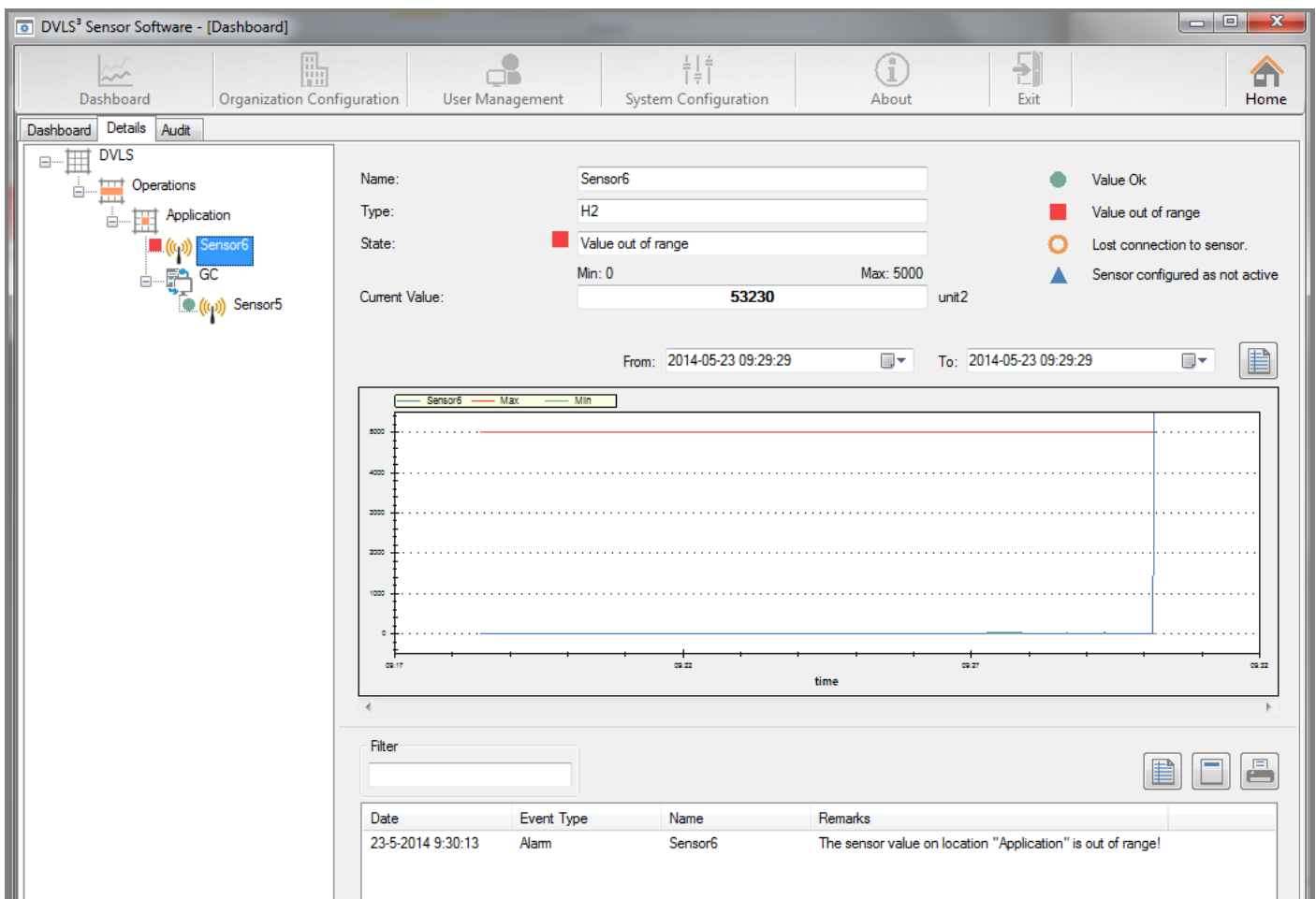
The principle of the DVLS³ Simply, Smart Sensor is based on a Catalytic reaction on the surface of a pellistor, that consists of a very fine coil of platinum wire embedded within a ceramic pellet. On the surface of the pellet is a layer of a high surface area noble metal, which, when hot, acts as a catalyst to promote exothermic oxidation of flammable gases.



**Catalytic Gas Sensor
- Schematic Diagram**

In operation, the pellet and so the catalyst layer is heated by passing a current through the underlying coil. In the presence of a flammable gas or vapour, the hot catalyst allows oxidation to occur in a similar chemical reaction to combustion.

Just as in combustion, the reaction releases heat, which causes the temperature of the catalyst together with its underlying pellet and coil to rise. This rise in temperature results in a change in the electrical resistance of the coil, and it is this change in electrical resistance which constitutes the signal from the sensor.



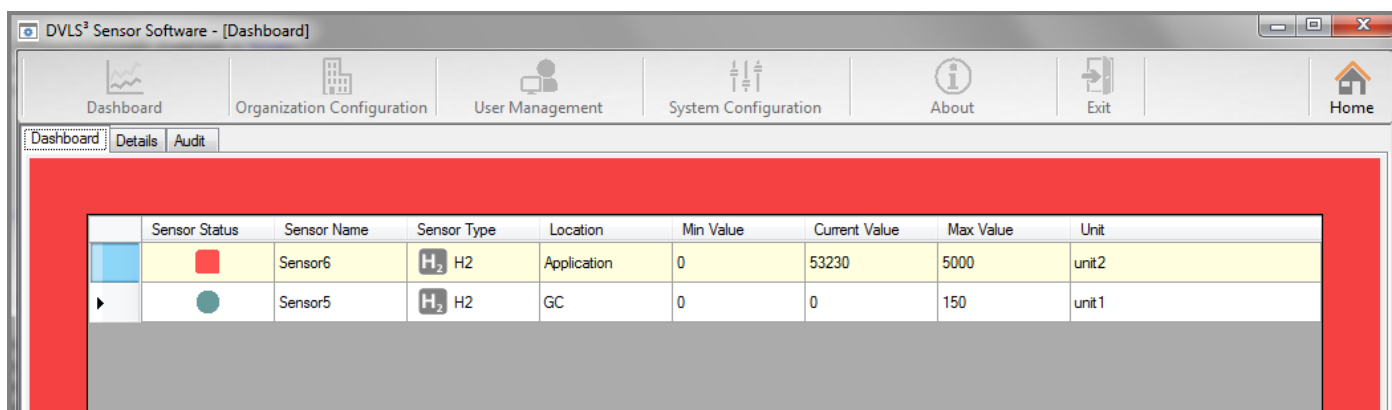
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Audit Trail

The Audit Trail option allows you check the performance of the sensor in time and create an overview of the changes in any settings. Filter the audit trail by location and report the alerts by print or as an CSV export file.

Remarks
"SMS" on LocationSensor "Sensor5" for User "admin" successfully added to database table.
"Prowl" on LocationSensor "Sensor5" for User "admin" successfully added to database table.
"Growl" on LocationSensor "Sensor5" for User "admin" successfully added to database table.
"E-mail" on LocationSensor "Sensor5" for User "admin" successfully added to database table.
"SMS" on LocationSensor "Sensor6" for User "admin" successfully added to database table.
"Prowl" on LocationSensor "Sensor6" for User "admin" successfully added to database table.
"Growl" on LocationSensor "Sensor6" for User "admin" successfully added to database table.
"E-mail" on LocationSensor "Sensor6" for User "admin" successfully added to database table.
OrganizationalUnit permission "Operations" on Group "Administrators" successfully added to database table.
"Phone" changed from "4556778879789" to "+31102581870".

Audit Trail of the changed settings



	Sensor Status	Sensor Name	Sensor Type	Location	Min Value	Current Value	Max Value	Unit
		Sensor6	H ₂ H2	Application	0	53230	5000	unit2
▶		Sensor5	H ₂ H2	GC	0	0	150	unit1

Dashboard showing the sensor status for Hydrogen

Key Benefits of the DVLS³ Simply Smart Sensor

- Safe technique to constantly monitor hydrogen leaks
- Automatic alarm transmission through:
 1. Optical and acoustic alarms
 2. E-mail messages
 3. Text (SMS) messages
 4. Growl
 5. Prowl
- Optional software controls the alarm settings per sensor & user
- Audit trail function creates a record of the reported alarms and settings
- Automatic carrier gas switching from Hydrogen to Nitrogen
- Leak detection indicates analysis is compromised
- Automatic stop signal sent to the GC
- Easy calibration and installation
- Compatible with all GC brands
- Versatile design supports up to 4 sensors. Select four sensor types out of the following options:
 1. Hydrogen
 2. Hydrogen as Leak Detector
 3. Temperature
 4. Barometric Pressure
 5. Level (liquid) weight



The versatile multi sensor offers GC labs a safe solution to change the GC carrier gas to hydrogen.