EXTRIMA®

HYDROGEN LEAK DETECTOR
(HW II)

SW version 2.04

Operating Instructions

Publication: INFICON AB -nina61e1-c (1209)- All information can be modified without prior notice

INFICON

Contents

EN

1. General

The Hydrogen Leak Detector **Extrima** is an extremely sensitive and selective, intrinsically safe detector for hydrogen gas (H_2). It is especially designed for leak detection using Hydrogen Tracer Gas, (Hydrogen diluted with Nitrogen down to a safe concentration), which is an effective and economical tracer gas for leak testing.

Extrima detects hydrogen in air at atmospheric pressure with no need for vacuum pumping. It is especially suitable for applications where high sensitivity and selectivity is required in combination with simplicity and reliability.

The instrument has three main functions: **Detection Mode, Analysis Mode and Combined Mode**.

- Detection Mode is used when there is a need to detect and locate a leak quickly. The results are shown as a moving bar.

- Analysis Mode is used when there is a requirement to analyse the concentration of hydrogen gas in the air and thus determine the size of the leak. The results are shown by figures in PPM or other unit, selected by the user.

- In Combined Mode a moving bar and figures are shown.

In all three cases the results are also indicated by an audio signal. The frequency of the sound depends on the measured signal, which allows the user to work without having visual contact with the display.

Ex

An intrinsically safe instrument is constructed to remove all ignition sources. This means that even in the event of a failure in the circuits, the surface temperature and available spark energy is limited to given values.

The guidelines for the protective measures are given in international standards. A third party, a so called Certification Body has assessed and tested the compliance with the relevant standards and issued a certificate stating the classification that the instrument fulfills.

Read this User Guide carefully before using the instrument. You must, under all circumstances read and understand the section "Special conditions for safe use" on p. 5. On "5. To get started" on p. 13, there is a description of how to get started quickly. However, to be able to utilise all the functions of the instrument, one should also read all the other sections in the guide. When running through the menu section for the first time, it is a good idea to have the instrument in front of you so that the build of the menu system can be recognised quickly. It is also your responsibility as user to assess whether the certification code of the instruments makes it suitable for use in your hazardous location.

The major advantages of Hydrogen Tracer Gas* are:

EN

- It is the cheapest of all tracer gases (standard industrial grade mixtures).
- The natural background concentration in air is only 0.5 ppm.
- Hydrogen is very easily vented away from the test area, thereby minimizing background problems.
- Hydrogen is non-toxic, 100% environmentally friendly and non-flammable.
- Hydrogen is a renewable natural resource.
- Hydrogen is a low viscosity gas which spreads very rapidly inside the test object and easily penetrates a leak. After testing it is easy to eliminate the gas from the test area.

***Whenever the word Hydrogen Tracer Gas is used throughout this manual it implies that the hydrogen gas is safely mixed with Nitrogen in the proportions 5% H_2 - 95% N_2.**

2. Safety

The safety terms **WARNING**, **CAUTION** and **NOTE** are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

WARNING: indicates that death, severe personal injury and/or substantial property damage can occur if proper precautions are not taken.

CAUTION: indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.

NOTE: indicates and provides additional technical information, which may not be very obvious even to qualified personnel.

Compliance with other, not particularly emphasised notes, with regard to transport, assembly, operation and maintenance and with regard to technical documentation (e.g. in the operating instruction, product documentation or on the product itself) is essential, in order to avoid faults, which in themselves might directly or indirectly cause severe personal injury or property damage.

Special conditions for safe use

The 'X' suffix to the certificate number relates to the following special condition for safe use:

EU (ATEX)

As aluminium is used at the accessible surface of this equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the **Extrima** Hydrogen Leak Detector is used in locations that specifically require group II, category 1G equipment, i.e. Zone 0 or Division 1 applications.

Examples of materials quoted as possibly able to create sparks on impact with aluminium are concrete and rust.

Proper care must be taken to avoid impact with aluminium surface when working in Zone 0 areas where impact with such materials can occur. Protecting the instrument with a leather or antistatic synthetic protection case is recommended.

Canada (CSA)

Battery Charger for the Canadian market must be CSA Certified (or equivalent), with a maximum charging voltage of 12.6 V and a maximum charging current of 770 mA.

Summary of scope of certificate

EN

The following instructions apply to equipment covered by certificate numbers:
Sira 07ATEX2117X Issue 5,
CSA 1981011 Issued July 17, 2012
IECEx Sp Issue 3, April 17, 2012
NEPSI GYJ081012, Modification II, May 23, 2012

1. The equipment may be used with flammable gases and vapours in explosion groups IIA, IIB and IIC and with temperature classes T1, T2, and T3.

2. The equipment is only certified for use in ambient temperatures in the range –20°C to +50°C.

3. The certificate number has an 'X' suffix which indicates that special conditions of use apply (see above).

4. The equipment is portable and is not intended for fixed installation. Assembly for operation, see "5. To get started" on p. 13.

5. Repair of this equipment may only be carried out by service organisations authorised by INFICON, Sweden.

6. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances — e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions — e.g. regular checks as part of routine inspections (see also under "Caution" below).

Safety regulations

WARNING!

• Pure hydrogen is a flammable gas. Only use ready-made Hydrogen Tracer Gas of 5% Hydrogen in Nitrogen. This is a safe, standard industrial gas mixture used in various industrial applications. The normal risks associated with all compressed gases must however be considered. As the tracer gas mix contains no oxygen, releasing large amounts of gas in a confined space may lead to asphyxiation.

• Whenever the word Hydrogen tracer gas is used throughout this manual it implies that the hydrogen gas is safely mixed with Nitrogen in the proportions 5% H_2 - 95% N_2.

• Compressed gases contain a great deal of stored energy. Always carefully secure gas bottles before connecting pressure regulator. Never transport gas bottle with pressure regulator fitted.

• Before connecting tracer gas: confirm that the connectors or test object is designed for working at the test pressure.

• Pressurising objects at too high pressures can result in a burst object. This in turn can result in serious injury or even death. Never pressurise objects that have not previously been burst tested or otherwise approved for the chosen test pressure. INFICON can not take any responsibility for the consequences arising from the inapropriate use of certain test pressures.

• Pressure shocks might cause strong sounds which can cause impairment of hearing.

• Charge battery in safe area only! Read the section "Special conditions for safe use" on p. 5 and "10. Charging" on p. 38, before using the instrument.

• Check that all relevant legislation and safety standards are complied with before putting **Extrima** into service.

CAUTION!

• Do not open detector! Service of this equipment may only be carried out by service organisations authorised therefore by INFICON, Sweden.

• If the detector gets outer damage it must be controlled and repaired by service organisation authorised by INFICON.

• Replacement of Hand Probe and Probe Cable may be carried out by the user.

• Do **not** expose the probe to a hydrogen concentration higher than 0.1 % when the instrument is not switched on, this might damage or destroy the probe sensor.

• When the instrument is switched on the sensor withstands temporary exposure to hydrogen concentration up to 100%. Avoid long exposures to high concentrations.

Hydrogen Tracer Gas for leak detection

NOTE: Whenever the word Hydrogen tracer gas is used throughout this manual it implies that the hydrogen gas is safely mixed with Nitrogen in the proportions 5% H_2 - 95% N_2.

When a mixture of less than 5.5% hydrogen in nitrogen mixes with air there is not sufficient energy to support a flame, irrespective of the ratio of air-to-gas.

When a mixture of more than 5.5% hydrogen in nitrogen is released into air there is a region of ratios of air-to-gas where the mixture is flammable. When, for example, a mixture of 10% hydrogen in nitrogen mixes with air there is still very little energy available.
Only in exceptional circumstances can a flame be self-supporting, even for a 10% hydrogen mixture. However, such mixtures cannot detonate.

Hydrogen/nitrogen mixtures containing more than approximately 15% hydrogen con detonate when mixed in certain proportions with air.

WARNING!
Never use a gas mixture containing more than 5% hydrogen.

Never make your own gas mixtures. Only use ready-made mixtures, or use a certified hydrogen/nitrogen mixer installed by your gas supplier.

3. Working principle

EN

Theory

The **Extrima** detector is based on micro-electronic sensor technology known as GAS-FET technology. The sensor is a field effect transistor in an integrated circuit. The gate electrode of the transistor is made of a hydrogen absorbing metal alloy (metal hydride). When this device is exposed to hydrogen the gas molecules adsorb on its surface, dissociate into hydrogen ions (protons), and diffuse rapidly into the gate metal. The absorption of hydrogen ions affects the work function (surface potential) of the metal, which gives the same effect as if the gate voltage of the transistor was changed.

Only hydrogen ions can diffuse into the metal. This excludes cross sensitivity from substances that do not contain hydrogen. Also, the dissociation of hydrogen from other molecules is very inefficient, a fact that makes these sensors practically insensitive to other substances. The only, relatively common, substance being detected with comparable signals is H_2S, hydrogen sulphide. This gas is, however, extremely toxic and has a very strong and distinct smell. It is therefore never present in interfering concentrations in normal working environments.

The electrical output signal from these sensors is not at all as stable and repeatable as, for example, sensors for physical parameters such as temperature, pressure, etc. Therefore the output signal must undergo signal interpretation in order to give reliable measurements. This is done by a microprocessor in the instrument, which also controls the sensor temperature with high accuracy, and other sensor diagnostics in order to ensure functionality. It also automatically compensates for background gas.

Background compensation

There is always some hydrogen gas in the background. In fresh air this is as low as 0.5 ppm (parts per million).

Extrima actively adjusts itself to the background. This is done automatically at start-up and thereafter it slowly adapts itself to slow variations in the background concentration. By adjusting slowly (minutes) it avoids taking an actual leak for an increased background, and vice versa. Therefore a sudden rise in background concentration will be detected, but if the concentration remains constant it will be gradually cancelled out over a period of several minutes.

For example, if the background concentration, for some reason, should suddenly rise to 10 ppm H_2, then the detector will give a corresponding signal which will, very slowly, decline to zero. If you thereafter expose the probe to a leak which gives rise to another 10 ppm H_2, the detector will give essentially the same signal as if there was no background concentration.

Interferences

Some examples of hydrogen sources which could cause interferences:

- Engine exhaust
- Battery charging stations
- Welding smoke
- Cigarette smoke
- Breathing air
- Human flatulence
- Scratching on aluminium

Extrima is extremely selective. Among naturally occurring gases only Hydrogen Sulphide (extremely toxic) gives a comparable response to hydrogen. The detector will also react to some synthetic gases, predominantly used within the semiconductor industry, such as Silane, Phosphine, Arsine etc. Exposure to such synthetic gases severely reduces the life of the Hydrogen sensor.

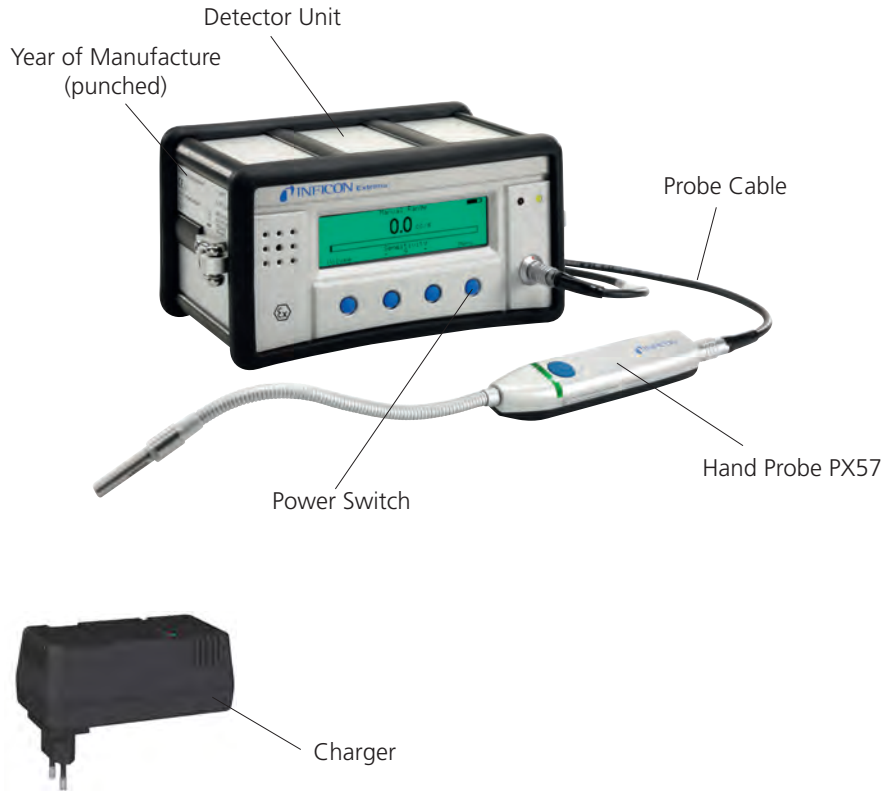
4. Main parts

EN

Extrima consists of five main parts:

- Detector unit with display, controls, and connections
- Hand Probe PX57-Flex
- Probe cable with connectors
- Charger
- Operating Instructions

Extrima



5. To get started

1. Connect the Hand Probe to the instrument front using the probe cable.
2. Switch on the power by pressing the right button for a few seconds.

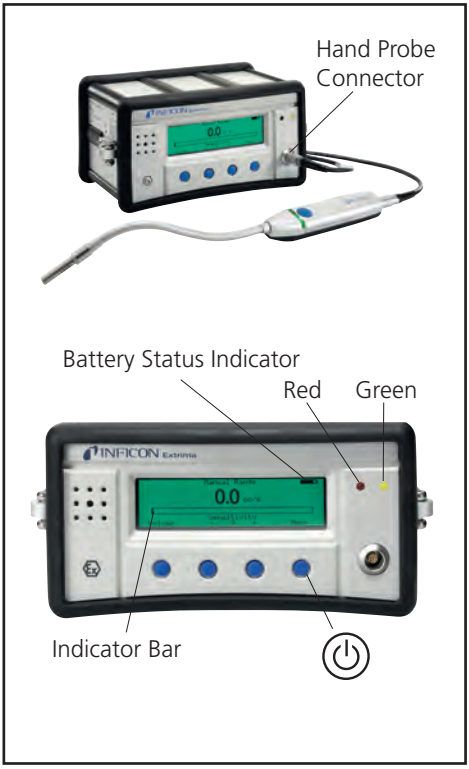
   The red and green LED indicators lights up for a few seconds and then the red LED goes out and the green LED starts to flash slowly. The green LED on the hand probe starts flashing slowly. The display on the detector lights up and an indicator bar shows that the sensor is stabilising and the detector is booting up.

> **NOTE:** Avoid exposing the probe to hydrogen during the stabilisation period.

3. When the stabilisation period is over (typically 90 seconds) the leak detector is ready for operation.

   On the detector the green LED stays on. The green LED on the hand probe stops flashing. The display will start in **Detection Mode**, **Analysis Mode** or **Combined Mode**, depending on which mode was used when the detector was switched off.

> **CAUTION!**
> The instrument is water-proof, but the sensor has to be protected if there is a risk of contact with water or other liquids. See "Water protection" on p. 31.



Shut down

To shut down **Extrima**, press the right button for a few seconds. The display shows: "Shut down **Extrima**?"
Press **YES**. Abort shut down by pressing **NO**.

Basic leak detection

EN

Extrima has three different modes: **Detection Mode, Analysis Mode and Combined Mode.** The Combined Mode is the default mode.

In **Detection Mode** you will see a bar and hear a sound with a frequency that increases as the probe approaches the leak, and decreases as the probe is moved away from the leak. No figures are shown on the display, and the frequency is not an accurate measure of the leak rate.

You will soon get used to listening for changes in the frequency rather than to the actual frequency. Move the probe over the surface of the tested object to detect and precisely locate a leak, even when there are other leaks nearby. Keep moving the probe to find out where the signal increases and where it decreases. Let the audio signal guide you to the exact position of the leak.

If you expose the probe to a constant gas concentration you will hear the frequency continue to increase slowly until it eventually levels off, and very slowly declines again. This takes 30 - 45 seconds for small leaks and just a few seconds for large leaks. The decline is the automatic background adjustment coming into action. A gas concentration being constant for several minutes is being taken as an increased background level.

In **Analysis Mode** figures are shown on the display. These figures are an accurate measurement of the leak rate.

The detector determines the gas concentration from the change as the probe goes from being exposed to background to being position right on the leak.

The detector does not continuously monitor the gas concentration but takes just one reading instead. Another suitable alternative name for this mode could be Sampling Mode. It is important to keep this in mind when using the detector in this mode.

In **Combined Mode** the bar and the sound in Detection Mode is combined with the figures in Analysis Mode, this means that at the same the signal is displayed as a bar and the measured value is displayed in figures.

When you have located the leak you can measure its size in the following way:

1. Remove the probe from the leak into fresh air.
2. Wait until 0.0 appears on screen and then put the tip of the probe right on the leak.

NOTE: The tip of the hand probe gets warm when the instrument is in use. This is normal.

CAUTION!
Always connect the probe before switching on the instrument.

Never put the probe in water or any other liquid.

6. Controls and indicators

Display

The display shows:

• The indicator bar in **Detection Mode** and values in **Analysis Mode** or both in **Combined Mode**.

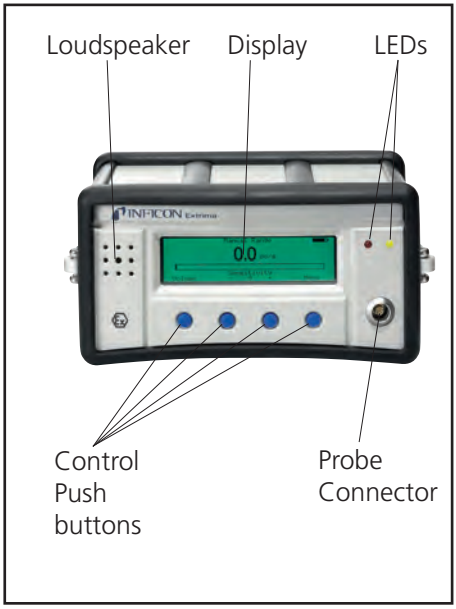
• The six main menus. Their positions are indicated on a horizontal scale. Change from one menu to another using the < and > buttons.

• The main menus have submenus, which are also indicated by horizontal scales and can be selected using the < and > buttons.

• Scales for setting numeric values, languages, etc.

• Messages.

• A battery status indicator in the upper right corner.



Control Push buttons

The functions of the push buttons are shown at the lower edge of the display.

• Change from one menu item to another using the < and > buttons.

• Press **Enter** to move down to the nearest submenu.

• Press **Save** to save the set value.

• Press **Undo** to restore the previously set value.

• Press **Esc** to move up to the nearest higher level(s).

LEDs

The two LEDs on the detector and the two LEDs on the hand probe indicate the status of the instrument as follows:

• Green LED flashing slowly during warming up phase.

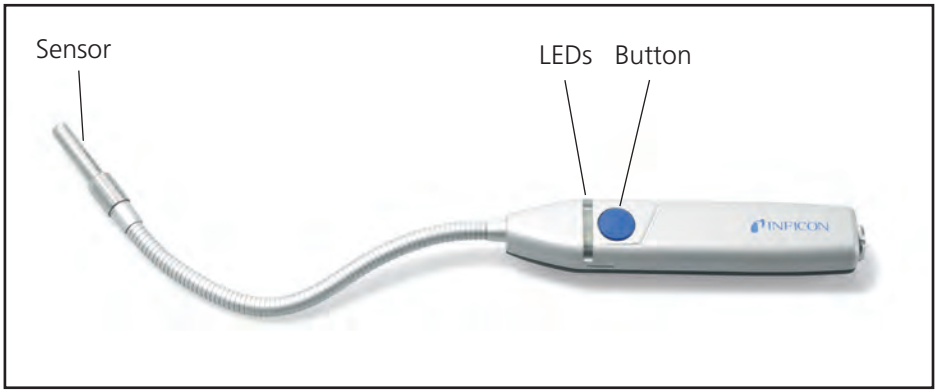
• Steady green LED indicates that instrument is ready and hydrogen signal below leak limit.

• Red fixed light together with **LEAK** on display means the instrument has detected a leak larger than the set alarm limit.

• Red LED flashing. Check message on display. See "11. Trouble-shooting" on p. 39

Probe

EN



LEDs

The two LEDs indicate the status of the instrument as described on previous page. During leak location the green LEDs guide the user to the leak by increasing the flashing frequency proportional to locating signal.

The red LED light up when signal is above Leak Alarm Limit.

Push button

The push button is used to switch between **Manual Range**, **Auto Range** and **Dynamic Range**. See "Range Setting" on p. 24.

The button can also be used to start calibration when instrument is in **Calibration Mode**.

7. Menu system

The menu system is designed in the form of a tree structure. The display shows all the levels when browsing down through the menus so that you can always see exactly where you are.

> **NOTE:** If no setting is made in a menu or its submenues within 60 seconds, the instrument will revert to the latest Test mode.

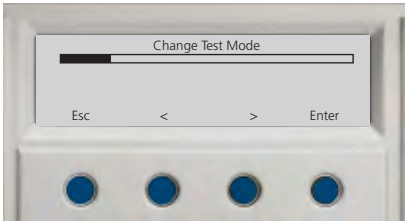
• All changes in values are valid only when saved using the **Save** or **Enter** button.
• Use the **Undo** or **Esc** button to delete a change in value and revert to the previous setting.
• Use the **Esc** button to browse upwards through the menus and out of the menu tree to the operating screen.

Main menus

To enter the menus, press **Menu** (button on the far right). Press < and > to choose between the six main menus, which are explained in detail on the following pages. To exit the menu press **Esc**.

Change Test Mode

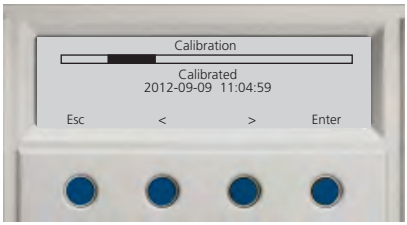
Select:
Analysis Mode,
Detection Mode and
Combined Mode.
See "Change Test Mode" on p. 19.



EN

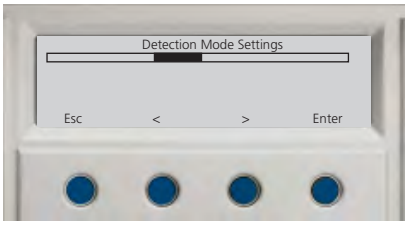
Calibration

The instrument must be calibrated to ensure that the correct values are displayed in the **Analysis Mode** or **Combined Mode**. Select **Calibrate**, **Calibration Coefficient**, **Calibration Time** or **Password Protected Calibration**. Calibration is described in "Calibration" on p. 20 and "Calibration" on p. 34.



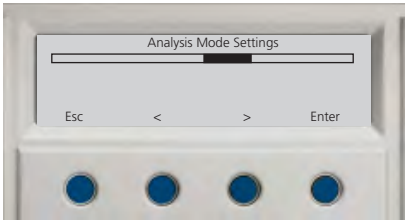
Detection Mode Settings

Select **Sensitivity**, **Range Setting**, **Direct Sensitivity Adjustment**, **Leak Alarm Indication** and **Lowest Frequency**. See "Detection Mode Settings" on p. 23.



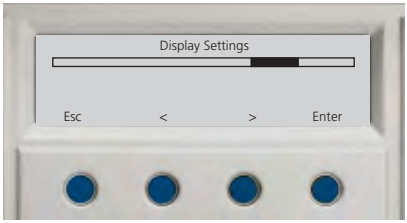
Analysis Mode Settings

Select **Leak Alarm Level**, **Leak Rate Unit**, **Min. Presentation Time**, **Leak Alarm Indications**, and **Lowest Frequency**. See "Analysis Mode Settings" on p. 25.



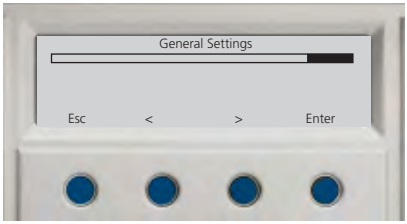
Display Settings

Select **Contrast**, **Brightness** and **Screen Save Timeout** for the display. See "Display Settings" on p. 27.



General Settings

Various general settings. **Select Language**, **Change Password**, **Set Clock**, **Set Date** See "General Settings" on p. 28.

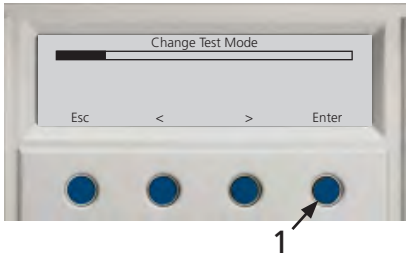


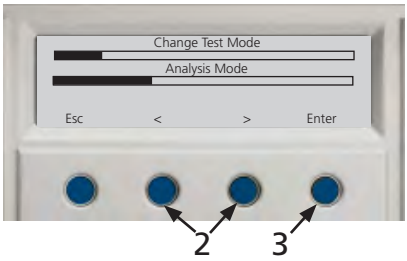
Change Test Mode

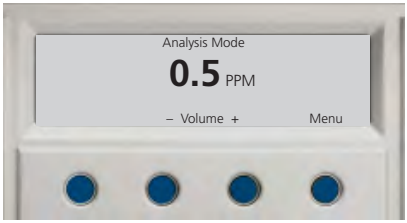
Select the main menu **Change Test Mode** as described in "Change Test Mode" on p. 17.

1. Press **Enter**.
2. Select:
   Analysis Mode,
   Detection Mode or
   Combined Mode
   by pressing < and > until you reach the wanted mode.
3. Press **Enter**.

> **NOTE:** To change quickly from **Detection Mode** to **Analysis Mode** or vice versa, press the right-hand button three times in succession.







Explanations

In **Detection Mode**, the signal is displayed in the form of a bar. The length of the bar varies with the gas concentration.

In **Analysis Mode** the measured value is displayed in figures, "To Quantify Leaks" on p. 33. The default unit is in PPM but it is possible to choose other units, see "Leak Rate Unit and Calibration Coefficient" on p. 35.

In **Combined Mode** you can see the signal displayed as a bar and the measured value in figures at the same time.

Calibration

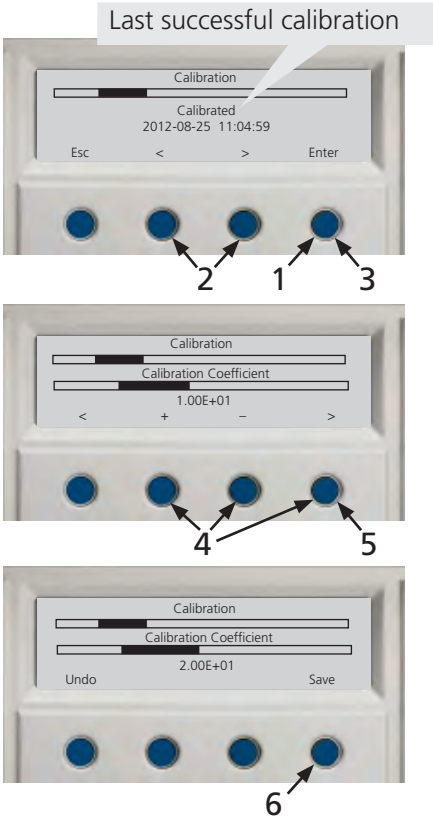
EN

Select the **Calibration** menu as described in "7. Menu system" on p. 17.

1. Press **Enter**.
2. Select:
   Calibrate
   Calibration Coefficient
   Calibration Time or
   Password Protected Calibration
   by pressing < and > until you reach the wanted mode.
3. Press **Enter**.

> **NOTE:** If **Enter Password** is displayed, this means that the setting function is protected by a password, see "Password" on p. 34.

4. To change a alfanumerical value, e.g. Calibration Coefficient, use + and –. Use > to move to next character.
5. Save the changed value by pressing > to the far right of the set value. **Save** will then appear on the bottom of the screen.
6. Press **Save** to save the set value. The setting scale will flash to confirm the setting.



> **NOTE:** Press **Undo** to delete the setting and revert to the previous value.

Explanations

Calibration Time

The number of seconds that measurement is in progress when calibrating in the **Analysis Mode**. The default value is 8 seconds but values from 5 to 30 seconds can be used.

Calibration Coefficient

Calibration parameter. The relation between the detector signal and the displayed number is set by the **Calibration Coefficient**. See "Leak Rate Unit and Calibration Coefficient" on p. 35.

Password Protected Calibration

The calibration function can be protected using the password so that calibrating cannot be done by unauthorised users. Factory default is no password. For more information see page 29 or 34.

Calibrate

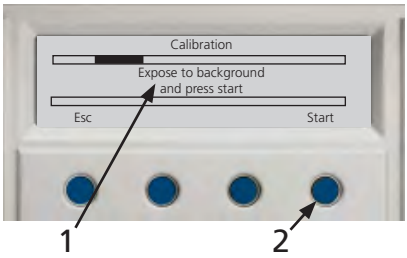
Select the sub menu Calibrate.

NOTE: The instrument must be calibrated to ensure it displays the correct values in **Analysis Mode**. Before calibration the **Calibration Coefficient** must be set correctly as described in "Leak Rate Unit and Calibration Coefficient" on p. 35.

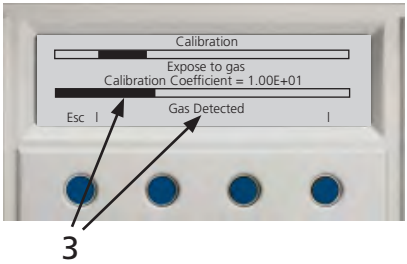
When starting calibration, the sensor must not sense gas, i.e. no measured value should be displayed in **Analysis Mode**.

Regarding the interval between calibration occasions, etc., see "Calibration messages" on p. 37.

1. Press **Enter**. The display shows **Expose to background and press Start**.
2. Expose the probe to background air, press **Start**, or the button on the probe, to begin the calibration procedure.
3. An increase in the length of bar can be seen on the display during calibration. While the bar is moving, expose the probe to the calibration gas or reference leak. The display then shows **Gas Detected**.

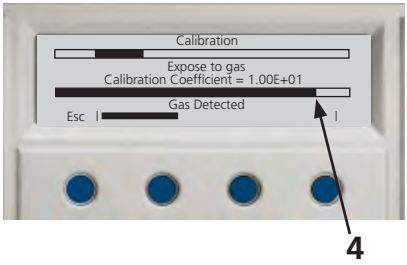


NOTE: The probe does not have to be exposed to calibration gas during the whole **Calibration Time** (while the bar is moving). The instrument only measures the change as the probe goes from background air to calibration gas.



4. Remove the calibration gas at the latest when the bar reaches its end position.

NOTE: If the message **"No Gas or Unstable Signal"** is displayed repeatedly — go back to **Detection Mode** and check functionality.



5. If **Repeat Calibration** is displayed the measured value deviated more than 10% from the previous calibration value. Press **Re-calibrate** to repeat steps 3 – 5. Otherwise go to step 6.

NOTE: Allow 30 seconds between repeated calibrations for greatest accuracy. This message will be blinking on the display to alert the operator.

Calibration may have to to be repeated several times, especially after probe replacement.

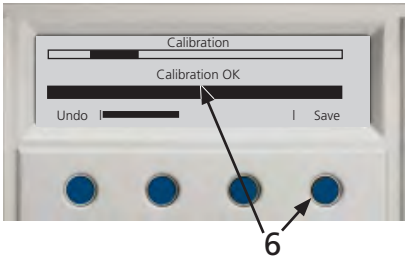
6. The display will show **Calibration OK** if the calibration was successful. Press **Save**.

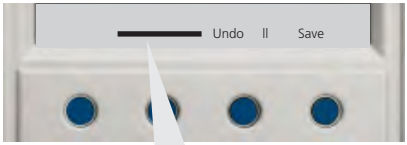
NOTE: If you do not press **Save** at this point, the instrument will revert to the previous value after one minute.

To discard calibration press **Undo**.

NOTE: The Detector will warn if sensitivity of sensor is too low to safely detect a leak equal to the set leak alarm limit. The warning can be ignored and calibration updated.

NOTE: If desired, the calibration can be set under the general password to prevent the operator from calibrating by mistake. In this case you will have to enter the password to start the calibration routine. Setting password protection on calibration is done in the **General Settings** menu. Note that you must also set a password. The instrument is delivered with no password set. See "Change Password" on p. 29 or 34.





Sensor condition indicator.
The indicator bar extends in length when the sensor is detecting reference gas. The length of the bar shows the condition of the sensor. The bar will become shorter if the sensor has lost some in sensitivity, but is still useful. The sensitivity is too low when you can´t carry out the calibration or get a Low sensitivity warning.

Detection Mode Settings

> **NOTE:** Detection Mode settings only affects **Detection Mode**. To calibrate the **Analysis Mode**, see "Calibrate" on p. 21.

If **Direct Sensitivity Adjustment** is **OFF**, Sensitivity can be adjusted as described below.

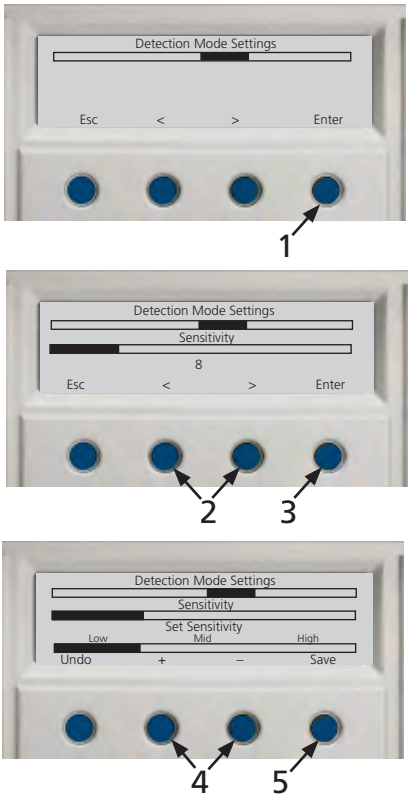
The chosen Sensitivity will only be stored in memory if adjusted in the menu system.

Select the main menu **Detection Mode Settings** as described in "Detection Mode Settings" on p. 18.

1. Press **Enter.**
2. Select:
   Sensitivity
   Range Settings
   Direct Sensitivity Adjustment
   Leak Alarm Indication or
   Lowest Frequency using < and >.
3. Press **Enter**.
4. Adjust the desired parameter using the + and – buttons or < and > depending on submenu.

> **NOTE:** Press **Undo** or **Esc** to delete the setting and revert to the previous value.

5. Press **Save** or **Enter** to save the set value. The setting scale will flash to confirm the setting.



Explanations

Sensitivity
The sensitivity of the instrument in **Detection Mode** is adjusted by changing the **Sensitivity**. The default value in the submenu **Set Sensitivity** is 8, but values from 1 to 13 can be used. Each step doubles the sensitivity. In **Dynamic Range** the sensitivity is **Low**, **Mid** or **High**.

Range Setting
Select type of **Detection Mode Range**: **Manual Range**, **Auto Range** or **Dynamic Range**.

In **Manual Range** the detection mode sensitivity can be set manually. In **Auto Range** the sensitivity can be set, but will be changed automatically if necessary. In **Dynamic Range** sensitivity changes automatically by using an nonlinear presentation on the bar, high sensitivity at the beginning of the bar and low sensitivity at the end of the bar. In this mode both small leaks and gross leaks can be detected in the same range.

Direct Sensitivity Adjustment
The feature Sensitivity (see above) can be turned off by setting **Direct Sensitivity Adjustment** to **OFF**. Sensitivity changes made in the main screen are not stored in the memory and the instrument will start with the sensitivity stored in the **Detection Mode Settings** menu.

Leak Alarm Indication
If **Leak Alarm Indication** is set to **OFF** a leak will not be indicated neither by the word LEAK on the display nor by light or sound signals.

Lowest Frequency (Detection Mode Settings)
The lowest frequency of the sound can be adjusted using **Lowest Frequency**, i.e. when no gas is detected. The default value is 1 Hz but values from 0 to 10 Hz can be used. 0 Hz means that the loudspeaker is silent when the detector has reverted to background level. The setting is not valid in Dynamic Range.

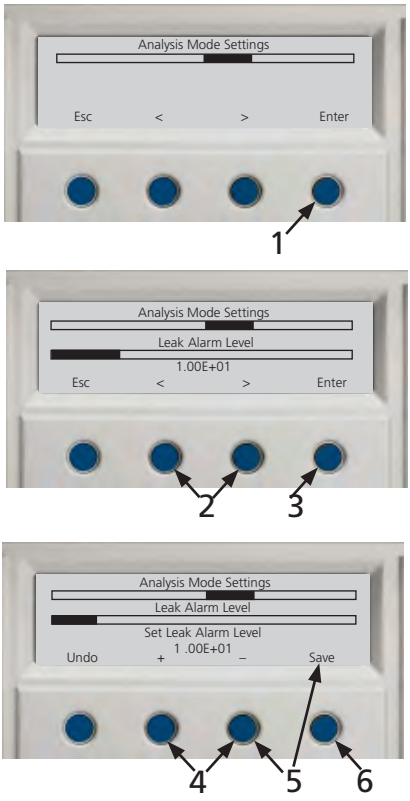
Analysis Mode Settings

Select the main menu **Analysis Mode Settings** as described in "Change Test Mode" on p. 19.

1. Press **Enter**.
2. Select:
   Leak Alarm Level
   Leak Rate Unit
   Min Presentation Time
   Leak Alarm Indications or
   Lowest Frequency
   by pressing < and > until you reach the wanted mode.
3. Press **Enter**.
4. Adjust the desired parameter using the + and – buttons or < and > depending on submenu.

> **NOTE:** Press **Undo** or **Esc** to delete the setting and revert to the previous value.

5. Save the changed alfanumerical value (e.g. Leak Alarm Level) by pressing > to the far right of the set value. **Save** will then appear on the bottom of the screen.
6. Press **Save** or **Enter** to save the set value. The setting scale will flash to confirm the setting.



EN

Leak Alarm Level
The level at which an indication should be considered as a leak. The default setting is 1.00E+01=10.

Leak Rate Unit
Select unit to be displayed in Analysis mode. See further explanation in "Leak Rate Unit and Calibration Coefficient" on p. 35.

Min Presentation Time
The measured value is shown until the sensor has recovered. A longer time can be set by increasing the Min Presentation Time. The default value is 1 second, but values from 0 - 120 seconds can be used. Applies only to Analysis Mode.The Screen Save function will dim the display lamp after a certain time of inactivity.

Leak Alarm Indications
There are four choices of leak alarm indication:
• LEDs only: This is the default setting. No other indication than red LED on front and probe.
• Flashing Backlight: The backlight starts to flash when signal exceeds leak limit.
• Chopped audio signal: The audio signal is chopped (silent/loud) when signal exceeds leak limit.
• Backlight & Audio: A combination of both backlight flashing and audio chopping when signal exceeds leak alarm limit.

Lowest Frequency (Analysis Mode Settings)
The lowest frequency of the sound can be adjusted using **Lowest Frequency**, i.e. when no gas is detected. The default value is 1 Hz but values from 0 to 10 Hz can be used. 0 Hz means that the loudspeaker is silent when the detector has reverted to background level. The setting is not valid in Combined Mode.

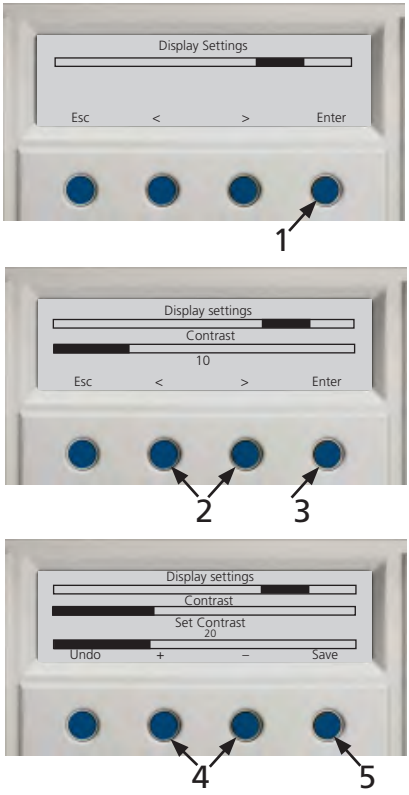
Display Settings

Select the main menu **Display Settings** as described in "7. Menu system" on p. 17.

1. Press **Enter**.
2. Select:
   Contrast
   Brightness or
   Screen Save Timeout
   using the < and > buttons.
3. Press **Enter**.
4. Adjust the desired parameter using + and –.

> **NOTE:** Press **Undo** or **Esc** to delete the setting and revert to the previous value.

5. Press **Save** to save the set value. The setting scale will flash to confirm the setting.



Explanations

To obtain a good screen display, adjust the brightness and contrast to suit the current light conditions and temperature at the work place. To save batterytime a lower brightness can be chosen.

The **Screen Save Timeout** can be set between 1 and 60 minutes. At the timeout the LCD backlight is automatically reduced. Display returns to normal brightness when a button is pressed, gas is being detected or an instrument error is detected. The function is deactivated if set to Zero.

General Settings

EN

Select the main menu **General Settings** as described in "General Settings" on p. 18.

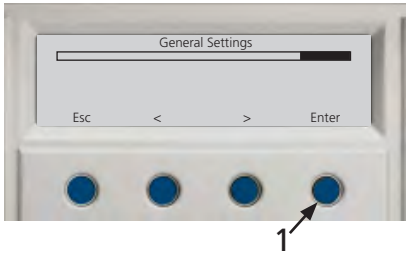
1. Press **Enter**.
2. Select:
   Language
   Change Password
   Set Clock or
   Set Date
   using the < and > buttons.
3. Press **Enter**.

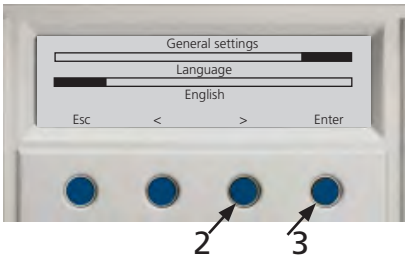
> **NOTE:** If **Enter Password** is displayed, this means that the setting function is protected by a password, see "Change Password" on p. 29 and "Password" on p. 34.

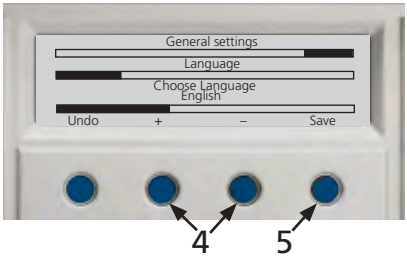
4. Set the desired value using + and – or as described on the following page.

> **NOTE:** Press **Undo** or **Esc** to delete the setting and revert to the previous value.

5. Press **Save** to save the set value. The setting scale will flash to confirm the setting.







Language
Select menu language.

Change Password
The most critical parameters can be protected using a password so that the instrument settings cannot be changed by unauthorised users. Factory default is no password.

When **Change Password** is displayed press **Enter**. **Enter New Password** will be displayed. Type in the password (alpha/numeric characters) using **+** and **–**. Move forward to the next character using **>**. A ***** will be shown instead of the chosen character. Press **>** twice after the last character to save. The display now shows **Confirm New Password**. To confirm, type in the password again and press **>** twice. The display then shows **New Password Accepted**.

If no password is required, only press **>** twice in response to **Enter New Password** on the display.

NOTE: When entering characters, go left to come directly to the digits and press right to reach the letters (i.e pressing left arrow at start scrolls around to the last character in the list). This function also works for timer settings.

Set Clock
When **Set Clock** is displayed. Press **Enter**. **Set Time** will be displayed. Type in the time using **+** and **–**. Move forward to the next character using **>**. Press **>** once after the last character to save.

Set Date
When **Set Date** is displayed press **Enter**. Set year using **+** and **–** buttons and press **>** once after the last character to save. Select month using **<** and **>** and press **Enter**. Set day using **+** and **–** and press **>**.

8. Operating the Leak Detector

EN

The detector operates in three modes.

1. The leak detection mode (**Detection Mode**), mainly used for detecting and locating leaks but not quantifying them.

2. The hydrogen analysis mode (**Analysis Mode**) measures the concentration of hydrogen.

3. The **Combined Mode**, (default mode) which is a combination of Detection and Analysis mode.

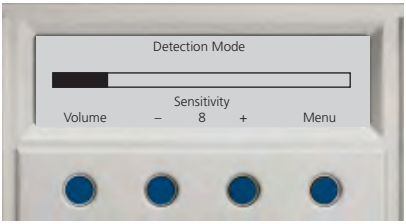
The Detection Mode operates continuously while the Analysis Mode determines the hydrogen concentration (and calculates a corresponding leak rate) in a step measurement.

Detection Mode gives no numbers. It therefore needs no actual calibration. The sensitivity of the sound signal and the moving bar on the display is set manually or automatically, see below.

When using the instrument in **Analysis Mode**, it must be calibrated as described in "Calibrate" on p. 21 and "Calibration" on p. 34 in order to give correct figures.

To detect leaks

If all you wish to do is to detect the presence of a leak, i.e. find out whether there is a leak or not, then use the **Detection Mode**. The definition of Leak/No Leak will then simply be "A leak is a leak when it can be detected by the detector, set to a specific sensitivity".



To set up:

The operation in Detection Mode is not quantitative. No figures are given but the signal is still increasing and decreasing with gas concentration.

Therefore, there is no actual calibration to be done, but rather a setting of the sensitivity to a desired level.

A typical set-up procedure for the **Detection Mode** is:

1. Set up a reference leak which corresponds to the smallest leak you wish to detect.

2. Put the probe close to the reference leak and note approximately what reaction you get (no reaction, small, medium, high, full scale) within the first few seconds.

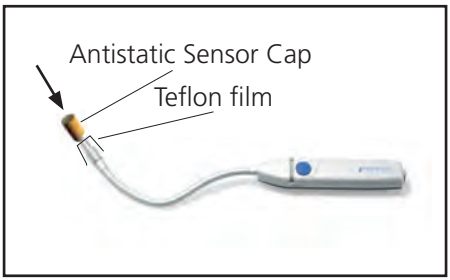
3. Set the sensitivity. This can be done permanently under the menu **Detection Mode Settings** or temporarily as a **Direct Sensitivity Adjustment** on the display (unless you have set this function to **OFF** under the **Detection Mode Settings** menu. See "Detection Mode Settings" on p. 23).

NOTE: If the **Detection Mode** is used and the alarm function is required to be activated at a particular calibrated level, then the unit must be calibrated in accordance with the instructions in "Calibrate" on p. 21 and "Calibration" on p. 34. The reason for this is that the alarm is based on the **Analysis Mode** when the **Detection Mode** is displayed, due to inaccuracies in the **Detection Mode** signal.

Water protection

The instrument is water-proof, but the sensor has to be protected if there is a risk of contact with water or other liquids, which could penetrate or block the filter and prevent the tracer gas from reaching the sensor.

Protect the sensor by placing a piece of teflon tape over the filter. Secure it in place by mounting an Antistatic Sensor Cap.



To Locate Leaks

EN

The Detection Mode is used to locate leaks. This mode is semi-quantitative, i.e. it gives an audio and visual signal which increases as a leak is approached (a higher gas concentration) and decreases as you move the probe away from the leak. It does not display figures.

In this mode of operation leaks can easily be detected using a sensitivity which can be pre-set, see "Sensitivity" on p. 24. Leaks can be located very accurately, even when there are other leaks nearby.

If, for example, you are trying to locate a leak on a fuel tank and the tank has a major leak, then you will get an audio signal as soon as the probe is placed close to the tank. When the probe is moved around over the tank, the signal will increase as the probe approaches the leak. If the signal goes out of scale, simply reduce the sensitivity setting to bring the signal within the scale. Working with the sensitivity setting this way you will be able to locate multiple leaks that are in close proximity to each other.

NOTE: Working inside a confined space such as, for example, a cabinet or a narrow passage on a combustion engine there is a risk that the background concentration accumulates to levels close to the upper detection limit of the detector. In such case it will not be possible to locate leaks as easily as in open spaces.

Do not expose the probe to more gas than is necessary, because it will slowly saturate with time. It is good practice to detect a leak, locate it, and immediately remove the probe to avoid saturation. The probe is not damaged by the exposure but it will recover more slowly. After excessive exposure it will be less sensitive for a short period of time.

To Quantify Leaks

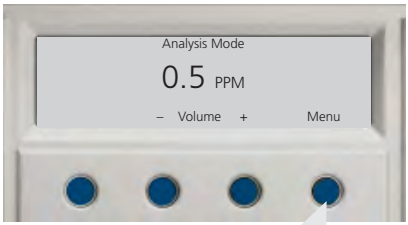
The **Analysis Mode** is used for measuring the size of a leak (or the concentration of a gas sample).

To be able to do this measurement and obtain correct values, the instrument must first be calibrated using the calibration function. See the following page and "Calibration" on p. 34.

In the **Analysis Mode** the detector determines the gas concentration from the change, as the probe goes from being exposed to background to being exposed to a certain gas concentration. The detector does not continuously monitor the gas concentration but takes just one reading instead, a sample. It is important to keep this in mind when using the detector in this mode.

In Analysis Mode the probe should be moved directly from a background situation to the test point. The size of the leak in PPM, or any other selected units*, is shown on the display. The probe can and should be removed from the measuring point as the measured value remains on the display.

The period during which the measured value is displayed can be adjusted in the submenu **Min Presentation Time** of the **Analysis Mode Settings** menu. See "Analysis Mode Settings" on p. 25.



To switch between **Detection Mode** and **Analysis Mode** simply press the right hand button three times.

The **Extrima** detector operates in the range 0 - 2000 ppm giving reasonable linearity between 0 and 500 ppm. To obtain greatest accuracy over this range, calibrate the detector at a concentration somewhere between 10 and 100 ppm. Generally accuracy is always best near the concentration at which it was calibrated.

***Leak Rate Unit** is selected in the **Analysis Mode Settings** menu, "Analysis Mode Settings" on p. 25 and "Leak Rate Unit and Calibration Coefficient" on p. 35.

Leak Alarm Level

Leak Alarm Level is set in decimal or scientific format. The scientific format is explained by the following example:

$2.4 \times 10^{-2} = 0.024$

can be written:

2.4E–0.2 or 0.024

If entered incorrectly the previous value will be retained. Always check that the correct value is saved.

The unit used is the current **Leak Rate Unit**. See "Leak Rate Unit" on p. 26 and "Leak Rate Unit and Calibration Coefficient" on p. 35.

Calibration

The instrument can be calibrated using the integral calibration function, see "Calibration" on p. 20. After calibration the instrument will show the correct measured values on the display in **Analysis Mode**.

(The sensitivity settings made in Detection Mode are described in "Sensitivity" on p. 24)

Calibration is a natural part of leak measurement and an important factor in Quality Assurance. This is achieved by using the integral calibration function described in "Calibrate" on p. 21.

It is impossible to specify an exact requirement for the interval between calibrations because the applications for which the instrument is used can vary considerably.

If the detector is used, but is not subjected to gas for a lengthy period or exposed to very small gas concentrations (less than 10 ppm) with long intervals between exposure, there will be some oxidation of the sensor which reduces the sensitivity.

The oxidation is reduced when the instrument is subjected to large gas concentrations.

If the instrument is subjected to a very large gas concentration over a long period, a certain amount of insensitivity can occur directly afterwards. This saturation effect can make it difficult to detect very small leaks. Therefore, make a habit of removing the probe from the measuring point as soon as the measured value is displayed. This gives the detector an opportunity to recover. The measured value remains on the display for the period selected under **Min Presentation Time** in the **Analysis Mode Settings** menu, see "Min Presentation Time" on p. 26.

NOTE: The calibration is saved in the probe even if it is disconnected.

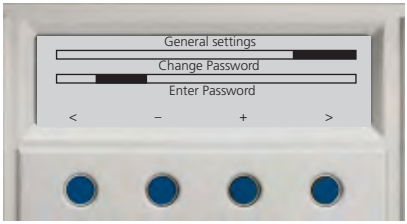
If another probe is connected it must be calibrated if this is not done earlier, if it has not been used for a while or if the reference is changed.

Password

To prevent settings for measurements being changed inadvertently or by unauthorised persons, all critical settings can be protected with a password.

When the display shows **Enter Password** coupled with a flashing line, type in the desired password using the + and – , and press > twice after the last character.

To set password, see "Change Password" on p. 29.



If the display shows **Wrong Password**, press **Enter** and type in the correct password. Menus will be unlocked until you return to **Detection Mode/Analysis Mode**.

Leak Rate Unit and Calibration Coefficient

The **Leak Rate Unit** is a text string defined by the user (default: PPM). The relation between the detector signal and the displayed number is set by the **Calibration Coefficient**.

The **Leak Rate Unit** is set in the **Analysis Mode** menu. Select **PPM**, **cc/s**, **cc/min**, **SCCM**, **g/a**, **oz/yr**, **mbarl/s**, **mm^3/s**, **mm^3/min**, **Pa m^3/s** or **custom**.
When you select Custom you can enter any unit as long as it contains a maximum of 12 characters. The unit can also be as a concentration, for example PPM or mg/ml-H_2.

Calibration can be performed against:
— a known leak flow,
or
— a known hydrogen concentration.

Measuring Leak Flow

When measuring leak flow, calibrate the detector against a reference leak.

The reference leak should have a flow close to the chosen Leak Alarm Level. See also section **"Selecting the reference" on p. 36**.

Set the **Calibration Coefficient** to the certified value of the reference leak. Set the **Leak Rate Unit** to the same unit as the **Calibration Coefficient**.

Example:
A reference leak is certified to 1.5 cc/min. Set **Calibration Coefficient** to 1.5 and **Leak Rate Unit** to cc/min.

Measuring hydrogen concentration

When measuring hydrogen concentration the detector should be calibrated against a reference gas with a known concentration. The reference gas should be Hydrogen in Synthetic Air.

Set the **Calibration Coefficient** to the value of the known gas concentration. Set the **Leak Rate Unit** to the same unit as the **Calibration Coefficient**.

Example:
A reference gas contains 10 ppm Hydrogen in synthetic air. Set **Calibration Coefficient** to 10 and **Leak Rate Unit** to PPM.

NOTE: It is important that the unit for **Leak Rate Unit** is the same as for the used leak flow/concentration. If not — convert one of the values.

Selecting the reference

Your reference should have a concentration or flow equal or close to what is to be measured.

Instrument specification is valid for concentrations ranging from 0.1 to 10 times the leak alarm level in the range 0.5 to 100 ppm.

Example for reference gas:
Leak Alarm Level is set at 8 PPM.

A reference gas mix containing 8 ppm hydrogen in synthetic air will give best accuracy.

For good accuracy, reference gas should be within +/- 50% of leak alarm level.

In this example it means 4 to 12 ppm Hydrogen.

Concentration of hydrogen should always be within 2 ppm to 400 ppm.

Example for reference leak:
Leak Alarm Level is set at 2.0E-4 atm.cc/s

A reference leak calibrated to 2.0E-4 cc/s will give best accuracy.

Calibration messages

Below is a list of the different messages that can be displayed during calibration.

Message	Explanation	Remedy
Expose to background...	Prepare the probe for calibration by holding it in hydrogen free background.	
Gas detected	Gas signal is detected.	Normal operation, gas exposure can be interrupted.
Repeat calibration	Calibration was not within 10% of last stored value.	Wait 30 s and calibrate again.
Calibration OK	Calibration was within acceptable limit.	Press save to store calibration in memory.
No gas or unstable signal	No gas signal or no stable signal detected during calibration.	Check reference. Gas valve may be shut. Check that sensor is not clogged. Background is higher than reference gas concentration Improve ventilation.
Sensitivity too low for alarm level	Sensitivity of sensor is too low to guarantee correct response to a gas flow or concentration equal to the leak alarm level. The most likely reason is that sensor is too old.	Check reference. Gas valve may be shut. Check that sensor is not clogged. Check setting of Leak Alarm Level.
High signal! Check reference!	Reference signal is abnormally high.	Check that reference gas mix is not replaced with tracer gas mix. Check condition of reference. Check that reference leak connections has no leaks.

If calibration fails you can still use the instrument. Last valid calibration parameters will be used. You should, however, check that the instrument reacts to the reference.

9. Changing the probe

EN

1. Switch off the detector
2. Disconnect the probe
3. Connect the new probe
4. Switch on the detector
5. While waiting for the instrument to stabilise, check that the green LED is flashing. Red LED indicates a fault in the cable or the hydrogen sensor inside the probe.

NOTE: Perform calibration according to instruction in "Calibration" on p. 20 or set up as detailed in "Calibration" on p. 34, depending on whether the Analysis Mode or the Detection Mode is to be used.

Repeat calibration after one hour to achieve greatest accuracy.

10. Charging

WARNING!
Instrument must not be charged inside hazardous area. Charger can cause ignition. Charge battery in safe area only!

CAUTION!
Do not use other chargers than the enclosed charger delivered with the Extrima. Use of other charger may invalidate safety of instrument.

NOTE: When the battery voltage is too low, **Extrima** is automatically switched off.

Extrima is automatically switched off and can not be started when the charger is connected.

On the main screens (**Detection, Analysis** and **Combined Mode**) a symbol in the upper right corner shows the battery charge status.

LED indicators on charger
- Green LED lights at mains contact
- Red LED flashes at short circuit or deep discharging
- Red LED lights during charging and is switched off when charging is completed

Extrima will operate for 7 hours on a fully charged battery.

It takes 8 hours to fully charge a flat battery.

One hour charging will give roughly one hour of operating time. This can be done when considered necessary, but it is important to regularly charge the battery fully.

Battery technology: 12V Litium Ion Rechargeable Cells.

11. Trouble-shooting

WARNING!
The instrument contains no parts that can be repaired by the user and may only be dismantled by an authorised service technician. Opening or dismantling an instrument that is powered up can cause serious personal injury or danger to life. If repairs are carried out by a non-authorised person, the Ex-classification will not longer be valid. If the measures described below do not result in a functioning instrument, send or hand in the instrument to an authorised service workshop for repair.

Fault symptom:	**Action:**
No sound in Detection, Analysis or Combined Mode.	Press the + button repeatedly.
No picture on display, no sound.	Charge battery.
No picture but sound when exposed to gas.	Display setting may be wrong. Watch the display from the side at low angle and aim a lamp at the screen. Try to see the text so that you can enter the Display Settings menu and adjust contrast and brightness. If this doesn't help — send in instrument for replacement of display lamp.
Red LED on charger flashes.	See section 10. Charging. Disconnect charger and connect again. If the flashing doesn't stop within 10 min, send the instrument to authorised service workshop for repair.
No signal when exposed to gas.	Check sensor against reference leak. Change sensor if necessary.
Error messages:	
Check Probe and Cable. Red LED flashes quickly.	Check that the probe cable is properly connected to the probe and the instrument. If the fault persists, switch off and replace the probe/cable.
Check Sensor. Voltage Error.	Sensor defect or missing.
Check Sensor. Temp Error.	Sensor defect or missing.
"Wait" on display. Green LED flashes slowly.	The instrument is in a stabilization phase. Wait until "wait" disappears.

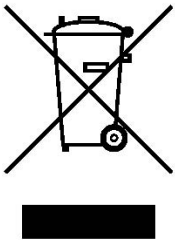
12. Range and Default Settings of all Parameters

EN

Parameter	Range	Default
Contrast	0 — 20	10
Brightness	0 — 19	19
Screen Save Timeout	0 — 60 min	20 min
Sensitivity	1 — 13	8
Range Setting	Manual Range/Auto Range/ Dynamic Range	Manual Range
Direct sensitivity adjustment	ON/OFF	ON
Leak Alarm Indication	ON/OFF	ON
Lowest Frequency	0 — 10 Hz	1 Hz
Leak Alarm Level	1.00E-37 – 1.00E+37	1.00E+01 = 10
Leak Rate Unit	Several choices	"PPM"
Min Presentation Time	1 — 120 s	1 s
Leak Alarm Indications	LEDs only Flashing backlight Chopped audio signal Backlight & Audio	Leds only
Language	English, German, French	English
Calibration Coefficient	1.00E-37 – 1.00E+37	1.00E+01 = 10
Calibration Time	5 - 30 s	8 s
Password	Max 12 characters	No password
Password protected calibration	ON/OFF	OFF
Clock	hh:mm:ss	-
Date	YY-MM-DD	-
Menu Mode	Analysis Mode / Detection Mode / Combined Mode	Combined Mode

13. Technical Specification

Power supply	
AC Mains Voltage	100 — 240 V 50/60 Hz
Environment	
Working temperature	-20°C — +50°C (-4F - +122F)
Start up temperature	> 0°C (>32F)
Humidity	95% RH (non-condensing)
Storage temperature	0°C — +60°C (32F - 140F)
Chemical	Jet-fuel and most common petroleum vapours
IP-Class	IP67, 30 min @1 m (IEC529)
Dimension	
Net Weight	4 kg (8.8 lbs)
Overall Dimensions	H x W x D 128 mm x 240 mm x 167 mm (5" x 9.5" x 6.6")
Application	
Europe	Zone 0, 1 and 2 (mines and dust excluded) Explosion groups IIA, IIB, IIC, All T1, T2, T3 gases including Hydrogen and Jet-fuels
US, Canada	Zone 0, 1 and 2 (mines and dust excluded) Class 1, Div 1, Groups A, B, C, D All T1, T2, T3 gases including Hydrogen and Jet-fuels
Sensitivity	
Range in H2 Analysis Mode	0.5 ppm — 0.2% H2
Detection Mode	1 x 10-7 cc/s (when using 5% H2 tracer gas)
Repeatability	Typical ±10% of reading + 0.3 PPM
Linearity in H2 Analysis Mode (within 0.1 — 10 x calibration point)	Typical ±15% (within 0.5 — 100 ppm)
Battery Capacity	
Operating time	7h (3h at -20°C) (-4F)
Charging time	7-8 h, flat to fully charged. Approx. 1h to 1h operating time Charge above 0C (32F)



Disposal of product when taken out of service

According to EU legislation, this product must be recovered for separation of materials and may not be disposed of as unsorted municipal waste.

If you wish you can return this INFICON product to the manufacturer for recovery.

The manufacturer has the right to refuse taking back products that are inadequately packaged and thereby presents safety and/or health risks to the staff.

The manufacturer will not reimburse you for the shipping cost.

Shipping address:
INFICON AB
Westmansgatan 49
582 16 Linköping
Sweden

14. Accessories and Spare parts

Complete Gas Injection Kit
For easy Tracer Gas injection
Part No: 590-621

Injection Pads
Easy use throwaway accessories
for local injection of Tracer Gas.
Small (60 mm / 2.4”) x 10
Part No: 590-615
Large (150 mm / 6”) x 10
Part No: 590-616

Injection Fix Kit
Part No: 590-618

Antistatic Sensor Caps X 50
Part No: 590-270

Water protective tape
Part No: 591-038

PX57-FLEX Hand Probe
Flex. neck
Part No: 590-607

Sensor for P50

Part No: 590-292

CX21 Probe cable

3 m Part No: 590-260

5 m Part No: 590-265

Battery charger

Part No: 591-656

Shoulder strap

Part No: 591-687

Reference Leaks

Standard leaks for detector calibration and function check. For part no. see separate Data Sheet.

Standard service Extrima

Part No: 591-909

15. Certificates

INFICON

CE Declaration of Conformity

Manufacturer

INFICON AB
Westmansgatan 49
SE-582 16 Linköping
Sweden

Phone: +46 (0)13-355900
Fax: +46 (0)13-355901

Product	**Brand Name**
Hydrogen Leak Detector	Extrima®

The manufacturer declares conformity with the following directives

EMC	Electromagnetic Compatibility (2004/108/EC).
ATEX	Equipment intended for use in potentially Explosive Atmospheres (94/9/EC)
ROHS	Restriction of the use of certain Hazardous Substances in electronic equipment (2002/95/EC).
WEEE	Waste electrical and electronic equipment (2002/96/EC).
LVD	Electrical safety - Low Voltage (2006/95/EC) *.

* Relevant only for battery charger (CE marked). Manufacturers declaration provided on request

Harmonized European standards which have been applied

No.	**Issue**	**Subject**
SS-EN 61000-6-1	2	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments.
SS-EN 61000-6-3	2	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.
SS-EN 61000-4-6	1	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conduct disturbances, induced by radio-frequency fields.
EN 60079-11	2007	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i".
SS-EN 13980	1	Potentially explosive atmospheres - Application of quality systems.

Other standards which have been applied

EN 60079-26	2004	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga. Issue 2004 has been replaced by issue 2006 as per 2009-10-01. Changes relevant for this equipment are of editorial nature only and the equipment therefore fulfils the EHSRs of directive 94/9/EC.
EN 60079-0	2006	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements Issue 2006 has been replaced by Issue 2009 as per 2012-06-01. Issue 2009 is extended by Section 6.6: Electromagnetic and ultrasonic energy radiating equipment. The extension is not applicable for this product and the equipment therefore fulfils the EHSRs of directive 94/9/EC.

Test institutes / notified bodies

EMC	**ATEX quality assurance**	**ATEX product certificate**
BK CE Services AB Datalinjen 5A 583 30 Linköping Sweden Phone: +46 (0)13 21 26 50 Fax: +46 (0)13 99 13 025	SP Technical Research Institute of Sweden Box 857 50115 Borås, Sweden Phone: +46 (0) 10 516 50 00 Fax: +46 (0) 33 13 55 02 Notified body number 0402	Sira Certification Service Rake Lane, Eccleston, Chester, CH4 9JN England Phone: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330 Notified body number 0518

Report and Certificate reference numbers

No.	**Issue**	**Subject**
Sira 07ATEX2117X	5	EC type-examination certificate
TR_ADI070827EMC001	-	EMC Test Report Extrima

For INFICON AB, June 07, 2012

Fredrik Enquist, R&D Manager

sira
CERTIFICATION

1 EC TYPE-EXAMINATION CERTIFICATE

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 07ATEX2117X Issue: 5

4 Equipment: Extrima® Hydrogen Leak Detector

5 Applicant: INFICON AB

6 Address: Westmannsgatan 49
SE-582 16 Linköping
Sweden

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0: 2006 EN 60079-11: 2007 EN 60079-26: 2004

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 1G
Ex ia IIC T3 (Ta = -20°C to +50°C)

Project Number 25248

C Ellaby
Deputy Certification Manager

Form 9400 Issue 1

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 07ATEX2117X
Issue 5

13 DESCRIPTION OF EQUIPMENT

The Extrima Hydrogen Leak Detector is a portable device used to detect hydrogen leaks and is powered by a rechargeable Lithium ion battery. The equipment has a main housing (which is referred to as the detector), interconnected by a pluggable cable to a PX50 series probe unit. The interconnecting cable is fitted with a Lemo connector at each end enabling it to be removed from both the probe and detector.

The detector housing, is made from extruded aluminium, which is anodized and protected by conductive rubber face seals fitted to the front and rear panels. The side panels and corners of the enclosure are fitted with protective rubber ribs. The front and rear panels are secured to the main detector housing by four fasteners.

The front panel is fitted with the following; glass LCD, piezo speaker, four rubber pushbuttons, two LEDs and a Lemo connector for connecting to the probe. On the outside, the back panel has a socket for connecting to the battery charger/barcode reader and a Gortex seal. The battery charger has the following maximum parameters, 12.6V, 770 mA.

Internally the equipment comprises a potted lithium battery pack fitted to the rear of the back panel, and the following PCBs:

- Main
- Keyboard
- Backlight
- LCD

Externally, the probe comprises a conductive plastic enclosure with a single switch and two LEDs. The nozzle, which varies in length and type, is fitted into the end of the probe. A hydrogen sensor fits inside the nozzle and plugs into a connector that is wired back to the probe electronics. The probe is fully encapsulated, however, the switch, two LEDs and the hydrogen sensor are located ouside of the encapsulation.

Internally, the probe comprises a single circuit board. The sensor wires are fitted at one end of the board and the Lemo connector at the other.

The Extrima® Hydrogen Leak Detector has an Ingress Protection rating of IP67 (1 m, for 30 minutes).

Variation 1 - This variation introduced the following changes:

i. To prolong the battery life, the probe power generation and protection circuit on the MAIN PCB in the Detector Unit has been redesigned. The circuit contains voltage enhancement and controlled semiconductor voltage shunts. These changes give increased output parameters to the probe.
ii. PX50x Series Probe Assembly now uses a housing made from an alternative plastic material and may incorporate a hydrogen sensor that is not component approved. The circuit has been modified to provide increased power to the sensor to improve its sensitivity.
iii. The applicant's name was changed from Adixen Sensistor AB to that currently shown.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 07ATEX2117X
Issue 5

Variation 2 - This variation introduced the following changes:

i. The LCD module for the Extrima® Hydrogen Leak Detector was modified and now includes components with a surface area of less than 20 mm².
ii. The bill of material drawings, KK1012-BOM-1H-CERT and KK1018-BOM-R7-CERT, were amended to:
   - Bring them into line with Sira report number R20666A/01.
   - Remove the manufacturer's name from the specification of various safety resistors.

Variation 3 - This variation introduced the following change:

i. The recognition of a change in the company name from Adixen Scandinavia AB to INFICON AB.

Variation 4 - This variation introduced the following changes:

i. The outline of the hand probe and the track layout of the hand probe PCB were amended.
ii. The material of the hand probe was changed from injection moulded plastic to metal.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	10 October 2007	R52A16411B	The release of the prime certificate.
1	18 December 2009	R20666A/00	The introduction of Variation 1 (Note: the date was revised by Issue 3 to correct a typographical error).
2	30 April 2010	R20666A/01	Issued to allow report R20666A/01 to replace report R20666A/00
3	20 October 2010	R23373A/00 R23526A/00	The introduction of Variation 2.
4	16 February 2012	R25248B/00	The introduction of Variation 3.
5	14 March 2012	R25248A/00	The introduction of Variation 4.

15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

15.1 As aluminium is used at the accessible surface of this equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the Extrima® Hydrogen Leak Detector is being used in locations that specifically require group II, category 1 equipment.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 07ATEX2117X
Issue 5

17 CONDITIONS OF CERTIFICATION

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 The battery pack shall be constructed from three, series connected SAFT type MP174865IS or type MP174865 Lithium ion rechargeable cells all encapsulated in Wacker Elastosil RT675.

17.4 The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of their products.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx SP 07.0002X issue No.:3

Status: **Current**

Date of Issue: **2012-04-17** Page 1 of 4

Certificate history:
Issue No. 3 (2012-4-17)
Issue No. 2 (2010-12-10)
Issue No. 1 (2010-6-7)
Issue No. 0 (2007-9-21)

Applicant: **INFICON AB**
Westmansgatan 49
Box 76
SE-581 02 Linköping
Sweden

Electrical Apparatus: **Hydrogen Leak Detector type Extrima**
Optional accessory:

Type of Protection: **Intrinsic safety "ia"**

Marking: Ex ia IIC T3
Ta: -20 °C to +50 °C

Approved for issue on behalf of the IECEx Certification Body: Peter Bremer

Position: Certification Officer

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SP Technical Research Institute of Sweden
Box 857
SE-501 15 Boras
Sweden

IECEx Certificate of Conformity

Certificate No.: IECEx SP 07.0002X

Date of Issue: **2012-04-17** Issue No.: **3**

Manufacturer: **INFICON AB**
Westmansgatan 49
Box 76
SE-581 02 Linköping
Sweden

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-11 : 2006 Edition: 5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2006 Edition: 2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
GB/SIR/ExTR07.0085/00 GB/SIR/ExTR09.0206/01 GB/SIR/ExTR10.0252/00
GB/SIR/ExTR12.0063/00 SE/SP/ExTR07.0001/00

Quality Assessment Report:

SE/SP/QAR07.0002/00

IECEx Certificate of Conformity

Certificate No.: IECEx SP 07.0002X

Date of Issue: **2012-04-17** Issue No.: **3**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The detector is a hand held device used to detect hydrogen leaks and is powered by a rechargeable Lithium ion battery. The device consists of a main unit interconnected by a pluggable cable to a PX50 series probe unit.

The housing of the main unit is made from aluminium which is anodized and protected by conductive rubber face seals fitted to the front and rear panels. The side panels and corners of the enclosure are fitted with protective rubber ribs. The back panel has a Gortex seal and a socket intended to be used outside hazardous areas, for connecting to the battery charger/barcode reader. The battery charger has the following maximum parameters, 12.6 V, 770 mA.

The probe has a conductive plastic enclosure and a nozzle which varies in length and type. Inside the nozzle fits a hydrogen sensor (Ex component according to ExTR SE/SP/ExTR07.0001/00 and ATEX certificate SP07ATEX3636U). The probe is fully encapsulated, however, a switch, two LEDs and the hydrogen sensor are located outside the encapsulation.

The detector has an ingress protection rating of IP67.

CONDITIONS OF CERTIFICATION: YES as shown below:

Conditions of Certificate and Manufacture
The applicant (manufacturer) shall note the following:

1. The permitted battery pack is constructed from 3 series connected SAFT type MP174865IS or type MP174865 Lithium ion rechargeable cells all encapsulated in Wacker Elastosil RT675.

2. The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform SP of any modifications of the devices that may impinge upon the explosion safety design of their products.

3. The IECEx certificate number referred to in the Manufacturer´s Documents and in the Marking Plate, according to ExTR GB/SIR/ExTR07.0085/00, shall be "IECEx SP 07.0002X".

Conditions for Safe Use

As aluminium is used at the accessible surface of this equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the detector is being installed or used in locations that specifically require level of protection Ga (see IEC 60079-26).

IECEx Certificate of Conformity

Certificate No.: IECEx SP 07.0002X

Date of Issue: **2012-04-17** Issue No.: **3**

Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 of the certificate
This issue of the certificate, introduces variation 1 of the Detector Unit and the Probe. The following modifications are introduced by this variation:

To prolong the battery life, the probe power generation and protection circuit on the MAIN PCB in the Detector Unit has been redesigned. The circuit contains voltage enhancement and controlled semiconductor voltage shunts. These changes give increased output parameters to the probe.

PX50x Series Probe Assembly now uses a housing made from an alternative plastic material. The circuit has been modified to provide increased power to the sensor to improve its sensitivity.

The name of the applicant and manufacturer, has been changed from Adixen Sensistor AB to Adixen Scandinavia AB. The introduced modifications have been assessed and tested according to ExTR GB/SIR/ExTR09.0206/01, which also include assessment and test of the HS85 sensor.

Issue 2 of the certificate
This variation - variation 2 - introduces the following modifications:
The LCD module has been modified and the bill of material drawings has been amended. New components on the LCD module, have affected the original thermal assessment. The modifications have been assessed according to ExTR GB/SIR/ExTR10.0252/00, which also introduces and confirm compliance with IEC 60079-26:2006 (ed 2).

Issue 3 of the certificate
The name of the applicant and manufacturer is changed from "Adixen Scandinavia AB" to "INFICON AB". The outline of the hand probe and the track layout of the probe PCB has been amended. The material of the hand probe has been changed from plastic to aluminium. The changes have been assessed according to ExTR GB/SIR/ExTR12.0063/00.

EXPLOSION PROTECTION
CERTIFICATE OF CONFORMITY

Cert NO. GYJ081012

This is to certify that the product

Hydrogen Leak Detector

manufactured by INFICON AB
(Address: Westmannsgatan 49, SE-582 16 Linköping Sweden)

which model is Extrima

Ex marking Ex ia II CT3

product standard /

drawing number 500131 CERT

has been inspected and certified by NEPSI, and that it conforms to GB3836.1-2010 GB3836.4-2010

This Approval shall remain in force until 2013.01.20

Remarks [Modification Ⅰ]: The manufacturer's name, standards applied and the product structure are changed. Issue date: 2010/12/8.

[Modification Ⅱ]: The manufacturer's name and the product structure are changed. Issue date: 2012/05/23.

1. The note for safe use specified in the attachmentⅢto this certificate.

Director

National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation

Issued Date 2008.01.21

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.

103 Cao Bao Road
Shanghai 200233, China

http://www.nepsi.org.cn
Email: info@nepsi.org.cn

Tel: +86 21 64368180
Fax: +86 21 64844580

Edition 05

防 爆 合 格 证

证 号： GYJ081012

由 INFICON AB 制造的产品：
(地址：Westmannsgatan 49, SE-582 16 Linköping Sweden)

名 称 气体探测器

型号规格 Extrima

防爆标志 Ex ia II CT3

产品标准 /

图样编号 500131 CERT

经图样及技术文件的审查和样品检验，确认上述产品符合 GB3836.1－2010、GB3836.4－2010 标准，特颁发此证。

本证书有效期： 2008 年 1 月 21 日 至 2013 年 1 月 20 日

备注 [更改Ⅰ]：制造厂名称、采用标准及产品结构更改。签发日期：2010 年 12 月 8 日。
[更改Ⅱ]：制造厂名称及产品结构更改。签发日期：2012 年 5 月 23 日。
1. 产品使用注意事项见防爆合格证附件Ⅲ。

站长

国家级仪器仪表防爆安全监督检验站

颁发日期 二〇〇八 年 一 月 二十一日

本证书仅对与认可文件和样品一致的产品有效。

地址：上海市漕宝路103号
邮编：200233
网址：www.nepsi.org.cn
Email:info@nepsi.org.cn
电话：+86 21 64368180
传真：+86 21 64844580

版本05

国家级仪器仪表防爆安全监督检验站

National Supervision and Inspection Centre for
Explosion Protection and Safety of Instrumentation

(GYJ081012) (AttachmentⅢ)

GYJ081012防爆合格证附件Ⅲ

由INFICON AB生产的Extrima型气体探测器（以下简称探测器），经国家级仪器仪表防爆安全监督检验站(NEPSi)检验，符合下列标准：

GB3836.1-2010 爆炸性环境用 第1部分：设备 通用要求

GB3836.4-2010 爆炸性环境用 第4部分：由本质安全型“i”保护的设备

产品防爆标志Ex ia Ⅱ C T3，防爆合格证号GYJ081012。

本附件将代替2010年12月8日签发的GYJ081012防爆合格证附件Ⅱ。

一、产品使用注意事项

1. 探头外壳含有轻金属，用于0区时需注意防止由于冲击或摩擦产生的点燃危险。
2. 探测器的使用环境温度范围为：－20℃～＋50℃。
3. 探测器采用3块MP174865型或MP174865IS型锂电池（Saft公司生产）串联的电池组供电。为确保安全，严禁在危险场所更换电池及充电。
4. 用户不得随意更换探测器内部元器件，以免影响其防爆安全性能。
5. 探测器在现场使用过程中，严禁干擦清洗，以防静电危险；探测器壳体为铸铝材质，应防止冲击，以免产生的火花成为潜在点燃源。
6. 产品的安装、使用和维护应同时遵守产品使用说明书、GB3836.13-1997“爆炸性气体环境用电气设备 第13部分：爆炸性气体环境用电气设备的检修”、GB3836.15-2000“爆炸性气体环境用电气设备 第15部分：危险场所电气安装（煤矿除外）”、GB3836.16-2006“爆炸性气体环境用电气设备 第16部分：电气装置的检查和维护（煤矿除外）”、GB50257-1996“电气设备安装工程爆炸和火灾危险环境电气装置施工及验收规范”。

二、制造厂责任

1、产品制造厂必须将上述使用注意事项纳入产品使用说明书；

2、制造厂必须严格按照NEPSI认可的文件资料生产；

3、产品铭牌中应至少包括下列内容：

a) NEPSI认可标志（见防爆合格证书）

b) 产品防爆标志

c) 防爆合格证号

d) 使用环境温度

国家级仪器仪表防爆安全监督检验站

二O一二年五月二十三日

Certificate of Compliance

Certificate: 1981011 **Master Contract:** 241576

Project: 2531732 **Date Issued:** July 17, 2012

Issued to: **INFICON AB**

P.O. Box 76
Linkoping, 581 02
Sweden
Attention: Fredrik Enquist

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

Rawn Murphy

Issued by: Rawn Murphy

PRODUCTS

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non - Incendive Systems - For Hazardous Locations

CLASS 2258 83 - PROCESS CONTROL EQUIPMENT-Intrinsically Safe and Non-Incendive - Systems-For Hazardous Locations-Certified to U.S. Standards

Exia IIC:

AExia IIC:

Hydrogen Leak Detector System; portable, consisting of Model Extrima Detector, battery operated, 11.25 Vnominal (three Lithium-Ion non-field-replaceable Batteries); intrinsically safe and providing intrinsically safe circuits to Model PX50x Probe, via P/N CX21 Connection Cable; Temperature Code T3; –20 ºC < Tamb. < +50ºC; IP 67.

Note: the suffix “x” in the PX50x model number denotes minor variations in the physical characteristics of the Probe nozzle (not affecting safety).

Certificate: 1981011 **Master Contract:** 241576

Project: 2531732 **Date Issued:** July 17, 2012

SPECIAL CONDITIONS FOR SAFE USE "X"

Battery Charger must be CSA Certified (or equivalent), with a maximum charging voltage of 12.6 V and a maximum charging current of 770 mA.

Notes:

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91	General Requirements – Canadian Electrical Code, Part II
CAN/CSA-C22.2 No. 60079-0:07	Electrical apparatus for explosive gas atmospheres - Part 0: General Requirements
CAN/CSA-E60079-11:02	Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic Safety "i"
CAN/CSA-C22.2 No. 60529:05	Degrees of protection provided by enclosures (IP Code)
ANSI/UL 60079-0:09	Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements
ANSI/UL 60079-11:09	Electrical apparatus for Explosive Gas Atmospheres - Part 11: Intrinsic Safety "i"
ANSI/IEC 60529:2004	Degrees of Protection Provided by Enclosures (IP Code)

MARKINGS

For the Extrima Detector and CX21 cable the following markings are provided on a min 0.02 in thick metal nameplate, secured to the enclosure with adhesive (Refer to Drawing 1421). For the Probe the following markings are produced by a laser-engraving method printed directly on the side of the aluminum handle:

Extrima Detector

- CSA Monogram with C US Indicator;
- Company name;
- Model number;
- Serial number or Date Code (appears on a separate nameplate);
- Certificate reference ("CSA 2007 1981011 X")

Certificate:	1981011	**Master Contract:**	241576
Project:	2531732	**Date Issued:**	July 17, 2012

- Hazardous Location designation for Canada: “Exia IIC T3” (In addition to these required markings, the following optional markings may also appear: “Class I, Zone 0, Group IIC”)
- Hazardous Location designation for the US: “Class I, Zone 0 AExia IIC T3”
- Ambient Temperature (“Ta = -20 Deg. C to + 50 Deg. C”)
- The statement: “WARNING – Charge batteries in safe area only. Do not open detector” (appears on separate label)
- The statement: “Charging Um = 12.6 V, max 770 mA”

PX50x Probe

- Model number
- Serial number or date code
- The statement: “Part of Extrima Detector System”
- The statement: “See label on detector for details”

CX21 Connection Cable

- Model number
- The statement: “Part of Extrima Detector System”
- The statement: “See label on detector for details”

Note - Jurisdictions in Canada may require these markings to also be provided in French language. It is the responsibility of the manufacturer to provide bilingual marking, where applicable, in accordance with the requirements of the Provincial Regulatory Authorities. It is the responsibility of the manufacturer to determine this requirement and have bilingual wording added to the "Markings".

INFICON AB, Box 76, SE-581 02 Linköping, Sweden
Phone: +46 (0) 13 35 59 00 Fax: +46 (0) 13 35 59 01
www.inficon.com E-mail: reach.sweden@inficon.com