Extrima

Hydrogen Leak Detector
(HW II)

User's manual
1. General

**EXTRIMA** is an extremely sensitive and selective, intrinsically safe detector for hydrogen gas (H₂). It is especially designed for leak detection using Hydrogen Tracer Gas, (Hydrogen diluted with Nitrogen down to a safe concentration), which is the most 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.

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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 page 5. On page 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.
The major advantages of Hydrogen Tracer Gas* are:

- 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 remarkably 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% H₂ - 95% N₂.
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 will 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.

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**Special conditions for safe use**

The ‘X’ suffix to the certificate number relates to the following special condition 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 **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.

Battery Charger for the North American 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

The following instructions apply to equipment covered by certificate numbers:
Sira 07ATEX2117X Issue 3
CSA 1981011 Issue October 25, 2010
IECEX SP 07. 0002 X Issue No:2, December 10, 2010
NEPSI GYJ081012, Mod 1, December 8 2010

1. The equipment may be used with flammable gases and vapours with apparatus 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 installation and use apply (see above).

4. The equipment is portable and is not intended for fixed installation. Assembly for operation, see page 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).

7. There are no special checking or maintenance conditions.
Safety regulations

Warning

• Pure hydrogen is a flammable gas. Only use ready-made Hydrogen Tracer Gas of 5% Hydrogen in Nitrogen. This is an absolutely 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% H₂ - 95% N₂.

• 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 page 5 and Charging on page 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 put into operation, this might damage or destroy the probe sensor.

- When the instrument is put into operation the sensor withstands temporary exposure to hydrogen concentration up to 100%. Avoid long exposures to high concentrations.
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% H₂ - 95% N₂.

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. However, such mixtures cannot detonate.

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

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

Warning!
- Never use a gas mixture containing more than 5% hydrogen.
- Never make your own gas mixtures.
3. Working principle

**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 is H₂S, 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.

There is always some hydrogen gas in the background. In fresh air this is as low as 0.5 ppm (parts per million).
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 H₂, 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 H₂, the detector will give essentially the same signal as if there was no background concentration.

Some examples of hydrogen sources which could cause interferences:

Interferences

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

Hydrogen Leak Detector 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

**EXTRIMA** consists of five main parts:
- Detector unit with display, controls, and connections
- Hand Probe PX57-Flex
- Probe cable with connectors
- Charger
- User’s Manual
5. To get started

EXTRIMA is very easy to setup:

- Connect the Hand Probe to the instrument using the probe cable.

- Switch on the power using the right button. The display lights and an indicator bar shows that the sensor is stabilising and the detector is booting up. Green LED flashes slowly.

Avoid exposing the probe to hydrogen during the stabilisation period.

- When the stabilisation period is over (typically 90 seconds) the green LED goes out.

- The display will start in Detection Mode, Analysis Mode or Combined Mode, depending on which mode was used when the detector was switched off.

- The leak detector is now ready for operation.

Note! The instrument is water-proof, but the sensor has to be protected if there is a risk of contact with water. See page 31.

Shut down
If the display shows a sub menu you first have to press Esc to get to one of the main modes.

To shut down EXTRIMA, press the right button. The display shows:
Shut down Extrima? Press YES.
Basic leak detection

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.

N.B. Do not leave the probe tip in front of a large leak for long times. Remove the tip when the leak has been located.

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:

- Remove the probe from the leak into fresh air.
- Wait until 0.0 appears on screen and the 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.

Important!
- 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.

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 instrument and the two LEDs on the 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.
**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 flashing. Red LED lits over the Leak Alarm Limit.

**Push button**

The push button is used to switch between **Manual Range, Auto Range** and **Dynamic Range**.

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 similar to that used in mobile telephones. The display shows all the levels when browsing down through the menus so that you can always see exactly where you are.

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.

Change Test Mode
Move between Detection Mode, Analysis Mode and Combined Mode. See page 19.

Calibration
The instrument must be calibrated to ensure that the correct values are displayed in the Analysis Mode. Calibration is described on page 20 and 34.
Detection Mode Settings

Analysis Mode Settings
Select Leak Alarm Level, Leak Rate Unit, Min. Presentation Time, Leak Alarm Indications, and Lowest Frequency. See page 25 and 26.

Display Settings
Select Contrast, Brightness and Screen Save Timeout for the display. See page 27.

General Settings
Various general settings. See page 28.

The following is applicable to the settings described on this page and subsequent pages:

- If no setting is made in a menu or its submenus within 60 seconds, the instrument will revert to the Detection Mode/Analysis Mode.

- All changes in values are valid only when saved using the Save button.

- Use the Undo button to delete a change in value and revert to the previous setting.

Use the Esc button to browse backwards through the menus to the start position Detection Mode/Analysis Mode.
Change Test Mode

Select the main menu Change Test Mode as described on page 17.

1. Press Enter.

2. Select Analysis Mode by pressing Enter again, or select Detection Mode or Combined Mode by pressing >.

Tip!
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, (see page 33). The default unit is in PPM but it is possible to choose other units, see page 26.

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

Select the **Calibration** menu as described on page 17.

1. Press **Enter**.

2. Select:
   - **Calibrate**
   - **Calibration Coefficient**
   - **Calibration Time** or
   - **Password Protected Calibration**

3. Press **Enter**. If **Enter Password** is displayed, this means that the setting function is protected by a password, see page 34.

4. Set the desired value using + and –. Use > to move to next character and after the last character.

5. Press **Undo** to delete the setting and revert to the previous value.

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

Revert to Detection Mode/Analysis Mode by pressing **Esc** twice.

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**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. See page 35.

**Password Protected Calibration**
The calibration function can be protected using the password so that calibrating cannot be done by unauthorised users. **Note!** Factory default is no password.
**Calibrate**
Select the sub menu Calibrate.

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

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**.

   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. The display will show **Calibration OK** if the calibration was successful. Press **Save**. If you do not press **Save** at this point, the instrument will revert to the previous value after one minute.
If **Repeat Calibration** is displayed this means that the measured value deviated more than 10% from the previous calibration value. Press **Recalibrate** to repeat steps 2 – 5.

**Important!** Allow 30 seconds between repeated calibrations for greatest accuracy.

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

**Important!** When performing calibration — make sure to follow the above instructions step by step.

**Low sensitivity warning**
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.

**Irregular reference warning**
The Detector will warn if the calibration signal is unreasonably high. This can happen e.g. if 5% tracer gas mix has been used instead of proper reference gas or if the reference leak has an extra non-intentional leak. Warning can be ignored and the calibration updated.

**Password**
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.

**Explanation**
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 on page 35.

Regarding the interval between calibration occasions, etc., see **Calibration** on page 34.
Detection Mode Settings

**Note!** Detection Mode settings only affect Detection Mode. To calibrate the Analysis Mode, see page 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 on page 18.

1. Press **Enter**.

2. Select:
   - Sensitivity
   - Range Settings
   - Direct Sensitivity Adjustment
   - Leak Alarm Indication
   - Lowest Frequency using < and >.

3. Press **Enter**.

4. Adjust the desired parameter using the + and – buttons.

   (5. Press **Undo** 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.

Revert to Detection Mode by pressing **Esc** twice.
Explanations

Sensitivity
The sensitivity of the instrument in Detection Mode is adjusted by changing the Sensitivity. The default value is 5, 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 detection mode sensitivity can be changed directly from the Detection Mode main screen by pressing Sensitivity + and -. This feature 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 on page 18.

1. Press **Enter**.

2. Select:
   - Leak Alarm Level
   - Leak Rate Unit
   - Min. Presentation Time
   - Leak Alarm Indications or Lowest Frequency using < and >.

3. Press **Enter**.

4. Adjust the desired parameter using the + and – buttons.

   (5. Press **Undo** to delete the setting and revert to the previous value.)

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

Revert to **Detection Mode** by pressing **Esc** twice.
**Explanations**

**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 on page 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 on page 18.

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 –.

(5. Press **Undo** to delete the setting and revert to the previous value.)

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

Revert to Detection Mode/Analysis Mode by pressing Esc twice.

**Explanations**

To obtain a good screen display, adjust the brightness and contrast to suit the current light conditions at the work place. To save energy you can choose a lower brightness value.

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 on page 18.

1. Press Enter.

2. Use < and > to choose between:
   Language
   Change Password
   Set Clock
   Set Date

3. Press Enter. If Enter Password is displayed, this means that the setting function is protected by a password, see page 34.

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

5. Press Undo to delete the setting and revert to the previous value.

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

Revert to Detection Mode/Analysis Mode by pressing Esc twice.
Explanations

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. Note! Factory default is no password.

When Enter Password is displayed: Type in the password (alpha/numeric characters) using + and –. Move forward to the next character using >. Press > twice after the last character. 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 Time is displayed: Type in the time using + and –. Move forward to the next character using >. Press > twice after the last character.

Set Date
When Set Date is displayed: Set year using + and – buttons and press Enter. Select month using < and > and press Enter. Set day using + and – and press >.
8. Operating the Leak Detector

The detector operates in three modes.

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

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

- 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 on pages 21 and 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:

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

• 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.

• 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 pages 23 and 24).

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 on page 21 and 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, which can pierce the filter and prevent the tracer gas from reaching the sensor.

Protect the sensor by placing a piece of teflon film over the filter. Fix it by mounting an Antistatic Sensor Cap and remove excessive film.
To Locate Leaks

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 (page 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.

N.B. 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.

Hint: 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 page 21.

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. 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 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.

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:

\[ 2.4E-0.2 \text{ or } 0.024 \]

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

The period during which the measured value is displayed can be adjusted in the Analysis Mode Settings menu. See page 25.

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, page 25.
Calibration

The instrument can be calibrated using the integral calibration function, see page 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 on page 24.)

Calibration is a natural part of leak measurement and an important factor in Quality Assurance. It is easily achieved by using the integral calibration function described on page 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 page 26.

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.

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.
The EXTRIMA detector has no pre-defined leak rate units. 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, mbarl/s, mm³/s, mm³/min Pa m³/s or Custom.

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 limit. See also section Selecting the reference, page 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. (Hydrogen in Nitrogen can also be used, but the accuracy may be impaired.)

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.

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 greatest 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 achieve the greatest degree of accuracy.
### Calibration messages

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

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

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

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.
6. Perform calibration according to instruction on page 21 or set up as detailed on page 34, depending on whether the Analysis Mode or the Detection Mode is to be used.
7. Repeat calibration after one hour to achieve greatest accuracy.

10. Charging

- Instrument must not be charged inside hazardous area. Charger can cause ignition. Charge battery in safe area only!
- Do not use other chargers than the enclosed charger delivered with the EXTRIMA. Use of other charger may invalidate safety of instrument.
- 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 at charge end

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

It takes 8 hours to fully charge a run down 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

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 don’t changes to fixed light 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, 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast</td>
<td>0 — 20</td>
<td>10</td>
</tr>
<tr>
<td>Brightness</td>
<td>0 — 19</td>
<td>19</td>
</tr>
<tr>
<td>Screen Save Timeout</td>
<td>0 — 60 min</td>
<td>2 min</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>1 — 13</td>
<td>8</td>
</tr>
<tr>
<td>Direct sensitivity adjustment</td>
<td>ON/OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Leak Alarm Indication</td>
<td>ON/OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Lowest Frequency</td>
<td>0 — 10 Hz</td>
<td>1 Hz</td>
</tr>
<tr>
<td>Leak Alarm Level</td>
<td>1.00E-37 – 1.00E+37</td>
<td>1.00E+01 = 10</td>
</tr>
<tr>
<td>Leak Rate Unit</td>
<td>Several choices</td>
<td>“PPM”</td>
</tr>
<tr>
<td>Min Presentation Time</td>
<td>1 — 120 s</td>
<td>1 s</td>
</tr>
</tbody>
</table>
| Leak Alarm Indications             | LEDs only
Flashlight
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                   | Min Calibration Time – 30 s | 8 s       |
| Min Calibration Time               | 0 — 30 s               | 5 s           |
| Password                           | Max 12 characters      | No password   |
| Password protected calibration     | ON/OFF                 | OFF           |
| Clock                              | hh:mm:ss               | -             |
| Date                               | YY-MM-DD               | -             |
| Menu Mode                          | Several choices        | Combined Mode |
13. Service Mode
The detector is equipped with a service mode to help in trouble shooting and diagnostics.

IMPORTANT! The normal operator should not enter this mode. The service mode menu option is therefore normally not shown in the menu system and most of the functions in the service mode are protected by a special password.

IMPORTANT! We strongly recommend that the service mode log in procedure is kept secret from all personnel not fully trained in the details of all functions of the detector.

Logging in
Service Mode Log In Procedure
1. Switch power OFF.
2. Press the left button and hold. Then press start with the right button.

During warm up the display will show software versions and the serial numbers for the EXTRIMA and the Hand Probe PX57. Time and the inside temperature are also shown. All menu items, except showing the service mode display, are locked by a password.

The password can be obtained from INFICON. Simply send your request by FAX or email including the following information:

Subject: Service Mode Password
Name:
Job Title:
Name of Organisation:
Name of Division (if applicable):
Serial Number of Detector:

FAX number: +46 13 355901
e-mail: reach.sweden@inficon.com

Menu options
When instrument has been set to service mode there will be an extra menu item, Service Settings, on the display.
Choosing **Service Settings** will display the following options:

**Show Password**
If you have “lost” your user password, you can retrieve it by choosing this menu option.

**System Reset**
Choosing this option will reset all parameters to factory standard. See page 40 for factory default values.

You will be asked to confirm this choice once before system is reset.

Consider the work of resetting every parameter to suit your application before you perform a system reset.
**Min Calibration Time**

This parameter sets the lowest possible Calibration Time that can be set under the **Calibration** menu. Default is 5 s.

Min calibration time should be set to safeguard that the following two requirements are fulfilled:

1. The hydrogen from the reference leak or gas line must reach the sensor before end of calibration time.

2. The sensor must have time to reach its maximum signal before end of calibration time.

Setting Min Calibration Time too low will have the following effects:

- Calibration will fail if Calibration Time is set too low.
- Calibration might pass but be incorrect.

Setting a high Min Calibration Time will have the following effects:

- Calibration takes longer time than necessary.
- Calibration gas consumption is higher than necessary.

It is of course possible to set Min Calibration Time to 0 and anyway set the correct Calibration Time from under the Calibration Menu.

**IMPORTANT!** Correct calibration is an essential parameter in quality testing. We, therefore, recommend that careful consideration is paid to setting an appropriate Min Calibration Time. This will inhibit personnel, lacking detailed knowledge about calibration, from jeopardising quality by setting a too short Calibration Time.
# 14. Technical Specification

<table>
<thead>
<tr>
<th><strong>Power supply</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Mains Voltage</td>
<td>100 — 240 V 50/60 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Environment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working temperature</td>
<td>-20°C — +50°C</td>
</tr>
<tr>
<td>Start up temperature</td>
<td>&gt; 0°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% RH (non-condensing)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>0°C — +60°C</td>
</tr>
<tr>
<td>Chemical</td>
<td>Jet-fuel and most common petroleum vapours</td>
</tr>
<tr>
<td>IP-Class</td>
<td>IP67, 30 min @1 m (IEC529)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Dimension</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Weight</td>
<td>4 kg</td>
</tr>
<tr>
<td>Overall Dimensions</td>
<td>H x W x D 128 mm x 240 mm x 167 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Application</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>Zone 0, 1 and 2 (mines and dust excluded)</td>
</tr>
<tr>
<td>US, Canada</td>
<td>Zone 0, 1 and 2 (mines and dust excluded) US, Canada Class 1, Div 1, Groups A, B, C, D (Hydrogen, Jet-fuels, and other T3 gases)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sensitivity</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Range in H2 Analysis Mode</td>
<td>0.5 ppm — 0.2% H2</td>
</tr>
<tr>
<td>Sensitivity in Leak Detection</td>
<td></td>
</tr>
<tr>
<td>Mode with Hand Probe PX57</td>
<td>1 x 10^-7 cc/s (when using 5% H2 tracer gas)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Typical ±10% of reading + 0.3 PPM</td>
</tr>
<tr>
<td>Linearity in H2 Analysis Mode (within 0.1 — 10 x calibration point)</td>
<td>Typical ±15% (within 0.5 — 100 ppm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Battery Capacity</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>7h (3h at -20°C)</td>
</tr>
<tr>
<td>Charging time</td>
<td>7-8 h, flat to fully charged. Approx. 1h to 1h operating time</td>
</tr>
</tbody>
</table>
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
15. 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) x 10
Part No: 590-615
Large (150 mm) 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

**PX57 Hand Probe**
Rigid neck
Part No: 590-606
Sensor for PX57
Part No: 590-292

Probe Tip Filter x 50
Part No: 591-234

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: T.B.A.
16. Certificates

Declaration of CE Conformity

Manufacturer
INFICON AB
P.O. Box 76
SE-581 02 Linköping
Sweden
Phone: +46 (0)13-355900
Fax: +46 (0)13-355901

Object of the declaration
Extrima® Hydrogen Leak Detector (HWII) and Hand Probe PX57

The objects of the declaration as described above are in conformity with the relevant Community Directives, namely:

ATEX Equipment intended for use in potentially Explosive Atmospheres (2014/34/EU)
EMC Electromagnetic Compatibility (2014/30/EU)
RoHS Restriction of the use of certain Hazardous Substances in electronic equipment (2011/65/EU)
LVD Electrical safety - Low Voltage (2014/35/EU) *

* Relevant only for battery charger (CE marked). Manufacturer's declaration provided on request

Harmonized European standards which have been applied

<table>
<thead>
<tr>
<th>Standard</th>
<th>Edition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-EN 61000-6-1</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments.</td>
</tr>
<tr>
<td>SS-EN 61000-6-3</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.</td>
</tr>
<tr>
<td>SS-EN 80079-34</td>
<td>2011</td>
<td>Application of Quality system for Ex Equipment Manufacturing.</td>
</tr>
<tr>
<td>SS-EN 50581</td>
<td>2012</td>
<td>Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances</td>
</tr>
</tbody>
</table>

Other standards which have been applied

<table>
<thead>
<tr>
<th>Standard</th>
<th>Edition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60079-0</td>
<td>2006</td>
<td>Electrical apparatus for explosive gas atmospheres - Part 0: General requirements</td>
</tr>
<tr>
<td>EN 60079-11</td>
<td>2007</td>
<td>Explosive atmospheres - Part 11: Equipment protection by intrinsic safety &quot;i&quot;.</td>
</tr>
<tr>
<td>EN 60079-26</td>
<td>2004</td>
<td>Equipment with protection level EPL G</td>
</tr>
</tbody>
</table>

Test institutes / notified bodies

EMC
BK CE Services AB
Datalinjen 5A
583 30 Linköping
Sweden
Phone: +46 (0)13 21 26 50
Fax: +46 (0)13 85 13 025

ATEX quality assurance
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

ATEX product certificate
Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 7UN
England
Phone: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Notified body number 0518

Report and Certificate reference numbers

<table>
<thead>
<tr>
<th>No.</th>
<th>Issue</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sira 07ATEX2117X</td>
<td>5</td>
<td>EC type-examination certificate</td>
</tr>
<tr>
<td>TR_ADIO70827EMC001</td>
<td>-</td>
<td>EMC Test Report Extrima</td>
</tr>
<tr>
<td>SP07ATEX4125</td>
<td>-</td>
<td>Production Quality Assurance Notification</td>
</tr>
</tbody>
</table>

For INFICON AB, March 7, 2018

Fredrik Enquist, Development Manager

INFICON AB, Box 76, SE-581 02 Linköping, Sweden

Visiting address: Westmansgatan 49
Phone: +46 (0) 13 35 59 00 Fax: +46 (0) 13 35 59 01
www.inficon.com E-mail: reach.sweden@inficon.com
Org.nr: 556209-9001, VAT.nr: SE5562099000101
EC TYPE-EXAMINATION CERTIFICATE

2. Certificate Number: Sira 07ATEX2117X
3. Issue: 5
4. Equipment: Extrima® Hydrogen Leak Detector
5. Applicant: INFICON AB
6. Address: Westmansgatan 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:

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

---

Project Number 25248

C Ellaby
Deputy Certification Manager

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 870900
Fax: +44 (0) 1244 891330
Email: info@siracertification.com
Web: www.siracertification.com

INFICON - User’s manual Extrima
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 outside 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.
SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

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 Annex.

14.2 Associated Sira Reports and Certificate History

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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.

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Sira Certification Service
Rank Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 661330
Email: info@siracertification.com
Web: www.siracertification.com
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 MPI74865IS or type MPI74865 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.
## Certificate Annexe

**Certificate Number:** Sira 07ATEX2117X  
**Equipment:** Extrima® Hydrogen Leak Detector  
**Applicant:** INFICON AB

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# Certificate Annexe

## Certificate Number:
Sira 07ATEX2117X

## Equipment:
Extrima® Hydrogen Leak Detector

## Applicant:
INFICON AB

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**Sira Certification Service**

Rake Lane, Eccleston, Chester, CH4 9UN, England

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Form 9400 Issue 1

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## Certificate Annexe

**Certificate Number:** Sira 07ATEX2117X  
**Equipment:** Extrima® Hydrogen Leak Detector  
**Applicant:** INFICON AB

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<td>1 to 4</td>
<td>01A</td>
<td>05 Mar 12</td>
<td>Probe PCB Schematics</td>
</tr>
<tr>
<td>ATEX (PX57) Probe PCB</td>
<td>1 to 2</td>
<td>01A</td>
<td>05 Mar 12</td>
<td>Probe PCB Bill of Materials</td>
</tr>
<tr>
<td>ATEX (PX57) Probe PCB</td>
<td>1 to 10</td>
<td>01B</td>
<td>05 Mar 12</td>
<td>Probe PCB Artworks</td>
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<tr>
<td>ATEX (PX57) Probe PCB (Assy.)</td>
<td>1 to 2</td>
<td>01A</td>
<td>05 Mar 12</td>
<td>Probe PCB Component Assembly</td>
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The following drawings were deleted:

- 500100 CERT
- Sensistor 16-7 Probe R7 CERT
- KK1018-BOM-R7-CERT
- Sensistor Probe R6
- Sensistor Probe R6

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*This certificate and its schedules may only be reproduced in its entirety and without change.*

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**Sira Certification Service**  
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Tel: +44 (0) 1244 670000  
Fax: +44 (0) 1244 681330  
Email: info@siracertification.com  
Web: www.siracertification.com

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INFICON - User’s manual Extrima 55
<table>
<thead>
<tr>
<th>Certificate No.</th>
<th>IECEx SP 07.0002X</th>
<th>Issue No.</th>
<th>3</th>
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<tbody>
<tr>
<td>Status</td>
<td>Current</td>
<td>Certificate history:</td>
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<tr>
<td>Date of Issue</td>
<td>2012-04-17</td>
<td>Issue No. 3 (2012-04-17)</td>
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<tr>
<td>Applicant</td>
<td>INFICON AB</td>
<td>Issue No. 2 (2010-12-10)</td>
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<td>Westmansgatan 49</td>
<td>Issue No. 1 (2010-06-07)</td>
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<td></td>
<td>Box 76</td>
<td>Issue No. 0 (2007-09-21)</td>
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<tr>
<td>Equipment</td>
<td>Hydrogen Leak Detector type Extrima</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional accessory:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Protection</td>
<td>Intrinsic safety &quot;ia&quot;</td>
<td></td>
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<tr>
<td>Marking</td>
<td>Exia IIC T3</td>
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<td></td>
</tr>
<tr>
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<td>Tia -20 °C to +50 °C</td>
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</tr>
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</table>

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

Position: Certification Officer

Signature: (for printed version)

Date:

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 16 Boras
Sweden
IECEx Certificate of Conformity

Certificate No: IECEx SP 07.0002X
Date of Issue: 2012-04-17
Manufacturer: INFICON AB
Westmansgatan 49
Box 75
SE-611 02 Linköping
Sweden

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

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/EXTR/07.0085/00
GB/SIR/EXTR/09.0206/01
GB/SIR/EXTR/10.0252/00
GB/SIR/EXTR12.0006/00
SE/SP/EXTR/07.0001/00

Quality Assessment Report:
SE/SP/QAR/07.0002/00
IECEx Certificate of Conformity

Certificate No: IECEx SP 07.0002X
Date of Issue: 2012-04-17

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 anodised 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 5/0854/ExTR07.0001/00 and ATEX certificate SP07ATEX36536U). 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.

SPECIFIC CONDITIONS OF USE: 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 MP174855S or type MP174855 Lithium ion rechargeable cells all encapsulated in Wacker Elastostat RT676.

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/09/1/ExTR07.0001/00, 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

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 HS86 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/EXTR10.0282/00, 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/EXTR12.0096/00.
EXPLOSION PROTECTION
CERTIFICATE OF CONFORMITY

Cert NO. GYJ13.1393X

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 C T3 Ga
product standard /
drawing number 500131 CERT

has been inspected and certified by NEPSI, and that it conforms
to GB 3836.1-2010, GB 3836.4-2010, GB 3836.20-2010
This Approval shall remain in force until 2018.11.07

Remarks 1. Conditions for safe use are specified in the attachment to this certificate.
2. Symbol "X" placed after the certification number denotes specific conditions of use,
   which are specified in the attachment to this certificate.
3. Intrinsic safety parameters specified in the attachment to this certificate.

Director
National Supervision and Inspection Centre for
Explosion Protection and Safety of Instrumentation
Issued Date 2013.11.08

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.
一、产品安全使用条件

证书编号后缀“X”表明产品具有安全使用特殊条件：
- 产品外壳含有轻金属，在O区时应防止由于冲击或摩擦引起的点燃危险。
- 探测器采用由3节MP174865或MP1748685I型锂电池（SAFT公司生产）串联组成的电池组供电。
- 严禁在危险场所充电或更换电池。
- 产品充电器最大输出参数为12.6V，770mA。

二、产品使用注意事项

1. 探测器的使用环境温度为-20℃～+50℃。

2. 用户不得自行随意更换该产品的电气零部件，应会同产品制造商共同解决运行中出现的故障，以免影响防爆性能和损坏现象的发生。

三、制造厂责任

1. 产品制造厂必须将上述使用注意事项纳入该产品的使用说明书中。
2. 制造厂必须严格按NEPSI认可的文件资料生产。
3. 产品铭牌中应至少包含下列内容：
   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

国家级防爆安全监督检验站
二〇〇三年十一月八日
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.

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, 11.25V nominal (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 °C < Tamb. < +50°C; 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).
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

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

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”)
<table>
<thead>
<tr>
<th>Certificate:</th>
<th>1981011</th>
<th>Master Contract:</th>
<th>241576</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>2531732</td>
<td>Date Issued:</td>
<td>July 17, 2012</td>
</tr>
</tbody>
</table>

- 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”.

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DQD 507 Rev. 2012-05-22