



HORSE HILL
DEVELOPMENTS LTD

Horse Hill Developments Ltd

Title: Leak Detection & Repair Plan

Document Number: HHDL-EPR-HHP-LDAR-010

Revision: 1

1	Rev	Revised for Current Site	19/11/2020	ZG-SS	ZG-TF	TH
0	Rev	Original Issue	20/03/2020	ZG-SS	ZG-TF	TH
Rev.	Status	Reason for Issue	Revision Date	Written by	Reviewed by	Approved by
Revision History						

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure	Revision: 1	Date: 19/11/20

REVISION DESCRIPTION SHEET

Details to include revision number, a description of the revision indicating paragraphs and pages that have been revised, together with the date and approved signature.

Revision	Description	Date	Approved by
0	Original Issue	20/03/2020	TH
1	Revised to consider current site only.	19/11/2020	TH

Table of Contents

1.	Introduction.....	4
2.	Notice Regarding the Health and Safety of All Persons	4
3.	Objectives of this Plan.....	4
4.	Management of the Leak Detection and Repair Plan	4
5.	Training of Personnel	5
6.	Roles and Responsibilities	6
7.	Identification of Components and Equipment Subject to the Plan.....	7
7.1	Tagging of Components and Equipment.....	7
7.2	Fugitive Emissions Risk Assessment.....	7
8.	Leak Detection Procedure	8
8.1	Leak Detection and Inspection Programme.....	8
8.2	Methods of Detection	8
8.2.1	Steady State Monitoring	8
8.2.2	Snoop Test (Bubble Leak Testing)	8
8.2.3	Infrared Detection.....	9
8.3	Method of Reporting.....	10
8.4	Leak Detection, Monitoring and Repair Report - Section 1	10
8.5	Arrangements for Estimating the Size of Fugitive Emissions.....	10
9.	Arrangements for Monitoring Leaking Components and Equipment	11
9.1	Leak Detection, Monitoring and Repair Report - Section 2	11
10.	Leak Repair Procedure.....	12
10.1	Arrangements for Repairing Leaking Components and Equipment	12
10.2	Arrangements for Evaluating Replacement Components and Equipment.....	13
10.3	Method of Reporting.....	13
10.4	Leak Detection, Monitoring and Repair Report - Section 3	13
	Appendix 1 – Leak Detection Equipment Information and Technical Specification	15
	Appendix 2 - LDAR System Inventory	17
	Appendix 3 - Leak Detection and Inspection Programme	19
	Appendix 4 - Leak Detection, Monitoring and Repair Report	21

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD		HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure		Revision: 1	Date: 19/11/20

1. INTRODUCTION

The Leak Detection and Repair (LDAR) Plan is applicable to Horse Hill Developments LTD (HHDL), its contractors and subcontractors and shall be used at all applicable locations under the operatorship of HHDL.

It can be used in support of applications to the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2016 (EPR2016), where there is a requirement to provide a Leak Detection and Repair Plan. The LDAR plan covers well testing operations, production operations; workover operations and well abandonment operations.

2. NOTICE REGARDING THE HEALTH AND SAFETY OF ALL PERSONS

The LDAR plan has been produced to provide a clear process over the detection, monitoring, repair and associated recording of any leaks identified within HHDL operations. The plan shall only be implemented once HHDL's own internal risk assessment process has been carried out on this plan. This assessment shall be known as the 'Fugitive Emissions Risk Assessment' (see Section 7.2). This plan shall be implemented in accordance with all necessary health and safety control measures as determined by HHDL and the Fugitive Emissions Risk Assessment. The assessment shall also give consideration to the work exposure limits (WELs) of substances listed within the Health and Safety Executive's EH40 publication. For example, should H₂S be identified on personal gas monitors then this plan shall not be implemented until further suitable control measures have been implemented. Further controls could be full shut in, or appropriate Respiratory Protection Equipment.

3. OBJECTIVES OF THIS PLAN

The LDAR Plan objective is to ensure a systematic and consistent approach to the detection, monitoring and repair or replacement of leaking components and equipment. The procedures contained within this document covers the detection, monitoring and repair or replacement of leaking components and equipment that have the potential to release fugitive emissions.

This objective will be achieved by:

- Identification of Components and Equipment subject to the plan;
- Identification of risks associated with leaks and fugitive emissions;
- Establishing arrangements for the detection of leaks;
- Establishing arrangements for estimating the size of leaks and fugitive emissions;
- Establishing arrangements for monitoring leaking components and equipment;
- Establishing arrangements for repairing or replacing leaking components and equipment;

4. MANAGEMENT OF THE LEAK DETECTION AND REPAIR PLAN

HHDL will communicate the LDAR Plan to the Well Site Supervisor which shall be issued either an electronic version or paper copy, with copy of receipt or transmittal which shall be recorded by HHDL. A copy shall be held within the Well Site Supervisor office and shall be available for review by regulatory bodies. The LDAR Plan will be communicated to site personnel and a copy will be made available on site to all personnel.

Any necessary changes or deviations from the LDAR Plan are to be referred to HHDL or to the Well Site Supervisor in the first instance. No changes or deviations from this LDAR Plan are to be implemented until the changes or deviations have been reviewed and approved by HHDL. However, alterations may be implemented as an immediate control measure to resolve an identified problem prior to notification to HHDL.

Senior management will conduct periodic compliance audits of the LDAR Plan and communicate environmental performance, significant findings and non-conformances.

The Well Site Supervisor will ensure sufficient priority is placed on undertaking audits and ensure that performance and findings from audits, inspections and non-conformances is communicated to site personnel and contractors.

HHDL will periodically review the Leak Detection and Repair Plan or when significant changes to operations or site equipment have occurred and amend where necessary.

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD		HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure		Revision: 1	Date: 19/11/20

5. TRAINING OF PERSONNEL

All personnel involved in leak detection, leak monitoring and leak repair/replacement procedures will receive training prior to commencement of their responsibilities. Training will be undertaken by HHDL and a record of training will be recorded and held on site. Training will include:

- Technical understanding of the Leak Detection and Repair Plan;
- Personnel responsibilities for conducting leak detection and repair procedures; and
- Detection, monitoring, repair and replacement requirements and record keeping requirements.

6. ROLES AND RESPONSIBILITIES

Role	Key Responsibilities
Chief Executive	<p>Overall responsible for all business activities and must ensure that suitable and sufficient systems, processes and resources are provided to adhere to the HSE Management System (HSEMS) and legislative requirements in relation to this plan. They shall:</p> <ul style="list-style-type: none"> • Apply HSEMS standards and procedures throughout the project; • Provide suitable and sufficient input and resources required to maintain an effective HSEMS; • Stipulate project requirements and conditions, e.g. budget, time constraints, milestones and feedback; and • Ensure a proactive and robust system is in place for the management of leaks during well site operations.
Commercial Director	<ul style="list-style-type: none"> • The communication of the HSEMS structure and responsibilities to the Well Site Supervisor; • Co-ordinate the implementation of the Leak Detection and Repair Plan; • Providing assistance and guidance in the update and approval of the Leak Detection and Repair Plan; • Ensuring that legislative compliance is maintained through the provision of adequate competent resources; • Ensuring competent personnel are available to monitor and assess the requirements of the LDAR Plan • Ensuring that roles and responsibilities are identified and the assessment of individuals is recorded; • Selecting contractors who can meet all standards through a robust tendering and/or selection process and the monitoring of contractors to ensure that these standards are being met; • The development and training of staff or assessing the competence of contractors so that they are competent and capable of carrying out their work to the required standards; • Conducting periodic audits of compliance and communicating environmental performance, significant findings and non-conformances. • Ensuring that suitable and sufficient resources are provided to implement the LDAR plan.
Well Site Supervisor	<ul style="list-style-type: none"> • Providing assistance and guidance in updating and maintaining the Leak Detection and Repair Procedure; • Ensuring that defined practices and processes are communicated; • Ensuring that leaks and fugitive emissions are reported and investigated; • Ensuring that where required, emissions are sampled to determine source and composition of the emission; • Ensuring that training is provided to all personnel on pollution prevention and pollution control; • Ensuring that all repairs / replacement component parts are tagged with a unique reference number and recorded on site documentation; • Ensuring all repairs / replacement component parts or equipment are monitored for of seven (7) days; • Monitoring compliance with the Leak Detection and Repair Procedure; • Ensuring sufficient priority is placed on undertaking audits; and • Ensuring that performance and findings from audits, inspections and non-conformances is communicated.
Site Operatives	<ul style="list-style-type: none"> • Ensure they are fully conversant with the Leak Detection and Repair Procedure; • Ensure adequate control measures are in place prior to commencement of the task; • Ensure they take reasonable care to ensure that their actions do not have an adverse impact on the health and safety of personnel or on the environment; and • Personnel must not intentionally or recklessly interfere with, or misuse anything that is provided in the interest of health, safety and the environment.
Engineer	<p>Specialist Contractors authorised by HHDL to undertake repairs and replacement of leaking components and equipment. They shall:</p> <ul style="list-style-type: none"> • Ensure they are fully conversant with the Leak Detection and Repair Procedure; • Ensure adequate control measures are in place prior to commencement of the task; and • Take reasonable care to ensure that their actions do not have an adverse impact on the health and safety of personnel or on the environment.
All personnel	<p>All personnel are to follow the requirements of this Leak Detection and Repair Plan and cooperate fully with senior management.</p> <p>All personnel must take reasonable care to ensure that their actions do not have an adverse impact on the environment. Personnel must not intentionally or recklessly interfere with, or misuse anything that is provided in the interest of health, safety and the environment.</p>

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD		HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure		Revision: 1	Date: 19/11/20

7. IDENTIFICATION OF COMPONENTS AND EQUIPMENT SUBJECT TO THE PLAN

Following installation of well testing and production equipment and components, an exercise will be undertaken to identify equipment and components that have the potential to leak and release fugitive emissions to water, land or air. The types of components and equipment identified are to include, but not limited to:

- Seals / Couplings;
- Flanges;
- Pumps;
- Well Test Equipment;
- Production Equipment;
- Valves;
- Storage Tanks; and
- Associated pipework.

7.1 Tagging of Components and Equipment

Tagging components and equipment that have the potential to leak and release fugitive emissions is an essential process and will assist site personnel in identifying the correct component or equipment to be inspected, monitored or repaired.

To ensure that all components and equipment that have the potential to leak and release fugitive emissions are clearly identified, a system of unique tagging will be implemented across the well site.

The tagging system will comprise of a dedicated coloured tag displaying a unique reference relating specifically to each individual component identified.

Where components and equipment are not easily accessible, i.e. valves housed within cabinets, the tag is to be displayed in a prominent position as near to the component as possible i.e. on the cabinet handle.

Tags will be designed to be durable enough to withstand the environment associated with the well site, industry processes and local weather conditions.

Tagging components and equipment will also assist the Well Site Supervisor in ensuring that all components and equipment are systematically inspected or monitored in accordance with this Leak Detection and Repair Plan.

To ensure that components and equipment are correctly tagged, tags will be installed by personnel who are familiar with the components and equipment to ensure that tags are placed correctly.

Following installation of equipment and components a System Inventory will be undertaken of the well site. The system inventory will identify hazardous products held within production equipment and onsite storage tanks that have the potential to leak or emit fugitive emissions.

A System Inventory template is provided in Appendix 1.

7.2 Fugitive Emissions Risk Assessment

A Fugitive Emissions Risk Assessment shall be undertaken and recorded following the installation of well site equipment, throughout the phases of operation. The assessment will consider all equipment and components associated with testing equipment, production equipment, workovers and any other phases that shall be subject to the LDAR Plan. The assessment, as a minimum shall include:

- Potential release points and sources of pollution;
- Operations carried out which may lead to fugitive emissions;
- Estimated size of the leak;
- Receptors;
- Pathway;
- Probability of exposure;
- Consequence;
- Magnitude of Risk;
- Risk management including mitigation measures;
- Residual risk; and
- Responsible person for monitoring the leak point.

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD		HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure		Revision: 1	Date: 19/11/20

8. LEAK DETECTION PROCEDURE

8.1 Leak Detection and Inspection Programme

A Leak Detection Inspection Programme shall be implemented to ensure that all components and equipment identified in the System Inventory, and assessed by the Fugitive Emissions Risk Assessment, are inspected in accordance with the determined frequency.

An inspection shall also be undertaken following the installation of new, or after the repair of existing, components and equipment. The inspection frequency of new and repaired components and equipment shall be included within the revised Leak Detection Inspection Programme.

In adopting a Leak Detection Inspection Programme, the risk of components or equipment not being inspected within the determined frequency of inspection will be minimised.

The Leak Detection Inspection Programme details the following:

- Component Name;
- Tag ID;
- Inspection Frequency;
- Date of last inspection;
- Date of next inspection; and
- Date inspection completed.

A Leak Detection Inspection Programme template is provided in Appendix 2.

8.2 Methods of Detection

8.2.1 Steady State Monitoring

Steady State Monitoring is a process that utilises site personnel’s visual, olfactory or audible senses to detect leaking components and equipment. It provides real time monitoring and will assist in the early detection of any leaks and potential fugitive emissions and is a cost effective way of identifying leaks and fugitive emissions without the requirement of complex inspections and equipment.

Steady State Monitoring is not routine, and shall not be relied upon, however site personnel shall be required to take note of any odours, noises or damage to components that they encounter as part of their normal working day that indicates a leak and report it immediately to the Well Site Supervisor.

8.2.2 Snoop Test (Bubble Leak Testing)

Snoop Test (Bubble Leak Testing) is a technique that utilises a liquid to detect the presence of a leak. Liquid is applied to the component or equipment to be inspected in one of the following methods:

- Liquid emersion;
- Liquid film; or
- Foam application.

The advantages of using the Bubble Leak Testing (Snoop Test) method include its simplicity and ability to apply it quickly to components and equipment. It affords the inspector to locate the exact points of leaks of various sizes within harming the environment.

A Snoop Test shall be carried out to confirm whether a suspected leak is present and should be applied as soon as reasonably practicable. A Snoop test cannot confirm the leak volumes but can be used to indicate whether a leak is present and the size of the leak to enable the inspector and Well Site Supervisor to estimate the leak. See Section 8.5.

Snoop Test (Bubble Leak Testing) will be undertaken at the following frequencies:

- Following installation, repair and commission of the relevant components and equipment;
- Following breaking containment of the relevant components and equipment; and
- For leak confirmation following suspicion of a leak identified through steady state monitoring.

Step	Responsible Person	Action
Planning		
001	Well Site Supervisor	Review previous leak inspection reports for identified leaks or comments raised.
002	Well Site Supervisor	Ensure working area is safe. Safety mitigation measures are implemented and communicated.
003	Inspector	Clean area to be inspected of dirt, rust or any foreign debris. Ensure that cleaning chemical used will not interact with the liquid used in the Snoop Test.
Performing the Task		
004	Inspector	Check temperature of the component or equipment to be inspected. Temperature must be within the working temperature of the liquid used in the Snoop Test.
005	Inspector	Apply the liquid used in the Snoop Test
006	Inspector	Immediately inspect the area for bubble formation.
007	Inspector	If the liquid shows bubbles collapsing and reforming, this indicates that a leak has been detected.
Record Keeping		
008	Inspector	Record the result of the inspection on the Leak Detection Report.
Notifications		
009	Inspector	Report all identified leaks to the Well Site Supervisor.
010	Well Site Supervisor	Report all identified leaks to Senior Management.
011	Well Site Supervisor	Notify site personnel and any contractors of the identified leak.
Monitor and Review		
012	Well Site Supervisor	Undertake Risk Assessment of the identified leak for potential safety and environmental hazards.
013	Well Site Supervisor	Implement any safety or environmental mitigation measures identified from the Risk Assessment and inform site personnel / contractors.
014	Well Site Supervisor	Arrange for repair / replacement of the component or equipment.
015	Well Site Supervisor	Implement Leak Detection Monitoring Procedure.

Table 8.1 - Snoop Test (Bubble Leak Test) Procedure

8.2.3 Infrared Detection

The methane detector proposed for the site shall be either a IRwin SX / IRwin SXT / IRwin SXG / IRwin SXGT. Specifications, performance criteria, performance evaluation measures and calibration principles of the methane detector are detailed within Appendix 1.

For clarity, the methane detector shall be programmed to detect fugitive emissions in both parts per million (ppm) and % Volume. The selected equipment (Irwin SX Range) will monitor Methane in PPM from Oppm up to a value of 990ppm, after which the unit of measurement will change to % Volume and will monitor from 0.1% Volume up to 5% Volume. A PPM to % Volume conversion table has been provided below for easy reference.

PPM	%
0	0
1	0.0001
10	0.001
100	0.01
1,000	0.1
10,000	1
20,000	2
30,000	3
40,000	4
50,000	5

Infrared detection shall be undertaken every 6 months by HHDL or an appointed contractor to confirm any leak points within the equipment and plant. Following a period of Infrared monitoring HHDL may agree with the Environment Agency to reduce the frequency of infrared detection to annually if it is evident that no leaks are identified in the first instance.

Monitoring leaking components or equipment will be undertaken until repairs have been undertaken and the fugitive emission has been eliminated. This will need to be recorded on the A Leak Detection, Monitoring and Repair Report. To ensure that the repair and installation of new or replacement components or equipment is successful, a period of monitoring will be undertaken for a minimum of one (1) week to identify that the leak has been eliminated.

For example, if a reading of 253ppm was observed that would equate to 0.0253% Volume. Likewise, if a reading of 1.7% Volume was observed that would be represented as 17,000ppm.

Table 8.2 PPM to %

8.3 Method of Reporting

All leaks identified shall be recorded on the Leak Detection, Monitoring and Repair Report and notified to the Well Site Supervisor as soon as reasonably practicable, who again will report the leak to Senior Management as soon as reasonably practicable. A Leak Detection, Monitoring and Repair Report template is included in Appendix 4.

8.4 Leak Detection, Monitoring and Repair Report - Section 1

Section 1 of the Leak Detection Report requires the following details:

- Report Number;
- Site Name;
- Component & Tag ID;
- Method of Inspection;
- Time and Date;
- CLP Classification;
- UN and CAS Number;
- Details of Fugitive Emissions Inc. PPM and Mass;
- Any Other Relevant details; and
- Appropriate Signatures

8.5 Arrangements for Estimating the Size of Fugitive Emissions

Should a leak be identified, an estimation of the measurement of fugitive emissions of volatile organic compounds (VOCs) shall be undertaken by HHDL with assistance from the Well Site Supervisor. The estimation shall be based on the known gas composition and the concentration of VOC's (ppm) at the interface of the leak. It is then converted to a mass emission rate to quantify the estimated release of VOCs in kilograms per hour (kg/h). This calculation will be undertaken using the correlation values detailed within the European Standard EN 15446:2008.

The estimation may be determined utilising the following information:

- Calculation based on flow rate, pressure and size of leak area;
- Leak definitions adopted e.g. mass emission rates detailed within EN 15446:2008.

If point source monitoring is undertaken using portable detection equipment, the average value of the total mass emission over the reporting period shall be taken as the average between the total emission rate at the beginning of the reporting period and the total emission rate at the end of the reporting period, multiplied by the duration of the reporting period.

The Well Site Supervisor is responsible for ensuring that the estimated size of the fugitive emission is recorded on the Leak Detection, Monitoring and Repair Report.

As part of normal operations, the gas composition from the well will be obtained and can be used in conjunction with the results of the methane leak detection rate to calculate the leak of all natural gas constituents based on a percentage basis.

9. ARRANGEMENTS FOR MONITORING LEAKING COMPONENTS AND EQUIPMENT

In the event that a significant leak has been identified, the Well Site Supervisor will take the necessary procedures required to isolate the leak and prevent the release of significant fugitive emissions occurring, subject to how reasonably practicable it is to do so.

Any leaks shall be the subject of frequent monitoring and the Well Site Supervisor is responsible for ensuring that leaking components and equipment are regularly monitored to ensure that the leak does not increase. Monitoring is to be undertaken by competent personnel who have received leak detection and monitoring training and a copy of training is to be held on site.

Subject to the Infrared Detection equipment being unavailable the Wellsite Supervisor or his delegate shall estimate the size of the fugitive emissions to monitor whether the leak rates increase and re-assess the control measures needed as appropriate, giving consideration to both health and safety and the environment. The estimation of the leakage rate shall be undertaken in accordance with Section 8.5.

For clarity, the frequency that components and equipment will be monitored will be determined on the size of the leak identified and the estimated size of the fugitive emission as detailed in Table 9.1.

Size of Leak	Estimated Size of Fugitive Emission	Monitoring Frequency
Minor	Less than 500 ppm.	6 hourly
Medium	Greater than 500 ppm.	3 hourly
Major	Greater than 10,000 ppm	Shut in and Isolate.

Table 9.1: Monitoring Frequency of Leaking Components and Equipment

9.1 Leak Detection, Monitoring and Repair Report - Section 2

Section 2 of the Leak Detection Report requires the following details:

- Date of Leak Identification;
- Monitoring Frequency;
- Time and Date;
- Details of Fugitive Emissions Inc. PPM and Mass;
- Confirmation of Leak Rate Increase; and
- Appropriate Signatures.

10. LEAK REPAIR PROCEDURE

10.1 Arrangements for Repairing Leaking Components and Equipment

The repair of leaking components and equipment will be undertaken as soon as reasonably practicable by competent authorised personnel and a record of repair will be kept on site.

The Well Site Supervisor is responsible for ensuring that leaking components and equipment are repaired or replaced in a timely manner to minimise fugitive emissions.

The procedure for repairing leaking components and equipment is summarised in Table 9.1.

Step	Responsible Person	Action
Planning		
001	Well Site Supervisor	Ensure sufficient resources are available to undertake the repair.
002	Well Site Supervisor	Ensure person(s) undertaking the repair are competent and authorised.
003	Well Site Supervisor	Ensure working area is safe. Safety mitigation measures are implemented and communicated.
004	Engineer	Ensure correct component or equipment to be repaired is identified.
005	Engineer	Ensure suitable access to the component or equipment to be repaired is available.
Performing the Task		
006	Engineer	Undertake the repair.
007	Engineer	Perform Snoop Test (Bubble Leak Test) after repair has been completed to ensure that the leak has been eliminated.
008	Engineer	Manage waste in accordance with site practices.
Record Keeping		
009	Well Site Supervisor	Record the result of monitoring on the Leak Monitoring Report.
010	Well Site Supervisor	Update site records.
Notifications		
011	Engineer	Notify repair completed to Well Site Supervisor.
012	Well Site Supervisor	Notify Senior Management repair completed.
Monitor and Review		
013	Well Site Supervisor	Ensure monitoring is maintained for seven (7) days following repair.

Table 10.1 - Repairing Leaking Components and Equipment Procedure

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure	Revision: 1	Date: 19/11/20

10.2 Arrangements for Evaluating Replacement Components and Equipment

Prior to the replacement of components or equipment, HHDL will evaluate the replacement component or equipment. This will ensure that consideration has been undertaken of new and replacement components and equipment and that they meet industry Best Available Techniques (BAT) thus minimising or eliminating potential leaks.

Changes to components and equipment can introduce new hazards or compromise the safeguards built into the existing systems. Best industry practice requires that modifications should not be undertaken without having first undertaken an occupational health, safety and environmental review, and an engineering review in conjunction with an economic justification.

The installation of new components and equipment will be reviewed to ensure that change is managed effectively and the risks associated with the proposed change(s) are identified and adequately controlled. This review will be conducted to ensure:

- The integrity of the organisational structure, management systems and business activities by ensuring that the proposed change(s) are assessed in relation to relevant legislation, regulations and industry best practices;
- A system is in place for reassessing risk and applying appropriate controls when parameters change;
- Measures specified by risk assessments are not removed or reduced;
- Competent persons are consulted throughout the change management process;
- Cost benefit analysis are performed; and
- Documentation is recorded, maintained and reviewed accordingly.

10.3 Method of Reporting

All repairs undertaken are to be recorded on the Leak Repair Report and communicated to the Well Site Supervisor and senior management.

10.4 Leak Detection, Monitoring and Repair Report - Section 3

Section 3 of the Leak Detection Report requires the following details:

- Date of Repair or Replace;
- Tag ID;
- Component / Equipment;
- Description of Repair / Replacement;
- Company / Engineer Details;
- 7 Day Follow-up Test Results; and
- Appropriate Signature.

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

Page Left Blank Intentionally

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

APPENDIX 1 – LEAK DETECTION EQUIPMENT INFORMATION AND TECHNICAL SPECIFICATION

Equipment Specifications

The methane detector proposed for the well site operations will be either a IRwin SX / IRwin SXT / IRwin SXG / IRwin SXGT. Specifications of the methane detector to be used for the detection of fugitive emissions are detailed within Table A1.

Serial	Criteria of EN15446:2008	IRwin SX Range Device(s)
01	Instrument shall respond to the compounds being screened	Gases Measured Methane (CH ₄) by Infra Red (IR)
02	Maximum lower detection limit of the detector shall be 10 ppmv	Measurement Range 1 ppm – 5 Vol%
03	Scale resolution of the instrument shall be $\pm 5\%$ of the threshold concentration (± 50 ppm)	Measurement Error +5/-2 ppm (<20 ppm) +/-10% (20 – 50 ppm) +/-5% (50 ppm – 2.2 Vol%) +/-20% (2.2 – 5 Vol%)
04	The instrument shall be equipped with a pump so that a continuous sample is provided to the detector. The nominal sample flow rate shall be 0.2 – 1.2 l min ⁻¹	Pump Output 60 l/h (1.00 l min ⁻¹)
05	The instrument shall be intrinsically safe for operation in explosive atmospheres	EX Certification Rating Ex ia IIC T3, (T _{amb} : -20°C to +50°C) Ex Ranges of Applications Zones: 0, 1 and 2 Gas groups: IIA, IIB and IIC Temperature classes: T1, T2 and T3
06	The instrument shall be equipped with a probe or probe extension for sampling with a maximum outside diameter of 6.4mm, with a single end opening for admission of the sample	Probe Diameter <6.4mm
07	The instrument used for quantification of fugitive emissions shall have a minimum measurement range of up to 50,000 ppmv	Range 50,000ppm (5 Vol%)

Table A1.1: Leak Detection Equipment Specifications

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

Performance Criteria

Performance specifications of the methane detector to be used for the detection of fugitive emissions are detailed within Table A2.

Serial	Criteria of EN15446:2008	IRwin SX Range Device
01	Instrument response factors for the individual components to be measured shall be less than 10	Response Time Methane: T ₅₀ : 3 seconds Methane: T ₉₀ : 5 seconds
02	Instrument response time shall be equal to or less than 5 seconds. The response time shall be determined for the instrument configuration to be used during screening.	Instrument Response Time T ₅₀ : <3 seconds T ₉₀ : <5 seconds
03	The calibration precision shall be lower than or equal to 10% of the calibration gas value	Calibration Precision Calibration value: 10ppm / 100ppm / 2.2 Vol%

Table A1.2: Leak Detection Equipment Performance Criteria

Performance Evaluation

Performance evaluation procedures for the methane detector to be used for the detection of fugitive emissions are detailed within Table A3.

Serial	Criteria of EN15446:2008	IRwin SX Range Device
01	Where required, equipment response factors of the methane detector will be determined prior to the LDAR survey being undertaken.	Equipment Response Times Methane: T ₅₀ : 3 seconds Methane: T ₉₀ : 5 seconds
02	A calibration precision test shall be completed on the methane detector in accordance with the frequencies identified.	Calibration Frequencies Initial: Prior to initial LDAR survey Routine: Every 3 months
03	A response time test shall be completed on the methane detector in accordance with the frequencies identified.	Response Time Test Frequencies Initial: Prior to initial LDAR survey Modification: Following modification to the pumping system or flow configuration

Table A1.3: Leak Detection Equipment Performance Evaluation

Records of performance evaluation tests shall be maintained and included within the Leak Detection Report.



Original operating instructions

IRwin S/SX/SXT/SXG/SXGT

Portable Methane Leak Detector

580-000, 580-010, 580-015, 580-020, 580-030, 580-712

From software version:
2.01.01

mina66en1-12-(1802)



INFICON GmbH

Bonner Strasse 498

50968 Cologne, Germany

Table of Contents

1	About these instructions	6
1.1	Target groups	6
1.2	Warnings.....	6
2	Safety	7
2.1	Intended use	7
2.2	Special conditions for safe use	8
2.2.1	Intrinsic Safety (Ex protection)	8
2.2.2	Certified Gas Measurement	8
2.3	Owner/supervisor responsibilities	9
2.4	Duties of the operator	10
2.5	Safe operation	10
3	Scope of delivery	11
4	Description.....	12
4.1	Function	12
4.2	Design of the leak detector	13
4.3	Probes	14
4.4	Display	16
4.5	Technical data	19
4.5.1	EX certification (intrinsic safety).....	21
4.5.2	Sensors.....	21
4.6	Factory settings	26
4.7	Concentration of calibration and test gases.....	28
5	Getting started	29
5.1	Charging the battery	29
5.2	Assembling the probe system.....	32
5.3	Transfer data to computer	34
5.3.1	Install software for data transfer.....	34
5.3.2	Pairing the leak detector with computer via Bluetooth interface	34
5.3.3	Transfer log files from leak detector to computer.....	35
5.3.4	Real-time streaming from leak detector to computer	35
6	Operation.....	37
6.1	Switch ON.....	37
6.2	Initial setup.....	38
6.2.1	Adjust the local time.....	38

6.2.2	Setting the language	38
6.2.3	Change permission level.....	38
6.2.4	Screensaver timeout	39
6.2.5	Configure data logging.....	39
6.2.6	Enable dead band suppression (IRwin SXnn only).....	40
6.2.7	Setting the Function Test interval	40
6.2.8	Calibration.....	40
6.2.8.1	Standard calibration procedures	42
6.2.8.2	Setting of calibration gas concentrations	43
6.2.9	Adjust calibration reminder	44
6.3	Operating modes	45
6.3.1	Select operating mode	45
6.3.2	Operating mode "Above Ground".....	45
6.3.3	Operating mode "Bar Hole".....	47
6.3.3.1	Automatic "Bar Hole" testing	48
6.3.3.2	Setting parameters for "Auto Bar Hole".....	49
6.3.4	Operating mode "GC Ethane Analysis"	50
6.3.5	Operating mode "Confined Space"	52
6.3.6	Operating mode "House"	54
6.3.7	Operating mode "Gas Purity"	55
6.3.8	Operating mode "Ex"	57
6.3.9	Operating mode "Ex Tox"	60
6.3.9.1	Change gas type for %LEL measurement	62
6.3.10	IR Ethane Analysis and compensation	63
6.3.10.1	Entering ethane concentration manually.....	63
6.3.10.2	Setting reminder for IR Ethane Analysis	64
6.3.10.3	Performing IR Ethane Analysis after automatic reminder	64
6.3.10.4	Starting IR Ethane Analysis manually.....	65
6.3.10.5	Viewing IR Ethane Analysis info	66
6.3.11	Set limits and alarm levels	66
6.3.12	Set the brightness of the display.....	67
6.3.13	Performing function tests	67
6.4	Measuring	68
6.5	Perform self test.....	69
6.6	Viewing Status menu	69
6.7	Logging data to file	69
6.8	Viewing logfile list	69
6.9	Information.....	70
6.9.1	Retrieve information and statistics	70
6.9.2	Viewing the Service Screen	70

6.10 Activating Auto-Rotate Screen.....	70
6.11 Resetting to factory settings	71
6.12 Switching OFF	71
6.13 Warnings and error messages.....	71
7 Maintenance.....	76
7.1 Maintenance plan	76
7.2 Spare parts list.....	76
7.3 Maintenance of the leak detector.....	77
7.3.1 Seasonal shut-down	77
7.3.2 Change the cigarette filter in the sample inlet.....	77
7.4 General check of the probe system	77
7.5 Maintenance of the hand probe	79
7.5.1 Replace cigarette filter in the hand probe	79
7.6 Change the inline filter of the carpet probe.....	79
7.7 Maintenance of the bell probe	79
7.7.1 Change the filter discs in the bell	79
7.7.2 Change the paper filter in the bell	81
8 Decommissioning the leak detector.....	82
8.1 Sending in the leak detector	82
8.2 Disposing of the equipment	84
9 Certificates.....	85
9.1 TÜV, Certificate for lower explosive limit (LEL)	86
9.2 Certificate for oxygen and toxic gases.....	90
9.3 Certificate for software for Ex/ExTox	92
9.4 ATEX certificate for explosion protection (IRwin SXnn).....	93
9.5 CSA (US/Canada) certificate for explosion protection (IRwin SXnn).....	94
9.6 IECEx certificate for explosion protection (IRwin SXnn).....	95
9.7 NEPSI (China) certificate for explosion protection.....	98
9.8 CE Declaration of Conformity	104
Index.....	108

1 About these instructions

This document applies to the software version stated on the title page.

Product names may occur in the document, which are added for identification purposes only and belong to the respective owner of the rights.

1.1 Target groups

These Operating Instructions are written for trained and experienced gas pipeline survey operators.

1.2 Warnings



DANGER

Imminent hazard resulting in death or serious injuries



WARNING

Hazardous situation potentially resulting in death or serious injuries



CAUTION

Hazardous situation potentially resulting in minor injuries



NOTICE

Risk for damage to property or the environment

2 Safety

2.1 Intended use

The IRwin Methane Leak Detector is intended for professional use in residential and commercial areas. The operation of the equipment requires sufficient knowledge and experience in gas pipeline inspection. The different IRwin versions are equipped for the measurement of different gases, see Technical data [▶ 19] as well as for the applications listed below:

- IRwin S
Above ground, Bar hole
- IRwin SX (EX certified)
Above ground, Bar hole, Confined Space, House, Gas Purity, Ex
- IRwin SXT (EX certified)
Above ground, Bar hole, Confined Space, House, Gas Purity, Ex, Ex Tox
- IRwin SXG (EX certified)
Above ground, Bar hole, Confined Space, House, Gas Purity, Ex, GC Ethane Analysis
- IRwin SXGT (EX certified)
Above ground, Bar hole, Confined Space, House, Gas Purity, Ex, Ex Tox, GC Ethane Analysis

The IRwin SX, IRwin SXG, IRwin SXT and IRwin SXGT are intrinsically safe and can be used in areas with potentially explosive atmospheres according to the EX rating and EX application it is certified for (see EX certification (intrinsic safety) [▶ 21]).

These models are jointly referred to as **IRwin SXnn** in the following.


The IRwin S is not EX certified.

Pay attention to the safety instructions Safe operation [▶ 10].

- You must assemble, operate and maintain the equipment only in compliance with these operating instructions.
- Use only within the allowed ambient conditions Technical data. Operating or storing the equipment outside the given range can result in erroneous readings and possible malfunction.
- Use the leak detector exclusively for the detection of the specified gases.
- Do not suck liquids into the leak detector.
- Do not suck dirt or sand into the leak detector.
- Do not use the IRwin S in areas with potentially explosive atmospheres.

Improper use

See also

 Safe operation [▶ 10]

2.2 Special conditions for safe use

2.2.1 Intrinsic Safety (Ex protection)

IRwin is certified intrinsically safe to prevent ignition of flammable atmospheres.

IRwin holds an ATEX certificate for EU and corresponding certificates for several other regions as shown by the attached certificates, see Certificates [▶ 85]).

For details of rating, see EX certification (intrinsic safety) [▶ 21].

The "X" after the respective type certificate number relates to the following special conditions for safe use:

The only device allowed to be connected to the charging socket on any of the models

- IRwin SX
- IRwin SXT
- IRwin SXG
- IRwin SXGT

is the Ex Certified IRwin Charging adapter (PN 580-604).

The charger or car adapter is subsequently connected to the inlet of the Ex Certified IRwin Charging Adapter.

This means that the charger for IRwin S must, under no circumstances, be connected directly to the charging socket on any of IRwin models SX, SXT, SXG, and SXGT. See also Charging the battery [▶ 29].

IRwin SXnn is certified as intrinsically safe at an ambient temperature of -20 - +50°C. Further temperature restrictions apply to oxygen and toxic gas measurement of IRwin SXT and SXGT. See Certified Gas Measurement.

IRwin SXnn is certified for use in Gas groups IIA, IIB and IIC and in Zones 0, 1 and 2. The external surface of the enclosure is therefore slightly conductive to prevent electrostatic charging and sparks. Labels added for marking purposes must not be larger than 400 mm². If larger the instrument should not be used in gas group IIC, Zone 0 applications. Natural gas applications are not affected by this regulation.

2.2.2 Certified Gas Measurement

IRwin SX, IRwin SXG, IRwin SXT, and IRwin SXGT are certified by TÜV Rheinland to EN 60079-29-1 for measuring methane (CH₄), propane C₃H₈, butane C₄H₁₀ and natural gas concentration in units of percentage of lower flammability level. In IRwin we use the more widely known acronym LEL as synonymous with the more correct LFL.

Special conditions for safe use

Traduction française pour **CANADA**

Le X après le numéro de certificat ATEX concerne les conditions particulières suivantes pour une utilisation en toute sécurité:

Le seul accessoire autorisé à être connecté à la prise de charge sur l'un des modèles
IRwin SX
IRwin SXT
IRwin SXG
IRwin SXGT

est l'adaptateur de recharge Ex certifié IRwin (PN 580-604).

Le chargeur ou l'adaptateur de voiture est ensuite connecté à l'entrée de l'adaptateur de recharge.

Le chargeur pour IRwin S ne doit en aucun cas être connecté directement à la prise de charge de l'un des modèles IRwin SX, SXT, SXG ou SXGT.

IRwin SXT and IRwin SXGT are, in addition, also certified by TÜV Rheinland to EN50104 and EN 45544 for measuring Oxygen (O₂), Carbon Dioxide (CO₂), Carbon Monoxide (CO) and Hydrogen Sulfide (H₂S).

The certification is valid in an ambient temperature of -15 to +40 °C and subject to periodic calibration, see Calibration [► 40]

IRwin S, IRwin SX and IRwin SXG are operable within -20 to +50 °C. The certification is valid in an ambient temperature of -15 to +40 °C. The accuracy may not be according to specification outside this range.

IRwin SXT and IRwin SXGT are operable within -20 to +40 °C. The certification is valid in an ambient temperature of -15 to +40 °C.

2.3 Owner/supervisor responsibilities

The following notes are for organizations or any person responsible for the safe and effective use of this equipment.

Safety conscious operation

- Check that the leak detector is properly calibrated and not damaged before using it.
- Make sure you operate the leak detector in accordance with this manual.
- Adhere to the following regulations:
 - Intended use
 - General applicable safety and accident prevention regulations
 - International, national and local standards and guidelines
 - Additional equipment-related provisions and regulations
- Use only original parts or parts approved by the manufacturer.
- Keep this instruction manual available on site.

Staff qualifications

- Only properly trained staff should be permitted to work with and on the equipment. The training must cover the actual equipment model used.
- Make sure that users have read and understood the operating instructions and all other applicable documents.

Non-authorized repairs forbidden

The manufacturer (INFICON) denies all responsibility for the compliance of this product with any of the type certificates for this product if any repairs or service involving opening the instrument enclosure (yellow box) has been performed by individuals or organizations not qualified therefore in writing by INFICON AB, Sweden. The manufacturer (INFICON) denies all responsibility for the compliance of this product with any of the type certificates for this product if the equipment is used in any way not conforming to the instructions in this User Manual. Replacement of externally accessible parts such as probes and filters is allowed with the exception of the Hand Probe and the hose between Hand Probe and IRwin detector. These two parts are certified anti-static and must not be replaced with non-original parts.

2.4 Duties of the operator

- Read, observe, and follow the information in this manual and in the work instructions provided by the owner. This concerns in particular the safety instructions and warnings.
- Always observe the complete operating instructions for all work.
- If you have any questions about operation or maintenance that are not answered in this manual, please contact Customer Service.

2.5 Safe operation

Hazards due to chemical substances and explosive gases

- Do not expose the leak detector to excess heat or a naked flame.
- Aggressive substances such as solvents and other chemicals can damage the equipment.
- Adhere to the restrictions of use.
- Do not suck liquids into the leak detector. Proper maintenance of all filters reduces this risk.

Operation mode and Ex

The safety related modes Ex and Ex Tox has certified safety features. The detector monitors its functionality and proper function is indicated by an acoustic alive signal beeping every 20 s and by the LED being green. This requires that the leak detector is calibrated according to the instructions and intervals stated in this manual.

If the signal LED is red, this indicates an alarm or an error.

Green LED and short beep every 20 s: Function OK.

Red LED: Gas alarm or instrument error.

Yellow LED: Special state Special state indicates functioning system but alarms are typically not active. This special state may occur for example during calibration or when changing a setting in the leak detector.

IRwin Methane Leak Detector was built according to the state-of-the-art and the recognized safety regulations. Nevertheless, improper use may result in risk to life and limb on the part of the user or third parties, or damage to the leak detector or other property may occur.

3 Scope of delivery

The following is included in the delivery of IRwin (580-712):

Article (catalog number)	Quantity
Harness (580-405)	1
Charger for IRwin S, 100-240V (580-603)	1 (IRwin S only)*
Car adapter for IRwin S, 12V (580-602)	1 (IRwin S only)*
Charger cable for car (591-361)	1
Charger for IRwin SXnn models, 100-240V (580-605)	1
Certified IRwin Charging Adapter (580-604)	1
Operating instructions	1

*Only valid for IRwin S up to serial number 92000700.

The following is included in the delivery of the IRwin Kit in addition to the above:

Article (catalog number)	Quantity
Rod 850mm (580-150)	1
Extension Rod 150mm (580-160)	1
Carpet (580-211)	1
Bell (580-301)	1
Carrying Case IRwin (580-450)	1
Filter-kit (580-700)	1
Bar Hole Probe (580-115)	1
Extension Connector (580-220)	1

► Check that the delivery is complete.

4 Description

4.1 Function

The IRwin is a portable methane leak detector for gas pipeline survey. It measures following gases depending on the leak detector version:

- Methane
- Carbon dioxide
- Ethane
- Propane
- Butane
- Oxygen
- Hydrogen sulfide
- Carbon monoxide

There are several probes available for the leak detector:

- The carpet probe is used for surveying paved or smooth surfaces. Pull or push the carpet along the surface.
- Use the bell probe for measuring gas at specific points. Press the bell firmly down to pull gas through the surface.
- The hand probe is used for checking features on or in buildings. The hand probe also constitutes the handle for the carpet probe and bell probe.
- The Bar Hole probe is used to sample air from drilled holes. Push into hole and tighten screw to expand rubber before connecting sample line.
- The optional Hand Probe Flexible Extension can be connected to the hand probe or rod for easier access.

**INFICON single-cell
wide range technology
(patent pending)**

IRwin methane leak detector uses the unique INFICON single-cell wide range technology for detecting all concentrations from 1 ppm to 100 Vol% methane. This technology is very sensitive to the ethane content of natural gas. Therefore, large deviations can occur at higher methane concentrations if the ethane concentration is not compensated for. The instrument has built-in routines for ethane compensation. The actual ethane concentration can be determined using the IR Ethane Analysis function. This can be used to automatically set the compensation concentration. If preferred you can instead set the ethane content manually. The safety certified modes Ex and Ex Tox are not affected by this phenomenon. See IR Ethane Analysis and compensation [▶ 63].



IRwin SXG and SXGT models also have GC Ethane Analysis capability for distinguishing between Natural gas (NG), liquid petroleum gas (LPG) and swamp gas by determining the presence of methane, ethane and propane in the sampled gas.

The GC Ethane Analysis function is not affecting the ethane compensation.

4.2 Design of the leak detector



Fig. 1: Design of the leak detector

1	Display	4	Gas outlet
2	Reference inlet	5	Charging socket
3	Gas inlet		

4.3 Probes



⚠ WARNING

Risk of explosion due to not approved probe parts.

The original INFICON Hand probe is the only part of the probe system that is certified for use in potentially explosive areas. Other parts of the probe system, or third party accessories are not allowed in potentially explosive areas.

- ▶ Pay proper attention to safety when using other accessories for locating and pin-pointing gas leaks in none classified areas.

Carpet probe

When you are looking for gas leaks on paved surfaces, use the Carpet probe. Pull or push the Carpet probe along the surface.



Fig. 2: Carpet probe

Bell probe

When searching for or measuring gas leaks at particular spots, use the Bell probe. This can be used to pull gas through most pavings. It is also suitable for emergency testing if surface is wet.



Fig. 3: Bell probe

Hand probe

You can use the Hand probe to search for gas in building installations. The hand probe also constitutes the handle for the Carpet probe and for the Bell probe.



Fig. 4: Hand probe

Bar Hole Probe

The Bar Hole Probe is used to pump out and take samples from holes drilled in the asphalt or concrete when pin-pointing a leak. Note that the Bell Probe can be used first to reduce the number of holes.



Fig. 5: Bar Hole Probe

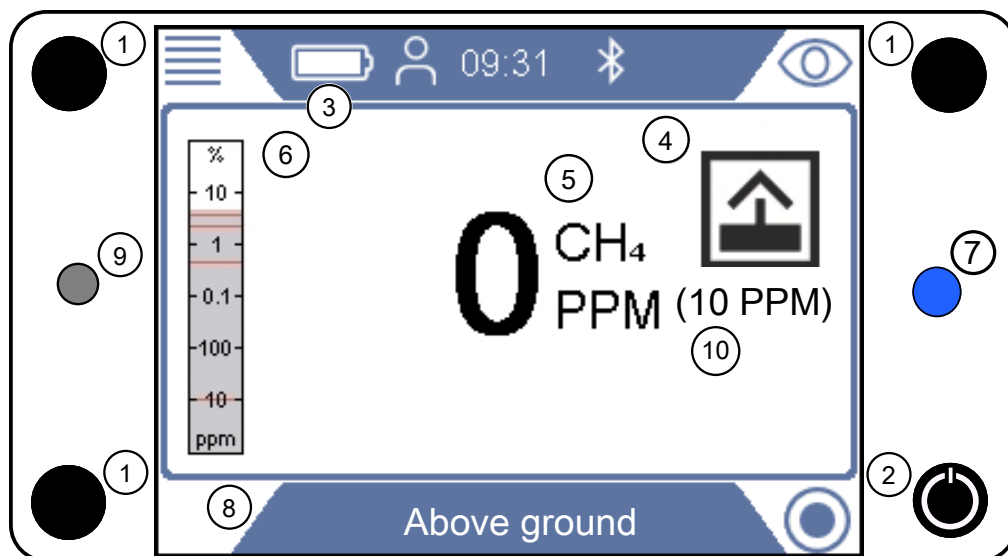
Hand Probe Flexible Extension

The flexible extension is practical when locating leaks in hard to reach installations. Use the Extension Connector to attach it to the long rod to reach even further.



Fig. 6: Hand Probe Flexible Extension

4.4 Display



1	Navigation buttons	2	Navigation and on / off button
3	Battery status indicator	4	Mode icon
5	Measured value, target gas and unit	6	Measurement range (in % or PPM CH ₄ depending on the operation mode)
7	Status indicator LED	8	Operation mode and menu bar
9	Buzzer	10	PPM threshold in Above Ground and Confined Space modes.

Navigation buttons

	Menu	Upper left
	Settings	Upper left after pressing "Menu"
	Operation	Upper right
	Information	Lower left after pressing "Menu"
	Diagnosis	At lower right after pressing "Menu"

Table 1: Navigation buttons

To select a menu, press the navigation button to go to desired tab or field.

Press check mark button , select or open a highlighted option.

Function buttons

	OK/Select/Confirm
	Navigation buttons (in this case go right)
	Cancel process
	Start process
	Start data logging
	Stop data logging


	Mute the alarm
---	----------------

Table 2: Function buttons

Symbols of the status bar
















	Bluetooth activated
	Symbol ON = GPS connected and tracking Symbol flashing = GPS not connected
	Battery status indicator
The color of the battery status indicator shows the remaining runtime before shut-down: White: > 1h remaining Orange: < 1h remaining Red flashing: < 10 min remaining	
Progress bars for calibration processes etc.	
	White bar: Process has not yet started
	Light green bar: Process running
	Dark green bar: Process completed
	Red bar: Process failed

Table 3: Status indicators

Mode icons

-  Operation mode- Above ground
-  Operation mode- Bar hole
-  Operation mode- Confined Space
-  Operation mode- House
-  Operation mode- Gas Purity
-  Operation mode- Ex
-  Operation mode- Ex Tox
-  Operating mode- GC Ethane Analysis

Permission levels




Symbol	Permission level	Password
	Basic	none
	Intermediate	1111
	Advanced	1422

Table 4: Permission levels

Status LED

Green	<ul style="list-style-type: none">• Leak detector is charging normal (power off)• Normal operation in the modes Ex and Ex Tox.
Cyan	Leak detector is charging fast.
Blue	Normal operation (in all operation modes except Ex and Ex Tox)
Red	<ul style="list-style-type: none">• Alarm• Error message
Yellow	The leak detector is in a state in which functions like for example alarms could be disabled. For example, during warm up or calibration.

4.5 Technical data

Mechanical data

	580-000	580-010	580-015	580-020	580-030
Name	IRwin S	IRwin SX	IRwin SXT	IRwin SXG	IRwin SXGT
Weight	1,4 kg (3 lb.)	1.6 kg (3.5 lb.)	1.6 kg (3.5 lb.)	1.6 kg (3.5 lb.)	1.6 kg (3.5 lb.)
Dimensions (lxwxh)	197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)	197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)	197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)	197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)	197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)

Electrical data

	580-000	580-010	580-015	580-020	580-030
Name	IRwin S	IRwin SX	IRwin SXT	IRwin SXG	IRwin SXGT
Power input	4 A	4 A	4 A	4 A	4 A
Memory capacity for measured data	64 MB	64 MB	64 MB	64 MB	64 MB
Type of protection	IP54	IP54	IP54	IP54	IP54
Electronic interfaces	Bluetooth 3.0 Class 1	Bluetooth 3.0 Class 1	Bluetooth 3.0 Class 1	Bluetooth 3.0 Class 1	Bluetooth 3.0 Class 1
Battery operating time	8 h as verified during certification, typical value 9 h	8 h as verified during certification, typical value 9 h	8 h as verified during certification, typical value 9 h	8 h as verified during certification, typical value 9 h	8 h as verified during certification, typical value 9 h
Battery charging time	4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading	4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading	4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading	4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading	4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading
Battery	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion

Physical data

	580-000	580-010	580-015	580-020	580-030
Name	IRwin S	IRwin SX	IRwin SXT	IRwin SXG	IRwin SXGT
Noise level	< 70 dB (A)	< 70 dB (A)	< 70 dB (A)	< 70 dB (A)	< 70 dB (A)

	580-000	580-010	580-015	580-020	580-030
Detectable gases	Methane, ethane, propane, butane, carbon dioxide	Methane, carbon dioxide, ethane, propane, butane	Methane, carbon dioxide, ethane, propane, butane, oxygen, hydrogen sulfide, carbon monoxide	Methane, carbon dioxide, ethane, propane, butane	Methane, carbon dioxide, ethane, propane, butane, oxygen, hydrogen sulfide, carbon monoxide
Gas flow through sniffer line	Typically 60 l/h	Typically 60 l/h	Typically 60 l/h	Typically 60 l/h	Typically 60 l/h

Ambient conditions

	580-000	580-010	580-015	580-020	580-030
Name	IRwin S	IRwin SX	IRwin SXT	IRwin SXG	IRwin SXGT
Max. altitude above sea level	2000 m	2000 m	2000 m	2000 m	2000 m
Permissible ambient temperature (during operation)	-20° - +50°C (-4 - 122°F)	-20 - 50°C (-4 - 122°F)	-15 - 40°C (-5 - 104°F)	-20 - 50°C (-4 - 122°F)	-15 - 40°C (-5 - 104°F)
Storage temperature	-25 - +70°C (-13 - 158°F)	-25 - 70°C (-13 - 158°F)	-25 - 70°C (-13 - 158°F)	-25 - 70°C (-13 - 158°F)	-25 - 70°C (-13 - 158°F)
Pressure range	80 kPa - 120 kPa	80 kPa - 120 kPa	80 kPa - 120 kPa	80 kPa - 120 kPa	80 kPa - 120 kPa
Max. relative humidity	95% (non-condensing)	95% (non-condensing)	95% (non-condensing)	95% (non-condensing)	95% (non-condensing)

4.5.1 EX certification (intrinsic safety)

Type certificate Type certificates, see Certificates [► 85]

The products:

- IRwin SX 580-010,
- IRwin SXT 580-015,
- IRwin SXG580-020,
- IRwin SXGT580-030,

are Ex certified with rating according to the following table. The IRwin S 580-000 is not Ex certified.

EX rating	EX rating	Ex ia IIC T3, T _{amb} : -20°C - +50°C, ⊕ II 1G (EPL Ga) USA: Intrinsically safe, Class I, Division 1, Groups A, B, C and D.
	EX ranges of applications	<ul style="list-style-type: none"> • Zones: 0, 1 and 2 • Gas groups: IIA, IIB and IIC • Temperature classes: T1, T2 and T3 • USA: Zone 0, Class I, Division 1, Groups A, B, C and D.

4.5.2 Sensors

Basic sensor data	Gas (measurement range)	Sensor	Warm up time
	CH ₄ , C ₂ H ₆	Infrared (IR)	< 30 s
	CO ₂	Infrared (IR)	< 30 s
	O ₂ , CO, H ₂ S	Electrochemical	< 120 s O ₂ sensor: 1 - 12 hours if stored with flat battery.

Sensor performance data The calibration gases defined below are the typical gases and gas mixes used to calibrate the different modes. For optimum performance adjust these settings to the actual concentrations of the gases used. See Calibration [► 40].

Above ground mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : 1 ppm - 5 Vol%
Resolution	1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0,1 Vol% (0,1 - 5 Vol%)

Measurement error	+5/-2 ppm (<20 ppm) +/-10% (20 - 50 ppm) +/-5% (50 ppm - 2.2 Vol%) +/-20% (2.2 - 5 Vol%)
Response time	$t_{50} < 3$ s, $t_{90} < 5$ s
Recovery time	$t_{50} < 3$ s, $t_{10} < 5$ s
Cross sensitivity	All hydrocarbons CxHy
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gases	Fresh air, CH ₄ in air: 10 ppm, 100 ppm, 2.2 Vol%

Bar hole mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : 0.5 - 100 Vol% C ₂ H ₆ content in CNG: 0.5 - 8 Vol% CO ₂ : 0.1 - 20 Vol%
Resolution	CH ₄ & CO ₂ : 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (>1 Vol%) C ₂ H ₆ : 0.1 Vol% (Auto test) 0.5 Vol% (manual selection)
Measurement error	CH ₄ : ±3 Vol% CO ₂ : +/-1% (<10 Vol%), +/-20% (>10 Vol%)
Response time	$t_{50} < 5$ s, $t_{90} < 10$ s
Recovery time	$t_{50} < 5$ s, $t_{10} < 10$ s
Cross sensitivity	All hydrocarbons CxHy CO ₂ : Negligible
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gases	Fresh air, CH ₄ in air: 2.2 Vol%, 100 Vol%. CO ₂ , 20 Vol%

GC Ethane Analysis mode:

Measurement principle	Gas Chromatography separation with semiconductor detector
Measurement range	1000 ppm gas needed in sample. This refers to total hydrocarbon content (i.e., natural gas, swamp gas or LPG etc.).
Capability	Can identify Natural Gas at 0.5% C ₂ H ₆ level. Automatic interpretation of result as either of: <ul style="list-style-type: none"> • NG with Ethane detected • Swamp gas detected • LPG detected

	<ul style="list-style-type: none"> Gas type not identified (given if result is not clear)
Cycle time*:	Ethane only: 2 min at 25°C, 3 min at 0°C Ethane and Propane: 5 min at 25°C, Propane detection not possible at 0°C
Purge time (before new GC test):	3 min
Lifetime	Separation column: Guaranteed 3 years, expected > 10 years Semiconductor sensor: Guaranteed 1 year, expected 3 years.

* Times given are valid after 1 h operation in given ambient temperature. Times include 30 s sensor purge before analysis. Three minutes column purge after analysis is not included. The column purge can be postponed.

House mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : 1 ppm - 5 Vol%
Resolution	1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (>1 Vol%)
Measurement error	+5/-2 ppm (<20 ppm) +/-10% (20 - 50 ppm) +/-5% (50 ppm - 2.2 Vol%) +/-20% (2.2 - 5 Vol%)
Response time	t ₅₀ <3 s, t ₉₀ <5 s
Recovery time	t ₅₀ <3 s, t ₁₀ <5 s
Cross sensitivity	All hydrocarbons C _x H _y
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gases	Fresh air, CH ₄ in air: 10 ppm, 100 ppm, 2.2 Vol%

Confined Space mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , 1 ppm – 100 Vol% for natural gas with up to 8% C ₂ H ₆ (ethane) content
Resolution	1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (>1 Vol%)
Measurement error	+5/-2 ppm (<20 ppm) +/-10% (20 - 50 ppm) +/-5% (50 ppm - 2.2 Vol%) +/-3 Vol% (2.2 - 100 Vol%)
Response time	t ₅₀ <5 s, t ₉₀ <10 s

Recovery time	$t_{50} < 5 \text{ s}$, $t_{10} < 10 \text{ s}$
Cross sensitivity	All hydrocarbons CxHy
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gas	Fresh air, CH ₄ in air: 10 ppm, 100 ppm, 2.2 Vol%, 100 Vol%

Gas Purity mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ : 0.5 - 100 Vol%
Resolution	0.5 Vol% (0.5 - 1 Vol%), 1 Vol% (>1 Vol%)
Measurement	±3 Vol%
Response time	$t_{50} < 5 \text{ s}$, $t_{90} < 10 \text{ s}$
Recovery time	$t_{50} < 5 \text{ s}$, $t_{10} < 10 \text{ s}$
Cross sensitivity	All hydrocarbons CxHy
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gas	Fresh air, CH ₄ in air: 2.2 Vol%, 100 Vol%

Ex mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : 1 - 100% LEL
Resolution	1%LEL
Measurement error	±5%LEL
Response time	CH ₄ : $t_{50} = 3 \text{ s}$, $t_{90} = 5 \text{ s}$
Recovery time	$t_{50} < 3 \text{ s}$, $t_{10} < 5 \text{ s}$
Cross sensitivity	All hydrocarbons CxHy
Lifetime	Guaranteed 1 years, expected > 2 years
Calibration gas	Fresh air, CH ₄ : 2.2 Vol%

Ex Tox mode:

Measurement principle	Infrared (IR)
Measurement range	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : 1 - 100% LEL CO ₂ : 0.1 - 5 Vol%

	<p>O₂: 0.1 - 25 Vol%</p> <p>CO: 1 - 500 ppm</p> <p>H₂S: 1 - 400 ppm</p>
Resolution	<p>CH₄, C₃H₈, C₄H₁₀: 1% LEL</p> <p>CO₂: 0.05 Vol%</p> <p>O₂: 0.1 Vol%</p> <p>CO: 1 ppm</p> <p>H₂S: 0.1 ppm</p>
Measurement error	<p>CH₄: ±5 % LEL C₃H₈: +/-40% of indicated value C₄H₁₀: +/-50% of indicated value</p> <p>CO₂: ±0.1 Vol%</p> <p>O₂: ±0.3 Vol%</p> <p>CO: ±3 ppm</p> <p>H₂S: ±0.5 ppm</p>
Response time	<p>CH₄: t₅₀ <3 s, t₉₀ <5 s</p> <p>O₂: t₅₀ <16 s, t₉₀ <40 s</p> <p>CO: t₅₀ < 15 s, t₉₀ <30 s</p> <p>CO₂: t₅₀ <12 s, t₉₀ <36 s</p> <p>H₂S: t₅₀ <18 s, t₉₀ <66 s</p>
Recovery time	<p>CH₄: t₅₀ <3 s, t₁₀ <5 s</p> <p>CO₂: t₅₀ <12 s, t₁₀ <36 s</p> <p>O₂: t₅₀ <16 s, t₁₀ <39 s</p> <p>CO: t₅₀ <15 s, t₁₀ <30 s</p> <p>H₂S: t₅₀ < 18 s, t₁₀ <66 s</p>
Sensitivity drift	<p>CH₄, C₃H₈, C₄H₁₀: <±5 %LEL in 1 month</p> <p>CO₂: <±5 Vol% in 1 month</p> <p>O₂: <±1 Vol% in 3 months</p> <p>CO: <±4% in 12 months</p> <p>H₂S: <±2% in 12 months</p>
Cross sensitivity	<p>CH₄: All hydrocarbons C_xH_y.</p> <p>O₂: negligible</p> <p>CO: <12% of applied H₂S concentration, <8% of applied H₂ concentration</p> <p>H₂S: <1.5% of applied CO concentration, <0.3% of applied H₂ concentration</p> <p>CO₂: negligible</p>

Lifetime	CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ : Guaranteed 1 years, expected > 2 years CO ₂ : Guaranteed 1 years, expected > 2 years O ₂ : Guaranteed 4 years, expected > 5 years CO: Guaranteed 2 years, expected > 3 years H ₂ S: Guaranteed 2 years, expected > 3 years
Calibration gas	Fresh air, ToxMix (CH ₄ 2.2 Vol%, CO ₂ 2 Vol%, CO 40 ppm, H ₂ S 40 ppm, O ₂ 0 Vol% in N ₂)

4.6 Factory settings

Parameter	Factory Setting	Options
Screen timeout (auto standby)	30 s	Off 5, 30 s 1, 2, 5, 10, 20, 30 min 1, 2
Brightness	10	1 -10
Screensaver (IRwin S only)	enabled	enabled or disabled
CH ₄ PPM Alarm	10 PPM	3, 5, 10, 15, 20, 25, 50, 100
CH ₄ AL1	10% LEL	3, 5, 10
CH ₄ AL2	50% LEL	30, 40, 50
CH ₄ AL3	100% LEL	80, 90, 100
C ₃ H ₈ PPM alarm	10 PPM	3, 5, 10, 15, 20, 25, 50, 100
C ₃ H ₈ AL1	10% LEL	3, 5, 10
C ₃ H ₈ AL2	50% LEL	30, 40, 50
C ₃ H ₈ AL3	100% LEL	80, 90, 100
C ₄ H ₁₀ PPM alarm	10 PPM	3, 5, 10, 15, 20, 25, 50, 100
C ₄ H ₁₀ AL1	10% LEL	3, 5, 10
C ₄ H ₁₀ AL2	50% LEL	30, 40, 50
C ₄ H ₁₀ AL3	100% LEL	80, 90, 100
CO ₂ AL1	0.5 Vol%	0.1, 0.2, 0.3, 0.4, 0.5
CO ₂ AL2	1.0 Vol%	0.6, 0.7, 0.8, 0.9, 1.0
CO ₂ AL3	5 Vol%	1.0, 2.0, 3.0, 4.0, 5.0
CO ₂ STEL	1.0 Vol%	0.5, 0.6, 0.7, 0.8, 0.9, 1.0
CO ₂ LTEL	0.5 Vol%	0.1, 0.2, 0.3, 0.4, 0.5

Parameter	Factory Setting	Options
CO AL1	30 ppm	10, 20, 30
CO AL2	60 ppm	40, 50, 60
CO AL3	500 ppm	100, 200, 300, 400, 500
CO STEL	30 ppm	10, 20, 30
CO LTEL	30 ppm	10, 20, 30
H ₂ S AL1	10 ppm	3, 5, 7, 10
H ₂ S AL2	20 ppm	10, 15, 20
H ₂ S AL3	100 ppm	50, 60, 70, 80, 90, 100
H ₂ S STEL	10 ppm	3, 5, 7, 10
H ₂ S LTEL	10 ppm	3, 5, 7, 10
O ₂ AL1	10 Vol%	3, 5, 10, 15
O ₂ AL2	18 Vol%	16, 17, 18, 19, 20
O ₂ AL3	23 Vol%	21, 22, 23, 24, 25
Calibration reminder	Off	Off, 1 - 7, 14, 30 days
Function test reminder	Off	Off, 2, 4, 8 h.
Time	UTC +2 h.	-11 - +12 h.
Language	English	English, Deutsch, Italiano, Nederlands, Polskie
Ethane %	0%	0 - 8% (in increments of 0.5%)
Log to file	enabled	enabled / disabled
Logging Interval (log file period)	1 s	1, 2, 3, 5, 10, 30 s, 1 min
Start menu	Ex, (Above ground in IRwin S)	
Autorotations	Off	On, Off
Re-test C ₂ H ₆ in Bar Hole	Off	Off, startup, always
Measuring duration (Auto bar hole)	10 s	10, 15, 20, 25, 30 s
Evacuation duration (Auto bar hole)	3 min	3, 4, 5, 10, 15 min
CO ₂ -limit at evacuation (Auto bar hole)	Off	Off, 1, 2, 3, 4, 5%

4.7 Concentration of calibration and test gases

Calibration routine	Gases	Default	Options
Above Ground	10 ppm CH ₄	10 ppm	8 - 15 ppm in 0.1 ppm increments
	100 ppm CH ₄	100 ppm	90 - 110 ppm in 1 ppm increments
	2.2 Vol% CH ₄	2.2 Vol%	2.0 - 2.5 Vol% in 0.1 Vol% increments
Ex Tox (Tox) Mixture of:	2.2 Vol% CH ₄	2.2 Vol%	1.4 - 2.5 Vol% in 0.1 Vol% increments
	2.0 Vol% CO ₂	2.0 Vol%	0.5 - 3.0 Vol% in 0.1 Vol% increments
	0 Vol% O ₂	0.0 Vol%	0.0 - 18.0 Vol% in 0.1 Vol% increments
	40 ppm H ₂ S	40 ppm	4 - 50 ppm in 1 ppm increments
	40 ppm CO	40 ppm	20 - 160 ppm in 1 ppm increments
	Balance: N ₂	Not applicable	Not applicable
Ex	2.2 Vol% CH ₄	2.2 Vol%	2.0 - 2.5 Vol% in 0.1 Vol% increments
Bar Hole CO₂	20.0 Vol% CO ₂	20.0 Vol%	10.0 - 20.0 Vol% in 0.1 Vol% increments
Bar Hole CH₄	2.2 Vol% CH ₄	2.2 Vol%	2.0 - 2.5 Vol% in 0.1 Vol% increments
	100 Vol%	100 Vol%	80 - 100 Vol% in 1 Vol% increments
GC Ethane analysis* Mixture of:	1 Vol% CH ₄	Not applicable	Not applicable
	50 ppm C ₂ H ₆	Not applicable	Not applicable

**Used only for Function Test of GC Ethane Analysis.*

Balance gas is Synthetic Air if nothing else stated (Ex Tox balance is N₂).

5 Getting started

5.1 Charging the battery



WARNING

Explosion hazard

The equipment for charging IRwin is not ATEX certified/ex-protected.

- ▶ Never charge IRwin (all models) in potentially explosive atmospheres.



WARNING

Using the wrong charger could damage the explosion protection of IRwin SXnn models.

The only equipment allowed to be connected to the Charging socket of any of the IRwin SXnn models is the Ex Certified IRwin Charging Adapter. Connect this adapter to the leak detector first and then connect the charger or car cable to the adapter.



NOTICE

Fast charging reduces the lifetime of the battery.

- ▶ Do not use fast charging regularly.
- ▶ The ambient temperature during the charging process should be between 10 and 30 °C.

Accessories for charging for IRwin S up to serial number 929000704



Charger for IRwin S, 100-240V
(580-603)

or



Car adapter for IRwin S, 12V
(580-602)

Charge IRwin S

- 1 Switch off IRwin S.
 - 2 Connect the "Charger for IRwin S, 100-240V (580-603)" or "Car adapter for IRwin S, 12V (580-602)" to the charging inlet of IRwin S. Align the red marks of the charging socket and charging plug with each other.
- ⇒ The status LED is green when the battery charges normal.

Fast charging IRwin S

- 1 For charging the leak detector faster switch on the IRwin S.
 - 2 Connect the "Charger for IRwin S, 100-240V (580-603)" or "Car adapter for IRwin S, 12V (580-602)" to the charging inlet of IRwin S.
 - 3 Select fast charge when the pop-up is shown on the display.
- ⇒ The signal LED is turquoise when the battery is charging at a fast rate.

Accessories for charging for IRwin SXnn and IRwin S from serial number 929000705



Charger for IRwin SXnn models,
100-240V (580-605)



Certified IRwin Charging Adapter
(580-604)

or



Charger cable for car (591-361)

Charging IRwin SXnn and IRwin S from serial number 929000705

- 1 Switch off IRwin SXnn.
 - 2 Connect the "Certified IRwin Charging Adapter (580-604)" to the charging inlet of IRwin SXnn. Align the red markings of the charging socket and charging plug to each other.
 - 3 Connect the "Charger for IRwin SXnn models, 100-240V (580-605)" or "Charger cable for car (591-361)" to the "Certified IRwin Charging Adapter (580-604)".
- ⇒ The status LED is green when battery is charging normally. The status LED goes out when charging is completed.

Fast charging IRwin SXnn

- ▶ When the signal LED is green and indicating normal charge, press the upper right button.
- ⇒ The detector is now charging fast and the status LED turns cyan.

	Normal	Fast charge
100%	4 h from empty to full charge produces 9.5 h operation time	3 h from empty to full charge produces 9 h operation time
Short charge	1 h charging gives >3.25 h of operation	1 h charging gives 4 h of operation

5.2 Assembling the probe system



⚠ WARNING

Risk of explosion due to not approved probe parts.

The original INFICON Hand probe is the only part of the probe system that is certified for use in potentially explosive areas. Other parts of the probe system, or third party accessories are not allowed in potentially explosive areas.

- ▶ Pay proper attention to safety when using other accessories for locating and pin-pointing gas leaks in none classified areas.



NOTICE

The assembly of the probe system influences the response time stated in the technical data.

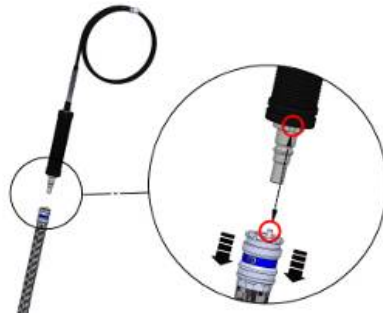
The probe system consists of the hand probe, the probe rod, the probe rod extension, the carpet probe and the bell probe. Each probe part is equipped with quick couplings and can be assembled according to the following graphics. The connection to the leak detector is made with the hand probe in all configurations.

The proper functioning of the system can only be assured with compatible probe systems of the manufacturer.

- 1 Attach the probe rod to the carpet or the bell probe.



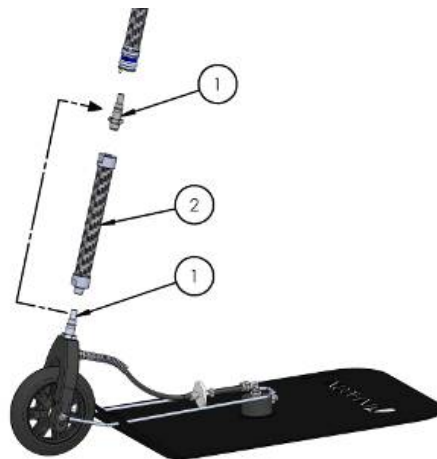
- 2 Attach the hand probe to the probe rod.



- 3 Connect the probe tube of hand probe to the gas inlet of the leak detector, see Design of the leak detector [► 13].

Install the probe rod extension

To improve the ergonomics of the carpet probe, you can install the "probe rod extension".



- 1 Remove the male quick fitting (1) from the carpet using as 17 mm wrench.
- 2 Remove the tape covering the female thread of the extension rod (2).
- 3 Place the O-ring, found under the tape, flat on the bottom surface of the female threaded hole.
- 4 Screw the removed male quick fitting (1) in place in the extension rod (2). Make sure the O-ring stays in place by holding the extension rod (2) vertical. If desired you can use nut locking fluid to secure the fitting (1).

- 5 Remove the O-ring and clean the threaded hole on the black fork on the carpet (where you removed the connector).
- 6 Place the O-ring flat on the bottom surface of the threaded hole.
- 7 Screw the extension rod in place in the carpet fork. Make sure the O-ring stays in place by holding the fork vertical.
IMPORTANT: Be careful when tightening. The fork is plastic and the threads are easily destroyed. If desired you can use nut locking fluid to secure the extension rod (2).
- 8 Connect the longer rod to the carpet.

5.3 Transfer data to computer



NOTICE

System requirements: Windows 7 or later with Bluetooth interface.

5.3.1 Install software for data transfer

- 1 Install the IRwin App software on your computer.
- 2 Follow the instructions on the screen.

More complete information about supporting software can be found in separate documents.



5.3.2 Pairing the leak detector with computer via Bluetooth interface

- ✓ Set IRwin in one of the following operating modes: Bar Hole, Gas Purity, House, Above Ground and Confined Space. Bluetooth is active in all these modes.
- ✓ Make sure IRwin App is installed on your computer.
- ✓ Make sure Bluetooth is activated on your computer.
 - 1 Establish a Bluetooth connection. Refer to the instructions on your computer. When searching for your detector on the computer, locate the correct serial number of your detector and select that device on the computer. Some computers will prompt you to acknowledge that a connection "password" has been correctly transferred to the detector. You must confirm this on both computer and detector.
 - 2 Start the program IRwin App on your computer.
 - 3 In the IRwin App on your computer, Click Connection (menu item) > Port and select your detector.

⇒ The serial number of the leak detector is displayed in the drop down menu.

- 4 Select "Connect" on the menu bar in IRwin App.
- 5 Click "Start Streaming" on the menu bar of IRwin App.

5.3.3 Transfer log files from leak detector to computer

- ✓ You have installed IRwin App software on your computer.
- ✓ You have recorded at least one log file in your detector.
- ✓ You have activated the Bluetooth interface on your computer.
 - 1 Switch on the leak detector
 - 2 Perform self-test.
 - 3 Set IRwin in one of the following operating modes: Bar Hole, Gas Purity, House, Above Ground or Confined Space. Bluetooth is active in all these modes.
 - 4  >  > Data output > Files (Tab)
 - 5 Start IRwin App on your computer
 - 6 Select the serial number of your detector in "Port" drop down menu. If not found, check setting of Bluetooth interface and repeat pairing sequence if necessary.
 - 7 Click "Connect" in IRwin App.
 - 8 Select tab "File" in the graphic window in IRwin App.
 - 9 Select the file to transfer. You can only transfer one file at the time.
 - 10 Click "Download File" in IRwin App.
 - 11 IRwin App will confirm when file is transferred.
 - 12 To delete a file, select the file in the IRwin App and click "Delete File". Reenter the file list in IRwin to confirm that the file is deleted.

5.3.4 Real-time streaming from leak detector to computer

- ✓ You have installed IRwin App software on your computer.
- ✓ You have activated the Bluetooth interface on your computer.
 - 1 Switch on the leak detector.
 - 2 Perform self-test.
 - 3 Set the leak detector in the desired mode. This must be one of the following operating modes: Bar Hole, Gas Purity, House, Above Ground or Confined Space. Bluetooth is active in all these modes.
 - 4 Start IRwin App on your computer.
 - 5 Select the serial number of your leak detector in "Port" drop down menu. If not found, check setting of Bluetooth interface and repeat pairing sequence if necessary.

- 6 Click “Connect” in IRwin App.
 - 7 Select tab “Live” in the graphic window in IRwin App.
 - 8 Click “Start Streaming” in IRwin App.
- ⇒ The measurement data is now presented as a graph.



While streaming you can change mode as desired.

Streamed data cannot be saved.

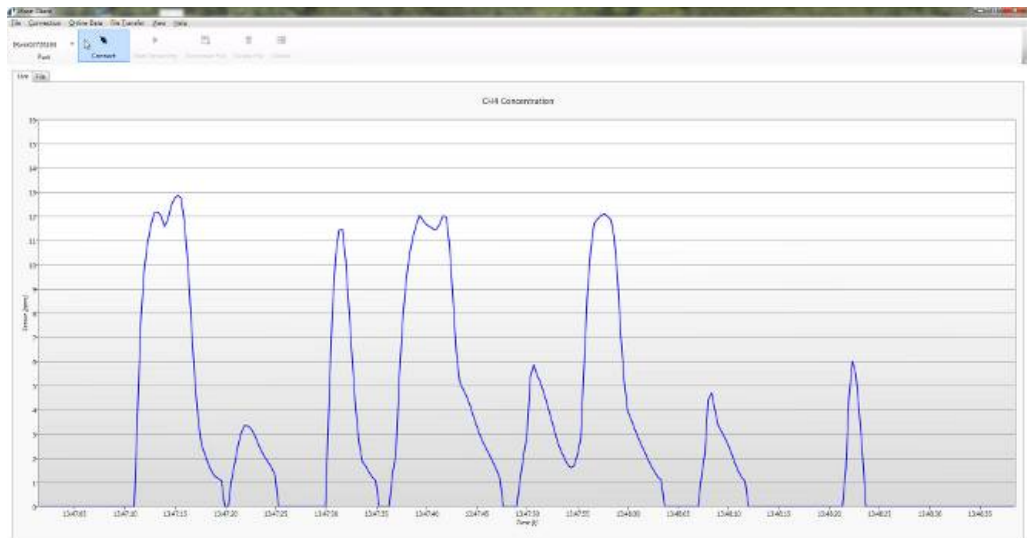


Fig. 7: Streamed measurement data

6 Operation



⚠ WARNING

Danger to life and limb

Due to incorrect and irregular inspections.

- ▶ Check all parts of the entire measuring system regularly for damages.

6.1 Switch ON



⚠ WARNING

Explosion hazard

IRwin S and any kind of equipment for charging (for all models), are not ex-protected.

- ▶ Do not use the IRwin S or any kind of charger for the S and SXnn versions in explosive atmospheres.



The start-up sequence can differ slightly between the individual models.

- 1 Press the on / off button on the lower right of the display (Design of the leak detector).
 - ⇒ During start-up, the leak detector passes through a warm-up phase of 2 minutes maximum and performs a self-test of software and parameter memories, battery, display, pumps, valve(s), buzzer, sensors and status LED.
- 2 To confirm the function of the buzzer, press the button next to check mark (upper right).
- 3 The status LED lights up in various colors as indicated on the screen. Confirm each color by pressing the check mark (upper right).
- 4 Confirm the results of the self test.
 - ⇒ The measurement screen appears.
- 5 If you want to check the condition of the leak detector even further, perform a calibration test (Calibration) or a function test (Performing function tests) before starting to work.




6.2 Initial setup






After 2 minutes of inactivity the menu system exits automatically to the measurement screen.

6.2.1 Adjust the local time

If the time of the leak detector and the local time do not match you can change the time zone.

- 1  >  > General > Time/Date (Tab).
- 2 Adjust the local time zone.
⇒ For the settings, see Factory settings [▶ 26].
- 3 Leave the view via .

6.2.2 Setting the language

- 1  >  > General > Misc (Tab) > Language
- 2 Select a language.
- 3 Leave the view via .

6.2.3 Change permission level

The leak detector has three permission levels “Basic“, “Intermediate“ and “Advanced“.

The leak detector starts with the permission level "Basic". The permission levels “Intermediate“ and “Advanced“ are protected by a password. You can see which permission level is active in the status line of the display (Display [▶ 16]).







Symbol	Permission level	Password
	Basic	none
	Intermediate	1111
	Advanced	1422



Table 5: Permission levels

Change permission level

- 1  >  > Password > Login (Tab).
- 2 Use the navigation buttons to enter the password for the desired permission level.
- 3 Leave the view via .




Log out from a higher permission level

If you want to restore the permission for "Basic", you must log off.

- 1  >  > Password > Logout (Tab).
- 2 Press the check mark button two times to log out.

6.2.4 Screensaver timeout

You can activate a screen saver that will turn the screen off if there is no alarm or key action within an adjustable time.

- 1  >  > General > Display (Tab)
- 2 Select the desired timeout or select "Off" to disable the screensaver.
- 3 Leave the view via .

Switch on screen

- ▶ To switch the screen back on, press any button. It will switch on automatically if a gas alarm is triggered.

6.2.5 Configure data logging

You can record and store the following data in the leak detector.



- Date
- Time
- GPS coordinates

Measurement data of the activated mode:

- CH₄ and CO₂ measurements
- % LEL
- CO, O₂ and H₂S measurements (IRwin SXT and IRwin SXGT)

The measurement data recording must be configured before the initial use:

✓   Login as Intermediate or Advanced






- 1  >  > Data output > Log to File (Tab)
- 2 Select "Enable log to file" and press the button next to .
- 3 Select "Log interval" and select a time interval. A blue button is shown in the lower right corner when data logging is enabled. Press the on / off button to start and stop logging to file.



The shorter you set the recording interval the more disk space is required. The percentage of disk space used is shown by the bar below, "Used disk space" on the Log to File tab.

6.2.6 Enable dead band suppression (IRwin SXnn only)



For the toxic sensors in the application mode “Ex Tox mode“ a dead band suppression can be activated. If you activate the dead band suppression, the leak detector will suppress small signal fluctuations around the zero point of the measurement signal.




- 1  >  > General > Misc (Tab) > dead band Suppression.
⇒ The symbols  (top right) and  (bottom right) appear.
- 2 Press the button next to .

6.2.7 Setting the Function Test interval

Determine time interval of Aufforderung Funktionstest

Consider relevant standards and regulations.

✓   Login as Intermediate or Advanced

- 1  >  > Function Test > Interval (Tab)
- 2 Select the function test and the time interval.
⇒ IRwin S: You can set a time interval.
⇒ IRwin SXnn: You can set the time interval individually for the modes “Above Ground“, “Ex“ and “Ex Tox“.
- 3 Leave the view via .

6.2.8 Calibration

The built-in calibration routines guide you through the adjustment of the leak detector sensitivity to the various test gases. You can set calibration intervals for the different adjustments and will then get a reminder when calibration is due (Adjust calibration reminder).



Allow IRwin to warm up for 1 hour before calibrating for best accuracy.

The calibration intervals for Ex and Ex Tox are based on the TÜV certificates for these operating modes. For the other modes these time intervals are chosen to give you the best performance. Use the results of the various function tests to judge whether a calibration is needed. If you want to perform more than one calibration procedure at a given time you should run them in the following sequence for best performance.

1. Above Ground
2. Ex Tox (IRwin SXT and SXGT only)
3. Ex CH₄ (IRwin SX, SXT, SXG and SXGT only)
4. Bar Hole CO₂
5. Bar Hole CH₄

Recommended calibration intervals

- Above Ground CH₄ - weekly
For calibration in Above Ground mode you need the following gas concentrations: 10 ppm CH₄, 100 ppm CH₄, 2.2% CH₄.
With this calibration you calibrate the higher range (Vol%) of the modes House and Bar Hole at the same time.
- Ex Tox - weekly
For calibration in Ex Tox mode you need Tox mix.
The CO₂ calibration of other modes is not affected. CH₄ of the operation mode Ex is also calibrated during the Ex Tox calibration. However, for best performance, it is recommended to perform the Ex calibration after the Ex Tox calibration.
- Ex CH₄ - weekly
For calibration in Ex mode you need the following gas concentrations: 2.2% CH₄.
- Bar Hole CO₂ - monthly
For calibration of the CO₂ measurement of Bar Hole you need the following gas concentrations: 20% CO₂.



This calibration does not influence the toxic CO₂ calibration (ppm) in the Ex Tox calibration routine.

- Bar Hole CH₄ - monthly
For calibration of the CH₄ measurement of Bar Hole you need the following gas concentrations: 2.2% CH₄, 100% CH₄.
Beside the calibrations of the application mode "Bar Hole" the application modes "Gas Purity" and "Confined Space" will be calibrated in the higher measurement range (Vol%), too.



WARNING

Explosion, asphyxiation, toxic risk

Incorrect calibration leads to incorrect measurement results. Thus you are not properly warned against any possibly dangerous gas concentrations.

- ▶ Calibrate the leak detector only when you have been properly trained.
- ▶ Calibrate the detector in well ventilated rooms or outdoors.



The methane calibration is possible with gas mixtures in synthetic air only.

The natural background of CO₂ (typically 400 ppm) in ambient air will offset the calibration.

Fresh air exposure should, however, always be by ambient air.



After the leak detector has been calibrated with 100% methane it shows a few ppm increase in the measured value for a few minutes. This is a normal behavior of the leak detector and due to gas residues inside the leak detector.

Retrieving information about the calibration

The leak detector saves the date and the time of the last successful calibration.

▶ ≡ > ⚙ > Calibration > Info (Tab)

6.2.8.1 Standard calibration procedures

Prepare calibration

For a complete calibration you need the gases listed, see Concentration of calibration and test gases [▶ 28].

It is not necessary that you calibrate all modes at the same time.

Mode	Calibration Routine				
	Above Ground	Ex Tox	Ex	Bar Hole CO2	Bar Hole CH4
Above Ground	X				
Bar Hole				X	X
Confined Space	X				X
House	X				
Gas Purity					X
Ex		X*	X		
Ex Tox		X*			
GC Ethane Analysis	Not calibrated (qualitative test only)				

**Ex Tox calibration routine also calibrates Ex mode.*

No need to run Ex calibration routine separately if Ex Tox calibration has been performed.







Calibrate Above Ground first for best performance.

You don't need to perform any of the calibration routines more than once for a complete instrument calibration.

You can use different calibration stations for the calibration. However, the following requirements have to be fulfilled.

- The gas flow delivered by the calibration station must be higher than the flow aspired by the leak detector. Set the gas flow to at least 80 l/h.
- The gas must be delivered at ambient pressure (i.e., do not push gas into the leak detector). Normal way to accomplish this is to create an open connection between gas container and detector inlet so that the excess calibration gas is vented to the ambient. This exhaust should be placed outside the test room, preferably outdoors.

Calibration

- ✓   Login as Intermediate or Advanced
- ▶  >  > Calibration > Calibration (Tab)
 - ⇒ Select the calibration to perform and click the check mark button.
 - ⇒ The leak detector leads you through the process by indicating which gas to deliver to the detector in each step. Make sure that no residual gases are present in the ambient during Fresh Air step. Most common problems occur if you used 2.2 Vol% or 100 Vol% methane shortly before the trying to calibrate with 10 ppm or 100 ppm methane.
 - ⇒ A successful calibration is confirmed by a green check mark.
 - ⇒ A failed calibration is indicated by a red cross.



You can continue to use the leak detector even if calibration failed. The previous calibration parameters are restored.






6.2.8.2 Setting of calibration gas concentrations



Accuracy can be affected by calibration gas tolerance.

For optimum performance adjust the concentrations of the calibration gases set in the leak detector to the actual composition of your calibration gases.

For optimum performance of your leak detector you should use the proposed calibration gases. The exact concentrations of the gas delivered often deviates slightly from these values due to tolerance factors etc. The exact value is typically stated on the analysis certificate of the respective gas. You should therefore adjust the concentrations of the calibration gases set in the detector to match the actual composition of your calibration gases, see "Concentration of calibration and test gases [▶ 28]".

- ✓   Login as Intermediate or Advanced
- 1  >  > Calibration > Settings (Tab)
- 2 Select calibration routine first and then select the gas to adjust (if several).
- 3 Confirm your selection with .

⇒ A window appears with controls for adjusting the gas selected.

- 4 Set the exact gas concentration value via drop-down menus. The leak detector shows the gas to adjust in the window and the currently stored concentration appears just below the setting line. You cannot set the concentration outside the range.
- 5 Select "Set" to confirm new value or "Reset" to restore the default value.



The "names" for the different calibration routines is not affected by the adjustment of calibration gas concentrations. The texts displayed during the calibration process will, however, show the adjusted values.



If using the same gas in several calibration routines, you must adjust the concentration of that gas in all relevant routines.

6.2.9 Adjust calibration reminder

You can set an Interval for a calibration reminder for each of the calibration types. The Interval is set to Off as default, meaning no reminder.

Activate calibration reminder

✓   Login as Intermediate or Advanced

1  >  > Calibration > Interval (Tab)

2 Select the operation mode for which you want to set a calibration reminder and set the desired period of time.

3 Leave the view via .

The leak detector saves the set period of time automatically.

6.3 Operating modes



After 2 minutes of inactivity the menu system exits automatically to the measurement screen.

6.3.1 Select operating mode

After finishing the self test the leak detector goes into the operating mode "Ex" ("Above ground" IRwin S).

- ▶ Press  repeatedly to scroll through the operating modes.

The detector is ready to use when the measurement value(s) turn(s) black and the status LED illuminates blue (green for Ex and Ex Tox modes).

6.3.2 Operating mode "Above Ground"

This mode is the most sensitive and intended for pipeline survey. This is done by taking samples on the ground surface along the pipe route typically using the carpet probe.

The detector is ready to use when the measurement value(s) turn(s) black and the status LED illuminates blue (green for Ex and Ex Tox modes).



WARNING

Do not use Above Ground for safety check.

The accuracy is not certified for LEL measurement.

Observe all safety precautions when alarms are given.

Never open or enter a confined space without first testing LEL level in the Ex or ExTox mode.

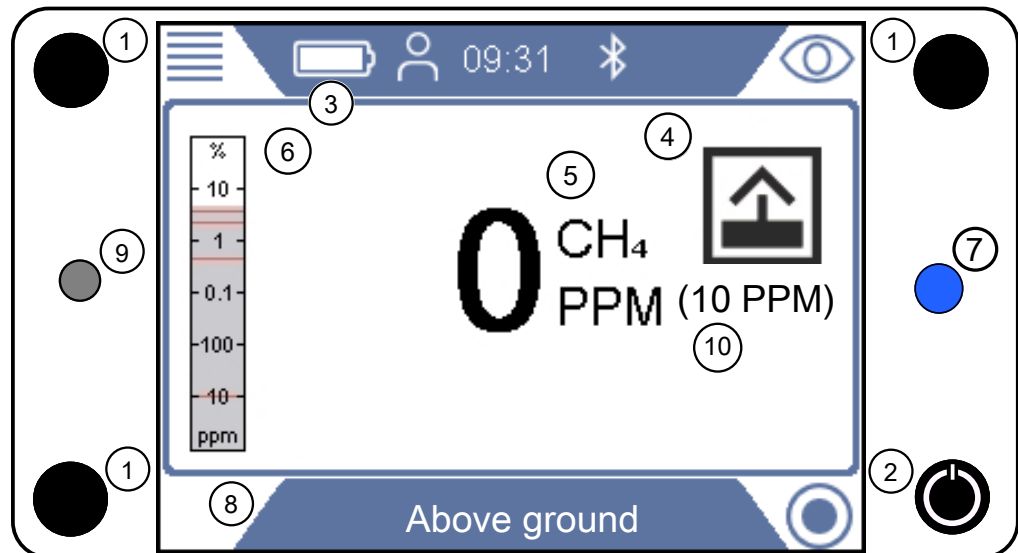


Fig. 8: "Above Ground" display

1	Navigation buttons	2	Navigation and on / off button
3	Battery status indicator	4	Mode icon
5	Measured value, target gas and unit	6	Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in quasi-logarithmic scale
7	Status indicator LED	8	Operation mode and menu bar
9	Buzzer	10	PPM threshold in Above Ground and Confined Space modes.
Measurement range		Measurement range	
		1 ppm - 5 Vol% methane	

6.3.3 Operating mode “Bar Hole”

This mode is intended for pin-pointing leaks by measuring the concentration in the ground. The detector is ready to use when the measurement value is black and status LED is blue. No gas alarms are given in this mode.



⚠ WARNING

No gas alarms are given in the Bar Hole mode.

When pin-pointing leaks you will often encounter very high concentrations, far above the LEL limit. Be careful and follow all relevant safety regulations.

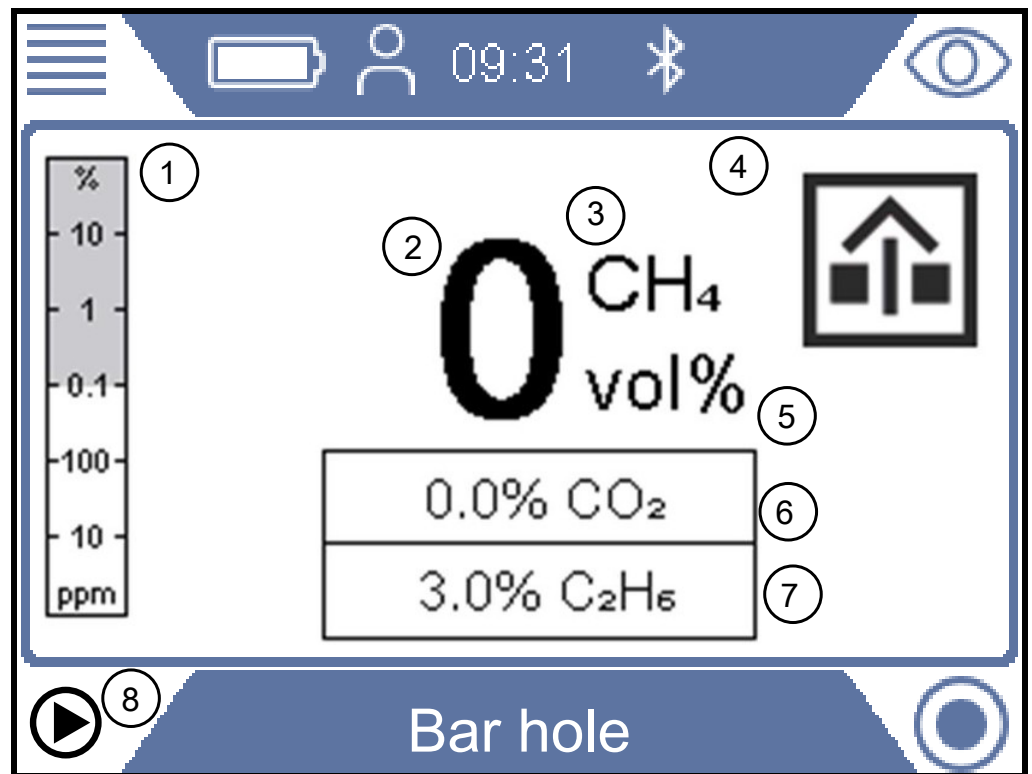


Fig. 9: "Bar hole" display

1	Analog bar showing range (grey) and measurement value (blue) in Vol% (quasi logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active operating mode
5	Unit of the measured value	6	CO ₂ measurement value
7	C ₂ H ₆ compensation value	8	Start Automatic Bar hole test. Zeroing button, if needed. Zeroing symbol disappears if gas is detected.

Measurement range	Measurement range	0.5 Vol% - 100 Vol% CH ₄
		0.1 Vol% - 20 Vol% CO ₂

You can readjust the zero point of the CH₄ Vol% value if needed. This can be done if deviation is within +/- 5 Vol%. Press lower left button if "0" appears in blue.

Deviation outside +/- 5 Vol% is an indication that the system needs to be calibrated.



NOTICE

Measurement errors due to incorrect ethane compensation

Incorrect ethane compensation value can result in significant deviations in the estimated methane concentration.

See Entering ethane concentration manually [▶ 63] for information on how you set the value for ethane compensation. See also Setting reminder for IR Ethane Analysis [▶ 64].

6.3.3.1 Automatic “Bar Hole” testing



The detector has an automated function for ventilating and testing the gas content in bar holes. This function will take three samples in the hole with a pre-determined evacuation time between the samples. Default setting is 10 s measurement and 3 minutes evacuation between samples. You can also set the detector to terminate the sequence when the CO₂ level has dropped below a given threshold even if all three samples are not yet taken (Setting parameters for “Auto Bar Hole”).

A low content of CO₂ is a good marker for a well ventilated hole.

The leak detector starts beeping when the test sequence is finished and displays the methane and CO₂ concentrations.

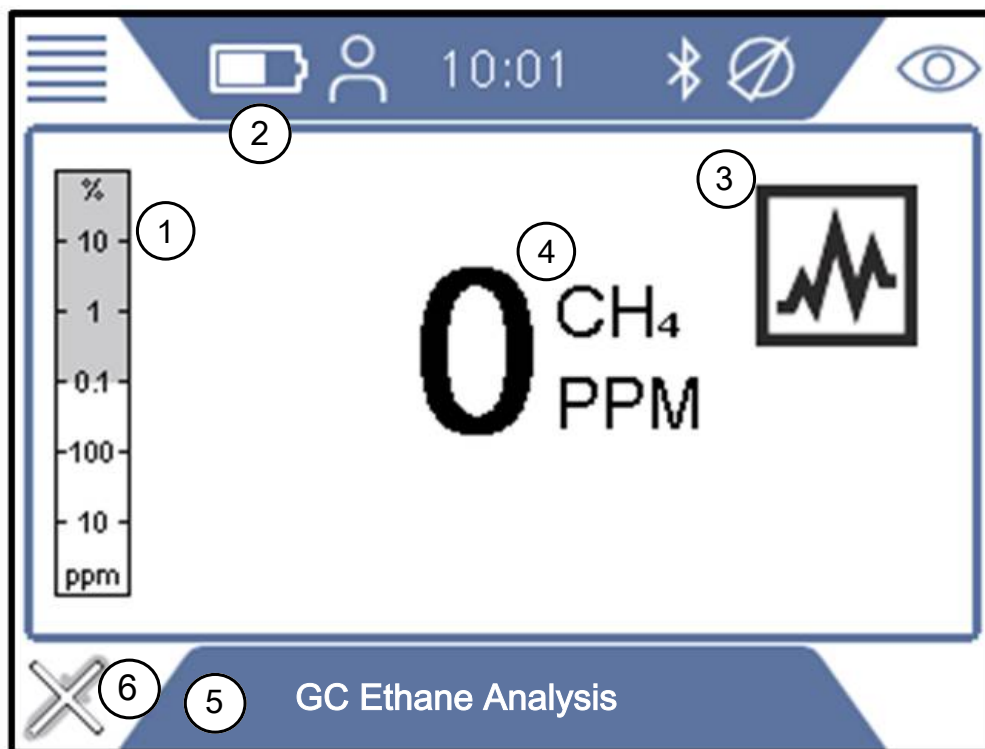
1. Set the leak detector in Bar Hole mode.
2. Press the lower left key „▶“ to start Auto Bar Hole test.
3. Place the probe in or on the hole and press the check mark key.
4. Leave the leak detector to complete the Auto bar Hole test.
5. You can read the result of the individual measurements on the display when the sequence is ready. The leak detector will start beeping when the test is ready. Note that three results will be presented even if IRwin did not make all three. The results are cleared when you press the check mark key.

6.3.3.2 Setting parameters for “Auto Bar Hole”

- 1  >  > Auto Bar Hole > Settings (Tab)
- 2 Measuring Duration. This is the time the detector tests the gas in each measurement. Select 10 - 20 s (5 s increments)
- 3 Evacuation Duration. This is the pumping/evacuation time between measurements. Select 3, 4, 5, 10 or 15 min.
- 4 CO₂ Limit on Evacuation. This is the limit indicating a well evacuated test point. Auto Bar Hole sequence will be terminated directly after completing one measurement in which CO₂ level has dropped below the set limit. Select Off to disable function or 1 - 5% to activate function.

6.3.4 Operating mode "GC Ethane Analysis"

This mode is intended for determining if a gas sample is natural gas (NG), liquefied petroleum gas (LPG) or swamp gas / bio gas.



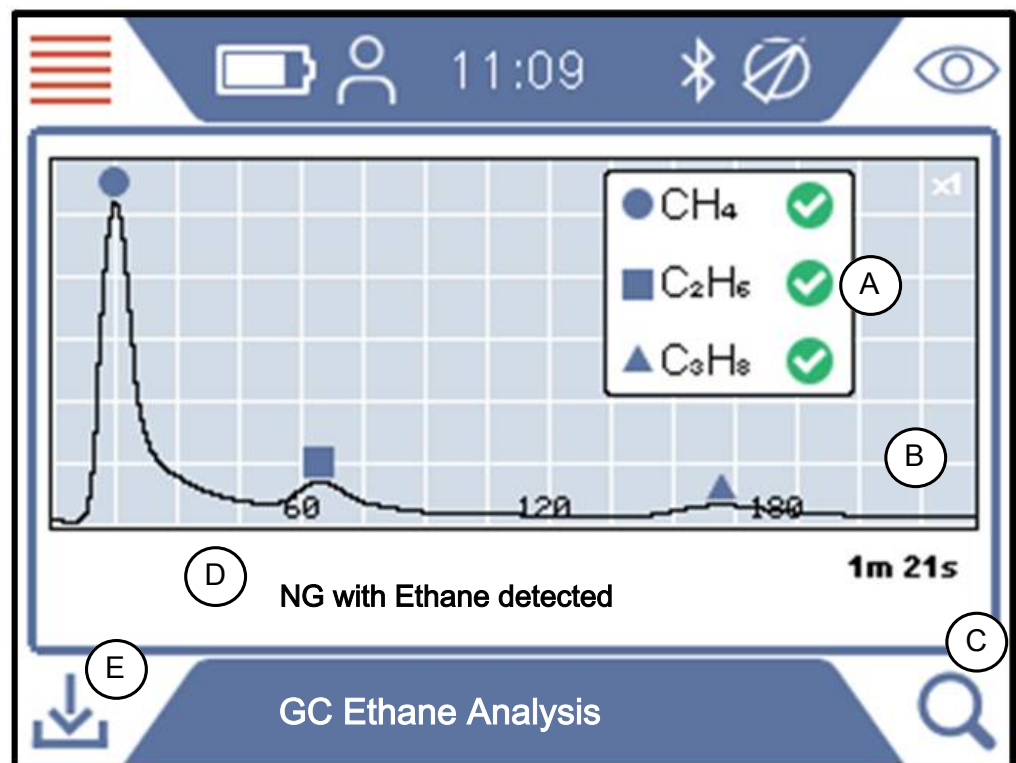
1	Analog bar indicating concentration range (grey) needed to perform GC Ethane Analysis and measurement value (blue) in quasi logarithmic scale	2	Battery status indicator
3	Mode icon	4	Measured value, target gas and unit
5	Operation mode and menu bar	6	Take sample for analysis. Becomes active (blue) and cross disappears when natural gas concentration is high enough.

Measurement range

Detectable range	≥ 0.5 Vol% ethane in gas.
------------------	---------------------------

- 1 When in GC Ethane Analysis mode, expose to gas
- 2 Press lower left button when cross disappears and sampler symbol turns blue.
- 3 Confirm that you want to perform GC Ethane Analysis and follow instructions:
 - ⇒ The detector prompts you to keep exposing to gas

- 4 Move probe to fresh air, when the detector prompts you to place probe in fresh air.
 - ⇒ The semiconductor sensor is purged to prepare for GC Ethane Analysis.
 - ⇒ GC analysis starts and the resulting graph is being displayed. Remaining time is displayed.
- 5 Press lower left button (x) and confirm to end the analysis when ethane analysis is completed (typically 80s). Propane is not analyzed if ending.
 - ⇒ Result is interpreted and displayed (see A and D below)
 - ⇒ The GC system is purged. Remaining purge time is displayed (see B below).
- 6 Press lower right to zoom graph (see C below)
- 7 Press lower left button to save analysis (see E below).
- 8 You can postpone purging of GC system by changing mode. Confirm by pressing Check mark button.
 - ⇒ Purging will restart automatically if shutting IRwin down or attempting to make a new GC Ethane Analysis.



The data saved after a GC Ethane Analysis contains data for when and where the sample was taken.

The data can be retrieved by the IRwin APP (Windows application) that will create a PDF report for the analysis.

You can save a large number of analysis data files for later report generation.

The GC Ethane Analysis requires no calibration.

6.3.5 Operating mode “Confined Space”



⚠ WARNING

The accuracy of the methane measurement in the operating modes "Confined Space" and "House" is not certified for the LEL measurement.

Observe all safety precautions when alarms are given. Never open or enter a room without first checking the LEL level in Ex or Ex Tox operation mode.

The operating mode House is not intended for pre-entry safety checks. The fire potential can only be determined in one of the Ex or Ex Tox operating modes.



NOTICE

The reference inlet of the leak detector must be in fresh air.

Only probe inlet should be in the confined space.

This mode is used for checking the gas concentration in confined spaces such as man holes, duct openings, etc. The leak detector is ready to use when measurement value is black and the status LED is blue.

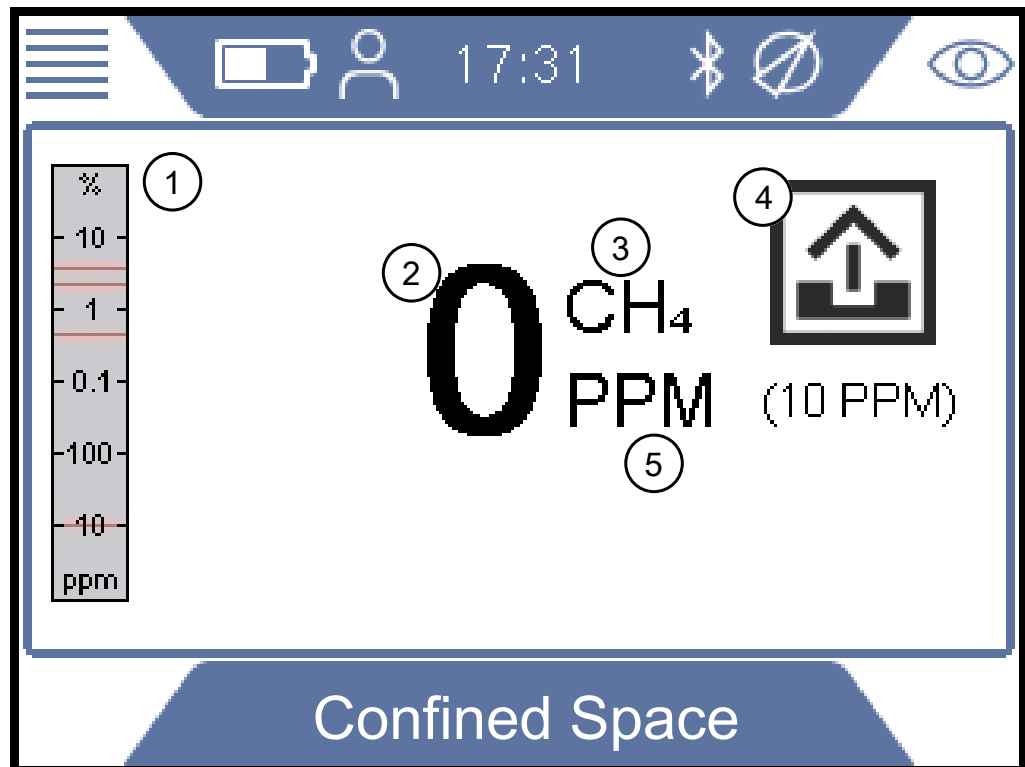


Fig. 10: “Confined Space” display

1	Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in VOL% (quasi-logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active operating mode
5	Unit of the measured value		

Measurement range

Measurement range	1 ppm - 100 Vol% methane
-------------------	--------------------------

6.3.6 Operating mode "House"



⚠ WARNING

Gas alarms are not safe in this mode!

The background concentration around the detector is zeroed out. Signal will only be displayed if probe detects higher gas than the reference inlet.

The accuracy of the methane measurement in the operating modes "Confined Space" and "House" is not certified for the LEL measurement.

- ▶ Observe all safety precautions when alarms are given.

This operating mode is used to check installations and pinpoint leaks in buildings. The detector is ready to use when the measurement value is black and status LED is blue.

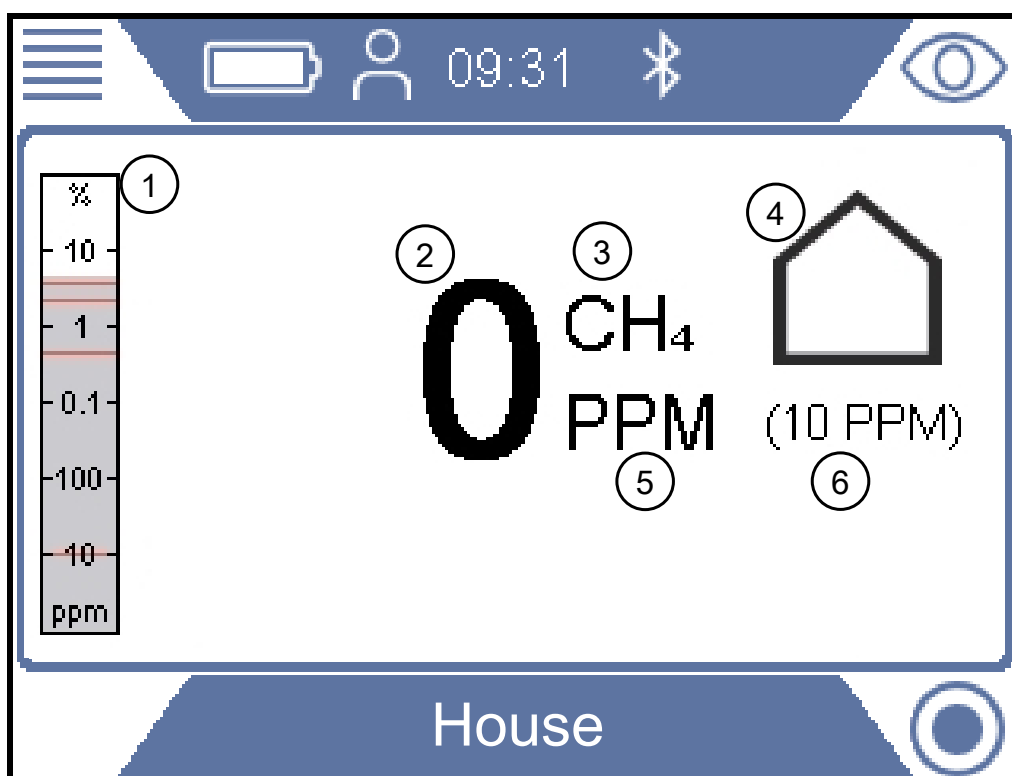


Fig. 11: "House" display

1	Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in VOL% (quasi-logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active operating mode
5	Unit of the measured value	6	Set point for PPM alarm
Measurement range		Measurement range	
		1 ppm - 5 Vol% methane	

6.3.7 Operating mode "Gas Purity"

This mode is intended for checking that the gas has reached a certain point in the network when a previously purged section is refilled.



⚠ WARNING

No gas alarms are given in this operation mode!

This operating mode is intended for the measurement of higher gas concentrations. In this mode you usually see up to 100 Vol% methane.

Follow all relevant safety precautions and regulations.

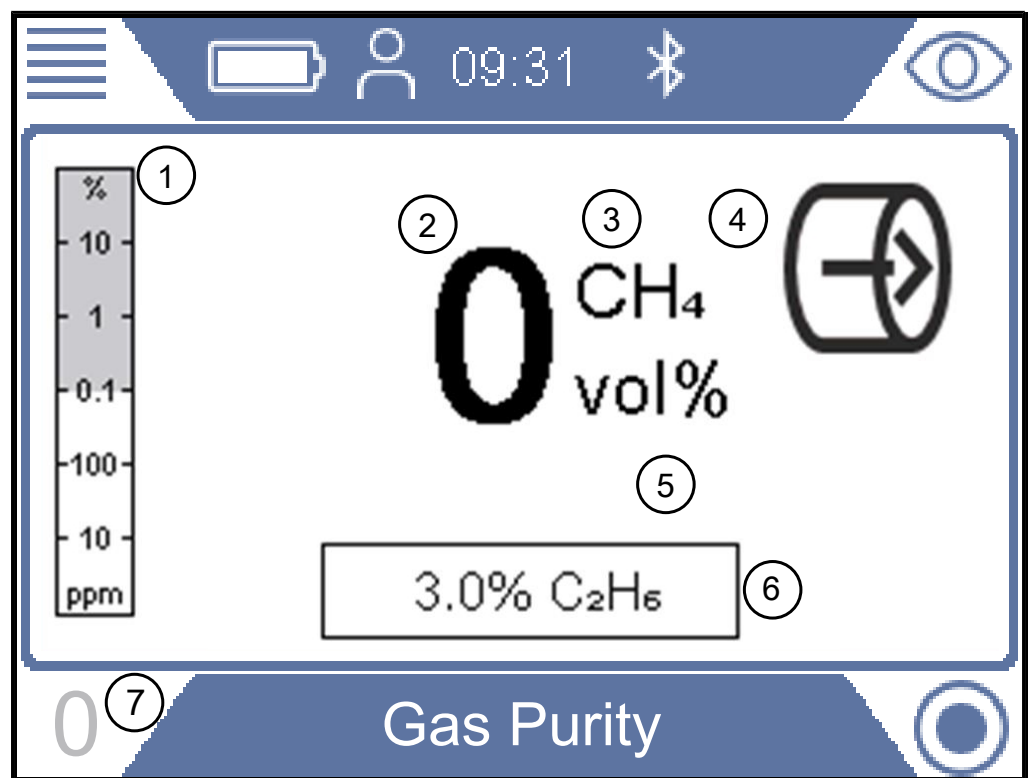


Fig. 12: "Gas Purity" display

1	Analog bar indicating range (grey) and measurement value (blue) in Vol% (quasi logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active operating mode
5	Unit of the measured value	6	C ₂ H ₆ compensation value
7	Zeroing button, if needed. Zeroing symbol disappears if gas is detected.		

Measurement range

Measurement range	0.1 - 100 Vol% methane
-------------------	------------------------

You can readjust the zero point of the CH₄ Vol% value if needed. This can be done if deviation is within +/- 5 Vol%. Press lower left button if "0" appears in blue.

Deviation outside +/- 5 Vol% is an indication that the system needs to be calibrated.

6.3.8 Operating mode "Ex"

This operating mode is used to check or monitor the fire or explosion risk in the working environment. The concentration of the gas is given in %LEL. A signal of 100%LEL or higher (> %LEL) means there is a risk of fire.



⚠ WARNING

Explosion risk

Be aware that the displayed concentration represents the concentration at the gas inlet point of the probe. The concentration can be much higher at another point close by.

The leak detector is ready to use when the measurement value is black and the status LED is green and the acoustic alive signal beeps every 20 seconds. See warning text.

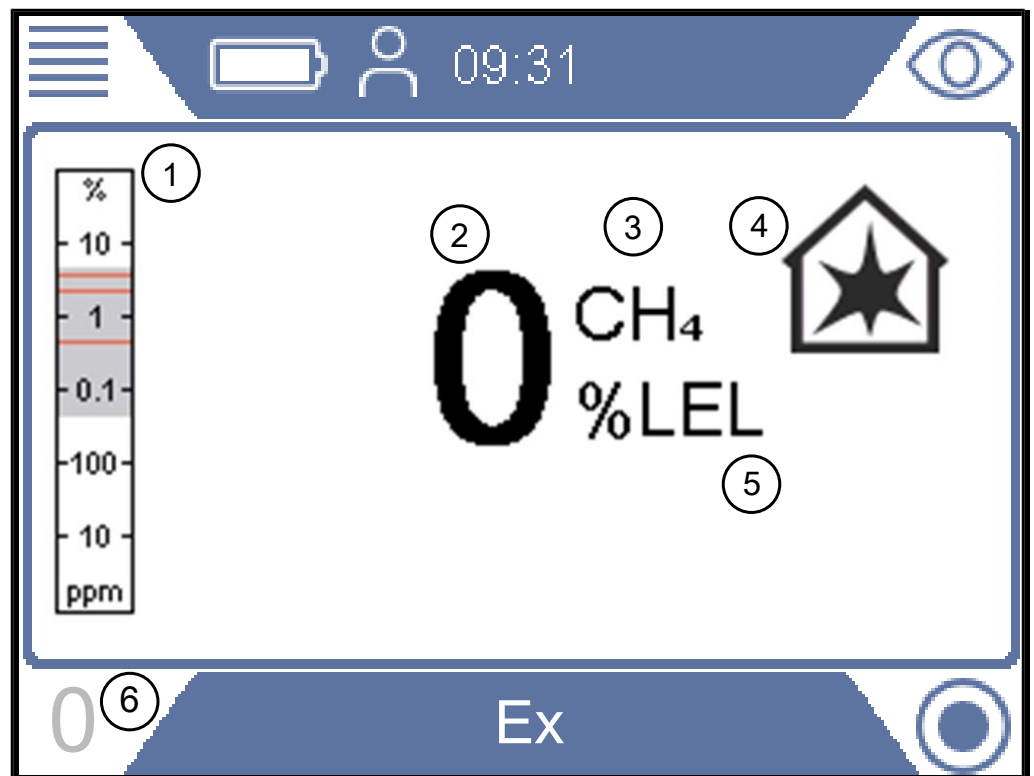


Fig. 13: "Ex" display

1	Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in Vol% (quasi-logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active operating mode
5	Unit of the measured value	6	Zeroing button, if needed. Zeroing symbol disappears if gas is detected.

Measurement range

Measurement range

1 - 100 %LEL methane

You can readjust the zero point of the %LEL value if needed. This can be done if deviation is within +/- 5 %LEL. Press lower left button if "0" appears in blue.

Deviation outside +/- 5 %LEL is an indication that the system needs to be calibrated.

If required, change the primary target gas from methane (CH₄) to propane (C₃H₈) or butane (C₄H₁₀). The leak detector will then recalculate the signals to propane or butane values using a certified correlation curve.

Use this feature if you need to work on LPG installations.

For changing gas type see Change gas type for %LEL measurement [▶ 62].

**Status LED**

Keep an eye on the status LED when working in either of the safety certified modes Ex or Ex Tox. The LED is green when the leak detector works properly and no gas alarm is activated.

Listen also for the acoustic "alive signal" that beeps every 20 s to indicate normal operation if there are no gas alarms.

The status LED changes to red when a gas alarm is triggered or an error exists. Status LED is yellow in special states such as when in setting menus or calibration etc. Blue status LED means normal operation in all other modes.

**⚠ WARNING****Explosion risk may exist when "alive" signal not present.**

When operating in any of the two safety related modes Ex and Ex Tox respectively, the leak detector will confirm its proper function with a short acoustic "alive" signal every 20 s and by the status LED being green.

- ▶ Leave hazardous areas immediately if the alive signal does not sound every 20 s.
- ▶ Do not use the leak detector until it operates normally again.

Ex

The acoustic signal and the status LED are the primary alarm signals. All gas alarms have a latching function. After a gas alarm is triggered, a check mark key appears in the upper right corner of the display.

You can mute the acoustic alarm by pressing the check mark key. The alarm will come on again if a new alarm is triggered.



NOTICE

After the leak detector has been exposed to high methane concentrations, it often displays increased measurement values in the ppm range for a few minutes. This is a normal behavior of the leak detector due to gas residues inside the leak detector.

6.3.9 Operating mode "Ex Tox"

This operation mode is used to monitor and warn for explosive and toxic gas concentrations as well as oxygen deficiency in the working area.

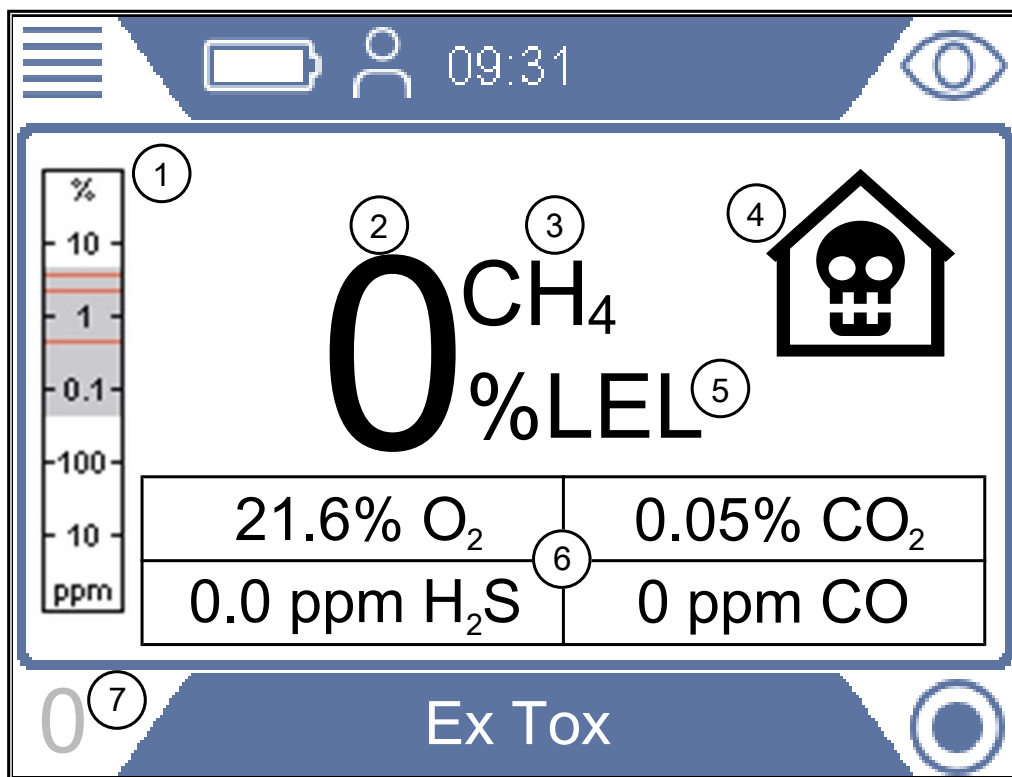


Fig. 14: "Ex Tox" display

1	Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) of flammable gas in Vol% (quasi-logarithmic scale)	2	Measurement value
3	Measured gas	4	Symbol of active mode
5	Unit of the measured value	6	Measurement values of toxic gases and oxygen in ppm and Vol % respectively
7	Zeroing button, if needed. Zeroing symbol disappears if gas is detected.		

The leak detector shows the gas concentrations of CH₄, CO₂, CO, H₂S and O₂.

Measurement range

Gas	Measurement range
CH ₄ , C ₃ H ₈ or C ₄ H ₁₀	1 - 100% LEL
CO ₂	0.1 - 5 Vol%
CO	1 - 500 ppm
H ₂ S	1 - 400 ppm

O ₂	0.1 - 25 Vol%
----------------	---------------

You can readjust the zero point of the %LEL value if needed. This can be done if deviation is within +/- 5 %LEL. Press lower left button if "0" appears in blue.

Deviation outside +/- 5 %LEL is an indication that the system needs to be calibrated.

If desired you can change the primary target gas from methane (CH₄) to propane (C₃H₈) or butane (C₄H₁₀). The leak detector will then recalculate the signals to propane or butane values using certified correlation curves.

Use this feature if you need to work on propane or butane installations.

For changing gas type see Change gas type for %LEL measurement [▶ 62].



Status LED

Keep an eye on the status LED when working in either of the safety certified modes Ex or Ex Tox. The LED is green when the leak detector works properly and no gas alarm is activated.

Listen also for the acoustic "alive signal" that beeps every 20 s to indicate normal operation if there are no gas alarms.

The status LED changes to red when a gas alarm is triggered or an error exists. Status LED is yellow in special states such as when in setting menus or calibration etc. Blue status LED means normal operation in all other modes.



WARNING

Explosion risk may exist when "alive" signal not present.

When operating in any of the two safety related modes Ex and Ex Tox respectively, the leak detector will confirm its proper function with a short acoustic "alive" signal every 20 s and by the status LED being green.

- ▶ Leave hazardous areas immediately if the alive signal does not sound every 20 s.
- ▶ Do not use the leak detector until it operates normally again.

Ex Tox

The acoustic signal and the status LED are the primary alarm signals. All gas alarms have a latching function. After a gas alarm is triggered, a check mark key appears in the upper right corner of the display.

You can mute the acoustic alarm by pressing the check mark key. The alarm will come on again if a new alarm is triggered.



NOTICE

After the leak detector has been exposed to high methane concentrations, it often displays increased measurement values in the ppm range for a few minutes. This is a normal behavior of the leak detector due to gas residues inside the leak detector.



NOTICE

Measuring of high gas concentrations of H₂S or CO reduces sensor life time.

Frequent measuring of high gas concentrations will reduce the life time of the sensors for the detection of toxic gases.

Set Time Weighted Average (TWA)

The leak detector has a TWA-Function (Time Weighted Average Function) with which alarms can be given according to LTEL (Long Term Exposure Limit) or STEL (Short Term Exposure Limit). The LTEL value and the STEL value correspond to the maximum dose of a substance to which a person should be exposed over a defined period.

- STEL is the weighted average value over 15 minutes (for the respective toxic gas).
- LTEL is the weighted average value over 8 hours (for the respective toxic gas).

To set the Alarm Level for LTEL and STEL, see Set limits and alarm levels [▶ 66].



NOTICE

The TWA calculations are reset when you switch from Ex Tox to another operating mode.

For changing gas type see Change gas type for %LEL measurement [▶ 62].

6.3.9.1 Change gas type for %LEL measurement

✓ Login as Intermediate or Advanced

▶ > > General > Misc (Tab) > Select gas

⇒ Choose between methane (CH₄), propane (C₃H₈) or butane (C₄H₁₀).

This option is only valid for the LEL measurement (operating modes Ex and Ex Tox).

6.3.10 IR Ethane Analysis and compensation



Incorrect Ethane compensation value can result in significant deviation in the estimated methane concentration, in the operating modes "Above Ground", "Bar Hole", "Confined Space" and "Gas Purity".

Why an IR Ethane Analysis?

This function is mainly used to distinguish between natural gas and swamp gas from underground biological decay. Natural gas contains varying concentrations of ethane while swamp gas does not.

Such analysis is traditionally made with a gas chromatograph. With IRwin the same analysis with similar sensitivity is performed much faster. Instead of the typical 5 to 10 minutes a gas chromatograph requires for an analysis IRwin only needs a few seconds.

The second purpose of the IR Ethane Analysis is to establish the ethane concentration for compensation at high methane levels.

The IR Ethane Analysis can be made from below 1 to 8 Vol% ethane in the natural gas. The resolution is 0.1% and the accuracy better than 1 Vol%.

INFICON single-cell wide range technology (patent-pending)

IRwin methane leak detector employs the unique INFICON single-cell wide range technology to detect all concentrations from 1 ppm to 100 Vol% methane. This technology is very sensitive to the ethane content in the natural gas. Therefore, large deviations can occur at higher gas concentrations if the ethane concentration is not compensated for.

The leak detector has a built-in routine for ethane compensation. The ethane content can be entered manually, if known. A more practical way is to use the IR Ethane Analysis function to measure the ethane content and automatically set the compensation concentration. The safety certified modes Ex and Ex Tox are not affected by this phenomenon.






IRwin SXG and SXGT models also have GC Ethane Analysis capability for distinguishing between Natural gas (NG), liquid petroleum gas (LPG) and swamp gas by determining the presence of methane, ethane and propane in the sampled gas.

The GC Ethane Analysis function is not affecting the ethane compensation.

6.3.10.1 Entering ethane concentration manually



If you know the current ethane concentration in your natural gas you can enter this value manually. We recommend, however, that you use the built-in IR Ethane Analysis to determine the ethane concentration as this typically varies from day to day and from location to location.

✓   Login as Intermediate or Advanced

- 1  >  > IR Ethane Analysis > Settings (Tab)
- 2 Select "Ethane (%) for Compensation".
- 3 Set the desired ethane concentration.
 - ⇒ The value shown is the current setting. The last value (indicated by an "A") is the result of the last IR Ethane Analysis.
- 4 Leave the view via .

6.3.10.2 Setting reminder for IR Ethane Analysis

You can set the detector to remind you to make an IR Ethane Analysis. If set, the detector will ask if you want to perform a new IR Ethane Analysis or keep the current value.

- 1  >  > IR Ethane Analysis > Settings (Tab)
- 2 Select "Reminder for Ethane Compensation Analysis".
- 3 Select between the following settings:

Off	No reminder
Start-up	Reminder first time you enter "Bar Hole" mode after start-up of detector (10 s delay)
Always	Reminder every time you enter "Bar Hole" mode (10 s delay).

6.3.10.3 Performing IR Ethane Analysis after automatic reminder

You need a methane concentration in the range of 5 to 15 Vol% to perform the IR Ethane Analysis. The compensation is only needed for high gas concentrations and is therefore only needed when you have found a significant leak.

You should connect the Bell probe before performing the IR Ethane Analysis.



- 1 Change to operating mode "Bar hole".
 - ⇒ If reminder is activated a window will appear showing the current ethane concentration setting. The leak detector asks if you want to keep the current value or a make a new analysis.
- 2 Select "New" and press the bell firmly down onto the place where you found the gas.
 - ⇒ A number between 0 and 100 appears on the display.
- 3 If the value is smaller than 20, push the probe harder onto the surface or look for a place with higher methane concentration. If the value is higher than 80 you should move the bell away from the leak to find a spot with lower concentration.

- ⇒ Try to make the signal stabilize at a value between 20 and 80. When succeeding, the detector will need another 2-3 seconds to calculate the ethane concentration. The result is displayed as % C₂H₆.
- ⇒ Press check mark to continue. IRwin will ask if you want to "Save Ethane Concentration for Compensation".
- ⇒ Select "No" if analysis was made for confirming natural gas or "Yes" to use for compensation. If selecting "Yes" the value is saved as ethane concentration and shown in the C₂H₆ field.
See Operating mode "Bar Hole" [▶ 47].
- ⇒ An ethane concentration value of 1 % or higher is a safe indication of natural gas. A value between 0.4 and 1 % is a probable indication of natural gas.



If the measured ethane values are between 0 and 2% it is recommended that you repeat the measurement at least 3 times on the same position to check the result is consistent.

6.3.10.4 Starting IR Ethane Analysis manually

- 1  >  > IR Ethane Analysis > Start (Tab)
- 2 Press button next to check mark to start.
- 3 Press the bell firmly down onto the place where you found the gas.
 - ⇒ A number between 0 and 100 appears on the display.
- 4 If the value is smaller than 20, push the probe harder onto the surface or look for a place with higher methane concentration. If the value is higher than 80 you should move the bell away from the leak to find a spot with lower concentration.
 - ⇒ Try to make the signal stabilize at a value between 20 and 80. When succeeding, the detector will need another 2-3 seconds to calculate the ethane concentration. The result is displayed as % C₂H₆.
 - ⇒ Press check mark to continue. IRwin will ask if you want to "Save Ethane Concentration for Compensation".
 - ⇒ Select "No" if analysis was made for confirming natural gas or "Yes" to use for compensation. If selecting "Yes" the value is saved as ethane concentration and shown in the C₂H₆ field.
See Operating mode "Bar Hole" [▶ 47].
 - ⇒ An ethane concentration value of 1 Vol% or higher is a safe indication of natural gas. A value between 0.4 and 1 Vol% is a probable indication of natural gas.



If the measured ethane values are between 0 and 2% it is recommended that you repeat the measurement at least 3 times on the same position to check the result is consistent.

6.3.10.5 Viewing IR Ethane Analysis info

Display the date of the last IR Ethane Analysis as follows.

▶ ≡ > ⚙ > IR Ethane Analysis > Info (Tab)

⇒ The date and the time of the last C₂H₆ Analysis will be shown.

⇒ IRwin SXG and SXGT will also show the time of the last GC Ethane Analysis.

6.3.11 Set limits and alarm levels



WARNING

Explosion hazard

Irwin S is not certified for use in explosive atmospheres and is also not suitable for estimating fire potential (LEL level).

Alarm indications:

Gas alarms are usually separated into three levels of severity:

Priority	Alarm	Display and status LED	Acoustic signal
Low	AL1	Red, flashing (1 Hz)	1 Hz
Medium	AL2	Red, flashing (1.5 Hz)	1.5 Hz
High	AL3	Red, steady on	Steady on

The detector will beep and the status LED and the display will be red if the measured gas concentration exceeds a set alarm level (below threshold for O₂ alarms AL1 and AL2).

Faster flashing or beeping will indicate more severe conditions. See table above.






The oxygen alarm differs from the other in that the main risk (asphyxiation) is associated with low oxygen. The alarms AL1 and AL2 for oxygen warns when the oxygen concentration goes below the respective alarm level. AL3 for oxygen is activated when oxygen concentration exceeds AL3.

The % unit in the settings menu means % of LEL for Ex and Ex Tox operation modes and volume % for all other modes. In the operating modes "Above Ground", "Confined Space" and "House" you can also set a PPM level alarm to help when surveying for leaks.

The acoustic signal and the status LED are the primary alarm signals of the operating modes "Ex" and "Ex Tox".

- All alarms are latching and must be confirmed manually even if the alarm conditions that lead to the alarm are no longer existing. Alarms are confirmed by pressing the upper right key, next to the check mark.
The alarm will come on again if the alarm condition is still valid.
- You can temporarily mute the alarm by pressing the lower left key (🔇). The muting will turn off automatically after 15 minutes.
You can unmute the alarm manually by pressing the lower left key again.
- Muting will also turn off if a higher alarm is triggered.




Setting alarm thresholds

- ✓   Login as Intermediate or Advanced
- 1  >  > Thresholds
- 2 Select desired tab:
 - ⇒ CxHy (gas survey and LEL alarms)
 - ⇒ Safety (toxic and oxygen alarms)
 - ⇒ xTEL (toxic exposure limits)
- 3 Set the desired thresholds.
- 4 Leave the view via .



When you press the lower left key you mute the acoustic alarm 🔇. You can unmute the alarm manually by pressing the same button again. The alarm will be unmuted automatically after 15 minutes.

6.3.12 Set the brightness of the display

- 1  >  > General > Display (Tab) > Brightness
- 2 Select a value for the brightness.
- 3 Leave the view via .

6.3.13 Performing function tests



Correct readings only if settings are correct.

If the leak detector does not work correctly, it may not show every leak.

- ▶ Test the leak detector regularly as recommended.

Use the Function tests to test the status and accuracy of the leak detector. The leak detector will guide you through the test procedures and tell you when operator actions are needed.




Recommended Function test intervals (based on IRwin model)

Once you have set the function test intervals, the leak detector will remind you to perform the respective Function test, see Setting the Function Test interval [▶ 40].

- Above ground: Before starting work (10 ppm CH₄)
- Ex: Daily (2.2% CH₄)
- Ex Tox: Daily (2.2% CH₄, CO₂, CO, O₂, H₂S)

You can use different calibration stations for the Function tests. However, the following requirements have to be fulfilled.

- The gas flow through the calibration station must be higher than the gas flow of the leak detector. Minimum 80 l/h.
 - The gas must not be fed with over pressure into the leak detector.
- ✓ To perform the Function test, you need fresh air and either 10 ppm CH₄, 2.2 Vol% CH₄ in synthetic air. For IRwin SXT and SXGT you will also need the ToxMix gas mixture.

- 1 Check the leak detector for visible damage.
 - 2  >  > Function Test > Test (Tab)
 - 3 Select the desired function test from the list.
 - 4 Start the selected Function test by pressing .
- ⇒ The leak detector guides you through the process.

You can display the date of the last function test.

- ▶  >  > Function Test > Info (Tab)

This time is the basis for the next function test reminder. Refer to Setting the Function Test interval [▶ 40].

6.4 Measuring

- ✓ Connect the leak detector to the desired probe. See "Function [▶ 12]".
- 1 Switch on the leak detector by pressing the I/O key.
 - 2 Complete the self test.
 - 3 Make sure that the desired basic settings are correct. See "Initial setup [▶ 38]".
 - 4 Make sure that the settings for the desired operating mode are correct. See "Operating modes [▶ 45]".
 - 5 Switch to the desired operating mode.
 - 6 Consider all relevant regulations for the operation in question.
 - 7 Record the measured values if desired. See "Logging data to file [▶ 69]".
 - 8 Start measuring.

6.5 Perform self test

When you turn on the leak detector it will automatically perform a self test for the main components such as software and parameter memories, battery, gas sensors, valve(s), pumps, buzzer and status LED.

If not all test are passed successfully it may be that some operating modes cannot work properly. That is indicated by the status LED being yellow. The test can, for example, fail because you accidentally blocked an inlet during the test.

If the problem has been solved it is possible to re-start the self test sequence and get the detector into normal operation mode without having to re-start the complete system.

▶  >  > Function Test > Test (Tab)

To understand more about the causes of test failure and the leak detector staying in a special state see "Warnings and error messages [[▶ 71](#)]".

6.6 Viewing Status menu

You are able to read the current status of the self diagnostic functions of the system in a menu.

When troubleshooting or contacting the service, use this information.

▶  >  > Status

6.7 Logging data to file

IRwin can log data in all operating modes. This is especially practical to save data from leak surveys in Above Ground mode.

Starting/stopping the data logging.

✓ You have configured the data logging, see [Configure data logging \[\[▶ 39\]\(#\)\]](#).



✓ You have set the leak detector in operating mode Above Ground.

1 To start or stop the logging press  or  in the measurement screen.

2 Confirm your choice.

6.8 Viewing logfile list

✓   Login as Intermediate or Advanced

▶  >  > Data output > Files (Tab)

⇒ The recorded files are shown in the Log files table.

Deleting files is only possible with the IRwin App software, see [Transfer data to computer \[\[▶ 34\]\(#\)\]](#).



To view the logged data, transfer the file(s) to a computer, see Transfer data to computer [▶ 34].

6.9 Information

During operation, the display shows information that helps you operate the leak detector. Activated operation mode, warnings and error messages are shown in addition to the measurement values.

The leak detector is equipped with extensive self-diagnostic functions. If the electronics detect an incorrect state, the leak detector displays this as far as possible and interrupts operation when necessary.

6.9.1 Retrieve information and statistics

Call up detector information

- 1 > > ABOUT.
- 2 Leave the view via .

Call up statistics

- 1 > > STATISTICS
- 2 Leave the view via .

6.9.2 Viewing the Service Screen

On the service screen you will find details about sensor signals and monitored supply voltages, for example. During contact with the service department this could be useful.

- ✓ Login as Advanced
- ▶ > > Service Screen




6.10 Activating Auto-Rotate Screen

When you set the auto-rotate screen the display will flip automatically as soon as you turn the leak detector upside down.

- 1 > > General > Display (Tab) > Auto-rotate screen
 - ⇒ The symbols (top right) and (bottom right) appear.
- 2 Select auto-rotate screen press button next to crossed box .
 - ⇒ To switch off the auto-rotate screen, press button next to empty box .

6.11 Resetting to factory settings

You can reset the factory settings of the instrument, if needed.

- ✓  Login as Advanced
- ▶  >  > System Reset



Note, that the calibration settings of the instrument will not be reset.

6.12 Switching OFF

Switching OFF

- 1 Press the "On / Off" key for 3 seconds.
 - ⇒ The leak detector asks whether you want to switch off the instrument.
- 2 Select "Yes" and press the check mark key.

Hard switch off

Some errors can make the leak detector go into watchdog state. The acoustic alarm beeps continuously and the status LED is red. The leak detector may not even be reacting to the menu buttons. If this happens you must turn the leak detector off. Press and hold the "On / Off" key until the detector shuts down (roughly 9 s).


Do not use this option without cause. You risk losing settings and the bias of the oxygen sensor on SXT and SXGT models. This leads to a prolonged warm up at next power on. It can take up to 12 hours to stabilize the oxygen sensor if sensor bias is lost form more than a few minutes. If you need to do a hardware switch off you should restart the leak detector immediately, If the leak detector malfunctions again you will need to contact INFICON service.

- 1 Press the "On / Off" key for 9 seconds.
- 2 Restart the leak detector as soon as possible to restore O₂ sensor bias (IRwin SXT and SXGT).

6.13 Warnings and error messages

Warnings

Warnings are given for conditions that can impair the accuracy of measurements. The operation of the leak detector is normally not interrupted but some functions may be barred or indicated as non-compliant by status LED being yellow and values being red instead of black.

If the navigation button "Menu"  is colored red this means that there has been an error that you have not yet checked. If the cause of the error remains there will be a new warning/error alarm and a new entry in the error log. The navigation button turns blue again when you have read the warnings list.

Open the warnings log list:

▶ ≡ > 🔍 > Warnings

Error messages

Errors are events that force the interruption of the operation. Errors are also logged in the warnings log list.



The division between errors and warnings is sometimes not very clear. In both cases it is worth restarting the detector to try to pass the self-test again. Charging the battery also reduces the risk for some errors and warnings.

No.	Message	Possible error sources	Remedy
Warnings			
-	Red LED / Constant beep	HW Watchdog triggered	Perform hard switch off. Restart detector. If problems remains: Contact INFICON service.
W2	Reference Inlet Blocked	Reference inlet blocked	Check that nothing is blocking the inlet.
		Reference inlet filter clogged	Contact INFICON service.
W3	Sample Inlet Blocked	Sample inlet blocked	Check that nothing is blocking the inlet
		Sample inlet filter blocked	Replace cigarette filter in sample inlet.
		Blockage in accessory	Disconnect accessory. If alarm disappears: Check accessory.
		Internal filter blocked	Disconnect accessories. If alarm remains: Contact INFICON service.
W4	Exhaust Blocked	Exhaust blocked	Check that nothing is blocking the exhaust. If alarm remains: Contact INFICON service.
W5	O ₂ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W6	O ₂ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W7	H ₂ S sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W8	H ₂ S sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W9	CO sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W10	CO sensor error	System error	Restart detector. If problems remains: Contact INFICON service.

No.	Message	Possible error sources	Remedy
W11	CH ₄ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W12	CH ₄ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W13	CO ₂ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W14	CO ₂ sensor error	System error	Restart detector. If problems remains: Contact INFICON service.
W17	H ₂ S STEL level reached, (STEL and limit shown,Confirm)	Short Term Exposure alarm for H ₂ S.	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
W18	H ₂ S LTEL level reached, (LTEL and limit shown,Confirm)	Long Term Exposure alarm for H ₂ S.	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
W19	CO STEL level reached, (STEL and limit shown,Confirm)	Short Term Exposure alarm for CO	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
W20	CO LTEL level reached, (LTEL and limit shown,Confirm)	Long Term Exposure alarm for CO	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
W21	CO ₂ STEL level reached, (STEL and limit shown,Confirm)	Short Term Exposure alarm for CO ₂ .	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
W22	CO ₂ LTEL level reached, (LTEL and limit shown,Confirm)	Long Term Exposure alarm for CO ₂ .	Normal function. If warning reappears without any gas present: Re-calibrate TOX mode. If still reappearing: Contact INFICON service
Error messages			
E1	Main Pump error	Exhaust blocked	Check that nothing is blocking the exhaust. If alarm remains: Contact INFICON service.
		Reference inlet blocked	Check that nothing is blocking the reference inlet. If alarm remains: Contact INFICON service.
		Pump dirty or broken	Contact INFICON service.

No.	Message	Possible error sources	Remedy
E2	Sample Pump error	Sample pump not running	Restart detector. If problems remains: Contact INFICON service.
E3	IR Lamp error	IR Lamp error	Restart detector. If problems remains: Contact INFICON service.
E4	IR Lamp error	IR lamp supply error	Restart detector. If problems remains: Contact INFICON service.
E5	Battery level too low (count down to power off)	Battery low	Switch off detector and charge battery
E7	SnO ₂ voltage error	System error	Restart detector. If problems remains: Contact INFICON service.
E8	Detector shuts down	System error	Restart detector. If problems remains: Contact INFICON service.
E9	Red LED and constant beep	HW watchdog triggered	Perform hardware reset. Restart detector. If problems remains: Contact INFICON service.
E10	O ₂ Sensor bias lost	O ₂ sensor bias lost due to uncontrolled shut down.	Check in Ex Tox mode that O ₂ value is OK (close to 20.9%). If not, leave the detector on until O ₂ sensor shows 20 - 22% in air. This can take up to 12 hours.
E11	"IR Lamp" has red cross in function test result screen.	IR system error	Restart detector. If problems remains: Contact INFICON service.
E12	"Pump & Valve" test has red cross in function test result screen.	Exhaust blocked	Restart detector. If problems remains: Contact INFICON service.
		Pump dirty or broken	Contact INFICON service.
E13	"Pump & Valve" test has red cross in function test result screen.	Valve clogged	Restart detector. If problems remains: Contact INFICON service.
		System error	Restart detector. If problems remains: Contact INFICON service.
E14	"Pump & Valve" test has red cross in function test result screen.	Exhaust blocked	Check that nothing is blocking the exhaust. If alarm remains: Contact INFICON service.
		Reference inlet blocked	Check that nothing is blocking the reference inlet. If alarm remains: Contact INFICON service.
		Pump dirty or broken	Contact INFICON service.

No.	Message	Possible error sources	Remedy
E15	"Gas Sensors" has red cross in function test result screen.	Sensor error or warm-up drift	Restart detector. If problems remains: Contact INFICON service.
E16	"Gas Sensors" has red cross in function test result screen.	Sensor error or warm-up drift	Restart detector. If problems remains: Contact INFICON service.
E17	"Gas Sensors" has red cross in function test result screen.	Sensor error or warm-up drift	Restart detector. If problems remains: Contact INFICON service.
E18	"Buzzer" has red cross in function test result screen.	Buzzer "hole" blocked or filled with water	Dry and clean buzzer hole. Restart detector. If problems remains: Contact INFICON service.
E19	"LED" has red cross in function test result screen.	LED broken	Contact INFICON service.
E20	RAM test error (Power off)	Memory damaged or test error	Restart detector. If problems remains: Contact INFICON service.
E21	ROM test error (Power off)	Memory damaged or test error	Restart detector. If problems remains: Contact INFICON service.
E22	CRC error (power off)	Memory damaged or test error	Restart detector. If problems remains: Contact INFICON service.
E23	"Gas Sensors" has red cross in function test result screen.	Sensor error or warm-up drift	Restart detector. If problems remains: Contact INFICON service.
E24	No message given	Service info only	No action needed.
E25	Surrounding temperature is outside of rated temperature. Function might be affected	Instrument temperature is too high or too low	Explosion protection cannot be guaranteed. Immediately move detector to cooler place or switch OFF if flammable gases could be present.

7 Maintenance

The gas inlet of the instrument, as well as the probe system include various filters. These must be replaced at intervals specified in the maintenance plan. If the leak detector is used in dirty environments, more frequent replacements may be necessary.



NOTICE

The internal sample inlet filter can become clogged.

Running the leak detector with no probe connected can make the internal filters clogged. This can cause need for service.

7.1 Maintenance plan

Maintenance cycle	Additional information	
daily	7.3.2	Change the cigarette filter in the sample inlet
weekly	7.5.1	Replace cigarette filter in the hand probe
monthly	7.6	Change the inline filter of the carpet probe
	7.7.1	Change the filter discs in the bell
	7.7.2	Change the paper filter in the bell

7.2 Spare parts list

Spare part	Order number	Purpose
Filter cartridge 0.45 um	581-704	Carpet
Filter disk OD=8 mm	591-367	Bell
Dust filter, 8612	591-095	Bell
Cigarette Filter 120-pack	581-700	Hand Probe and Sample inlet

7.3 Maintenance of the leak detector

7.3.1 Seasonal shut-down

IRwin SXT is using a small amount of power when shut off. This allows the clock to continue running and the function of oxygen sensor to be maintained for faster warm-up.

When you want to store the leak detector *up to 3 months* charge it fully.

When you want to store the leak detector *more than 3 months* select one of the following possibilities.

Connect the charging equipment and leave the charger on.

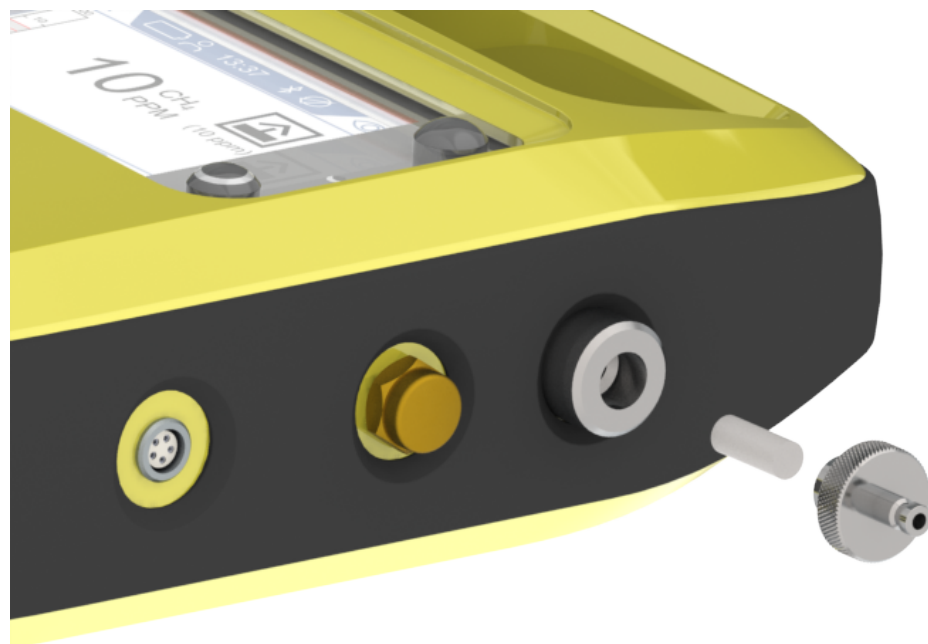
OR:

Charge the battery every 3 months as long as you store the leak detector.

7.3.2 Change the cigarette filter in the sample inlet

► Change the filter according to the maintenance plan, see Maintenance plan [► 76].

Be careful when checking the cigarette filter in the inlet, make sure that it is not deformed, otherwise it will lose part of its function. Replace the filter if in doubt.



7.4 General check of the probe system

The probe system used must be checked regularly for external damage and leaks.

- 1** Examine all parts of the probe system for external damages.
 - 2** Check that the rubber grip of the Hand Probe is not broken or missing.
The rubber is certified anti-static and must be replaced by original INFICON spare if damaged or missing.
 - 3** Connect the probe system to the instrument.
 - 4** Block the inlet of the probe system.
- ⇒ If the error message "Blocked flow alarm" appears, the probe system is sufficiently leak-proof. When the leak detector does not show an error there is a leak in the system.

7.5 Maintenance of the hand probe

7.5.1 Replace cigarette filter in the hand probe

Replace the filter according to the maintenance plan, see Maintenance plan.

Be careful when checking the cigarette filter in the inlet, make sure that it is not deformed, otherwise it will lose part of its function. Replace the filter in doubt.



7.6 Change the inline filter of the carpet probe

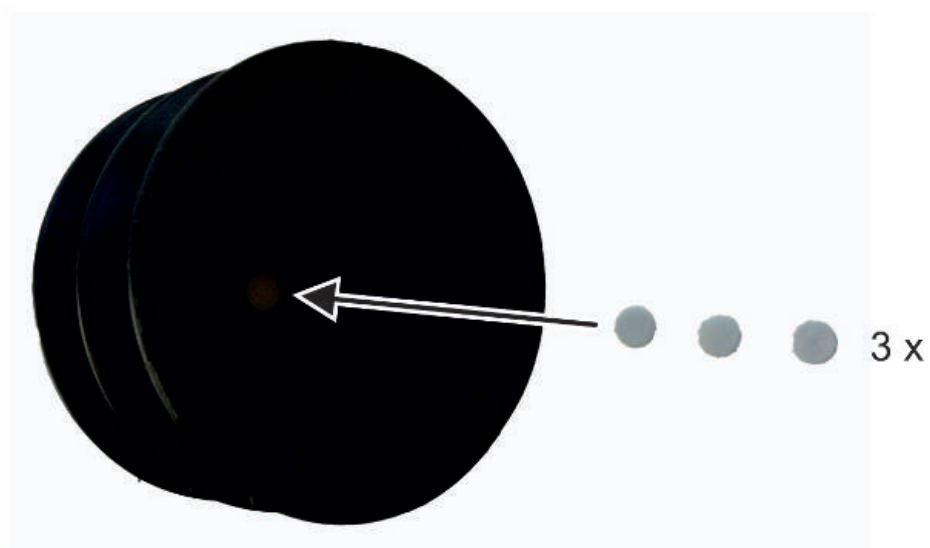
- ▶ Change the inline filter according to the maintenance plan, see Maintenance plan [▶ 76].



7.7 Maintenance of the bell probe

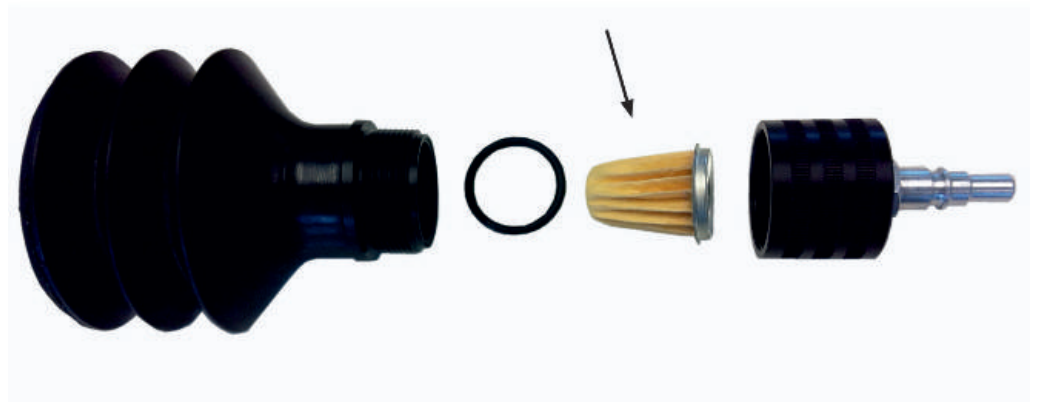
7.7.1 Change the filter discs in the bell

- ▶ Change the filter discs according to the maintenance plan, see Maintenance plan [▶ 76].



7.7.2 Change the paper filter in the bell

- ▶ Change the filter according to the maintenance plan, see Maintenance plan [▶ 76].



8 Decommissioning the leak detector

8.1 Sending in the leak detector



WARNING

Danger due to harmful substances

Contaminated equipment can endanger the health. The contamination declaration serves to protect all persons who come into contact with the equipment.

- ▶ Fill in the declaration of contamination completely.

- 1** Please do not hesitate to contact us and send a completed declaration of contamination before sending anything to us.
⇒ You will then receive a return number from us.
- 2** Use the original packaging when returning.
- 3** Before sending the instrument attach a copy of the completed contamination declaration. See below or on the homepage of INFICON.

Declaration of Contamination

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
 This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

1 Description of product
 Type _____
 Article Number _____
 Serial Number _____

2 Reason for return

3 Operating fluid(s) used (Must be drained before shipping.)

4 Process related contamination of product:

toxic	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>	 2) Products thus contaminated will not be accepted without written evidence of decontamination!
caustic	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>	
biological hazard	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)	
explosive	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)	
radioactive	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)	
other harmful substances	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>	

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

The product is free of any substances which are damaging to health
 yes

5 Harmful substances, gases and/or by-products
 Please list all substances, gases, and by-products which the product may have come into contact with:

Trade/product name	Chemical name (or symbol)	Precautions associated with substance	Action if human contact

6 Legally binding declaration:
 I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be dispatched in accordance with the applicable regulations.

Organization/company _____

Address _____ Post code, place _____

Phone _____ Fax _____

Email _____

Name _____

Date and legally binding signature _____ Company stamp _____

Copies:
 Original for addressee - 1 copy for accompanying documents - 1 copy for file of sender

8.2 Disposing of the equipment

The leak detector can either be disposed of by the owner or be sent to the manufacturer. The leak detector contains materials that can be recycled. This option should be exercised to prevent waste and also to protect the environment.

During disposal, observe the environmental and safety regulations of your country.



Li-ion

Information for recycling.



The leak detector cannot be scrapped with the normal domestic waste.

9 Certificates

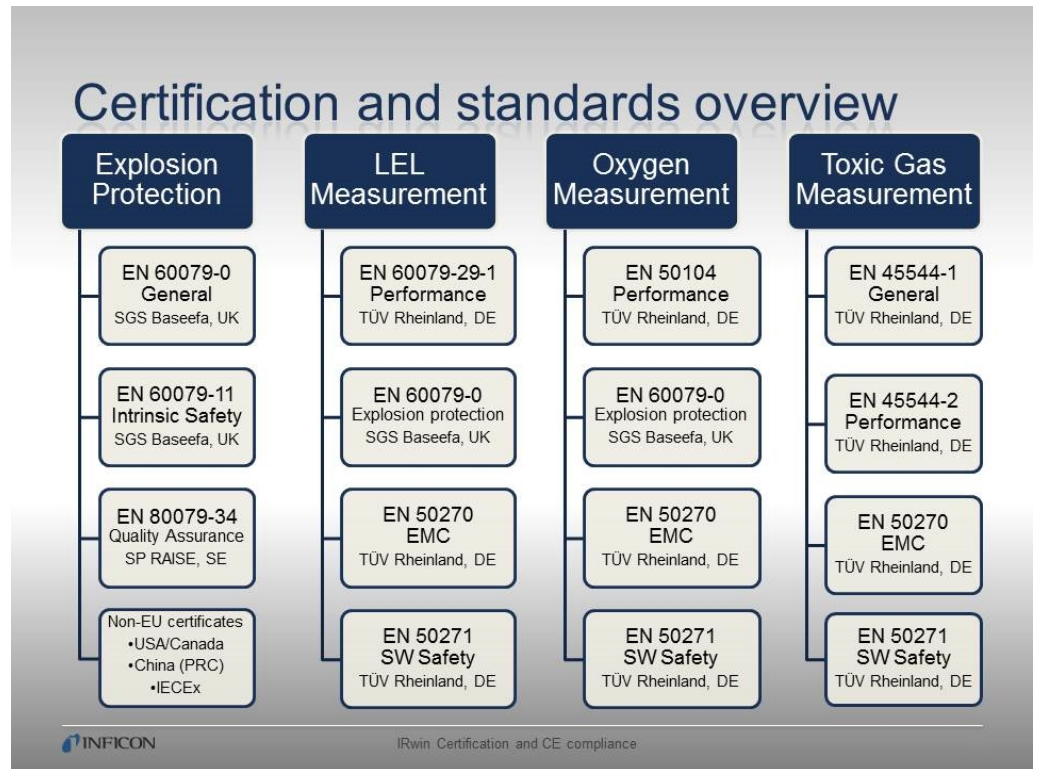


Fig. 15: Certificates and permissions

9.1 TÜV, Certificate for lower explosive limit (LEL)

(1) **EU-TYPE EXAMINATION CERTIFICATE** 

(2) Equipment and Protective Systems intended for use in Potentially Explosive Atmosphere - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number

TÜV 16 ATEX 7822 X Issue: 00

- (4) Equipment: **Portable gas detector type IRwin SX****
- (5) Manufacturer: **INFICON AB**
- (6) Address: **PO Box 76,
581 02 Linköping, Sweden**
- (7) This product and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The certification body for explosion protection of TÜV Rheinland Industrie Service GmbH, Notified Body No. 0035 in accordance with Article 21 of the Council Directive 2014/34/EU of 26th February 2014, certifies this product which has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmosphere, given in Annex II to the Directive.
- The examination and test results are recorded in the confidential reports 557 / Ex 7822.00 / 16 and 968/FSP 1342.00/16.
- (9) Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule of this certificate, has been assessed by reference to:
- EN 60079-0:2012 EN 60079-29-1:2007 EN 50104:2010
EN 50271:2010**
- (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 EU-Type Examination Certificate relates only to the design and specification for construction of the equipment or protective system. It does not cover the process for actual manufacture or supply of the equipment or protective system, for which further requirements of the directive are applicable.

 **II 1 G**

TÜV Rheinland certification body for explosion protection

Cologne, 17.01.2017

Dipl.-Ing. Klauspeter Graff

This EU-Type Examination Certificate without signature and stamp shall not be valid.
This EU-Type Examination Certificate may be circulated only without alteration. Extracts or alterations are subject to approval by the TÜV Rheinland Industrie Service GmbH TÜV Rheinland Group Am Grauen Stein 51105 Köln.
Tel. +49 (0) 221 806-0 Fax. + 49 (0) 221 806 114

www.tuv.com



(13) Annex

(14) **EU-Type Examination Certificate**
TÜV 16 ATEX 7822 X Issue: 00

(15) Description of equipment

15.1 Equipment and type:

Portable gas detector type IRwin SX**

The 4 device versions are suitable for the measurement of different gases, as well as for use in the applications listed in the following:

- IRwin SX - Above ground verification, Bar Hole, Confined Space, House, Gas purity, Warning Ex
- IRwin SXG - Above ground verification, Bar Hole, Confined Space, House, Gas purity, Warning Ex, Ethane analysis
- IRwin SXT - Above ground verification, Bar Hole, Confined Space, House, Gas purity, Warning Ex, Warning ExTox
- IRwin SXGT - Above ground verification, Bar Hole, Confined Space, House, Gas purity, Warning Ex, Ethane analysis, Warning ExTox

15.2 Description

The device is a portable leak detector for gas pipeline network inspection. The tested versions of the detector can measure following gases: Methane (CH₄), Propane (C₃H₈), natural gas or oxygen (O₂).

The portable gas detector is a battery operated and portable/ handheld aspirated system with integral sensor for gas detection. The device is used for professional use in residential and business areas. Use requires the necessary knowledge of gas pipeline network inspection.

There are three probes available for the device:

- For searching for gas on fixed surfaces, use the carpet probe. Pull or push the carpet probe over the floor.
- For searching for gas at particular points, use the bell probe.
- The hand probe is used for searching textures on the house for gas, such as windows or external pipes. Use the hand probe as such, or combine with the probe rod and the carpet probe or the bell probe.

This EU-Type Examination Certificate without signature and official stamp shall not be valid.
 This certificate may be circulated without alteration. Extracts or alterations are subject to approval by:
 Certification body of TÜV Rheinland Industrie Service GmbH

15.3 Technical Data

Name	IRwin SX	IRwin SXT	IRwin SXG	IRwin SXGT
Power input	4A	4A	4A	4A
Memory capacity for measured	64 MB	64 MB	64 MB	64 MB
Protection	IP54	IP54	IP54	IP54
Electronic interfaces	Bluetooth	Bluetooth	Bluetooth	Bluetooth
Operational voltage	12VDC +/- 5%	12VDC +/- 5%	12VDC +/- 5%	12VDC +/- 5%
Battery operating time	8 has verified during certification, typical value 9 h	8 has verified during certification, typical value 9 h	8 has verified during certification, typical value	8 has verified during certification, typical value 9 h
Battery charging time	4 h from empty until full charge (3 h for quick charging). 1 h loading time produces 3.25 h operation (4 h	4 h from empty until full charge (3 h for quick charging). 1 h loading time produces 3.25 h operation (4 h	4 h from empty until full charge (3 h for quick charging). 1 h loading time produces 3.25 h operation (4 h	4 h from empty until full charge (3 h for quick charging). 1 h loading time produces 3.25 h operation (4 h
Battery	Lithium-Ion battery	Lithium-Ion battery	Lithium-Ion battery	Lithium-Ion battery

Ambient conditions

Max. altitude above sea level	2000 m
Ambient temperature range	-15 °C up to +40 °C
Pressure range	80kPa to 120kPa
Max. relative humidity	95% (non-condensing)

(16) Test report no. 557 / Ex 7822.00 / 16 and 968/FSP 1342.00/16

This EU-Type Examination Certificate without signature and official stamp shall not be valid.
 This certificate may be circulated without alteration. Extracts or alterations are subject to approval by:
 Certification body of TÜV Rheinland Industrie Service GmbH



(17) Special conditions for safe use

1. For use in explosive atmospheres, the special conditions of use listed in EU-Type Examination certificate no. Baseefa16ATEX0034X have to be observed.
2. The tested and qualified ambient temperature range of the portable gas detector is $-15\text{ °C} \leq T_a \leq +40\text{ °C}$.

(18) Basic Safety and Health Requirements

Covered by afore mentioned standards.

TÜV Rheinland certification body for explosion protection

Cologne, 17.01.2017



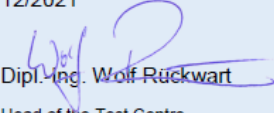
Dipl.-Ing. Klauspeter Graffi

This EU-Type Examination Certificate without signature and official stamp shall not be valid.
This certificate may be circulated without alteration. Extracts or alterations are subject to approval by:
Certification body of TÜV Rheinland Industrie Service GmbH

Page 3 / 3 of Annex to TÜV 16 ATEX 7822 X

Issue: 00

9.2 Certificate for oxygen and toxic gases

<h1>Zertifikat</h1>			Bauart geprüft Regelmäßige Produktions- überwachung www.tuv.com ID 000054222
			Type Approved Regular Production Surveillance www.tuv.com ID 000054222
Zertifikat Nr. S 498 2016 C2_1			
Hersteller <i>Manufacturer</i>	INFICON AB Box 76 58102 Linköping, Sweden		
Produkt <i>Product</i>	Tragbarer Gasdetektor für die Detektion und Konzentrationsmessung von Sauerstoff und toxischen Gasen. <i>Portable gas detector for detection and measurement of oxygen and toxic gas concentrations.</i>		
Typ <i>Type</i>	IRwin SX, IRwin SXT, IRwin SXG, IRwin SXGT		
Anwendungsbereich <i>Area of application</i>	Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung von O₂, toxischer Gase und Dämpfe. <i>Electrical apparatus used for detection and measurement of O₂ concentrations, toxic gases and vapours, in workplace atmospheres.</i>		
Prüfanforderung Test requirements	EN 50104:2010, EN 45544-1:2015 and EN45544-2:2015		
Prüfergebnis Test result	Der Prüfling hält die Anforderungen der oben genannten Prüfrichtlinien/Normen ein. Einschränkungen siehe Anhang. <i>The tested device meets the requirements of the listed test standards. Restrictions see appendix.</i>		
<p>Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. S 498 2016 T1 vom 05.12.2016 dokumentiert sind.</p> <p>Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen. Es wird ungültig bei jeglicher Änderung der Erzeugnisse oder einer Zurückziehung der aufgeführten Prüfgrundlage.</p> <p><i>The issue of this certificate is based upon an examination, whose results are documented in report no. S 498 2016 T1 dated 2016/12/05.</i></p> <p><i>This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the product or the withdrawal of the listed test standards.</i></p>			
Gültig bis / valid until	12/2021		
Köln, 05.12.2016 TÜV Rheinland Energy GmbH Test Centre for Energy Appliances 51105 Cologne - Germany	 Dipl.-Ing. Wolf Rückwart Head of the Test Centre		

Anhang zu Zertifikat Nr. S 498 2016 C2



Zertifikatsanhang

Appendix to certificate

Einschränkungen:

Abweichend von der Gerätespezifikation wurde der Arbeitstemperaturbereich von -15 °C bis + 40 °C geprüft.

Der CO2 Sensor erfüllt nicht die Anforderung von Absatz 5.4.3.1 der EN 45544-1. Die Anforderung von Absatz 5.4.3.2 hingegen wird erfüllt.

Die EMV Prüfung wurde separat, mit Bericht REC-E704557, von der Firma DELTA Development Technology AB durchgeführt. Die Norm EN 50270 ist nicht Bestandteil der Laborakkreditierung, jedoch sind alle EMV Basisnormen, worauf sich die EN 50270 bezieht, im Scope der Akkreditierung.

Restrictions:

Deviating from the device specification, the working temperature range was tested from -15 °C to +40 °C.

The CO2 sensor does not meet the requirements cl. 5.4.3.1 of EN 45544-1, but the requirement of cl. 5.4.3.2 is met.

EMC was proved separately with report REC-E704557 by DELTA Development Technology AB. The standard EN 50270 is not within the scope of the laboratory accreditation, but all EMC basic standards to which the standard refers, are within the scope of the accreditation.

9.3 Certificate for software for Ex/ExTox

Certificate





Functional Safety

www.tuv.com
ID 0600000000

No.: 968/FSP 1342.00/16

Product tested	Portable Methane Leak Detector (Mode Ex and ExTox)	Certificate holder	INFICON AB P.O. Box 76 58102 Linköping Sweden
Type designation	IRwin SX, IRwin SXT, IRwin SXG, IRwin SXGT		
Codes and standards	EN 50271:2010		
Intended application	Portable handheld gas detection. Mainly used for pipeline network inspections and leak detection.		
Specific requirements	Only the Ex and ExTox mode are certified. The operating instructions shall be considered.		

The Ex and Ex-Tox mode used within the Portable Methane Leak Detector Irwin (Variants: SX, SXT, SXG, SXGT) comply with the requirements of EN 50271:2010.
The requirements for SIL 1 of chapter 4.8 of the standard have not been considered within this evaluation.

Valid until 2021-11-28

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1342.00/16 dated 2016-11-28.
This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

Köln, 2016-11-28

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln
Certification Body Safety & Security for Automation & Grid



Dipl.-Ing. Stephan Häb

10222 12_12.E.A4 © TÜV, TÜEV and TUV are registered trademarks. Utilisation and application requires prior approval.

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany
Tel.: +49 221 806-1790, Fax: +49 221 806-1539, E-Mail: industrie-service@de.tuv.com

www.fs-products.com
www.tuv.com



9.4 ATEX certificate for explosion protection (IRwin SXnn)

Certificate Number
Baseefa16ATEX0034X
Issue 1



Issued 2 November 2016
Page 1 of 3

1 EU - TYPE EXAMINATION CERTIFICATE

2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 EU - Type Examination Certificate Number: **Baseefa16ATEX0034X – Issue 1**

4 Product: **IRwin SX***

5 Manufacturer: **Inficon AB**

6 Address: **Box 76, 581 02 Linköping, Sweden**

7 This re-issued certificate extends EU Type Examination Certificate No. Baseefa16ATEX0034X to apply to product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

8 SGS Baseefa, Notified Body number 1180, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. See Certificate History

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012+A11:2013 EN 60079-11:2012

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following :

Ⓢ II 1 G Ex ia IIC T3 Ga (-20°C ≤ T_a ≤ +50°C)

SGS Baseefa Customer Reference No. **7324**

Project File No. **16/0776**

This document is issued by the Company subject to its General Conditions for Certification Services accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and the Supplementary Terms and Conditions accessible at <http://www.sgs.com/SGSBaseefa/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. It does not necessarily indicate that the equipment may be used in particular industries or circumstances. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, schedule included, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Baseefa Limited

Rockhead Business Park, Staden Lane,
 Buxton, Derbyshire SK17 9RZ

Telephone +44 (0) 1298 766600 Fax +44 (0) 1298 766601
 e-mail baseefa@sgs.com web site www.sgs.co.uk/baseefa

Registered in England No. 4305578.

Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN


 R S SINCLAIR
 TECHNICAL MANAGER

On behalf of SGS Baseefa Limited

9.5 CSA (US/Canada) certificate for explosion protection (IRwin SXnn)

			
<h1>Certificate of Compliance</h1>			
Certificate:	70095939	Master Contract:	241576
Project:	70095939	Date Issued:	August 2, 2017
Issued to:	Inficon AB P.O. Box 76 58102 Linköping SWEDEN Attention: Fredrik Enquist		
<p><i>The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and US Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only</i></p>			
		Issued by:	 R Papiah
PRODUCTS			
CLASS 2258-02	PROCESS CONTROL EQUIPMENT – For Hazardous Locations		
CLASS 2258-82	PROCESS CONTROL EQUIPMENT -For Hazardous Locations-Certified to U.S. Standards		
Ex ia IIC T3 Ga Class I, Division 1, Groups A, B, C and D			
AEx ia IIC T3 Ga Intrinsically safe Class I, Division 1, Groups A, B, C and D			
Inficon IRwin SX* Portable battery powered gas detector; Temperature Code T3 (Tamb = -20°C to + 50°C)			
The Irwin SX* models covered by this approval are as follows:			
IRwin SX (CH ₄)			
Irwin SXT (As SX + O ₂ , H ₂ S, CO)			
DOD 507 Rev. 2016-02-18			Page 1

9.6 IECEx certificate for explosion protection (IRwin SXnn)

	<h3 style="margin: 0;">IECEx Certificate of Conformity</h3>
<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres <small>for rules and details of the IECEx Scheme visit www.iecex.com</small></p>	
<p>Certificate No.: IECEx SP 16.0001X</p> <p>Status: Current</p> <p>Date of Issue: 2016-08-22</p> <p>Applicant: Inficon AB Box 76 SE-581 02 Linköping Sweden</p> <p>Equipment: Gasdetector type IRwin SX* <i>Optional accessory:</i></p> <p>Type of Protection: Intrinsic safety "ia"</p> <p>Marking: Ex ia IIC T3 Ga</p>	<p>Issue No: 0</p> <p>Page 1 of 3</p> <p><u>Certificate history:</u> Issue No. 0 (2016-08-22)</p>
<p><i>Approved for issue on behalf of the IECEx Certification Body:</i></p> <p style="text-align: right;">Peter Bremer</p> <p><i>Position:</i> Certification Officer</p> <p><i>Signature:</i> (for printed version)</p> <p><i>Date:</i></p>	
<p>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.</p>	
<p>Certificate issued by:</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>SP Technical Research Institute of Sweden Box 857 SE-501 15 Borås Sweden</p> </div> <div style="text-align: center;">  </div> </div>	



IECEX Certificate of Conformity

Certificate No: IECEX SP 16.0001X Issue No: 0
Date of Issue: 2016-08-22 Page 2 of 3
Manufacturer: **Inficon AB**
Westmansgatan 49
SE-582 16 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 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 : 2011 Explosive atmospheres - Part 0: General requirements
Edition:6.0
IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I"
Edition:6.0

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/BAS/ExTR16.0156/00](#)

Quality Assessment Report:

[SE/SP/QAR07.0002/07](#)



IECEx Certificate of Conformity

Certificate No: IECEx SP 16.0001X Issue No: 0
 Date of Issue: 2016-08-22 Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The IRwin SX* is a portable battery powered gas detector intended for detection of various gas types, dependent upon variant, and fitted with internal pumps for sampling via the hand probe. Measurements are shown via the integrated LCD screen and are additionally stored for later retrieval or may be transmitted via a Bluetooth connection.

The equipment consists of a PCB featuring numerous components, an LCD screen with accompanying buttons for interface purposes, secondary lithium-ion cells with small solenoids and DC pumps for gas sampling, all housed within a static dissipative plastic enclosure.

The hand-probe is connected to the sample inlet connector. A charger/serial port connector allows for the internal batteries to be recharged or for data retrieval. The charger/serial port is not used in the hazardous area.

The IRwin SX* models covered by this certificate are as follows:

IRwin SX	CH ₄
IRwin SX	As SX + O ₂ , H ₂ S, CO
IRwin SXG	As SX + gas chromatograph
IRwin SXGT	As SXT + gas chromatograph

CONDITIONS OF CERTIFICATION: YES as shown below:

1. Battery charging and data transfer may only be performed in the non-hazardous area. Only the certified IRwin Charging Adaptor (P/N-580-604) may be connected to the IRwin SX* for battery charging or data transfer.

9.7 NEPSI (China) certificate for explosion protection



EXPLOSION PROTECTION CERTIFICATE OF CONFORMITY

Cert NO.GYJ16.1435X

This is to certify that the product

Gas Detector

manufactured by **INFICON AB**
(Address:BOX 76, 581 02 Linköping, Sweden)

which model is **IRwin SX^a**

Ex marking **Ex ia IIC T3 Ga**

product standard /

drawing number **5574**

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 **2021.12.12**

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.

Director 

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

Issued Date **2016.12.13**

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: GYJ16.1435X

由 INFICON AB
(地址: BOX 76, 581 02 Linköping, Sweden)

制造的产品:

名称 气体探测器

型号规格 IRwin SXa

防爆标志 Ex ia II C T3 Ga

产品标准 /

图样编号 5574

经图样及技术文件的审查和样品检验, 确认上述产品符合 GB 3836.1-2010、GB 3836.4-2010、GB 3836.20-2010 标准, 特颁发此证。

本证书有效期: 2016年12月13日至2021年12月12日

备注 1. 安全使用注意事项见本证书附件。
2. 证书编号后缀“X”表明产品具有安全使用特殊条件, 内容见本证书附件。

站长

国家级仪器仪表防爆安全监督检验站

颁发日期二〇一六年十二月十三日

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

(GYJ16.1435X)

(Attachment I)

GYJ16.1435X防爆合格证附件 I

由INFICON AB生产的IRwin SXa系列气体探测器（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，符合以下国家标准的规定：

GB3836.1-2010 爆炸性环境 第1部分：设备 通用要求

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

GB3836.20-2010 爆炸性环境 第20部分：设备保护级别（EPL）为Ga级的设备
产品防爆标志为Ex ia II C T3 Ga，防爆合格证号为GYJ16.1435X。

本次认可产品的具体型号规格为IRwin SXa，其中：

a代表传感器类型，可为无（CH₄），T（IRwin SX+O₂，H₂S，CO），G（IRwin SX+气相色谱探头）或GT（IRwin SXT+气相色谱探头）。

一、 产品安全使用特殊条件

防爆合格证号后缀“X”表示特殊使用注意事项：

- 产品仅可由6节Panasonic生产的NCR18650A或NCR18650B（每3节并联后再串联）组成的电池组供电。
- 产品电池组的充电及数据传输必须在安全场所进行。
- 产品电池组的充电及数据传输必须采用IRwin生产的充电器（型号：580-604）。

二、 产品使用注意事项

1. 探测器允许的使用环境温度：-20℃～+50℃。
2. 用户不得自行随意更换产品内部电气零部件，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。
3. 产品的安装、使用和维护应同时遵守产品使用说明书、GB3836.13-2013“爆炸性环境 第13部分：设备的修理、检修、修复和改造”、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）”及

第 1 页 共 2 页



(GYJ16.1435X)**(Attachment I)**

GB50257-2014 “电气装置安装工程 爆炸和火灾危险环境电气装置施工及验收规范”的有关规定。

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. 制造厂必须严格按照NEPSI认可的文件资料生产。

国家级仪器仪表防爆安全监督检验站

二〇一六年十二月十三日

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

(GYJ16.1435X)

(Attachment I)

Attachment I to GYJ16.1435X

IRwin SX_q series Gas Detector, manufactured by INFICON AB, has been certified by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI). The Gas Detector accords with following standards:

GB3836.1-2010 Explosive atmospheres-Part 1: Equipment -General requirements

GB3836.4-2010 Explosive atmospheres-Part 4: Equipment protection by Intrinsic safety "i"

GB3836.20-2010 Explosive atmospheres-Part20: Equipment with equipment protection level (EPL) Ga

Gas Detector has the Ex marking Ex ia II C T3 Ga. The certificate number is GYJ16.1435X.

The certified type codes are:

EJX110 series Gas Detector

IRwin SX_q, in which:

█ indicates used sensors, which could be none (CH₄), T (IRwin SX + O₂, H₂S, CO), G (IRwin SX + gas chromatograph) or GT (IRwin SXT + gas chromatograph).

1. Special conditions for safe use

The suffix "X" placed after the certificate number indicates that this product is subject to special conditions for safe use:

- Only battery pack composed of six Panasonic NCR18650A or NCR18650B (2s3p) shall be used as the supply power of the Gas Detector.
- Battery charging and data transfer may only be performed in the non-hazardous area.
- Only IRwin charging adaptor (P/N: 580-604) may be connected to the Gas Detector for battery charging or data transfer.

2. Conditions for safe use

2.1 The ambient temperature range is -20°C~+50°C

2.2 Forbid end user to change the configuration to ensure the equipment's explosion protection performance.



(GYJ16.1435X)**(Attachment I)**

2.3 When installation, use and maintenance of Gas Detector, observe following standards

GB3836.13-2013 "Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation"

GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)"

GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"

GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

3. Manufacturer's Responsibility

3.1 Special condition for safe use specified above should be included in the instruction manual.

3.2 Manufacturing should be done according to the documentation approved by NEPSI.

National Supervision and Inspection Center
for Explosion Protection and Safety of Instrumentation
2016.12.13



9.8 CE Declaration of Conformity



Declaration of CE Conformity

Manufacturer

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

Object of the declaration

IRwin[®] Methane Leak Detector (Models: S)

Type numbers: MLD.130.010

INFICON AB declares on its own responsibility that the object of the declaration as described below is in conformity with the relevant Community Directives, namely:

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) *
RED	Radio equipment (Directive 2014/53/EU)

* Relevant only for battery charger supply (CE marked).

Linköping 01/11/2017

Fredrik Enquist, Development Manager

See next page for details of standards applied.

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: SE556209900101

Harmonized European standards which have been applied

Standard	Edition	Title / Comment
EN 61000-6-1	2	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments.
EN 61000-6-3	2	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.
EN 50581	2012	Restriction of the use of certain hazardous substances (RoHS)
EN 300 328	V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques

Other European standards which have been applied

Standard	Edition	Title / Comment
EN 50270	2015	Electromagnetic compatibility – Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Missing from list of harmonised standards but Annex ZZ Declares compliance with essential requirements of 2004/108/EC (old EMC).

Test institutes / notified bodies

**EMC
(EN50270)
REC-E704557**
DELTA Development Technology AB
Finnsätten
Elektronikgatan 47
721 36 Västerås, Sweden

**Software
(EN50271)
968/FSP 1342/16
TÜV Rheinland**
Am Grauen Stein 29
51105 Köln
Germany
NB 0035

**ATEX quality assurance
(EN 80079-34)
SP07ATEX4125**
SP Technical Research Institute of Sweden
Box 857
50115 Borås, Sweden
NB 0402

**Toxic gases
(EN45544-1 and -2)
S 498 2016 C2_1
TÜV Rheinland Energie GmbH**
Am Grauen Stein 29
51105 Köln
Germany
NB 0035

**ATEX Type certificate
(EN60079-0, EN60079-11)
Baseefa16ATEX0034X**
SGS Baseefa
Rake Lane, Eccleston, Chester, CH4 9JN
England
NB 1180

**Detector for oxygen and flammable gases
(EN50104, EN60079-29-1)
TÜV 16 ATEX 7822 X
TÜV Rheinland Industrie Service GmbH**
Laboratory for explosion protection
Moltkeplatz 1
45138 Essen
Germany
NB0035



Declaration of CE Conformity

Manufacturer

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

Object of the declaration

IRwin[®] Methane Leak Detector

Type numbers	Model
MLD.130.020	IRwin SX
MLD.130.030	IRwin SXT
MLD.130.040	IRwin SXG
MLD.130.050	IRwin SXGT

INFICON AB declares on its own responsibility that the object of the declaration as described below is 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) *
RED	Radio equipment (Directive 2014/53/EU)

* Relevant only for battery charger supply (CE marked).

Linköping 01/11/2017

Fredrik Enquist, Development Manager

See next page for details of standards applied.

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: SE556209900101

Harmonized European standards which have been applied

Standard	Edition	Title / Comment
EN 61000-6-1	2	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments.
EN 61000-6-3	2	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.
EN 80079-34	2011	Application of Quality system for Ex Equipment Manufacturing.
EN 60079-0	2012	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
EN 60079-11	2012	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I".
EN 60079-29-1	2007	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases.
EN 50104	2010	Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods. (Not applicable for IRwin SX and IRwin SXG)
EN 50271	2010	Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies.
EN 50581	2012	Restriction of the use of certain hazardous substances (RoHS)
EN 300 328	V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques

Other European standards which have been applied

Standard	Edition	Title / Comment
EN 50270	2015	Electromagnetic compatibility – Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Missing from list of harmonised standards but Annex ZZ Declares compliance with essential requirements of 2004/108/EC (old EMC).
EN 45544-1	2015	Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 1: General requirements and test methods. (Not applicable for IRwin SX and IRwin SXG)
EN 45544-2	2015	Part 2: Performance requirements for apparatus used for exposure measurement. (Not applicable for IRwin SX and IRwin SXG)

Test institutes / notified bodies**EMC****(EN50270)****REC-E704557**

DELTA Development Technology AB
 Finnslätten
 Elektronikgatan 47
 721 36 Västerås, Sweden

Software**(EN50271)****968/FSP 1342/16****TÜV Rheinland**

Am Grauen Stein 29
 51105 Köln
 Germany
 NB 0035

ATEX quality assurance**(EN 80079-34)****SP07ATEX4125**

SP Technical Research Institute of Sweden
 Box 857
 50115 Borås, Sweden
 NB 0402

Toxic gases**(EN45544-1 and -2)****S 498 2016 C2_1****TÜV Rheinland Energie GmbH**

Am Grauen Stein 29
 51105 Köln
 Germany
 NB 0035

ATEX Type certificate**(EN60079-0, EN60079-11)****Baseefa16ATEX0034X**

SGS Baseefa
 Rake Lane, Eccleston, Chester, CH4 9JN
 England
 NB 1180

Detector for oxygen and flammable gases**(EN50104, EN60079-29-1)****TÜV 16 ATEX 7822 X****TÜV Rheinland Industrie Service GmbH**

Laboratory for explosion protection
 Moltkeplatz 1
 45138 Essen
 Germany
 NB0035

Index

A		F	
Alarm		Factory settings	26
latching function	58, 61	Filter	76, 81
alive signal	58, 61	cigarette filter	77
Ambient conditions	20	cylinder filter	79
Application mode		filter discs	79
Above Ground	45	Inline Filter	79
Bar Hole	47	Function	12
Confined Space	52	Function buttons	17
Ex	57	Function test	67
Ex Tox	60	intervals	68
Gas Purity	55		
Applications	7	I	
ATEX application	21	Installation	
ATEX rating	21	Measuring system	32
		Intended use	7
		IR Ethane Analysis	63
C			
Charging the battery		L	
IRwin S	30	Language	38
D		M	
Dead band	40	Maintenance	76
Declaration of Contamination	82	Bell probe	79
Delete file	35	Hand probe	79
Display		measurement data recording	39
Icons	16, 46		
Documentation of inspections	69		
		N	
		Navigation buttons	16, 46
E			
Electrical data	19	P	
Ethane Analysis		Permission levels	38
determine automatically	64	Personnel qualifications	9
Recall information	66	Physical data	19
		Probes	14

R

Return 82

S

Scope of delivery 11
Screen timeout 39
Self-test 69
Settings
 for the measurement 45
statistics 70
Status 69
Status display 16, 46
Status indicators 17
Switch gas 62
Switch OFF 71
Switch operating mode 45

T

Technical data 19
Time
 local time 38
Type certificate 21

W

Warning and error messages 72
Warning Ex 57

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

APPENDIX 2 - LDAR SYSTEM INVENTORY

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

Page Left Blank Intentionally



Leak Point (Component/Equipment)	Assigned Tag ID	Fugitive Emission (Oil, Gas, Methanol etc.)	Max Quantity ¹		Emission / Substance Classification			
			Volume	Tonnes	UN NO	CLP Classification	Chemical Composition	CAS No.

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

APPENDIX 3 - LEAK DETECTION AND INSPECTION PROGRAMME

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

Page Left Blank Intentionally



HORSE HILL
DEVELOPMENTS LTD

HORSE HILL DEVELOPMENTS LTD

HHDL-EPR-HHP-LDAR-010b

Leak Detection and Inspection Programme

Revision: 0

Date: 20/03/20

Tag ID	Component / Equipment	Inspection Frequency	Date of Last Inspection	Date of Next Inspection	Date Inspection Completed	Inspection Type (Steady State or Snoop Test)



Tag ID	Component / Equipment	Inspection Frequency	Date of Last Inspection	Date of Next Inspection	Date Inspection Completed	Inspection Type (Steady State or Snoop Test)

Well Site Supervisor

Name: _____

Time: _____

Date: _____

Signed _____

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

APPENDIX 4 - LEAK DETECTION, MONITORING AND REPAIR REPORT

 HORSE HILL DEVELOPMENTS LTD	HORSE HILL DEVELOPMENTS LTD	HHDL-EPR-HHP-LDAR-010	
	Leak Detection and Repair Procedure Appendices	Revision: 0	Date: 20/03/20

Page Left Blank Intentionally

SECTION 1 LEAK DETECTION RECORD

Report Number	
----------------------	--

Site Name:			
Component / Equipment Tested:		TAG ID:	
Method of Inspection:			

Fugitive Emission:			
Chemical Composition:			
UN Number:		CAS Number:	
CLP Classification:			
Hazard Class and Category(ies):			
Hazard Statement(s):			
Fugitive Emission Estimation:		VOCs (ppm)	Mass (kg/h)

Additional Comments

Inspector Details and Declaration (if different from Well Site Supervisor)			
Name:		Time:	
Date:		Signed:	

Well Site Supervisor Details and Declaration			
Name:		Time:	
Date:		Signed:	

SECTION 2 LEAK MONITORING

Date of Leak Identification:				Monitoring Frequency			
Monitoring Log and Record to be updated as per frequency. Add additional lines as required.							
Date	Time	Leak Increased		Fugitive Emission Estimation		Wellsite Supervisor Signature	
		Yes	No	VOCs (ppm)	Mass (kg/h)		

Well Site Supervisor Details and Declaration Upon Completion of Monitoring Stage			
Name:		Time:	
Date:		Signed:	

SECTION 3 LEAK REPAIR REPORT

Date of Repair or Replacement:		TAG ID	
Component / Equipment:		Company / Engineer	

Description of Repair or Replacement

Follow Up Snoop Tests	Date	Time	Leak Detected		Wellsite Supervisor Signature
			Yes	No	
Immediate					
Day 1					
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Well Site Supervisor Details and Declaration Upon Completion of Monitoring Stage			
Name:		Time:	
Date:		Signed:	