Original operating instructions

IRwin® S/SX/SXT/SXG/SXGT

Portable Methane Leak Detector

Catalog No.
580-000, 580-010, 580-015, 580-020, 580-030

From software version
3.01.01

mina66en1-16-(2001)
INFICON GmbH
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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 resulting in potential death or serious injuries

⚠️ **CAUTION**

Hazardous situation resulting in minor injuries

NOTICE

Hazardous situation resulting in damage to property or the environment
2 Safety

2.1 Intended use

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 [\[22\]]", 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 Tox, GC Ethane Analysis
- IRwin SXGT (EX certified)
  Above Ground, Bar hole, Confined Space, House, Gas Purity, Ex, Ex Tox, GC Ethane Analysis

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) [\[24\]]").

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

IRwin S is not EX certified.

Pay attention to the safety instructions "Safe operation [\[12\]]":

- You must assemble, operate and maintain the equipment only in compliance with these operating instructions.
- Use only within the allowed ambient conditions. 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.
Improper use

- Do not suck liquids into the leak detector.
- Do not suck dirt or sand into the leak detector.
- Do not use IRwin S in areas with potentially explosive atmospheres.

See also

- Technical data [\ref{22}]
- EX certification (intrinsic safety) [\ref{24}]

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 [\ref{98}].

For details of rating, see EX certification (intrinsic safety) [\ref{24}].

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 [\ref{35}].

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.

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 [49]."

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.
- It is recommended that EN/IEC 60079-29-2 is observed to guarantee proper use and continued proper function of IRwin when used in Ex or ExTox modes.

It is also recommended that IRwin is submitted for yearly service at an approved service site.

Contact your supplier for contact details.

EN/IEC 60079-29-2: (Explosive atmospheres – Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen)

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:

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

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

IRwin Accessory Kit (580-712):

<table>
<thead>
<tr>
<th>Article (catalog number)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rod 850mm (580-150)</td>
<td>1</td>
</tr>
<tr>
<td>Extension Rod 150mm (580-160)</td>
<td>1</td>
</tr>
<tr>
<td>Carpet (580-211)</td>
<td>1</td>
</tr>
<tr>
<td>Bell (580-301)</td>
<td>1</td>
</tr>
<tr>
<td>Carrying Case IRwin (580-450)</td>
<td>1</td>
</tr>
<tr>
<td>Filter-kit (580-700)</td>
<td>1</td>
</tr>
<tr>
<td>Bar Hole Probe (580-115)</td>
<td>1</td>
</tr>
<tr>
<td>Extension Connector (580-220)</td>
<td>1</td>
</tr>
</tbody>
</table>

► Check that the delivery is complete.
4 Description

4.1 Function

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:

- Carpet probe is used for surveying paved or smooth surfaces. Pull or push the carpet along the surface.
- Use bell probe for measuring gas at specific points. Press the bell firmly down to pull gas through the surface.
- Hand probe is used for checking features on or in buildings. Hand probe also constitutes the handle for carpet probe and bell probe.
- Bar Hole probe is used to sample air from drilled holes. Push into hole and tighten screw to expand rubber before connecting sample line.
- Optional Hand Probe Flexible Extension can be connected to the hand probe or rod for easier access.
- Swan Neck Probe is used on uneven surfaces and in bushes etc.
- Flexi Bell is used for simple survey including meters and piping. The bell adapts to pipe geometry.

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 [76]".
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

<table>
<thead>
<tr>
<th></th>
<th>Reference inlet</th>
<th></th>
<th>Gas outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Display</td>
<td>5</td>
<td>Charging socket</td>
</tr>
<tr>
<td>3</td>
<td>Gas inlet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 pinpointing gas leaks in none classified areas.

**Carpet probe**

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

![Fig. 2: Carpet probe](image)

**Bell probe**

When searching for or measuring gas leaks at particular spots, use the INFICON 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](image)
**Hand probe**

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

![Fig. 4: Hand probe](image)

**Bar Hole Probe**

The INFICON 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 INFICON Bell Probe can be used first to reduce the number of holes.

![Fig. 5: Bar Hole Probe](image)

**Hand Probe Flexible Extension**

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

![Fig. 6: Hand Probe Flexible Extension](image)
**Swan Neck**

The INFICON Swan Neck is used on uneven surfaces where the carpet probe is unpractical. Can also be practical in bushes and other “confined” areas.

*Fig. 7: Swan Neck*

**Flexi Bell**

The INFICON Flexi Bell is practical for surveys including frequent entries into gardens and check of meters and piping. The softer bell adapts to pipe geometry.

*Fig. 8: Flexi Bell*
4.4 Display

Fig. 9: Display IRwin

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 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 CH₄ 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

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>OK/Select/Confirm</td>
</tr>
<tr>
<td>&gt;</td>
<td>Navigation buttons (in this case go right)</td>
</tr>
<tr>
<td>✗</td>
<td>Cancel process</td>
</tr>
<tr>
<td>◀</td>
<td>Start process</td>
</tr>
<tr>
<td>●</td>
<td>Start data logging</td>
</tr>
<tr>
<td>○</td>
<td>Stop data logging</td>
</tr>
<tr>
<td>🗓️</td>
<td>Mute the alarm</td>
</tr>
</tbody>
</table>

*Table 2: Function buttons*

### Symbols of the status bar

<table>
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<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗺️</td>
<td>Bluetooth activated</td>
</tr>
</tbody>
</table>
| ✗      | 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 shutdown:

- White: > 1h remaining
- Orange: < 1h remaining
- Red flashing: < 10 min remaining

*Table 3: Status indicators*

### Progress bars for calibration processes etc.

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>White bar: Process has not yet started</td>
</tr>
<tr>
<td>Light green</td>
<td>Light green bar: Process running</td>
</tr>
<tr>
<td>Dark green</td>
<td>Dark green bar: Process completed</td>
</tr>
<tr>
<td>Red</td>
<td>Red bar: Process failed</td>
</tr>
</tbody>
</table>

*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
- 🌐 Operating mode- Universal
### Permission levels

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Permission level</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗓️</td>
<td>Basic</td>
<td>none</td>
</tr>
<tr>
<td>⌚️</td>
<td>Intermediate</td>
<td>1111</td>
</tr>
<tr>
<td>⚖️</td>
<td>Advanced (Supervisor)</td>
<td>1422</td>
</tr>
</tbody>
</table>

*Table 4: Permission levels*

### Status LED

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>• Leak detector is charging normal (power off)</td>
</tr>
<tr>
<td></td>
<td>• Normal operation in the modes Ex and Ex Tox.</td>
</tr>
<tr>
<td>Cyan</td>
<td>Leak detector is charging fast.</td>
</tr>
<tr>
<td>Blue</td>
<td>Normal operation (in all operation modes except Ex and Ex Tox)</td>
</tr>
<tr>
<td>Red</td>
<td>• Alarm</td>
</tr>
<tr>
<td></td>
<td>• Error message</td>
</tr>
<tr>
<td>Yellow</td>
<td>The leak detector is in a state in which functions like for example alarms could be disabled. For example, during warm up or calibration.</td>
</tr>
</tbody>
</table>
### 4.5 Technical data

#### Mechanical data

<table>
<thead>
<tr>
<th>580-000</th>
<th>580-010</th>
<th>580-015</th>
<th>580-020</th>
<th>580-030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>IRwin S</td>
<td>IRwin SX</td>
<td>IRwin SXT</td>
<td>IRwin SXG</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.4 kg (3 lb.)</td>
<td>1.6 kg (3.5 lb.)</td>
<td>1.6 kg (3.5 lb.)</td>
<td>1.6 kg (3.5 lb.)</td>
</tr>
<tr>
<td><strong>Dimensions (l x w x h)</strong></td>
<td>197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)</td>
<td>197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)</td>
<td>197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)</td>
<td>197 x 256 x 62 mm (6.6 x 9.7 x 2.3 in.)</td>
</tr>
</tbody>
</table>

#### Electrical data

<table>
<thead>
<tr>
<th>580-000</th>
<th>580-010</th>
<th>580-015</th>
<th>580-020</th>
<th>580-030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>IRwin S</td>
<td>IRwin SX</td>
<td>IRwin SXT</td>
<td>IRwin SXG</td>
</tr>
<tr>
<td><strong>Power input</strong></td>
<td>4 A</td>
<td>4 A</td>
<td>4 A</td>
<td>4 A</td>
</tr>
<tr>
<td><strong>Memory capacity for measured data</strong></td>
<td>64 MB</td>
<td>64 MB</td>
<td>64 MB</td>
<td>64 MB</td>
</tr>
<tr>
<td><strong>Type of protection</strong></td>
<td>IP54</td>
<td>IP54</td>
<td>IP54</td>
<td>IP54</td>
</tr>
<tr>
<td><strong>Electronic interfaces</strong></td>
<td>Bluetooth 3.0 Class 1</td>
<td>Bluetooth 3.0 Class 1</td>
<td>Bluetooth 3.0 Class 1</td>
<td>Bluetooth 3.0 Class 1</td>
</tr>
<tr>
<td><strong>Battery operating time</strong></td>
<td>8 h as verified during certification, typical value 9 h</td>
<td>8 h as verified during certification, typical value 9 h</td>
<td>8 h as verified during certification, typical value 9 h</td>
<td>8 h as verified during certification, typical value 9 h</td>
</tr>
<tr>
<td><strong>Battery charging time</strong></td>
<td>4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading</td>
<td>4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading</td>
<td>4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading</td>
<td>4 h from empty to full charge (3 h for fast charging). 4 hours operation by 1 hour fast loading</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>Lithium-Ion, 10.0 Ah / 7.2 V / 73 Wh</td>
<td>Lithium-Ion, 10.0 Ah / 7.2 V / 73 Wh</td>
<td>Lithium-Ion, 10.0 Ah / 7.2 V / 73 Wh</td>
<td>Lithium-Ion, 10.0 Ah / 7.2 V / 73 Wh</td>
</tr>
</tbody>
</table>
## Physical data

<table>
<thead>
<tr>
<th>Name</th>
<th>580-000</th>
<th>580-010</th>
<th>580-015</th>
<th>580-020</th>
<th>580-030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise level</td>
<td>&lt; 70 dB (A)</td>
<td>&lt; 70 dB (A)</td>
<td>&lt; 70 dB (A)</td>
<td>&lt; 70 dB (A)</td>
<td>&lt; 70 dB (A)</td>
</tr>
<tr>
<td>Detectable gases</td>
<td>Methane, ethane, propane, butane, carbon dioxide</td>
<td>Methane, carbon dioxide, ethane, propane, butane</td>
<td>Methane, carbon dioxide, ethane, propane, butane, oxygen, hydrogen sulfide, carbon monoxide</td>
<td>Methane, carbon dioxide, ethane, propane, butane, oxygen, hydrogen sulfide, carbon monoxide</td>
<td>Methane, carbon dioxide, ethane, propane, butane, oxygen, hydrogen sulfide, carbon monoxide</td>
</tr>
<tr>
<td>Gas flow through sniffer line</td>
<td>Typically 60 l/h</td>
<td>Typically 60 l/h</td>
<td>Typically 60 l/h</td>
<td>Typically 60 l/h</td>
<td>Typically 60 l/h</td>
</tr>
</tbody>
</table>

## Ambient conditions

<table>
<thead>
<tr>
<th>Name</th>
<th>580-000</th>
<th>580-010</th>
<th>580-015</th>
<th>580-020</th>
<th>580-030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. altitude above sea level</td>
<td>2000 m</td>
<td>2000 m</td>
<td>2000 m</td>
<td>2000 m</td>
<td>2000 m</td>
</tr>
<tr>
<td>Permissible ambient temperature (during operation)</td>
<td>-20° - +50°C (-4 - 122°F)</td>
<td>-20 - 50°C (-4 - 122°F)</td>
<td>-15 - 40°C (-5 - 104°F)</td>
<td>-20 - 50°C (-4 - 122°F)</td>
<td>-15 - 40°C (-5 - 104°F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 - +70°C (-13 - 158°F)</td>
<td>-25 - 70°C (-13 - 158°F)</td>
<td>-25 - 70°C (-13 - 158°F)</td>
<td>-25 - 70°C (-13 - 158°F)</td>
<td>-25 - 70°C (-13 - 158°F)</td>
</tr>
<tr>
<td>Pressure range</td>
<td>80 kPa - 120 kPa</td>
<td>80 kPa - 120 kPa</td>
<td>80 kPa - 120 kPa</td>
<td>80 kPa - 120 kPa</td>
<td>80 kPa - 120 kPa</td>
</tr>
<tr>
<td>Max. relative humidity</td>
<td>95% (non-condensing)</td>
<td>95% (non-condensing)</td>
<td>95% (non-condensing)</td>
<td>95% (non-condensing)</td>
<td>95% (non-condensing)</td>
</tr>
</tbody>
</table>
4.5.1 EX certification (intrinsic safety)

**Type certificate**

Type certificates, see "Certificates [\p 98]"

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. IRwin S 580-000 is not Ex certified.

<table>
<thead>
<tr>
<th>EX rating</th>
<th>Ex ia IIC T3, ( T_{\text{amb}}: -20^\circ \text{C} - +50^\circ \text{C} ), USA: Intrinsically safe, Class I, Division 1, Groups A, B, C and D.</th>
</tr>
</thead>
</table>
| **EX ranges of applications** | • 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**

<table>
<thead>
<tr>
<th>Gas (measurement range)</th>
<th>Sensor</th>
<th>Warm up time</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{CH}_4, \text{C}_3\text{H}_8, \text{C}<em>4\text{H}</em>{10} )</td>
<td>Infrared (IR)</td>
<td>&lt; 30 s</td>
</tr>
<tr>
<td>( \text{CO}_2 )</td>
<td>Infrared (IR)</td>
<td>&lt; 30 s</td>
</tr>
</tbody>
</table>
| \( \text{O}_2, \text{CO}, \text{H}_2\text{S} \) | Electrochemical | < 120 s  
  \( \text{O}_2 \) 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 [\p 49].
Universal mode

This mode is available if Universal Mode option is enabled. See Operating mode "Universal" [p. 56].

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
</table>
| Measurement range      | CH₄, C₂H₆, C₄H₁₀: 1 ppm - 100 Vol%  
The following is also displayed when total NG is above 2.7 Vol%:  
C₂H₆ content in NG: 0.5 - 8 Vol%  
CO₂: 0.1 - 20 Vol% |
| Resolution             | CH₄: 1 ppm (0 - 100 Vol%), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 2.7 Vol%), 1 Vol% (<2.7 Vol%)  
CO₂: 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (<1 Vol%)  
C₂H₆: 0.1 Vol% (Auto test) 0.5 Vol% (manual selection) |
| Measurement error      | CH₄: ±5/-2 ppm (<20 ppm) ±10 Vol% (20 - 50 ppm) ±5 % (50 ppm - 2.2 Vol%) ±20 % (2.2 - 2.7 Vol%), ±3 Vol% (>2.7 Vol%)  
CO₂: ±1% (<10 Vol%), ±20% (>10 Vol%) |
| Response time          | t₉₀ <3 s (<2.7 Vol%), <5 s (>2.7 Vol%),  
t₅₀ <5 s (<2.7 Vol%), <10 s (>2.7 Vol%) |
| Recovery time          | t₉₀ <3 s (<2.7 Vol%), <5 s (>2.7 Vol%),  
t₅₀ <5 s (<2.7 Vol%), <10 s (>2.7 Vol%) |
| Cross sensitivity      | All hydrocarbons CₓHᵧ  
CO₂ and H₂O: Negligible |
| Lifetime               | Guaranteed 1 year, expected > 2 years |
| Calibration gases      | Fresh air, CH₄ in synthetic air: 10 ppm, 100 ppm 2.2 Vol%, 100 Vol% CO₂, 20 Vol% |

Note: IRwin allows other concentrations and reduced number of gases. The measurement error may fall outside specification if choosing other set-up than the recommended.
Above ground mode:

This mode is not available if Universal mode option is activated.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, C₃H₈, C₄H₁₀: 1 ppm - 5 Vol%</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 5 Vol%)</td>
</tr>
<tr>
<td>Measurement error</td>
<td>+5/-2 ppm (&lt;20 ppm) ±10% (20 - 50 ppm) ±5% (50 ppm - 2.2 Vol%) ±20% (2.2 - 5 Vol%)</td>
</tr>
<tr>
<td>Response time</td>
<td>t₉₀ &lt; 3 s, t₉₀ &lt; 5 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>t₅₀ &lt; 3 s, t₁₀ &lt; 5 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gases</td>
<td>Fresh air, CH₄ in synthetic air: 10 ppm, 100 ppm, 2.2 Vol%</td>
</tr>
</tbody>
</table>

Bar hole mode:

This mode is not available if Universal mode option is activated.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, C₃H₈, C₄H₁₀: 0.1 - 100 Vol%</td>
</tr>
<tr>
<td></td>
<td>C₂H₆ content in CNG: 0.5 - 8 Vol%</td>
</tr>
<tr>
<td></td>
<td>CO₂: 0.1 - 20 Vol%</td>
</tr>
<tr>
<td>Resolution</td>
<td>CH₄ &amp; CO₂: 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (&gt;1 Vol%)</td>
</tr>
<tr>
<td></td>
<td>C₂H₆: 0.1 Vol% (Auto test) 0.5 Vol% (manual selection)</td>
</tr>
<tr>
<td>Measurement error</td>
<td>CH₄: ±3 Vol%</td>
</tr>
<tr>
<td></td>
<td>CO₂: ±1% (&lt;10 Vol%), ±20% (&gt;10 Vol%)</td>
</tr>
<tr>
<td>Response time</td>
<td>t₅₀ &lt; 5 s, t₉₀ &lt; 10 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>t₅₀ &lt; 5 s, t₁₀ &lt; 10 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td></td>
<td>CO₂: Negligible</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gases</td>
<td>Fresh air, CH₄ in synthetic air: 2.2 Vol%, 100 Vol%. CO₂, 20 Vol%</td>
</tr>
</tbody>
</table>
### GC Ethane Analysis mode:

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Gas Chromatography separation with semiconductor detector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>1000 ppm gas needed in sample. This refers to total hydrocarbon content (i.e., natural gas, swamp gas or LPG etc.).</td>
</tr>
<tr>
<td>Capability</td>
<td>Can identify Natural Gas at 0.5% C2H6 level. Automatic interpretation of result as either of:</td>
</tr>
<tr>
<td></td>
<td>• NG with Ethane detected</td>
</tr>
<tr>
<td></td>
<td>• Methane detected</td>
</tr>
<tr>
<td></td>
<td>• LPG detected</td>
</tr>
<tr>
<td></td>
<td>• Gas type not identified (given if result is not clear)</td>
</tr>
</tbody>
</table>
| 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:**

This mode is not available if Universal mode option is activated.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, C₂H₆, C₄H₁₀: 1 ppm - 5 Vol%</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (&gt;1 Vol%)</td>
</tr>
<tr>
<td>Measurement error</td>
<td>+5/-2 ppm (&lt;20 ppm) ±10% (20 - 50 ppm) ±5% (50 ppm - 2.2 Vol%) ±20% (2.2 - 5 Vol%)</td>
</tr>
<tr>
<td>Response time</td>
<td>tₜ₀ &lt; 3 s, tᵣ₀ &lt; 5 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>tₜ₀ &lt; 3 s, tᵣ₀ &lt; 5 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gases</td>
<td>Fresh air, CH₄ in synthetic air: 10 ppm, 100 ppm, 2.2 Vol%</td>
</tr>
</tbody>
</table>
### Confined Space mode:

This mode is not available if Universal mode option is activated.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, 1 ppm – 100 Vol% for natural gas with up to 8% C₂H₆ (ethane) content</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 ppm (0 - 100 ppm), 10 ppm (110 - 990 ppm), 0.1 Vol% (0.1 - 1 Vol%), 1 Vol% (&gt;1 Vol%)</td>
</tr>
<tr>
<td>Measurement error</td>
<td>±5/-2 ppm (&lt;20 ppm) ±10% (20 - 50 ppm) ±5% (50 ppm - 2.2 Vol%) ±3 Vol% (2.2 - 100 Vol%)</td>
</tr>
<tr>
<td>Response time</td>
<td>tₜ₅₀ &lt;5 s, tₜ₉₀ &lt;10 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>tₜ₅₀ &lt;5 s, tₜ₁₀ &lt;10 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gas</td>
<td>Fresh air, CH₄ in synthetic air: 10 ppm, 100 ppm, 2.2 Vol%, 100 Vol%</td>
</tr>
</tbody>
</table>

### Gas Purity mode:

This mode is not available if Universal mode option is activated.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄: 0.1 - 100 Vol%</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.5 Vol% (0.5 - 1 Vol%), 1 Vol% (&gt;1 Vol%)</td>
</tr>
<tr>
<td>Measurement error</td>
<td>±3 Vol%</td>
</tr>
<tr>
<td>Response time</td>
<td>tₜ₅₀ &lt;5 s, tₜ₉₀ &lt;10 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>tₜ₅₀ &lt;5 s, tₜ₁₀ &lt;10 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gas</td>
<td>Fresh air, CH₄ in synthetic air: 2.2 Vol%, 100 Vol%</td>
</tr>
</tbody>
</table>
### Ex mode:

This mode is not available in IRwin S.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, C₂H₆, C₄H₁₀: 1 - 100% LEL</td>
</tr>
<tr>
<td>Resolution</td>
<td>±5% LEL</td>
</tr>
<tr>
<td>Measurement error</td>
<td>±5% LEL</td>
</tr>
<tr>
<td>Response time</td>
<td>CH₄: t₉₀ = 3 s, t₉₀ = 5 s</td>
</tr>
<tr>
<td>Recovery time</td>
<td>t₉₀ &lt; 3 s, t₉₀ &lt; 5 s</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td>All hydrocarbons CₓHᵧ</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Guaranteed 1 year, expected &gt; 2 years</td>
</tr>
<tr>
<td>Calibration gas</td>
<td>Fresh air, CH₄ in synthetic air: 2.2 Vol%</td>
</tr>
</tbody>
</table>

### Ex Tox mode:

This mode is only available in IRwin SXT and SXGT.

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Infrared (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>CH₄, C₂H₆, C₄H₁₀: 1 - 100% LEL</td>
</tr>
<tr>
<td>CO₂: 0.1 - 5 Vol%</td>
<td></td>
</tr>
<tr>
<td>O₂: 0.1 - 25 Vol%</td>
<td></td>
</tr>
<tr>
<td>CO: 1 - 500 ppm</td>
<td></td>
</tr>
<tr>
<td>H₂S: 0.1 - 400 ppm</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>CH₄, C₂H₆, C₄H₁₀: 1% LEL</td>
</tr>
<tr>
<td>CO₂: 0.05 Vol%</td>
<td></td>
</tr>
<tr>
<td>O₂: 0.1 Vol%</td>
<td></td>
</tr>
<tr>
<td>CO: 1 ppm</td>
<td></td>
</tr>
<tr>
<td>H₂S: 0.1 ppm</td>
<td></td>
</tr>
<tr>
<td>Measurement error</td>
<td>CH₄: ±5 % LEL C₂H₆: ±40% of indicated value C₄H₁₀: ±50% of indicated value</td>
</tr>
<tr>
<td>CO₂: ±0.1 Vol%</td>
<td></td>
</tr>
<tr>
<td>O₂: ±0.3 Vol%</td>
<td></td>
</tr>
<tr>
<td>CO: ±3 ppm</td>
<td></td>
</tr>
<tr>
<td>H₂S: ±0.5 ppm</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>CH₄: t₉₀ &lt; 3 s, t₉₀ &lt; 5 s</td>
</tr>
<tr>
<td>Gas</td>
<td>Recovery time</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>O₂</td>
<td>t₉₀ &lt;16 s, t₉₀ &lt;40 s</td>
</tr>
<tr>
<td>CO</td>
<td>t₉₀ &lt; 15 s, t₉₀ &lt;30 s</td>
</tr>
<tr>
<td>CO₂</td>
<td>t₉₀ &lt;12 s, t₉₀ &lt;36 s</td>
</tr>
<tr>
<td>H₂S</td>
<td>t₉₀ &lt;18 s, t₉₀ &lt;66 s</td>
</tr>
</tbody>
</table>

Recovery time

- CH₄: t₉₀ <3 s, t₉₀ <5 s
- CO₂: t₉₀ <12 s, t₉₀ <36 s
- O₂: t₉₀ <16 s, t₉₀ <39 s
- CO: t₉₀ <15 s, t₉₀ <30 s
- H₂S: t₉₀ <18 s, t₉₀ <66 s

Sensitivity drift

- CH₄, C₂H₆, C₄H₁₀: <±5 %LEL in 1 month
- CO₂: <±5 Vol% in 1 month
- O₂: <±1 Vol% in 3 months
- CO: <±4% in 12 months
- H₂S: <±2% in 12 months

Cross sensitivity

- CH₄: All hydrocarbons CₓHᵧ.
- O₂: negligible
- CO: <12% of applied H₂S concentration, <8% of applied H₂ concentration
- H₂S: <1.5% of applied CO concentration, <0.3% of applied H₂ concentration
- CO₂: negligible

Lifetime

- CH₄, C₃H₈, C₄H₁₀: Guaranteed 1 year, expected > 2 years
- CO₂: Guaranteed 1 year, expected > 2 years
- O₂: Guaranteed 4 years, expected > 5 years
- CO: Guaranteed 2 years, expected > 3 years
- H₂S: Guaranteed 2 years, expected > 3 years

Calibration gas

Fresh air, ToxMix (CH₄ 2.2 Vol%, CO₂ 2 Vol%, CO 40 ppm, H₂S 40 ppm, O₂ 0 Vol% in N₂)
### 4.6 Factory settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory Setting</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen timeout (auto standby)</td>
<td>30 s</td>
<td>Off 5, 30 s 1, 2, 5, 10, 20, 30 min 1, 2</td>
</tr>
<tr>
<td>Brightness</td>
<td>10</td>
<td>1 -10</td>
</tr>
<tr>
<td>Screensaver (IRwin S only)</td>
<td>enabled</td>
<td>enabled or disabled</td>
</tr>
<tr>
<td>PPM Adjustment Factor</td>
<td>1.0</td>
<td>1.0, 1.2, 1.4, 1.6, 1.8, 2.0</td>
</tr>
<tr>
<td>Select Gas (Ex)</td>
<td>CH₄</td>
<td>CH₄, C₂H₆, C₃H₁₀</td>
</tr>
<tr>
<td>CH₄ PPM Alarm</td>
<td>10 PPM</td>
<td>3, 5, 10, 15, 20, 25, 50, 100</td>
</tr>
<tr>
<td>CH₄ AL1</td>
<td>10% LEL</td>
<td>3, 5, 10</td>
</tr>
<tr>
<td>CH₄ AL2</td>
<td>50% LEL</td>
<td>30, 40, 50</td>
</tr>
<tr>
<td>CH₄ AL3</td>
<td>100% LEL</td>
<td>80, 90, 100</td>
</tr>
<tr>
<td>C₃H₈ PPM alarm</td>
<td>10 PPM</td>
<td>3, 5, 10, 15, 20, 25, 50, 100</td>
</tr>
<tr>
<td>C₃H₈ AL1</td>
<td>10% LEL</td>
<td>3, 5, 10</td>
</tr>
<tr>
<td>C₃H₈ AL2</td>
<td>50% LEL</td>
<td>30, 40, 50</td>
</tr>
<tr>
<td>C₃H₈ AL3</td>
<td>100% LEL</td>
<td>80, 90, 100</td>
</tr>
<tr>
<td>C₄H₁₀ PPM alarm</td>
<td>10 PPM</td>
<td>3, 5, 10, 15, 20, 25, 50, 100</td>
</tr>
<tr>
<td>C₄H₁₀ AL1</td>
<td>10% LEL</td>
<td>3, 5, 10</td>
</tr>
<tr>
<td>C₄H₁₀ AL2</td>
<td>50% LEL</td>
<td>30, 40, 50</td>
</tr>
<tr>
<td>C₄H₁₀ AL3</td>
<td>100% LEL</td>
<td>80, 90, 100</td>
</tr>
<tr>
<td>CO₂ AL1</td>
<td>0.5 Vol%</td>
<td>0.1, 0.2, 0.3, 0.4, 0.5</td>
</tr>
<tr>
<td>CO₂ AL2</td>
<td>1.0 Vol%</td>
<td>0.6, 0.7, 0.8, 0.9, 1.0</td>
</tr>
<tr>
<td>CO₂ AL3</td>
<td>5 Vol%</td>
<td>1.0, 2.0, 3.0, 4.0, 5.0</td>
</tr>
<tr>
<td>CO₂ STEL</td>
<td>1.0 Vol%</td>
<td>0.5, 0.6, 0.7, 0.8, 0.9, 1.0</td>
</tr>
<tr>
<td>CO₂ LTEL</td>
<td>0.5 Vol%</td>
<td>0.1, 0.2, 0.3, 0.4, 0.5</td>
</tr>
<tr>
<td>CO AL1</td>
<td>30 ppm</td>
<td>10, 20, 30</td>
</tr>
<tr>
<td>CO AL2</td>
<td>60 ppm</td>
<td>40, 50, 60</td>
</tr>
<tr>
<td>CO AL3</td>
<td>500 ppm</td>
<td>100, 200, 300, 400, 500</td>
</tr>
<tr>
<td>CO STEL</td>
<td>30 ppm</td>
<td>10, 20, 30</td>
</tr>
<tr>
<td>CO LTEL</td>
<td>30 ppm</td>
<td>10, 20, 30</td>
</tr>
<tr>
<td>H₂S AL1</td>
<td>10 ppm</td>
<td>3, 5, 7, 10</td>
</tr>
<tr>
<td>Parameter</td>
<td>Factory Setting</td>
<td>Options</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>( H_2S ) AL2</td>
<td>20 ppm</td>
<td>10, 15, 20</td>
</tr>
<tr>
<td>( H_2S ) AL3</td>
<td>100 ppm</td>
<td>50, 60, 70, 80, 90, 100</td>
</tr>
<tr>
<td>( H_2S ) STEL</td>
<td>10 ppm</td>
<td>3, 5, 7, 10</td>
</tr>
<tr>
<td>( H_2S ) LTEL</td>
<td>10 ppm</td>
<td>3, 5, 7, 10</td>
</tr>
<tr>
<td>( O_2 ) AL1</td>
<td>10 Vol%</td>
<td>3, 5, 10, 15</td>
</tr>
<tr>
<td>( O_2 ) AL2</td>
<td>18 Vol%</td>
<td>16, 17, 18, 19, 20</td>
</tr>
<tr>
<td>( O_2 ) AL3</td>
<td>23 Vol%</td>
<td>21, 22, 23, 24, 25</td>
</tr>
<tr>
<td>Calibration reminder</td>
<td>Off</td>
<td>Off, 1 - 7, 14, 30 days</td>
</tr>
<tr>
<td>Function test reminder</td>
<td>Off</td>
<td>Off, 2, 4, 8 h.</td>
</tr>
<tr>
<td>100% CH(_4) LEL conc</td>
<td>4.4 Vol%</td>
<td>4.4 Vol%, 5.0 Vol%</td>
</tr>
<tr>
<td>Deadband Suppression</td>
<td>Disabled</td>
<td>Disabled/ Enabled</td>
</tr>
<tr>
<td>Universal Mode</td>
<td>Disabled</td>
<td>Disabled/ Enabled</td>
</tr>
<tr>
<td>AbG Cal Setup</td>
<td>Classic</td>
<td>Generic / Classic</td>
</tr>
<tr>
<td>AbG Fnc Test conc</td>
<td>10 ppm</td>
<td>10 ppm, 500 ppm, 2.5%</td>
</tr>
<tr>
<td>Time</td>
<td>UTC +2 h.</td>
<td>-11 - +12 h.</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
<td>English, Deutsch, Italiano, Nederlands, Polskie, Chinese</td>
</tr>
<tr>
<td>Ethane %</td>
<td>0%</td>
<td>0 - 8% (in increments of 0.5%)</td>
</tr>
<tr>
<td>Log to file</td>
<td>enabled</td>
<td>enabled / disabled</td>
</tr>
<tr>
<td>Logging Interval (log file period)</td>
<td>3 s</td>
<td>1, 2, 3, 5, 10, 30 s, 1 min</td>
</tr>
<tr>
<td>Start Mode</td>
<td>Default (Ex or Above Ground for IRwin S)</td>
<td>Default, Last Used, Ex, Ex Tox, Universal (if enabled), GC Ethane Analysis</td>
</tr>
<tr>
<td>Auto-rotate Screen</td>
<td>Off</td>
<td>On, Off</td>
</tr>
<tr>
<td>Re-test C(_2)H(_6) in Bar Hole</td>
<td>Off</td>
<td>Off, startup, always</td>
</tr>
<tr>
<td>Measuring duration (Auto bar hole)</td>
<td>10 s</td>
<td>10, 15, 20, 25, 30 s</td>
</tr>
<tr>
<td>Evacuation duration (Auto bar hole)</td>
<td>3 min</td>
<td>3, 4, 5, 10, 15 min</td>
</tr>
<tr>
<td>CO(_2)-limit at evacuation (Auto bar hole)</td>
<td>Off</td>
<td>Off, 1, 2, 3, 4, 5%</td>
</tr>
</tbody>
</table>
## 4.7 Concentration of calibration and test gases

<table>
<thead>
<tr>
<th>Calibration routine</th>
<th>Default gas</th>
<th>Adjustable range</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex (2.x% CH₄)</td>
<td>2.2 Vol% CH₄</td>
<td>2.0 - 2.5 Vol% in 0.1 Vol% increments</td>
<td>Select gas close to 50% LEL</td>
</tr>
<tr>
<td>Above Ground and Universal (low range)</td>
<td>10 ppm CH₄</td>
<td>8 - 15 ppm in 0.1 ppm increments</td>
<td>All three needed in &quot;Classic&quot; AbG Cal setup.</td>
</tr>
<tr>
<td></td>
<td>100 ppm CH₄</td>
<td>80 - 1100 ppm in 1 ppm increments</td>
<td>Select one, two or three in &quot;Generic&quot; setup.</td>
</tr>
<tr>
<td></td>
<td>2.2 Vol% CH₄</td>
<td>1.5 - 3.0 Vol% in 0.1 Vol% increments</td>
<td></td>
</tr>
<tr>
<td>Bar Hole CH₄ and Universal (high range)</td>
<td>2.2 Vol% CH₄</td>
<td>2.0 - 2.5 Vol% in 0.1 Vol% increments</td>
<td>Select gas close to 50% LEL</td>
</tr>
<tr>
<td></td>
<td>100 Vol% CH₄</td>
<td>80 - 100 Vol% in 1 Vol% increments</td>
<td></td>
</tr>
<tr>
<td>Bar Hole CO₂ and Universal CO₂</td>
<td>20.0 Vol% CO₂</td>
<td>10.0 - 20.0 Vol% in 0.1 Vol% increments</td>
<td></td>
</tr>
<tr>
<td>Ex Tox (Tox) Mixture of:</td>
<td>2.2 Vol% CH₄</td>
<td>1.4 - 2.7 Vol% in 0.1 Vol% increments</td>
<td>Select gas close to 50% LEL</td>
</tr>
<tr>
<td></td>
<td>2.0 Vol% CO₂</td>
<td>0.5 - 3.0 Vol% in 0.1 Vol% increments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 Vol% O₂</td>
<td>0.0 - 18.0 Vol% in 0.1 Vol% increments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 ppm H₂S</td>
<td>4 - 50 ppm in 1 ppm increments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 ppm CO</td>
<td>20 - 160 ppm in 1 ppm increments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Balance: N₂</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>GC Ethane Analysis Option 1 mix*</td>
<td>1 Vol% CH₄</td>
<td>Not applicable</td>
<td>Timing adjustment only</td>
</tr>
<tr>
<td></td>
<td>50 ppm C₂H₆</td>
<td>Not applicable</td>
<td>Timing adjustment only</td>
</tr>
<tr>
<td></td>
<td>1000 ppm C₃H₈</td>
<td>Not applicable</td>
<td>Timing adjustment only</td>
</tr>
<tr>
<td>GC Ethane Analysis Option 2 mix*</td>
<td>1 Vol% CH₄</td>
<td>Not applicable</td>
<td>Timing adjustment only</td>
</tr>
<tr>
<td></td>
<td>50 ppm C₂H₆</td>
<td>Not applicable</td>
<td>Timing adjustment only</td>
</tr>
</tbody>
</table>

*Used only for Function Test of GC Ethane Analysis.

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

Water content in all gases should be below 10 ppm.
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 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.

ℹ️ 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.

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Fast charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>4 h from empty to full charge produces 9.5 h operation time</td>
<td>3 h from empty to full charge produces 9 h operation time</td>
</tr>
<tr>
<td>Short charge</td>
<td>1 h charging gives &gt;3.25 h of operation</td>
<td>1 h charging gives 4 h of operation</td>
</tr>
</tbody>
</table>

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 pinpointing 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 [15]."

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 an 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 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 Make sure IRwin is not in Ex or ExTox mode. Bluetooth is active in all other 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 paring 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.

NOTICE

Avoid transferring files while performing a GC Ethane Analysis as this can severely affect the GC analysis.

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 paring 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. 10: 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 IRwin S or any kind of charger for 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

IRwin is delivered set in English language, and modes according to German DVGW regulations.

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

6.2.1 Select available operating modes

IRwin can be also set for general use in "Universal mode" and in several languages.

Enabling Universal mode gives you one mode for the full range of gas concentrations from 1 ppm to 100 volume %.

1. Press General > Custom (Tab)
2. Select Universal mode and press the button next to .
3. Leave the view via .

6.2.2 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. Press General > Time/Date (Tab).
2. Adjust the local time zone.
   • For the settings, see "Factory settings [32]."
3. Leave the view via .

6.2.3 Setting the language

1. Press General > Misc (Tab) > Language
2. Select a language.
3. Leave the view via .
6.2.4 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 [19]").

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Permission level</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>1111</td>
</tr>
<tr>
<td></td>
<td>Advanced (Supervisor)</td>
<td>1422</td>
</tr>
</tbody>
</table>

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.

6.2.5 PPM Adjustment Factor

The PPM Adjustment Factor can be used to slightly overestimate low natural gas concentrations. This can be handy if bump test requirements require an indication of at least 10 ppm.

The selected value (1.0 to 2.0) will be multiplied with the calibrated reading. Setting this factor to e.g., 1.4 will make IRwin display a 10 ppm reading as 1.4 x 10 = 14 ppm.

This adjustment affects values up to 10 ppm and turns into a minor offset above 10 ppm.

► > General > Misc (Tab).

6.2.6 Select Gas (Ex)

If desired you can set IRwin to measure Propane (C3H8) or Butane (C4H10) instead of methane (CH4).

IRwin will use your methane calibration and built-in correction data for the selected gas.

► > General > Misc (Tab).
6.2.7 100% CH4 LEL conc

You can select the LEL level according to local standards. Choose between 4.4% and 5.0%.

► Edit > General > Custom (Tab)

6.2.8 Universal Mode

IRwin can be set up in two general ways: Default and Universal.

The default mode is adapted to German and Dutch work procedures with specific test modes for different applications.

By enabling the Universal mode you can instead combine most of these modes into one Universal mode covering the entire concentration range from ppm to 100 Vol%.

► Edit > General > Custom (Tab)

6.2.9 AbG Cal Setup

Above Ground Calibration Setup is used to customize the calibration routing for low concentration methane measurements. The Classic setting uses the calibration routine specified by German and Dutch work procedures whereas the Generic option makes it possible to use only one or two gas concentrations instead of three.

Note that reducing the number of gas concentrations may result in lower accuracy not fulfilling the entire specification.

► Edit > General > Custom (Tab)

Selection of gas concentrations to use is made by changing the Setting of calibration gas concentration. See "Calibration [49]Setting of calibration gas concentrations [52]."

6.2.10 AbG Fnc Test conc

The gas concentration used for Above Ground Function Test can be set to suit your application. You can chose between 10 ppm, 500 ppm and 2.2 or 2.5 Vol% (representing 50% LEL as set).

► Edit > General > Custom (Tab)
6.2.11 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.
6.2.12 Configure data logging

You can record and store your survey with 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
- Data output > Log to File (Tab)
- Select “Enable log to file” and press the button next to.
- 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.

6.2.13 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.

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

6.2.14 Setting the Function Test Interval

| Setting time interval for Function Test |
| Reminder |
| Consider relevant standards and regulations. |
| Login as Intermediate or Advanced |
| Data output > Function Test > Interval (Tab) |
| 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” / "Universal (low range)”, “Bar Hole” / "Universal (high range)”, “Ex”, “Tox Mx” and “GC”.

3 Leave the view via AMERA.

6.2.15 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 the operating modes 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 or Universal (low range) if Universal mode is enabled
2. Ex CH₄ (IRwin SX, SXT, SXG and SXGT only)
3. Tox (IRwin SXT and SXGT only)
4. Bar Hole CH₄ or Universal (high range) if Universal mode is enabled
5. Bar Hole CO₂ or Universal (20% CO₂) if Universal mode is enabled

Recommended calibration intervals

- Above Ground CH₄ / Universal (low range) - 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.

- 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 / Universal (20.0% 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 CO\(_2\) calibration (ppm) in the Ex Tox calibration routine.

- Bar Hole CH\(_4\) / Universal (high range) - monthly
  For calibration of the CH\(_4\) measurement of Bar Hole you need the following gas concentrations:
  2.2% CH\(_4\), 100% CH\(_4\)
  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 CO\(_2\) (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)
6.2.15.1 Standard calibration procedures

Prepare calibration

For a complete calibration you need the gases listed, see "Concentration of calibration and test gases [34]."

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

<table>
<thead>
<tr>
<th>Mode</th>
<th>Above Ground Universal (low range)</th>
<th>Ex</th>
<th>Bar Hole CH₄ Universal (high range)</th>
<th>Bar Hole CO₂ Universal (CO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal (low range)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar Hole</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Universal (high range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confined Space</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Gas Purity</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ex</td>
<td></td>
<td>X</td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td>Tox</td>
<td></td>
<td></td>
<td></td>
<td>X*</td>
</tr>
</tbody>
</table>

*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 / Universal (low range) first for best performance.

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

We strongly recommend using so called ODFRs (On Demand Flow Regulators) to administrate calibration and test gases to the instrument. These regulators automatically supplies the exact gas flow aspired by the instrument and automatically shuts off when disconnected from the sample input.

It is also possible to use other 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). The 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

1. > > 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.

### 6.2.15.2 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 [34]."

- 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.

6.2.15.3 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.

1 Login as Intermediate or Advanced

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.

- 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. 11: "Above Ground" display

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

**Measurement range**

- Measurement range: 1 ppm - 5 Vol% methane
6.3.3 Operating mode "Universal"

This mode combines highest sensitivity for PPM levels of Methane all the way up to 100 Vol% and can be used for all applications except safety checks.

Use Ex or ExTox mode for checking the safety of the work place.

⚠️ WARNING

Do not use Universal mode 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.

⚠️ 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 mode "Universal" is not certified for the LEL measurement.

> Observe all safety precautions when alarms are given.
Table 12: Universal

<table>
<thead>
<tr>
<th></th>
<th>Measurement value</th>
<th>2</th>
<th>Measured gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Unit of measured value</td>
<td>4</td>
<td>PPM threshold</td>
</tr>
<tr>
<td>5</td>
<td>Zeroing button, if needed. Zeroing symbol disappears if gas is detected.</td>
<td>6</td>
<td>Data logging activation.</td>
</tr>
</tbody>
</table>

**Measurement range**

Measurement range 1 ppm - 100 Vol% methane
6.3.4 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.
You can readjust the zero point of the \( \text{CH}_4 \) \( \text{Vol}\% \) value if needed. This can be done if deviation is within \( \pm 5 \text{ Vol}\% \). Press lower left button if "0" appears in blue.

Deviation outside \( \pm 5 \text{ Vol}\% \) 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 [76] for information on how you set the value for ethane compensation. See also Setting reminder for IR Ethane Analysis [77].

### 6.3.4.1 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 \( \text{CO}_2 \) 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 \( \text{CO}_2 \) 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 \( \text{CO}_2 \) concentrations.

1. Set the leak detector in Bar Hole mode.
2. Press the lower left key \( \bullet \) 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.
6.3.4.2 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.
6.3.5 Operating mode "GC Ethane Analysis"

This mode is intended for determining if a gas sample is natural gas (NG) or liquefied petroleum gas (LPG), by identifying the methane, ethane and propane content.

Natural gas (NG) typically contain at least 0.5 vol% of ethane in addition to a high concentration of methane.

Liquefied petroleum gas (LPG) typically contain propane or butane or a mixture of the two.

These differences are the basis for identifying gas type from an hydrocarbon analysis. While significant ethane content (>0.5 Vol%) in a methane rich mixture is a certain indication of natural gas, it is not entirely safe to say that no indication of ethane in a methane rich mixture is a certain indication of swamp gas.

Some natural gas contains no or only traces of ethane. This can be due to several reasons, for example:

- The gas source is solely or partly liquefied natural gas (LNG) which sometime has very low ethane content.
- The gas source is solely or partly biogas.
- The natural gas source has very low ethane content.

![Fig. 14: GC Ethane Analysis](image-url)
Analog bar indicating concentration range (grey) needed to perform GC Ethane Analysis and measurement value (blue) in quasi logarithmic scale

Battery status indicator

Mode icon

Measured value, target gas and unit

Operation mode and menu bar

Take sample for analysis. Becomes active (blue) and cross disappears when natural gas concentration is high enough.

<table>
<thead>
<tr>
<th>Measurement range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detectable range</td>
</tr>
</tbody>
</table>

The following procedure is highly recommended on site to strengthen the evidence that a gas sample is indeed natural gas:

- Check that ambient temperature is within range for GC Ethane Analysis: 0 – 50°C (32-122°F)
- Perform a GC Ethane Analysis Function test to check that the GC Ethane Analysis can detect ethane down to 0.5 Vol% in the gas sample. Gas used see Concentration of calibration and test gases [34]
- Make a GC Ethane Analysis on a sample of natural gas from the actual gas line at your site.
- Make a GC Ethane Analysis on the gas to be identified and compare the resulting curve to that obtained from the natural gas sample. Three consecutive tests with same result should serve as a clear result.
- If any doubt on this result remains perform a final function test to assure that the unit was working properly during testing.

If the ethane content in the natural gas is below 0.5 Vol% the GC Ethane Analysis cannot be used. The GC must also give a clear indication of ethane to serve as an indicator of natural gas. A clear indication is a ticked ethane box on the screen.

IRwin GC is sensitive enough to detect 0.5 % ethane in methane.

The operator is fully responsible for evaluating the logic and likelihood of the correctness of the result being presented by IRwin, based on the ethane content in the tested gas, the maintenance and functionality of IRwin Methane Leak Detector and other circumstances related to the issue.
NOTICE

Overloading the GC column with high gas concentrations will make analysis slow and possible non-functional

Move instrument away from leak area to fresh air directly after taking sample to avoid this. If you suspect overloading, you can make a prolonged column purge by pressing the sampling button (lower left) more than 3s.

Purging will continue until manually terminated or until instrument shuts down.

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.
Fig. 15: NG with Ethane detected

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

The data can be retrieved by 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.

NOTICE

Avoid transferring files while a GC analysis is running as this can severely affect the result.
6.3.6 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 manholes, duct openings, etc. The leak detector is ready to use when measurement value is black and the status LED is blue.

This mode is not available if Universal mode is activated.

![Confined Space display](image)

*Fig. 16: “Confined Space” display*
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in VOL% (quasi-logarithmic scale)</td>
<td>2</td>
<td>Measurement value</td>
</tr>
<tr>
<td>3</td>
<td>Measured gas</td>
<td>4</td>
<td>Symbol of active operating mode</td>
</tr>
<tr>
<td>5</td>
<td>Unit of the measured value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurement range**

| Measurement range | 1 ppm - 100 Vol% methane          |
6.3.7 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.

This mode is not available if Universal mode is activated.

**Fig. 17: "House" display**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in VOL% (quasi-logarithmic scale)</td>
</tr>
<tr>
<td>2</td>
<td>Measurement value</td>
</tr>
<tr>
<td>3</td>
<td>Measured gas</td>
</tr>
<tr>
<td>4</td>
<td>Symbol of active operating mode</td>
</tr>
<tr>
<td>5</td>
<td>Unit of the measured value</td>
</tr>
<tr>
<td>6</td>
<td>Set point for PPM alarm</td>
</tr>
</tbody>
</table>

**Measurement range**

- Measurement range: 1 ppm - 5 Vol% methane
6.3.8 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.

This mode is not available if Universal mode is activated.

![Gas purity display](image)

**Fig. 18: "Gas Purity" display**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog bar indicating range (grey) and measurement value (blue) in Vol% (quasi logarithmic scale)</td>
</tr>
<tr>
<td>2</td>
<td>Measurement value</td>
</tr>
<tr>
<td>3</td>
<td>Measured gas</td>
</tr>
<tr>
<td>4</td>
<td>Symbol of active operating mode</td>
</tr>
<tr>
<td>5</td>
<td>Unit of the measured value</td>
</tr>
<tr>
<td>6</td>
<td>C₂H₆ compensation value</td>
</tr>
<tr>
<td>7</td>
<td>Zeroing button, if needed. Zeroing symbol disappears if gas is detected.</td>
</tr>
</tbody>
</table>

**Measurement range**

- Measurement range: 0.1 - 100 Vol% methane

**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.
You can readjust the zero point of the CH$_4$ 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.
6.3.9 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.

This mode is not available if Universal mode is activated.

⚠️ 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. 19: “Ex” display

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog bar indicating range (grey), measurement value (blue) and alarm settings (red lines) in Vol% (quasi-logarithmic scale)</td>
</tr>
<tr>
<td>2</td>
<td>Measurement value</td>
</tr>
<tr>
<td>3</td>
<td>Measured gas</td>
</tr>
<tr>
<td>4</td>
<td>Symbol of active operating mode</td>
</tr>
<tr>
<td>5</td>
<td>Unit of the measured value</td>
</tr>
<tr>
<td>6</td>
<td>Zeroing button, if needed. Zeroing symbol disappears if gas is detected.</td>
</tr>
</tbody>
</table>
±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 [75]."

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.
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.
6.3.10 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.

![Ex Tox Display](image)

**Fig. 20:** "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.

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>Gas</th>
<th>Measurement range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CH₄, C₂H₆ or C₄H₁₀</td>
<td>1 - 100% LEL</td>
</tr>
<tr>
<td></td>
<td>CO₂</td>
<td>0.1 - 5 Vol%</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>1 - 500 ppm</td>
</tr>
<tr>
<td></td>
<td>H₂S</td>
<td>1 - 400 ppm</td>
</tr>
</tbody>
</table>
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 (CH$_4$) to propane (C$_3$H$_8$) or butane (C$_4$H$_{10}$). 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 [75]”.

### 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.
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 [79]."

**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 [75]."

**6.3.10.1 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).
6.3.11 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 GC Ethane Analysis is to establish the ethane concentration for compensation at high methane levels.

The GC 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 GC 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.

6.3.11.1 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 GC 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. \( \text{IR} > \text{IR Ethane Analysis} > \text{Settings (Tab)} \)

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 \( \text{Esc} \).

### 6.3.11.2 Setting reminder for IR Ethane Analysis

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

1. \( \text{IR} > \text{IR Ethane Analysis} > \text{Settings (Tab)} \)

2. Select "Reminder for Ethane Compensation Analysis".

3. Select between the following settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Reminder Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No reminder</td>
</tr>
<tr>
<td>Start-up</td>
<td>Reminder first time you enter &quot;Bar Hole&quot; mode after start-up of detector (10 s delay)</td>
</tr>
<tr>
<td>Always</td>
<td>Reminder every time you enter &quot;Bar Hole&quot; mode (10 s delay).</td>
</tr>
</tbody>
</table>

### 6.3.11.3 Performing IR Ethane Analysis after automatic reminder

You need a methane concentration in the range of 5 to 15 Vol% to perform the GC 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 GC 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 that 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 % C$_2$H$_6$.

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 C$_2$H$_6$ field.

See Operating mode “Bar Hole” [58].

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.

6.3.11.4 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 that 80 you should move the bell away from the leak to find a spot with lower concentration.
5. 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 % C$_2$H$_6$.
6. Press check mark to continue. IRwin will ask if you want to "Save Ethane Concentration for Compensation".
7. 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 C$_2$H$_6$ field.
   - See Operating mode “Bar Hole” [58].
8. 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.
6.3.11.5 Viewing IR Ethane Analysis info

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

► ▶ > ○ > IR Ethane Analysis > Info (Tab)

⇒ The date and the time of the last \( \text{C}_2\text{H}_6 \) Analysis will be shown.
⇒ IRwin SXG and SXGT will also show the time of the last GC Ethane Analysis.

6.3.12 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:

<table>
<thead>
<tr>
<th>Priority</th>
<th>Alarm</th>
<th>Display and status LED</th>
<th>Acoustic signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>AL1</td>
<td>Red, flashing (1 Hz)</td>
<td>1 Hz</td>
</tr>
<tr>
<td>Medium</td>
<td>AL2</td>
<td>Red, flashing (1.5 Hz)</td>
<td>1.5 Hz</td>
</tr>
<tr>
<td>High</td>
<td>AL3</td>
<td>Red, steady on</td>
<td>Steady on</td>
</tr>
</tbody>
</table>

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 \( \text{O}_2 \) 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.

6.3.13 Set the brightness of the display

1 ➡️ General ➡️ Display (Tab) ➡️ Brightness

2 Select a value for the brightness.

3 Leave the view via 📋.

6.3.14 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.

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 [48]"
**Recommended Function test intervals**
(based on IRwin model)

- Before starting work (10 ppm CH₄)
  
  Above Ground: Response time can be measured by clocking time from adding gas until display shows 90% of expected value (9 ppm if testing with 10 ppm).

- 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.

- Best choice is to use On Demand Flow Regulators (ODFR) that opens automatically when IRwin pulls gas delivers the exact amount required. If using a conventional pressure regulator type, make sure gas flow through the calibration station is higher than the gas flow of the leak detector.

- The gas must not be fed with over pressure into the leak detector. This is best taken care of by using "ODFR" regulators.

✓ 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 [48]".

---

Function tests expects factory default concentrations. Using other concentrations, even if within the adjustable calibration concentration range, can make the automatic function test interpretation invalid.

If you fail function test and you are using non-standard gases we recommend that you test the instrument by simply exposing the respective mode for the test gas and observe the reading. This way you can still verify the function but the last passed function test will not be logged if automatic interpretation failed.

---

**6.4 Measuring**

✓ Connect the leak detector to the desired probe. See "Function [14]".

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 [44]."
4 Make sure that the settings for the desired operating mode are correct. See "Operating modes [54]."
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 [82]."
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 [84]."

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.

✓ You have configured the data logging, see "Configure data logging [48]."
✓ 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 IRwin App software, see "Transfer data to computer [>] 40]."

To view the logged data, transfer the file(s) to a computer, see "Transfer data to computer [>] 40]."

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.
6 | Operation

6.11 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 for 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).

6.12 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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Message</th>
<th>Possible error sources</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Warnings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Red LED / Constant beep</td>
<td>HW Watchdog triggered</td>
<td>Perform hard switch off. Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W2</td>
<td>Reference Inlet Blocked</td>
<td>Reference inlet blocked</td>
<td>Check that nothing is blocking the inlet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reference inlet filter clogged</td>
<td>Contact INFICON service.</td>
</tr>
<tr>
<td>W3</td>
<td>Sample Inlet Blocked</td>
<td>Sample inlet blocked</td>
<td>Check that nothing is blocking the inlet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sample inlet filter blocked</td>
<td>Replace cigarette filter in sample inlet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blockage in accessory</td>
<td>Disconnect accessory. If alarm disappears: Check accessory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal filter blocked</td>
<td>Disconnect accessories. If alarm remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W4</td>
<td>Exhaust Blocked</td>
<td>Exhaust blocked</td>
<td>Check that nothing is blocking the exhaust. If alarm remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W5</td>
<td>O₂ sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W6</td>
<td>O₂ sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W7</td>
<td>H₂S sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W8</td>
<td>H₂S sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W9</td>
<td>CO sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W10</td>
<td>CO sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W11</td>
<td>CH₄ sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W12</td>
<td>CH₄ sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>W13</td>
<td>CO₂ sensor error</td>
<td>System error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>No.</td>
<td>Message</td>
<td>Possible error sources</td>
<td>Remedy</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| W14 | CO₂ sensor error | System error | Restart detector.  
If problems remains: Contact INFICON service. |
| W17 | H₂S STEL level reached, (STEL and limit shown, Confirm) | Short Term Exposure alarm for H₂S. | Normal function.  
If warning reappears without any gas present: Recalibrate TOX mode.  
If still reappearing: Contact INFICON service |
| W18 | H₂S LTEL level reached, (LTEL and limit shown, Confirm) | Long Term Exposure alarm for H₂S. | Normal function.  
If warning reappears without any gas present: Recalibrate 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: Recalibrate 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: Recalibrate TOX mode.  
If still reappearing: Contact INFICON service |
| W21 | CO₂ STEL level reached, (STEL and limit shown, Confirm) | Short Term Exposure alarm for CO₂. | Normal function.  
If warning reappears without any gas present: Recalibrate TOX mode.  
If still reappearing: Contact INFICON service |
| W22 | CO₂ LTEL level reached, (LTEL and limit shown, Confirm) | Long Term Exposure alarm for CO₂. | Normal function.  
If warning reappears without any gas present: Recalibrate 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. |
| 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. |
<table>
<thead>
<tr>
<th>No.</th>
<th>Message</th>
<th>Possible error sources</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>E5</td>
<td>Battery level too low (count down to power off)</td>
<td>Battery low</td>
<td>Switch off detector and charge battery</td>
</tr>
<tr>
<td>E7</td>
<td>SnO₂ voltage error</td>
<td>System error</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E8</td>
<td>Detector shuts down</td>
<td>System error</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E9</td>
<td>Red LED and constant beep</td>
<td>HW watchdog trigged</td>
<td>Perform hardware reset.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E10</td>
<td>O₂ Sensor bias lost</td>
<td>O₂ sensor bias lost due to uncontrolled shut down.</td>
<td>Check in Ex Tox mode that O₂ value is OK (close to 20.9%). If not, leave the detector on until O₂ sensor shows 20 - 22% in air. This can take up to 12 hours.</td>
</tr>
<tr>
<td>E11</td>
<td>“IR Lamp” has red cross in function test result screen.</td>
<td>IR system error</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E12</td>
<td>“Pump &amp; Valve” test has red cross in function test result screen.</td>
<td>Exhaust blocked</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pump dirty or broken</td>
<td>Contact INFICON service.</td>
</tr>
<tr>
<td>E13</td>
<td>“Pump &amp; Valve” test has red cross in function test result screen.</td>
<td>Valve clogged</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>System error</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E14</td>
<td>“Pump &amp; Valve” test has red cross in function test result screen.</td>
<td>Exhaust blocked</td>
<td>Check that nothing is blocking the exhaust.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If alarm remains: Contact INFICON service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reference inlet blocked</td>
<td>Check that nothing is blocking the reference inlet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If alarm remains: Contact INFICON service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pump dirty or broken</td>
<td>Contact INFICON service.</td>
</tr>
<tr>
<td>E15</td>
<td>“Gas Sensors” has red cross in function test result screen.</td>
<td>Sensor error or warm-up drift</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E16</td>
<td>“Gas Sensors” has red cross in function test result screen.</td>
<td>Sensor error or warm-up drift</td>
<td>Restart detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>No.</td>
<td>Message</td>
<td>Possible error sources</td>
<td>Remedy</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>E17</td>
<td>&quot;Gas Sensors&quot; has red cross in function test result screen.</td>
<td>Sensor error or warm-up drift</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E18</td>
<td>&quot;Buzzer&quot; has red cross in function test result screen.</td>
<td>Buzzer &quot;hole&quot; blocked or filled with water</td>
<td>Dry and clean buzzer hole. Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E19</td>
<td>&quot;LED&quot; has red cross in function test result screen.</td>
<td>LED broken</td>
<td>Contact INFICON service.</td>
</tr>
<tr>
<td>E20</td>
<td>RAM test error (Power off)</td>
<td>Memory damaged or test error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E21</td>
<td>ROM test error (Power off)</td>
<td>Memory damaged or test error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E22</td>
<td>CRC error (power off)</td>
<td>Memory damaged or test error</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E23</td>
<td>&quot;Gas Sensors&quot; has red cross in function test result screen.</td>
<td>Sensor error or warm-up drift</td>
<td>Restart detector. If problems remains: Contact INFICON service.</td>
</tr>
<tr>
<td>E24</td>
<td>No message given</td>
<td>Service info only</td>
<td>No action needed.</td>
</tr>
<tr>
<td>E25</td>
<td>Surrounding temperature is outside of rated temperature. Function might be affected</td>
<td>Instrument temperature is too high or to low</td>
<td>Explosion protection cannot be guaranteed. Immediately move detector to cooler place or switch OFF if flammable gases could be present.</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Maintenance cycle</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily</td>
<td>7.4.2 Change the cigarette filter in the sample inlet</td>
</tr>
<tr>
<td></td>
<td>7.5 Maintenance of the hand probe</td>
</tr>
<tr>
<td>weekly</td>
<td>7.6 Maintenance of the carpet probe</td>
</tr>
<tr>
<td>monthly</td>
<td>7.6 Maintenance of the carpet probe</td>
</tr>
<tr>
<td></td>
<td>7.7 Maintenance of the bell probe</td>
</tr>
<tr>
<td></td>
<td>7.8 Maintenance of the swan neck</td>
</tr>
<tr>
<td></td>
<td>7.9 Maintenance of the bar hole probe</td>
</tr>
</tbody>
</table>

7.2 Spare parts list

<table>
<thead>
<tr>
<th>Spare part</th>
<th>Order number</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter cartridge 0.45 um</td>
<td>581-704</td>
<td>Carpet</td>
</tr>
<tr>
<td>Filter disk OD=8 mm</td>
<td>591-367</td>
<td>Bell</td>
</tr>
<tr>
<td>Dust filter, 8612</td>
<td>591-095</td>
<td>Bell, Swan Neck and Flexi Bell</td>
</tr>
<tr>
<td>Cigarette Filter 120-pack</td>
<td>581-700</td>
<td>Hand Probe and Sample inlet</td>
</tr>
<tr>
<td>Bar Hole Rubber</td>
<td></td>
<td>Seal for Bar Hole Probe</td>
</tr>
</tbody>
</table>

7.3 General check of 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.
7.4 Maintenance of the leak detector

7.4.1 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.

7.4.2 Change the cigarette filter in the sample inlet

- Change the filter according to the maintenance plan, see Maintenance plan [89].

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

7.5 Maintenance of the hand probe

Replace the filter in the tip of the probe 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 loose part of its function. Replace the filter if in doubt.
7.6 Maintenance of the carpet probe

► Change the inline filter according to the maintenance plan, see Maintenance plan [p. 89].
7.7 Maintenance of the bell probe

Fig. 21: Flexi Bell

- Change the filter according to the maintenance plan, see Maintenance plan.

Fig. 22: Bell Probe

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bell</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Paper filter</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Screw off the top of the filter housing.
2. Remove the old paper filter and o-ring.
3. Place the o-ring around end cap on top of the new paper filter.
4. Place the filter and o-ring in the compartment of the filter housing.
5. Screw on the top tightly by hand.
6. Replace the bell probe.
7.8 Maintenance of the swan neck

*Fig. 23: Swan Neck*

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

**See also**
- Maintenance of the bell probe [93]

7.9 Maintenance of the bar hole probe

Rubber needs to be replaced when worn. Contact INFICON.

*Fig. 24: Bar Hole Probe*
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
   - caustic
   - biological hazard
   - explosive
   - radioactive
   - other harmful substances

   The product is free of any substances which are damaging to health
   1) or not containing any amount of hazardous residues that exceed the permissible exposure limits
   2) Products thus contaminated will not be accepted without written evidence of decontamination.

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:
   
<table>
<thead>
<tr>
<th>Trade/product name</th>
<th>Chemical name (or symbol)</th>
<th>Precautions associated with substance</th>
<th>Action if human contact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 addressers
   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.

<table>
<thead>
<tr>
<th>Information for recycling.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li-ion</td>
</tr>
<tr>
<td>The leak detector cannot be scrapped with the normal domestic waste.</td>
</tr>
</tbody>
</table>
9 Certificates

Fig. 25: Certificates and permissions
9.1 TÜV, Certificate for lower explosive limit (LEL)
Annex

EU-Type Examination Certificate
TÜV 16 ATEX 7822 X
Issue: 00

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.

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Certification body of TÜV Rheinland Industrie Service GmbH

Page 1 / 3 of Annex to TÜV 16 ATEX 7822 X
Issue: 00
### 15.3 Technical Data

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

#### 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)

(15) Test report no. 557 / Ex 7822.00 / 16 and 966/FSP 1342.00/16

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(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 \(-15 \, ^\circ\text{C} \leq T_a \leq +40 \, ^\circ\text{C}\).

(18) **Basic Safety and Health Requirements**

Covered by afore mentioned standards.

TÜV Rheinland certification body for explosion protection

Cologne, 17.01.2017

Dipl.-Ing. Klaus Peter Grahn

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9.2 Certificate for oxygen and toxic gases

Zertifikat

Zertifikat Nr. S 498 2016 C2_1

Hersteller
Manufacturer
INFICON AB
Box 76
58102 Linköping, Sweden

Produkt
Product
Tragbarer Gasdetektor für die Detektion und Konzentrationsmessung von Sauerstoff und toxischen Gasen.
Portable gas detector for detection and measurement of oxygen and toxic gas concentrations.

Typ
Type
IRwin SX, IRwin SXT, IRwin SXG, IRwin SXGT

Anwendungsbereich
Area of application
Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung von O₂, toxischer Gase und Dämpfe.
Electrical apparatus used for detection and measurement of O₂ concentrations, toxic gases and vapours, in workplace atmospheres.

Prüfanforderung
Test requirements

Prüfergebnis
Test result
Der Prüfling hält die Anforderungen der oben genannten Prüfleistungs-Normen ein. Einschränkungen siehe Anhang.
The tested device meets the requirements of the listed test standards. Restrictions see appendix.

Der Ausstellung dieses Zertifikats liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. S 498 2016 T1 vom 05.12.2016 dokumentiert sind.

Die Prüfung ist nur gültig für Erzeugnisse, die mit dem Prüfzeugnis überestimmen. Es wird ungültig bei jeglicher Änderung der Erzeugnisse oder einer Zurückziehung der aufgeführten Prüfgrundlage.

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.

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.

Gültig bis / valid until
12/2021

Köln, 05.12.2016
Dipl.-Ing. Wolf Ruckward
TÜV Rheinland Energy GmbH
Test Centre for Energy Appliances
51105 Cologne - Germany
Head of the Test Centre

www.tuv.com
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

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 Ex.Tox 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 3 of chapter 4.8 of the standard have not been considered within this evaluation.

Valid until: 2021-11-28

www.fs-products.com
www.tuv.com
9.4 ATEX certificate for explosion protection (IRwin SXnn)

Certificate Number
Baseefa16ATEX0034X – Issue 1

EU - TYPE EXAMINATION CERTIFICATE

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

EU - Type Examination Certificate Number:
Baseefa16ATEX0034X – Issue 1

Product:
IRwin SX*

Manufacturer:
Inficon AB

Address:
Box 76, 581 02 Linköping, Sweden

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.

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.

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

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

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.

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.

The marking of the product shall include the following:

II 1 G Ex ia IIC T3 Ga (-20°C ≤ Tₐ ≤ +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 limitations 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, Duxton, 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. 4105578
Registered address: Resmorre Business Park, Ellesmere Port, Cheshire, CH65 5EN

R S SINCLAIR
TECHNICAL MANAGER
On behalf of SGS Baseefa Limited
9.5 CSA (US/Canada) certificate for explosion protection (IRwin SXnn)

Certificate of Compliance

Certificate: 70095939
Project: 70095939
Issued to: INFICON AB
P.O. Box 76
58102 Linköping
SWEDEN
Attention: Fredrik Enquist

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (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

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
AEEx 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 (CH4)
IRwin SXT (As SX + O2, H2S, CO)
9.6 IECEx certificate for explosion protection (IRwin SXnn)
IECEx Certificate
of Conformity

Certificate No: IECEx SP 16.0001X
Date of Issue: 2016-08-22
Manufacturer: Inficon AB
Westmanssgatan 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/BSI/EXTR16.0156/00
Quality Assessment Report: SE5P/CQAR07.0002/07
IECEx Certificate of Conformity

Certificate No: IECEx SP 16.0081X

Date of Issue: 2016-08-22

Issue No: 0

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:

<table>
<thead>
<tr>
<th>Model</th>
<th>Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRwin SX</td>
<td>CH₄, H₂, CO</td>
</tr>
<tr>
<td>IRwin SXK</td>
<td>As SX + CO₂, H₂S, CO</td>
</tr>
<tr>
<td>IRwin SXG</td>
<td>As SX + gas chromatograph</td>
</tr>
<tr>
<td>IRwin SXGT</td>
<td>As SX + gas chromatograph</td>
</tr>
</tbody>
</table>

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 (PIN-586-604) may be connected to the IRwin SX™ for battery charging or data transfer.
9.7 NEPSI (China) certificate for explosion protection

9.7.1 NEPSI (China) certificate for explosion protection

[Certificate Image]

This is to certify that the product

Gas Detector

manufactured by INFICON AB
(Address: BOX 76, S81 02 Linköping, Sweden)

which model is IRwin SXa

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 2016.12.15

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.
防爆合格证
证号：GYJ16.1435X

由 INFICON AB 制造的产品：
（地址：BOX 75, 581 02 Linkoping, Sweden）

名称 气体探测器
型号规格 IRwin SX®
防爆标志 Ex ia IIC T3 Ga
产品标准 /
图纸编号 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O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 网址：www.nepsi.org.cn 电话：+86 21 64368180
邮编：200233 Email：info@nepsi.org.cn 传真：+86 21 64844580

IRwin®-Operating-instructions-mina66en1-16-(2001)  113 / 128
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防爆合格证附件 I

由INFICON AB生产的IRwin SX®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 SX®，其中：
- 代表传感器类型，可为无（CH4），T（IRwin SX+C2H2，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

防爆合格证号后级“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5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：560-804）。

二、 产品使用注意事项

1. 探测器允许的使用环境温度为：-20℃～+50℃。
2. 用户不得擅自更换产品内部电气零部件，应由合同产品制造商或维护人员进行更换。
3. 产品的安装、使用和维护应参照产品使用说明书、GB3836.13-2013 “爆炸性环境 第13部分：设备的修理、检查、修复和改造”、GB3836.15-2000 “爆炸性气体环境用电气设备 第15部分：危险场所电气装置（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
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。
Attachment I to GYJ16.1435X

IRwin SX® 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®, in which:

② indicates used sensors, which could be none (CH₄), C (IRwin SX + CO₂, H₂S, CO), G (IRwin SX + gas
chromatograph) or GT (IRwin SX + 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: 580-004) 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.
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)"
GB3836.18-2006 "Electrical apparatus for explosive gas atmospheres Part 18: 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.
9.8 CE Declaration of Conformity

EU Declaration of Conformity

Manufacturer
INFICON AB
P.O. Box 76
SE-561 02 Linköping
Sweden
Phone: +46 (0)13-355800
Fax: +46 (0)13-355931

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, Sweden, January 10, 2020

[Signature]

Fredrik Enquist, Development Manager

See next page for details of standards applied.
### Harmonized European standards which have been applied

<table>
<thead>
<tr>
<th>Standard</th>
<th>Edition</th>
<th>Title / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 81000-6.1</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6.1: Generic standards - Immunity for residential, commercial and light-industrial environments.</td>
</tr>
<tr>
<td>EN 81000-6.3</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6.3: Generic standards - Emission standard for residential, commercial and light-industrial environments.</td>
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<tr>
<td>EN 50581</td>
<td>2012</td>
<td>Restriction of the use of certain hazardous substances (RoHS)</td>
</tr>
<tr>
<td>EN 300 328</td>
<td>V2.1.1</td>
<td>Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques</td>
</tr>
</tbody>
</table>

### Other European standards which have been applied

<table>
<thead>
<tr>
<th>Standard</th>
<th>Edition</th>
<th>Title / Comment</th>
</tr>
</thead>
</table>

### Test institutes / notified bodies

**EMC**  
(ENS9270)  
REC-ET04587  
SEPTA Development Technology AB  
Finsjön  
Electronikgatan 47  
T21 36 Västerås, Sweden
EU Declaration of Conformity

Manufacturer
INFICON AB
P.O. Box 76
SE-561 02 Linköping
Sweden
Phone: +46 (0) 13-355900
Fax: +46 (0) 13-356901

Object of the declaration
IRwin® Methane Leak Detector

<table>
<thead>
<tr>
<th>Type numbers</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLD.130.020</td>
<td>IRwin SX</td>
</tr>
<tr>
<td>MLD.130.030</td>
<td>IRwin SXT</td>
</tr>
<tr>
<td>MLD.130.040</td>
<td>IRwin SXG</td>
</tr>
<tr>
<td>MLD.130.050</td>
<td>IRwin SXGT</td>
</tr>
</tbody>
</table>

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 January 10, 2020

Fredrik Enquist, Development Manager

See next page for details of standards applied.
Harmonized European standards which have been applied

<table>
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<tr>
<th>Standard</th>
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<th>Title / Comment</th>
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<tbody>
<tr>
<td>EN 61000-6-1</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - immunity for</td>
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<tr>
<td></td>
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<td>residential, commercial and light-industrial environments.</td>
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<tr>
<td>EN 61000-6-3</td>
<td>2</td>
<td>Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission</td>
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<tr>
<td></td>
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<td>standard for residential, commercial and light-industrial environments.</td>
</tr>
<tr>
<td>EN 60070-34</td>
<td>2011</td>
<td>Application of Quality system for Ex Equipment Manufacturing.</td>
</tr>
<tr>
<td>EN 60079-0</td>
<td>2012</td>
<td>Electrical apparatus for explosive gas atmospheres - Part 0: General requirements</td>
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<tr>
<td>EN 60079-11</td>
<td>2012</td>
<td>Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “ “.</td>
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<tr>
<td>EN 50104</td>
<td>2010</td>
<td>Electrical apparatus for the detection and measurement of oxygen - Performance</td>
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<tr>
<td></td>
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<td>requirements and test methods</td>
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<tr>
<td>EN 50271</td>
<td>2010</td>
<td>Electrical apparatus for the detection and measurement of combustible gases, toxic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>gases or oxygen - Requirements and tests for apparatus using software and/or digital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>technologies</td>
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<tr>
<td>EN 50581</td>
<td>2012</td>
<td>Restriction of the use of certain hazardous substances (RoHS)</td>
</tr>
<tr>
<td>EN 300 328</td>
<td>V2.1.1</td>
<td>Wideband transmission systems; Data transmission equipment operating in the 2,4</td>
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<tr>
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<td></td>
<td>GHz ISM band and using wide band modulation techniques</td>
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Other European standards which have been applied

<table>
<thead>
<tr>
<th>Standard</th>
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<th>Title / Comment</th>
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<tr>
<td>EN 50270</td>
<td>2015</td>
<td>Electromagnetic compatibility – Electrical apparatus for the detection and</td>
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<tr>
<td></td>
<td></td>
<td>measurement of combustible gases, toxic gases or oxygen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing from list of harmonized standards but Annex ZZ Declares compliance with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>essential requirements of 2004/108/EC (old EMC).</td>
</tr>
<tr>
<td>EN 45544-1</td>
<td>2015</td>
<td>Workplace atmospheres - Electrical apparatus used for the direct detection and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>direct concentration measurement of toxic gases and vapours - Part 1: General</td>
</tr>
<tr>
<td></td>
<td></td>
<td>requirements and test methods. (Not applicable for IRwin SX and IRwin SXG)</td>
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<tr>
<td>EN 45544-2</td>
<td>2015</td>
<td>Part 2: Performance requirements for apparatus used for exposure measurement.</td>
</tr>
<tr>
<td></td>
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<td>(Not applicable for IRwin SX and IRwin SXG)</td>
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<tr>
<td>EN 60070-29-1</td>
<td>2007</td>
<td>Explosive atmospheres - Part 29-1: Gas detectors – Performance requirements of</td>
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<tr>
<td></td>
<td></td>
<td>detectors for flammable gases.</td>
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<tr>
<td></td>
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<td>2018. All 13 major technical changes in edition 2016 are fulfilled.</td>
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Test institutes / notified bodies

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