SF6 LeakCheck P1 XTL

Instrument Quick Start Guide V8.0

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Pioneering Gas Sensing Technology.

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Register your instrument online for extended warranty

Thank you for purchasing your ION Science® instrument.

The standard warranty of your SF6 LeakCheck P1 XTL is for one year.

To receive your extended warranty, you must register your instrument online within one month of purchase (terms and conditions apply.)

Click here to extend your instrument warranty or scan the QR code below.

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Safety Information

Before using the measuring system read and observe the following information:

Retain the documentation safely.

Only instructed and authorised staff may open the equipment or parts of it.

Within the equipment there are components that might need maintenance.

Symbols

This manual uses the following symbols to stress certain text passages:

Symbol	Meaning
	**Danger** – Failure to observe this note may cause corrupt measurement, material damage and risk of injury.
	**Note** – Please pay special attention to this paragraph.
	**Environmental** – Information relevant regarding the environmentally compatible operation and disposal of the product.

Precautions

Use the instrument ONLY on voltage free and grounded equipment. Failure to observe this rule may cause fatal injury and/or material damage.

The surface you are going to check for leaks must be free of all liquids like oil or water, and coarse dirt. If necessary, wipe it with a cloth before approaching it with the sensor tip. The ingress of liquids will immediately destroy the SmartSensor, while grease and similar substances, even in small quantities, will obstruct the sample inlet.

Setup Options

This document restricts to very few options that may be significant to the operator.

Measuring principle

An advanced high-voltage ionization detector (**NIC**©- Negative Ion Capture) is used which has been optimised in consideration of the following:

- Sensitivity
- Precision
- Service life
- Reliability

Through miniaturisation it has been possible to accommodate the sensor directly in the measurement tip, thereby attaining excellent response and recovery timings.

Usage in practice

Owing to the practice-oriented design of the instruments, work with these is simple and reliable when observing the following:

For leak detection

Switch the instrument to **Search Mode**.

Guide the sniffer probe as closely as possible to the suspected leaking locations. Establishing material contact with the sniffer probe will be useful.

The velocity at which the sniffer probe is advanced should be at about 20 mm/s.

Do not push the sniffer probe over the test specimen, instead, pull it gently to help prevent grease and dirt from entering the probe.

For leak measurements

Switch the instrument to **Measurement Mode**.

Make sure it is set to the desired units of measurement (cc/s or g/a).

Guide the sniffer probe as closely as possible to the suspected leaking locations. Establishing material contact with the sniffer probe will be useful.

The magnitude of the leak can be considered as being correctly acquired when the measured value does not change within 2 seconds.

For concentration rise measurements (integral atm.)

In the set-up select the unit of measurement ‘ppm’.

Place the test specimen within the chamber free of SF6, close the chamber.

Zero the leak detector in clean ambient air by operating the ‘Zero’ button.

For the initial measurement with the P1 XTL leak detector, push the sniffer probe for approximately 10 to 20 seconds through a corresponding connection directly into the chamber.

Check the measurement value V1. Remove the sniffer probe from the chamber.

After the measurement time defined by the customer has elapsed, Zero the leak detector in clean air by operating the ‘Zero’ button, introduce the sniffer probe into the chamber again and perform the final measurement for a duration of approximately 10 to 20 seconds.

Check the measurement value V2. Remove the sniffer probe from the chamber.

The difference between the two measured values (V2-V1) gives the rise in concentration within the measurement time specified by the customer.

P1 XT menu system

From the main screen that is seen during measurement, the menu system is invoked by clicking the symbol in the upper right corner of the screen. This will bring up the menu selection screen.

Available options are:

1. MEASUREMENT

This is home to all settings related to actual measurement. From here, the following menu items are available (greyed out options are disabled and reserved for future use):

1.1 Display Units

By clicking on 'cc/s', 'ppm', or 'gm/yr', the corresponding units are selected for measurement. Please observe that concentration measurement (ppm) is calibrated independently, while leak rate modes (cc/s, gm/yr) share a common calibration.

To exit, use 'BACK' if you wish to continue with the menu system, 'ESC' to return to measurement.

1.2 Set Alarm Value

Define your maximum allowable leak rate or concentration here. All alarm outputs (light signals, vibration alarm, audible alarm) are referenced to this value. The 0 to 100% scale on the available measurement screens is adjusted such that 100% equals the selected alarm value.

To exit, use 'BACK' if you wish to continue with the menu system, 'ESC' to return to measurement.

1.3 Gas

Select the gas which is used in your components

- SF6
- C4-FN (Pay-Option)

C4-FN allows you to select the desired concentration. The displayed value is adjusted for concentrations lower than 100% to provide a direct readout of the calculated leak rate.

1.4 User Adjustable Zero Tracking

The measurement of electron-capturing substances is based on a very small current flowing through ionised air. When a substance such as SF6 is present, this current decreases slightly, and the reduction is used to determine the quantity of the substance.

The current flowing in the absence of such substances is considered as a virtual zero line for measurement. Since it is subject to slow fluctuation in the SmartSensor, as well as to changes induced by the ambient air, it is necessary to constantly maintain and update this virtual zero.

For leak detection in sniffing mode, which often takes place in an environment which might be contaminated with SF6, generally the medium setting 'NORM' is suggested. Try 'HIGH' if you experience frequent false alarms through changing background levels of detectable gas.

For laboratory environments, the 'LOW' setting is suitable and recommended in most cases for concentration measurements, unless you need to detect very small concentrations (< 2ppm).

In the latter case, or when you experience strange behaviour like slowly rising readout after a measurement, switch to 'OFF'. This freezes the Zero Tracking entirely. On this setting, it is mandatory to manually zero the instrument immediately before taking a measurement.

A minus sign leading the readout indicates that a manual zeroing is required when it is shown permanently. When it does not show up or flashes, this indicates that the virtual zero is right on spot.

To set up the Zero Tracking mode, pull up the menu system, then select 'Measurement' / 'Zero Tracking', and use the arrow keys to set the desired modes (OFF/LOW/NORM/HIGH) for leak rate and concentration measurement respectively.

To exit, use 'BACK' if you wish to continue with the menu system, 'ESC' to return to measurement.

1.5 Calibration

This will calibrate the instrument for the currently selected units of measurement. Please observe that concentration (ppm), and leak rate (cc/s, gm/yr) modes are calibrated separately. This is because unlike with concentrations, leak rate measurement must account for the instruments sample intake flow which may slightly differ between individual instruments.

First step is to enter the value of the calibration source you intend to use, i.e. either a leak rate as specified on the calibration leak, or a calibration gas concentration when running in ppm mode. Please observe that calibration gases mixed with compounds other than air, in particular nitrogen as the neutral compound, are not suitable for use with this instrument.

Press 'Modify' if the value on display needs to be changed.

The next step is triggered by pressing 'Confirm'. You will then be prompted to approach the calibration source. Calibration completes automatically when the instrument detects enough gas.

To exit, use 'BACK' if you wish to continue with the menu system, 'ESC' to return to measurement.

1.6 Couple Cal. Factors

The instrument provides for separate calibration factors for the basic operating modes 'Leak rate' [cc/s, gm/yr] and 'Concentration' [ppm]. Normally the final calibration for both operating modes is performed independently of each other.

By optionally coupling the calibration factors (Tick in the box) it is possible to calibrate the leak detector through a single final calibration in one operating mode simultaneously for the other one, too. This is particularly useful when no suitable calibration source for the desired operating mode is available.

Calibration for the presently active mode is performed as usual, while the calibration factor for the other mode is derived by internal calculation. However, this is subject to a significant error margin due to some tolerance in sample intake flow rate. Therefore, cross mode calibration is only suggested as a work-around when a suitable calibration source is not available for the desired mode.

To exit, use 'BACK' if you wish to continue with the menu system, 'ESC' to return to measurement.

2. APPEARANCE

In the current firmware version, options other than ‘Volume’ are disabled, and reserved for future use.

Click ‘Volume’ and adjust the slider to the desired volume level.

To exit, use ‘BACK’ if you wish to continue with the menu system, ‘ESC’ to return to measurement.

3. TECHNICAL

This menu comprises the following options:

3.1 Radio

Each P1 XT instrument comes with a USB Radio Stick uniquely dedicated to it. It will not connect to a different Radio Stick.

This option is only ever used if you need to connect the instrument to a different USB Radio Stick by entering the Radio Sticks MAC address. To change it, clear the entire entry field, and enter the MAC address of the new USB Radio Stick as per separate instructions. When done, turn the instrument off and on again to transfer the new address to its permanent memory, and it will from now on connect to the new USB Radio Stick.

3.2 Serial Number

Displays the instruments serial number.

3.3 Standby

This sets up the desired idle time before the instrument enters standby. This saves battery power, and SmartSensor lifetime. The recommended time is 5 minutes, adjust the slider to the desired time (settings below 5 minutes are not possible). Setting it to the leftmost position will deactivate the standby option entirely. When the instrument is in the Standby mode of operation, the LEDs of the Alarm Projector flash in blue at a slow rate. This is meant to be able to distinguish the Standby from the Off state.

The instrument will wake up from standby when it is being moved.

To exit, use ‘BACK’ if you wish to continue with the menu system, ‘ESC’ to return to measurement.

3.4 Technical Data

Here you can read out the SmartSensors, and instruments hours of operation.

Please observe that for the sake of reliable operation, SmartSensors are considered unusable when their run time exceeds 300 hours. When this limit is reached, the instrument will no longer work with this SmartSensor.

To exit, use ‘BACK’ if you wish to continue with the menu system, ‘ESC’ to return to measurement.

Operating The SF6 LeakCheck P1 XTL instrument

Open the case.

Press firmly on the top of the P1 XT Handgun to release the docking station to the working position.

The instrument will slide out in the working position.

Wait for any action until working position.
Take one **P1 SmartSensor** out of the storage bay.

Attach the **P1 SmartSensor** into the plug at the handgun before you switch the instrument on.

To switch the instrument **ON** press the **left button** on the Handgun shortly.

The P1 XT will start in **'SEARCH MODE'** or **'MEASUREMENT MODE',** whichever was used before.

To change from **'SEARCH MODE'** to **'MEASUREMENT MODE'** and back again, swipe your finger over the display from left to right.

To set the measured value to **Zero,** press right button shortly.


Setup Button
Touch Screen
Hotkey Left
Hotkey Right
0
E-8 cc/s
OFF/STBY
ZERO
P1 XT

P1 XT Handgun Park Position
Push down to lock the docking station and secure the instrument by closing the lid

P1 SmartSensor
Storage Area

USB
No data, charge only for mobile devices

Mains Power
100 …240 V 50/60 Hz

Storage Shelf
For accessories e.g. power cable, user manual

Service life of the P1 SmartSensor

The service life to be expected of the SmartSensor is approximately 200 to 300 hours of continuous operation under average conditions of the air in the room. Based on an active measurement time of approximately 2 hours per workday, this gives a utilisation duration of approximately 6 months.

In the case of discontinuous measurement operation, the utilisation duration may be optimised by using the standby option. By using the standby modes, the SmartSensor is shut down during breaks and for this reason then not subjected to any wear.

The service life of the SmartSensor is mainly limited by contamination. This occurs in two ways:

1. Small particles in the sample air can pass through the front filter (Part No. P1:P-100-0024) and enter the ionization chamber.
2. Larger particles can block the filter element, reducing its filtering capacity.
   The service life therefore strongly depends on ambient conditions.

Any contamination in the ionisation chamber results in a noisier output signal from the SmartSensor, which manifests as fluctuations and sudden changes of the zero line. The SmartSensor must be considered worn out when these fluctuations relative to the set-up limit become too great. However, measurement sensitivity is maintained at a consistent level over the entire service life. In the case of extreme contamination, it may happen that the SmartSensor cannot be initialised anymore when starting the system.

The decaying air permeability of the filter element is compensated for by increasing the operating vacuum within a wide range. However, in case of severe contamination, the vacuum increases to such a level that the discharge within the SmartSensor becomes unstable or is extinguished without any apparent reason. The filter element must be considered as worn out when this occurs frequently.

From the 300th operating hour onwards, the operator is reminded upon starting the system that the SmartSensor must be replaced. Up to a maximum of 320 hours, the SmartSensor can still be operated after confirming the reminder. Thereafter, it must be replaced.

Exchanging the P1 SmartSensor

Before replacing the SmartSensor, the instrument must always be switched off first.

To remove the SmartSensor simply take hold of it at the chequered section of the plugs movable section and pull the sensor straight out of the socket.

When inserting the new SmartSensor, make sure that the marks at the plug and socket line up, and that the movable section of the plug engages in the locking position by resting flush against the outer collar of the socket.

Instrument Firmware Log

Instrument Firmware	Amendment	Manual Version	PC Software
1.0.08	Launch Version – P1 XTL First Edition	V1	N/A
1.0.11	Display Units ppm and g/year added Technical Data Screen added	V2	N/A
1.0.12	Battery drain Issue improved Calibration stabilisation time improved Passed calibration screen message improved SmartSensor lifetime message The firmware update process via the radio has been stabilised	V3	N/A
1.0.13	Option C4-FN added Reworked parameters for HV generation Reworked Zero Tracking Reworked filter for sensor noise Reworked signal cleardown Streaming selectable parameters added	V4	**1.0.01**
1.0.14.1	Zero Tracking added Standby Time below 5 min blocked	V5	**1.0.03**
1.0.14.2	Improved calibration routine ppm Zero Tracking optimised	V5	**1.0.03**
1.0.15	Disc pump flow technology design improved Battery management adjusted Standby flashing LED added @ Alarm Projector	V6	**1.0.04**
1.0.16	Regulation of measuring current improved Regulation of vacuum level improved for more precision re-regulation after power up less frequent Duration of forced Zero Tracking after manual zero prolonged to 4 seconds Watchdog added Couple Calibration Factors added	V7	**1.0.05**
1.0.16.1	Verification of plausible calibration values added	V7	**1.0.05**
1.0.16.2	Watchdog bug fix	V8	**1.0.06**

Technical Data

Detection principal	NIC (Negative Ion Capture)
Detects	SF6 and gas mixtures with C4-FN (option)
SF6 Sensitivity	Standard 1.0E-7 cc/s – 1.0 ppm – 0.01 g/a HIGHsens 1.0E-8 cc/s – 0.1 ppm – 0.001 g/a
Response time t90	approx. 0.5 s
Response time t10	approx. 0.5 s
Alarm	Selectable Handset Vibration Audio LED-Projection
Audio	Frequency / repeat rate coupled to leak rate condition signals
Display	2.8” Touch Display on handset
Self-diagnostics	Sample flow, sensor condition, battery condition, hardware fault
Battery	Handset Li-ion, inductive charge at docking station, shelf life 12 months if charged fully
Storage conditions	-10 °C to + 60 °C
Operating temperature	0 °C to 50 °C
Power supply	100 to 240 V 50/60 Hz
Dimension	Handset 300 x 105 x 80 mm (H x D x W) Console 420x240x470 mm (H x D x W)
Weight	Handset 0.750 kg Console 9.8 kg

EU DECLARATION OF CONFORMITY

According to Decision No. 90/2016 Sb. of the European Parliament and of the Council

SF6 LEAKCHECK P1 XTL

The manufacturer stated below declares that the characteristics of the product meet the required technical standards, directives and specification and that it conforms to the respective European Union harmonisation standards. Furthermore, the manufacturer declares the product to be safe whilst adhering to the conditions for its correct installation, maintenance and use. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Manufacturer:
ISM Deutschland GmbH, Laubach 30, 40822 Mettmann, Germany - www.ism-d.de

Notification of quality assurance:
DIN EN ISO 9001:2015 Certificate No.: DE011836-1

Product description:
SF6 Leak detector is sensitive instrument for determining SF6 or gasmixture with C4-FN leaks.

Conformity assessment procedure:
The product's conformity was assessed with respect to the following requirements:
– EMC Directive 2014/30/EU, LVD Directive 2014/35/EU.
– it was compared with the submitted documentation
– issued on fundamentals of declaration of conformity of the producer– it was tested according to standards

List of standards:

EN 55011 ed. 4:2017 + A1:2017 +A11:2020 +A2:2021	EN 61000-3-3 ed. 3:2014 + A1:2019 +A2:2022	EN 61000-4-2 ed. 2:2009
EN 61000-4-4 ed. 3:2013	EN 61000-4-6 ed. 4:2014	EN IEC 61000-3-2 ed. 5:2019 +A1:2021
EN IEC 61000-4-11 ed. 3:2020	EN IEC 61000-4-3 ed. 4:2021	EN IEC 62368-1 ed. 2+ A11:2021

Date and Place of Issue:
Mettmann 12.04.2024

Authorised Representative:
Clemens A. VERLEY

CE

Disposal

Please contact **ISM** for return or proper disposal of equipment.

Environmental Notice

Dispose of all equipment and its components and any used batteries in accordance with all local and national safety and environmental requirements. This includes the European WEEE (Waste Electrical and Electronic Equipment) directive. **ISM** Deutschland GmbH offers a take back service. Please contact us for more information.

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