

Gas detector

Based on infrared technology

Model GIR-10

WIKA data sheet SP 62.02

SF₆-IR-Leak

Applications

- Locating and quantifying leakages at SF₆ gas filled equipment
- Determination of leak rate for final inspection of SF₆ gas filled equipment

Special features

- Smallest concentrations of up to 0.6 ppm_v can be detected
- Responds only to SF₆ gas and is therefore not sensitive to humidity and common volatile organic compounds (VOC)
- Easy to use
- Fast response time
- Calibration in the factory using certified test gases



Gas detector model GIR-10

Description

The gas detector model GIR-10 is used for the detection of the smallest SF₆ gas concentrations and is thus ideal for detecting the place and size of leakages.

Infrared technology

The GIR-10, which is based on the non-dispersive infrared technology (NDIR), offers fast response times and reliable measured values even in case of small leakages.

Simple operation

This instrument is characterised by simple handling and good readability. Both the hand-held instrument and the console case are equipped with a digital indicator which is easy to read. This allows reading the current SF₆ gas values from any position.

The leakage detection is carried out using a hand-held instrument which has a movable gooseneck with gas inlet on the front side. An exchangeable filter prevents particles from being sucked in, thus protecting the infrared sensor.

A pump in the console case provides continuous flow of the sucked-in gas mixture through the sample chamber of the infrared sensor.

If the SF₆ gas is already present in low concentrations in the measurement environment, this offset can be tared to 0 ppm_v at the instrument. It makes the leakage detection easier, as every measured value greater than 0 ppm_v represents leakage.

Depending on the version, model GIR-10 sends an acoustic alarm when a defined concentration is exceeded.

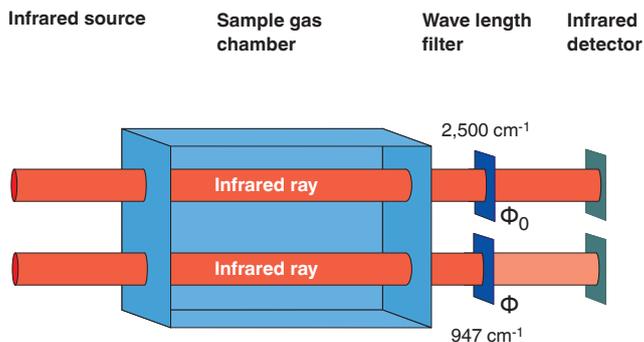
Measuring principle

Non-dispersive infrared technology (NDIR)

Non-dispersive infrared sensors are optical sensors which are often used in the gas analysis.

The most important components are the infrared source, a sample gas chamber, a wave length filter and an infrared detector.

In the gas detector model GIR-10, the sucked-in air is pumped through the sample chamber. The concentration of SF₆ gas is determined electro-optically by means of absorption of SF₆ at 947 cm⁻¹. The output signal of the detector is directly proportional to the absorption of the infrared light at the specific wave number. The GIR-10 does not need consumables and is maintenance-free within the calibration cycle.



The Lambert-Beer law

$$A = -\lg \frac{\Phi}{\Phi_0} = \varepsilon \cdot c \cdot l$$

A: Absorption

Φ: Light intensity after absorption of SF₆ gas

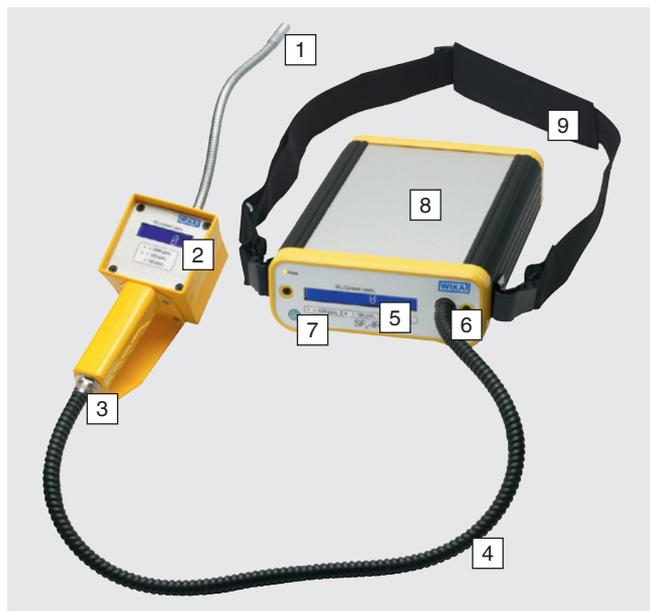
Φ₀: Light intensity without absorption

ε: Extinction coefficient

c: Concentration

l: Length of the irradiated chamber (sample gas chamber)

Instrument construction



- 1 Gas inlet with particle filter
- 2 Digital indicator of the hand-held instrument
- 3 Connection to the hand-held instrument
- 4 Connecting hose
- 5 Digital indicator on the console case
- 6 Connection to the console case
- 7 On/Off switch, zero adjustment
- 8 Console case
- 9 Shoulder belt

Specifications

Measuring range	0 ... 2,000 ppm _v	0 ... 50 ppm _v
Area of application	Leakage detection	Integral leak detection
Detection limit ¹⁾	3 ppm _v	0.6 ppm _v
Detectable leak rate (calculated)	3.43 g/year (corresponds to 1.81 x 10 ⁻⁵ mbar x L/s)	0.34 g/year (corresponds to 1.81 x 10 ⁻⁶ mbar x L/s)
Accuracy	< 50 ppm _v ±2 ppm _v ≥ 50 ... < 100 ppm _v ±5 ppm _v ≥ 100 ... < 2,000 ppm _v ±2 %	≤ 10 ppm _v ±0.5 ppm _v > 10 ppm _v ±2 %
Resolution	1 ppm _v	0.1 ppm _v
Unit	ppm _v	ppm _v
Response time T90	< 1 second	< 12 seconds
Acoustic alarm signals	yes	no

1) No cross sensitivity to typical volatile organic compounds (VOC).
No influence of air humidity between 0 ... 100 % r.h. (non-condensing).

Repeatability

< 0.3 %

Voltage supply

Lithium-ion accumulator for approx. 8 h operating time
Charger AC 100 ... 265 V, 50/60 Hz

Permissible temperature ranges

Storage temperature: -10 ... +60 °C

Operating temperature: 0 ... +45 °C

Calibration sequence

every 2 years

Weight

Console case: approx. 2.5 kg

Hand-Held: approx. 0.5 kg

Dimensions

Console case: 285 x 195 x 80 mm

Hand-Held: 210 x 110 x 90 mm

Option

- Switching between the display of additional units: g/y, cc/s

Accessories and spare parts

Description	Order no.
Particle filter	14005140
Transparent filter cap	14005999
O-ring	14004754

Ordering information

Model / Measuring range / Unit / Accessories and spare parts

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