

Gas presence detector

Based on infrared technology

Model GIR-10

WIKA data sheet SP 62.02

Applications

- Locating and quantifying leakages at SF₆ gas-filled plants
- Determining leakage rates for the final inspection of SF₆ gas-filled plants

Special features

- Smallest concentrations of up to 0.6 ppm_v can be detected
- Responds only to SF₆ gas and is therefore insensitive to moisture and the usual volatile organic compounds (VOC)
- Easy to use
- Fast response time
- Calibration in the factory using certified test gases



Gas presence detector, model GIR-10

Description

The gas presence detector model GIR-10 is used for the detection of the smallest SF₆ gas concentrations and is thus optimally suited for detecting the location and size of leakages.

Infrared technology

Model 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 handling

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.

Measurement principle

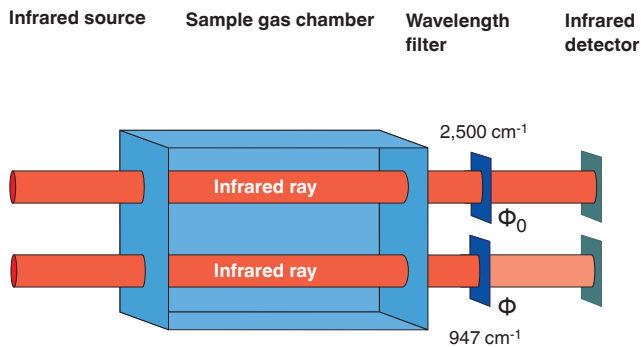
Non-dispersive infrared technology (NDIR)

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

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

In the gas presence detector model GIR-10, the sucked-in air is pumped through the sample chamber. The SF₆ concentration is determined optoelectrically by 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 wavenumber. Model GIR-10 does not need any consumables and is maintenance-free within the calibration cycle.

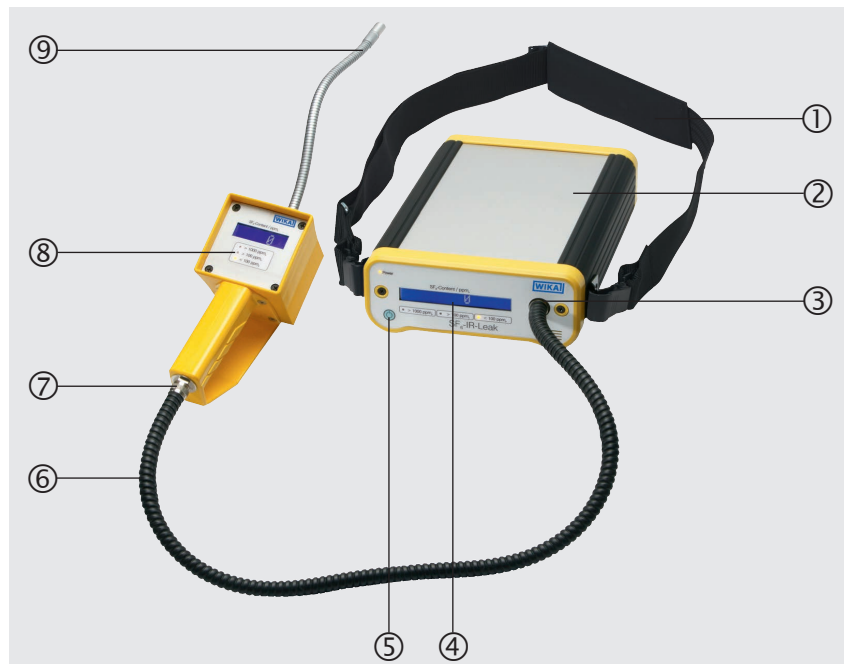


The Lambert-Beer law

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

- 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 (gas sample chamber)

Instrument construction



- ① Shoulder strap
- ② Console case
- ③ Connection of the connection hose to the console case
- ④ Digital indicator in the console case
- ⑤ On/Off switch, zero point setting
- ⑥ Connection hose
- ⑦ Connection of the connection hose to the hand-held
- ⑧ Digital indicator of the hand-held instrument
- ⑨ Gas inlet with particle filter

Specifications

Basic information	
Measurement principle	Non-dispersive infrared technology (NDIR)
Voltage supply	<ul style="list-style-type: none"> ■ Lithium-ion rechargeable battery for approx. 8 hours operating time ■ Battery charger AC 100 ... 265 V, 50/60 Hz
Calibration cycle	After 1,200 hours of operation or every 2 years at the latest
Permissible temperature ranges	
Storage temperature	-10 ... +60 °C [14 ... 140 °F]
Operating temperature	0 ... 50 °C [32 ... 122 °F]
Dimensions	
Console	285 x 195 x 80 mm [11.22 x 7.67 x 3.14 in]
Hand-held	210 x 110 x 90 mm [8.26 x 4.33 x 3.54 in]
Weight	
Console	2.5 kg [5.51 lb]
Hand-held	0.5 kg [1.1 lb]

Sensor (SF ₆ gas version, 0 ... 2,000 ppm _v)	
Application area	Leakage detection
Medium	SF ₆ gas
Measuring range	0 ... 2,000 ppm _v
Detection limit ¹⁾	3 ppm _v
Detectable leakage rate (calculated)	3 g/year (corresponds to 1.81 x 10 ⁻⁵ mbar x L/s)
Accuracy ²⁾	
≤ 100 ppm _v	±3 ppm _v
≥ 100 ... ≤ 2,000 ppm _v	±2 % of end value
Resolution	1 ppm _v
Measuring units	<ul style="list-style-type: none"> ■ ppm_v ■ g/y ■ cc/s
Response time T ₉₀	< 1 second
Alarm signal	Visual and audible

- 1) No cross-sensitivity to typical volatile organic compounds (VOC).
No influence of air humidity between 0 ... 95 % relative humidity, non-condensing.
- 2) Max. drift of 0.05 % per month

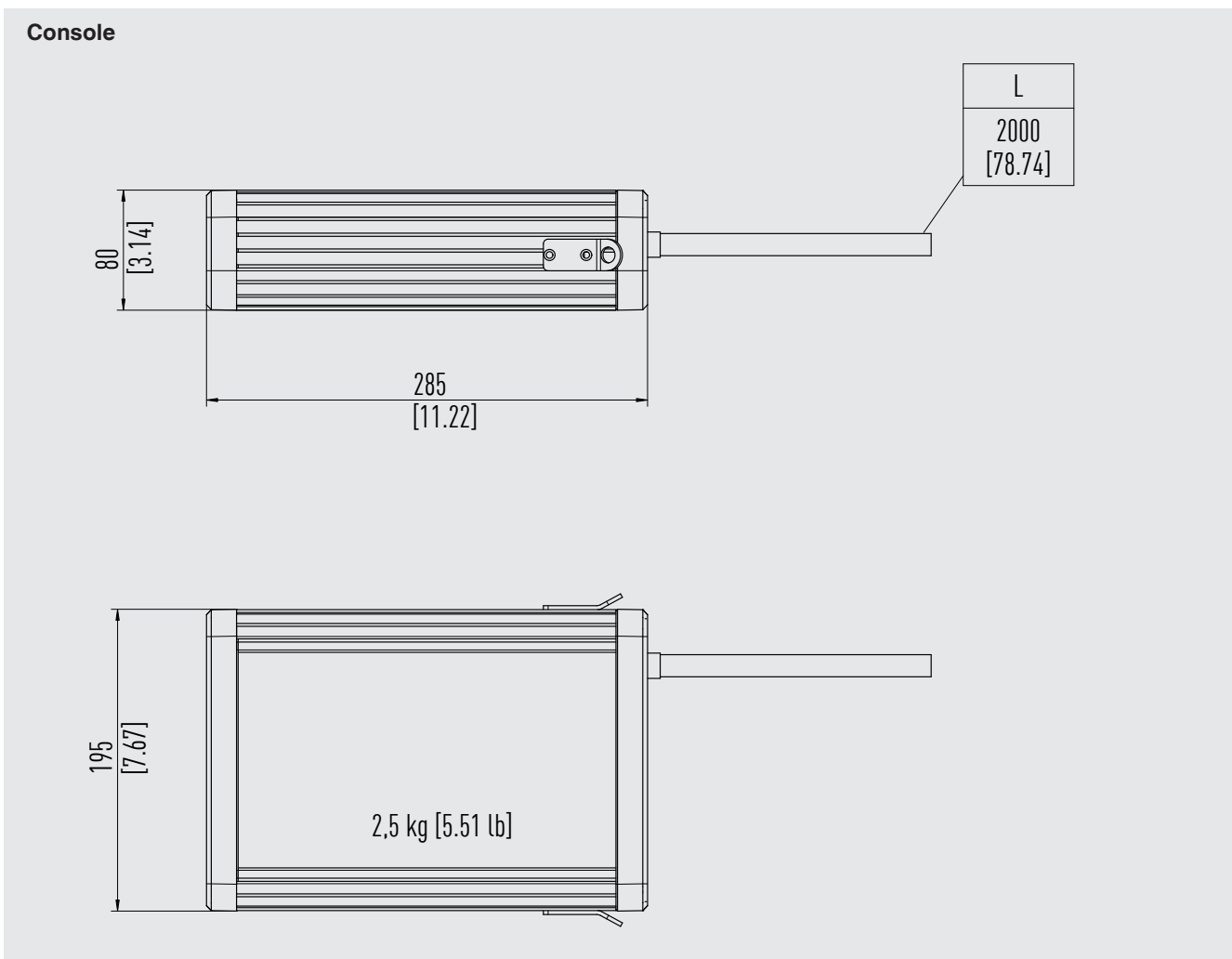
Sensor (SF ₆ gas version, 0 ... 50 ppm _v)	
Application area	Integral leak test
Medium	SF ₆ gas
Measuring range	0 ... 50 ppm _v
Detection limit ¹⁾	0.6 ppm _v
Detectable leakage rate (calculated)	0.34 g/year (corresponds to 1.81 x 10 ⁻⁶ mbar x L/s)
Accuracy	
≤ 10 ppm _v	±0.5 ppm _v
> 10 ppm _v	±2 %
Resolution	0.1 ppm _v
Measuring units	ppm _v
Response time T ₉₀	< 12 seconds
Alarm signal	Visual and audible

- 1) No cross-sensitivity to typical volatile organic compounds (VOC).
No influence of air humidity between 0 ... 95 % relative humidity, non-condensing.

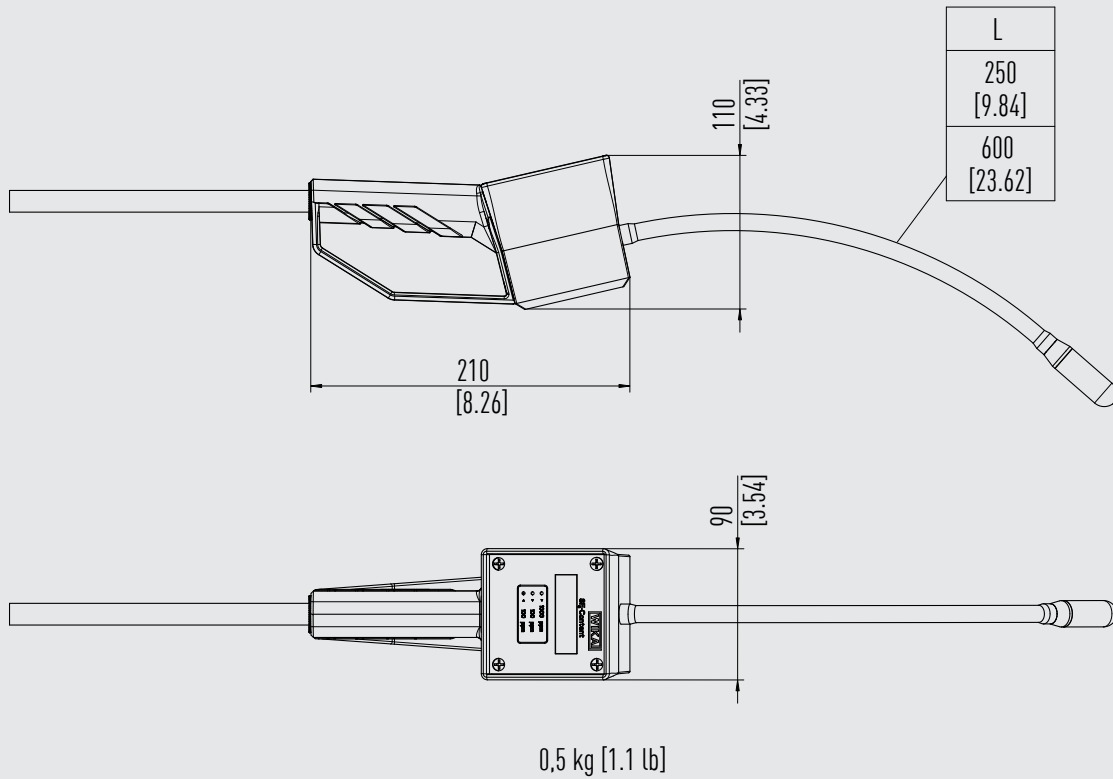
Sensor (CO ₂ version, 0 ... 1,000 ppm _v (N ₂ /Clean Air/dry air))	
Application area	Integral leak test
Medium	CO ₂
Measuring range	0 ... 1,000 ppm _v
Detection limit ¹⁾	10 ppm _v
Detectable leakage rate (calculated)	3.43 g/year (corresponds to 1.81 x 10 ⁻⁵ mbar x L/s)
Accuracy	±50 ppm _v
Resolution	1 ppm _v
Measuring unit	ppm _v
Response time T90	< 1 second
Alarm signal	Visual

1) No cross-sensitivity to typical volatile organic compounds (VOC).
No influence of air humidity between 0 ... 95 % relative humidity, non-condensing.

Dimensions in mm [in]



Hand-held



Accessories and spare parts

Description	Order number
Particle filter	14005140
Transparent filter cap	14005999
O-ring	14004754
Measuring tip with injection needle	14093643
Sampling bag, 5 litres	14029961

Ordering information

Model / Measuring range / Option / Accessories and spare parts

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