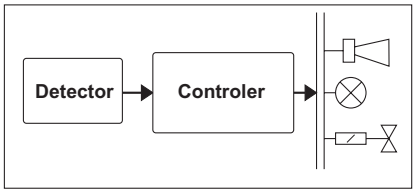
Bieler+Lang

Gas Detector
IR 220 SF6

Data Sheet

Gas Measurement and Warning Systems

Application / Design



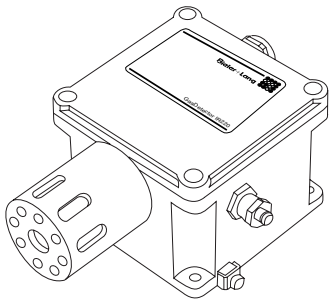
The sensor in Gas Detector IR 220 SF6, in combination with an evaluation system, has the following functions:

- Measurement and display of the current SF6 concentration
- Monitoring or warning of the presence of this gase.
- Monitoring of unintended leakage in order to avoid downtime and protect the environment.
- Protecting the health and safety of personnel.
- Initiation of protective measures:
  - Technical: actions to counter an increase in concentration (ventilators; switching equipment off....).
  - Organisational: visual and acoustic signals.

A gas detection and alarm system consists of the following components:

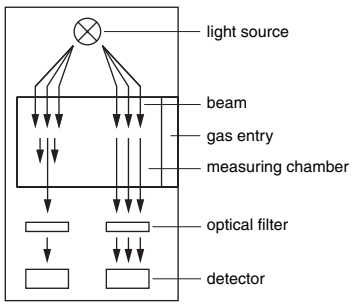
- Sensor
- Evaluation system
- Controllable devices such as ventilators, warning signs and solenoid valves

Product features



- Gases detected:
  Detection of SF6 at ppm-levels with a high degree of gas selectivity
- Measurement range:
  - Sensor type IR-10k: 0 ... 1,000 ppm (1 vol%)
  - Sensor type IR-20k: 0 ... 2,000 ppm (2 vol%)
  - Sensor type IR-50k: 0 ... 5,000 ppm (5 vol%)
- Measurement principle: NDIR (non-dispersive infra-red)
- Long useful life of the sensor
- Low influence of temperature and relative humidity
- High accuracy and repeatability
- High resistance to chemical poisons
- Linear 4 ... 20 mA measurement signal
- Integrated switched outputs for:
  - Alarm 1 (pre-alarm)
  - Alarm 2 (main alarm)
  - Sensor fault
- One-person calibration (optional operating unit)

Measurement principle NDIR gas sensor



The NDIR sensor consists of a light source, optical band filters, and detectors. The light source emits a pulsing wide-band spectrum. The radiation crosses the measurement chamber. The substance being measured enters the chamber by diffusion.
Some gases have the property of reducing the intensity of radiation in certain, limited wave-length ranges (infra-red). Two detectors are mounted at the end of the radiation path. There are two optical band filters upstream of the detectors. The transmission bands of these filters are chosen to suit the gas being measured.
The pass-band of the reference filter is restricted to the wave-length range that is not absorbed by the sample gas. The detector filter permits passage of the spectrum that the gas can absorb. The linearisation algorithm determines the concentration of the gas being measured from the recorded difference between the measurement detector and its compensation detector. An additional temperature measurement compensates for ambient temperature effects.

How it works

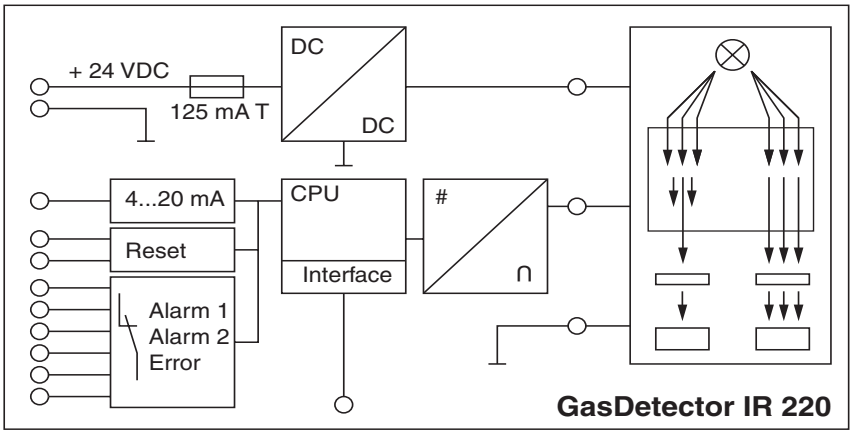
The sensor in Gas Detector IR 220 uses NDIR (Non Dispersive Infra-red) technology to monitor the presence of SF6 Gase. The IR sensor is equipped with its own electronics and firmware to provide a linearised and temperature compensated output. This output signal is converted into a 4mA … 20mA current signal.

The Gas Detector IR 220 can be programmed to use either of two operating modes:

- **Standalone**
  The integrated alarm evaluation is activated. Two alarm stages with switching hysteresis can be programmed. Alarm stage 1 (pre-alarm) switches non-saving NC contacts, and Alarm stage 2 (main alarm) switches saving NC contacts. When the signal falls below this alarm threshold, the alarm remains activated and must be acknowledged with a reset input. A pair of fault message contacts signal a malfunction, including when the measurement range is exceeded. In addition, the reading is provided as a 4 ... 20 mA current signal output for further processing.
- **Transmitter CL**
  If the alarm evaluation function is not required, the sensor can be operated using the integrated CL option. In this case, the sensor provides the measured gas concentration as a 4 ... 20 mA current signal for further processing in an alarm control centre; the alarm switching contacts are then inoperative.

The optionally available Type CB02 operating unit with its software stick, can be used for programming operating parameters, and adjusting the measurement sensor.

Block wiring diagram



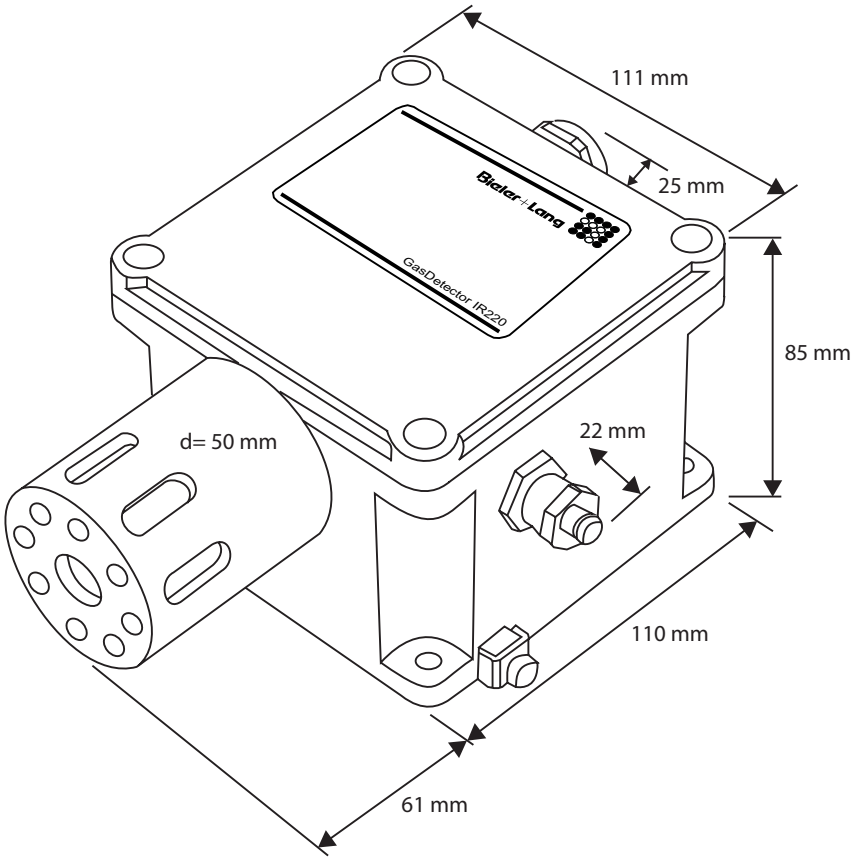
Technical data
General

	Gas Detector IR 220 SF6		
Sensor type	IR-10k	IR-20k	IR-50k
Application	Wall mounting		
Gas measured:	SF6 (Sulphur Hexfluoride)		
Measurement range	0 ... 0.1 vol% 0 … 1.000 ppm	0 … 0.2 vol% 0 … 2.000 ppm	0 … 0.5 vol% 0 … 5.000 ppm
Measurement principle	NDIR (dual beam technology)		
Response time T90	≤ 60 s		
Warm-up time	≤ 60 s		
Max. flow speed	6 m/sec		
Temperature range	-20 ... +50 °C		
Atmospheric pressure range	800 … 1200 hPa		
Humidity	0 … 95% non-condensing		
Storage	Temperature: -40 ... +85 °C Atm. pressure: 800 … 1200 hPa Humidity: 0 … 95% non-condensing		
Short-term stability	±1% of measurement range		
Accuracy *	±1% of range for measurements below 25 % ±2% of range for measurements below 50 % ±5% of range for measurements above 50 %		
Resolution	0.2% of measurement range		
Long-term stability of zero setting	±2% of measurement range / year		
Temperature	±3% of range for measurements below 50 % ±5% of range for measurements above 50 %		
Pressure	0.1 % ... 0.2 % of display per hPa		
Warm-up time	Reaches operating mode after 60 s full accuracy ≤ 60 min @ 25 °C		
Expected useful life (sensor)	> 4 years		

Mechanical data

	Gas Detector IR 220 SF6
Degree of protection (housing)	IP54
Housing material	Sensor: stainless steel / plastic (POM) Housing: aluminium
Weight	ca. 1350 g
Cable entry	1) 1 cable gland for cable 6-10 mm dia. 2) 1 blanking plug M16
Terminals	0.5 ... 2.5 mm^2 (w/o. cable-end sleeves) 0.5 ... 1.5 mm^2 (with cable-end sleeves)

Mechanical data



Technical data
Installation

	Gas Detector IR 220 SF6
Field interface	4 ... 20 mA Maximum safe voltage Um=250V
Power supply voltage (at sensor terminals)	18 ... 28 VDC SELV / PELV Integrated pre-fusing 125 mAT Maximum safe voltage Um=250V
Switch contacts	All are NC contacts (failsafe), max. 28 VDC SELV/PELV, integrated pre-fusing 200 mAT - Alarm 1 (pre-alarm) Free within measurement range - Alarm 2, saving (main alarm) Free within measurement range - Fault
Reset input	18 ... 28 VDC, potential-free
Max. cable length	200 m (dependent on cable type)
Connection lead	3 active conductors plus shield preferably H05VVC4V5-K
Suitable evaluator units	GMC 8022, GMC 8022E, GMC 8364, GMC 8420
Current draw	75 mA @ 24VDC integrated pre-fusing 125 mAT

Accessories

- Test gas set
- Calibration gases
- Operating unit, Type CB02

Service

Everything from a single supplier - from project planning to installation of your new Gas Detection and Alarm System. Our comprehensive marketing and service network is your guarantee. And after your purchase our service technicians are always ready with advice and assistance.

Bieler + Lang GmbH
Gas Measurement and Warning Systems

PO Box 1129, D-77842 Achern
Von-Drais-Str. 31, D-77855 Achern

Telephone +49 (0) 7841 6937-0
Telefax +49 (0) 7841 6937-99
Email info@bieler-lang.de

Internet www.bieler-lang.de

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We reserve the right to make technical changes!