

# Analytic instrument for SF<sub>6</sub> gas, g<sup>3</sup> gas or N<sub>2</sub> gas

## Model GA11

WIKA data sheet SP 62.11

### Applications

- Analysis of the gas quality in gas-filled equipment
- For the analysis of SF<sub>6</sub> gas, g<sup>3</sup> gas or N<sub>2</sub> gas

### Special features

- Provides measured values for humidity, gas composition (purity) and decomposition products (optional)
- Three methods for emission-free treatment of the measurement gas:
  - Direct back pumping into the tested gas compartment
  - Pumping into an external gas cylinder
  - Collecting in the external gas bag
- Battery power for min. 5 measurements or mains supply
- Not compromised by transport restrictions (IATA)



Analytic instrument model GA11

### Description

The model GA11 analytic instruments are innovative and reliable instruments for determining the quality of different insulating gases. Among these insulating gases are included SF<sub>6</sub>, Novec™ 4710 gas mixture (g<sup>3</sup> gas) as well as applications for technical air (clean air/ dry air, based on oxygen and nitrogen). The model GA11 can measure the concentration of up to six parameters, depending on the selected equipment variant.

#### Set up

A clearly arranged menu structure and a 7" colour touchscreen allow for intuitive operation. Sensors for the measurement of purity and humidity are included as standard. Optionally, the model GA11 can be extended with electrochemical sensors for determining the SF<sub>6</sub> gas decomposition products.

The measured gases can either be pumped back into the gas compartment of the switchgear or an external gas cylinder or, alternatively, it can be collected directly in a gas bag. In each case, emission into the atmosphere is avoided. The described treatment of the measuring gas can also be carried out in the battery mode if mains voltage is not available.

#### Field use

The analytic instrument is protected from the harsh environmental conditions through an impact-resistant and waterproof plastic case. The hard-top case, which is designed for field use, is fitted with wheels and a telescopic carrying handle for ease of transport.

# Operator interface

## Operation

The user interface is intuitive and can be operated via the touchscreen. English, German, Spanish, Japanese, Chinese and Korean are the available languages for selection.

After connecting the gas compartment or the gas cylinder under test, the measurement can be started.



Language selection

## Displaying the measurement results

The measurement results on the concentration of purity, decomposition products and humidity of SF<sub>6</sub> gas are displayed after the end of the measurement.

These results are automatically compared to the set guidelines for contaminated or reusable SF<sub>6</sub> gas (CIGRE B3.02.01, IEC or in accordance with user-defined specifications). Accordingly, an OK or Not-OK symbol is shown.

The GA11 makes it quick and easy to import a measuring point list, edited on a PC. Due to the complexity of the measurement task, specific knowledge is a pre-requisite, see IEC 62271-4:2013, ASTM D2029-97:2017 and CIGRÉ - SF<sub>6</sub> Measurement guide (723).

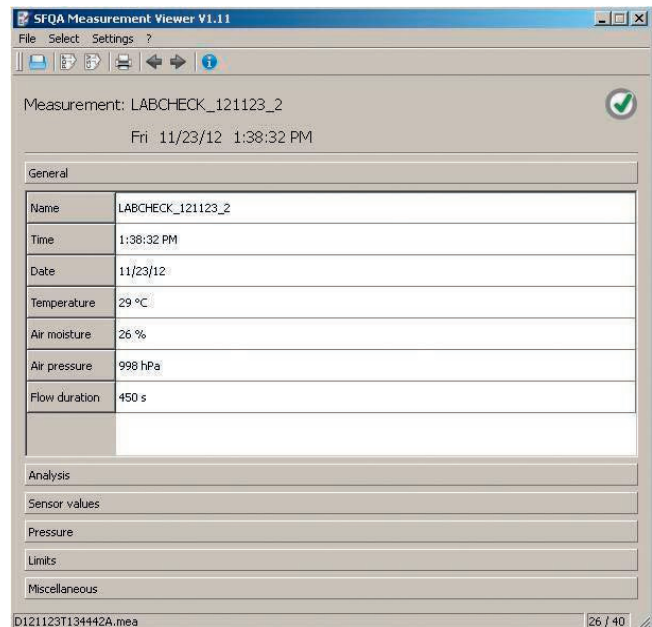


Measured value display

## Saving and export of the values

Up to five hundred measurement results can be stored within the instrument and can be transferred via the USB interface.

The enclosed software “SF<sub>6</sub>-Q-Analyser measurement viewer” is free of charge and can output the measurement results as a PDF report or in CSV format. The CSV format is suitable for importing the data using Microsoft® Excel® or other table calculation programs or database programs.



Database

## Instrument construction



- 1 TFT touchscreen
- 2 On and Off button
- 3 USB interface
- 4 Mains supply indicator
- 5 Charging indicator
- 6 Network connection (LAN)
- 7 Power connection
- 8 Outlet for gas recovery bag
- 9 Outlet for gas cylinder
- 10 Inlet, return pumps

## Specifications, version for SF<sub>6</sub> gas

Base instrument	
<b>Connections</b>	
Inlet/return pumps	Quick coupling with self-sealing valve
Outlet for gas cylinder	Self-sealing valve DN 8
Outlet for gas recovery bag	Quick coupling, self-sealing valve
<b>Permissible pressure ranges</b>	
Inlet/return pumps	1.3 ... 35 bar abs./1.3 ... 10 bar abs.
Outlet for gas cylinder	1.3 ... 10 bar abs.
Outlet for gas recovery bag	< 1.015 bar abs.
<b>TFT touchscreen</b>	7" (resolution 800 x 480)
<b>Voltage supply</b>	
Battery power	Lithium-ion battery, battery is charged during mains supply mode
Mains operated	AC 90 ... 264 V (50 ... 60 Hz)
<b>Permissible temperature ranges</b>	
Operation	0 ... 40 °C
Storage	-20 ... +60 °C
<b>Flow measuring gas</b>	
	20 litres/hour
<b>Dimensions</b>	
	W x H x D: 538 x 406 x 297 mm
<b>Weight</b>	
	approx. 25 kg

Humidity sensor	
<b>Measurement principle</b>	Polymer-based capacitive humidity sensor
<b>Measuring range/accuracy</b>	-40 ... +20 °C dew point ±2 °C dew point -60 ... < -40 °C dew point ±4 °C dew point
<b>Resolution</b>	1 °C
<b>Units</b>	°Ctd/°Ftd/ppm <sub>w</sub> /ppm <sub>v</sub> /°Ctdpr/°Ftdpr (Dew point at gas compartment pressure, relative to ambient pressure and temperature-compensated at 20 °C)
<b>Calibration interval</b>	2 years

SF <sub>6</sub> percentage sensor	
<b>Measurement principle</b>	Sound velocity
<b>Measuring range/accuracy</b>	0 ... 100 % ±0.5 % based on SF <sub>6</sub> /N <sub>2</sub> mixtures (calibration for SF <sub>6</sub> /CF <sub>4</sub> mixtures on request)
<b>Resolution</b>	0.1 %

### Optional sensor technology

SO <sub>2</sub> sensor	
<b>Measurement principle</b>	Electrochemical SO <sub>2</sub> sensor
<b>Measuring range/accuracy</b>	In combination with HF sensor, only 0 ... 10 or 0 ... 20 ppm <sub>v</sub> make sense. <ul style="list-style-type: none"> <li>■ 0 ... 10 ppm<sub>v</sub> ±0.5 ppm<sub>v</sub></li> <li>■ 0 ... 20 ppm<sub>v</sub> ±1 ppm<sub>v</sub></li> <li>■ 0 ... 100 ppm<sub>v</sub> ±3 ppm<sub>v</sub></li> <li>■ 0 ... 500 ppm<sub>v</sub> ±5 ppm<sub>v</sub></li> </ul>
<b>Resolution</b>	0.1 ppm <sub>v</sub>
<b>Permissible air humidity</b>	15 ... 90 % r. h. (non-condensing)
<b>Max. zero offset</b>	0.1 ppm <sub>v</sub>
<b>Long-term stability</b>	< 1 % signal degradation/month (linear) < 0.5 % at 0 ... 500 ppm <sub>v</sub>
<b>Service life</b>	2 years starting from installation

HF sensor	
Measurement principle	Electrochemical hydrogen fluoride sensor
Measuring range/accuracy	0 ... 10 ppm <sub>v</sub> ±1 ppm <sub>v</sub>
Resolution	0.1 ppm <sub>v</sub>
Permissible air humidity	15 ... 90 % r. h. (non-condensing)
Max. zero offset	0.1 ppm <sub>v</sub>
Long-term stability	< 1 % signal degradation/month (linear)
Service life	2 years starting from installation

H <sub>2</sub> S sensor	
Measurement principle	Electrochemical H <sub>2</sub> S sensor
Measuring range/accuracy	0 ... 100 ppm <sub>v</sub> ±5 ppm <sub>v</sub>
Resolution	0.1 ppm <sub>v</sub>
Permissible air humidity	15 ... 90 % r. h. (non-condensing)
Max. zero offset	0.1 ppm <sub>v</sub>
Long-term stability	< 1 % signal degradation/month (linear)
Service life	2 years starting from installation

CO sensor	
Measurement principle	Electrochemical CO sensor
Measuring range/accuracy	0 ... 500 ppm <sub>v</sub> ±9 ppm <sub>v</sub>
Resolution	0.1 ppm <sub>v</sub>
Permissible air humidity	15 ... 90 % r. h. (non-condensing)
Max. zero offset	0.1 ppm <sub>v</sub>
Long-term stability	< 1 % signal degradation/month (linear)
Service life	2 years starting from installation

Precision pressure sensor	
Measuring range	0 ... 10 bar abs.
Accuracy	≤ ±0.05 % of span Including non-linearity, hysteresis, non-repeatability, zero offset and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.
Non-linearity (per IEC 61298-2)	≤ ±0.04 % of span BFSL
Temperature error	0 ... 10 °C: ≤ ±0.2 % of span/10 K 10... 40 °C: no additional temperature error
Long-term stability	≤ ±0.1 % of span/year
Measuring rate	2 ms
Calibration interval	2 years

## Specifications, version for g<sup>3</sup> gas (3M™ Novec™ 4710)

Base instrument	
<b>Connections</b>	
Inlet/return pumps	Quick coupling with self-sealing valve
Outlet for gas cylinder	Self-sealing valve DN 8
Outlet for gas recovery bag	Quick coupling, self-sealing valve
<b>Permissible pressure ranges</b>	
Inlet/return pumps	1.3 ... 12 bar abs.
Outlet for gas cylinder	1.3 ... 12 bar abs.
Outlet for gas recovery bag	< 1.015 bar abs.
<b>TFT touchscreen</b>	7" (resolution 800 x 480)
<b>Voltage supply</b>	
Battery power	Lithium-ion battery, battery is charged during mains supply mode
Mains operated	AC 90 ... 264 V (50 ... 60 Hz)
<b>Permissible temperature ranges</b>	
Operation	0 ... 40 °C
Storage	-20 ... +60 °C
<b>Flow measuring gas</b>	20 litres/hour
<b>Dimensions</b>	W x H x D: 538 x 406 x 297 mm
<b>Weight</b>	approx. 25 kg

Humidity sensor	
<b>Measurement principle</b>	Polymer-based capacitive humidity sensor
<b>Measuring range/accuracy</b>	<ul style="list-style-type: none"> <li>■ -25 ... 0 °C dew point ±2 °C dew point</li> <li>■ -35 ... -25 °C dew point ±3 °C dew point</li> <li>■ -55 ... -35 °C dew point ±4 °C dew point</li> </ul>
<b>Resolution</b>	1 °C
<b>Units</b>	°Ctd/°Ftd/ppm <sub>w</sub> /ppm <sub>v</sub> /°Ctdpr/°Ftdpr (Dew point at gas compartment pressure, relative to ambient pressure and temperature-compensated at 20 °C)
<b>Calibration interval</b>	2 years

g <sup>3</sup> percentage sensor (3M™ Novec™ 4710 in g <sup>3</sup> -Gas)	
<b>Measurement principle</b>	Sound velocity
<b>Measuring range/accuracy</b>	0 ... 10 % (percentage Novec™ 4710) ±0.3 % based on Novec™ 4710/CO <sub>2</sub> mixture <sup>1)</sup> Any measuring range on request, based on Novec™ 4710/CO <sub>2</sub> or Novec™ 4710/N <sub>2</sub> mixtures <sup>2)</sup>

1) ±0.5 % if the ambient pressure (standard at 1,000 mbar abs.) deviates by more than 100 mbar.

2) For special calibrations, the measuring tolerances may deviate from the standard specification.

### Optional sensor technology

Oxygen sensor	
<b>Measurement principle</b>	Optical
<b>Measuring range/accuracy</b>	0 ... 10 % vol. ±0.3 % vol. (option: 0 ... 25 % vol.) <sup>3)</sup>
<b>Permissible air humidity</b>	15 ... 90 % r. h. (non-condensing)
<b>Max. zero offset</b>	0.2 % vol.
<b>Long-term stability</b>	< 2 % signal degradation/month (linear)
<b>Service life</b>	2 years starting from installation

3) ±0.5 % at 0 ... 25 %, for special calibrations the measuring tolerances may deviate from the standard specification.

## Specifications, version for N<sub>2</sub> gas

Base instrument	
<b>Connections</b>	
Inlet/return pumps	Quick coupling with self-sealing valve
Outlet for gas cylinder	Self-sealing valve DN 8
Outlet for gas recovery bag	Quick coupling, self-sealing valve
<b>Permissible pressure ranges</b>	
Inlet/return pumps	1.3 ... 12 bar abs. / 1.3 ... 10 bar abs.
Outlet for gas cylinder	1.3 ... 10 bar abs.
Outlet for gas recovery bag	< 1.015 bar abs.
<b>TFT touchscreen</b>	7" (resolution 800 x 480)
<b>Voltage supply</b>	
Battery power	Lithium-ion battery, battery is charged during mains supply mode
Mains operated	AC 90 ... 264 V (50 ... 60 Hz)
<b>Permissible temperature ranges</b>	
Operation	0 ... 40 °C
Storage	-20 ... +60 °C
<b>Flow measuring gas</b>	40 litres/hour
<b>Dimensions</b>	W x H x D: 538 x 406 x 297 mm
<b>Weight</b>	approx. 25 kg

Humidity sensor	
<b>Measurement principle</b>	Polymer-based capacitive humidity sensor
<b>Measuring range/accuracy</b>	<ul style="list-style-type: none"> <li>■ -25 ... 0 °C dew point ±2 °C dew point</li> <li>■ -35 ... -25 °C dew point ±3 °C dew point</li> <li>■ -55 ... -35 °C dew point ±4 °C dew point</li> </ul>
<b>Resolution</b>	1 °C
<b>Units</b>	°Ctd/°Ftd/ppm <sub>w</sub> /ppm <sub>v</sub> /°Ctdpr/°Ftdpr (Dew point at gas compartment pressure, relative to ambient pressure and temperature-compensated at 20 °C)
<b>Calibration interval</b>	2 years

N <sub>2</sub> percentage sensor (helium in N <sub>2</sub> )	
<b>Measurement principle</b>	Sound velocity
<b>Measuring range/accuracy</b>	0 ... 5 % vol. ±0.5 % vol. Any measuring range on request, based on helium in N <sub>2</sub> mixtures <sup>1)</sup>

1) For special calibrations, the measuring tolerances may deviate from the standard specification.


N <sub>2</sub> percentage sensor (SF <sub>6</sub> in N <sub>2</sub> )	
<b>Measurement principle</b>	Sound velocity
<b>Measuring range/accuracy</b>	0 ... 100 % vol. ±0.5 % vol.

### Optional sensor technology

Oxygen sensor	
<b>Measurement principle</b>	Optical
<b>Measuring range/accuracy</b>	0 ... 10 % vol. ±0.3 % vol. (option: 0 ... 25 % vol. ±0.3 % vol.) <sup>1)</sup>
<b>Permissible air humidity</b>	15 ... 90 % r. h. (non-condensing)
<b>Max. zero offset</b>	0.2 % vol.
<b>Long-term stability</b>	< 2 % signal degradation/month (linear)
<b>Service life</b>	2 years starting from installation

1) ±0.5 % at 0 ... 25 %, for special calibrations the measuring tolerances may deviate from the standard specification.

## Accessories

	Description	Order number
	<b>Gas recovery bag, model GA45</b> <ul style="list-style-type: none"><li>■ Low weight and easily transportable</li><li>■ Cost-effective version to prevent SF<sub>6</sub> gas emissions</li><li>■ Compatible with all WIKA gas analytic instruments</li><li>■ With overpressure valve as burst protection</li><li>■ Resistant to decomposition products</li><li>■ Storage capacity 110 litres</li></ul> For further specifications see data sheet SP 62.08	14013015
	<b>Hose connection</b> 4 m, Ø 2.5 mm	14200598

## Ordering information

Model / Version / Optional sensor technology / Accessories

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