

# Operating Instructions

## VISIC100SF

Gas Adjustment Kit



**Described product**

Product name: VISIC100SF Gas Adjustment Kit

**Manufacturer**

Endress+Hauser SICK GmbH+Co. KG  
Bergener Ring 27  
01458 Ottendorf-Okrilla  
Germany

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**Original document**

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## 1 About this document

### 1.1 Function of this document

This document describes:

- Adjusting the gas sensors
- Transport and storage conditions for the VISIC100SF Gas Adjustment Kit
- Important safety information for safe operation.

### 1.2 Scope of application

These Operating Instructions apply exclusively to the VISIC100SF Gas Adjustment Kit from Endress+Hauser for adjusting the CO, NO and NO<sub>2</sub> gas sensors used in the VISIC100SF.

They are not applicable for other Endress+Hauser devices.

### 1.3 Target groups

This Manual is intended for persons qualified to perform an adjustment of the VISIC100SF gas sensors.

### 1.4 Further detailed information

- VISIC100SF Operating Instructions

### 1.5 Symbols and document conventions

#### 1.5.1 Warning symbols

Symbol	Significance
	Hazard (general)
	Hazard through voltage
	Hazard through acidic substances
	Hazard through toxic substances
	Hazard through noxious substances
	Hazard for the environment/nature/organic life

#### 1.5.2 Warning levels and signal words

**DANGER:**

Risk or hazardous situation which *will* result in severe personal injury or death

**WARNING:**

Risk or hazardous situation which *could* result in severe personal injury or death

**CAUTION:**

Hazard or unsafe practice which *could* result in less severe or minor injuries

**NOTICE:**

Hazard which *could* result in property damage

**Note:**

Tips

**1.5.3 Information symbols**

Symbol	Significance
	Important technical information for this product
	Important information on electric or electronic functions

**1.6 Data integrity**

Endress+Hauser uses standardized data interfaces, such as standard IP technology, in its products. The focus here is on product availability and features.

Endress+Hauser always assumes the integrity and confidentiality of data and rights affected in connection with the use of the products are ensured by the customer.

In all cases, the customer is responsible for the implementation of safety measures suitable for the respective situation, e.g., network separation, firewalls, virus protection and patch management.

## 2 For your safety

### 2.1 Basic safety information

- ▶ Read and observe these Operating Instructions.
- ▶ Observe all safety information.

#### Correct use

- ▶ Only use the measuring device as described in “Intended use”. The manufacturer assumes no responsibility for any other use.
- ▶ Maintenance work should be performed as prescribed in this Manual.
- ▶ Do not perform any work or repairs on the measuring device not described in this Manual.
- ▶ Do not remove, add or modify any components to or on the device unless described and specified in the official manufacturer information.
- ▶ Use only original spare parts and wear and tear parts from Endress+Hauser.

Failure to observe these precautions could result in:

- Voiding the manufacturer's warranty.
- Causing the device to become dangerous.

#### Special local conditions

In addition to the information in these Operating Instructions, follow all local laws, technical rules and company-internal operating and installation directives applicable wherever the device is installed.

#### Retention of documents

These Operating Instructions:

- ▶ Must be available for reference.
- ▶ Must be conveyed to new owners.

#### Ensure the operational safety during all work on the device

The VISIC100SF is mainly used in combination with regulation and control technology.

- ▶ During all work on the device, ensure that this can not lead to hazards or hindrances for traffic.

#### 2.1.1 Electrical safety

##### Hazard through electrical shock

There is a risk of electric shock when working on the measuring device with the voltage supply switched on.

- Before starting work on the measuring device, ensure the power supply can be switched off using a power isolating switch or circuit breaker in accordance with the valid standard.
- Switch off the power supply before carrying out any work on the measuring device.
- After completion of the work or for test purposes or adjustment, the power supply may only be activated again by authorized personnel complying with the safety regulations.

### 2.1.2 Dangerous substances

#### Hazard through acidic liquids

If the gas sensor is mechanically damaged, corrosive liquid may escape and cause serious injury.

- Take appropriate protective measures for work (e.g., by wearing a safety mask, protective gloves and acid resistant clothes).
- In case of contact with the skin or eyes, rinse the affected parts immediately with clear water and consult a doctor.

#### Hazard through escaping calibration gases

Incorrect handling of calibration gases can cause high concentrations above the workplace exposure limits to escape from the gas sensor into the ambient air and lead to poisoning.

- Observe the Safety Datasheets of the calibration gases.
- Ensure adequate ventilation.
- Limit gassing time.

## 2.2 Intended use

The Gas Adjustment Kit serves to check and adjust the gas sensors in the VISIC100SF.

## 2.3 Requirements for personnel qualification

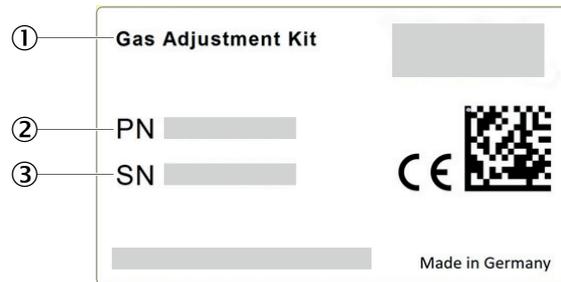
The device may only be operated by authorized persons who, based on their training on, and knowledge of the specific device, as well as knowledge of the relevant regulations can assess the tasks given and recognize the hazards involved.

### 3 Product description

#### 3.1 Product identification

Product name	VISIC100SF Gas Adjustment Kit
Manufacturer	Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 · 01458 Ottendorf-Okrilla · Germany
Type plate	On the lid of the case, right bottom

Fig. 1: Type plate, Gas Adjustment Kit



- ① Designation
- ② Part number
- ③ Serial number

## 3.2 Layout and function

The Gas Adjustment Kit continuously checks the gas type and measuring range set for agreement with gas type and measuring range of the connected gas sensor and outputs an error if there is an inconsistency.

### 3.2.1 Gas Adjustment Kit



Fig. 2: Contents, Gas Adjustment Kit

	Designation
1	Hose (marked blue/orange), 3 m for nitrogen monoxide (NO) and nitrogen dioxide (NO <sub>2</sub> )
2	Hose, transparent (marked pink), 3 m for carbon monoxide (CO) and synthetic air
3	Accessories: 2 × hose adapters and transition pieces, 2 × replacement seals (O-rings) for tapping valves
4	Stainless steel sampling valve (marked blue) for NO and NO <sub>2</sub> , flow rate: 0.5 l/min
5	Brass sampling valve (marked pink) for CO and synthetic air, flow rate: 0.5 l/min
6	Adjustment tool
	Operating Instructions



**Note:**

It is assumed that the test gases are provided by the customer.  
Calibration gas data, see [“Test gases”, page 28.](#)

## 4 Transport and storage

### 4.1 Transport, VISIC100SF Gas Adjustment Kit

No special regulations must be observed when transporting and storing the Gas Adjustment Kit. The standard Endress+Hauser regulations are applicable.

### 4.2 Storage, VISIC100SF Gas Adjustment Kit and accessories

Always store the contents of the Service case in the Service case.

### 4.3 Transporting and storing test gases

The following Sections describe the general obligations when transporting and storing test gases or test gas cylinder for the VISIC100SF Gas Adjustment Kit.

#### 4.3.1 Regulations applicable for VISIC100SF

- The dangerous goods amount in the vehicle must NOT exceed 1000 ADR (Accord européen relatif au transport international des marchandises dangereuses par route) points.
- The test gases or test gas cylinders may only be transported to the place of use to carry out measurements, repairs or maintenance work, i.e. no supply trips!
- Also observe the respective local regulations!

#### 4.3.2 Securing loads

The load must always be secured adequately, also during transport in private vehicles.

- Lashing straps
- Clamping bars
- Wedges etc.

Secure the load so that pieces being transported cannot change direction and therefore not damage the load. The test gases or test gas cylinders may only be transported in the intended bags.

#### 4.3.3 Valve protection

The closing valves must be protected against damage (e.g. by protective caps, valve protection collars, protective boxes, etc.).

#### 4.3.4 No smoking allowed

Open fire or light is forbidden during loading work, in the proximity of the transport pieces and other vehicles as well as in the vehicles.

#### 4.3.5 Hazard labels

Hazard labels must be affixed to the test gas cylinders. The code is required in the bottom corner of the hazard label.

#### 4.3.6 Ventilation

No special ventilation is required when the limit values ([see 4.3.1](#)) are observed.

#### 4.3.7 Transport document

**Note:**

► Always carry the transport document.

The transport document is not required in Germany in compliance with Exception 18 GGAV when:

- Gases are not transferred to third parties
  - No special agreement is applied
  - A proof of quantity (e.g. delivery bill) is available
- 

#### 4.3.8 Vehicle equipment

Not required when carrying a maximum of 340 liters of specified CO test gas cylinders or 880 liters of specified NO test gas cylinders or 4290 liters of specified NO<sub>2</sub> test gas cylinders.

#### 4.3.9 Other equipment

Not required.

#### 4.3.10 Marking

Not required.

#### 4.3.11 Accident leaflet

Not required.

#### 4.3.12 Training

All persons involved in transporting dangerous goods (e.g. driver, loader, consignor, consignee, filler, transporter) must have received appropriate training.

#### 4.3.13 Disposal

Test gas cylinders that are not emptied must be returned to the supplier and the supplier is responsible for their disposal.

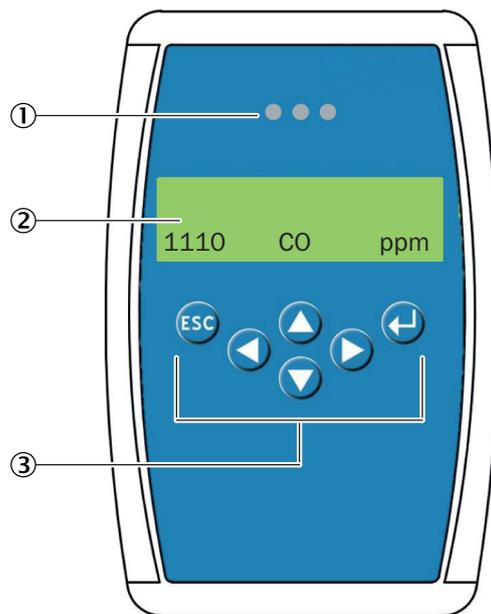
## 5 Operation

### 5.1 Operating concept

The complete operation and configuration is performed using the control keys and the LC display.

### 5.2 Displays and operating elements

#### 5.2.1 Adjustment tool



	Designation
1	Status LEDs
2	LC display
3	Control keys

#### 5.2.2 Status LEDs

The status LEDs indicate the operating status.

- Green: Ready for operation
- Yellow: Malfunction

### 5.2.3 Keypad

Key	Designation	Function
	ESC key	<ul style="list-style-type: none"> <li>• Terminate program</li> <li>• Query whether value should be saved</li> <li>• Return to previous menu level</li> </ul>
	Confirm key	<ul style="list-style-type: none"> <li>• Select submenu</li> <li>• End value input</li> <li>• Store parameter</li> </ul>
	Arrow up	<ul style="list-style-type: none"> <li>• Navigating within a menu level</li> <li>• Change value</li> </ul>
	Arrow down	<ul style="list-style-type: none"> <li>• Navigating within a menu level</li> <li>• Change value</li> </ul>
	Arrow left	<ul style="list-style-type: none"> <li>• Change cursor position</li> </ul>
	Arrow right	<ul style="list-style-type: none"> <li>• Change cursor position</li> </ul>

### 5.3 Navigating and setting

Press key	Action
	Open menu.
 and 	Move cursor to position segment to be changed.
 and 	Use to set the desired parameter or setpoint.
	End value input.
 and 	Change other parameters in the same menu.
	End value input.
	Save changed value?
	<b>Yes</b> and return to next higher menu or
	<b>No</b> and return to next higher menu. Old value is not overwritten.

### 5.4 Status and malfunction messages

Possible status and malfunction messages are described in the respective Menu Section.

### 5.5 Measuring point

The term measuring point (MP) refers to a gas sensor connected to the VISIC100SF.

For a sensor with digital communication, the display shows  
DP = Digital Measuring Point.

The number following is always 1 because the adjustment tool can only address one sensor.

## 6 Menus

### 6.1 Start menu

#### Display

Endress+Hauser		
1110	CO	ppm

- Display of the company name and by default the CO sensor.
- The adjustment tool automatically tries to communicate with a CO sensor.

### 6.2 Menu tree

Menu level	Explanation
<b>Nom./Gas/Unit</b>	Select gas type
<b>Error Status</b>	Display malfunction
<b>Measuring Values</b>	Display measured values
<b>Display Parameters</b>	Display parameters
Software Version	Display software version
Serial Number	Display serial number
Language	Select language
LCD Function	Test hardware function
<b>Installation &amp; Calibration</b>	Read out and change measuring point and system parameters, perform adjustment
MP Parameters	Read out measuring point parameters
System Parameters	Read out or change system parameters
Operation Data	Read out gas sensor operating data
Calibration	Adjust gas sensor: Zero point and sensitivity
DP1	Select measuring point
Zero DP1	Adjust zero point
Test gas	Set test gas concentration

### 6.3 Menu - Nom./Gas/Unit

#### Function: Set gas type

#### Display

Nom./Gas/Unit		
1110	CO	ppm

Symbol	Description
1110	Type number of the gas sensor used and the gas type
CO	Gas type formula
ppm	Unit

Table 1: Gas types and measuring ranges

Type	Gas type	Formula	Measuring range	Unit
1110	Carbon monoxide	CO	0-300/0-200	ppm
1129	Nitrogen monoxide	NO	0-100	ppm
1130	Nitrogen dioxide	NO <sub>2</sub>	0-5	ppm

## 6.4 Menu - Error status

**Function: Display current error message**

### Display

- Status LED is yellow.
- The currently pending error is displayed.
- The malfunction message is acknowledged automatically when the malfunction is cleared.

## 6.5 Menu - Measuring Values

**Function: Display measured value characteristics and messages**

### Display

Symbol	Description	Function
DP1	Measuring point number	Digital measuring point
CO	Gas type formula	Gas type display
ppm	Unit	
51.0 l	Measured value (example)	I = Current measured value (actual value) of the gas concentration
#	Maintenance information	Gas sensor maintenance required (maintenance date exceeded)
Comm.Error	Malfunction measuring point	Communication malfunction, gas sensor ↔ Adjustment tool
Underrange	Monitoring measuring range	Measuring signal < permissible range (< zero point - 6%)
Overrange		Measuring signal > permissible range (> measuring range end value +6%)
Warm-Up Time	Warm-up time	Warm-up time of gas sensor active

## 6.6 Menu - Display Parameters

**Function: Display and change parameters**

- General and non-safety relevant parameters are stored.
- The change can be made in operating mode.

### Display Parameters

- Software version
- Serial number of the adjustment tool
- Language: Select language
  - German (factory setting)
  - English
  - USA English
  - French
  - Italian
- LCD function: Test LCD hardware.
  - All LEDs light up for approx. 2 seconds.
  - Backlight is yellow.
  - All points are displayed on the LED.

---

## 6.7 Menu - Installation and Calibration

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**Note: Changed parameters must be read back to check for correctness!**

---

### 6.7.1 MP Parameters

**Function: Display measuring point parameters**

**Display**

Displays the measuring range of the active measuring point

**Procedure:**

- 1 Menu: Installation & Calibration → MP Parameter → DP1 → Open Nom/Gas/Unit.
- 2 Press Down arrow key and display the measuring range.

### 6.7.2 System Parameters

**Function: Display system parameters**

**System Parameters**

- System information: Serial number
- Power-on time

**Power-on time**

Gas sensors require a warm-up time until the measurement process reaches a stable state. During this warm-up time, the sensor signal can lead to the unwanted triggering of a pseudo alarm. Therefore, the power-on time is started after switching on the voltage or voltage recovery. During this time, the sensor outputs “Warm-up time” instead of the measured value.

The factory-set power-on time is 5 min. and can only be read out.

### 6.7.3 Menu - Operating Data

**Function: Read out operating data of the gas sensor**

#### Display operating data

Symbol	Description
Software Version	Current software version
Days of Operation	Number of current operating days
Gas Conc. Counter	<ul style="list-style-type: none"> <li>Gas concentration counter*</li> <li>Unit. 10% of measuring range per day</li> </ul>
Days of Operation expected	<ul style="list-style-type: none"> <li>Expected lifetime of the gas sensor.</li> <li>Is continuously recalculated based on adjustments and concentration counter</li> </ul>
Min. Temperature	<ul style="list-style-type: none"> <li>Display of the lowest measured temperature (start value = 70 °C)</li> <li>Will be updated only after 7 days when restarting</li> </ul>
Max. Temperature	<ul style="list-style-type: none"> <li>Display of the highest temperature value measured on the device (start value = -34 °C)</li> <li>Will be updated only after 7 days when restarting</li> </ul>
Last Tool No.	Display of the tool number used for the last access.
Number of Calibr.	Number of adjustments performed
Sensitivity	Sensitivity of the sensor at the last adjustment to new sensor
Maintenance Days last	Remaining maintenance days due before the last adjustment
Days of operation Last	Number of operating days since last adjustment (fixed value)
Maintenance Days Currently	Current remaining days until next maintenance date (down counter)
Max. Current Value	Maximum measured current value of the gas sensor

#### Procedure:

- 1 Menu: Installation & Calibration → Open Operating Data.
  - »» Operating data are read in.
  - »» “Please wait...” is displayed during reading in.
    - »» Read-in not successful: Display returns to the previous menu item.
    - »» Read-in successful: First subordinate menu item is displayed.
- 2 Press “Down arrow” to display the following menu items.

## 6.7.4 Menu - Calibration

### Function: Adjust zero point and sensitivity

#### 6.7.4.1 Adjust zero point

##### Display

Symbol	Description
Zero	Zero point adjustment
□	Zero point adjustment finished, zero point offset saved
Current value too small	Electrochemical cell defective, replace gas sensor.
Current value too high	Wrong gas for zero point adjustment (actual current value > 10% of measuring range)
Current value unstable	Displayed as long as the deviation between two measuring cycles (100 ms) is > 3%. Goes off automatically when sensor signal becomes stable.
Internal error	Displayed when the adjustment is not possible, e.g. in case of serious errors. Exchange gas sensor.

##### Procedure

see [“Perform adjustment”, page 23](#)

6.7.4.2 *Adjust sensitivity***Display**

Symbol	Description
Test gas XX.x ppm	Set the test gas concentration
Gain	Sensitivity adjustment
□	Sensitivity adjustment finished, sensitivity offset saved
Current Value too small	No test gas or incorrect test gas at the sensor
Current value too high	Test gas concentration > entered value. Internal error. Exchange gas sensor.
Test gas too small	Set test gas concentration must be within 30% and 90% of the measuring range.
Test gas too high	
Actual value unstable	Displayed as long as the deviation between two measuring cycles (100 ms) is > 3%. Goes out automatically when sensor signal becomes stable.
Time too short	<ul style="list-style-type: none"> <li>• Message "Actual value unstable" starts internal timer (10-20 s).</li> <li>• The text is displayed when the timer has expired and the actual value is still unstable.</li> <li>• The process starts again.</li> <li>• If the value is stable, the actual value is displayed again and the adjustment process is continued.</li> <li>• There is an internal error when the cycle repeats several times.</li> <li>• The adjustment procedure must be canceled and the gas sensor replaced.</li> </ul>
Sensitivity <	Sensitivity of the gas sensor < 30%, adjustment no longer possible. Exchange gas sensor.
Internal error	Internal error that cannot be corrected. Exchange gas sensor.

**Procedure**

see ["Perform adjustment"](#), page 23

## 7 Adjustment

An electrochemical process always leads to a loss of sensitivity over time. Therefore, an adjustment of the zero point and the sensitivity is necessary at regular intervals.

### 7.1 Safety

**WARNING: Hazard by voltage.**

Live parts are accessible when the device is open!  
▶ Only use suitable, insulated tools.

**WARNING: Hazard by corrosive liquids**

If the gas sensor is mechanically damaged, corrosive liquid may escape and cause serious injury.

- ▶ Take appropriate protective measures for work (e.g., by wearing a safety mask, protective gloves and acid resistant clothes).
- ▶ In case of contact with the skin or eyes, rinse the affected parts immediately with clear water and consult a doctor.
- ▶ Dispose of damaged gas sensors immediately.

**WARNING: Health hazard due to defective gas cylinders**

The use of defective test gas cylinders for adjusting the electrochemical cells can lead to accidents and health hazards.

- ▶ Do not use expired test gas cylinders.
- ▶ When handling pressure vessels, observe the required safety regulations.

**WARNING: Hazard through escaping calibration gases**

Incorrect handling of calibration gases can cause high concentrations above the occupational exposure limits to escape from the gas sensor into the ambient air and lead to poisoning.

- ▶ Observe the Safety Datasheets of the calibration gases.
- ▶ Ensure adequate ventilation.
- ▶ Limit gassing time.

### 7.2 Materials and tools required

- Gas Adjustment Kit
- VISIC100SF with gas sensors
- Test gas cylinder with synthetic air (21% O<sub>2</sub>, 79% N<sub>2</sub>) for zero point adjustment
- Test gas cylinder with test gas:
  - For CO/NO in the range 30-90% of the measuring range for sensitivity adjustment
  - For NO<sub>2</sub>: 30% measuring range end value up to 6 ppm
- Test gas CO /NO/NO<sub>2</sub>
- Allen key, SW4
- Special pliers/universal tool for cable glands

## 7.3 Preparation


**NOTICE:**

Risk of destruction of electronic components by electrostatic discharge (ESD)  
When touching electronic assemblies, there is a risk of the assembly being destroyed by electrical equipotential bonding.

- ▶ Make sure you have the same electric potential as the subassembly (e.g. by grounding) before touching the subassembly.


**NOTICE:**

Entering a too high test gas concentration on the adjustment tool can lead to incorrect adjustment of the electrochemical cell.

- ▶ Ensure the correct test gas concentration is used depending on the gas concentration, see [“Test gases”, page 28](#).


**NOTICE:**

The warm-up phase for the gas sensors takes 5 minutes.

- ▶ Do not interrupt the connection to the gas sensors or the voltage supply of the VISIC100SF when opening it.

The 5-minute warm-up phase of the gas sensors will otherwise restart.

### Running-in time and warm-up time

Gas sensor	Running-in time (hrs.)	Warm-up time (min.)	Flow rate (ml/min.)	Exposure time (sec.)
CO	24	5	500	120
NO	24	5	500	120
NO <sub>2</sub>	24	5	500	180

### Procedure

- 1 Open the VISIC100SF enclosure:
  - ▶ Unscrew the two screws on the enclosure cover with the SW4 hex key.
  - ▶ Remove the enclosure cover on the front side of the device.
  - ▶ Unscrew the four screws of the measuring unit.
  - ▶ Hang the measuring unit in using the hinge fixture and swivel it downwards.
- 2 Set the VISIC100SF to Maintenance mode.
- 3 Observe the running-in and warm-up time for the gas sensors.

## 7.4 Perform adjustment

### 7.4.1 Sequence and duration

Sequence:

- 1 Zero point adjustment
- 2 Sensitivity adjustment

The sequence **cannot** be changed.

Duration: 3 ... 10 minutes.

The gas sensor terminates the adjustment mode automatically after a certain period of inactivity (typically 10 minutes).

### 7.4.2 Connections between gas sensor and test gas cylinder

To obtain reliable results during adjustment, make sure the hoses and sampling valves are used correctly. All parts are marked accordingly:

For CO and synthetic air (parts are marked in pink):

- Hose, transparent
- Hose adapter
- Transition piece for tapping valve
- Brass tapping valve, flow rate: 0.5 l/min

For NO and NO<sub>2</sub> (parts are marked blue/orange):

- Hose
- Hose adapter
- Transition piece for tapping valve
- Stainless steel tapping valve, marked blue, flow rate: 0.5 l/min



**NOTICE:**

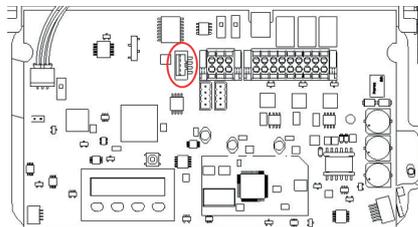
Only use undamaged sealing rings on the tapping valves.

---

### 7.4.3 Select gas type

#### Procedure

- 1 Place the adjustment tool on the interface on the board.



- 2 Switch the adjustment tool on.
  - » The Start menu appears on the display.
- 3 On the adjustment tool: Press “Confirm”.
  - » Menu: Nom./Gas/Unit opens.
- 4 Use the arrow keys to select the type number for the corresponding gas type, see [“Gas types and measuring ranges”, page 15](#).
- 5 End the input with “Confirm”.
- 6 Press “ESC”.
  - » Value is saved.

#### 7.4.4 Performing zero point adjustment

##### Procedure

- 1 Screw the hose adapter for synthetic air (marked pink) into the thread under the sensor to be calibrated.
- 2 Attach the hose for synthetic air (marked pink) to the hose adapter.
- 3 Screw the closed sampling valve (marked pink) onto the test gas cylinder with synthetic air.
- 4 Connect the corresponding transition piece (marked pink) to the tapping valve.
- 5 Connect the open end of the hose to the transition piece.
- 6 On the calibration tool: Menu: "Confirm" → Installation & Calibration → Calibrate → DP1 → Open zero.
- 7 Press "Confirm".
  - » Current actual value is displayed.
- 8 Open the sampling valve for feeding the test gas.



##### Note:

The flow rate is set to a fixed value of 0.5 l/min for all gases.

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- 9 Press "Confirm" to start the adjustment procedure.
  - » New zero offset is calculated.
  - » During the calculation, an underscore runs from left to right in the 2nd line.
  - » The actual value drops to "0".
- 10 When the actual value is stable, press "Confirm" and finish calculation of the value.
  - » "Save" appears.
  - » After successful saving, a square is briefly displayed on the right.
  - » Zero point adjustment is finished. New zero point offset is saved.
  - » Display automatically changes to the display of the current actual value (new zero point).
- 11 Press "ESC".
- 12 Close the gas sampling valve to stop the gas sampling.
- 13 Pull the hose off the hose adapter.
- 14 Remove the hose adapter.

##### Possible malfunction messages

see ["Adjust zero point", page 19](#)

### 7.4.5 Performing sensitivity adjustment

The sensitivity adjustment is started when the zero point adjustment has been completed.



**NOTICE:**

Use correct hoses, hose adapters, sampling valves and transition pieces for the respective gas sensor:

- ▶ CO: Marked pink
- ▶ NO and NO<sub>2</sub>: Marked blue/orange

**Procedure**

- 1 Screw the hose adapter for the corresponding test gas into the thread under the sensor to be calibrated.
- 2 Attach the hose for the corresponding test gas to the hose adapter.
- 3 Screw the closed sampling valve onto the test gas cylinder containing the test gas.
- 4 Connect the appropriate adapter to the tapping valve.
- 5 Connect the open end of the hose to the transition piece.
- 6 On the adjustment tool: Menu item: "DP1" appears
- 7 On the adjustment tool: Press "Down arrow" to menu item:  
Test gas → Enter test gas concentration
- 8 Enter the test gas concentration using the "Arrow" keys.
- 9 Press "Confirm".
- 10 Press "Arrow down".
- » Menu: Gain DP1 is displayed.
- 11 Open the sampling valve to feed the test gas. Hose connection of the hose adapter must point vertically downwards.



**Note:**

The flow is automatically regulated to a constant value.

- 0.5 l/min for synthetic air and CO, NO and NO<sub>2</sub>

- 12 Press "Confirm".
- » Current actual value and sensitivity value from the last adjustment are displayed.
- 13 Press "Confirm" to start the adjustment procedure.
- » New sensitivity value is calculated.
- » During the calculation, an underscore runs from left to right in the 2nd line.
- » The actual value adjusts to the entered test gas concentration.
- » The sensitivity is also recalculated.
- 14 When the actual value is stable, press "Confirm" and finish calculation of the value.
- » "Save" appears.
- » After successful saving, a square is briefly displayed on the right.
- » Sensitivity adjustment is finished. New zero point offset is saved.
- » Display automatically changes to the display of the current actual value (new zero point).
- 15 Close the gas sampling valve to stop the gas sampling.
- 16 Pull the hose off the hose adapter.
- 17 Remove the hose adapter.

**Possible malfunction messages**

see ["Adjust sensitivity", page 20](#)

**7.4.6 Final steps**

- 1 Switch off the adjustment tool and remove it from the board.
- 2 VISIC100SF: Set maintenance mode to inactive.
- 3 Close the measuring unit and fasten it with the 4 screws.
- 4 Replace the housing cover and tighten it with the two screws.

## 8 Technical data

### 8.1 Test gases

#### For gas sensor CO

Zero point				
Gas	Formula	Concentration	Accuracy	Rest
Synthetic air	O <sub>2</sub>	20.9%	< ± 2%	Nitrogen N <sub>2</sub>

Sensitivity				
Gas	Formula	Concentration	Accuracy	Rest
Carbon monoxide	CO	180 ppm (160 ... 200 ppm)	< ± 2%	Nitrogen N <sub>2</sub>

#### For gas sensor NO

Zero point				
Gas	Formula	Concentration	Accuracy	Rest
Synthetic air	O <sub>2</sub>	20.9%	< ± 2%	Nitrogen N <sub>2</sub>

Sensitivity				
Gas	Formula	Concentration	Accuracy	Rest
Nitrogen monoxide	NO	60 ppm (50 ... 70 ppm)	< ± 2%	Nitrogen

#### For gas sensor NO<sub>2</sub>

Zero point				
Gas	Formula	Concentration	Accuracy	Rest
Synthetic air	O <sub>2</sub>	20.9%	< ± 2%	Nitrogen N <sub>2</sub>

Sensitivity				
Gas	Formula	Concentration	Accuracy	Rest
Nitrogen dioxide	NO <sub>2</sub>	5 ppm	5%	Synthetic air



**Note:**

The flow volumes for CO, NO and NO<sub>2</sub> are set fixed using the valves.

**Recommended sizes of the test gas packs**

Typical gas fill volume (liter)	34	58	110
Cylinder bottle size (liter)	0.9	1.6	1.6
Pressure (bar)	34	34	68
Dimensions (mm)			
	<b>Height</b>	281	359
	<b>Width</b>	74	90
Empty weight (kg)	0.56	1.11	1.11
Valve outlet	5/8" 18 UNF C10	5/8" 18 UNF C10	5/8" 18 UNF C10

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