

## Multitec® 545/540



# Multitec® 545/540



Fig. 1: **Multitec 540** device overview

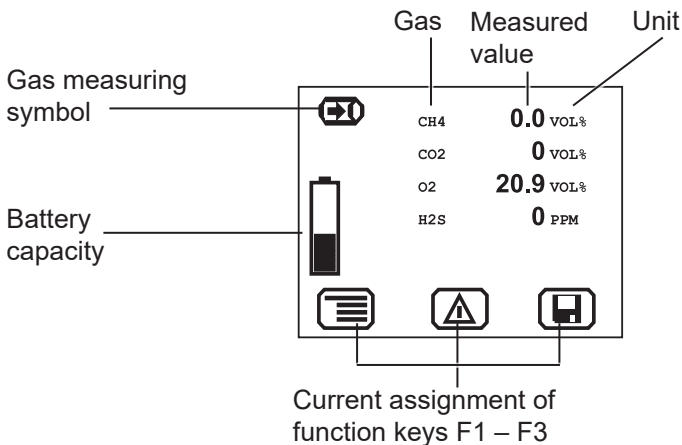


Fig. 2: **Multitec 540** display

## Display symbols



Menu



OK



Cancel



Perform device inspection



Tab (jump to next input field)



Save



Open stored comments  
Open stored inspectors



Information



Clear



Fault



Gas measuring



Battery  
capacity

## Information about this document

The symbols used in the document mean the following:



### **NOTICE!**

Indicates a hazardous situation for the product, which could result in functional disturbance, damage or destruction.

---



### **CAUTION!**

Indicates a hazardous situation for users, which could present health risks or result in bodily injury.

---



### **WARNING!**

Indicates a hazardous situation for users, which could result in serious injury or death.

---

### **Note:**

Indicates tips and useful information.

---

Instructions that must be followed in a specific sequence are numbered:

1. First action
2. Second action
  - a) Step one
  - b) Step two

Lists and instructions comprising only one action are indicated as follows:

- List point A
- List point B
  - Subordinated list point

/.../ Reference to standards, guidelines and regulations  
(see bibliography section 7.11 on page 52)

---

<b>1</b>	<b>General .....</b>	<b>1</b>
1.1	Warranty .....	1
1.2	Purpose .....	2
1.3	Intended use .....	3
1.4	General safety information .....	4
<b>2</b>	<b>Features .....</b>	<b>5</b>
2.1	Visual and audible signals.....	5
2.2	Sensors .....	5
2.3	Explosion protection .....	6
<b>3</b>	<b>Operation .....</b>	<b>7</b>
3.1	General information on operation.....	7
3.1.1	Keys and jog dial.....	7
3.1.2	Selecting/exiting menus and menu items.....	8
3.1.3	Switching the device on .....	8
3.1.4	Differences between measuring mode and settings mode ..	10
3.2	Measuring mode .....	10
3.2.1	Accessing the menu (measuring mode menu structure).....	10
3.2.2	Zero point .....	11
3.2.3	Gas measuring.....	11
3.2.4	Settings .....	12
3.2.5	Saving a measurement .....	12
3.2.6	Protocols .....	13
3.2.7	Device inspection .....	13
3.2.8	Device information .....	14
3.3	Settings .....	14
3.3.1	Opening settings .....	14
3.3.2	Settings menu structure .....	16
3.3.3	Adjustment .....	17
3.3.4	System .....	18
3.3.5	Date/time.....	19
3.3.6	Memory .....	20
<b>4</b>	<b>Power supply.....</b>	<b>21</b>
4.1	Suitable disposable/rechargeable battery types .....	21

---

---

4.2	Operation with rechargeable batteries .....	22
4.2.1	Charging.....	22
4.2.2	Rechargeable battery maintenance .....	23
4.3	Battery alarm.....	23
4.4	Replacing disposable/rechargeable batteries .....	24
<b>5</b>	<b>Maintenance .....</b>	<b>25</b>
5.1	Device inspection .....	25
5.1.1	General information on the device inspection .....	25
5.1.1.1	Scope .....	25
5.1.1.2	Frequency .....	25
5.1.1.3	Documentation .....	25
5.1.1.4	Integrated device inspection .....	26
5.1.1.5	Order .....	27
5.1.2	Performing the device inspection .....	27
5.1.2.1	Accessing the device inspection .....	27
5.1.2.2	Concluding the device inspection.....	28
5.1.3	Testing the general status .....	29
5.1.3.1	Housing .....	30
5.1.3.2	Signals .....	30
5.1.3.3	Probe.....	30
5.1.3.4	Filter .....	30
5.1.3.5	Pump.....	31
5.1.4	Testing indication accuracy with supply of fresh air .....	31
5.1.5	Testing indication accuracy with supply of test gas.....	32
5.2	Adjustment .....	33
5.2.1	Scope .....	33
5.2.2	Suitable test gases.....	34
5.2.3	Special features of adjustment with gas mixture.....	34
5.2.4	Preparation.....	35
5.2.5	Performing the adjustment .....	35
5.2.5.1	Adjusting the zero point.....	36
5.2.5.2	Adjusting the sensitivity.....	36
5.2.6	Carrying out an oxygen adjustment .....	37
5.2.6.1	Adjusting the zero point for oxygen.....	37
5.2.6.2	Adjusting the sensitivity for oxygen .....	38
5.3	Servicing .....	39

---

---

<b>6</b>	<b>Faults.....</b>	<b>40</b>
<b>7</b>	<b>Appendix.....</b>	<b>41</b>
7.1	Specifications and permitted operating conditions.....	41
7.2	Limit values for the device inspection .....	42
7.3	Memory capacity .....	42
7.4	Sensors .....	43
7.4.1	Infrared sensors (IR) .....	43
7.4.1.1	Methane CH <sub>4</sub> .....	43
7.4.1.2	Carbon dioxide CO <sub>2</sub> .....	43
7.4.2	Electrochemical sensors (EC).....	43
7.4.2.1	Oxygen O <sub>2</sub> .....	43
7.4.2.2	Hydrogen sulphide H <sub>2</sub> S .....	44
7.4.2.3	Carbon monoxide CO .....	45
7.5	Technical information .....	46
7.5.1	Identification sticker (back of device) .....	46
7.5.2	Cleaning .....	46
7.5.3	Electrostatic charge.....	46
7.6	Accessories and consumables.....	47
7.7	Declaration of conformity .....	48
7.8	Inspection protocol .....	49
7.8.1	Test with individual gases.....	49
7.8.2	Test with gas mixture.....	50
7.9	Advice on disposal .....	51
7.10	Terminology and abbreviations .....	51
7.11	Referenced documents .....	52
<b>8</b>	<b>Index.....</b>	<b>53</b>

# 1 General

## 1.1 Warranty

The following instructions must be complied with in order for any warranty to be applicable regarding functionality and safe operation of this equipment. This product must only be commissioned by qualified professionals who are familiar with the legal requirements (Germany: DVGW).

- Read these operating instructions prior to operating the product.
- Use the product only as intended.
- Repairs and maintenance must only be carried out by specialist technicians or other suitably trained personnel. Only spare parts approved by Hermann Sewerin GmbH may be used when performing repairs.
- Use only suitable battery types, otherwise the device will not be explosion-proof.
- Changes or modifications to this product may only be carried out with the approval of Hermann Sewerin GmbH.
- Use only Hermann Sewerin GmbH accessories for the product.

Hermann Sewerin GmbH shall not be liable for damages resulting from the non-observance of this information. The warranty conditions of the General Terms and Conditions (AGB) of Hermann Sewerin GmbH are not affected by this information.

In addition to the warnings and other information in these Operating Instructions, always observe the generally applicable safety and accident prevention regulations.

The manufacturer reserves the right to make technical changes.



### 1.2 Purpose

The **Multitec 545** and its alternative version **540** are gas measuring devices for monitoring gas mixtures that are formed in biological processes (biogas, landfill gas). They measure the concentration of several gases in the gas mixture simultaneously. The devices are ideal for use in waste disposal sites, sewage plants and biogas plants.

The devices are fitted with infrared sensors for measuring methane  $\text{CH}_4$  and carbon dioxide  $\text{CO}_2$  as standard. The **Multitec 545** also features an electrochemical sensor for hydrogen sulphide  $\text{H}_2\text{S}$  (5000 ppm) as standard. Both models of the device can be fitted with additional electrochemical sensors.

---

#### **Note:**

These operating instructions describe the **Multitec 545** with all additional equipment (firmware version 1.XXX). All descriptions refer to the device as delivered (factory settings) and apply to both models. The manufacturer reserves the right to make changes.

---

### 1.3 Intended use

This device is intended for professional residential and commercial use including small firms and commercial operations. The appropriate specialist knowledge is required to operate the device.

The device may be used to measure the following gases (depending on the sensors fitted).

- Methane CH<sub>4</sub>
- Carbon dioxide CO<sub>2</sub>
- Carbon monoxide CO
- Oxygen O<sub>2</sub>
- Hydrogen sulphide H<sub>2</sub>S

If the device is used in closed spaces these must be well ventilated.

It should not be used for:

- Warning against flammable and toxic gases (operator protection)
- Monitoring liquids

The device can be used up to a temperature of 40 °C. However, high temperatures reduce the lifetime of the sensors and rechargeable batteries.

If a device with an electrochemical sensor is exposed to concentrations above the measuring range limit, this can reduce the lifetime of the sensor.

### 1.4 General safety information

- The **Multitec 545/540** is a gas measuring device, not a gas warning instrument. It does not, therefore, warn of dangerous toxic and explosive gas concentrations or lack of oxygen. If you suspect dangerous gas concentrations, always take along a gas warning instrument too.
- Observe the relevant safety regulations when working at agricultural biogas plants /1/
- When working in enclosed spaces, always ensure adequate ventilation.

SEWERIN recommends: When measuring in enclosed spaces fit the gas outlet adapter to the device to reduce the risk of high concentrations of H<sub>2</sub>S. The gas outlet adapter is available to buy as an accessory.

- The device has been tested to ensure that it is explosion-proof in accordance with European standards (CENELEC).
- Do not use this device in oxygen-enriched atmospheres, otherwise it will not be explosion-proof.
- Only probe hoses with a hydrophobic filter may be used.

**Exception:**

If the probe has a built-in hydrophobic filter, the hose does not require any other filters.

- Devices may only be tested with test gases in well ventilated areas or outdoors. Test gases must be handled in a professional manner.
- Always carry out a device inspection (section 5.1 on page 25) after the device has suffered an impact (for example, if dropped accidentally).
- The device complies with the limits of the EMC directive. Always observe the information in the manuals of (mobile) radio equipment when using the device close to (mobile) radio equipment.



**NOTICE!**

Follow the advice regarding explosion protection (see section 2.3 on page 6).

---

## 2 Features

The device comes in two different models:

### Multitec 545

### Multitec 540

### 2.1 Visual and audible signals

The device features two alarms:

- Signal light on top of device (visual signal)
- Buzzer on side of device (audible signal)

The signals indicate faults (see section 6 on page 40). The device also emits signals when it is switched on and off.

### 2.2 Sensors

The device features two types of sensor:

- Infrared sensor (IR)
- Electrochemical sensor (EC)

Gas	Measuring range	Sensors	Features
CH <sub>4</sub>	0.0 – 100 % vol.	IR	×
CO <sub>2</sub>	0 – 100 % vol.	IR	×
CO	0 – 500 ppm	EC	○
H <sub>2</sub> S	0 – 5000 ppm (Multitec <b>545</b> only)	EC	×
	0 – 2000 ppm (Multitec <b>540</b> only)	EC	○
O <sub>2</sub>	0 – 25.0 % vol.	EC	○

× standard  
○ optional

### 2.3 Explosion protection

The device is assigned to the following explosion-proof groups:

Explosion-proof group	For the following atmospheres	When using
<b>II2G Ex de ib IIB T4 Gb</b>	<ul style="list-style-type: none"><li>– Methane CH<sub>4</sub></li><li>– Propane C<sub>3</sub>H<sub>8</sub></li><li>– Butane C<sub>4</sub>H<sub>10</sub></li><li>– Hydrogen sulphide H<sub>2</sub>S</li></ul>	Device <b>without</b> carrying bag TG8
<b>II2G Ex de ib IIC T4 Gb</b>	<ul style="list-style-type: none"><li>– Methane CH<sub>4</sub></li><li>– Propane C<sub>3</sub>H<sub>8</sub></li><li>– Butane C<sub>4</sub>H<sub>10</sub></li><li>– Hydrogen sulphide H<sub>2</sub>S</li><li>– Hydrogen H<sub>2</sub></li></ul>	Device <b>with</b> carrying bag TG8

EC type-examination certificate: TÜV 07 ATEX 553353 X

---



#### **WARNING!**

It is essential to observe the following points to ensure that the device is explosion-proof:

- Only ever open the battery compartment and recharge the batteries outside of explosive areas.
  - Only use the USB port outside of explosive areas.
  - Always use the appropriate type of disposable/rechargeable battery.
  - To ensure that the device complies with explosion-proof group **IIC** with hydrogen H<sub>2</sub>, the device must be used in carrying bag TG8.
-

## 3 Operation

### 3.1 General information on operation

#### 3.1.1 Keys and jog dial

The ON/OFF key is the only control on the device that does not change its function.

When switched on, the device is operated using the jog dial and function keys to navigate the display.

Control	Action	Function
<b>ON/OFF key</b>	Press	<ul style="list-style-type: none"> <li>● Switches the device on</li> <li>● Switches the device off</li> </ul>
<b>Function keys F1, F2, F3</b>	Press	<ul style="list-style-type: none"> <li>● Variable</li> <li>● As indicated on the display at the bottom of the screen</li> <li>● Function keys may also have no function assigned in some cases</li> </ul>
<b>Jog dial</b>	Turn	<ul style="list-style-type: none"> <li>● Selects functions, settings, measurement data, etc.</li> <li>● Modifies values</li> </ul>
	Press	<ul style="list-style-type: none"> <li>● Opens the next program level (e.g. menu item, function, measurement data, selectable values)</li> <li>● Applies values</li> </ul>

### 3.1.2 Selecting/exiting menus and menu items

Functions and settings etc. are selected via the main menu (for short: **Menu**). This **menu** has submenus and menu items. Refer to section 3.2.1 on page 10 for information on accessing the main menu.

#### Selecting submenus/menu items

Submenus and menu items are selected and opened using the jog dial and/or the function keys (see section 3.1.1 on page 7).

The name of the selected menu or menu item is always shown at the top left of the display.

#### Exiting menus/menu items

There are generally two ways to exit open menus/menu items and return to the next level up:

- Press **Esc**
- Select **Exit** from the menu

### 3.1.3 Switching the device on

---

#### Note:

Always switch the device on with fresh air.

---

- Press the ON/OFF key. The device switches on.  
A visual and audible signal confirms that the device has been switched on. The display and the pump come on.  
The start screen appears on the display.

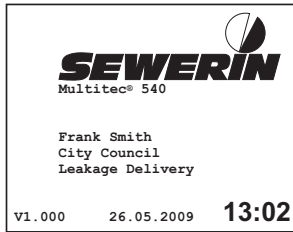


Fig. 3: Start screen

Display:

- Device type: Multitec 540
- User:  
Frank Smith  
City Council  
Leakage Delivery
- Firmware version: V1.000
- Date and time

An overview of the gases that can be detected will then appear briefly.

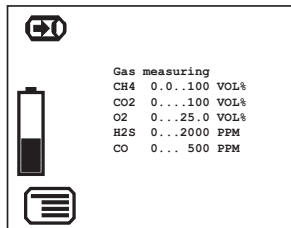


Fig. 4: Overview of detectable gases

Display:

- Symbol: Gas measuring
- Detectable gases
- Measurement ranges
- Battery capacity

The device switches to measuring mode.

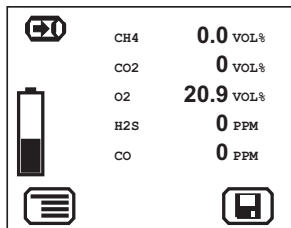


Fig. 5: Measuring mode – display of current readings

Display:

- Current readings: zero when device is switched on with fresh air

The device is ready for use.



#### 3.1.4 Differences between measuring mode and settings mode

The device is operated in two modes:

- **Measuring mode** (see section 3.2 on page 10)

Measurements are taken in measuring mode. All functions needed to take readings can be accessed from one menu.

- **Settings** (see section 3.3 on page 14)

The device settings can be changed in settings mode. Information about the device can also be retrieved. Measurements cannot be taken in settings mode.

Settings are accessed via the menu in measuring mode. The settings are access-protected by a PIN code.

#### 3.2 Measuring mode

When switched on (see section 3.1.3 on page 8) the device is in measuring mode. In measuring mode, the current measurements are always displayed (see fig. 5).

#### 3.2.1 Accessing the menu (measuring mode menu structure)

In measuring mode **F1** can be used to access the **Menu**.

Zero point
Gas measuring
Settings
Save measurement
Protocol
Device inspection
Device information
Exit

Fig. 6: **Menu** with submenus (menu items)

**Device inspection** only appears in the menu when the integrated device inspection is switched on (section 5.1.1.4 on page 26).

### 3.2.2 Zero point

The zero point only has to be set manually if the displayed fresh air measurement is not zero after the end of the warm-up period.

Gas	Content in fresh air	Correct zero point on device
O <sub>2</sub>	20.9 % vol.	20.9 % vol.
CO <sub>2</sub>	0.04 % vol.	0 % vol.
CH <sub>4</sub>	0 % vol.	0.0 % vol.
H <sub>2</sub> S	0 ppm	0 ppm
CO	0 ppm	0 ppm

The manual zero point setting is not saved. The zero point can be corrected by adjustment as often as zero point deviations occur (see section 5.2 on page 33).

#### Requirements for correct setting of the zero point

- Device was switched on with fresh air.
- Device continues to draw in fresh air.

#### Setting zero point (manual zero point setting)

1. Press **Menu**.
2. Select **Zero point** from the menu. The values are automatically adjusted. The device returns to measuring mode.

### 3.2.3 Gas measuring

You can find an overview of detectable gases under Gas measuring in the menu (see fig. 4). The device automatically returns to measuring mode.

### 3.2.4 Settings

You can change the device settings and access information about the device under **Settings** in the menu (see section 3.3 on page 14).

### 3.2.5 Saving a measurement

The current measurement values are saved using **Save measurement**.

---

#### Note:

If the current measurement values are stable, the **Save** symbol will be displayed.

---

Up to 80 measurements can be saved.

The measured values can be saved with or without a comment. Comment entries are saved automatically (ring memory with max. 12 entries).



Once the first comment has been entered, the **Open stored comments** function will become available.

The stored measurements can be displayed on a computer using a **readout program**. The program is available at [www.sewerin.com](http://www.sewerin.com).

1. Press **Save**.

OR

a) Press **Menu**.

b) Select **Save measurement** from the menu.

2. Enter a **comment** for the measurement.

a) Select the characters required using the jog dial. Confirm each character using the jog dial.

OR

Press **Open stored comments**. A list of the stored comments will appear. Select the desired comment. Open the comment with **OK**.

b) Then confirm your entry/selection with **OK**.

OR

Press **Esc** if you do not wish to enter a comment for the measurement.

The measurement is saved as a protocol. The protocol name is formed from the date, time and comment.

### 3.2.6 Protocols

You can retrieve or clear protocols of saved data under **Protocol** in the menu. When saved, the protocols are assigned to different protocol types.

The following protocol types are available:

- Device inspection
- Measurements

Protocols can only be cleared individually.

You can find information on how to clear all protocols of one protocol type in section 3.3.6 on page 20.

### 3.2.7 Device inspection

**Device inspection** only appears in the menu when the integrated device inspection is switched on. The **device inspection** can be used to check the general status and the indication accuracies.

---

#### Note:

The integrated device inspection is switched off in the factory settings. More detailed information about the device inspection can be found in section 5.2 on page 33.

---

If the integrated device inspection is switched on, the device will remind you every 3 months to perform a device inspection.



The **Device inspection** symbol will appear when the inspection is due. It is visible in the display until the complete integrated device inspection has been carried out successfully.

### 3.2.8 Device information

The following device information is shown under **Device information** in the menu:

- Installed electrochemical sensors:  
gas, installation date, warranted/expected lifetime
- Firmware:  
version, date
- Service:  
date of the last service, date of the next service

### 3.3 Settings

The following menus and menu items are included under Settings (see section 3.3.3 to section 3.3.6):

- Adjustment
- System
- Date/time
- Memory

You can find information on selecting and exiting menus and menu items in section 3.1.2 on page 8.

#### 3.3.1 Opening settings

1. Press **Menu**.
2. Select **Settings** from the menu.

Access is protected by a PIN code. The **default setting** is always **PIN code 0001**.

---


#### **Note:**

You can change the PIN code at any time (see section 3.3.4 on page 18).

SEWERIN recommends setting a different PIN code after initial start-up, so only authorised personnel have access to the settings.

---

3. Enter the PIN code from left to right. The active digit is always displayed with a black background.

Digit	To change	To confirm
1st digit	Turn the jog dial	Push the jog dial
2nd digit		Push the jog dial
3rd digit		Push the jog dial
4th digit		

If the PIN code has been entered correctly, the **Settings** menu will appear once the last digit has been confirmed (fig. 7). Otherwise the device will revert to measuring mode.

Adjustment
System
Date/time
Memory
Exit

Fig. 7: **Settings** menu

### 3.3.2 Settings menu structure

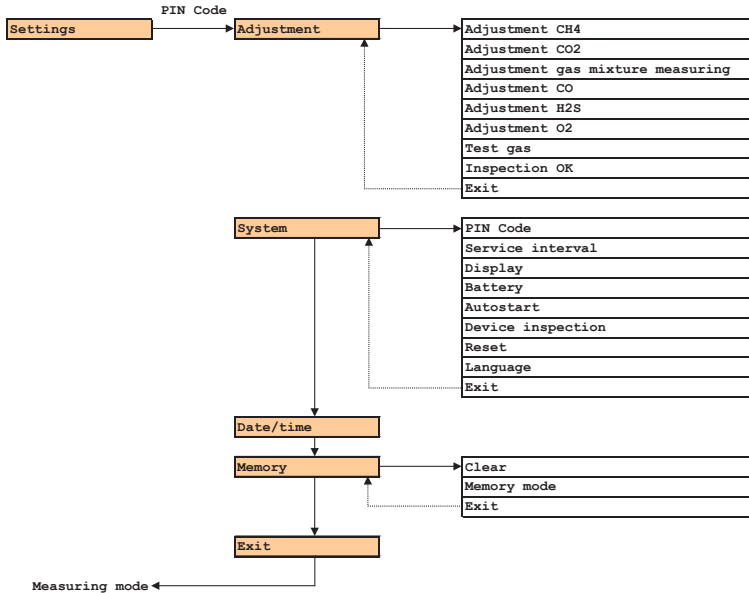


Fig. 8: **Settings** menu structure

---

**Note:**

The number of available menu items depends on the optional additional equipment.

---

### 3.3.3 Adjustment

The Adjustment menu is used to set the sensors.

**NOTICE!**

The device may only be adjusted by specialist technicians in well ventilated rooms or in the open air. Incorrect adjustment can lead to incorrect measurement results.

---

**Note:**

A detailed description of adjustment along with important information is provided in section 5.2 on page 33.

---

**Adjustment CH<sub>4</sub>**

Used to adjust the infrared sensor for methane CH<sub>4</sub> in the % vol. range.

**Adjustment CO<sub>2</sub>**

Used to adjust the infrared sensor for carbon dioxide CO<sub>2</sub> in the % vol. range.

**Adjustment gas mixture measuring**

Used to adjust the infrared and electrochemical sensors for all components of the test gas (gas mixture).

**Adjustment CO**

Used to adjust the electrochemical sensor for carbon monoxide CO in the ppm range.

**Adjustment H<sub>2</sub>S**

Used to adjust the electrochemical sensor for hydrogen sulphide H<sub>2</sub>S in the ppm range.



#### **Adjustment O2**

Used to adjust the electrochemical sensor for oxygen O<sub>2</sub> in the % vol. range.

#### **Test gas**

Used to adjust the concentration of the test gases used.

#### **Inspection OK**

Confirms the device is in proper working order. This extends the service interval.

#### **3.3.4 System**

General information and specifications for operation are set in the System menu.

#### **PIN code**

Used to change or reset the PIN code.

---

#### **Note:**

If you lose the PIN code, you must contact SEWERIN Service. If the PIN code is set to **0000**, you will not be asked to enter it. The settings can then be accessed by anyone.

---

#### **Service interval**

Specifies the regular inspections/maintenance required for the device. You can also activate the automatic switch-off function once the set interval has passed.

#### **Display**

Used to set how long the display remains illuminated after any key is pressed as well as the display contrast.

### **Battery**

Used to set the type of disposable/rechargeable battery used.



#### **NOTICE!**

The battery type setting must always be correct to prevent damage to the device.

---

### **Autostart**

This setting cannot be changed.

### **Device inspection**

Switches the integrated device inspection on and off.

### **Reset**

Used to reset the device settings to the factory settings.

### **Language**

Sets the language.

#### **3.3.5 Date/time**

Used to set the time, day, month and year. There are two formats available for the date.

### 3.3.6 Memory

The Memory menu is used to specify how measurement data and protocols are handled.

#### **Clear**

Used to clear protocols.

The two different protocol types must each be cleared separately. All protocols in one protocol type are cleared at once.

You can find information on clearing individual protocols in section 3.2.6 on page 13.

#### **Memory mode**

Switches between ring memory and stack memory.

## 4 Power supply

This device can be operated using:

- Disposable (non-rechargeable) alkaline batteries
- Rechargeable NiMH batteries

The device comes with nickel metal hydride rechargeable batteries. The corresponding settings are stored.

---



### **CAUTION!**

The device must not be used with leaking batteries.

- Replace leaking batteries.
  - Clean the battery compartment (and, if necessary, the device) before inserting the new disposable/rechargeable batteries.
- 

### 4.1 Suitable disposable/rechargeable battery types

---



### **WARNING!**

To ensure that the device remains explosion-proof as per /6/, only the following disposable/rechargeable batteries may be used:

- Batteries supplied by SEWERIN
- Batteries other than those supplied by SEWERIN, provided compliance with /3/ is guaranteed.

The batteries used in a battery compartment must always be identical in terms of type (disposable/rechargeable), capacity and manufacturer.

---

### **Disposable battery requirements**

- Alkaline disposable batteries
  - Battery size: AA, Type: LR6 as per /4/
  - The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /3/.
-

### Rechargeable battery requirements

- NiMH rechargeable batteries
- Battery size: AA, Type: HR6 as per /5/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /3/.
- The rechargeable batteries must be fast charging ( $I > 1.25 \text{ A}$ ) and remain within the temperature range.



#### **NOTICE!**

A device operated with disposable alkaline batteries cannot be charged. A note to this effect is shown on the display.

---

## 4.2 Operation with rechargeable batteries

The operating time of the device depends on the battery capacity.

If the device is not used or not kept in the docking station, the batteries will lose their charge due to self-discharge. The self-discharge intensity depends on the battery type.

### 4.2.1 Charging

The device can be charged via:

- Connection for power supply
- Docking station TG8



#### **WARNING!**

The device must only be charged outside of explosive areas.

---

For charging you will need either:

- M4 AC/DC adapter
- M4 vehicle cable

Please note the following points:

- The device or docking station must not be directly connected to a 24-V on-board power supply in the vehicle. The voltage is too high for the charging process.
- The battery should be charged at approximately room temperature.
- It is not permitted to connect (cascade) several TG8 adapters in series.

### 4.2.2 Rechargeable battery maintenance

If the device is not used for a long period of time, it is advisable to fully discharge the battery before recharging it again.

A full discharging and recharging process takes approx. 11 hours (8 hours to discharge + 3 hours to recharge). The duration depends on the capacity of the rechargeable batteries used.



#### **WARNING!**

The device must only be charged outside of explosive areas.

---

- Connect the device (switched on) to the power supply via the side connection.

OR

- Place the device (switched on) into the docking station.

The rechargeable batteries will be fully discharged. Once the device has been discharged, it will automatically switch to charging mode.

### 4.3 Battery alarm

As soon as the remaining capacity of the batteries gets low, a battery alarm will go off:

- Level 1: Battery almost empty
- Battery capacity symbol flashes
  - Audible signal (one-off)
  - Remaining operating time: approx. 15 min
- Level 2: Battery empty
- Blank display apart from Battery capacity symbol
  - Continuous audible signal
  - Measuring mode unavailable
  - Device shuts off

### 4.4 Replacing disposable/rechargeable batteries

---



#### **WARNING!**

The battery compartment must only be opened outside of explosive areas.

---

A 2.5 mm Allen key (supplied) is required to open the battery compartment on the back of the device.

1. Loosen the two screws securing the battery compartment. Remove the screws by repeatedly turning them alternately a short way; this ensures that the battery compartment does not twist.
2. Lift out the battery compartment.
3. Remove the disposable/rechargeable batteries and insert new ones. Ensure that the batteries are inserted with the correct polarity.
4. Replace the battery compartment so it fits neatly into place and secure firmly with the screws.
5. When you switch the device back on again, you will be asked which battery type is in use. Enter the correct battery type.

If it takes longer than 120 seconds to change the batteries, the date and time will have to be reset the next time you switch the device on. All the other data will be saved.

## **5 Maintenance**

In accordance with the legal regulations, device maintenance comprises the following elements:

- Device inspection including test of indication accuracy
- Adjustment
- Maintenance

All inspections must be documented. The documentation must be retained for at least one year.

### **5.1 Device inspection**

#### **5.1.1 General information on the device inspection**

##### **5.1.1.1 Scope**

The device inspection includes the following tests:

- Analysis of the general status  
(see section 5.1.3 on page 29)
- Test of the indication accuracy with supply of fresh air  
(see section 5.1.4 on page 31)
- Test of the indication accuracy with supply of test gas  
(see section 5.1.5 on page 32)

##### **5.1.1.2 Frequency**

The device inspection must be carried out at intervals ranging from once a week to every six months /2/.

If the integrated device inspection is switched on, the device will remind you every 3 months to perform a device inspection.

##### **5.1.1.3 Documentation**

The device inspection procedure must be documented. There are two ways of doing this:

- On paper
- Saved electronically supported by the device (integrated device inspection)



Only the integrated device inspection is described in these operating instructions.

---

**Note:**

The device inspection must be documented on paper if the integrated device inspection is switched off.

---

### 5.1.1.4 Integrated device inspection

The integrated device inspection is accessed via the **menu** (fig. 6).

The results of the device inspection are stored in the device as a protocol. The device inspection protocols can be opened at any time (see section 3.2.6 on page 13). They can also be displayed on a computer using a **readout program**. The program is available at [www.sewerin.com](http://www.sewerin.com).



The **Perform device inspection** symbol appears when a device inspection is due. It is visible in the display until the complete integrated device inspection has been carried out successfully. If the device inspection was completed but the device failed on some points, the symbol will remain visible.

The integrated device inspection is switched off in the factory settings. The integrated device inspection has to be switched on (once only) before it can be performed.

#### Switching on the integrated device inspection

1. Press **Menu**.
2. Select **Settings**.
3. Enter your **PIN code**.
4. Select **System**.
5. Select **Device inspection**.
6. Select **Yes**.
7. Apply the setting with **OK**.
8. Exit the **settings** with **Back**.

### 5.1.1.5 Order

You can carry out the tests that make up the device inspection in any order you wish. You can repeat the tests as often as you wish provided you have not yet concluded the device inspection.

## 5.1.2 Performing the device inspection

### 5.1.2.1 Accessing the device inspection

The device is in measuring mode.

1. Press **Device inspection**.

OR

a) Press **Menu**.

b) Select **Device inspection** from the menu.

c) Select **Measuring in bar holes/Gas measuring** from the menu.

The **Device inspection** menu appears.

General status
Fresh air
Gas mixture measuring
Test gas CO

Fig. 9: **Device inspection** menu

Please note that **Test gas CO** only appears in the menu if the device has a CO sensor.

2. Select a test from the menu (**General status, Fresh air, Gas mixture measuring, Test gas CO**).
3. Carry out the test.

For detailed information, refer to the following sections:

- General status    section 5.1.3 on page 29
- Fresh air        section 5.1.4 on page 31
- Test gas ...     section 5.1.5 on page 32

### 5.1.2.2 Concluding the device inspection

After all the tests have been carried out as described in section 5.1.3 to section 5.1.5, the **Save** symbol will appear in the display.

An integrated device inspection is concluded by saving it. Up to 40 device inspections can be saved. The following information can be stored along with the device inspection:

- Inspector (e.g. inspector's name or initials)
- Password to protect the protocol from being accessed by unauthorised people

Inspector entries are saved automatically (ring memory with max. 10 entries).



Once the first inspector has been entered, the **Open stored inspectors** function will become available.

1. Press **Save**.
2. Enter the name of the **inspector**.
  - a) Select the characters required using the jog dial. Confirm each character using the jog dial.  
OR  
Press **Open stored inspectors**. A list of the stored inspectors will appear. Select the desired inspector. Open the inspector with **OK**.
  - b) Then confirm your entry/selection with **OK**.  
OR  
Press **Esc** if you do not wish to enter an inspector for the device inspection.
3. Enter a **password**.
  - a) Select the characters required using the jog dial. Confirm each character using the jog dial.
  - b) Then confirm your entry with **OK**.  
OR  
Press **Esc** if you do not wish to enter a password for the device inspection.

The device inspection is saved as a protocol. An overview with the device inspection results is displayed.

4. Confirm the overview by pressing **OK**. The device returns to measuring mode.

### 5.1.3 Testing the general status

The general status test is part of the device inspection (see section 5.1.1.1 on page 25). It is based on estimations by the user. The following must be tested:

- Housing
- Signals
- Probe
- Filter
- Pump

The battery charge status and the working condition of the controls are automatically tested during the integrated device inspection.

The device inspection has been opened (see section 5.1.2.1).

1. Select **General status** from the **Device inspection** menu.
2. Test all associated subitems as described in section 5.1.3.1 to section 5.1.3.5.
3. Confirm the prompt **General status OK?** by pressing **Yes** if **all** subitems show no faults during testing. **General status OK** appears on the display.

### 5.1.3.1 Housing

- Is the housing free from external damage?

### 5.1.3.2 Signals

During the integrated device inspection the signals are emitted at short intervals.

- Can the audible signal be heard?
- Is the visual signal visible?

### 5.1.3.3 Probe

Probes are accessories. They only need to be tested if they are likely to be used in the course of the working day.

- Are the probes free from external damage?

Probe hoses are tested with a simple leak check.

1. Connect the probe hose to the gas input.
2. Seal the free end of the probe hose.

An error message should appear after approx. 10 seconds. This indicates that the probe hose is in good condition.

### 5.1.3.4 Filter

The fine dust filter is located behind the gas input. It is tested by means of a visual inspection.

1. Unscrew the gas input.
2. Remove the fine dust filter.
3. Check that there is no dirt in the fine dust filter.

As soon as there are any signs of deposits, the filter must be replaced. If you do not replace the filter, you must reinsert it exactly as you found it.

### 5.1.3.5 Pump

The pump function is tested with a simple leak check.

1. Seal the gas input.

After a maximum of 10 seconds an error message should appear. This indicates that the pump is working correctly.

If the error message does not appear, the pump may be faulty. The device must be tested by SEWERIN Service.

2. Release the gas input again.

After approximately 5 seconds, the error message should disappear again. Otherwise there is a fault (see section 6 on page 40).

### 5.1.4 Testing indication accuracy with supply of fresh air

The indication accuracy with supply of fresh air test is part of the device inspection (see section 5.1.1.1 on page 25).

The device inspection has been opened (see section 5.1.2.1 on page 27).

1. Make sure that only fresh air is being drawn in.
2. Select **Fresh air** from the **Device inspection** menu.
3. Wait until the displayed readings are stable. A **Status: OK** message will appear.
4. Press **OK** to confirm. **Fresh air OK** will appear on the display.

If the **Status: OK** message does not appear within a reasonable amount of time, the air inflow does not correspond to the limit values stored in the device (see section 7.2 on page 42). Move the device somewhere else and repeat the test.

If the **Status: OK** message still does not appear when the test is repeated, the device must be re-adjusted (see section 5.2 on page 33).

### 5.1.5 Testing indication accuracy with supply of test gas

The indication accuracy with supply of test gas test is part of the device inspection (see section 5.1.1.1 on page 25).

All test gases specified in the device must be tested. The number of specified test gases depends on the model and the optional additional equipment.

The following resources are needed for the test:

- Test gas (gas mixture, 40 ppm CO)
- Test set for the supply of test gas (e.g. **SPE VOL**)

---

#### Note:

Details of how to use the test set can be found in the accompanying operating instructions.

---

SEWERIN recommends the test gas **Bio IR** as the gas mixture. It contains 60 % vol. CH<sub>4</sub>, 40 % vol. CO<sub>2</sub> and 180 ppm H<sub>2</sub>S.

The device inspection has been opened (see section 5.1.2.1 on page 27).

1. On the **Device inspection** menu, select the menu item to be tested (**Gas mixture measuring, Test gas CO**).
2. Check whether the test gas concentration specified by the device matches the test gas you intend to use. To do this press **Information**.
3. Add the test gas
4. Wait until the displayed readings are stable. A **Status: OK** message will appear.
5. Press **OK** to confirm.
6. Stop the test gas supply.
7. Repeat for the second test gas if applicable.

---

#### Note:

The **Test gas OK** message only appears when all the test gases specified in the device inspection have been successfully tested.

---

If the **Status: OK** message does not appear within a reasonable amount of time, this may be due to the following:

Cause	Corrective action
Connections leaking	Repeat check, checking the seal on the connections
Measurement values outside the specified limit values (see section 7.2 on page 42)	Adjustment required (see section 5.2 on page 33)

### Changing the test gas concentration

If no test gas with the specified concentrations is available for the test, the values can be changed accordingly under **Test gas** in the adjustment menu (see section 3.3.3 on page 17).

## 5.2 Adjustment



### NOTICE!

The device may only be adjusted by specialist technicians in well ventilated rooms or in the open air. Incorrect adjustment can lead to incorrect measurement results.

---

### 5.2.1 Scope

The following are adjusted:

- Zero point
- Sensitivity



### NOTICE!

Always adjust the zero point first, followed by the sensitivity.

---

The adjustment can be carried out with:

- Gas mixture
- Individual gases



Only gases for which the readings are outside the predefined limits need to be adjusted during the adjustment process (see section 7.2 on page 42).

### 5.2.2 Suitable test gases

The following test gases can be used for adjustment:

Gas	Suitable test gases for ...	
	Zero point	Sensitivity
CH <sub>4</sub>	<ul style="list-style-type: none"> <li>● Fresh air</li> </ul>	<ul style="list-style-type: none"> <li>● Gas mixture</li> <li>● 100 % vol. CH<sub>4</sub></li> </ul>
CO <sub>2</sub>	<ul style="list-style-type: none"> <li>● Fresh air</li> </ul>	<ul style="list-style-type: none"> <li>● Gas mixture</li> <li>● 100 % vol. CO<sub>2</sub></li> </ul>
CO	<ul style="list-style-type: none"> <li>● Fresh air</li> </ul>	<ul style="list-style-type: none"> <li>● 40 ppm CO</li> </ul>
O <sub>2</sub>	<ul style="list-style-type: none"> <li>● Gas mixture</li> <li>● 100 % vol. N<sub>2</sub></li> <li>● 100 % vol. CH<sub>4</sub></li> </ul>	<ul style="list-style-type: none"> <li>● Fresh air</li> </ul>
H <sub>2</sub> S	<ul style="list-style-type: none"> <li>● Fresh air</li> </ul>	<ul style="list-style-type: none"> <li>● Gas mixture</li> <li>● 180 ppm H<sub>2</sub>S</li> </ul>

If more than one test gas can be used to adjust a gas, it does not have to be adjusted with all test gases. However, adjusting with more than one test gas increases the measurement quality.

Fresh air contains 20.9 % vol. O<sub>2</sub> and is therefore used with oxygen to adjust the sensitivity.

Carbon monoxide can only be adjusted with an individual gas.

### 5.2.3 Special features of adjustment with gas mixture

If you are using a SEWERIN gas mixture as the test gas, the following gases can be adjusted **in a single step** via **Adjustment gas mixture measuring**:

- Methane CH<sub>4</sub>
- Carbon dioxide CO<sub>2</sub>
- Oxygen O<sub>2</sub>
- Hydrogen sulphide H<sub>2</sub>S

SEWERIN recommends the test gas **Bio IR** as the gas mixture. It contains 60 % vol. CH<sub>4</sub>, 40 % vol. CO<sub>2</sub> and 180 ppm H<sub>2</sub>S.

**Note:**

Use of test gases not provided by SEWERIN can cause interference.

The concentration of the test gas used must match the specified test gas concentration.

---

**Zero point**

For a gas mixture, the zero point is adjusted under Fresh air in the menu. The following parameters are adjusted in a single step:

- Zero points of CH<sub>4</sub>, CO<sub>2</sub> and H<sub>2</sub>S
- Sensitivity of O<sub>2</sub> (20.9 % vol.)

**Sensitivity**

The sensitivity is adjusted under **Gas mixture** in the menu. The following parameters are adjusted in a single step:

- Sensitivities of CH<sub>4</sub>, CO<sub>2</sub> and H<sub>2</sub>S
- Zero point of O<sub>2</sub>

**5.2.4 Preparation**

Carrying out an adjustment always takes some time. Leave yourself plenty of time to prepare the necessary steps of the procedure. Have all necessary tools available. Let the device run for several minutes to guarantee that the temperature is correct, for example.

**5.2.5 Performing the adjustment**

The zero point and sensitivity are adjusted following the same procedure for all gases (see section 5.2.5.1 / section 5.2.5.2). The adjustment of **oxygen** is an **exception**. For this reason it is described separately (see section 5.2.6 on page 37).



You can find detailed information on the adjustment of various gases (for example, test gas concentration, installation date of the sensor, date of last adjustment) under **Information**.

The symbol appears after the corresponding **Adjustment...** menu item has been selected.

### 5.2.5.1 Adjusting the zero point

For all gases except oxygen O<sub>2</sub>, the zero point is adjusted following the same procedure.

---

**Note:**

When adjusting the zero point of carbon dioxide CO<sub>2</sub>, a carbon dioxide filter **must** be used. This applies to both **Adjustment CO** and **Adjustment gas mixture measuring**.

---

1. Make sure that only fresh air is being drawn in.
2. Open the **settings** (see section 3.3.1 on page 14).
3. Select **Adjustment** from the menu.
4. Select the desired adjustment (e.g. **Adjustment CH4**).
5. Wait at least 1 minute. The displayed reading must be stable.

---

**Note:**

For **Adjustment gas mixture measuring**, all values must be stable. This time required for this varies.

---

6. Select **Zero point** from the menu (select and confirm with **OK**).  
This adjusts the zero point. The reading shows zero (0.0 % vol. / 0 ppm).

### 5.2.5.2 Adjusting the sensitivity

For all gases except oxygen O<sub>2</sub>, the sensitivity is adjusted following the same procedure.

The following resources are needed for adjusting the sensitivity:

- Test gas
- Test set for the supply of test gas (e.g. **SPE VOL**)

---

**Note:**

Details of how to use the test set can be found in the accompanying operating instructions.

---

**Note:**

**Never** use a carbon dioxide filter when adjusting the sensitivity.

---

1. Connect the device to the test set.
  2. Open the **settings** (see section 3.3.1 on page 14).
  3. Select **Adjustment** from the menu.
  4. Select the desired adjustment (e.g. **Adjustment CH4**).
  5. Select the menu item that specifies the sensitivity to be tested (for example 100 **VOL% CH4**). **Do not confirm with OK yet.**
  6. Press and hold the release button on the test set. The test gas is added. **Do not let go of the release button.**
  7. Wait at least 1 minute. The displayed reading must be stable.
- 

**Note:**

For **Adjustment gas mixture measuring**, all values must be stable. This time required for this varies.

---

8. Press **OK** to confirm. The device is adjusted. The reading shows the specified value (e.g. 100 % vol. CH<sub>4</sub>).
9. Let go of the release button on the test set.

## 5.2.6 Carrying out an oxygen adjustment

As oxygen is a component of fresh air, the procedure for adjusting oxygen is different from the procedure for all other gases.

### 5.2.6.1 Adjusting the zero point for oxygen

The zero point for oxygen must be adjusted using an inert gas which contains no oxygen and does not damage the sensor. Refer to section 5.2.2 on page 34 for information on suitable test gases.

The following resources are needed for adjusting the zero point:

- Test gas
  - Test set for the supply of test gas (e.g. **SPE VOL**)
-

**Note:**

Details of how to use the test set can be found in the accompanying operating instructions.

---

1. Open the **settings** (see section 3.3.1 on page 14).
2. Select **Adjustment** from the menu.
3. Select **Adjustment O2** from the menu.
4. Select **Zero point** from the menu. **Do not confirm with OK yet.**
5. Press and hold the release button on the test set. The test gas is added. **Do not let go of the release button.**
6. Wait at least 1 minute. The displayed reading must be stable.
7. Press **OK** to confirm. The device is adjusted. The reading shows zero (0.0 % vol.).
8. Let go of the release button on the test set.

### 5.2.6.2 Adjusting the sensitivity for oxygen

The sensitivity for oxygen is adjusted with fresh air.

1. Make sure that only fresh air is being drawn in.
2. Open the **settings** (see section 3.3.1 on page 14).
3. Select **Adjustment** from the menu.
4. Select **Adjustment O2** from the menu.
5. Wait until the displayed reading is stable. (The reading may still flash.)
6. Select **20.9 % VOL. (fresh air)** from the menu (select and confirm with **OK** ).

This adjusts the sensitivity. The reading shows 20.9 % vol.

### 5.3 Servicing

The device must only be serviced and repaired by SEWERIN Service.

- Send the device to SEWERIN for repairs and for annual maintenance.

---

**Note:**

If there is a service agreement in place, the device can be serviced by the mobile maintenance service.

---



The inspection plate on the device shows confirmation of the last maintenance and the next scheduled maintenance.

Fig. 10: Inspection plate

---

**IMPORTANT! Damage from leaking sensors**

Electrochemical sensors that are faulty or have exceeded their expected service life can leak. The leaking substance can cause permanent damage to the device.

You can tell if a sensor is faulty because, for example, the corresponding adjustment will no longer be possible.

The installation date of a sensor and the expected service life can be found in the **Device information**.

- Always get SEWERIN Service to replace faulty or out of date sensors immediately.
-

## 6 Faults

If a fault occurs during operation, an error message will appear on the screen.

Error messages are displayed in the order in which they occur. Up to five errors can be displayed. Error messages continue to be displayed until the error is corrected.

### Overview of possible error messages

Error code	Error message on the display	Error correction
9	No calibration IR sensor adjustment	Adjustment CH4 or Adjustment CO2 or Adjustment gas mixture measuring required (see section 5.2 on page 33)
10	Adjustment failed Test gas	Check test gas
52	XFLASH SEWERIN Service	Error can only be corrected by SEWERIN Service
59	Error unknown SEWERIN Service	Error can only be corrected by SEWERIN Service
62	IR sensor	Error can only be corrected by SEWERIN Service
100	Pump error Probe/filter	Check all filters, probes and hose connections for porosity and dirt
105	Pump error Gas outlet	Check pressure at gas input/gas outlet
200	I2C HOST – IR SEWERIN Service	Error can only be corrected by SEWERIN Service
201	I2C HOST – EC SEWERIN Service	Error can only be corrected by SEWERIN Service
202	I2C HOST – EX SEWERIN Service	Error can only be corrected by SEWERIN Service

## 7 Appendix

### 7.1 Specifications and permitted operating conditions

#### Device data

Dimensions (W x D x H)	approx. 148 x 57 x 205 mm approx. 148 x 57 x 253 mm with supporting bracket
Weight	approx. 1000 g, depending on equipment

#### Device elements

Display	monochromatic graphic display, 320 x 240 pixels
Buzzer	frequency 2.4 kHz, volume 80 dB (A) / 1 m
Signal light	red
Pump	vacuum: > 250 mbar volume flow: typically 50 l/h ± 20 l/h
Port	USB 2.0
Data memory	8 MB
Operation	ON/OFF key, 3 function keys, jog dial

#### Operating conditions

Operating temperature	-20 °C – +40 °C
Storage temperature	-25 °C – +60 °C (temperatures above 40 °C reduce the service life of the sensors)
Humidity	5 – 90 % r.h., non-condensing
Atmospheric pressure	800 – 1100 hPa
Pressure at gas inlet	-175 – +65 hPa
Protection rating	IP54

#### Power supply

Power supply	NiMH rechargeable or disposable alkaline batteries, size AA
Operating time, typical	at least 8 h
Battery capacity	2500 mAh
Battery voltage	rechargeable batteries: 4 x 1.2 V disposable batteries: 4 x 1.5 V
Charging time	approx. 3 h (complete charge), depending on capacity
Charging temperature	0 °C – +30 °C
Charging voltage	12 V DC
Charging current	max. 1 A



## 7.2 Limit values for the device inspection

Gas	Zero point		Sensitivity	
	Specification	Deviation	Specification	Deviation
CH <sub>4</sub>	0.00 % vol.	±1 % vol.	60 % vol.	±3 % vol.
CO <sub>2</sub>	0 % vol.	±1 % vol.	40 % vol.	±2 % vol.
CO	0 ppm	±10 ppm	40 ppm	±10 ppm
H <sub>2</sub> S	0 ppm	±10 ppm	180 ppm	±18 ppm
O <sub>2</sub>	0 % vol.	±0.5 % vol.	20.9 % vol.	±0.5 % vol.

## 7.3 Memory capacity

The total memory capacity of the device is divided up as follows:

Protocol type	Maximum number of storable protocols
Device inspection	40
Measurement	80

There is a choice of two memory modes (see section 3.3.6 on page 20). The selected memory mode applies for all protocol types.

## 7.4 Sensors

### Note:

Probes increase the stated response times.

### 7.4.1 Infrared sensors (IR)

#### 7.4.1.1 Methane CH<sub>4</sub>

Measuring range	0 – 100 % vol.
Resolution	0.1 % vol. (0 – 79.9 % vol.) 1 % vol. (80 – 100 % vol.)
Response times	t <sub>50</sub> < 9 s, t <sub>90</sub> < 17 s
Temperature range	-20 °C – +40 °C
Measuring error	± 1.5 % from upper range value
Interference	all hydrocarbons
Lifetime, expected	5 years

#### 7.4.1.2 Carbon dioxide CO<sub>2</sub>

Measuring range	0 – 100 % vol.
Resolution	1 % vol.
Response times	t <sub>90</sub> < 20 s
Temperature range	-20 °C – +40 °C
Measuring error	± 1.5 % from upper range value
Interference	none
Lifetime, expected	5 years

### 7.4.2 Electrochemical sensors (EC)

#### 7.4.2.1 Oxygen O<sub>2</sub>

Measuring range	0 – 25 % vol.
Resolution	0.1 % vol.
Response times	t <sub>90</sub> < 15 s
Warm-up time	approx. 1 min
Temperature range	-20 °C – +40 °C
Measuring error	±3 % or ±0.3 % vol. (±3 digits)
Interference	none
Lifetime, expected	24 months

### 7.4.2.2 Hydrogen sulphide H<sub>2</sub>S

#### Multitec 545

Measuring range	0 – 5000 ppm
Resolution	1 ppm (0 – 100 ppm) 2 ppm (100 – 998 ppm) 0.02 % vol. / 200 ppm (0.10 – 0.5 % vol.)
Response times	t <sub>90</sub> < 30 s
Warm-up time	approx. 1 min
Temperature range	-20 °C – +40 °C
Measuring error	±3% or ±5ppm (±5 digits) ±5 ppm (long-term stability)
Interference	at 20 °C 100 ppm CO: approx. 1 ppm H <sub>2</sub> S 1 % vol. H <sub>2</sub> : approx. 10 ppm H <sub>2</sub> S 100 ppm NO <sub>2</sub> : approx. 3 ppm H <sub>2</sub> S
Lifetime, expected	24 months

#### Multitec 540

Measuring range	0 – 2000 ppm
Resolution	1 ppm (0 – 100 ppm) 2 ppm (100 – 998 ppm) 0.02 % vol. / 200 ppm (0.10 – 0.2 % vol.)
Response times	t <sub>90</sub> < 30 s
Warm-up time	approx. 1 min
Temperature range	-20 °C – +40 °C
Measuring error	±3% or ±3ppm (±3 digits) ±3 ppm (long-term stability)
Interference	at 20 °C 100 ppm CO: approx. 1 ppm H <sub>2</sub> S 1 % vol. H <sub>2</sub> : approx. 10 ppm H <sub>2</sub> S 100 ppm NO <sub>2</sub> : approx. 3 ppm H <sub>2</sub> S
Lifetime, expected	24 months

### 7.4.2.3 Carbon monoxide CO

Measuring range	0 – 500 ppm
Resolution	1 ppm
Response times	$t_{90} < 30$ s
Warm-up time	approx. 1 min
Temperature range	-20 °C – +40 °C
Measuring error	$\pm 10$ % or $\pm 3$ ppm ( $\pm 3$ digits) $\pm 5$ ppm (long-term stability as per EN 45544)
Interference	at 20 °C 3000 ppm H <sub>2</sub> : approx. 1000 ppm CO 100 ppm NO; approx. 25 ppm CO
Lifetime, expected	36 months

## 7.5 Technical information

### 7.5.1 Identification sticker (back of device)

The symbols on the sticker mean the following:



Only ever open the battery compartment outside of the explosive area.



Read the operating instructions.

### 7.5.2 Cleaning

The device must only be cleaned with a damp cloth.



#### **NOTICE!**

Do not use solvents, petrol or cockpit spray containing silicone or similar substances to clean the device!

---

### 7.5.3 Electrostatic charge

Avoid electrostatically charging the device. Electrostatically un-earthed objects (e.g. including metallic housing without an earth connection) are not protected against applied charges (e.g. through dust or dispersed flows).



#### **NOTICE!**

To prevent electrostatic charging when working with hydrogen H<sub>2</sub>, always use the carrying bag **TG8**.

---

## 7.6 Accessories and consumables

### Accessories

Part	Order number
Docking station TG8	LP11-10001
M4 AC/DC adapter	LD10-10001
M4 vehicle cable, 12 V= portable	ZL07-10100
M4 vehicle cable, 12 V= installed	ZL07-10000
M4 vehicle cable, 24 V= portable	ZL09-10000
"Vario" carrying system	3209-0012
Carrying bag TG8	3204-0040
Case TG8-RÜ	ZD29-10000
Compact case TG8	ZD31-10000
Flexible hand probe	ZS32-10000
Probe hose	ZS25-10000 (e.g.)
Gas sample connection installation set	MG04-Z1000
Test set SPE VOL	PP01-90101
Universal test head	PP01-B1700
Gas outlet adapter	MG04-Z2000

### Consumables

Part	Order number
Fine dust filter	2499-0020
Hydrophobic filter	2491-0050
Rechargeable NiMH battery	1354-0009
Disposable alkaline battery	1353-0001
Bio IR test gas (60 % vol. CH <sub>4</sub> , 40 % vol. CO <sub>2</sub> , 180 ppm H <sub>2</sub> S), test gas can 1 l, pressure approx. 12 bar	ZT49-10000

Other accessories and consumables are available for the product. Please contact our SEWERIN sales department for further information.

**7.7 Declaration of conformity**

Hermann Sewerin GmbH hereby declares that the **Multitec® 545** fulfils the requirements of the following guidelines:

- 2014/34/EU
- 2014/30/EU

Gütersloh, 2016-04-20



Dr. S. Sewerin  
(General Manager)

Hermann Sewerin GmbH hereby declares that the **Multitec® 540** fulfils the requirements of the following guidelines:

- 2014/34/EU
- 2014/30/EU

Gütersloh, 2016-04-20




Dr. S. Sewerin  
(General Manager)

The complete declarations of conformity can be found online.


## 7.8 Inspection protocol

### 7.8.1 Test with individual gases

INSPECTION PROTOCOL	<b>Multitec® 540</b>	
Serial no. (e.g.: 066 11 0501)	<input style="width: 20px; height: 15px;" type="text"/> <input style="width: 20px; height: 15px;" type="text"/> <input style="width: 20px; height: 15px;" type="text"/>	
04.12.2018		
<b>1.0 General status</b>		
1.1 - Housing correct (e.g.: Y / N)	<input type="checkbox"/>	<input type="checkbox"/>
1.2 - Fine dust filter correct (e.g.: Y / N)	<input type="checkbox"/>	<input type="checkbox"/>
1.3 - Disposable/rechargeable battery capacity (e.g.: %)	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.0 Pump check</b>		
2.1 - Pump error F100 in seal	<input type="checkbox"/>	<input type="checkbox"/>
<b>3.0 Methane CH<sub>4</sub></b>		
3.1 Zero point (fresh air) - Display -1 – +1 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
3.2 Test gas 100 % vol. CH <sub>4</sub> - Display 95 – 105 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
<b>4.0 Carbon dioxide CO<sub>2</sub></b>		
4.1 Zero point (fresh air 0.04 % vol.) - Display -1 – +1 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
4.2 Test gas 100 % vol. CO <sub>2</sub> - Display 95 – 105 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
<b>5.0 Oxygen O<sub>2</sub></b>		
5.1 Zero point (test gas 100 % vol. CH <sub>4</sub> ) - Display -0.5 – +0.5 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
5.2 Test gas fresh air (20.9 % vol.) - Display 20.4 – 21.4 % vol.	<input type="checkbox"/>	<input type="checkbox"/>
<b>6.0 Hydrogen sulphide H<sub>2</sub>S</b>		
6.1 Zero point (fresh air) - Display -10 – +10 ppm	<input type="checkbox"/>	<input type="checkbox"/>
6.2 Test gas 40 ppm - Display 30 – 50 ppm	<input type="checkbox"/>	<input type="checkbox"/>
<b>7.0 Carbon monoxide CO</b>		
7.1 Zero point (fresh air) - Display -3 – +3 ppm	<input type="checkbox"/>	<input type="checkbox"/>
7.2 Test gas 40 ppm - Display 37 – 43 ppm	<input type="checkbox"/>	<input type="checkbox"/>
<b>8.0 Comments</b>		
- Maintenance required (inspection plate)	<input type="checkbox"/>	<input type="checkbox"/>
- Sensor lifetime exceeded	<input type="checkbox"/>	<input type="checkbox"/>
- Adjustment, repair	<input type="checkbox"/>	<input type="checkbox"/>
- or similar	<input type="checkbox"/>	<input type="checkbox"/>
<b>9.0 Inspection</b>		
- Day	<input type="checkbox"/>	<input type="checkbox"/>
- Month	<input type="checkbox"/>	<input type="checkbox"/>
- Year	<input type="checkbox"/>	<input type="checkbox"/>
- Signature	<input type="checkbox"/>	<input type="checkbox"/>



7.8.2 Test with gas mixture

INSPECTION PROTOCOL	Bio IR	<b>Multitec® 540</b>				
Serial no. (e.g.: 066 11 0501)	<input style="width: 40px; height: 15px;" type="text"/> <input style="width: 40px; height: 15px;" type="text"/> <input style="width: 40px; height: 15px;" type="text"/>					
04.12.2018						
<b>1.0 General status</b>						
1.1	- Housing correct (e.g.: Y / N)					
1.2	- Fine dust filter correct (e.g.: Y / N)					
1.3	- Disposable/rechargeable battery capacity (e.g.: ¼)					
<b>2.0 Pump check</b>						
2.1	- Pump error F100 in seal					
<b>3.0 Fresh air</b>						
3.1	Zero point CH <sub>4</sub> - Display -1 – +1 % vol.					
3.2	Zero point CO <sub>2</sub> (0.04 % vol.) - Display -1 – +1 % vol.					
3.3	Oxygen O <sub>2</sub> (20.9 % vol.) - Display 20.4 – 21.4 % vol.					
3.4	Zero point H <sub>2</sub> S - Display -10 – +10 ppm					
<b>4.0 Bio IR gas mixture</b>						
4.1	Methane CH <sub>4</sub> (60 % vol.) - Display 57 – 63 % vol.					
4.2	Carbon dioxide CO <sub>2</sub> (40 % vol.) - Display 38 – 42 % vol.					
4.3	Oxygen O <sub>2</sub> (0 % vol.) - Display -0.5 – +0.5 % vol.					
4.4	Hydrogen sulphide H <sub>2</sub> S (180 ppm) - Display 162 – 198 ppm					
<b>5.0 Carbon monoxide CO</b>						
5.1	Zero point (fresh air) - Display -3 – +3 ppm					
5.2	Test gas 40 ppm - Display 37 – 43 ppm					
<b>6.0 Comments</b>						
6.0	- Maintenance required (inspection plate) - Sensor lifetime exceeded - Adjustment, repair - or similar					
<b>7.0 Inspection</b>						
7.0	- Day					
	- Month					
	- Year					
	- Signature					

## 7.9 Advice on disposal

The European Waste Catalogue (EWC) governs the disposal of appliances and accessories.

Description of waste	Allocated EWC waste code
Device	16 02 13
Test gas can	16 05 05
Disposable battery, rechargeable battery	16 06 05

### End-of-life equipment

Used equipment can be returned to Hermann Sewerin GmbH. We will arrange for the equipment to be disposed of appropriately by certified specialist contractors free of charge.

## 7.10 Terminology and abbreviations

<b>CENELEC</b>	<ul style="list-style-type: none"> <li>European Committee for Electrotechnical Standardization</li> </ul>
<b>EC</b>	<ul style="list-style-type: none"> <li>Electrochemical sensor</li> </ul>
<b>Gas type</b>	<ul style="list-style-type: none"> <li>Hydrocarbon <math>C_xH_y</math>, which can be measured with the IR</li> </ul>
<b>IR</b>	<ul style="list-style-type: none"> <li>Infrared sensor</li> </ul>
<b>NiMH</b>	<ul style="list-style-type: none"> <li>Nickel metal hydride</li> </ul>
<b>ppm</b>	<ul style="list-style-type: none"> <li>Parts per million</li> </ul>
<b>Ring memory</b>	<ul style="list-style-type: none"> <li>Type of data storage in the device</li> <li>If the available storage space is full, the oldest file is automatically overwritten by the current file.</li> </ul>
<b>Stack memory</b>	<ul style="list-style-type: none"> <li>Type of data storage in the device</li> <li>If the available storage space is full, you are prompted to confirm whether the oldest file should be overwritten by the current file.</li> </ul>
<b>VOL</b>	<ul style="list-style-type: none"> <li>Volume</li> </ul>

### 7.11 Referenced documents

The following standards, guidelines and regulations are referred to in these operating instructions:

- /1/ Bundesverband der landwirtschaftlichen Berufsgenossenschaften e. V. (Federal Association of Institutions for Statutory Accident Insurance and Prevention in the Agricultural Sector): Safety regulations for agricultural biogas plants (Procedure Document 69)  
Available from regional agricultural employer's liability insurance associations
- /2/ DVGW G 465-4  
Deutscher Vereinigung des Gas- und Wasserfaches e. V. (German Association of Gas and Water Specialists); Regulation G 465-4: Gasspür- und Gaskonzentrationsmessgeräte für die Überprüfung von Gasanlagen (Gas-Detection and Gas-Concentration Measurement Devices for Inspection of Gas Systems)  
Available for download at: [www.dvgw.de](http://www.dvgw.de)
- /3/ EN 60079-7:2007
- /4/ EN 60086-1
- /5/ IEC 60079-20
- /6/ 94/9/EC (ATEX 100a)

---

## 8 Index

### A

- Accessories 47
- Adjustment 17, 33
  - CH<sub>4</sub> 17
  - CO 17
  - CO<sub>2</sub> 17
  - gas mixture measuring 17
  - H<sub>2</sub>S 17
  - O<sub>2</sub> 18
  - of oxygen 37
  - performing 35
  - preparing 35
  - scope 33
  - sensitivity 36
  - with gas mixture 34
  - zero point 36
- Adjustment menu 17
- Autostart 19

### B

- Battery alarm 23

### C

- Carbon dioxide filter 36
- Cleaning 46
- Clearing 20
- Comment 12
- Consumables 47

### D

- Date 19
- Device
  - models 5
  - switching off 7
  - switching on 7, 8
- Device information 14
- Device inspection 13, 19, 25
  - accessing 27
  - concluding 28
  - documentation 25
  - frequency 25
  - integrated 26
  - limits 42
  - order 27
  - performing 27
  - protocol 13

- reading protocol 26
- scope 25
- switching on 26
- Display 18
- Display contrast 18
- Display illumination 18
- Disposable battery 19
  - replacing 24
  - requirements 21
  - setting the type 19
  - suitable types 21
- Disposal 51

### E

- Electrostatic charge 46
- Error message 40
- Explosion protection 6

### F

- Factory settings 19
- Faults 40
- Filter 30
- Fine dust filter 30
- Function key 7

### G

- Gas measuring 11
- Gas mixture, special features 34
- General status 29

### H

- Housing 30

### I

- Identification plate 46
- Indication accuracy
  - with fresh air 31
  - with test gas 32
- Inspection OK 18
- Inspection protocol
  - gas mixture 50
  - individual gases 49
- Inspector 28
- Integrated device inspection see Device inspection

### J

Jog dial 7

### K

Keys 7

### L

Language 19

### M

Main menu *see* Menu

Maintenance 25, 39

Manual zero point setting *see* Zero point, setting

Measurement

protocol 13

reading protocol 12

saving 12

starting 12

stopping 12

Measuring mode 10

menu structure 10

Memory 20, 42

Memory mode 20

Menu 8, 10

exiting 8

opening 10

selecting 8

Menu item

exiting 8

selecting 8

Menu structure 10, 16

### O

Opening stored comments 12

Opening stored inspectors 28

Operation 7

Oxygen 37

### P

Password 28

PIN code 14, 18

Power supply 21

Probe 30

Protocols 13

Protocol types 13

Pump 31

### R

Readout program 12, 26

Rechargeable battery 22

charging 22

maintenance 23

replacing 24

requirements 22

self-discharge 22

setting the type 19

suitable types 21

Ring memory 20

### S

Sensitivity

adjusting 36, 38

Sensors 5, 43

electrochemical 5, 43

infrared 5, 43

installation date 14

Service interval 18

Settings 10, 12, 14

menu structure 16

opening 14

Signals 30

audible 5

visual 5

Stack memory 20

System 18

### T

Test gas 18

changing 33

Test gases, suitable 34

Time 19

### U

Use

intended 3

### Z

Zero point 11

adjusting 36, 37

setting 11



#### Hermann Sewerin GmbH

Robert-Bosch-Straße 3  
33334 Gütersloh, Germany  
Tel.: +49 5241 934-0  
Fax: +49 5241 934-444  
[www.sewerin.com](http://www.sewerin.com)  
[info@sewerin.com](mailto:info@sewerin.com)

#### SEWERIN SARL

17, rue Ampère – BP 211  
67727 Hoerdts Cedex, France  
Tél. : +33 3 88 68 15 15  
Fax : +33 3 88 68 11 77  
[www.sewerin.fr](http://www.sewerin.fr)  
[sewerin@sewerin.fr](mailto:sewerin@sewerin.fr)

#### SEWERIN IBERIA S.L.

Centro de Negocios "Eisenhower"  
Avenida Sur del Aeropuerto  
de Barajas 28, Of. 2.1 y 2.2  
28042 Madrid, España  
Tel.: +34 91 74807-57  
Fax: +34 91 74807-58  
[www.sewerin.es](http://www.sewerin.es)  
[info@sewerin.es](mailto:info@sewerin.es)

#### Sewerin Portugal, Lda

Rua do Senhor dos Milagres 16,  
2º Esq  
3800-261 Aveiro, Portugal  
Tlf.: +351 234 133 740  
Fax.: +351 234 024 446  
[www.sewerin.pt](http://www.sewerin.pt)  
[info@sewerin.pt](mailto:info@sewerin.pt)

#### Sewerin Sp.z o.o.

ul. Twórcza 79L/1  
03-289 Warszawa, Polska  
Tel.: +48 22 675 09 69  
Tel. kom.: +48 501 879 444  
[www.sewerin.pl](http://www.sewerin.pl)  
[info@sewerin.pl](mailto:info@sewerin.pl)

#### Sewerin Ltd

Hertfordshire  
UK  
Phone: +44 1462-634363  
[www.sewerin.co.uk](http://www.sewerin.co.uk)  
[info@sewerin.co.uk](mailto:info@sewerin.co.uk)