Operating Instructions

SEWERIN

Protecting Water, Gas and Life.

Multitec® 545/540

Multitec® 545/540

Connector
Supporting bracket
Buzzer
USB port
ON/OFF key
Connection for power supply

Signal light
Gas input
Display
Function keys
Jog dial
Connector

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

Gas   Measured value   Unit

Gas measuring symbol

Battery capacity

CH4   0.0 %VOL
CO2   0 %VOL
O2   20.9 %VOL
H2S   0 PPM

Current assignment of function keys F1 – F3
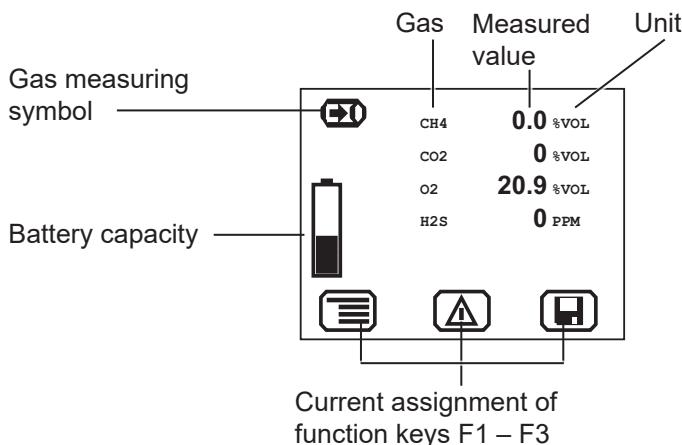
Fig. 2:   **Multitec 540** display

Display symbols

General

Menu		Fault	
OK		Perform device inspection	
Esc Cancel		Tab (jump to next input field)	
Save			
Clear		Information	
Battery capacity		Open stored comment Open stored inspector	

Applications

Interspace		Gas measuring	

Information about this document

The warnings and notes in this document mean the following:

⚠️ **DANGER!**
Risk of personal injury. Will result in serious injury or death.

⚠️ **WARNING!**
Risk of personal injury. Could result in serious injury or death.

⚠️ **CAUTION!**
Risk of personal injury. Could result in injury or pose a risk to health.

NOTICE!
Risk of damage to property.

Note:
Tips and important information.

Numbered lists (numbers, letters) are used for:

● Instructions that must be followed in a certain order

Lists with bullet points (point, dash) are used for:

● Lists

● Instructions that only involve one step

Numbers between forward slashes /.../ refer to the referenced documents.

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.
- Maintenance and repairs must only be carried out by qualified staff from Hermann Sewerin GmbH (SEWERIN for short) or by persons trained by SEWERIN. Only spare parts approved by SEWERIN may be used when performing repairs.
- Use only suitable battery types. otherwise the device will not be explosion-proof.
- Changes or modifications must not be made to this product without approval from SEWERIN.
- Use only SEWERIN accessories for the product.

SEWERIN 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 the **540** version 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.

In addition, the devices can be used to monitor the interspace of membrane roofs of biogas plant fermenters. When used in this way, the gas concentration is measured in the support air between the inner and outer membrane.

The devices are fitted with infrared sensors for measuring methane CH_4 and carbon dioxide CO_2 as standard. The Multitec **545** also features an electrochemical sensor for hydrogen sulphide H_2S (5000 ppm) as standard. Both models 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 device versions. 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_4
- Carbon dioxide CO_2
- Carbon monoxide CO
- Hydrogen H_2
- Oxygen O_2
- Hydrogen sulphide H_2S

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 ºC (104 ºF). 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** or **540** is a gas measuring device as opposed to 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 device too.
- Observe the relevant safety regulations when working at agricultural biogas plants /1/.

- When working in closed spaces, these must be well ventilated.

  SEWERIN recommends: For measurements in closed spaces, attach the gas outlet adapter to the device to reduce the risk of high concentrations at H_2S. The gas outlet adapter can be purchased 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.

- Handle the product carefully and safely, both during transport and operation.

- Do not use the product if it is damaged or faulty.

- Always perform a device inspection (section 5.1) 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.

Note:
Follow the advice regarding explosion protection (section 2.3).

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2 Features

The device comes in two 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 (section 6). 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_4	0 – 100% vol.	IR	×
CO_2	0 – 100% vol.	IR	×
CO	0 – 500 ppm	EC	○ *
H_2	0 – 1000 ppm	EC	○ *
O_2	0 – 25.0% vol.	EC	○
H_2S	0 – 5000 ppm (Multitec **545** only)	EC	×
	0 – 2000 ppm (Multitec **540**only)	EC	○

× standard, ○ optional
* The sensors for CO and H_2 can only be installed in a device in alternation, not simultaneously.

NOTICE! Damage caused by leaking sensors
Electrochemical sensors that are faulty or whose expected service life is exceeded can leak. The leaking substance can cause permanent damage to the device.
Faulty sensors can be identified, for example, by the fact that the corresponding adjustment is no longer possible.
The installation date of the sensor and the expected lifetime can be found in the **Device information**.
● Always arrange for SEWERIN Service to replace faulty or leaky sensors immediately.

2.3 Explosion protection

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

Explosion-proof group	For the following atmospheres	When using
II 2G **Ex db eb ib IIB T4 Gb**	Methane CH_4 Propane C_3H_8 Butane C_4H_{10} Hydrogen sulphide H_2S	Device **without** carrying bag TG8
II 2G **Ex db eb ib IIC T4 Gb**	Methane CH_4 Propane C_3H_8 Butane C_4H_{10} Hydrogen sulphide H_2S Hydrogen H_2	Device **with** carrying bag TG8

EU type examination certificate[1]: TÜV 07 ATEX 553353 X

⚠ **DANGER! Risk of explosion from sparks**
● Only ever open the battery compartment outside of explosive areas.
● Only ever charge the device outside of explosive areas.
● Only use the USB port outside of explosive areas.
● Use only suitable battery types.

———————
[1] For special test conditions, see EU type examination certificate.

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
ON/OFF key	Press	– Switches the device on – Switches the device off
Function keys F1, F2, F3	Press	– Variable – As indicated on the display at the bottom of the screen – Function keys may also have no function assigned in some cases
Jog dial	Turn	– Selects functions, settings, measurement data, etc. – Modifies values
	Press	– Opens the next program level (e.g. menu item, function, measurement data, selectable values) – Accept values

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 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.

In measuring mode the name of the selected application is indicated by the symbol at the top left of the display. You can find detailed information on how to select or switch applications in section 3.1.4.

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.

Each switch-on process is linked to activation of the buzzer, signal light and display. This allows the user to check the following device functions:

Buzzer: Is the audible signal working?
Signal light: Is the visual signal working?
Display: Can incorrect pixels be seen in the inverse display?

● Press the ON/OFF key. The device switches on.

   The start screen appears on the display.
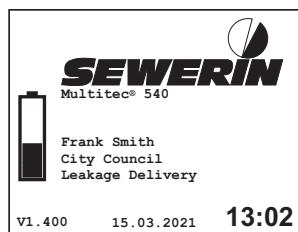
Display:
– Device type: Multitec 540
– User:
  Frank Smith
  City Council
  Leakage Delivery
– Firmware version: V1.400
– Date and time
– Battery capacity

Fig. 3:   Start screen

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

```
┌─────────────────────────────┐
│  ⊂▯⊃                         │
│                             │
│       Gas measuring         │
│       CH4  0.0..100 %VOL    │
│       CO2  0....100 %VOL    │
│  ▯    O2   0...25.0 %VOL    │
│  ▮    H2S  0...2000 PPM     │
│  ▮    CO   0... 500 PPM     │
│                             │
│  ▤                          │
└─────────────────────────────┘
```

Display:
– Symbol: Gas measuring
– Detectable gases
– Measurement ranges
– Battery capacity
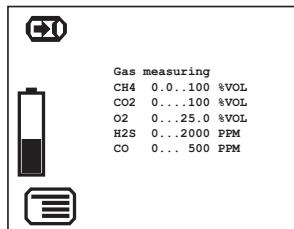
Fig. 4:   Overview of detectable gases

The device switches to measuring mode (**Gas measuring** application).

```
┌─────────────────────────────┐
│  ⊂▯⊃     CH4    0.0 %VOL     │
│                             │
│          CO2     0  %VOL    │
│  ▯       O2    20.9 %VOL    │
│  ▮       H2S     0  PPM     │
│  ▮       CO      0  PPM     │
│                             │
│  ▤              💾          │
└─────────────────────────────┘
```

Display:
– Current readings: zero when device is switched on with fresh air
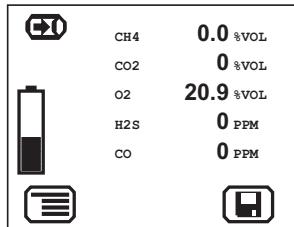
Fig. 5:   Measuring mode - **Gas measuring** application

Wait until the measurement values stop flashing. The device is then ready for use.

3.1.4   Selecting/changing the application

Note:
You may only switch applications when the device is drawing in fresh air.

The current application is indicated by the symbol at the top left of the display.

● Press **Menu**. Select the menu item for the application you want to use.

3.1.5 Differences between measuring mode and settings mode

The device is operated in two modes:

● **Measuring mode** (section 3.2)

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

● **Settings** (section 3.3)

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 the device is in measuring mode (section 3.1.3). In measuring mode, the current readings are always displayed (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
Interspace
Gas measuring
Settings
Save measurement
Protocol
Device inspection
Device information
Exit
```

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

Protocols is only visible in the menu if at least one protocol is saved.

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

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_2	20.9% vol.	20.9% vol.
CO_2	0.04% vol.	0% vol.
CH_4	0% vol.	0 ppm or 0.0% vol.
H_2S	0 ppm	0 ppm
CO	0 ppm	0 ppm
H_2	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 (section 5.2).

Requirements for correct setting of the zero point

● Device has been 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 again to measuring mode.

In the **Interspace** application, you can also access the **Set zero point** function using the corresponding symbol.

3.2.3 Interspace

The measuring mode can be changed to the **Interspace** application via this menu item.

If the device is already in the **Interspace** application, you can access an overview of detectable gases via this menu item. The device automatically returns to measuring mode.

Area of use

– Monitoring the interspace of gas membranes for leaks
– Leak tightness of fermenters, e.g. at greased cable outlets

Symbol

Measuring range

Infrared sensor CH_4 0 ppm to 1.00% vol.

Measurement data display
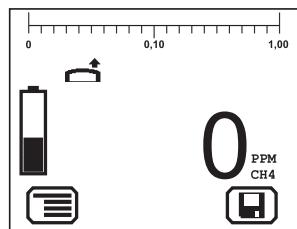
– Figure, e.g.
0 ppm CH_4
– Bar graph with quasi-logarithmic scale

Fig. 7: **Interspace** measuring mode

3.2.4 Gas measuring

The measuring mode can be changed to the **Gas measuring** application via this menu item.

If the device is already in the **Gas measuring** application, you can access an overview of detectable gases via this menu item. The device automatically returns to measuring mode.

Area of use

– Measuring the composition of biogas
– Proof of absence of gas in gas pipes

Symbol

Measuring range

Infrared sensor (Methane CH_4)	0.0 to 100% vol.
Infrared sensor (Carbon dioxide CO_2)	0 to 100% vol.
Electrochemical sensor (Oxygen O_2)	0.0 to 25.0% vol.
Electrochemical sensor (Hydrogen sulphide H_2S)	Multitec **545**: 0 to 5000 ppm Multitec **540**: 0 to 2000 ppm
Electrochemical sensor (Carbon monoxide CO)	0 to 500 ppm
Electrochemical sensor (Hydrogen H_2)	0 to 1000 ppm

Measurement data display
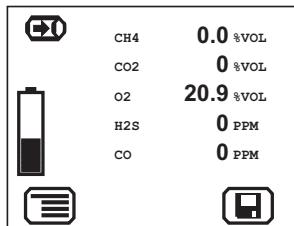
– Figure, e.g.
 0.0% vol. CH_4
 0% vol. CO_2
 20.9% vol. O_2
 0 ppm H_2S
 0 ppm CO

Fig. 8:   Gas measuring mode

3.2.5 Settings

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

3.2.6 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 measurement 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 saved measurements can be read out on a computer using the **GasCom** software. The software is available at 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. Load 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.

3.2.7 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 3.3.7.

3.2.8 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 5.1.

⚠ 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.

3.2.9   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 (section 3.3.3 to section 3.3.7):

● Adjustment

● System

● Date/time

● Memory

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

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.

SEWERIN recommends setting a different PIN code after initial start-up so that 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		Press the jog dial
2nd digit		Press the jog dial
3rd digit	Turn the jog dial	Press 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. 9). Otherwise the device will revert to measuring mode.

Adjustment
System
Alarms
Date/time
Memory
Exit

Fig. 9:   **Settings** menu

3.3.2 Settings menu structure
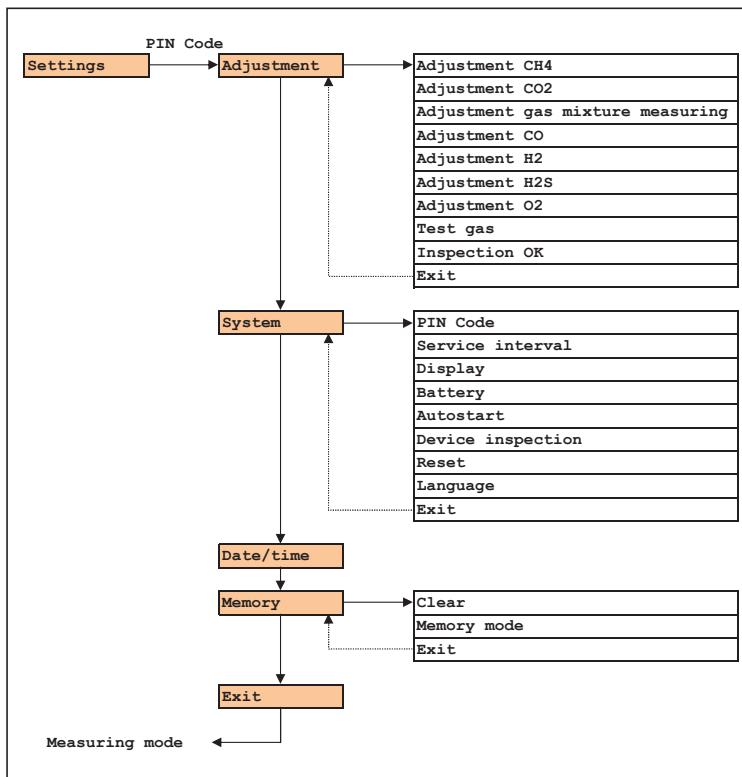
Fig. 10: **Settings** menu structure

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.

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

Adjustment CH4

Used to adjust the infrared sensor for methane CH_4 in the % vol. range.

Adjustment CO2

Used to adjust the infrared sensor for carbon dioxide CO_2 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 H2

Used to set the electrochemical sensor for hydrogen H_2 in the ppm range.

Adjustment H2S

Used to adjust the electrochemical sensor for hydrogen sulphide H_2S in the ppm range.

Adjustment O2

Used to adjust the electrochemical sensor for oxygen O_2 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.

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 Alarms

Used to set the alarm threshold for CH_4.

Application: Interspace

3.3.6 Date/time

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

3.3.7 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 3.2.7.

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! Risk of explosion due to unsuitable batteries**
To ensure that the device remains explosion-proof in accordance with /7/, only certain disposable/rechargeable batteries may be used.
● Only use batteries supplied by SEWERIN. Other disposable/rechargeable batteries, which have not been supplied by SEWERIN, may only be used if they meet the requirements of /3/.
● Only use batteries that are identical with respect to type (disposable or rechargeable), capacity and manufacturer.

Disposable battery requirements

- Disposable alkaline batteries
- Size: mignon (AA), type: LR6 as per /4/
- The creepage distance and air gap between the poles must not be less than 0.5 mm (0.0197 in) in accordance with /3/.

Rechargeable battery requirements

- NiMH rechargeable batteries
- Size: mignon (AA), type: HR6 as per /5/
- The creepage distance and air gap between the poles must not be less than 0.5 mm (0.0197 in) in accordance with /3/.
- The rechargeable batteries must be fast charging (I > 1.25 A) and remain within the temperature range.

Note:
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

⚠️ **DANGER! Risk of explosion from sparks**
High charging amperage occurs when charging batteries in explosive areas.
The mains adapter is not explosion proof.
● Only ever charge the device outside of explosive areas.

For charging you will need either:

● AC/DC adapter M4
● Vehicle cable M4

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.
● Temperatures from 10 to 25°C (50 to 77 °F) are ideal for charging.
● Never connect multiple TG8 AC/DC adapters in series (cascaded).

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.

⚠️ **DANGER! Risk of explosion from sparks**
High charging amperage occurs when charging batteries in explosive areas.
The mains adapter is not explosion proof.
● Only ever charge the device 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:   Batteries almost exhausted
- **Battery capacity** symbol flashes
- Audible signal (one-off)
- Remaining operating time: approx. 15 min

Level 2:   Battery exhausted
- Blank display apart from **Battery capacity** symbol
- Continuous audible signal
- Measuring mode unavailable
- Device shuts off

4.4   Replacing disposable/rechargeable batteries

⚠ **DANGER! Risk of explosion from sparks**
The device is not explosion proof when the housing is open.
- Only ever open the battery compartment outside of explosive areas.

NOTICE! Damage possible due to device overheating
If the battery type is not correctly set, the device can overheat.
- Always enter the correct battery type.

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
● Servicing

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
● Test of the indication accuracy with supply of fresh air
● Test of the indication accuracy with supply of test gas

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 accessed at any time and read on a computer using the **GasCom** software. The software is available at 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.

5.1.1.6 Test gases for the device inspection

The following variables depend on the application:

● Number of tests with test gas

● Test gases to be used

The following test gases can be used to check the indication accuracy when supplying test gas:

Application (group)	Test	Recommended test gases
Interspace	1% vol. CH_4	1% vol. CH_4*
Bar holes/measuring	Gas mixture measuring	Bio IR
	Test gas CO	40 ppm CO
	Test gas H_2	1000 ppm H_2

* in synthetic air

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.

Changing the test gas concentration

If no test gas with the specified concentrations is available for the test, the values can be changed to the test gas used under **Test gas** in the adjustment menu.

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.

   The **Device inspection** menu appears.

2. Select an application (**Interspace**, **Bar holes/measuring**).

   The **Dev. Test ...** menu appears.

3. Select a test (fig. 11).

Note:

The number and names of the available menu items depend on the device features.

---

4. Perform the test.

   For detailed information, refer to the following sections:

   − General status   section 5.1.3

   − Fresh air   section 5.1.4

   − Test gas …   section 5.1.5

General status
Fresh air
1.00 VOL% CH4

General status
Fresh air
Gas mixture measuring
Test gas CO

Fig. 11: Tests making up the device inspection
   Left image: **Interspace** application
   Right image: **Bar holes/measuring** application
                  (*here:* device with CO sensor)

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 again to measuring mode.

5.1.3 Testing the general status

The general status test is part of the device inspection (section 5.1.1.1). 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 (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.

This concludes the **General status** test.

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 (section 6).

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 (section 5.1.1.1).

The device inspection has been opened. An application has been selected. The **Dev. Test …** menu is visible (section 5.1.2.1).

1. Make sure that only fresh air is being drawn in.
2. Select **Fresh air** from the **Dev. Test ...** 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.

This concludes the **Fresh air** test.

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 (section 7.3). 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 (section 5.2).

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 (section 5.1.1.1).

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 (e.g. 1.00% vol. CH_4, gas mixture)

  SEWERIN recommends the test gas **Bio IR** as the gas mixture. It contains 60% vol. CH_4, 40% vol. CO_2 and 180 ppm H_2S.
- 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.

The device inspection has been opened. An application has been selected. The **Dev. Test …** menu is visible (section 5.1.2.1).

1. In the **Dev. Test …** menu, select the menu item to be tested (e.g. **1.00 VOL% CH4**, **Gas mixture measuring**).

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.

   The device switches back to the **Dev. test… menu.** A **Test gas … OK** message will appear.

7. Repeat the procedure where applicable for further test gases.

Once all tests have been successfully completed, the complete test of the indication accuracy with supply of test gas is also complete.

Test gas test unsuccessful

If a **Test gas …** test was not carried out successfully, the message **Test gas not OK** appears.

A test may be unsuccessful for the following reasons:

Cause	Corrective action
Connections leaking	Repeat check, checking the seal on the connections
Measurement values outside the specified limit values (section 7.3)	Adjustment required (section 5.2)

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 (section 3.3.3).

5.2   Adjustment

NOTICE!

Incorrect adjustment can lead to incorrect measurement results.
● Only specialist technicians may perform adjustments.
● Adjustments must be made in well ventilated rooms or in the open air.

5.2.1   Scope

The following are adjusted:
● Zero point
● Sensitivity

Note:

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 (section 7.3).

5.2.2 Test gases for the adjustment

The following test gases can be used for adjustment:

Gas	Suitable test gases for	
	Zero point	**Sensitivity**
CH_4	• Fresh air	• Gas mixture • 100% vol. CH_4 • 1.00% vol. CH_4
CO_2	• Fresh air	• Gas mixture • 100% vol. CO_2
CO	• Fresh air	• 40 ppm CO
H_2	• Fresh air	• 1000 ppm H_2
O_2	• Gas mixture • 100% vol. N_2 • 100% vol. CH_4	• Fresh air
H_2S	• Fresh air	• Gas mixture • 180 ppm H_2S

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_2 and is therefore used with oxygen to adjust the sensitivity.

Carbon monoxide can only be adjusted with an individual gas.

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.

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_4
- Carbon dioxide CO_2
- Oxygen O_2
- Hydrogen sulphide H_2S

SEWERIN recommends the test gas **Bio IR** as the gas mixture. It contains 60% vol. CH_4, 40% vol. CO_2 and 180 ppm H_2S.

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_4, CO_2 and H_2S
- Sensitivity of O_2 (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_4, CO_2 and H_2S
- Zero point of O_2

5.2.4 Preparation

Performing 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 (section 5.2.5.1 or section 5.2.5.2). The adjustment of **oxygen** is an **exception**. For this reason, it is described separately (section 5.2.6).

> **ⓘ** 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_2, the zero point is adjusted following the same procedure.

Note:

When adjusting the zero point of carbon dioxide CO_2, 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 **Settings**.
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.

7. Press **OK** to confirm. The zero point is adjusted. The reading shows zero (0.00% vol. / 0 ppm).

5.2.5.2 Adjusting the sensitivity

For all gases except oxygen O_2, the sensitivity is adjusted following the same procedure.

The following resources are needed for adjusting the sensitivity:

● Test gas

Information on test gases for adjustment can be found in section 5.2.2.

● 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:

A carbon dioxide filter must never be used when adjusting the sensitivity.

---

1. Connect the device to the test set.

2. Open **Settings**.

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 (e.g. **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$_4$).

9. Let go of the release button on the test set.

5.2.6 Performing 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.

The following resources are needed for adjusting the zero point:

● Test gas

  Information on test gases for adjustment can be found in section 5.2.2.

● 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. Connect the device to the test set.

2. Open **Settings**.

3. Select **Adjustment** from the menu.

4. Select **Adjustment O2** from the menu.

5. Select **Zero point** from the menu. **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.

8. Press **OK** to confirm. The device is adjusted. The reading shows zero (0.0% vol.).

9. Let go of the release button on the test set.

10. Disconnect the device from 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 **Settings**.

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.

7. Press **OK** to confirm. The sensitivity is adjusted. The reading shows 20.9% vol.

5.3   Servicing

Maintenance and repair work to the device must only be carried out by qualified SEWERIN staff or by persons trained by SEWERIN.

● 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. 12: Inspection plate

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 (section 5.2)
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

Series

Type/model	• Multitec 545: 066 13 • Multitec 540: 066 12

Certificates

Certificate	TÜV 07 ATEX 553353 X
	• II 2G Ex db eb ib IIB T4 Gb
	  basic device without leather bag for:
	  ◦ CH_4, C_3H_8, C_4H_{10}, C_9H_{20}, H_2S, CO
	• II 2G Ex db eb ib IIC T4 Gb
	  basic device with leather bag for:
	  ◦ CH_4, C_3H_8, C_4H_{10}, C_9H_{20}, H_2S, CO, H_2

Device data

Dimensions
(W × D × H)
	approx. 148 x 57 x 205 mm
	        (5.83 x 2.24 x 8.07 in)
	approx. 148 x 57 x 253 mm
	        (5.83 x 2.24 x 9.96 in) with supporting
	        bracket

Weight	approx. 1000 g (35 oz), depending on equipment

Features

Display	monochrome, 320 x 240 pixels
Buzzer	• frequency 2.4 kHz, • volume 80 dB (A) / 1 m (3.28 ft)
Signal light	red

Pump	• vacuum: > 250 mbar
	• volume flow: typically 50 l/h ±20 l/h
	• pump error (F100) depending on volume flow:
	  ◦ ≤ 20 l/h F100 certain
	  ◦ > 20 l/h – ≤ 35 l/h F100 possible

Interface	USB 2.0
Memory	8 MB
Control	• ON/OFF key • 3 function keys • jog dial
Sensors	• IR for flammable gases (CH_4) • IR for CO_2 optional: • EC for CO, H_2, H_2S, O_2

Operating conditions*

Operating temperature	-20 °C – 40 °C (-4 °F – 104 °F)
Humidity	5 – 90 % r.h., non-condensing
Atmospheric pressure	800 – 1100 hPa
Pressure at gas inlet	-175 – 65 hPa
Protection rating	IP54
Position of use	any

*Optional sensors can affect the operating conditions of the device.

Storage conditions

Storage temperature	-25 – 60 °C (-13 °F – 140 °F) Temperatures above 40 °C (104 °F) reduce the service life of the sensors)

Power supply

Power supply	4 cells, type Mignon AA, optionally: • rechargeable batteries: NiMH • disposable batteries: Alkaline
Operating time, typical	at least 6 h
Battery capacity	2000 mAh
Charging time	approx. 3 h (complete charge), depending on capacity
Charging temperature	0 °C – 35 °C (32 °F – 95 °F)
Charging voltage	12 V DC (max. 1 A)

Data transmission

Communication	USB

Gas types

Default	CH_4, CO_2
Optional	CO, H_2, H_2S, O_2

7.2   Alarm

Adjustable:	yes
Latching:	no
Trigger:	when alarm threshold **AL** is exceeded
Indicator:	– audible signal – visual signal – **AL** notification on display
Acknowledgement:	possible for audible signal when alarm threshold **AL** is exceeded
Reset:	– automatic when level falls below alarm threshold **AL**

7.3 Limit values for the device inspection

Interspace

Gas	Zero point		Sensitivity	
	Specification	Deviation	Specification	Deviation
CH_4	0 ppm	±300 ppm	1.00% vol.	± 30 % (0.70 – 1.30% vol. or 7000 – 13000 ppm)

Gas measuring

Gas	Zero point		Sensitivity	
	Specification	Deviation	Specification	Deviation
CH_4	0.00% vol.	±1% vol.	60% vol.	±3% vol.
CO_2	0% vol.	±1% vol.	40% vol.	±2% vol.
CO	0 ppm	±10 ppm	40 ppm	±10 ppm
H_2	0 ppm	±50 ppm	1000 ppm	±200 ppm
H_2S	0 ppm	±10 ppm	180 ppm	±18 ppm
O_2	0% vol.	±0.5% vol.	20.9% vol.	±0.5% vol.

7.4 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 (section 3.3.7). The selected memory mode applies for all protocol types.

7.5 Sensors

Note:
Probes increase the stated response times.

7.5.1 Infrared sensors (IR)

7.5.1.1 Methane CH_4 (Interspace application)

Type	infrared sensor (IR)
Use	Multitec 545/540
Measuring range	0 ppm – 1.00% vol.
Indication range	0 ppm – 2.5% vol.
Resolution	• 50 ppm (0 – 950 ppm) • 0.01% vol (0.10 – 2.50% vol.)
Response times	t_{50} <9 s, t_{90} <17 s
Warm-up time	< 60 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	±15 % of measured value (linearity), at least ±100 ppm
Interference, known	all hydrocarbons C_xH_y
Lifetime, expected	5 years

Adjustment	test gas concentration:
	• zero point:
	  hydrocarbon-free, clean air
	• CH_4:
	  1% vol., utilisable 0.50 – 1.00% vol.

7.5.1.2 Methane CH_4 (Gas measuring application)

Type	infrared sensor (IR)
Use	Multitec 545/540
Measuring range	0 – 100% vol.
Resolution	0.1% vol. (0 – 79.9% vol.) 1% vol. (80 – 100% vol.)
Response times	t_{50} <9 s, t_{90} <17 s
Warm-up time	< 30 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	±1.5% of measured value, at least ±0.5% vol.
Interference, known	all hydrocarbons C_xH_y
Lifetime, expected	5 years

Adjustment	test gas concentration:
	• zero point:
	  hydrocarbon-free, clean air
	• CH_4:
	  ◦ 100% vol.
	  ◦ gas mixture 60% vol. CH_4 / 40% vol. CO_2

7.5.1.3 Carbon dioxide CO_2

Type	infrared sensor (IR)
Use	Multitec 545/540
Measuring range	0 – 100 % vol.
Resolution	• 0.1% vol. (0 – 9.9% vol.) • 1% vol. (10 – 100% vol.)
Response times	t_{90} < 20 s
Warm-up time	< 30 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	±1.5% vol.
Zero point deviation	0.04% vol.
Interference, known	none
Humidity	5 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	5 years

Adjustment	test gas concentration:
	• zero point:
	  carbon dioxide-free, clean air
	• CO_2:
	  ◦ 100% vol.
	  ◦ gas mixture 60% vol. CH_4 / 40% vol. CO_2

7.5.2   Electrochemical sensors (EC)

Note for EC sensors:
At temperatures below 0 °C (32 °F) the specified response times and decay times may be longer.

7.5.2.1 Oxygen O$_2$

Type	electrochemical sensor (EC)
Use	Multitec 545/540
Measuring range	0 – 25% vol.
Indication range	0 – 30% vol.
Resolution	0.1% vol.
Response times	t_{90} < 30 s
Warm-up time	up to 90 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	• linearity: ≤ 1.5% of measured value, minimum ≤ 0.3% vol. • long-term stability: ≤ 0.2% vol. (3 months)
Drift	< 2% within 3 months
Interference, known	none
Humidity	5 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	2 years

Adjustment	test gas concentration:
	• zero point:
	  ◦ oxygen-free air
	  ◦ 100% vol. N2
	  ◦ 100% vol. CH_4
	• O$_2$: 20.9% vol., e.g. clean air

7.5.2.2 Carbon monoxide CO

Type	electrochemical sensor (EC)
Use	Multitec 545/540

Measuring range	0 – 500 ppm
	• lower limit:
	  ◦ 0 – 100 ppm: 4 ppm
	  ◦ > 100 ppm: 11 ppm

Indication range	0 – 600 ppm
Resolution	1 ppm
Response times	t_{90} < 30 s
Decay times	t_{10} < 25 s
Warm-up time	up to 90 s
Temperature range	-20 – 40 °C (-4 – 104 °F)

Measuring error	• ±3 %, minimum ±3 ppm (±3 digit)
	• long-term stability
	  ◦ test gas: ≤ 4% of measured value
	  ◦ zero point (fresh air): ≤ 1 ppm

Drift	< 10% within 6 months
Zero point deviation	• 0 – 100 ppm: 3 ppm • > 100 ppm: 13 ppm
Interference, known	at 20 °C (68 °F) • C_2H_2 100 ppm: approx. 90 ppm CO • C_2H_4 100 ppm: approx. 96 ppm CO • Cl_2 15 ppm: approx. 1 ppm CO • H_2 200 ppm: approx. 30 ppm CO • H_2S 50 ppm: approx. 1 ppm CO • NH_3 50 ppm: approx. 0 ppm CO • NO 50 ppm: approx. 15 ppm CO • SO_2 20 ppm: approx. 0 ppm CO
Humidity	15 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	3 years
Adjustment	test gas concentration: • zero point: clean air • CO: 40 ppm, utilisable 10 – 150 ppm

7.5.2.3 Hydrogen H_2

Type	electrochemical sensor (EC)
Use	Multitec 545/540
Measuring range	0 – 1000 ppm
Indication range	0 – 1200 ppm
Resolution	5 ppm
Response times	$t_{90} < 60$ s
Decay times	$t_{10} \leq 60$ s
Warm-up time	up to 90 s
Temperature range	-20 – 40 °C (68 °F)
Measuring error	±10 %, minimum ±15 ppm (±3 digit)
Drift	< 10% within 6 months
Zero point deviation	±10 ppm (±2 digit)
Interference, known	at 20 °C (68 °F) • CO 200 ppm approx. 150 ppm H_2 • H_2S 25 ppm approx. -0.5 ppm H_2 • N_2O 20 ppm approx. -1 ppm H_2 • NO 50 ppm approx. 20 ppm H_2 • S_2O 20 ppm approx. -1 ppm H_2
Humidity	15 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	3 years
Adjustment	test gas concentration: • zero point: clean air • H_2: 1000 ppm, utilisable 100 – 1000 ppm

7.5.2.4 Hydrogen sulphide H$_2$S

Multitec 545

Type	electrochemical sensor (EC)
Use	Multitec 545
Measuring range	0 – 5000 ppm • lower limit: 1 ppm
Indication range	0 – 6000 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_{90} < 60 s
Decay times	t_{10} ≤ 90 s
Warm-up time	up to 120 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	• ±3% or ±3 ppm (±3 digits) • ±3 ppm (long-term stability)
Drift	< 10% within 6 months
Zero point deviation	2 ppm
Interference, known	at 20°C (68 °F) • CO 200 ppm: approx. 2 ppm • SO$_2$ 20 ppm: approx. 3 ppm • NO$_2$ 200 ppm: approx. -30 ppm • H$_2$ 100 ppm: approx. 2 ppm
Humidity	15 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	2 years
Adjustment	test gas concentration: • zero point: clean air • H$_2$S: 180 ppm, utilisable 10 – 1200 ppm

MultiTec 540

Type	electrochemical sensor (EC)
Use	Multitec 540
Measuring range	0 – 2000 ppm • lower limit: 1 ppm
Indication range	0 – 2400 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_{90} < 60 s
Decay times	t_{10} ≤ 90 s
Warm-up time	up to 120 s
Temperature range	-20 – 40 °C (-4 – 104 °F)
Measuring error	• ±3% or ±3 ppm (±3 digits) • ±3 ppm (long-term stability)
Drift	< 10% within 6 months
Zero point deviation	2 ppm
Interference, known	at 20°C (68 °F) • H_2 2% vol.: approx. 150 ppm H_2S • Isopropanol 1% vol.: approx. 0 ppm H_2S • NH_3 1000 ppm: approx. 0 ppm H_2S
Humidity	15 – 90% r.h., non-condensing • short term: 0% r.h
Lifetime, expected	2 years
Adjustment	test gas concentration: • zero point: clean air • H_2S: 180 ppm, utilisable 10 – 1200 ppm

7.6   Technical information

7.6.1   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.

7.6.2 Cleaning

The device must only be cleaned with a damp cloth.

NOTICE! Possible damage to property from unsuitable cleaning agents

Unsuitable cleaning agents can chemically corrode the housing surface. Fumes from solvents and substances containing silicone can get into the device and damage the sensors.

● Never use solvents, petrol, cockpit sprays containing silicone or similar substances to clean the device.

7.6.3 Electrostatic charge

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

7.7　　Accessories and consumables

Accessories

Part	Order number
Docking station TG8	LP11-10001
AC/DC adapter M4	LD10-10001
Vehicle cable M4, 12 V= portable	ZL07-10100
Vehicle cable M4, 12 V= installed	ZL07-10000
Vehicle cable M4, 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
Test gas Bio IR (60% vol. CH_4, 40% vol. CO_2, 180 ppm H_2S), test gas can 1 l, pressure approx. 12 bar	ZT49-10000
Test gas 1% vol. CH_4 in synthetic air, test gas can 1 l, pressure approx. 12 bar	ZT04-10001
Test gas 40 ppm CO in synthetic air, test gas can 1 l, pressure approx. 12 bar	ZT39-10000
Test gas 1000 ppm H_2 in synthetic air, test gas can 1 l, pressure approx. 12 bar	ZT46-10000

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

7.8 Declaration of conformity

Hermann Sewerin GmbH hereby declares that the **Multitec® 545/540** fulfils the requirements of the following directives:

- 2011/65/EU
- 2014/30/EU
- 2014/34/EU

Gütersloh, 2025-09-01

Benjamin Sewerin (Managing Director)

The complete declarations of conformity can be found online.

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

CENELEC	– European Committee for Electrotechnical Standardization
EC	– Electrochemical sensor
Gas type	– Hydrocarbon C_xH_y, which can be measured with the IR
IR	– Infrared sensor
NiMH	– Nickel metal hydride
ppm	– Parts per million
Ring memory	– Type of data storage in the device – If the available storage space is full, the oldest file is automatically overwritten by the current file.
Stack memory	– Type of data storage in the device – If the available storage space is full, you are prompted to confirm whether the oldest file should be overwritten by the current file.

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 association

/2/ DVGW G 465-4 Deutsche Vereinigung des Gas- und Wasserfaches e. V. (German Association of Gas and Water Specialists); Regulation G 465-4: Gas-Detection and Gas-Concentration Measurement Devices for Inspection of Gas Systems; available for download at: www.dvgw.de

/3/ EN 60079-7:2007

/4/ EN 60086-1

/5/ IEC 60079-20

/6/ TRAS 120: Safety requirements for biogas plants

/7/ 94/9/EC (ATEX 100a)

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