SEWERIN
Technologies for leak detection.

Multitec® 520

Operating instructions

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Fig. 1: **Multitec 520** device overview

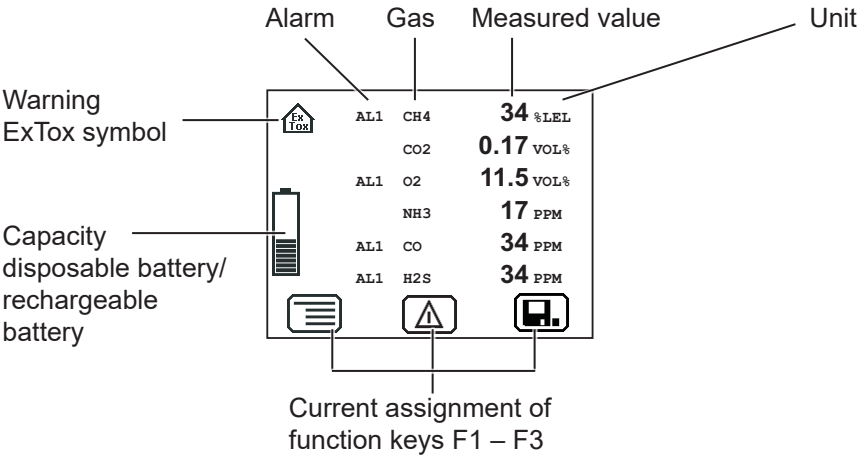

Fig. 2: **Multitec 520** display

Display symbols


Menu


OK

Cancel


Buzzer off


Save


Stop measurement


Capacity
disposable battery/
rechargeable battery


Fault


Carry out device inspection


Tab
(jump to next input field)


Clear


Information

Warning ExTox


Open stored comment
Open stored inspector

Information about this document

The warnings and notes in the document mean the following:

DANGER!
Risk of personal injury. Results include serious injury or death.

WARNING!
Risk of personal injury. Can result in serious injury or death.

CAUTION!
Risk of personal injury. Can result in injury or a risk to health.

CAUTION!
Risk of damage to property.

Note:
Tips and important information.

Enumerated lists (numbers, letters) are used for:

- Instructions that must be followed in a specific sequence

Bulleted lists (bullet points, dashes) are used for:

- Lists
- Instructions comprising only one action

Numbers enclosed by forward slashes /.../ refer to 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.
- 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 520** is a portable warning device for monitoring the atmospheric air in the workplace. The device can measure up to six gases simultaneously, thus offering comprehensive protection against dangerous gas concentrations. It warns, for example, of:

- explosive gas concentrations
- lack of oxygen/excessive oxygen
- toxic gases

The device is fitted with infrared sensors for measuring hydrocarbons C_XH_Y and carbon dioxide CO_2 as standard. It can also be equipped with electrochemical sensors for measuring O_2, H_2S, CO, and NH_3.

The infrared sensors operate on the principle of absorption via infrared-active gases, and the electrochemical sensors operate on the electrochemical cell principle.

Note:
These operating instructions describe the **Multitec 520** with all additional equipment (firmware version 1.XXX). All descriptions refer to the device as delivered (factory settings). 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 only be used to measure the following gases (depending on additional equipment):

- Methane CH_4 / Propane C_3H_8 / Butane C_4H_{10} / Nonane C_9H_{20}
- Carbon dioxide CO_2
- Oxygen O_2
- Hydrogen sulphide H_2S
- Carbon monoxide CO
- Ammonia NH_3

The device must **not** be used for:

- Gas analysis of technical processes
- Monitoring liquids

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

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

1.4 General safety information

- The device has been tested to ensure that it is explosion-proof in accordance with European standards (CENELEC).
- The device must only be switched on with fresh air.
- 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.
- If a device can be used for measuring nonane, special probe hoses must be used (TG nonane probe hose, see section 7.7 on page 63).
- The device must only be tested and adjusted with test gases in well ventilated rooms or in the open air. Test gases must be handled in a professional manner.
- Always carry out a device inspection 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 (see section 2.3 on page 7).

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2 Features

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 alarms and faults. The device also emits signals when it is switched on and off.

If this symbol appears on the display, the audible signal can be switched off.
When an audible signal has been switched off it cannot be switched back on.

This symbol appears at the top left of the display as soon as the audible signal has been switched off. It disappears automatically if the level falls below the alarm threshold.

Operating signal

The device emits a visual signal and an audible signal at regular intervals. This indicates that the device is working properly.

Alarm

The device can monitor several gases at the same time. If the measured gas concentration of one or more gases exceeds specified limit values (alarm thresholds) the device gives a warning. It emits both audible and visual signals, which are distinctly different from the operating signal.

WARNING! Danger of death due to hazardous gas concentrations

An alarm always indicates danger.

- Take all necessary measures for your own safety and the safety of others immediately.

There is detailed information on alarms in section 7.2 on page 50.

2.2 Sensors

The device features two types of sensor:

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

Application	Gas	Measuring range	Sensor
Warning ExTox	CH_4	0 – 100 % LEL	IR
	CO	0 – 500 ppm	EC
	CO_2	0 – 5 % vol.	IR
	H_2S	0 – 100 ppm	EC
	NH_3	0 – 100 ppm	EC
	O_2	0 – 25 % vol.	EC

2.3 Explosion protection

2.3.1 Passive explosion protection

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

Explosion-proof group	For the following atmospheres	When using
II2G Ex d e ib IIB T4 Gb	– Methane CH_4 – Propane C_3H_8 – Butane C_4H_{10} – Nonane C_9H_{20} – Hydrogen sulphide H_2S – Carbon monoxide CO – Ammonia NH_3	Device **without** carrying bag TG8
II2G Ex d e ib IIC T4 Gb	– Methane CH_4 – Propane C_3H_8 – Butane C_4H_{10} – Nonane C_9H_{20} – Hydrogen sulphide H_2S – Carbon monoxide CO – Ammonia NH_3 – Hydrogen H_2	Device **with** carrying bag TG8

EC type-examination certificate: TÜV 07 ATEX 553353 X

DANGER! Risk of explosion due to sparks

- Only open the battery compartment outside of explosive areas.
- Only charge the device outside of explosive areas.
- Only use the USB port outside of explosive areas.
- Use only suitable battery types.
- When working with hydrogen, always use the carrying bag TG8 for the device.

2.3.2 Active explosion protection

The functional safety test applies to:

Application:	Warning ExTox	
Gas types:	Measuring range:	As per:
– Methane CH_4	0 – 100 % LEL	/7/
– Propane C_3H_8	0 – 100 % LEL	/7/
– Nonane C_9H_{20}	0 – 100 % LEL	/7/
Gases:	Measuring range:	As per:
– Oxygen O_2	0 – 25 % O_2	/5/
– Carbon dioxide CO_2	0 – 5 % CO_2	/3/
– Carbon monoxide CO	0 – 500 ppm CO	/3/
– Hydrogen sulphide H_2S	0 – 100 ppm	/3/
Tested accessories:	– Test set SPE VOL – Flexible hand probe, 1 m – Floating probe 2 m, 6 m – Probe hose TG nonane, 1 m, 6 m	

Type examination

Testing institute:	DEKRA EXAM GmbH
Certificates:	PFG 08 G 002 X BVS 09 ATEX G 001 X

The following points were not part of the type examination:

- Saving measurement data (see section 3.2.5 on page 15)
- Saving protocols from the integrated device inspection (see section 5.1.1.4 on page 31)
- Disposable alkaline batteries for the power supply (see section 4.1 on page 25)

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) ● Accepts 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 on page 13 for information on accessing the menu.

Selecting submenus/menu items

Submenus and menu items are selected and opened using the jog dial and/or function keys.

In measuring mode the **Warning ExTox** application is indicated by the symbol at the top left of the display.

Exiting menus/menu items

There are generally two ways to exit open menus/menu items and go back up a level:

- **Press Esc**
- Select **Exit** menu item

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.

  The switching on process involves an internal check.

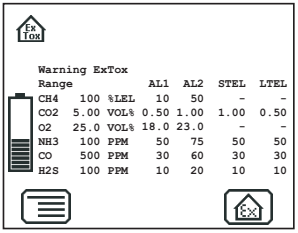
Process	Test purpose
Buzzer emits audible signal.	Is the audible signal working?
Signal light gives visual signal.	Is the visual signal working?
Display is inverted.	Are there pixels missing from the display?

The start screen appears on the display.

Fig. 3: Start screen

Display:
– Device type: Multitec 520
– User:
  Frank Smith
  City Council
  Leakage Delivery
– Firmware version: V1.200
– Date and time
– Capacity disposable battery/ rechargeable battery

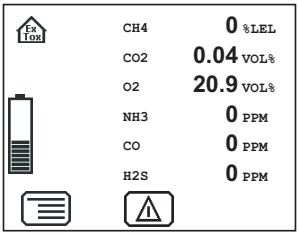
An overview of the measurable gases and corresponding alarm thresholds is then briefly displayed.



Display:
– Symbol: Warning ExTox
– Detectable gases
– Measuring range
– Alarm thresholds
– Capacity disposable battery/ rechargeable battery

Fig. 4: Overview of detectable gases and alarm thresholds

The device switches to measuring mode.



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

Fig. 5: Measuring mode – display of current readings

The device is ready for use.

WARNING! Danger of death due to incorrectly adjusted or faulty devices

Gas warning instruments must be inspected before use at regular intervals.

- Carry out a device inspection every day before starting work.

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 12)

  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 18)

  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.

WARNING!
Danger of death due to lack of alarm signal

The device only issues alarms in measuring mode. As soon you access the menu, alarms are no longer triggered.

- Only change the settings outside of explosive areas and away from toxic or low-oxygen atmospheres.

3.2 Measuring mode

When switched on, the device is in measuring mode. In measuring mode, the current measurements are always displayed (see fig. 5). However, to save the data from a measurement, you must always start the measurement manually (see section 3.2.5 on page 15).

WARNING!
Danger of death due to operating signal failure
If the operating signal fails, the device is not safe to use.
- Stop using the device immediately.
- Move away from explosive areas or toxic or low-oxygen atmospheres immediately.

3.2.1 Accessing the menu (measuring mode menu structure)

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

Zero point
Warning ExTox
Settings
Start measurement
Protocol
Device inspection
Gas type CxHy
Device information
Exit

Fig. 6: Menu with submenus/menu items

Once you have started a measurement, **Start measurement** in the menu becomes **Stop measurement.** You can find detailed information on starting and stopping measurements in section 3.2.5 on page 15.

Protocol does not appear in the menu until you save a protocol for the first time.

Gas type CxHy only appears in the menu if the device is equipped for at least one further gas type apart from methane CH4.

3.2.2 Zero point

The zero point can be set manually under **Zero point** in the menu. This is only necessary if the measurements displayed are different to the values for fresh air after the end of the warm-up period.

Gas	Content in fresh air	Correct zero point on device
CH_4	0 % vol.	0.0 % vol.
CO	0 ppm	0 ppm
CO_2	0.04 % vol.	0.04 % vol.
H_2S	0 ppm	0 ppm
NH_3	0 ppm	0 ppm
O_2	20.9 % vol.	20.9 % vol.

The manual zero point setting is not saved. The zero point can be corrected by adjustment as often as zero point deviations occur.

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 Warning ExTox

You can access the overview of detectable gases and corresponding alarm thresholds under **Warning ExTox** in the menu (fig. 4). The device automatically returns to measuring mode (fig. 5).

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 18).

3.2.5 Starting/stopping a measurement

Measurements must always be started and then stopped. When the measurement is stopped, the measurement data is stored in a file.

Note:
Measurements cannot be cancelled. The only way to cancel a measurement is to stop it.

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. 10 entries).

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

The stored measurement files can be displayed on a computer using a **readout program**. The program is available at www.sewerin.com.

Starting a measurement

1. Press **Menu**.
2. Select **Start measurement** from the menu. This starts measurement plot recording.

Measurement plot recording must always be concluded with **Stop measurement**.

Stopping a measurement

1. Press **Stop measurement**.

   OR

   a) Press **Menu**.

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

2. Answer **Yes** to the warning prompt.
3. 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 3.3.7 on page 24.

3.2.7 Device inspection

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

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 on page 30.

If the integrated device inspection is switched on, the device will remind you 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 Gas type CxHy

You can temporarily change the gas type under **Gas type CxHy** in the menu, provided the device is designed for additional gas types. Gas types available for selection:

- Methane CH_4
- Propane C_3H_8
- Butane C_4H_{10}
- Nonane C_9H_{20}

The temporary gas type change is not saved. If you need to set a different default gas type, you can do this in the **Settings** menu under **System**.

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** :

- Adjustment
- System
- Alarms
- Date/time
- Memory

You can find information on selecting and exiting menus and menu items in section 3.1.2 on page 10.

3.3.1 Opening Settings

1. Press **Menu**.

WARNING!
Danger of death due to lack of alarm signal
The device only issues alarms in measuring mode. As soon you access the menu, alarms are no longer triggered.
- Only change the settings outside of explosive areas and away from toxic or low-oxygen atmospheres.

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2. Select the **Settings** menu item.

   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 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	Press the jog dial
2nd digit		Press the jog dial
3rd digit		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. 7). Otherwise the device will revert to measuring mode.

Adjustment
System
Alarms
Date/time
Memory
Exit

Fig. 7: **Settings** menu

3.3.2 Settings menu structure

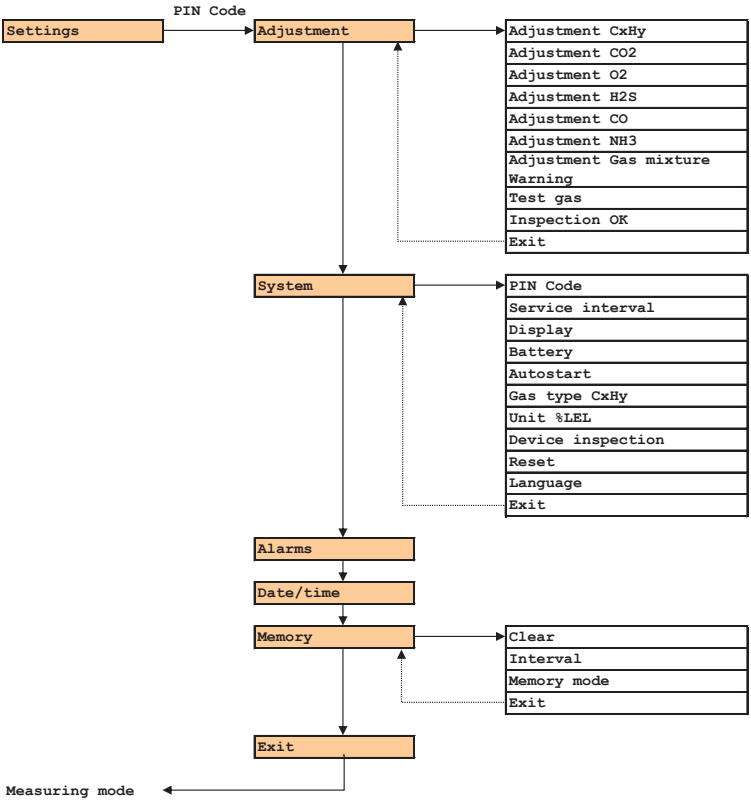

Fig. 8: **Settings** menu structure for Multitec 520 (gas type: methane)

Note:
The number and names of available menu items depend on the optional additional equipment.

3.3.3 Adjustment

The Adjustment menu is used to set the sensors.

WARNING! Danger of death due to incorrect adjustment

Incorrect adjustment can lead to incorrect measurement results. This means that the user may not be warned about dangerous gas concentrations in time.

- Only specialist technicians may perform adjustments
- Adjustments must be made in well ventilated rooms or in the open air.

A detailed description of adjustment along with important information is provided in section 5.2 on page 40.

Adjustment CxHy

Used to adjust the infrared sensor for gas type C_xH_y (methane CH_4, propane C_3H_8, butane C_4H_{10}, nonane C_9H_{20}) in the % vol. range/LEL range.

Adjustment CO2

Used to adjust the infrared sensor for carbon dioxide CO_2 in the % vol. range.

Adjustment O2

Used to adjust the electrochemical sensor for oxygen O_2 in the % vol. range.

Adjustment H2S

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

Adjustment CO

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

Adjustment NH3

Used to adjust the electrochemical sensor for ammonia NH_3 in the ppm range.

Adjustment gas mixture warning

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

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.

CAUTION! Damage possible due to device overheating

If the battery type is not correctly set, the device can overheat.

- Always enter the correct battery type.

Autostart

Sets the application that is automatically activated when the device is switched on.

Note:

For this device no function is assigned for this menu item because only the **Warning ExTox** application is available.

Gas type CxHy

Used to set the gas type (methane CH_4, propane C_3H_8, butane C_4H_{10}, nonane C_9H_{20}), which is automatically used when the device is switched on.

Unit %LEL

Used to set the unit of measurement.

Device inspection

Used to switch the integrated device inspection on or off.

Reset

Used to reset the device settings to the factory settings.

Language

Sets the language.

3.3.5 Alarms

Used to adjust the alarm thresholds for the gas types methane CH_4, propane C_3H_8, butane C_4H_{10}, and nonane C_9H_{20}.

There is detailed information on alarms in section 7.2 on page 50.

AL1 alarm

Used to set the pre-alarm.

AL2 alarm

Used to set the main alarm.

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 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 16.

Interval

Sets the interval at which measurement data is automatically saved.

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.

WARNING! Risk of explosion due to leaking batteries
Leaking electrolytes can shorten the creepage distance and air gap between the poles. As a result, the requirements for the batteries may no longer be met.

- Replace leaking batteries immediately.
- 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 as per /14/, 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 specifications in accordance with /6/.
- In each battery compartment use only batteries that are identical with respect to type (disposable or rechargeable), capacity and manufacturer.

Disposable battery requirements

- Alkaline disposable batteries
- Size: AA, type: LR6 as per /9/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /6/.

Rechargeable battery requirements

- NiMH rechargeable batteries
- Size: AA, type: HR6 as per /11/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /6/.
- 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 due to sparks
High charging current occurs when batteries are being charged.
The power supply is not explosion-proof.
- Only 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.
- 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.

DANGER! Risk of explosion due to sparks
High charging current occurs when batteries are being charged.
The power supply is not explosion-proof.
- Only 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: Battery almost empty
- – **Capacity disposable battery/rechargeable battery** symbol flashes
- – Audible signal (one-off)
- – Operating signal doubles
- – Remaining operating time: approx. 15 min

Level 2: Battery empty
- – Blank display apart from **Capacity disposable battery/rechargeable battery** symbol
- – Continuous audible signal
- – Measuring mode unavailable
- – Device shuts off

4.4 Replacing disposable/rechargeable batteries

DANGER! Risk of explosion due to sparks
When the housing is open, the device is not explosion-proof.

- Only open the battery compartment 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 replace 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.

WARNING! Danger of death due to incorrectly adjusted or faulty devices

Gas warning instruments must be inspected before use at regular intervals.

- Carry out a device inspection every day before starting work (as per /1/, /4/, /8/).

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 performed every day before starting work.

If the integrated device inspection is switched on, the device will remind you 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:
If the integrated device inspection is switched off, the device inspection must be documented on paper.

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. They can also be displayed on a computer using a **readout program**. The program is available at www.sewerin.com.

The **Carry out 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. Accept the setting with **OK**.
8. Exit the **settings** with **Exit.**

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

Test	Recommended test gases
Gas mixture	ExTox IR
Test gas C_3H_8	1.00 % vol. C_3H_8
Test gas C_4H_{10}	1.00 % vol. C_4H_{10}
Test gas C_9H_{20}	0.3 % vol. C_3H_8 (replacement test gas)
Test gas NH_3	50 ppm NH_3

If a gas mixture is used, but the device is equipped for other gas types and gases which are not contained in the gas mixture, these must be additionally tested with the relevant 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.

Changing the test gas concentration

If there is no test gas with the specified concentrations available for the inspection, the values can be adjusted to the test gas used in the adjustment menu under **Test gas** (see Section 3.3.3).

5.1.2 Carrying out 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.

General status
Fresh air
Gas mixture
Test gas NH3
Test gas C3H8
Test gas C4H10
Test gas C9H20

Fig. 9: **Device inspection** menu

Note:
Note that **Test gas C3H8**, **Test gas C4H10**,**Test gas C9H20** and **Test gas NH3** only appear in the menu if the device is equipped for the corresponding gas types.

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

   For detailed information, refer to the following sections:

   − General status section 5.1.3 on page 36
   − Fresh air section 5.1.4 on page 38
   − Test gas … section 5.1.5 on page 38

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. If necessary 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. The general status test 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.

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.

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.

The device inspection has been opened.

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.

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 (see section 7.3 on page 55). Move the device to another location 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 40).

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.

All test gases specified in the device must be tested. The number of specified test gases is dependent on the optional additional equipment.

The following resources are needed for the test:

- Test gas (e.g. gas mixture **ExTox IR**)

  Information on test gases for the device inspection can be found in section 5.1.1.6 on page 32.

- 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 procedure for testing with a gas mixture and individual gas is the same.

The device inspection has been opened.

1. On the **Device inspection** menu, select the menu item to be tested (**Gas mixture**, **Test gas C3H8**, **Test gas C4H10**, **Test gas C9H20**, **Test gas NH3**).
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 for further test gases if applicable.

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 (see section 7.3 on page 55)	Adjustment required

5.2 Adjustment

WARNING! Danger of death due to incorrect adjustment

Incorrect adjustment can lead to incorrect measurement results. This means that the user may not be warned about dangerous gas concentrations in time.

- Only specialist technicians may perform adjustments
- Adjustments must be made in well ventilated rooms or in the open air.

5.2.1 Scope

Adjustments must be made separately for each measuring range.

- Zero point
- Sensitivity

Note:
For each measuring range always adjust the zero point first, followed by the sensitivity.

Only gases for which the readings are outside the predefined limits need to be adjusted during the adjustment process (see section 7.3 on page 55).

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
CO_2	• Fresh air	• Gas mixture
O_2	• Gas mixture (free from O_2) • 100 % vol. N_2 • 100 % vol. CH_4	• Fresh air
H_2S	• Fresh air	• Gas mixture • 40 ppm H2S
CO	• Fresh air	• Gas mixture • 40 ppm CO
NH_3	• Fresh air	• 50 ppm NH_3
C_3H_8	• Fresh air	• 1.00 % vol. C_3H_8
C_4H_{10}	• Fresh air	• 1.00 % vol. C_4H_{10}
C_9H_{20}	• Fresh air	• 0.3 % vol. C_3H_8 (replacement test gas)

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.

Every gas must be adjusted separately, Except for adjustment with a gas mixture (see section 5.2.3 on page 42).

Replacement test gases are suitable for adjustment even though they do not contain the gas to be tested, although the adjustment error can be up to -15 % or +30 %.

Fresh air contains 20.9 % vol. O_2 and is therefore used with oxygen to adjust the sensitivity.

Propane C_3H_8, butane C_4H_{10} and nonane C_9H_{20} and ammonia NH_3 can only be adjusted with 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 warning**:

- Methane CH_4
- Carbon dioxide CO_2
- Oxygen O_2
- Hydrogen sulphide H_2S
- Carbon monoxide CO

SEWERIN recommends a gas mixture comprising the test gas **ExTox IR** (2.2 % vol. CH_4, 2.0 % vol. CO_2, 40 ppm CO and 40 ppm H_2S in N_2).

Zero point

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, H_2S and CO
- Sensitivity of O_2

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, H_2S and CO
- Zero point of O_2

5.2.4 Preparation

An adjustment always requires 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. The adjustment of **oxygen** is an **exception**. It is therefore described separately.

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 the zero point adjustment for **Adjustment CO2** in the menu and **Adjustment gas mixture warning**.

---

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**, **Adjustment gas mixture warning**).
5. Wait at least 1 minute. The displayed reading must be stable.

Note:
For **Adjustment gas mixture warning**, **all** values must be stable. The time required for this can vary depending on the specific gas.

6. From the menu select the method you wish to use to adjust the zero point.
   - e.g. for **Adjustment CH4**: **Zero point**
   - for **Adjustment gas mixture warning**: **Fresh air**
7. Press **OK** to confirm.

   This adjusts the zero point. The reading shows zero (0.00 % vol./0 ppm). (Except for **Adjustment gas mixture warning**: the value for oxygen O_2 is 20.9 % vol.)

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 on page 41.
- 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**, **Adjustment gas mixture warning**).
5. Select the menu item that specifies the sensitivity to be tested.
   - e.g. for **Adjustment CH4**: **2.20 %VOL. CH4**
   - for **Adjustment gas mixture warning**: **Gas mixture**

   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 warning**, **all** values must be stable. The time required for this can vary depending on the specific gas.

8. Press **OK** to confirm. The device is adjusted. The reading shows the specified value (e.g. 2.20 % vol. CH_4).
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 of oxygen must be adjusted using a gas that does not contain any oxygen and which will not damage the sensor.

The following resources are needed for adjusting the zero point of oxygen:

- Test gas

  Information on test gases for adjustment can be found in section 5.2.2 on page 41.

- 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.

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 (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

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 required (**Adjustment CxHy**, **Adjustment CO2** or **Adjustment gas mixture warning**)
10	Adjustment failed Test gas	Check test gas
11	Zero point Adjustment required	Adjustment required
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
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

Dimensions (W×D×H):	Approx. 148 × 57 × 205 mm Approx. 148 × 57 × 253 mm with supporting bracket
Weight:	Approx. 1000 g, depending on equipment
Operating position:	any
Protection rating:	IP54
Power supply:	4 cells, either: – Rechargeable batteries: NiMH – Disposable batteries: Alkaline
Operating time:	Minimum 8 h
Charging time for re-chargeable batteries:	approx. 3 h (full charge), depending on capacity
Charging voltage:	12 V DC (max. 1 A)
Operating temperature:	-20 ºC – +40 ºC
Storage temperature:	-25 ºC – +60 ºC
Pressure:	950 – 1100 hPa
Permissible relative humidity:	5 – 90 % r.h., non-condensing
Sensors:	– IR for flammable gases (CH_4, C_3H_8, C_4H_{10}, C_9H_{20}) – IR for CO_2 Optional: – EC for O_2, H_2S, CO, NH_3
Adjustable gas types:	– Methane CH_4 Optional: – Propane C_3H_8 – Butane C_4H_{10} – Nonane C_9H_{20}
Warm-up time:	– < 30 s – Up to 90 s for EC
PC connection:	USB
Memory:	8 MB
Display:	320 × 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 Pump error (F100) dependent on volume flow: – ≤ 20 l/h F100 certain – > 20 l/h – ≤ 35 l/h F100 possible

Pressure at gas input:	100 mbar, maximum
Operation:	– ON/OFF key – Jog dial – 3 function keys

7.2 Alarms

WARNING! Danger of death due to hazardous gas concentrations

An alarm always indicates danger.

- Take all necessary measures for your own safety and the safety of others immediately.

The type of action depends on the situation. In the event of a pre-alarm, it may be sufficient to ventilate thoroughly. In the event of a main alarm, it may be necessary to leave the danger zone immediately.

7.2.1 Features

AL1

Type:	Pre-alarm
Adjustable:	Yes
Latching:	No
Trigger:	Alarm threshold AL1 exceeded
Indicator:	– Audible signal – Visual signal – **AL1** message on display
Acknowledge-ment:	– Possible for audible signal when alarm threshold AL1 is exceeded
Reset:	– Automatic when level falls below alarm threshold AL1

Exception for **oxygen**: alarm AL1 is triggered when the level falls below alarm threshold AL1.

AL2

Type:	Main alarm
Adjustable:	Yes
Latching:	Yes
Trigger:	Alarm threshold AL2 exceeded
Indicator:	– Audible signal – Visual signal – **AL2** message on display
Acknowledge-ment:	– Possible for audible signal when alarm threshold AL2 is exceeded – Possible overall after level falls below alarm thresh-old AL2
Reset:	– By acknowledgement after level falls below alarm threshold AL2 – By switching device off

Exception for **oxygen**: alarm AL2 is non-latching.

AL3

Type:	End of measuring range
Adjustable:	No
Latching:	Yes
Trigger:	Alarm threshold AL3 exceeded
Indicator:	– Audible signal – Visual signal – **AL3** message on display – Reading flashes
Acknowledge-ment:	– Possible after level falls below alarm threshold AL2
Reset:	– By acknowledgement after level falls below alarm threshold AL2 – By switching device off

STEL

Type:	Main alarm (short-time exposure limit)
Adjustable:	No
Latching:	Yes
Trigger:	Sum of the concentrations of a gas is greater than the product of the OEL and the excess factor over the averaging time
Indicator:	– Audible signal – Visual signal – **STEL** message on display
Acknowledge-ment:	– Not possible
Reset:	– By switching device off

LTEL

Type:	Main alarm (long-time exposure limit)
Adjustable:	No
Latching:	Yes
Trigger:	Sum of the concentrations of a gas is greater than the OEL over the averaging time
Indicator:	– Audible signal – Visual signal – **LTEL** message on display
Acknowledge-ment:	– Not possible
Reset:	– By switching device off

7.2.2 Occupational exposure limits (OELs) and excess factors (STEL and LTEL)

The short-time exposure limit (STEL) is calculated by multiplying the OEL value by the excess factor over an averaging time of 15 minutes, as per /13/.

The long-time exposure limit (LTEL) is obtained from the OEL value over an averaging period of 8 hours, as per /13/.

Gas	OEL	Excess factor
CO_2	0.50 % vol.	2
H_2S	5 ppm	1
CO	30 ppm	1
NH_3	20 ppm	1

7.2.3 Alarm thresholds (factory settings)

Gas	AL1	AL2	AL3	STEL	LTEL
CH_4	10 % LEL	50 % LEL	100 % LEL	—	—
C_3H_8	10 % LEL	50 % LEL	100 % LEL	—	—
C_4H_{10}	10 % LEL	50 % LEL	100 % LEL	—	—
C_9H_{20}	10 % LEL	50 % LEL	100 % LEL	—	—
CO_2	0.50 % vol.	1.00 % vol.	5 % vol.	1.00 % vol.	0.50 % vol.
O_2	18.0 % vol.	23.0 % vol.	25 % vol.	—	—
H_2S	5 ppm	20 ppm	100 ppm	5 ppm	5 ppm
CO	30 ppm	60 ppm	500 ppm	30 ppm	30 ppm
NH_3	50 ppm	75 ppm	100 ppm	50 ppm	50 ppm

7.2.4 Setting ranges for gas types

LEL values are specified as per /10/ and /12/.

The setting for AL1 must not exceed the setting for AL2.

Gas type		AL1	AL2
All C_xH_y in % LEL	Threshold	**10 % LEL**	**50 % LEL**
CH_4	Threshold	**0.45 % vol.**	**2.20 % vol.**
	Setting range	0.20 – 2.60 % vol.	0.25 – 2.65 % vol.
	Increment	0.05 % vol.	0.05 % vol.
C_3H_8	Threshold	**0.17 % vol.**	**0.86 % vol.**
	Setting range	0.08 – 1.00 % vol.	0.10 – 1.02 % vol.
	Increment	0.02 % vol.	0.02 % vol.
C_4H_{10}	Threshold	**0.14 % vol.**	**0.7 % vol.**
	Setting range	0.08 – 0.82 % vol.	0.10 – 0.84 % vol.
	Increment	0.02 % vol.	0.02 % vol.
C_9H_{20}	Threshold	**0.07 % vol.**	**0.35 % vol.**
	Setting range	0.03 – 0.41 % vol.	0.04 – 0.42 % vol.
	Increment	0.01 % vol.	0.01 % vol.
CO_2	Threshold	**0.5 % vol.**	**1.0 % vol.**
	Setting range	0.1 – 4.99 % vol.	0.11 – 5.0 % vol.
	Increment	0.01 % vol.	0.01 % vol.
O_2	Threshold	**18.0 % vol.**	**23.0 % vol.**
	Setting range	0.5 – 20.5 % vol.	21.2 – 25.0 % vol.
	Increment	0.1 % vol.	0.1 % vol.
H_2S	Threshold	5 **ppm**	**20 ppm**
	Setting range	5 – 99 ppm	6 – 100 ppm
	Increment	1 ppm	1 ppm
CO	Threshold	**30 ppm**	**60 ppm**
	Setting range	5 – 499 ppm	6 – 500 ppm
	Increment	1 ppm	1 ppm
NH_3	Threshold	**50 ppm**	**75 ppm**
	Setting range	5 – 99 ppm	6 – 100 ppm
	Increment	1 ppm	1 ppm

Factory settings in **bold**

7.3 Limit values for the device inspection

Gas	Zero point		Sensitivity	
	Specification	Deviation	Specification	Deviation
CH_4	0.00 % vol.	±0.15 % vol.	2.20 % vol.	±0.20 % vol.
C_3H_8	0.00 % vol.	±0.12 % vol.	1.00 % vol.	±0.16 % vol.
C_4H_{10}	0.00 % vol.	±0.12 % vol.	1.00 % vol.	±0.16 % vol.
C_9H_{20}	0.00 % vol.	±0.06 % vol.	0.22 % vol. (replacement test gas 0.3 % vol. C_3H_8)	±0.06 % vol.
CO_2	0.04 % vol.	±0.06 % vol.	2.00 % vol.	±0.20 % vol.
O_2	0 % vol.	±0.5 % vol.	20.9 % vol.	±0.5 % vol.
H_2S	0 ppm	±3 ppm	40 ppm	±3 ppm
CO	0 ppm	±3 ppm	40 ppm	±3 ppm
NH_3	0 ppm	±5 ppm	50 ppm	±5 ppm

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 (see section 3.3.7 on page 24). The selected memory mode applies for all protocol types.

Measurements

Note:
A file is saved after each **Start measurement** – **Stop measurement** cycle, regardless of whether the memory capacity is exhausted.

Each file has a maximum memory capacity of 1800 data records. This means that a file can record data for 30 mins (0.5 h) at a save interval of 1 second. After this, data recording continues automatically in the next file.

Save interval	Save time for 1 file (1800 data records)	Save time for 80 files (max. memory capacity)
1 s	0.5 h	40 h
2 s	1 h	80 h
5 s	2.5 h	200 h
10 s	5 h	400 h
20 s	10 h	800 h

Factory settings in **bold**

7.5 Sensors

Note:
Probes increase the stated response times.

7.5.1 Infrared sensors (IR)

7.5.1.1 Methane CH_4, propane C_3H_8, butane C_4H_{10}, nonane C_9H_{20}

Type:	Infrared sensor
Measuring range:	0 – 100 % LEL
Measuring error: – CH_4 – C_3H_8 – C_9H_{20}	As per /7/ ±1 % LEL (short-term stability) ±4 % LEL (long-term stability) ±1 % LEL (short-term stability) ±1 % LEL (long-term stability) ±5 % LEL
Response times: – CH_4 – C_3H_8, C_4H_{10} – C_9H_{20}	 t_{50} < 8 s t_{90} < 14 s t_{50} < 9 s t_{90} < 17 s t_{50} < 16 s t_{90} < 120 s
Temperature range:	-20 ºC – +40 ºC
Interference:	All hydrocarbons C_xH_y
Lifetime: – Warranted – Expected	 2 years 5 years
Test gases: – Zero point – Sensitivity	 Fresh air 2.20 % vol. CH_4 1.00 % vol. C_3H_8 1.00 % vol. C_4H_{10} 0.22 % vol. C_9H_{20} (replacement test gas 0.3 % vol. C_3H_8)

7.5.1.2 Carbon dioxide CO_2

Type:	Infrared sensor
Measuring range: – Lower limit	0 – 5 % vol. 0.02 % vol.
Measuring error:	±0.04 % vol. (long-term stability) As per /2/
Zero point deviation:	≤ 0.04 % vol.
Response time:	t_{90} < 20 s
Decay time:	t_{10} < 14 s
Temperature range:	-20 ºC – +40 ºC
Interference:	None
Lifetime: – Warranted – Expected	 2 years 5 years
Test gases: – Zero point – Sensitivity	 Fresh air 2.00 % vol. CO_2

7.5.2 Electrochemical sensors (EC)

7.5.2.1 Oxygen O_2

Type:	Electrochemical sensor
Measuring range:	0 – 25 % vol.
Resolution:	0.1 % vol.
Measuring error:	±3 % / ±0.3 % vol. (±3 digits)
Response time:	t_{90} < 15 s
Drift:	< 2 % within 3 months
Temperature range:	-20 ºC – +40 ºC
Interference:	None
Lifetime: – Warranted – Expected	 2 years 3 years
Test gases: – Zero point – Sensitivity	 100 % vol. CH_4 or 100 % vol. N_2 Fresh air (20.9 % vol.)

7.5.2.2 Carbon monoxide CO

Type:	Electrochemical sensor
Measuring range: – Lower limit	0 – 500 ppm 4 ppm
Resolution:	1 ppm
Measuring error:	±3 % / ±3 ppm (±3 Digit) ±5 ppm (long-term stability) as per /2/
Zero point deviation:	7 ppm
Response time:	t_{90} < 30 s
Decay time:	t_{10} < 24 s
Drift:	< 10 % within 6 months
Temperature range:	-20 ºC – +40 ºC
Interference at 20 ºC. – 3000 ppm H_2 – 100 ppm NO	 Approx. 1000 ppm CO Approx. 25 ppm CO
Lifetime: – Warranted – Expected	 24 months 36 months
Test gases: – Zero point – Sensitivity	 Fresh air 40 ppm CO

7.5.2.3 Hydrogen sulphide H_2S

Type:	Electrochemical sensor
Measuring range: – Lower limit	0 – 100 ppm 1 ppm
Resolution:	1 ppm
Measuring error:	±3 % / ±3 ppm (±3 Digit) ±2 ppm (long-term stability) as per /2/
Zero point deviation:	1 ppm
Response time:	t_{90} < 30 s
Decay time:	t_{10} < 27 s
Drift:	< 10 % within 6 months
Temperature range:	-20 ºC – +40 ºC
Alarm thresholds (factory settings):	AL1: 10 ppm AL2: 20 ppm AL3: 100 ppm
Interference at 20 ºC. – 100 ppm CO – 1 % vol. H_2 – 100 ppm NO_2	 Approx. 1 ppm H_2S Approx. 10 ppm H_2S Approx. 3 ppm H_2S
Lifetime: – Warranted – Expected	 2 years > 3 years
Test gases: – Zero point – Sensitivity	 Fresh air 40 ppm H_2S

7.5.2.4 Ammonia NH_3

Type:	Electrochemical sensor
Measuring range:	0 – 100 ppm
Resolution:	1 ppm
Measuring error:	±3 % / ±3 ppm (±3 Digit)
Response time:	t_{90} < 60 s
Drift:	< 5 % within 6 months
Temperature range:	-20 ºC – +40 ºC
Alarm thresholds (factory settings):	AL1: 50 ppm AL2: 75 ppm AL3: 100 ppm
Interference at 20 ºC. – 20 ppm H_2	 approx. 1 ppm NH_3
Lifetime: – Warranted – Expected	 1 year > 2 years
Test gases: – Zero point – Sensitivity	 Fresh air 50 ppm NH_3 in N_2

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 explosive areas.

Read the operating instructions.

7.6.2 Cleaning

The device must only be cleaned with a damp cloth.

CAUTION! Damage possible due to unsuitable cleaning agents

Unsuitable cleaning agents can cause chemical corrosion on the housing surface. Vapours from solvents and substances containing silicone can penetrate the device and damage the sensors.

- Never clean the device with solvents, petrol or cockpit spray containing silicone or similar substances.

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).

DANGER! Risk of explosion due to sparks

When working with hydrogen, electrostatic charging can occur.

- When working with hydrogen, always use the carrying bag TG8 for the device.

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
Floating probe	ZS21-10100
Probe hose TG nonane, 1 m	ZZ27-20100
Probe hose TG nonane, 6 m	ZZ27-20600
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 ExTox IR, test gas can 1 l, (pressure approx. 12 bar	ZT47-10000

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® 520** fulfils the requirements of the following directives:

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

Gütersloh, 2016-04-20

Dr. S. Sewerin
(General Manager)

The complete declaration of conformity can be found online.

7.9 Inspection protocols

7.9.1 Test with individual gases

INSPECTION PROTOCOL ***Multitec® 520***

Fab. no. (e.g.: 066 01 5001)

04.12.2018

1.0	**General Status**										
1.1	- Housing correct (e.g.: Y / N)										
1.2	- Fine dust filter correct (e.g.: Y / N)										
1.3	- Battery capacity (e.g.: ¼)										
2.0	**Pump check**										
	- Pump error F100 in seal										
3.0	**Methane CH_4**										
3.1	Zero point (fresh air) - Display -0.15 – +0.15 % vol.										
3.2	Test gas 2.20 % vol. CH_4 - Display 2.00 – 2.40 % vol.										
3.3	Visual alarm (e.g.: Y / N)										
3.4	Audible alarm (e.g.: Y / N)										
4.0	**Carbon dioxide CO_2**										
4.1	Zero point (fresh air 0.04 % vol.) - Display -0.02 – +0.10 % vol.										
4.2	Test gas 2.00 % vol. CO_2 - Display 1.80 – 2.20 % vol.										
4.3	Visual alarm (e.g.: Y / N)										
4.4	Audible alarm (e.g.: Y / N)										
5.0	**Oxygen O_2**										
5.1	Zero point (test gas 100 % vol. CH_4) - Display -0.5 – +0.5 % vol.										
5.2	Test gas 17.5 % vol. - Display 17.0 – 18.0 % vol.										
5.3	Test gas fresh air (20.9 % vol.) - Display 20.4 – 21.4 % vol.										
5.4	Visual alarm (e.g.: Y / N)										
5.5	Audible alarm (e.g.: Y / N)										
6.0	**Carbon monoxide CO**										
6.1	Zero point (fresh air) - Display -3 – +3 ppm										
6.2	Test gas 40 ppm - Display 37 – 43 ppm										
6.3	Visual alarm (e.g.: Y / N)										
6.4	Audible alarm (e.g.: Y / N)										
7.0	**Hydrogen sulphide H_2S**										
7.1	Zero point (fresh air) - Display -3 – +3 ppm										
7.2	Test gas 40 ppm - Display 37 – 43 ppm										
7.3	Visual alarm (e.g.: Y / N)										
7.4	Audible alarm (e.g.: Y / N)										

8.0	**Ammonia NH_3**										
8.1	Zero point (fresh air) - Display -3 – +3 ppm										
8.2	Test gas 50 ppm - Display 45 – 55 ppm										
8.3	Visual alarm (e.g.: Y / N)										
8.4	Audible alarm (e.g.: Y / N)										

9.0	**Comments** - Maintenance required (inspection plate) - Lifetime sensor exceeded - Adjustment, repair - or similar										

10.0	**Inspection**										
	- Day										
	- Month										
	- Year										
	- Signature										

7.9.2 Test with gas mixture

INSPECTION PROTOCOL ExTox IR Multitec® 520

Fab. no. (e.g.: 066 01 5001)

04.12.2018

1.0	**General Status**										
1.1	- Housing correct (e.g.: Y / N)										
1.2	- Fine dust filter correct (e.g.: Y / N)										
1.3	- Battery capacity (e.g.: ¼)										
2.0	**Pump check**										
	- Pump error F100 in seal										
3.0	**Fresh air**										
3.1	Zero point CH_4 - Display -0.15 – +0.15 % vol.										
3.2	Zero point CO_2 (0.04 % vol.) - Display -0.02 – +0.10 % vol.										
3.3	Oxygen O_2 (20.9 % vol.) - Display 20.4 – 21.4 % vol.										
3.4	Zero point CO - Display -3 – +3 ppm										
3.5	Zero point H_2S - Display -3 – +3 ppm										
3.6	Zero point NH_3 - Display -3 – +3 ppm										
4.0	**Test gas gas mixture (2.2 % vol. CH_4, 2.0 % vol. CO_2, 0 % vol. O_2, 40 ppm CO, 40 ppm H_2S)**										
4.1	CH_4 - Display 2.00 – 2.40 % vol.										
4.2	CO_2 - Display 1.80 – 2.20 % vol.										
4.3	O_2 - Display -0.5 – +0.5 % vol.										
4.4	CO - Display 37 – 43 ppm										
4.5	H_2S - Display 37 – 43 ppm										
4.6	Visual alarm (e.g.: Y / N)										
4.7	Audible alarm (e.g.: Y / N)										
5.0	**Test gas ammonia NH_3**										
5.1	Test gas 50 ppm - display 45 – 55 ppm										
5.2	Visual alarm (e.g.: Y / N)										
5.3	Audible alarm (e.g.: Y / N)										
6.0	**Comments** - Maintenance required (inspection plate) - Lifetime sensor exceeded - Adjustment, repair - or similar										
7.0	**Inspection**										
	- Day										
	- Month										
	- Year										
	- Signature										

7.10 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.

7.11 Terminology and abbreviations

Multitec® 520

% vol.	● Percent concentration of a gas in a gas mixture with respect to the volume
AL	● Alarm
CENELEC	● European Committee for Electrotechnical Standardization
EC	● Electrochemical sensor
Gas type	● Hydrocarbon C_xH_y, which can be measured with the IR ● One of the available gas types must always be set at a time, as it is not possible to measure more than one gas type at the same time.
IR	● Infrared sensor
LEL	● Lower Explosion Limit
LTEL	● Long-time exposure limit
NiMH	● Nickel metal hydride
OEL	● Occupational exposure limit
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.
STEL	● Short-time exposure limit

7.12 Referenced documents

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

/1/ BGI T 023
Berufsgenossenschaft Chemie (Chemical Employers' Liability Insurance Association); Code of Practice T 023: Gas Warning Devices for Explosion Protection – Use and Operation
Available for download at: www.bgchemie.de

/2/ EN 45544

/3/ EN 45544-2

/4/ EN 45544-4

/5/ EN 50104:2010

/6/ EN 60079-7:2007

/7/ EN 60079-29-1

/8/ EN 60079-29-2

/9/ EN 60086-1

/10/ EN 61779-1

/11/ EN 61951-2

/12/ IEC 60079-20

/13/ TRGS 900: 2006
Technical regulations for hazardous substances: Occupational exposure limits
Available for download at: www.baua.de

/14/ 94/9/EC ATEX 100a

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