

Multitec® 410



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Operating instructions

Multitec® 410



Fig. 1: Overview of **Multitec 410**

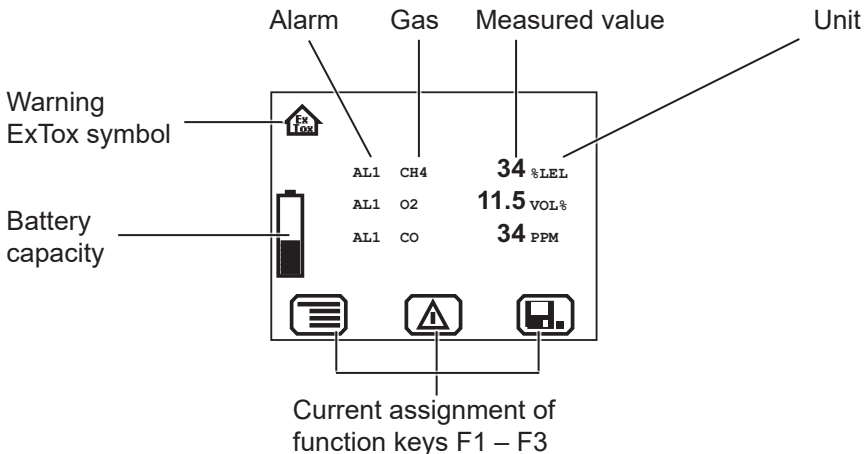


Fig. 2: **Multitec 410** display

Display symbols



Menu



Stop measurement



OK



Information



Cancel



Clear



Buzzer off



Fault



Perform device inspection



Warning ExTox



Tab (jump to next input field)



Open stored comments
Open stored inspectors



Battery capacity

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 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.

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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.

- 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 410** is a portable warning device for monitoring the atmospheric air in the workplace. The device can measure several gases simultaneously, thus offering comprehensive protection against dangerous gas concentrations. It warns, for example, of:

- explosive gas concentrations
- lack of oxygen/excessive oxygen
- carbon monoxide as a toxic gas

The device is fitted with a catalytic combustion sensor for measuring hydrocarbons C_xH_y as standard. It can also be equipped with electrochemical sensors for measuring O_2 and CO .

Catalytic combustion sensors operate on the catalytic combustion principle. Thermal conductivity sensors measure the specific conductivity of gases. Electrochemical sensors operate on the electrochemical cell principle.

Note:

These operating instructions describe the **Multitec 410** with all additional equipment (firmware version 1.2XX). All descriptions refer to the device as delivered. 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. It may be used to measure the following gases (depending on the device model and additional equipment):

- Methane CH_4 / Propane C_3H_8 / Butane C_4H_{10} / Nonane C_9H_{20}
- Oxygen O_2
- Carbon monoxide CO

It must **not** be used for:

- Gas analysis of technical processes
- Monitoring liquids

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

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

1.4 General safety information

- The 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.

- If a device can be used for measuring nonane, special probe hoses must be used (TG nonane probe hose, see section 7.6 on page 59).
- 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 been exposed to gas concentrations above the measuring range limit of the LEL range.
- 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).

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)



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:

- Catalytic combustion sensor (CC)
- Electrochemical sensor (EC)

Application	Gas	Measuring range	Sensor
Warning ExTox	CH ₄ C ₃ H ₈ C ₄ H ₁₀ C ₉ H ₂₀	0 – 100 %LEL	CC
	O ₂	0 – 25 % vol.	EC
	CO	0 – 500 ppm	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 de ib IIB T4 Gb	<ul style="list-style-type: none"> – Methane CH₄ – Propane C₃H₈ – Butane C₄H₁₀ – Nonane C₉H₂₀ – Hydrogen sulphide H₂S – Carbon monoxide CO – Ammonia NH₃ 	Device without carrying bag TG8
II2G Ex de ib IIC T4 Gb	<ul style="list-style-type: none"> – Methane CH₄ – Propane C₃H₈ – Butane C₄H₁₀ – Nonane C₉H₂₀ – Hydrogen sulphide H₂S – Carbon monoxide CO – Ammonia NH₃ – Hydrogen H₂ 	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	/6/
– Propane C ₃ H ₈	0 – 100 % LEL	/6/
– Nonane C ₉ H ₂₀	0 – 100 % LEL	/6/
Gases:	Measuring range:	As per:
– Oxygen O ₂	0 – 25 % O ₂	/4/
– Carbon monoxide CO	0 – 500 ppm CO	/2/
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

Certificate: 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)
- Saving protocols from the integrated device inspection (see section 5.1.1.4)
- Disposable alkaline batteries for the power supply (see section 4.1)

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	<ul style="list-style-type: none"> ● Switches the device on ● Switches the device off
Function keys F1, F2, F3	Press	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● Selects functions, settings, measurement data, etc. ● Modifies values
	Press	<ul style="list-style-type: none"> ● Opens the next program level (e.g. menu item, function, measurement data, selectable values) ● Applies 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 main menu.

Selecting submenus/menu items

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

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

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 return to the next level up:

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

3.1.3 Switching the device on

Note:

Always switch the device on with fresh air.

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

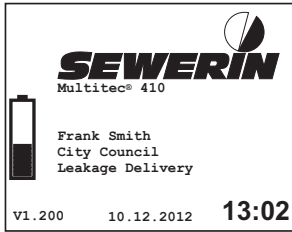


Fig. 3: Start screen

- Display:
- Device type: Multitec 410
 - User: Frank Smith
 - Public services: Any town
 - Dep.: Fault clearing
 - Firmware version: V1.200
 - Date and time
 - Battery capacity

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

Warning ExTox					
Range		AL1	AL2	STEL	LTEL
CH4	100 %LEL	10	50	-	-
O2	25.0 VOL%	18.0	23.0	-	-
CO	500 PPM	30	60	30	30

Fig. 4: Overview of detectable gases and alarm thresholds

- Display:
- Symbol: Warning ExTox
 - Detectable gases
 - Measuring range
 - Alarm thresholds
 - Battery capacity

The device switches to measuring mode.

CH4	0 %LEL
O2	20.9 VOL%
CO	0 PPM

Fig. 5: Measuring mode – display of current readings

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

The device is ready for use.



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 as 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 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
CH ₄	0 % vol.	0.0 % vol.
O ₂	20.9 % vol.	20.9 % vol.
CO	0 ppm	0 ppm

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

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.

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.

Stored measurement files can be read 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

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.

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



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.

More detailed information about the device inspection can be found in section 5.1 on page 30.

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 CH₄
- Propane C₃H₈
- Butane C₄H₁₀
- Nonane C₉H₂₀

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



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.
-

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 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

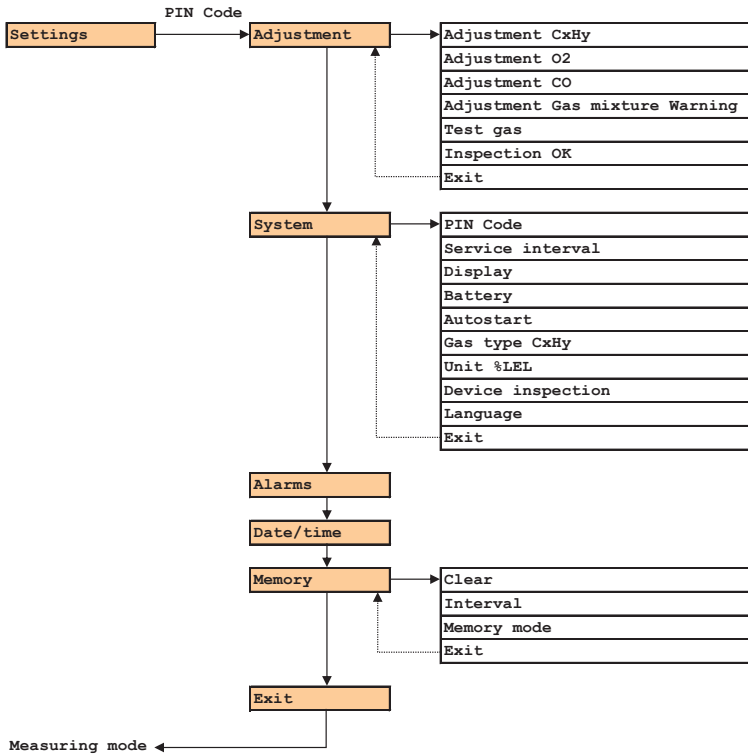


Fig. 8: **Settings** menu structure for the **Multitec 410**

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.



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 39.

Adjustment CxHy

Used to adjust the catalytic combustion 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. or LEL range.

Adjustment O2

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

Adjustment CO

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

Adjustment gas mixture warning

Used to adjust the catalytic combustion 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.

Note:

The inspection is used for regularly checking the device. It is not used as often for the device inspection (function control); more often it is carried out for maintenance purposes.

The inspection must be carried out by an authorised specialist (e.g. device inspector).

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

Used to set the Warning ExTox application.

Gas type C_xH_y

Used to set the gas type (methane CH₄, propane C₃H₈, butane C₄H₁₀, nonane C₉H₂₀), 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 CH₄, propane C₃H₈, butane C₄H₁₀, and nonane C₉H₂₀.

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

You can find information on clearing individual protocols in section 3.2.6 on page 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 /13/, 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 /5/.
 - 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 /8/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /5/.

Rechargeable battery requirements

- NiMH rechargeable batteries
- Size: AA, type: HR6 as per /10/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /5/.
- The rechargeable batteries must be fast charging ($I > 1.25 \text{ A}$) 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

When batteries are charged in potentially explosive areas, high charging current occurs.

The power supply is not explosion-proof.

- Only charge the device outside of explosive areas.
-

For charging you will need either:

- M4 AC/DC adapter
- M4 vehicle cable

Please note the following points:

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

4.2.2 Rechargeable battery maintenance

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

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



DANGER! Risk of explosion due to sparks

When batteries are charged in potentially explosive areas, high charging current occurs.

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

4.4 Replacing disposable/rechargeable batteries



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/, /3/, /7/).
-

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 every day.

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. The protocols can also be displayed on a computer using a **readout program**. The program 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.

5.1.2 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.

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

Fig. 9: **Device inspection** menu

Note:

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

2. Select a test from the menu (**Device inspection**, **Fresh air**, **Gas mixture**, **Test gas...**).

3. Carry out the test.

For detailed information, refer to the following sections:

- General status section 5.1.3 on page 35
- Fresh air section 5.1.4 on page 37
- Test gas ... section 5.1.5 on page 37

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.

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.

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.

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.

A gas mixture must be used for this test first of all.

If the device is designed for further gas types and gases which are not contained in the gas mixture, each of these must also be tested with the relevant individual gas.

The following resources are needed for the test:

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

Note:

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

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**).
2. Check whether the test gas concentration specified by the device matches the test gas you intend to use. To do this press **Information**.
3. Add the test gas
4. Wait until the displayed readings are stable. A **Status: OK** message will appear.
5. Press **OK** to confirm.
6. Stop the test gas supply.
7. Repeat for further test gases if applicable.

Note:

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

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

Cause	Corrective action
Connections leaking	Repeat check, checking the seal on the connections
Measurement values outside the specified limit values (see section 7.3 on page 55)	Adjustment required

Changing the test gas concentration

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

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

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 (see section 7.3 on page 55).

5.2.2 Suitable test gases

The following test gases can be used for adjustment:

Gas	Suitable test gases for	
	Zero point	Sensitivity
CH ₄	<ul style="list-style-type: none"> • Fresh air 	<ul style="list-style-type: none"> • Gas mixture • 2.2 % vol. CH₄
O ₂	<ul style="list-style-type: none"> • 100 % vol. N₂ • 100 % vol. CH₄ 	<ul style="list-style-type: none"> • Fresh air
CO	<ul style="list-style-type: none"> • Fresh air 	<ul style="list-style-type: none"> • Gas mixture • 40 ppm CO
C ₃ H ₈	<ul style="list-style-type: none"> • Fresh air 	<ul style="list-style-type: none"> • 1 % vol. C₃H₈
C ₄ H ₁₀	<ul style="list-style-type: none"> • Fresh air 	<ul style="list-style-type: none"> • 1 % vol. C₄H₁₀
C ₉ H ₂₀	<ul style="list-style-type: none"> • Fresh air 	<ul style="list-style-type: none"> • 0.3 % vol. C₃H₈ (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.

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. O₂ and is therefore used with oxygen to adjust the sensitivity.

Propane C₃H₈, butane C₄H₁₀ and nonane C₉H₂₀ 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 CH₄
- Oxygen O₂
- Carbon monoxide CO

SEWERIN recommends a test gas with 2.2 % vol. CH₄, 2.0 % vol. CO₂, 40 ppm CO and 17.5 % vol. O₂ as the gas mixture.

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 CH₄ and CO
- Sensitivity of O₂ (20.9 % vol.)

Sensitivity

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

- Sensitivities of CH₄ and CO
- Zero point of O₂

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 O₂, the zero point is adjusted following the same procedure.

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. This time required for this varies.

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 O₂ is 20.9 % vol.)

5.2.5.2 Adjusting the sensitivity

For all gases except oxygen O₂, the sensitivity is adjusted following the same procedure.

The following resources are needed for adjusting the sensitivity:

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

Note:

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

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. CH₄).
 9. Let go of the release button on the test set.
-

5.2.6 Carrying out an oxygen adjustment

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

5.2.6.1 Adjusting the zero point for oxygen

The zero point for oxygen must be adjusted using an inert gas which contains no oxygen and does not damage the sensor. Refer to section 5.2.2 on page 40 for information on suitable test gases.

The following resources are needed for adjusting the zero point:

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

Note:

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

1. 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 5 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/PX sensor adjustment	C_xH_y adjustment or gas mixture adjustment required
10	Adjustment failed Test gas	Check test gas concentration
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
60	PX sensor SEWERIN Service	Error can only be corrected by SEWERIN Service
61	PX sensor SEWERIN Service	Error can only be corrected by SEWERIN Service
100	Pump error Probe/filter	Check all filters, probes and hose connections for porosity and dirt
201	I2C HOST – EC SEWERIN Service	Error can only be corrected by SEWERIN Service
202	I2C HOST – EX SEWERIN Service	Error can only be corrected by SEWERIN Service

7 Appendix

7.1 Specifications and permitted operating conditions

Device data

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

Certificates

Certificate	TÜV 07 ATEX 553353 X II2G Ex d e ib IIB T4 Gb Basic device without leather bag for: CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ , C ₉ H ₂₀ , H ₂ S, CO II2G Ex d e ib IIC T4 Gb Basic device with leather bag for: CH ₄ , C ₃ H ₈ , C ₄ H ₁₀ , C ₉ H ₂₀ , H ₂ S, CO, H ₂ BVS 09 ATEX G 001 X, PFG 08 G 002 X (applies to CH ₄ , C ₃ H ₈ , C ₉ H ₂₀ , O ₂ , CO)
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Features

Display	Monochromatic graphic display, 320 x 240 pixels
Buzzer	Frequency 2.4 kHz, volume 80 dB (A) / 1 m
Signal light	Red
Pump	Vacuum > 250 mbar Volume flow approx. 50 l/h Pump error (F100) dependent on volume flow: – ≤ 20 l/h F100 certain – > 20 l/h – ≤ 35 l/h F100 possible
Interface	USB
Memory	8 MB
Operation	ON/OFF key, 3 function keys, jog dial

Operating conditions

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

Power supply

Power supply	NiMH rechargeable or disposable alkaline batteries, size AA
Operating time, typical	Minimum 8 h
Charging time	Approx. 3 h (complete charge), depending on capacity
Charging voltage	12 V DC, max. 1 A

Data transmission

Communication	USB
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Gas types

Standard	Methane CH ₄
Optional	Propane C ₃ H ₈ Butane C ₄ H ₁₀ Nonane C ₉ H ₂₀

Electrochemical sensor, oxygen O₂

Measuring range	0 – 25 % vol.
Resolution	0.1 % vol.
Response times	t ₉₀ < 15 s
Warm-up time	Approx. 1 min
Temperature range	-20 °C – +40 °C
Measuring error	±3 % or ±0.3 % vol. (±3 digits)
Interference	None
Lifetime, expected	36 months

Catalytic combustion sensor, CxHy LEL range

Measuring range	0 – 4.4 % vol. (CH ₄), 0 – 100 % LEL
Resolution	0.05 % vol.
Response times	t ₅₀ < 5 s t ₉₀ < 14 s (CH ₄) t ₅₀ < 6 s t ₉₀ < 11 s (C ₃ H ₈ , C ₄ H ₁₀) t ₅₀ < 20 s t ₉₀ < 60 s (C ₉ H ₂₀)
Measuring error	±1 % LEL CH ₄ (short-term stability as per EN 60079-29-1) ±4 % LEL CH ₄ (long-term stability as per EN 60079-29-1) ±1 % LEL C ₃ H ₈ (short-term stability as per EN 60079-29-1) ±2 % LEL C ₃ H ₈ (long-term stability as per EN 60079-29-1) ±5 % LEL C ₉ H ₂₀
Interference	All flammable gases
Lifetime, expected	5 years

Electrochemical sensor, carbon monoxide CO

Measuring range	0 – 500 ppm Lower limit: 4 ppm
Resolution	1 ppm
Response times	t ₉₀ < 30 s
Warm-up time	Approx. 1 min
Decay time	t10 < 24 s
Temperature range	-20 °C – +40 °C
Measuring error	±10 % or ±3 ppm (±3 digits) ±5 ppm (long-term stability as per EN 45544)
Zero point deviation	7 ppm
Interference	At 20 °C 3000 ppm H ₂ : Approx. 1000 ppm CO 100 ppm NO: Approx. 25 ppm CO
Operating temperature	-20 °C – +40 °C
Lifetime, expected	36 months

Note:

Probes increase the stated response times.

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
Acknowledgement:	– 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:	<ul style="list-style-type: none"> – Audible signal – Visual signal – AL2 message on display
Acknowledgement:	<ul style="list-style-type: none"> – Possible for audible signal when alarm threshold AL2 is exceeded – Possible overall after level falls below alarm threshold AL2
Reset:	<ul style="list-style-type: none"> – By acknowledgement after level falls below alarm threshold AL2 – By switching device off

Exception for **oxygen**: alarm AL2 is not latching.

AL3

Type:	End of measuring range
Adjustable:	No
Latching:	Yes
Trigger:	Alarm threshold AL3 exceeded
Indicator:	<ul style="list-style-type: none"> – Audible signal – Visual signal – AL3 message on display – Reading flashes
Acknowledgement:	– Possible after level falls below alarm threshold AL2
Reset:	<ul style="list-style-type: none"> – 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
Acknowledgement:	– 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
Acknowledgement:	– 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 /12/.

The long-time exposure limit (LTEL) is obtained from the OEL value over an averaging period of 8 hours, as per /12/.

Gas	OEL	Excess factor
CO	30 ppm	1

7.2.3 Alarm thresholds (factory settings)

Gas	AL1	AL2	AL3	STEL	LTEL
CH ₄	10 % LEL	50 % LEL	100 % LEL	—	—
C ₃ H ₈	10 % LEL	50 % LEL	100 % LEL	—	—
C ₄ H ₁₀	10 % LEL	50 % LEL	100 % LEL	—	—
C ₉ H ₂₀	10 % LEL	50 % LEL	100 % LEL	—	—
O ₂	18.0 % vol.	23.0 % vol.	25 % vol.	—	—
CO	30 ppm	60 ppm	500 ppm	30 ppm	30 ppm

7.2.4 Setting ranges for gas types and gases

LEL values are specified as per /9/and /11/.

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

Gas type/ Gas		AL1	AL2
All C _x H _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 ₃ H 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 ₄ H 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 ₉ H 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.
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.
CO	Threshold	30 ppm	60 ppm
	Setting range	5 – 499 ppm	6 – 500 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 ₃ H ₈	0.00 % vol.	±0.12 % vol.	1.00 % vol.	±0.16 % vol.
C ₄ H ₁₀	0.00 % vol.	±0.12 % vol.	1.00 % vol.	±0.16 % vol.
C ₉ H ₂₀	0.00 % vol.	±0.06 % vol.	0.22 % vol. (re- placement gas 0.3 % vol. C ₃ H ₈)	±0.06 % vol.
O ₂	0 % vol.	±0.5 % vol.	20.9 % vol.	±0.5 % vol.
CO	0 ppm	±3 ppm	40 ppm	±3 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 min (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 Technical information

7.5.1 Identification sticker (back of device)

The symbols on the sticker mean the following:



Only ever open the battery compartment outside of explosive areas.



Read the operating instructions.

7.5.2 Sensitivity of the catalytic combustion sensor

Oxygen-deficient atmospheres can reduce the sensitivity of the catalytic combustion sensor (sensor suffocation).

Gaseous constituents of silicones, oils and phosphate esters for example have a damaging effect on the sensor. They permanently reduce the sensitivity.

Contamination of the measurement environment with halogens, burnt neoprene, PVC or trichloroethene for example also lowers the sensitivity of the sensors, but they can be regenerated.

7.5.3 Electrostatic charge

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



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.
-

7.5.4 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 Accessories and consumables

Accessories

Part	Order number
Docking station TG8	LP11-10001
M4 AC/DC adapter	LD10-10001
M4 vehicle cable, 12 V= installed	ZL07-10100
M4 vehicle cable, 12 V= portable	ZL07-10000
M4 vehicle cable, 24 V= installed	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 CH ₄ /CO ₂ /O ₂ /CO	ZT32-10000
Test gas can 1 l, non-returnable	

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

7.7 Declaration of conformity

Hermann Sewerin GmbH hereby declares that the **Multitec® 410** fulfils the requirements of the following directives:

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


Gütersloh, 2016-04-20



Dr. S. Sewerin
(General Manager)

The complete declaration of conformity can be found online.

7.8 Inspection protocol

TEST PROTOCOL	Gas mixture	Multitec® 410				
Serial no. (e.g.: 066 31 00480)	<input type="text"/>					

04.12.2018

1.0	General status																
1.1	- Perfect condition (e.g.: Y / N)																
1.2	- Fine dust filter correct (e.g.: Y / N)																
1.3	- Disposable/rechargeable battery capacity (e.g.: ¼)																

2.0	Pump check																
2.1	- Pump error F100 in seal																

3.0	Warning ExTox (test gas = fresh air)																
3.1	Zero point CH ₄ - Display -3 – +3 % LEL or - Display -0.15 – +0.15 % vol.																
3.2	Fresh air O ₂ (20.9 % vol.) - Display 20.4 – 21.4 % vol.																
3.3	Zero point CO - Display -3 – +3 ppm																

4.0	Warning ExTox (test gas = gas mixture)																
4.1	CH ₄ (2.20 % vol.) - Display 45 – 55 % LEL or - Display 2.00 – 2.40 % vol.																
4.2	O ₂ (17.5 % vol.) - Display 17.0 – +18.0 % vol.																
4.3	CO (40 ppm) - Display 37 – 43 ppm																
4.4	Visual alarm (e.g.: Y / N)																
4.5	Audible alarm (e.g.: Y / N)																

5.0	Warning ExTox (test gas = fresh air) – propane C₃H₈, nonane C₉H₂₀ (optional gas types)																
5.1	Zero point C ₃ H ₈ - Display -3 – +3 % LEL or - Display -0.12 – +0.12 % vol.																
5.2	Zero point C ₉ H ₂₀ - Display -9 – +9 % LEL or - Display -0.06 – +0.06 % vol.																

6.0	Warning ExTox – propane C₃H₈ (optional gas type)																
6.1	C ₃ H ₈ (1.00 % vol.) - Display 55 – 61 % LEL or - Display 0.84 – 1.16 % vol.																

7 Appendix

7.0	Warning ExTox – nonane C₉H₂₀ (optional gas type)																		
7.1	Replacement test gas C ₃ H ₈ (0.3 % vol.) [Display in C ₉ H ₂₀ 0.22 % vol.] – Display 22 – 40 % LEL or – Display 0.16 – 0.28 % vol.																		
8.0	Comments – Housing damaged – Adjustment, repair – Inspection at factory – Or similar																		
9.0	Inspection																		
	– Day																		
	– Month																		
	– Year																		
	– Signature																		

7.9 Advice on disposal

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

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

End-of-life equipment

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

7.10 Terminology and abbreviations

AL	<ul style="list-style-type: none"> ● Alarm
CC	<ul style="list-style-type: none"> ● Catalytic combustion sensor
GENELEC	<ul style="list-style-type: none"> ● European Committee for Electrotechnical Standardization
EC	<ul style="list-style-type: none"> ● Electrochemical sensor
Gas type	<ul style="list-style-type: none"> ● Hydrocarbon C_xH_y, which can be measured with the CC ● 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.
LEL	<ul style="list-style-type: none"> ● Lower Explosion Limit
LTEL	<ul style="list-style-type: none"> ● Long-time exposure limit
NiMH	<ul style="list-style-type: none"> ● Nickel metal hydride
OEL	<ul style="list-style-type: none"> ● Occupational exposure limit
ppm	<ul style="list-style-type: none"> ● Parts per million
Ring memory	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● Short-time exposure limit
% vol.	<ul style="list-style-type: none"> ● Percent concentration of a gas in a gas mixture with respect to the volume

7.11 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 45544-2
- /3/ EN 45544-4
- /4/ EN 50104:2010
- /5/ EN 60079-7:2007
- /6/ EN 60079-29-1
- /7/ EN 60079-29-2
- /8/ EN 60086-1
- /9/ EN 61779-1
- /10/ EN 61951-2
- /11/ IEC 60079-20
- /12/ TRGS 900: 2006
Technical regulations for gas installations: Occupational exposure limits
Available for download at: www.baua.de
- /13/ 94/9/EC ATEX 100a

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