Operating instructions

SEWERIN
Protecting Water, Gas and Life.

VARIOTEC® EGA

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Fig. 1: Overview of device **VARIOTEC EGA**

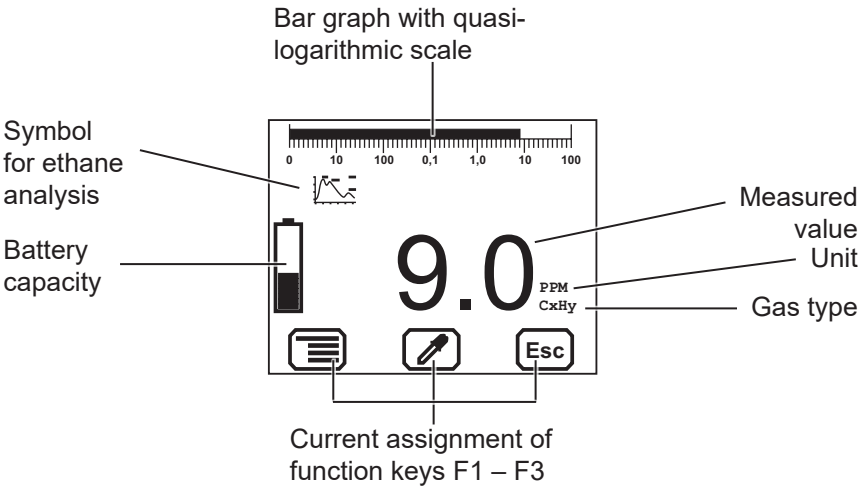

Fig. 2: Display, **VARIOTEC EGA**

Display symbols


Menu


Save


OK


Information

Cancel


Delete


Take sample


Fault


Perform device inspection


Purge


Tab (jump to next input field)


Ethane analysis


Battery capacity


Opening stored comments
Opening stored inspectors

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.

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

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

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

The manufacturer reserves the right to make technical changes.

1.2 Purpose

The **VARIOTEC EGA** is a portable measuring device for ethane analysis to help you safely distinguish between natural gas and swamp gas.

Note:
All descriptions in these operating instructions 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, in small firms and commercial operations and in industry. The appropriate specialist knowledge for working in gas pipelines is required to operate the device.

It may be used to measure the following gases:

- Methane CH_4 / Propane C_3H_8 / Butane C_4H_{10}

It may **not** be used for:

- Gas analysis of technical processes
- Monitoring liquids

The device can be used up to a temperature of 40 ºC (104 °F). However, high temperatures reduce the service life of the sensors and rechargeable batteries.

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.
- 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.
- Handle the product carefully and safely, both during transport and operation.
- Do not use the product if it is damaged or faulty.
- 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).

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2 Features

Standard device equipment includes:

- Detector for ethane analysis
- Thermal conductivity sensor (TC)
- Gas-sensitive semiconductor (SC)

Thermal conductivity sensors measure the specific conductivity of gases. The gas-sensitive semiconductor reacts to changes in conductivity brought about by reducible gases.

The device features two alarms:

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

Signals are emitted when a fault occurs.

Explosion protection

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

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

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

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

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.

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) ● Modifies values

3.1.2 Selecting / exiting menus and menu items

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

Selecting submenus / menu items

Submenus (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.

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.

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

   The switching on process involves an internal check.

Process	Test purpose
Buzzer Sounds an audible signal.	Is the audible signal working?
Signal light Displays a visual signal.	Is the visual signal working?
Display Display inverted.	Are there pixels missing from the display?

The start screen appears on the display.

Fig. 3: Start screen

Display:
– Device type: **VARIOTEC EGA**
– User:
  Frank Smith
  Public services: Any town
  Dep.: Fault clearing
– Firmware version: V1.200
– Date and time
– Battery capacity

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

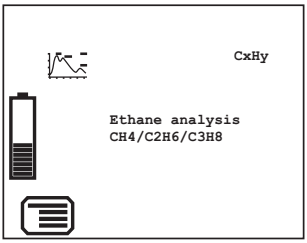

Fig. 4: Overview of detectable gases

Display:
– Symbol: Ethane analysis
– Detectable gases
– Battery capacity

The device switches to measuring mode. The device warms up. The reading flashes.

While the device is warming up, the prompt **Add fresh air!** is displayed as a reminder.

2. Make sure the device is actually drawing in fresh air. Change its location if necessary.
3. Wait until the reading stops flashing.

   The device is ready for use.

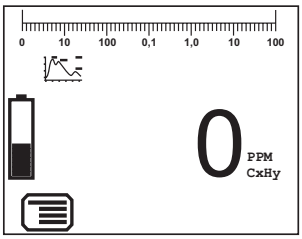

Fig. 5: Measuring mode – display of current readings

Display:
– Symbol: Ethane analysis
– Current measurement value
– Battery capacity

The device is ready for use.

3.1.4 Differences between measuring mode and settings mode

The device is operated in two modes:

- **Measuring mode** (see section 3.2)

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

- **Settings** (see section 3.3)

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

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

3.2 Measuring mode

When switched on, the device is in measuring mode. In measuring mode, the current measurements are always displayed (see Fig. 5).

3.2.1 Accessing the menu (measuring mode menu structure)

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

Zero point
Ethane analysis
Settings
Report
Start purge
Device inspection
Device information
Exit

Fig. 6: Menu with submenus (menu items)

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

3.2.2 Zero point

The zero point can be set manually in the **Zero point** item. This is only required if the displayed fresh air measurement is not zero after the end of the warm-up period.

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 Ethane analysis

The overview of detectable gases can be accessed in the **Ethane analysis** menu item (Fig. 4). The device automatically returns to measuring mode.

Note:
The ethane analysis cannot be started with the **Ethane analysis** menu item.
Information about carrying out the ethane analysis can be found in section 3.2.3.3.

3.2.3.1 General information on ethane analysis

Ethane analysis is used to demonstrate the presence of natural gas and to distinguish between natural gas and swamp gas. This analysis utilizes the fact that natural gas contains ethane, but swamp gas does not. Thus, if ethane is detected, it can be concluded that natural gas is present.

Note:
Ask the network operator about the composition of natural gas. Request an analysis certificate.

Ethane can definitely be detected in natural gas at a minimum concentration of 1% vol. If the concentration of ethane in natural gas is less than 0.5% vol., the gas cannot be detected. If the concentration falls between these two values, the analysis can be carried out, but the result must then be evaluated.

During the ethane analysis, the gas sample is always analyzed for the presence of the following three gases:

- Methane CH_4
- Ethane C_2H_6
- Propane C_3H_8

Prerequisite

The ethane analysis only works if the gas sample exhibits a specific concentration.

The device checks the concentration at the start of the analysis and prevents the analysis being carried out if the concentration is too low.

Gas sample concentration	Analysis is …	Device response
> 1% vol.	Definitely possible	Analysis can be carried out
1% vol. – 0.5% vol	Technically possible	Analysis can be carried out, but **Ethane analysis critical** message appears
< 0.5% vol.	Not possible	Analysis cannot be carried out because **Take sample** symbol is not displayed

Displayed measurement values

In **measuring mode**, the device displays the actual concentrations.

During the **analysis**, the device automatically dilutes the gas sample to 1% vol. to ensure optimal utilization of the semiconductor sensor. This means:

- The concentration ratios of all components of the gas sample are retained.
- The maximum concentration of a gas component is 1% vol., even if the actual concentration in the gas sample is higher. In the mode of curve, the maximum peak may be cut off as necessary (Fig. 9 right).

Number of measurements

Always carry out 2 – 3 measurements in the same location to obtain certain results. Observe the information on evaluation in section 3.2.3.4.

3.2.3.2 Purging the detector

The detector for ethane analysis must be kept clean at all times to prevent distortion of measurement results. When the device is in use, however, higher hydrocarbons (e.g. propane, butane) can accumulate in the detector and contaminate it.

The detector is automatically purged after every ethane analysis.

An additional purge of the detector is required in these situations:

- Canceled ethane analysis

If an ethane analysis is canceled, the message **Purging required** and the **Take sample** symbol appear automatically.

- Detector contamination suspected

Note:
The purge always takes 4 minutes. A new ethane analysis can only be started when the purge cycle has been completed.

The device is in measuring mode.

1. Only when detector contamination is suspected:
   a) Press **Menu**.
   b) Select the **Purging** menu item. The message **Purging required** and the **Take sample** symbol appear.

CAUTION! Risk of damaging the sensor
The ethane detector will be damaged if the air supply is contaminated or moist.
- Always add clean, dry fresh air.

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2. Make sure the device is drawing in fresh air.
3. Press **Take sample**.

   The purge cycle starts automatically as soon as the gas concentration drops below 50 ppm. The time remaining until the end of the purge cycle is displayed.

After the purge cycle is complete, the device will revert to measuring mode.

3.2.3.3 Carrying out an ethane analysis

The device is in measuring mode.

1. Make sure the device is drawing in fresh air.
2. The ethane analysis is generally performed on a bar hole. Use the localization probe and a probe hose.
   a) Insert the probe into the bar hole.
   b) Connect the probe hose to the device.

As soon as the measurement value satisfies specific conditions (gas concentration > 1% vol., stable measurement value), the **Take sample** symbol appears.

3. Press **Take sample**. A message appears.

Note:
An ethane analysis takes approximately 4 minutes. After **Esc** is used to cancel the analysis, the detector must be purged (see section 3.2.3.2). This purge cycle also takes 4 minutes.

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4. Confirm the **Take sample?** prompt by pressing **OK**. The gas sample is taken.

   The **Add fresh air** message appears.

5. Add fresh air.

   a) To do so, remove the probe hose from the device.

   b) Move away from the bar hole. Note the direction of the wind.

   As soon as the gas concentration drops below 50 ppm, the analysis of the gas sample taken starts automatically. The gas sample analysis is plotted on the display.

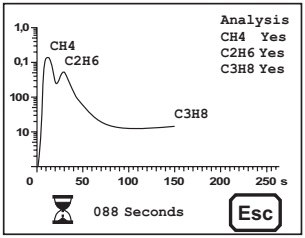

Fig. 7: Mode of curve of an analysis in progress

When the analysis is complete, the **Save** symbol appears.

6. Press **Save**.
7. If necessary enter a **Comment** on the analysis.

   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.

8. Confirm your entry with **OK**. The comment is saved together with the report name (date, time).

3.2.3.4 Evaluating an ethane analysis

Fully completed ethane analyses are saved as reports. These can be accessed and deleted at any time.

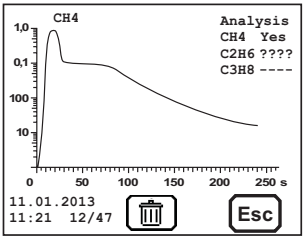

Fig. 8: Ethane analysis report

A report contains the following information about the gas sample:

– Analysis of the gas components:
  CH_4 Yes
  C_2H_6 ????
  C_3H_8 ––––
– Curve; peaks of the gas components definitely present in the sample are labeled: CH_4
– Date and time the report was saved
– Report number: 12/47, i.e. 12th report of 47 reports in total

The symbols next to the analyzed gas components are defined as follows:

Symbol	Gas component is …
Yes	Definitely present
????	Possibly present
––––	Not present

Ideally, the result of the ethane analysis is a curve with at least one clear, steep peak (Fig. 9 left). However, occasionally, the analysis does not provide a clear determination of the gas components present (Fig. 9 right). In such cases, you must decide whether the analysis quality is sufficient.

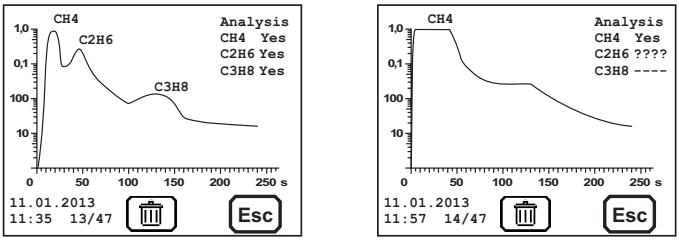

Fig. 9: Quality assessment of an ethane analysis; Left: good quality, Right: poor quality

Criteria for determining good analysis quality

- Methane is definitely present.
- Methane concentration is 1% vol.
- Peaks of the gas components present are clearly recognizable.

Criteria for determining the presence of natural gas

- Good analysis quality (see above)
- Ethane is definitely present.

Ethane analyses of insufficient quality

Note:
Never use poor-quality ethane analyses to demonstrate the presence of natural gas.

Poor-quality ethane analyses can exhibit the following features, for example:

- Curve does not contain any clear peaks (smooth concentration plot)

Reason: Residual gases from previous analyses have accumulated.

Corrective action: Purge with test gas, e.g.:
– 1% vol. CH_4 in synthetic air
OR
– 100 ppm C_2H_6, 1% vol. CH_4 in synthetic air

- Curve and symbols (**Analysis**) provide contradictory information about gas components

  Reason: Extremely high or low temperatures (optimal working temperature: 20°C (68°F))

3.2.4 Settings

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

Detailed information about the settings can be found in section 3.3.

3.2.5 Purge

The ethane detector purge is started with the **Purge** menu item.

Note:
The purge cycle starts immediately when the **Purge** menu item is selected. The purge always takes 4 minutes. A new ethane analysis can only be started when the purge cycle has been completed.

Detailed information about purging the detector can be found in section 3.2.3.2.

3.2.6 Report

You can retrieve or delete reports of saved data under **Report** in the menu. When saved, the reports are assigned to different report types.

The following report types are available:

- Ethane analysis
- Device inspection

Reports can only be deleted individually.

You can find information on how to delete all reports of one report type in section 3.3.6.

3.2.7 Device inspection

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

Note:
The integrated device inspection is switched off in the factory settings. More detailed information about the device inspection can be found in section 5.1.

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

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

3.2.8 Device information

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

- 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
- Date/time
- Memory

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

3.3.1 Opening Settings

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

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

Note:
You can change the PIN code at any time.
SEWERIN recommends setting a different PIN code after initial start-up, so only authorized personnel have access to the settings.

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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. 10). Otherwise, the device will revert to measuring mode.

Adjustment
System
Date/time
Memory
Exit

Fig. 10: **Settings** menu

3.3.2 Settings menu structure

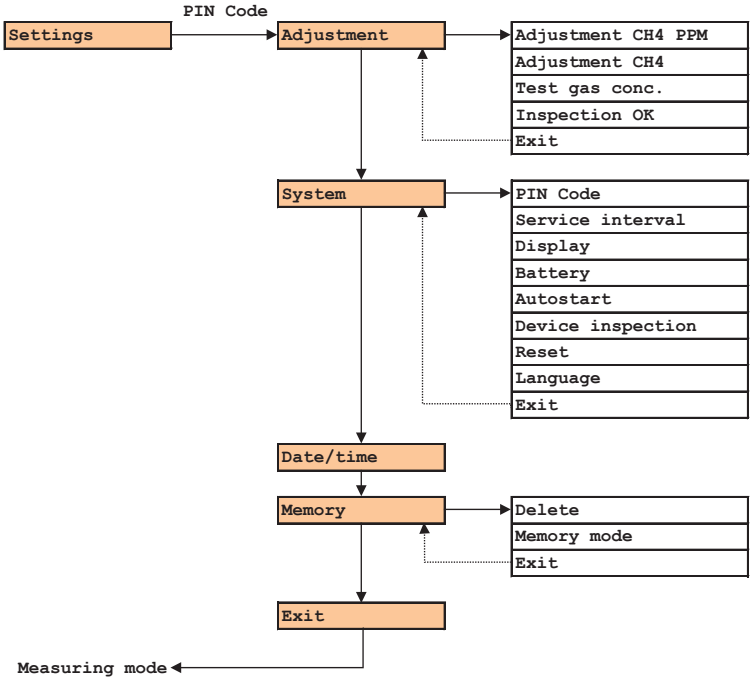

Fig. 11: **Settings** menu structure for the **VARIOTEC EGA**

3.3.3 Adjustment

The Adjustment menu is used to set the sensors.

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

Adjustment CH4 PPM

Used to adjust the gas-sensitive semiconductor for methane CH_4 in the ppm range.

Adjustment CH4

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

Test gas conc.

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 authorized 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

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 ethane analysis is available.

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 Date/time

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

3.3.6 Memory

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

Delete

Used to delete reports.

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

You can find information on clearing individual reports in section 3.2.6.

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 /4/, 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 /1/.
- In each battery compartment, respectively, use only those batteries that are identical with respect to type (disposable or rechargeable), capacity and manufacturer.

Disposable battery requirements

- Alkaline disposable batteries
- Size: mignon (AA), type: LR6 as per /2/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /1/.

Rechargeable battery requirements

- NiMH rechargeable batteries
- Size: mignon (AA), type: HR6 as per /3/
- The creepage distance and air gap between the poles must not be less than 0.5 mm in accordance with /1/.
- The rechargeable batteries must be quick 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
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.
- Temperatures from 10 to 25 °C (50 to 77 °F) are ideal for charging.

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 (once)
- – 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 slightly in alternation; 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.

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 device status
- Test of the indication accuracy with supply of fresh air
- Test of the indication accuracy with supply of test gas

5.1.1.2 Frequency

The device inspection must be carried out quarterly.

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 report.

The device inspection protocols can be accessed at any time and read on a computer using the **GasCom** software. The software is available at www.sewerin.com.

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

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

Switching on the integrated device inspection

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

Application (group)	Test	Recommended test gases
Ethane analysis	Test gas 50/100 PPM C2H6	100 ppm C_2H_6 in 1% vol. CH_4 (balance: synthetic air)

Note:
Use of test gases not provided by SEWERIN can cause interference.
The concentration of the test gas used must match the specified test gas concentration.

5.1.2 Performing the device inspection

5.1.2.1 Accessing the device inspection

The device is in measuring mode.

1. Press **Device inspection**.

   OR

   a) Press **Menu**.

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

   The **Device inspection** menu appears.

2. Select the **Ethane analysis** menu item.

   The **Dev. Test Ethane analysis** menu appears.

Device status
Fresh air
Test gas 50/100 PPM C2H6

Fig. 12: **Dev. Test Ethane analysis** menu

3. Select a test from the menu (**Device status**, **Fresh air**, **Test gas 50/100 PPM C2H6**).
4. Carry out the test.

   For detailed information, refer to the following sections:

   − Device status section 5.1.3

   − Fresh air section 5.1.4

   − Test gas … section 5.1.5

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 report from being accessed by unauthorized 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 report. 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 device status

The device status test is part of the device inspection. The device 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 **Device status** from the **Dev. Test Ethane analysis** menu.
2. Test all associated subitems as described in section 5.1.3.1 to section 5.1.3.5.

3. Confirm the prompt **Device status OK?** by pressing **Yes** if **all** subitems show no faults during testing. The device switches back to the **F-Inspection Ethane analysis** menu. A **Device status OK** message will appear.

This concludes the **Device 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. Make sure 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 **Dev. Test Ethane analysis** menu.
3. Wait until the displayed readings are stable. A **Status: OK** message will appear.
4. Press **OK** to confirm.

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 7.2). 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. The test is carried out in a manner similar to the ethane analysis.

The following resources are needed for the test:

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

Note:
Details on how to use the test set can be found in the accompanying operating instructions.

As a test gas, SEWERIN recommends a gas mixture with 100 ppm C_2H_6, 1.00% vol. CH_4.

The device inspection has been opened.

1. Select **Test gas 50/100 PPM C2H6** from the **Dev. Test Ethane analysis** menu.
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. As soon as the measurement value satisfies specific conditions (gas concentration > 1% vol., stable measurement value), the **Take sample** symbol appears.
5. Press **Take sample**. A message appears.
6. Confirm the **Take sample?** prompt by pressing **OK**. The gas sample is taken.

   The **Add fresh air** message appears.
7. Add fresh air.

   a) To do this, disconnect the test set from the device.

   b) Make sure the device is drawing in fresh air.

   As soon as the gas concentration drops below 50 ppm, the analysis of the gas sample taken starts automatically. The gas sample analysis is plotted on the display.

After the indication accuracy test is completed, the device switches back to the **F-Inspection Ethane analysis** menu. A **Test gas OK** message will appear. This concludes the **Test gas ...**test.

Test gas test unsuccessful

If the **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 7.2)	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

CAUTION! Damage possible due to incorrect adjustment
Incorrect adjustment can lead to incorrect measurement results.
- Only specialist technicians may perform adjustments
- Adjustments must be made in well ventilated rooms or in the open air.

5.2.1 Scope

The following are adjusted:

- Zero point
- Sensitivity

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

The adjustment only needs to be carried out if the measurement values of methane CH_4 are outside the specified limit values (see section 7.2).

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	• 10 ppm CH_4 • 100 ppm CH_4 • 1000 ppm CH_4 • 1.0% vol. CH_4 • 100% vol. CH_4

It is not necessary to perform the adjustment with all test gases. However, adjusting with more than one test gas increases the measurement quality.

The user cannot adjust ethane C_2H_6 or propane C_3H_8.

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 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.

5.2.4 Performing the adjustment

The zero point and sensitivity are adjusted following the same procedure for all test gases.

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.

5.2.4.1 Adjusting the zero point

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 PPM**).
5. Wait at least 1 minute. The displayed reading must be stable.
6. Select **Zero point** from the menu.
7. Press **OK** to confirm.

   This adjusts the zero point. The reading shows zero (0.0% vol. or 0 ppm).

5.2.4.2 Adjusting the sensitivity

The following resources are needed for adjusting the sensitivity:

- Test gas

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

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

Note:
Details on 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 PPM**).
5. Select the menu item that specifies the sensitivity to be tested.

   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 the specified value (e.g. 10 ppm CH_4).
9. Let go of the release button on the test set.

5.3 Servicing

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

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

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

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

Fig. 13: 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
8	No calibration PPM sensor adjustment	**Adjustment CH4 PPM** required
9	No calibration IR/PX sensor adjustment	**CH4 adjustment** required
10	Adjustment failed Test gas	Check test gas concentration
52	XFLASH SEWERIN Service	Error can only be corrected by SEWERIN Service
59	System error SEWERIN Service	Error can only be corrected by SEWERIN Service
60	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
202	I2C HOST – EX SEWERIN Service	Error can only be corrected by SEWERIN Service

7 Appendix

7.1 Specifications and permitted operating conditions

Series

Type/model	065 12

Certificates

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

Device data

Dimensions (W x D x H)	• approx. 148 x 57 x 205 mm (5.83 x 2.24 x 8.07 in) • approx. 148 x 57 x 253 mm (5.83 x 2.24 x 9.96 in) with supporting bracket
Weight	Approx. 1000 g, depending on equipment

Features

Display	monochrome, 320 x 240 pixel
Buzzer	frequency: 2.4 kHz volume: 80 dB (A) / 1 m (3.28 ft)
Signal light	red
Pump	• vacuum: > 250 mbar • volume flow: typically 50 l/h ±20 l/h • pump error (F100) depending on volume flow: ◦ ≤ 20 l/h F100 certain ◦ > 20 l/h – ≤ 35 l/h F100 possible
Interface	USB
Memory	8 MB
Control	• ON/OFF key • 3 function keys • jog dial
Sensors	• TC • SC

Operating conditions*

Operating temperature	-20 – 40 °C (-4 – 104 °F)
Humidity	5 – 90% r.h., non-condensing
Atmospheric pressure	800 – 1100 hPa
Pressure at gas inlet	max. 100 mbar
Protection rating	IP54
Position of use	any

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

Storage conditions

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

Power supply

Power supply	4 cells, type Mignon AA, optionally: • rechargeable batteries: NiMH • disposable batteries: Alkaline
Operating time, typical	at least 8 h
Charging time	approx. 3 h (complete charge), depending on capacity
Charging temperature	0 – 35 ºC (32 – 95 °F)
Charging voltage	12 V DC, max. 1 A

Data transmission

Communication	USB

Gas types

Default	CH_4

7.2 Limit values for the device inspection

Gas	**Zero point**	
	Specification	Deviation
CH_4	0 ppm	±3 ppm

7.3 Memory capacity

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

Report type	Maximum number of storable reports
Device inspection	40
Ethane analysis	40

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

7.4 Sensors

Note:
Probes increase the stated response times.

7.4.1 Thermal conductivity sensor (TC)

Methane CH_4

Type	thermal conductivity sensor
Measuring range	0 – 100% vol.
Resolution	• 0 – 9.9% vol.: 0.1% vol. • 10 – 100% vol.: 1% vol.
Response times	t_{50} < 9 s t_{90} < 17 s
Warm-up time	up to 90 s
Temperature range	-20 – 40 ºC (-4 – 104 °F)
Measuring error	according to EN 60079-29-1 • ±3% vol.
Interference, known	all gases with a different thermal conductivity
Lifetime, expected	5 years
Adjustment	test gas concentration: • zero point: hydrocarbon-free, clean air • CH_4: 100% vol., utilisable 20 – 100% vol.

7.4.2 Gas-sensitive semiconductor (SC)

Methane CH_4

Type	gas-sensitive semiconductor
Measuring range	0 – 10000 ppm
Resolution	• 0 – 10 ppm: 1 ppm • 10 – 100 ppm: 2 ppm • 100 – 999 ppm: 20 ppm • 0.10 – 1.0% vol.: 0.02% vol. (200 ppm)
Response times	t_{90} < 7 s
Warm-up time	approx. 1 min
Measuring error	30%
Interference, known	all flammable gases
Lifetime, expected	5 years
Adjustment	test gas concentration: • zero point: hydrocarbon-free, clean air • CH_4: ◦ 10 ppm ◦ 100 ppm ◦ 1000 ppm ◦ 1.0% vol.

7.5 Ethane detector

Type	gas chromatograph
Gases, separable	CH_4, C_2H_6, C_3H_8
Sensor, used	gas-sensitive semiconductor
Measuring range	0 – 12000 ppm
Separating capacity	25 ppm
Resolution	1 ppm
Measurement time	4 min
Warm-up time	approx. 1 min
Measuring error	±30%
Lifetime, expected	5 years
Test gases	gas mixture: 1% vol. CH_4 / 100 ppm C_2H_6 in synth. air

7.6 Technical information

7.6.1 Identification sticker (back of device)

The symbols on the sticker mean the following:

Only open the battery compartment outside of explosive areas.

Read the operating instructions.

7.6.2 Cleaning

Use only a damp cloth to clean the device.

CAUTION! Damage possible due to unsuitable cleaning agents

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

- Never clean the device with solvents, gasoline or cockpit spray containing silicone or similar substances!

7.6.3 Electrostatic charge

Avoid electrostatically charging the device. Electrostatically ungrounded objects (e.g. including metallic housing without an grounded 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
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
Localization probe	ZS03-10300
1 m probe hose	ZS25-10000
Test set SPE VOL	PP01-90101
Test set SPE ppm	PP01-40101
Test set SPE DUO	PP01-60001
Test case kit PPM	ZP03-12001

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 100 ppm C_2H_6, 1% vol. CH_4 in synthetic air Test gas can 1 l, non-returnable	ZT43-10000

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

7.8 EU declaration of conformity

Hermann Sewerin GmbH hereby declares that the **VARIOTEC® EGA** meets the requirements of the following guidelines:

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

Gütersloh, 2025-09-01

Benjamin Sewerin (CEO)

The complete declaration of conformity can be found online.

7.9 Inspection report

INSPECTION REPORT ***VARIOTEC® EGA***

Serial no. (e.g.: 065 12 00230)

February 1, 2013

1.0	**Device 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	**Ethane analysis**										
3.1	Test gas 100 ppm C_2H_6, 1 % vol. CH_4 – CH_4: Yes, C_2H_6: Yes, C_3H_8: No										

4.0	**Comment** – Housing damaged – Adjustment, repair – Inspection at factory – Or similar										

5.0	**Inspection**										
	– Day										
	– Month										
	– Year										
	– Signature										

7.10 Advice on disposal

The European Waste Catalog (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

CENELEC	● European Committee for Electrotechnical Standardization
Gas type	● Hydrocarbon C_xH_y, which can be measured with the TC
NiMH	● Nickel metal hydride
ppm	● Parts per million
Ring memory	● Type of data storage in the device ● If the available storage space is full, the oldest file is automatically overwritten by the current file.
SC	● Gas-sensitive semiconductor
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.
TC	● Thermal conductivity sensor
% vol.	● Percent concentration of a gas in a gas mixture with respect to the volume

7.12 Referenced documents

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

/1/ EN 60079-7:2007
/2/ EN 60086-1
/3/ EN 61951-2
/4/ 2014/34/EU

8 Index

M

O

P

R

S

T

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Z

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