

**Worldwide Supplier of Gas
Detection Solutions**



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G750 POLYTECTOR II

Operation and Maintenance Manual

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Introduction

For your safety

Like any piece of complex equipment, the GfG Polytector will do the job designed to do only, if it is used and serviced in accordance with the manufacturer's instructions. This manual must be carefully read by all individuals who have or will have the responsibility for using and servicing this product.

The warranties made by GfG with respect to the product are voided, if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following them. The above does not alter statements regarding GfG's warranties and conditions of sale and delivery.

Application

The POLYTECTOR II is a handheld detector for personal protection from gas hazards. The built-in pump allows to take gas samples from confined spaces (e.g. manholes, sewers or tanks) to check before entering, if the area is contaminated. With the pump deactivated, the POLYTECTOR II operates permanently in diffusion mode and gives a visual and audible warning, if gas hazards arise.

The POLYTECTOR II has been tested for the use in hazardous areas and certified with a type approval by „DMT - Gesellschaft für Forschung und Prüfung, Fachstelle für Sicherheit elektrischer Betriebsmittel“. The Ex-Certificate is: BVS 99.E.2016 for classification EEx ib d IIC T5.

The measurement function of the POLYTECTOR II has been tested by „DMT-Gesellschaft für Forschung und Prüfung mbH, Prüflaboratorium für Grubenbewetterung“. The tests were based on the standards DIN EN 50054 „Electrical Devices for Tracing and Measuring of Combustible Gases - General Requirements and Test Methods“, DIN EN 50057 „Electrical Devices for Tracing and Measuring of Combustible Gases - Requirements for the Operational Behaviour of Devices of Group II with a Detection Range up to 100 % of the Lower Explosion Limit“, DIN EN 50104 „Electrical Devices for Tracing and Measuring of Oxygen - Requirements for the Operational Behaviour and Test Methods“, the guideline T017 of BG Chemie „Warning Devices for Hydrogen Sulfide“, the guideline T 022 of BG Chemie „Gas Warning Equipment for Landfill Application - Test of Functioning“ and DIN EN 50271 „Electrical Devices for Detection and Measurement of Combustible Gases, Toxic Gases or Oxygen - Requirements and Tests for Warning Equipment using Software and/or Digital Technology“.

The functions marked with (#) have not been part of the test, which included the below ranges.

These sensors and detection ranges have been tested:

MK201-1	0 ... 100 %LEL	CH ₄	Methane
MK201-1	0 ... 100 %LEL	C ₃ H ₈	Propane
MK342-1	0 ... 25.0 Vol%	O ₂	Oxygen
MK200-1	0 ... 5.0 Vol%	CO ₂	Carbon dioxide
MK344-1	0 ... 500 ppm	CO	Carbon monoxide
MK345-1	0 ... 100 ppm	H ₂ S	Hydrogen sulfide

General Description

The Polytektor G 750 is a handy and compact gas detector for simultaneous monitoring of up to 6 gas hazards, e.g.:

- Combustible gases (e.g. methane up to 100 % LEL)
- Combustible gases (e.g. methane up to 100 Vol.-%)
- Oxygen deficiency or surplus
- Toxic gases (e.g. carbon monoxide)
- Toxic gases (e.g. hydrogen sulphide)
- Toxic gases (e.g. carbon dioxide)

The "Smart Sensor System" allows an easy change of the plug-in sensors to adapt the POLYTEKTOR II to new measurement tasks or to renew the sensors.

The POLYTEKTOR II is easily operated with only a few keys, supported by the clear text in the display. All user functions are affected directly by means of the keys Pump On/Off, Zoom On/Off, Alarm Reset, Display Illumination On/Off. In the detection mode every key stands for one function - you do not need a long training to operate the POLYTEKTOR II perfectly.

A special service code gives access to further controls for inspection and adjustment. The service mode also allows to change the settings of many parameters to make the POLYTEKTOR II suitable for specific measuring tasks.

Detection Principles

Depending on the gas to be monitored, the POLYTEKTOR II uses different detection principles. Catalytic combustion (CC) and thermal conductivity (TC) are proven principles to measure combustible gases for explosion protection. Electrochemical sensors (EC) with different characteristics are used to measure a wide range of toxic gases and oxygen. The infrared sensor (IR) gives exceptional results for measuring carbon dioxide (CO₂).

Catalytic Combustion (CC)

This principle is used to measure combustible gases and vapours up to 100 % LEL. The gas is supplied to and catalytically burnt at a heated wire filament. This combustion changes the electrical resistance of the wire. The change in resistance is measured, as it is proportional to the gas concentration.

Thermal conductivity (TC)

With this principle the gas passes a heated wire. Depending on its concentration, the gas more or less cools the wire, thus changing the electrical resistance. The change in resistance is measured, as it is proportional to the gas concentration. The POLYTEKTOR II uses the thermal conductivity principle to measure combustible gases up to 100 Vol.-%.

Electrochemical sensors (EC)

The electrochemical sensors consist of an electrolyte, a working electrode (anode), a counter electrode (cathode) and, for certain models, a reference electrode. Selection of specific electrodes and electrolytes make the sensors suitable for the gas to be monitored. The conversion of the gas between the electrolyte and the electrode generates an electrical signal which is proportional to the gas concentration. GfG's electrochemical sensors are operated on the capillary diffusion barrier technology, which, together with an additional temperature compensation, prevents interferences caused by changes in atmospheric pressure and temperature.

Infrared sensor (IR)

The infrared sensor uses the characteristic of gases to absorb light in certain spectral ranges. The light from an infrared source passes the gas in the sensor cell, which reduces the radiation energy by absorption. The absorption of the infrared radiation in a certain wavelength range is proportional to the concentration of the gas to be measured. The energy reduction of the infrared radiation is measured by means of detectors. Simultaneously the infrared light is measured in a different wavelength range, in which the gas does not cause any absorption, to obtain a reference signal. This provides a high accuracy even if the light source changes or if the mirrors are dirty.

Design

The POLYTECTOR II (fig. 1) is protected by an impact-proof compound casing. Operation and service is controlled by the keyboard (pos. 6). In the detection mode the big display (pos. 5) shows all measured components either simultaneously or in magnified letters. The gas is usually supplied to the sensor chamber through the diffusion inlet (pos. 4). When the pump is activated, the gas enters the sensor chamber through the pump inlet (pos. 1), to which you can also fix a sampling line. The big red alarm LED (pos. 2) gives a visual warning. The audible alarm is signaled by a buzzer, protected by a wiremesh (pos. 3). The charging socket (pos. 7) for the battery pack is at the bottom of the casing. The battery pack is placed behind a cover (pos. 8), which is fixed with a lock screw (pos. 9).

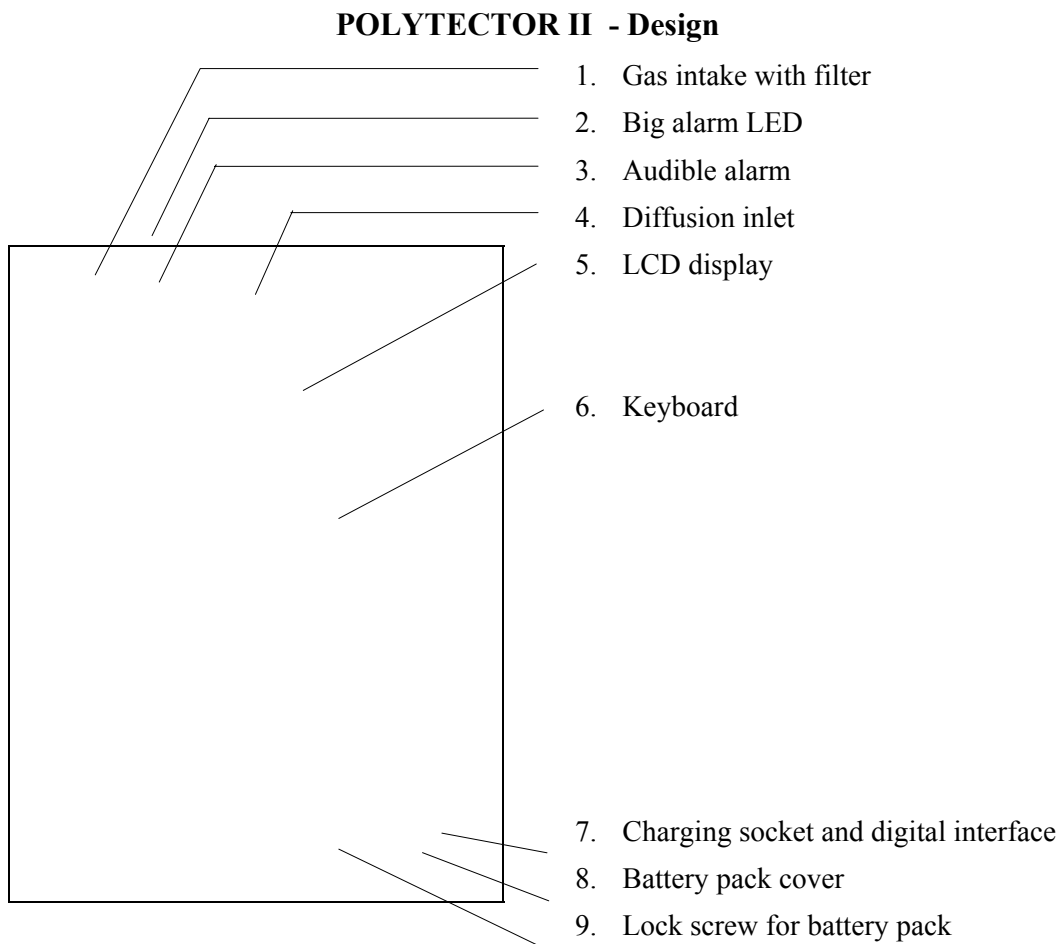


Fig. 1

Installation of sensors

The sensor chamber for three electrochemical (EC₁, EC₂, EC₃), one infrared (IR) and one combined catalytic combustion / thermal conductivity (CC / TC) sensor is behind the diffusion inlet. Fig. 2 shows the sensor positions in the sensor chamber. The chart „Sensor type and detection range“ in the annex gives a survey on the combinations of sensors and gases available for being installed in the POLYTECTOR II.

Sensor positions in sensor chamber

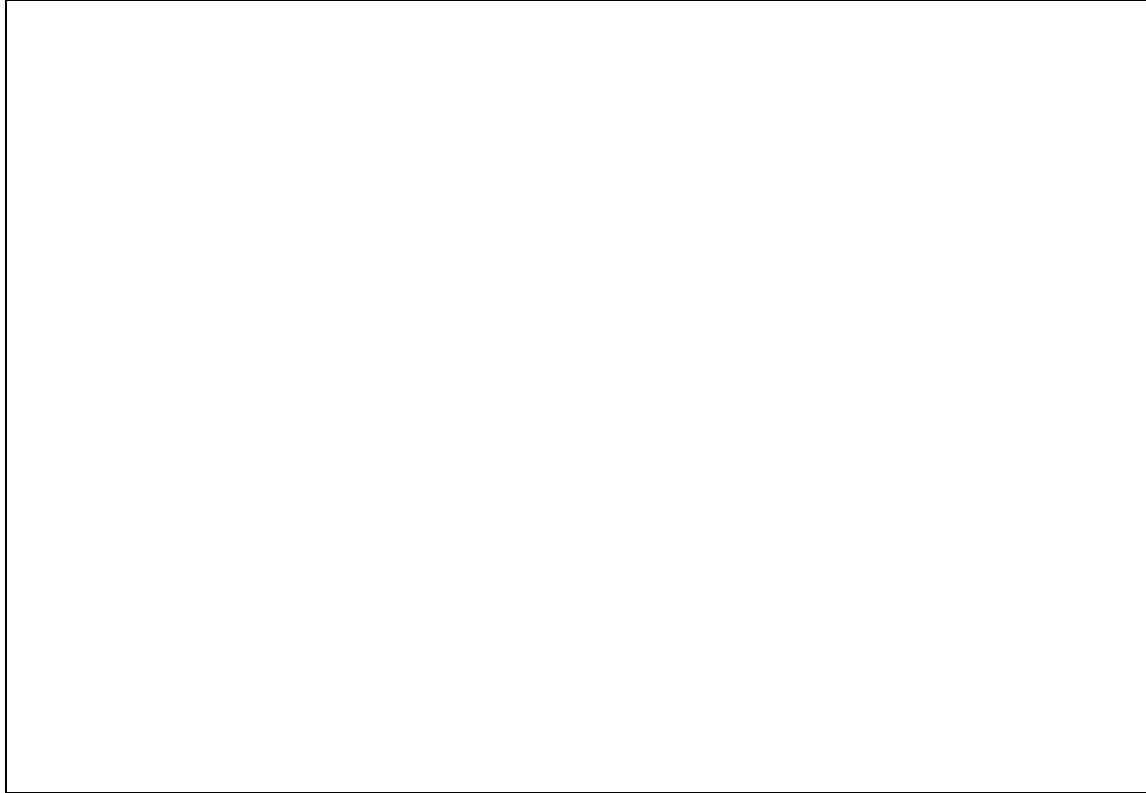


Fig. 2

Operational Hints

Detection Mode

The detection mode comprises functions the user needs to know for the proper operation of the gas detector POLYTECTOR II.

Switching On

Switch the POLYTECTOR II on in an environment, which is free from any gas, and before you enter a room, which might be confined by gases or vapours.

Press key to switch the POLYTECTOR II on.

The display now gives a short message about the detector, the user, the date and the time (this message can be set in the service mode).

Should the date for the next inspection be exceeded, the POLYTECTOR II gives a rhythmic alarm and the display reads „Inspection overdue“. You may reset this message by pressing the key .

The display also informs about every gas being measured, its detection range and the set alarm thresholds.
Example:

0.0 - 25.0 Vol % O ₂		
AL 1	AL 2	AL 3
19.0	17.0	23.0

Measured gas is oxygen, O₂
Detection range is 0 to 25 Vol.-%

e.g. thresholds for oxygen detection:

1. Alarm, falling below 19 Vol.-%
2. Alarm, falling below 17 Vol.-%
3. Alarm, exceeding 23 Vol.-%

Before the detector finishes the warm-up time and automatically turns to the detection mode, it gives a short visual and audible alarm. The display reads:

**BEGIN OF
MEASURING**

Switching Off

To switch the POLYTECTOR II off, press the keys and simultaneously and keep them pressed for approx. 3 seconds. You will hear short beeps and read the message:

**SWITCH OFF
in 3 seconds**

Stand-by mode (#)

If the detector is used with certain sensors (MK 379-2, MK 405-2) it is not completely switched off after having been turned off. It is only turned into the standby mode and should be recharged with a charging unit as soon as possible. The charger should be fixed to the detector until the detector is used for the next time.



By pressing the key the detector is switched on again. It goes through the processes as described in section "Switching on". For long transportation it is recommended to completely switch off the detector. Keep key pressed for several seconds to completely switch off the detector. After re-starting the detector allow for a longer warm-up time than usually required (see section "Sensor specification").

Readiness for Operation

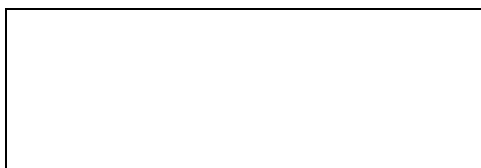
The POLYTECTOR II is ready for operation, if all measurement values, the unit and the gas are displayed. As long as „---“ instead of the measurement value and „WUP“ instead of the unit are shown, the relevant channel is not ready yet. During this time you get a short visual and audible signal every 10 seconds. The warm-up time usually takes about 40 seconds. Example for the display of a POLYTECTOR II with 4 sensors:



In case an operational beep is activated, the POLYTECTOR II gives an audible signal, depending on the set interval (refer to „Operational Beep - SIG“).

Individual Gas Display - Zoom Display

For magnification shortly press key to use the whole size of the display for a clear indication of individual gases.



Press key repeatedly to displays all other measurement values and the battery capacity one after the other in zoom display. Press once more, or do not hit any key for approx. 10 seconds, and the display returns to the standard multi-gas reading.

Individual Gas Display - Memory Display

The POLYTECTOR II allows to store and to display time weighted averages (TWA), short-term exposure levels (STEL), peak values (MAX) and minimum values (MIN). The stored values have the following meanings:

STEL: The STEL (short term exposure level) is an average value of the gas concentration over a time, which is determined by the short-term period. Short term exposure levels are used for evaluating the exposition peaks. In accordance with TRGS 402 and TRGS 900 for most

gases, the short-term period is set to 15 minutes. If other exposition intervals shall be set you can adjust the short-term period for toxic gases between 5 and 60 minutes.

TWA: The time-weighted average (TWA) is an average value of the gas concentration over an 8 hours working shift. For the calculation of the total dosis the POLYTECTOR II uses all expositions measured since the detector has been switched on. The thresholds for the TWA are equivalent to those for the TLV and have been fixed by TRGS 900.

MIN / MAX: Minimum resp. peak value measured since the detector was switched on or since the stored values were reset.

For reading the stored values you have to turn to the memory display by keeping the key pressed for approx. 3 seconds, while the zoom display is active.

Note: You cannot turn to the memory display, if the zoom display is not active, i.e. if all gases or the battery capacity are shown in the display.

As an example we are showing the following readings of the memory display for carbon dioxide and methane:

Carbon dioxide, CO₂:

MAX	15'STEL	8hTWA
0.09	0.08	0.01
VOL CO₂	VOL CO₂	VOL CO₂

Methane, CH₄:

MAX	MIN
14.5	0.0
%LEL CH₄	%LEL CH₄

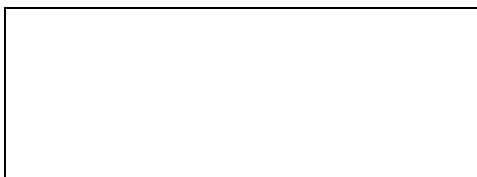
By repeated pressing key the stored values for every gas are displayed one after the other. You can return to the standard display mode by pressing the key for approx. 3 seconds, while the memory display is active. The POLYTECTOR II will also return to the standard display mode, if you switch it off and on again.

Resetting Stored Values

Resetting the stored values means, that the currently measured values are accepted as minimum resp. peak values. To reset the minimum and peak values, press key . You can only reset the MIN resp. MAX values of those gases, which are shown in the display. After switching the POLYTECTOR II on, the TWA and STEL values are also set to 0.

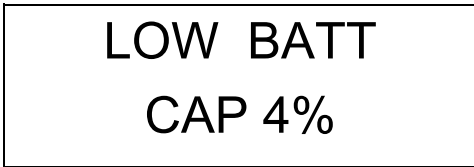
Battery Capacity - Battery Alarm


The fully charged battery pack of the POLYTECTOR II has a capacity for continuous operation of more than 8 hours in diffusion mode. The operational time may be reduced by sampling intervals and alarms. Use the ZOOM display for the indication of the residual capacity of the battery pack: Press key several times, until the battery capacity is displayed:




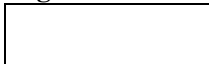
In the above example the battery has a residual capacity of 97%. The residual capacity refers to a voltage measurement at the battery. After the detector has been switched on, the voltage may reduce a little bit faster (within the first 15 minutes).

When the capacity falls to 4%, the POLYTECTOR II gives a visual and audible warning. The display reads:



Alarm Signal
 every 6 seconds

Confidence Bleep
 (after alarm reset)
 every 6 seconds

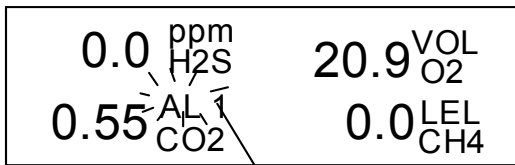
Signal - Automatic Turn-Off


Press key to reset the battery alarm. In this case the POLYTECTOR II gives a short signal in intervals of 6 seconds to remind of the low battery status. When the POLYTECTOR II gives a battery alarm, it should be connected to its charger. The residual capacity after a battery alarm is sufficient to operate the detector for another 15 minutes at least.

Once the battery capacity falls to 0%, the POLYTECTOR II gives an alarm in very short intervals and automatically turns the detector off.

Alarm

Should the measured gas concentration exceed a pre-set threshold, the detector immediately gives an audible and visual alarm. An optionally available vibrator makes you even feel the alarm. In addition to this, the display indicates the exceeded alarm threshold of the gas, which has caused the alarm. The following example shows the display for the exceeded first alarm of CO₂ (carbon dioxide):









AL 1 means that the first threshold is exceeded
 The display and the unit blink alternately

The POLYTECTOR II provides three alarms for the currently measured values of oxygen and combustible gases (e.g. CH₄) and two alarms for toxic gases (e.g. CO, H₂S, CO₂). A dangerous situation that is caused by decreasing concentrations, e.g. for oxygen deficiency, is displayed when falling below the pre-set alarm threshold (↓). An exceeding alarm (↑) is given, if a gas danger occurs due to increasing concentrations, e.g. for toxic and combustible gases. For the toxic gases there is an additional alarm for exceeded time weighted averages and short-term exposure levels (TWA and STEL).

Kind of Alarm	Sensors	Number of Alarms	Description
Current value (AL)	Oxygen	3	A current value alarm is activated immediately, if the gas concentration exceeds resp. falls below a pre-set threshold. The current value alarms are adjustable.
	Comb. gases	3	
	Toxic gases	2	
Short term value (STEL)	Toxic gases	1	The short-term value (STEL) is the average concentration over a short period (e.g. 15 minutes). The reference time is adjustable. The STEL alarm is not latching. It resets automatically as soon as the concentration has fallen below the threshold.
Long term value (TWA)	Toxic gases	1	The long-term value (TWA) refers to an 8 hours shift and calculates the average concentration. The TWA alarm cannot be reset. It is only de-activated, if the detector is switched off.

The audible and visual alarms provide different sound and flash frequencies:

Alarm threshold	Audible and visual alarm	Alarm signal	Priority
AL 3	fast sound and flash frequency (3 pulses in 1.0 seconds)		
TWA	fast sound and flash frequency (3 pulses in 1.0 seconds)		
STEL	medium sound and flash frequency (2 pulses in 1.2 seconds)		
AL 2	medium sound and flash frequency (2 pulses in 1.2 seconds)		
AL 1	slow sound and flash frequency (1 pulse in 1.5 seconds)		

The alarm thresholds are limit values for gas concentrations. The thresholds can be variably adjusted within the detection range of every measured gas, or they can be deactivated (see section „**Alarm Thresholds**“). Alarms AL 2, AL 3 are latching, i.e. they remain activated even if the gas concentration has fallen below the threshold. For alarm reset press key . The first alarm AL 1 is not latching, but resets automatically, if the gas concentration has fallen below the set value. The alarms have the following priorities: Exceeding detection range, gas alarm (AL3, TWA, STEL, AL2, AL1), pump failure, falling below detection range, PL-power failure, temperature failure.

Diffusion Mode

When you switch the POLYTECTOR II on, measurement is effected continuously in diffusion mode. In this mode, all concentrations are shown in the display. In addition, short term and long-term averages (STEL and TWA) are calculated for toxic gases, and for non-toxic gases peak and minimum values (MAX and MIN) are stored. The stored values can be read from the display, if you turn to the relevant display mode (refer to „**Individual Gas Display - Memory Display**“).

Note: During diffusion operation the diffusion inlet must not be covered.

The measurement results can also be stored in the optionally available data logger and transmitted and evaluated later on over the PC interface.

Diffusion Acceleration

Should the POLYTECTOR II recognize an important change in the gas concentration, it automatically activates the sampling pump. The pump remains active until only minimum changes of concentration are indicated. This reduces the response time considerably.

Sampling Mode

Press key **shortly** to run or stop the sampling pump. For a moment, the display reads „PUMP <ON>“ or „PUMP <OFF>“. ([#] From Firmware 3.24[#] the remarks “COVER SCREEN!” or “OPEN SCREEN!” can, as an option, be additionally displayed.) During the pump mode the measurement values are shown in the display just as in the diffusion mode. The POLYTECTOR II allows selecting one of 3 different sampling modes (refer to „**Pump Function - PUMP**“). In case the pump is operated in the single or interval mode and the

POLYTECTOR II notes a considerable change of signal during sampling, the pump is automatically turned off only once the gas concentration has stabilized.

**Note: During sampling the diffusion inlet must be covered.
An open diffusion inlet may distort the measurement result.**

Use the diffusion cover, which is fixed to the back of the leather case, to close the diffusion inlet. Lock the diffusion cover by means of the snap-fastener.

For taking gas samples out of e.g. manholes, confined areas or sewers, you can fit a sampling hose with or without a telescopic probe to the intake. As the response time mainly depends on the inner volume of the sampling hose, this should be kept as short as possible. Below you find the formula for the minimum sampling time (T_{MIN} in seconds):

$$T_{MIN} = 20s + 3s/m * L_{hose} + T_{probe}$$

L_{hose} = Length of sampling line in meter

T_{probe} = 10s (with tel. probe) , 0s (without tel. probe)

The sampling line should have the characteristics below:

1. The inner diameter should be 5 mm.
2. The material must not absorb the gas.
3. The hose should be as short as possible to reduce the sampling time.

Please ask your GfG service for special sampling lines for different tasks.

Measurement of gas hazards in the sampling mode is effected as described below:

1. Cover the diffusion inlet.
2. Fit sampling line to intake. The hose should include a dust/water filter to avoid damages by water (see accessories).
3. Bring the open end of the hose into the confined area. Should you have to take samples from the surface of liquids, please use a float probe.
4. Press key shortly to activate the pump. Have a look at the minimum sampling time!
5. Press key shortly to turn the pump off. Open the diffusion inlet for measurements in diffusion mode.

Pump Failure

Should the built-in pump not work properly, e.g. because a soiled filter reduced the flow rate below 50% of the nominal flow, the detector gives an audible and visual pump alarm.

100 Vol.-% Measurement of Methane resp. Natural Gas (#)

For measuring methane (CH_4) during standard detection the POLYTECTOR II uses a sensor, which is designed for a range from 0 to 100 % LEL. For measuring higher methane concentrations, the detector must be equipped with the combination sensor MK 202-1. Press key for approx. 3 seconds to turn to the range of 0 to 100 Vol.-%. High concentrations of methane (up to 100 Vol.-%) are always measured with activated sampling pump.

Note: As in the pump mode, this measurement requires the diffusion inlet to be covered. An open diffusion inlet might result in false measurement values.

During the standard measurement in Vol.-% all alarms are deactivated. The alarms for the Vol.-% range can, however, be activated.

Measurement of methane up to 100 Vol.-% is effected as follows:

1. Connect a hose to the intake. The hose should provide a dust and water filter to prevent soiling of the sensor chamber (see accessories).
2. Bring the open end of the hose into the room to be checked. For measurements above the surface of liquids we recommend to use a float probe.
3. Press key to run the pump and to start the EX-measurement. To stop the pump, press key . This does not finish the "Vol.-%" measurement yet, but continues in diffusion mode. The diffusion inlet must be opened again.



The Vol.-% measurement is finished by pressing key again. The pump starts automatically for at least 10 seconds to purge the sensor with fresh air. This purging process prevents a false alarm caused by residual gas in the sensor chamber. If you press key again during the purging process, the pump is stopped and the purging process is finished early.

Display Illumination

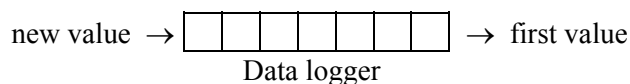
Whenever you press a key, the display illumination is turned on for approx. 5 seconds and turns off automatically after that time.

Storing of Data in Data Logger (#)

The data logger of the POLYTECTOR II automatically stores the measurement data during detection. You do not have to activate the data logger separately. The following data are stored:

- Measurement values of every detection range
- Date and time of every measurement value
- Location, if **LOC** was entered
- Alarm activation of every detection range
- Special events

In menu point „**REC**“ you can select different functions of data logging, e.g. whether you want the measurement values stored as current or average or peak values. You can also select the time interval, in which the measurement shall be recorded. The interval can be set within a range of 1 second and 30 minutes. The storage capacity is independent from the number of sensors and contains 1650 measurement points. By this you can collect data over an interval of 27 minutes up to 34 days. If you set the interval to 2 minutes you can collect data over 55 hours. The data is kept in the detector for several years until they are deleted or overwritten. The measurement data are stored in succession. Should the data logger be full, the first value stored is deleted.



Measurement data transfer to a PC is effected over an interface cable and by means of the GfG software program.

Special Notes for Oxygen Monitoring

Sour gases like CO₂ and SO₂ are easily absorbed by the electrolyte of the oxygen sensor. This results in an increased oxygen signal of e.g. approximately 0.3 % of the measurement value per 1 Vol.-% CO₂. The oxygen sensor, therefore, cannot be recommended for continuous measurement in concentrations above 25 Vol.-% CO₂. If the carrier gas is a gas with a molecular weight, which is different from that for nitrogen, the display values may also be incorrect.

There are no cross sensitivities of the oxygen sensor for toxic gas concentrations within the TLV range.

Special Notes for LEL Monitoring

For LEL monitoring the POLYTECTOR II uses a catalytic combustion (CC) sensor. Due to this principle the POLYTECTOR II cannot distinguish between measurement values in the LEL range and those in the high Vol.-% range (e.g. > 20 Vol.-% CH₄).

In case the detector also includes an oxygen sensor, you can determine gas concentrations in the high Vol.-% range, which are not accurately measured by the CC sensor. It is absolutely necessary, however, that you have already switched the detector on in an EX-free environment.

If the detector does not provide an oxygen sensor, an exceeded LEL range remains stored, until it is cancelled by pressing the key twice. After the first hit on this key, the display reads „GAS POSSIBLY>100%LEL“. Only the second hit on the key cancels the stored value. This must only be done, however, if the user has carefully checked, that there is no high Vol.-% concentration. Cancelling the stored value is only possible, if the measurement value is within the detection range.

Attention:

When measuring high concentrations of a combustible gas by means of the TC sensor please always keep in mind, that, in contrary to light gases like methane or hydrogen, the signal change of this sensor generates a negative display for heavy gases like propane or butane. This means, that high gas concentrations can always be neglected, if the display of the TC sensor reads values between -5.0 ... +5.0 Vol.-% CH₄.

Additional function for the unambiguousness of measuring combustible gases (from Firmware 3.24)^(#)

A measured oxygen concentration of less than 10 Vol.-% does not allow the CC sensor to measure combustible gases and vapours correctly (LEL monitoring). In this case the value measured by the CC sensor and „???“ are displayed alternately. Should the oxygen concentration rise above 10 Vol.-%, and should the CC sensor at the same time measure a value of more than 20 % LEL, you cannot necessarily rely on a correct measurement. Only when the oxygen concentration rises above 19 Vol.-% or when the CC sensor shows a value of less than 20 % LEL, the concentration of combustible gases and vapours are measured correctly. Then the „???“ disappears from the display.

Influence of Interfering Gases and Oxygen

It is to be considered, that the measurement of gas and/or vapour concentrations in the measurement range of 100% LEL cannot be done accurately, if the oxygen concentration is below 10 Vol.-%. In this case the CC sensor suffers from a lack of oxygen, which is necessary for the „catalytic combustion“. The EX-approval does not cover the use of the detector in oxygen enriched atmospheres. Certain components, known as „sensor or catalyst poisons“, may affect the signal behaviour of the CC sensor. The "sensitivity", i.e. the capability of the sensor to give signals, is reduced. Components of this kind are e.g. sulphuric, lead or silicone compounds.

Should you have to use the detector in siliceous atmospheres, make sure that a special charcoal filter is fit into the sampling line. In this case the POLYTECTOR II must only be operated in sampling mode and with covered diffusion inlet. This means, that methane, hydrogen, oxygen, carbon dioxide and carbon monoxide are measured. Other gases, like hydrogen sulphide, sulphur dioxide, chlorine, hydrogen cyanide, nitrogen dioxide, nitrogen monoxide, complex hydrocarbons or organic substances are adsorbed by the filter and cannot be measured.

Service Mode

In the service mode the POLYTECTOR II can be adjusted by changing of program parameters. A clear menu leads the way through the different adjustment possibilities. Several menu points require an access code „0011“ to prevent accidental modification of important functions. During the service mode all alarms are deactivated.

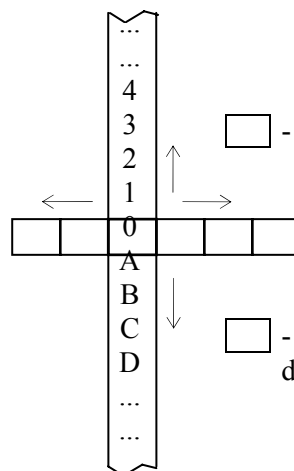
Menu Control

In all service menus the keys , , and have special functions and are used for the menu control and for entering. The functions of the keys are explained in bold, abbreviated letters in the bottom line of the display. The abbreviations stand for:

RET	RET = Return , key <input type="checkbox"/> . Returns to the previous menu point. Repeated pressing of "RET", no matter from which position, brings you back to the start and to the detection mode.
<<<	= Cursor to the left , key <input type="checkbox"/> . Goes to the previous point displayed.
SEL	SEL = Select , key <input type="checkbox"/> . Selects the marked point (cursor position). With "SEL" you can go to the next menu point.
>>>	= Cursor to the right , mainly key <input type="checkbox"/> . Goes to the next point displayed.
.. 9 .. / .. Z ..	Editor function . For entering figures or letters. Key <input type="checkbox"/> = next figure/letter. Key <input type="checkbox"/> = previous figure/letter.
+ / -	Changing figures. Key <input type="checkbox"/> = Increase value. Key <input type="checkbox"/> = Reduce value.
ON / OFF	Functions are turned on resp. off. Key <input type="checkbox"/> or <input type="checkbox"/> = Turn function on (activate) or off (de-activate).
< or >	Bring the cursor in this position to select the previous menu point. Is < or > existing, this substitutes "RET".
Cursor position	The cursor is always in the blinking position.

Editor function

- key moves the window one position to the left



- key moves the window one position to the top

-key moves the window one position to the right

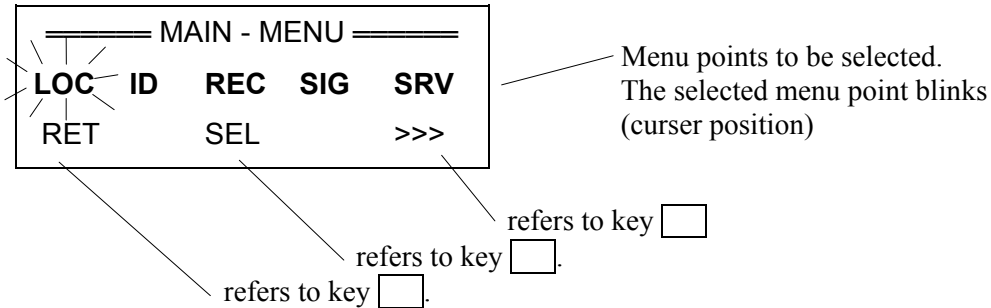
- key moves the window one position downward

Activation of Service Mode

With the detector being switched on, press key for approx. 3 seconds to activate the service mode.

Menu Control in Service Mode

All adjustments in the service mode are menu controlled. The 3 top keys stand for that function, which is shown in the bottom line of the display:

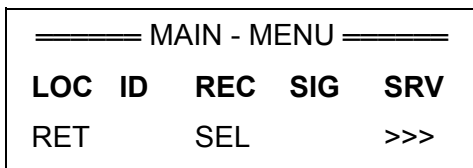


Example:

„LOC“ blinks in the above display. This means, that menu point „LOC“ was selected. The different menu points are explained below. Press "SEL", key , to open the menu point „LOC“. To move the cursor one position to the right, press ">>>", key , and you select the next menu point "ID". With "RET" key you return to the previous menu point resp. back to the detection mode.

Survey Main Menu

The main menu is the first menu point in the service mode:



Explanation of display:

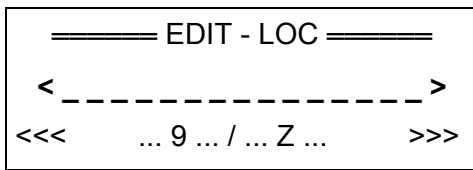
LOC	Entering a location of POLYTECTOR II.
ID	Free entering of identity.
REC	Data logger function.
SIG	Interval for operational beep.
SRV	Entering the service mode. Requires access code.

Entering possibilities:

	Key	Meaning
RET	<input type="checkbox"/>	Back to detection mode
SEL	<input type="checkbox"/> EX OFF	Open selected menu
>>>	<input type="checkbox"/>	Cursor to the right

Entering Location - LOC

You can enter up to 15 letters / figures to store a location in the POLYTECTOR II.



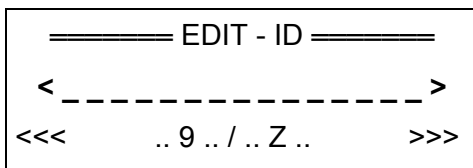
Entering possibilities:

	Key	Meaning
<<<		Cursor to the left
..9..		Next figure / letter
..Z..		Previous figure / letter
>>>		Cursor to the right

Entering the location is finished automatically, when the cursor has reached the mark "<" or ">". In combination with a data logger (option) you can enter a location for every measurement. This way, the measurement always refers clearly to a certain location.

Identification - ID

You can enter up to 15 letters / figures to store an "**Identification**" in the POLYTECTOR II. Entering the identification is finished automatically, when the cursor has reached the mark "<" or ">".

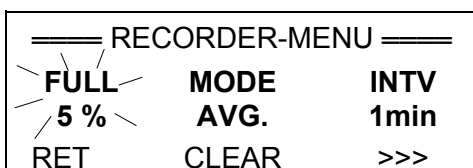


Entering possibilities:

	Key	Meaning
<<<		Cursor to the left
..9..		Next figure / letter
..Z..		Previous figure / letter
>>>		Cursor to the right


Data Logger Functions - REC

The menu point **REC** is only available for detectors with data logger. REC allows to adjust various parameters to set the memory function of the data logger to your individual requirements.




The selected menu point (FULL, MODE and INTV) blinks in the display.

Entering possibilities:

Display	Key	Meaning
RET	<input type="checkbox"/>	Back to user menu. Should you have changed something, you are asked whether you want the changes saved or not.
Clearing, Changing, + / -	<input type="checkbox"/>  <input type="checkbox"/>	Changing the selected mode. Depending on the mode you will read different function descriptions from the display.

The menu points **FULL**, **MODE** and **INTV** stand for:

Memory Display and Clearing of Data Logger - FULL


FULL indicates, which percentage of the data logger capacity is already used. In the example below, 5 % of the data logger is used. Press key  to clear the data logger memory.

===== RECORDER-MENÜ =====		
FULL	MODE	INTV
5 %	AVG.	1min
RET	CLEAR	>>>

Before all data are deleted, the display asks you

===== RECORDER-MENU =====	
CLEAR DATA ?	
NO	YES

Entering possibilities:


	Key	Meaning
NO	<input type="checkbox"/>	The data will not be deleted
YES		All data will be deleted

Storing Mode - MODE

You can select one of three different storing modes.



Function	Explanation
INST	The currently measured value is stored in the data logger. You can set the time interval (*).
AVG.	The average value over the set time interval (*) is calculated and stored in the data logger.
PEAK	Only the peak value within the set time interval (*) is stored in the data logger.

(*) refer to menu point **INTV**

Press key  to select the required function.

Storing Interval - INTV

The function INTV is used for changing the time interval for the storing modes described above. The interval can be set to 1, 10, 20, 30 seconds or to 1, 2, 3, 5, 10, 20, 30 minutes. Changing of interval is done as follows:




Display	Key	Meaning
+		Increasing the time interval by one step.
-		Reducing the time interval by one step.

Operational Bleep - SIG

If required, the POLYTECTOR II provides an operational bleep in regular intervals. In the menu point „SIG“ the interval can be turned on or off. To turn the interval on, enter the desired interval time between 15 and 90 seconds. Two dashes in the display „--“ indicate, that the operational bleep is deactivated.

===== SIGNALTONE =====	
INTERVAL: 15 sec	
RET	+ / -

Entering possibilities:

Display	Key	Meaning
RET		Back to user menu. Should you have changed something, you are asked whether you want to save the changes or not.
+/-	 	Changing the interval. The interval is displayed in seconds. Two dashes „--“ indicate that the operational bleep is de-activated.





Access to Service Menu - SRV

The security code is the "key" for opening the service mode "SRV". It prevents unauthorized persons from changing the adjustments and parameters of the POLYTECTOR II, as this might affect the measurement and warning.

===== SECURITY CODE =====	
< _ _ _ _ >	
<<<	.. 9 .. / .. Z .. >>>

The security code is: **0 0 1 1**

Entering possibilities:

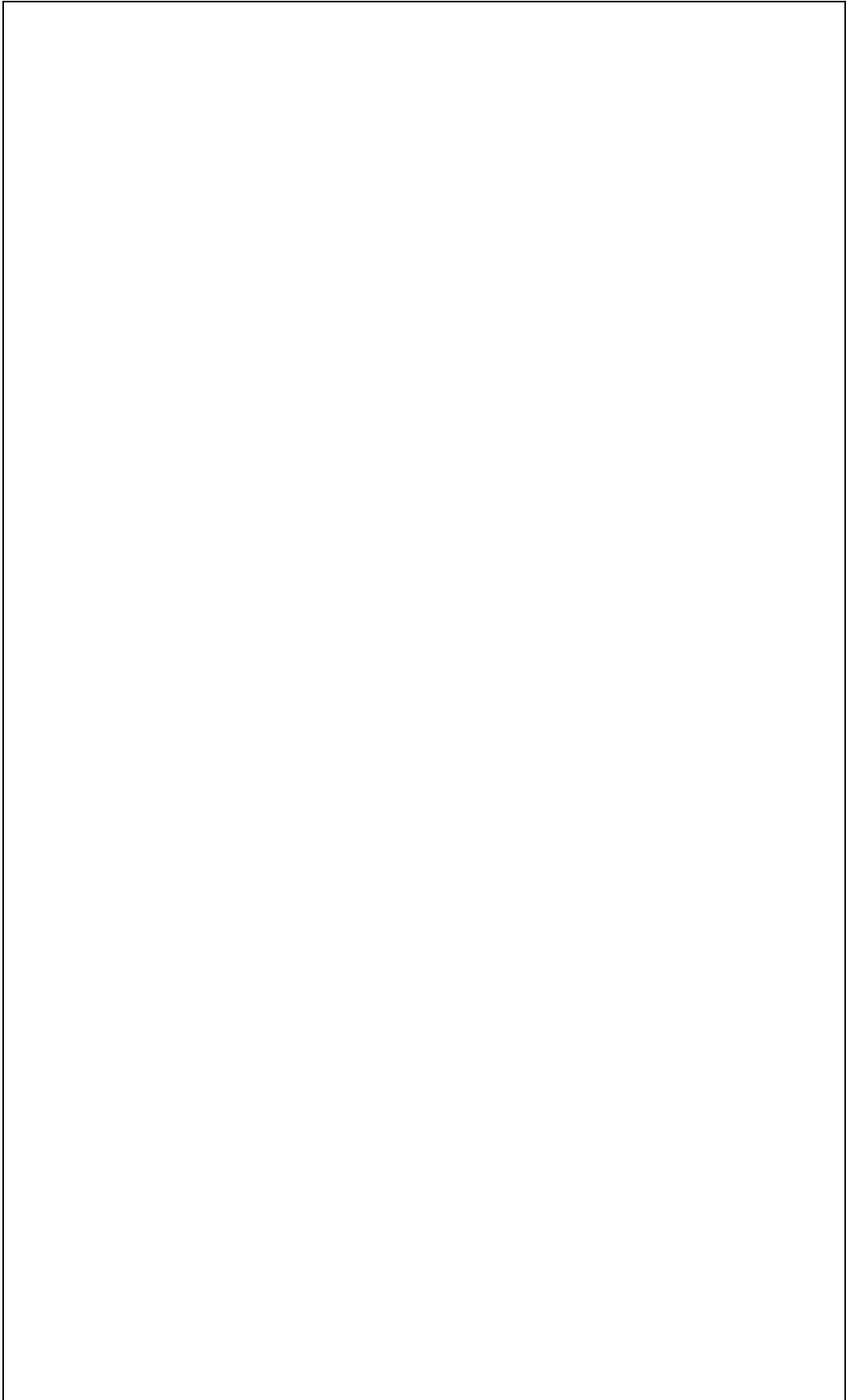
	Key	Meaning
<<<		Cursor to the left
..9..		Next figure / letter
..Z..		Previous figure / letter
>>>		Cursor to the right

Entering the security code is automatically finished, when the cursor has reached the mark "<" or ">". If the code has been entered correctly, you enter the service mode, which allows you to change and adjust a variety of parameters in the POLYTECTOR II, as there are:

1. General adjustment of parameters.
2. Sensor resp. gas specific setting of parameters.

Survey of Service Menu

The picture shows the service menu structure. The sensor specific adjustments are present for every sensor. All adjustments are only valid for the previously selected sensor.



General Adjustments - SYSTEM



The POLYTECTOR II can be adjusted for different measurement tasks.

===== SERVICE - MENU =====		
SYSTEM	O2	CO H2S CO2
	CH4(CC)	CH4(TC)
RET	SEL	>>>

Explanation of display:

SYSTEM	General adjustments and information.
(GASES)	Sensor specific adjustments and information.

Entering possibilities:

	Key	Meaning
RET	<input type="checkbox"/>	Back to previous menu
SEL		Open selected menu
>>>		Cursor to the right

Pump Function - PUMP

You can select one of 3 pump modes:

Mode 1 (ON/OFF)

Press key shortly to start the pump, and press again to stop it.

Mode 2 (SINGLE)

Press key shortly to start the pump. The pump will stop automatically after a pre-set time. Should the POLYTECTOR II detect a change of the gas concentration, the sampling time is extended over the set time. You may stop the pump at any time by pressing key again.

Mode 3 (REPEAT)



Press key shortly to start the pump. Now the sampling is effected in cycles, which include automatic stops and starts of the pump in regular intervals, which can be adjusted as required. Should the POLYTECTOR II detect a change in the gas concentration, the sampling time is extended over the set time interval. You can stop the pump cycle by pressing key again.

===== PUMP - MENU =====		
ON/OFF	SINGLE	REPEAT
-- / --	40 / --	30 / 15
RET	+ / -	>>>


Explanation of display:

ON/OFF	Mode 1:	Pump on/off via key, no time interval.
SINGLE	Mode 2:	Min. sampling time can be set in seconds.
REPEAT	Mode 3:	Time intervals for On/Off cycles can be set in seconds.

Entering possibilities:

	Key	Meaning
RET	<input type="checkbox"/>	Back to previous menu.
+		Increasing time interval by one second.
-	<input type="checkbox"/>	Reduce time interval by one second.
>>>		Cursor to the right.

Selection of Pump Mode:

- Move the cursor with >>>, key  to the required mode:
 - ON/OFF** = Mode 1.
 - SINGLE** = Mode 2
 - REPEAT** = Mode 3
- The selected pump mode blinks.
- Press "RET" key to leave the menu point.

Date and Time - TIME

The date and time can be read and, if required, adjusted.



===== TIME - MENU =====		
DD.MM.YYYY		hh:mm:ss
19. 01. 1998		09: 07: 33
RET	+ / -	>>>

Explanation of display:

DD	Day
MM	Month
YYYY	Year

hh	Hours
mm	Minutes
ss	Seconds

Entering possibilities:

	Key	Meaning
RET	<input type="checkbox"/>	Back to previous menu
+		Increase value by one
-	<input type="checkbox"/>	Reduce value by one
>>>		Cursor to the right

Note: Date and time are important parameters for storing data in the data logger (option).

Inspection Date - INSP

You can enter a date for the next inspection resp. service. Should the entered date be exceeded, the POLYTECTOR II gives a warning. When the inspection date is exceeded, the POLYTECTOR II gives a warning every time when it is switched on.

===== INSPECTION =====		
next	DD.MM.YYYY	
Date:	01. 01. 1999	
RET	+ / -	>>>

Explanation of display:

DD	Day of next inspection date
MM	Month of new inspection date
YYYY	Year of next inspection date

Entering possibilities:

	Key	Meaning
RET	<input type="checkbox"/>	Back to previous menu
+ / -	<input type="checkbox"/> EX OFF	Increasing Day, Month or Year by one
+ / -	<input type="checkbox"/>	Reducing Day, Month or Year by one
>>>	<input type="checkbox"/> Display	Cursor to the right

Detector Information - INFO

This menu point shows general information of the detector. These data cannot be changed.

===== SYSTEM - INFO =====	
DT:	G750/6
SN:	98010647
RET	>>>

Explanation of display:

DT	Detector type
SN	Serial number

Selection of Sensors - SENS

You can enable or disable every sensor individually. You can use this function, if there is no longer a need to measure a certain gas, or if the POLYTECTOR II is to be extended by additional sensors for different gases.





SENSOR - ENABLE					
EC1	EC2	EC3	CC	TC	IR
ON	Err	ON	ON	---	OFF
RET		ON / OFF			>>>

— Sensor place
 ON = Sensor activated
 OFF = Sensor deactivated
 Err = Sensor is faulty or not existing
 --- = No sensor existing

Explanation of display:

EC1	1. electrochemical sensor - oxygen, O ₂
EC2	2. electrochemical sensor - toxic gases e.g. carbon monoxide, CO
EC3	3. electrochemical sensor - toxic gases e.g. hydrogen sulphide, H ₂ S
CC	catalytic combustion sensor - EX-detection up to 100 % LEL e.g. methane, CH ₄
TC	thermal conductivity sensor - EX-detection up to 100 Vol.-% e.g. methane, CH ₄
IR	Infra-red sensor - carbon dioxide, CO ₂
ON	Sensor is activated
OFF	Sensor is de-activated
---	No sensor in detector

Entering possibilities:

	Key	Meaning
RET		Back to previous menu
ON		Activate
OFF		Deactivate
>>>		Cursor to the right

Selection of Sensors for Automatic Sensor Adjustment - aAIR and aCAL

The POLYTECTOR II allows a quick sensor adjustment in fresh air (**aAIR**) resp. with test gas (**aGAS**). This adjustment is started by a certain key combination and sets all sensors. Should you wish to exclude one or several sensors, you can turn them off in the menu point „aAIR“ for adjustment in fresh air resp. in „aGAS“ for adjustment with test gas.

Use of aAIR

The automatic adjustment with fresh air (aAIR) is recommended, if the zeropoints of several sensors resp. the sensitivity of the oxygen sensor are to be adjusted at the same time.

Note:

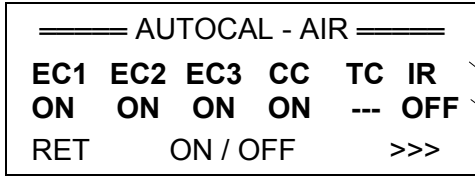
You should not adjust the zeropoint of the CO₂ IR sensors in fresh air, as even fresh air contains several hundred ppm CO₂. The zeropoint adjustment of the CO₂ IR sensor should, therefore, always be done individually by supplying 100% nitrogen.

Use of aCAL

The automatic calibration with test gas resp. test gas mixtures is done to adjust the sensitivity calibration of several sensors resp. the zeropoint of the oxygen sensor at the same time. A reasonable combination would be the simultaneous adjustment of the EC₂, EC₃ and CC sensors with a test gas mixture of e.g. 250 ppm CO, 50 ppm H₂S and 50 % LEL CH₄.

Note:

When using test gas mixtures, make sure that you do not supply it to those sensors, which show a cross sensitivity to any component of your mixture, as this might result in a wrong calibration. Furthermore, it is not recommended to adjust the zeropoint of the oxygen sensor automatically, as this should always be done with a test gas of 100 % nitrogen.



— Sensor place
 ON = Activate sensor for Auto-CAL
 OFF = Deactivate sensor for Auto-CAL
 --- = No sensor existing

Explanation of display:

EC1	1. electrochemical sensor - oxygen, O ₂
EC2	2. electrochemical sensor - toxic gases e.g. carbon monoxide, CO
EC3	3. electrochemical sensor - toxic gases e.g. hydrogen sulphide, H ₂ S
CC	catalytic combustion sensor - EX-detection up to 100 % LEL e.g. methane, CH ₄
TC	thermal conductivity sensor - EX-detection up to 100 Vol.-% e.g. methane, CH ₄
IR	Infra-red sensor - carbon dioxide, CO ₂
ON	Sensor activated for quick adjustment
OFF	Sensor de-activated for quick adjustment
---	No sensor in detector

Entering possibilities:

	Key	Meaning
RET		Back to previous menu
ON		Activate
OFF		De-activate
>>>		Cursor to the right

Serial Interface - COM

In the menu point COM you can set the data transmitting speed (BAUD) of the data from the data logger (option) to a PC or printer.

Sensor Specific Functions - 'GAS'

The following functions refer to the individual sensors in the POLYTECTOR II. In the service menu you can select each sensor individually. The adjustment possibilities described below are available for the relevant sensor selected.




For describing the functions of the sensor specific adjustments we mention the oxygen sensor (O₂). They are equivalent, however, for all other sensors.

===== SERVICE - MENU =====			
SYSTEM	O2	CO	H2S
	CH4(CC)	CH4(TC)	CO2
RET	SEL	>>>	

Explanation of display:

SYSTEM	General functions and information.
O2	Functions and information for oxygen sensor, EC1
CO	Functions and information for EC2 Sensor (e.g. CO)
H2S	Functions and information for EC3 Sensor (e.g. H ₂ S)
CO2	Functions and information for IR Sensor (e.g. CO ₂)
CH4(CC)	Functions and information for EX Sensor up to 100 % LEL (e.g. CH ₄)
CH4(TC)	Functions and information for EX Sensor up to 100 Vol.-% (e.g. CH ₄)

Entering possibilities:




	Key	Meaning
RET		Back to previous menu
SEL		Open selected menu
>>>		Cursor to the right

The following functions and information are valid for every sensor.

===== O ₂ (EC1) - MENU =====			
ZPT	CAL	ALM	INF
RET	SEL	>>>	

Explanation of display:

ZPT	Zeropoint adjustment
CAL	Sensitivity calibration
ALM	Setting of alarm thresholds
INF	Sensor information

	Key	Meaning
RET		Back to previous menu
SEL		Open selected menu
>>>		Cursor to the right

Zeropoint Adjustment - ZPT

The zeropoint adjustment refers only to the previously selected sensor. Do not expose the detector to the gas to be measured or to an interfering gas during zeroing. In case there is an interfering gas in the ambient air, use the pump inlet to supply a zero gas to the detector. In this case make sure that the diffusion inlet is covered. You can turn the built-in pump off, if you do not want to use it for the zero gas supply. Then you have to supply the zero gas by means of an external sampling equipment to the pump inlet. Make sure, that the zero gas is supplied with a flow rate of 0.5 ... 0.6 l/min.

Zero gas is:

- For zeropoint adjustment of combustible and toxic gases (except carbon dioxide, CO₂) - "clean ambient air" or synthetic air.
- For zeropoint adjustment of carbon dioxide (CO₂) - 100 % nitrogen (N₂) or synthetic air (without CO₂-content).
- For zeropoint adjustment of oxygen (O₂) - 100 % nitrogen (N₂).

Adhere to the following procedure:

- Cover the diffusions inlet and supply zero gas to the sensors over the intake of the POLYTECTOR II.





Adjustment of zeropoint:

===== CO ₂ (IR) - ZERO =====		
ACT:	0.00 VOL CO₂	
NOM:	0.00 VOL CO₂	
RET	+ / -	START

Explanation of display:

ACT	Actually measured gas concentration
NOM	Nominal value, to be set to the respective concentration of the zero gas (e.g. 0,00 Vol.-% CO ₂ = Start of detection range)

Entering possibilities:

	Key	Meaning
RET		Back to previous menu point
+		Increasing the nominal value "NOM" by one
-		Reducing the nominal value "NOM" by one
START		Start of zeropoint adjustment




After the zeropoint program is started, the pump is automatically activated, and you hear a rhythmic signal.

===== CO ₂ (IR) - ZERO =====		
ACT:	0.00 VOL CO₂	
NOM:	0.00 VOL CO₂	
PUMP	ESC	STOP

Explanation of display:

ACT	Actually measured gas concentration
NOM	Nominal value, zero gas concentration to which the sensor is calibrated to

Entering possibilities:

	Key	Meaning
PUMP		Pump is started or stopped
ESC		Zeropoint adjustment is interrupted
STOP		Zeropoint is adjusted to the nominal value

The zeropoint can only be adjusted, if the actually measured gas concentration is less than 7.7 % of the detection range resp. less than 0.3 Vol.-% CO₂. If the POLYTECTOR II recognizes that the measurement value is too high, it does not adjust the zeropoint, but displays an error message. In this case the zeropoint can only be adjusted by specially trained service staff.

In any case you should compare the actual and nominal values. If even after repeated trials the actual value cannot be set to the nominal value, the zeropoint of the sensor may be beyond the allowed range. In this case please call GfG's service. The sensor may possibly have to be replaced.

Note: Another way to adjust the zeropoint is described as "**Sensor Adjustment in Fresh Air**".

Sensitivity Calibration - CAL

The sensitivity calibration refers only to the previously selected sensor. Use the pump inlet to supply a known test gas concentration to the detector. You can turn the built-in pump off, if you do not want to use it for the test gas supply. Then you have to supply the zero gas by means of an external sampling equipment to the pump inlet. Make sure, that the zero gas is supplied with a flow rate of 0.5 ... 0.6 l/min. In any case the diffusion inlet is to be covered.

Test gas is:

- For calibration of combustible and toxic gases - a gas, which is equivalent to the gas measured by the selected sensor. The test gas concentration should be between 50 and 100 % of full scale.
- For calibration of oxygen - "clean ambient air" resp. test gas with a concentration of 20.9 Vol.-% oxygen (O₂) in nitrogen (N₂).

Adhere to the following procedure:

- Supply a test gas concentration to the intake of the POLYTECTOR II. The kind of gas and its concentration depends on the sensor selected for calibration. Supply the test gas for at least 3 minutes to avoid calibration errors due to gas absorption in the sampling line.





Setting of calibration value:

===== CO ₂ (IR) - CAL =====	
ACT:	4.00 VOL CO₂
NOM:	4.00 VOL CO₂
RET	+ / - START

Explanation of display:

ACT	Actually measured gas concentration
NOM	Nominal value, to be set to the respective concentration of the test gas (e.g. 4,00 Vol.-% CO ₂ = 80% of full scale)

Entering possibilities:

	Key	Meaning
RET		Back to previous menu point
+		Increasing the nominal value "NOM" by one
-		Reducing the nominal value "NOM" by one
START		Start of calibration




After the calibration program is started, the pump is automatically activated, and you hear a rhythmic signal.

===== CO ₂ (IR) - CAL =====		
ACT:	4.00 VOL CO₂	
NOM:	4.00 VOL CO₂	
PUMP	ESC	STOP

Explanation of display:

ACT	Actually measured gas concentration
NOM	Nominal value, test gas concentration to which the sensor is calibrated

Entering possibilities:

	Key	Meaning
PUMP		Pump is started or stopped
ESC		Calibration is interrupted
STOP		Sensitivity is set to the nominal value

The sensitivity can only be adjusted, if the actually measured gas concentration is higher than 7.7 % of the detection range. If the POLYTECTOR II recognizes that the measurement value is too low, it does not adjust the sensitivity, but displays an error message.

In any case you should compare the actual and nominal values. If even after repeated trials the actual value cannot be set to the nominal value, the sensitivity of the sensor may be beyond the allowed range. In this case please call GfG's service. The sensor may possibly have to be replaced.

Note: Another way of calibration is described as "**Sensor Adjustment with Test Gas**".

Alarm Thresholds - ALM

The POLYTECTOR II provides two alarm thresholds for the toxic gases (e.g. hydrogen sulphide, carbon monoxide, carbon dioxide) and three instantaneous alarm thresholds for the non-toxic gases (e.g. oxygen, methane). The alarms are activated, if the gas concentration exceeds resp. falls below the set threshold. For the toxic gases the detector provides an additional warning for exceeded long-term (TWA) and short-term (STEL) averages. Each threshold can be set individually, independent from each other, within the relevant detection range. The time interval for the calculation of the short-term average can be set separately.

Setting of alarm threshold for non-toxic gases





===== O ₂ (EC1) - ALARM =====		
AL1	AL2	AL3
19.0	17.0	23.0
RET	+ / -	>>>

Example: Display for oxygen, O₂

Explanation of display:

AL1	First alarm threshold (for oxygen: always falling below)
AL2	Second alarm threshold (for oxygen: always falling below)
AL3	Third alarm threshold (always exceeding)

Entering possibilities:

	Key	Meaning
RET		Back to previous menu
+		Increasing alarm threshold by one
-		Reducing alarm threshold by one
>>>		Cursor to the right, to next alarm threshold

Setting of alarm threshold for toxic gases





===== CO (EC ₂) - ALARM =====			
AL1	AL2	15[']STL	8hTWA
30	180	120	30
RET	+ / -		>>>

Example: Display for carbon monoxide, CO.

Explanation of display:

AL1	First alarm threshold
AL2	Second alarm threshold
15[']	Period of calculation for STEL
STL	Threshold for Short Term Exposure Level
8h	Time (hours) to which the Time Weighted Average refers to
TWA	Threshold for Time Weighted Average

Entering possibilities:

	Key	Meaning
RET		Back to previous menu
+		Increasing alarm threshold by one
-		Reducing alarm threshold by one
>>>		Cursor to the right, to next alarm threshold resp. to set the period for average calculation

Note: In case you do not want a warning from TWA and STEL values, enter „- - -“ instead of a figure.

Sensor Information - INF


Here you can read specific information of the sensor, including:

===== O ₂ (EC ₁) - INFO =====	
ID:	MK 342-01
SN:	01752
RET	>>>

Explanation of display:

ID	Sensor type
SN	Serial number of sensor
DR	Detection range of sensor
TR	Temperature range of sensor
GFG	Production date
SRV	Date of latest calibration

Entering possibilities:



	Key	Meaning
RET	<input type="checkbox"/>	Back to previous menu
>>>		To next information

Exit Service Mode

Repeated pressing of the key (shown as **RET** in the display) brings the POLYTECTOR II back to the detection mode. Before leaving the service mode you are asked, if you want to save the new configuration.

===== EXIT =====		
SAVE NEW ADJUSTMENT ?		
ESC	NO	YES

Entering possibilities:

	Key	Meaning
ESC	<input type="checkbox"/>	Back to service mode
NO		Changes are not stored. The POLYTECTOR II returns to the detection mode
YES		All changes are stored. The POLYTECTOR II returns to the detection mode

Selection of Language

The POLYTECTOR II allows selecting German or English readings. Should you wish to select another language than that which is programmed, just enter <GERM> or <ENGL> instead of the access code when entering the service mode.

Turn Tolerance Band On/Off

The POLYTECTOR II suppresses very low zeropoint fluctuations of sensors for toxic and combustible gases. For the oxygen sensor, fluctuations of +/-0.2 Vol.-% at 20.9 Vol.-% (fresh air) are suppressed. This tolerance band is activated by the manufacturer, but it can also be turned off. When entering the service mode, do not enter the access code but <REAL> for deactivation or <BAND> for activation of the tolerance band. For more detailed information on the tolerance band please refer to „Sensor types and detection ranges“.

Sensor Adjustment with Fresh Air

Without having to enter the service mode, you can adjust the sensors directly at fresh air by means of a calibration routine. You can select, if you want to adjust the individual sensors one after the other or all sensors automatically. For the automatic adjustment you have to enter the menu „aAIR“ to release the relevant sensors. Pressing a certain key combination starts the calibration routine. For the manual adjustment you have to enter the standard access code additionally.



- Make sure that the ambient air is free from any interfering gases. If necessary, release or deactivate the relevant sensors for the automatic adjustment.
- Press the keys and simultaneously and keep them pressed for approx. 3 seconds.
- Now you are asked for a safety check:

CALIBRATION WITH FRESH AIR ?		
NO	MANUAL	AUTO

Explanation of display:

NO	Leaving the adjustment program
MANUAL	Turning to manual zeropoint adjustment
AUTO	Automatic zeropoint adjustment is started for all sensors released in „aAIR“



Entering possibilities during automatic adjustment program:

	Key	Meaning
PUMP	<input type="checkbox"/>	Pump is started resp. stopped
ESC		Adjustment is interrupted
STOP		Adjustment is done immediately (value is accepted)

Once all sensors are adjusted, the POLYTECTOR II asks for confirmation:

===== EXIT =====		
SAVE NEW ADJUSTMENT ?		
ESC	NO	YES

Entering possibilities:



	Key	Meaning
ESC	<input type="checkbox"/>	Re-start of adjustment
NO		Adjustments are not stored
YES		Adjustments are stored. Detector is set completely

Sensor Adjustment with Test Gas

Without having to enter the service mode, you can adjust the sensors directly with test gas by means of a calibration routine. You can select, if you want to adjust the individual sensors one after the other or all sensors automatically. For the automatic adjustment you have to enter the menu „aCAL“ to release the relevant sensors. This makes only sense, if you are using test gas mixtures. Pressing a certain key combination starts the calibration routine. For the manual adjustment you have to enter the standard access code additionally.

Attention: Before starting the program, make sure that suitable test gases are available for every detection range. If necessary, deactivate relevant sensors.

For detailed instructions on test gas supply please refer to „Sensitivity Calibration - CAL“.

- Press the keys  and  simultaneously and keep them pressed for approx. 3 seconds.
- You are now asked for a safety check:




CALIBRATION WITH TEST GAS ?		
NO	MANUAL	AUTO

Explanation of display:

NO	Leaving the adjustment program
MANUAL	Turning to manual calibration
AUTO	Automatic adjustment is started for all sensor released in „aCAL“

Now all released sensors are calibrated one after the other. Supply the relevant test gases over the intake. Make sure, that the diffusion inlet is covered.




Entering possibilities:

	Key	Meaning
PUMP		Pump is started resp. stopped
ESC		Adjustment is interrupted
STOP		Adjustment is done immediately

Once all sensors are adjusted, the POLYTECTOR II asks for confirmation:

————— EXIT —————		
SAVE NEW ADJUSTMENT ?		
ESC	NO	YES

Entering possibilities:

	Key	Meaning
ESC		All adjustments are displayed again for being checked
NO		Adjustments will not be stored
YES		All adjustments are stored. The detector is completely set

Reading Data from Data Logger (#)

- Start GfG interface program
- Select "File" >> New >> POLYTECTOR II
- Connect POLYTECTOR II with interface and enter "ok"
- Data is transmitted from the data logger to the PC

For operating the GfG interface program refer to the relevant instruction manual.

Charging and Replacing the Battery Pack

The battery pack is on the back side of the detector (fig. 1). For reasons of EX-protection the battery cells and fuses are casted with their enclosure. The battery pack may be replaced in Ex-endangered areas.

Attention: Make sure that the detector is switched off before you replace the battery pack.

To remove the battery pack, unscrew the Allen screw on the bottom and slide the complete battery pack off, including the cover. Now slide a fresh battery pack on and fix the Allen screw.

Hints for recharging the battery pack

For recharging the battery pack use GfG's universal charger or plug-in charger. You may recharge the battery pack separately or when it is fit to the detector. Recharging **MUST NOT** be done in hazardous areas.

Universal Charger

The universal charger recharges the batteries completely within 8 hours. Once this is completed, the universal charger turns to „trickle charge“. A lower charging current keeps the batteries fully charged and prevents overcharging. In case you keep the battery pack connected to the charger for a long time, you should discharge and recharge it again after a period of approx. 6 weeks.

Plug-in Charger

With the plug-in charger, the charging time is approx. 12 to 24 hours. Make sure that the plug-in charger is disconnected from the battery pack after this time, to prevent overcharging and subsequent damaging the batteries.

Annex

Trouble Shooting

Failure, Display	Reason	Solution
Detector cannot be switched on	<ul style="list-style-type: none"> - Exhausted battery - Blown fuse - Keyboard is faulty 	<ul style="list-style-type: none"> - Recharge battery - Call GfG service
Detector cannot be charged	<ul style="list-style-type: none"> - Faulty charger - Blown fuse in POLYTECTOR II 	<ul style="list-style-type: none"> - Call GfG service
„Automatic Off“	<ul style="list-style-type: none"> - Battery voltage too low 	<ul style="list-style-type: none"> - Charge battery pack
„Remove battery!“	<ul style="list-style-type: none"> - Detector cannot be switched off 	<ul style="list-style-type: none"> - Check battery connection - Call GfG service
„RAM - Error“ and deactivation	<ul style="list-style-type: none"> - Faulty working memory 	<ul style="list-style-type: none"> - Call GfG service
„ROM - Error“ and deactivation	<ul style="list-style-type: none"> - Faulty program memory 	<ul style="list-style-type: none"> - Call GfG service
„Memory Error xx“	<ul style="list-style-type: none"> - Faulty parameter chip at sensor 	<ul style="list-style-type: none"> - Turn G 750 off and on again - Call GfG service
„Inspection overdue!“	<ul style="list-style-type: none"> - Exceeded inspection date 	<ul style="list-style-type: none"> - Get service/inspection done by authorized experts - Call GfG service
„Sensor Service necessary!“	<ul style="list-style-type: none"> - The max. operational life of the sensor is almost over. From the date of the first message the sensor will work for approx. 4 weeks 	<ul style="list-style-type: none"> - Press the reset key for continued measurement. Maintenance by GfG service is necessary
„Adaption of sensor signal is incorrect“	<ul style="list-style-type: none"> - Sensor signal too high or too low - Faulty sensor 	<ul style="list-style-type: none"> - Calibrate sensor - Call GfG service
„Check Alarm Thresholds!“	<ul style="list-style-type: none"> - One sensor was replaced by a different type - An additional sensor was fit 	<ul style="list-style-type: none"> - Check and, if necessary, adjust the alarm setpoints
„Value is too high! Adjustment impossible!“	<ul style="list-style-type: none"> - Zeropoint adjustment with test gas - Zeropoint is too positive 	<ul style="list-style-type: none"> - Do zeropoint adjustment with zero gas - Call GfG service
„Value is too low! Adjustment impossible!“	<ul style="list-style-type: none"> - Sensitivity calibration done with insufficient test gas concentration - Sensor has lost sensitivity 	<ul style="list-style-type: none"> - Use test gas with a concentration of 50 to 100 % of full scale - Replace sensor
Functions cannot be selected	<ul style="list-style-type: none"> - Functions not available - Faulty keyboard 	<ul style="list-style-type: none"> - Purchase functions - Call GfG service
„No Sensor“	<ul style="list-style-type: none"> - All sensors have been deactivated in the service mode (OFF) - Faulty parameter module in detector 	<ul style="list-style-type: none"> - Release sensors in service mode - Turn G 750 off and on again. - Call GfG service
„Range“	<ul style="list-style-type: none"> - Detection range exceeded/fallen below - Faulty calibration 	<ul style="list-style-type: none"> - Leave area with high concentration - Check calibration
„Pump fault“	<ul style="list-style-type: none"> - Too low pump capacity - Obstacles in sampling line, faulty pump 	<ul style="list-style-type: none"> - Replace filter - Call GfG service
„PL-Power-Fault“	<ul style="list-style-type: none"> - EX-Sensor operated on incorrect voltage 	<ul style="list-style-type: none"> - Check battery connection - Call GfG service
„Temperature“	<ul style="list-style-type: none"> - A sensor is operated beyond its temperature range - Faulty temperature sensor 	<ul style="list-style-type: none"> - Bring detector in normal temperature range - Call GfG service

Cleaning

After having used the POLYTECTOR II, you should give it a quick visual control. The casing may be cleaned with a damp cloth. Do not use any solvents or cleaning agents!

Service and Inspection

Service and inspection are measures to maintain the nominal status of the gas detectors. Part of service and inspection works is a regular check and adjustment of sensitivities and zeropoints. In addition to this, the proper functioning of the detector is to be checked.

Gas warning instruments may show a different behaviour, depending on the ambient conditions. It is important, thus, to check the detectors before use, independent from service and inspection work (see BG-Chemie, guideline T 031). This check includes:

- Charging status of battery
- Readout with zero gas and test gas

Maintenance - Repair

According to "Explosionsschutz-Richtlinien", "UVV-Gase", maintenance stands for service, inspection and repair of gas warning devices. Guideline T031 of BG Chemie describes the appropriate measures. The function check must be done before the instrument is used and at least once a year and includes:

- Position of zeropoint
- Charging status of battery
- Pump and diffusion inlet
- Display with zero gas and standard test gas and adjustment, if necessary
- Alarm signal activation, e.g. with alarm test gas concentration
- Constantly amplified signal with standard test gas
- Response time

The check must be done by an expert, and the result must be confirmed in writing. Any repair of the POLYTECTOR II must generally be done according to the manufacturer's instructions and with genuine spare parts.

Accessories

	Description	Part No.
1.	Universal charger 230 V/50 Hz (standard/trickle charge)	1750240
2.	Plug-in charger, 230 V (charging time 12 to 24 hours)	1750244
3.	G750 Leather case with shoulder strap	1750247
4.	Hip belt as supplement for leather case	1750251
5.	Telescopic probe CrNi steel, 1.36 m,	1000205
6.	Special charcoal filter against siliceous sensor poisons like e.g. hexamethylenedisilane (HMDS). Usable for detection of methane, oxygen and carbon dioxide.	1750206
7.	Special dust/water filter (pack of 3)	1000207
8.	Special sampling line 3 m, anti-static with dust/water filter	1000208
9.	Special sampling line 3 m, anti-static with filter and flow-indicator ^(#)	1000209
10.	Viton sampling line, solvent and hydrogen sulphide resistant ^(#)	on request
11.	Additional metal hydride battery pack for G750	1750203
12.	G750 cable for interface connection	1750232
13.	Float probe ^(#)	on request

Spare Parts

	Description	Part No.
1.	Sensor holder cap, incl. alarm LED and buzzer	1750301
2.	Casing incomplete, incl. fixing screws	1750305
3.	Keyboard cover, incl. fixing screw	1703303
4.	Metal hydride battery pack, plug-on type	1750203
5.	Keypad	1750304
6.	Sensor holder, without sensors	1750302
7.	Intake complete, with sealing	1703315
8.	Fine filter for intake (set of 100 each)	1703316
9.	Sealing for plug connector	1750306
10.	Lock screw for battery pack (set of 5 each)	1703309
11.	P.C. Board complete, incl. display	1750330
12.	Lithium battery for memory and real time clock	1750331
13.	EPROM with software G750 POLYTECTOR II	1750451
14.	Pump	1750201
15.	HD Pump with extended pump performance ^(#)	1750202

The spare parts and the accessories should be stored at ambient temperatures of 0...30°C. Storage time should not be longer than 5 years. Electrochemical sensors should not be stored for more than ½ year. When you store oxygen sensors be aware of the fact that storage reduces the expected lifetime of the sensor. When storing spare sensors, make sure that the ambient atmosphere is free from corrosive media and sensor poisons.

Sensor type and Detection range

Plug-possibility	Sensor type (ID)	Detection range	Gas		Resolution	T-band*
EC 1	MK 342-1	0 .. 25 Vol%	O ₂	Oxygen	0,1 Vol%	±0,2 Vol%
	MK 376-1 ^(#)	0 .. 25 Vol%	O ₂	Oxygen	0,1 Vol%	±0,2 Vol%
EC 2	MK 343-1 ^(#)	0 .. 100 ppm	H ₂ S	Hydrogen sulphide	0,5 ppm	±1,0 ppm
	MK 343-1 ^(#)	0 .. 500 ppm	CO	Carbon monoxide	1 ppm	±3 ppm
	MK 344-1	0 .. 500 ppm	CO	Carbon monoxide	1 ppm	±3 ppm
	MK 345-2 ^(#)	0 .. 50 ppm	H ₂ S	Hydrogen sulphide	0,5 ppm	±1,0 ppm
	MK 346-1 ^(#)	0 .. 20 ppm	SO ₂	Sulphur dioxide	0,1 ppm	±0,2 ppm
	MK 348-1 ^(#)	0 .. 50 ppm	NO ₂	Nitrogen dioxide	0,1 ppm	±0,3 ppm
	MK 350-1 ^(#)	0 .. 10 ppm	Cl ₂	Chlorine	0,1 ppm	±0,1 ppm
	MK 351-1 ^(#)	0 .. 100 ppm	HCN	Hydrogen cyanide	0,5 ppm	±1,0 ppm
	MK 353-1 ^(#)	0 .. 10 ppm	PH ₃	Phosphine	0,05 ppm	±0,0 ppm
	MK 369-1 ^(#)	0 .. 500 ppm	CO	Carbon monoxide	1 ppm	±3 ppm
	MK 377-1 ^(#)	0 .. 20 ppm	SiH ₄	Silane	0,05 ppm	±0,1 ppm
	MK 393-1 ^(#)	0 .. 200 ppm	NH ₃	Ammonia	1 ppm	±2 ppm
	MK 396-1 ^(#)	0 .. 2000 ppm	H ₂	Hydrogen	2 ppm	±10 ppm
	MK 399-1 ^(#)	0 .. 1000 ppm	NH ₃	Ammonia	5 ppm	±10 ppm
	MK 403-1 ^(#)	0 .. 2 Vol%	H ₂	Hydrogen	0,01 Vol%	±0,02 Vol%
	EC 3	MK 343-2 ^(#)	0 .. 300 ppm	H ₂ S	Hydrogen sulphide	1 ppm
MK 343-2 ^(#)		0 .. 500 (1000) ppm	CO	Carbon monoxide	1 ppm	±3 ppm
MK 344-2 ^(#)		0 .. 500 (1000) ppm	CO	Carbon monoxide	1 ppm	±3 ppm
MK 345-1		0 .. 100 ppm	H ₂ S	Hydrogen sulphide	0,5 ppm	±1,0 ppm
MK 346-2 ^(#)		0 .. 50 ppm	SO ₂	Sulphur dioxide	0,1 ppm	±0,2 ppm
MK 347-2 ^(#)		0 .. 100 ppm	NO	Nitrogen monoxide	0,5 ppm	±1,0 ppm
MK 348-2 ^(#)		0 .. 50 ppm	NO ₂	Nitrogen dioxide	0,1 ppm	±0,3 ppm
MK 369-2 ^(#)		0 .. 500 (1000) ppm	CO	Carbon monoxide	1 ppm	±3 ppm
MK 377-2 ^(#)		0 .. 20 ppm	SiH ₄	Silane	0,05 ppm	±0,1 ppm
MK 379-2 ^(#)		0 .. 20 ppm	C ₂ H ₄ O	Ethylene oxide	0,1ppm	±0,3 ppm
MK 393-2 ^(#)		0 .. 200 ppm	NH ₃	Ammonia	1 ppm	±2 ppm
MK 396-2 ^(#)		0 .. 2000 ppm	H ₂	Hydrogen	2 ppm	±10 ppm
MK 402-2 ^(#)		0 .. 5000 ppm	H ₂	Hydrogen	10 ppm	±40 ppm
MK 403-2 ^(#)		0 .. 4 Vol%	H ₂	Hydrogen	0,01 Vol%	±0,03 Vol%
MK 405-2 ^(#)		0 .. 100 mg/m ³	C ₄ H ₈ S	THT (Tetrahydrothiophen)	0,5 mg/m ³	±1,0 mg/m ³
IR		MK 200-1 ^(#) /-2 ^(#)	0 .. 10.000 ppm	CO ₂	Carbon dioxide	50 ppm
	MK 200-1 ^(#) /-2 ^(#)	0 .. 5,0 Vol%	CO ₂	Carbon dioxide	0,01..0,05 Vol%	-
	MK 200-1 ^(#) /-2 ^(#)	0 .. 25,0 Vol%	CO ₂	Carbon dioxide	0,01..0,20 Vol%	-
	MK 200-1 ^(#) /-2 ^(#)	0 .. 70,0 Vol%	CO ₂	Carbon dioxide	0,01..0,50 Vol%	-
	MK 209-1 ^(#)	0 .. 5,0 Vol%	C ₃ H ₈	Propane	0,01..0,02 Vol%	±0,05 Vol%
	MK 209-1 ^(#)	0 .. 25,0 Vol%	C ₃ H ₈	Propane	0,01..0,20 Vol%	±0,03 Vol%
CC / TC	MK 201-1 ^(#)	0 .. 100 %LEL	H ₂	Hydrogen	0,5 %LEL	±2,5 %LEL
	MK 201-1	0 .. 100 %LEL	CH ₄	Methane	0,5 %LEL	±2,5 %LEL
	MK 201-1	0 .. 100 %LEL	C ₃ H ₈	Propane	0,5 %LEL	±2,5 %LEL
	MK 201-1 ^(#)	0 .. 100 %LEL	C ₄ H ₁₀	Butane	0,5 %LEL	±2,5 %LEL
	MK 201-1 ^(#)	0 .. 100 %LEL	C ₅ H ₁₂	Pentane	0,5 %LEL	±2,5 %LEL
	MK 201-1 ^(#)	0 .. 100 %LEL	C ₇ H ₁₆	Heptane	1 %LEL	±3 %LEL
	MK 201-1 ^(#)	0 .. 100 %LEL	C ₉ H ₂₀	Nonane	1 %LEL	±3 %LEL
	MK 201-1 ^(#)	0 .. 100 %LEL	C ₂ H ₆ O	Ethanol	1 %LEL	±3 %LEL
	MK 202-1 ^(#)	0 .. 100 %LEL	CH ₄	Methane	0,5 %LEL	±2,5 %LEL
		& 0 .. 100 Vol%	CH ₄	Methane	& 0,5 Vol%	±1,0 Vol%

* T-band = Tolerance band

Sensor specification

MK200-1 /-2 ^(#) Infrared sensor for Carbon dioxide CO ₂			
Response time	T ₉₀ :	<70 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	<1,7% of display per % pressure-change (regarding to 1000 hPa)	
Humidity	10%...90% r.h.:	max. ±0,03Vol% or ±10% of display (regarding to 50% r.h.)	
Temperature	-20...+50°C:	max. ±0,10Vol% or ±10% of display (regarding to 20°C)	
Expected lifetime:		MK200-1: 5 years / MK200-2: 2 years	
MK201-1 Catalytic combustion sensor for combustible gases and vapors (as per EN 50057)			
Response time	T ₉₀ :	<30 sec	(<60 sec without diffusion acceleration)
Pressure	950...1150 hPa:	max. ±5% of detection range or ±15% of display (regarding to 1013 hPa)	
Humidity	5%...90% r.h.:	max. ±5% of detection range or ±15% of display (regarding to 55% r.h.)	
Temperature	-20...+ 50°C:	max. ±3% of detection range or ±10% of display (regarding to 20°C)	
Cross sensitivity at 50 % LEL: ^(#)		2.20Vol.% CH ₄ : 100% ,	0.50Vol.% C ₆ H ₁₄ : approx. 53%
		0.85Vol.% C ₃ H ₈ : approx. 77%	0.55Vol.% C ₇ H ₁₆ : approx. 43%
		0.70Vol.% C ₄ H ₁₀ : approx. 70%	0.40Vol.% C ₈ H ₁₈ : approx. 40%
		0.70Vol.% C ₅ H ₁₂ : approx. 73%	0.35Vol.% C ₉ H ₂₀ : approx. 37%
		This specification applies to the methane range. It may vary from sensor to sensor and depends on the gas and on the age of the sensor.	
Expected lifetime:		3 years	
MK202-1 Thermal conductivity sensor for combustible gases (as per EN 50058) ^(#) and catalytic combustion sensor see MK201-1			
Response time	T ₉₀ :	<30 sec	(<60 sec without diffusion acceleration)
Pressure	920...1150 hPa:	max. ±7% of detection range or ±15% of display (regarding to 1013 hPa)	
Humidity	5%...90% r.h.:	max. ±5% of detection range or ±10% of display (regarding to 55% r.h.)	
Temperature	-20...+ 50°C:	max. ±7% of detection range or ±10% of display (regarding to 20°C)	
Expected lifetime:		3 years	

MK209-1 Infrared sensor for Hydrocarbons^(#)			
Response time	T ₉₀ :	<70 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	<1.0% of display per % pressure change	(referred to 1000 hPa)
Humidity	10%...90% r.h.:	max. ±0.03 Vol.% or ±10% of display (<25 Vol.% C ₃ H ₈)	(referred to 50% r.h.)
Temperature	-20...+50°C:	max. ±0.05 Vol.% or ±10% of display (<5 Vol.% C ₃ H ₈) or ±20% of display (<25 Vol.% C ₃ H ₈)	(referred to 20°C)
Cross sensitivity at 50%LEL: (#)		0.85 Vol.% C ₃ H ₈ : 100 % 0.70 Vol.% C ₄ H ₁₀ : approx. 120 % 0.70 Vol.% C ₃ H ₁₂ : approx. 145 %	
		2.00 Vol.% H ₂ : 0 % 2.20 Vol.% CH ₄ : approx. 8 % 0.50 Vol.% C ₄ H ₁₄ : approx. 135 %	
Expected lifetime:		This specification applies to the propane range. It may vary from sensor to sensor and depends on the gas 5 years	
MK342-1 (as per EN 50104) / MK 376-1^(#) Electrochemical sensor for Oxygen O₂			
Response time	T ₉₀ :	<30 sec	(<100 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,2Vol% or ±2,5% of detection range	(regarding to 1000 hPa)
Humidity	10%...90% r.h.:	max. ±0,2Vol% or ±2,5% of detection range	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,5Vol% or ±2,5% of display	(regarding to 20°C)
Expected lifetime:		MK342-1: 1 year / MK376-1: 2 years	
MK343-1 /-2 Electrochemical sensor for Carbon monoxide CO or Hydrogen sulphide H₂S			
Response time	T ₉₀ :	<60 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±3ppm or ±7% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±3ppm or ±7% of display	(regarding to 50% r.h.)
Temperature	-10...+40°C:	max. ±3ppm or ±7% of display	(regarding to 20°C)
Temperature	-20...+50°C:	max. ±3ppm or ±15% of display	(regarding to 20°C)
Cross sensitivity	CO-Calibration:	H ₂ S: ≈250% , H ₂ : <40% , NO ₂ : ≈60% , SO ₂ : ≈50% , NO: ≈30% , Cl ₂ : 0.-100% (*1)	
	H ₂ S-Calibration:	CO: ≈40% , H ₂ : <15% , NO ₂ : ≈25% , SO ₂ : ≈20% , NO: ≈12% , Cl ₂ : 0.-40% (*1)	
Expected lifetime:		3 years	
MK344-1 /-2 Electrochemical sensor for Carbon monoxide CO			
Response time	T ₉₀ :	<60 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±3ppm or ±7% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±3ppm or ±7% of display	(regarding to 50% r.h.)
Temperature	-10...+40°C:	max. ±3ppm or ±7% of display	(regarding to 20°C)
Temperature	-20...+50°C:	max. ±3ppm or ±15% of display	(regarding to 20°C)
Cross sensitivities		H ₂ S: ≈7% , H ₂ : <40% , C ₂ H ₄ : <85% , NO: <9% , NO ₂ : 0...-20% , SO ₂ : 0% , Cl ₂ : 0% , C ₂ H ₆ : 0% (*1)	
Expected lifetime:		3 years	
MK345-1 /-2 Electrochemical sensor for Hydrogen sulphide H₂S (as per T 017)			
Response time	T ₉₀ :	<45 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±3ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±3ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-10...+40°C:	max. ±3ppm or ±10% of display	(regarding to 20°C)
Temperature	-20...+50°C:	max. ±3ppm or ±15% of display	(regarding to 20°C)
Cross sensitivities:		SO ₂ : ≈20% , NO ₂ : ≈20% , NO: <2% , CO: <0,5% , H ₂ : <0,1% (*1)	
Expected lifetime:		3 years	
MK346-1 /-2 Electrochemical sensor for Sulphur dioxide SO₂^(#)			
Response time	T ₉₀ :	<30 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,2ppm or ±5% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,2ppm or ±5% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,2ppm or ±5% of display	(regarding to 20°C)
Cross sensitivities		NO ₂ : ≈100% , CO: <1% , H ₂ S: 0% , NO: 0% (*1)	
Expected lifetime:		3 years	
MK347-2 Electrochemical sensor for Nitrogen monoxide^(#)			
Response time	T ₉₀ :	<45 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±1ppm or ±7% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±1ppm or ±7% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±2ppm or ±7% of display	(regarding to 20°C)
Cross sensitivities:		NO ₂ : <30% , H ₂ S: ≈10% , CO: 0% , SO ₂ : 0% (*1)	
Expected lifetime:		2..3 years	
Warm-up time:		Between 3 minutes and 1 day, depending on time the detector has been turned off	
MK348-1 /-2 Electrochemical sensor for Nitrogen dioxide NO₂^(#)			
Response time	T ₉₀ :	<40 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,3ppm or ±5% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,3ppm or ±5% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,3ppm or ±5% of display	(regarding to 20°C)
Cross sensitivities:		Cl ₂ : ≈100% , H ₂ S: ≈8% , CO: 0% , SO ₂ : 0% , NO: 0% (*1)	
Expected lifetime:		3 years	
MK350-1 Electrochemical sensor for chlorine Cl₂^(#)			
Response time	T ₈₀ :	<60 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,2ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,2ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,2ppm or ±10% of display	(regarding to 20°C)
Cross sensitivities:		H ₂ S: 0...-20% , CO: 0% , SO ₂ : 0% , NO: 0% (*1)	
Expected lifetime:		2..3 years	
MK351-1 Electrochemical sensor for Hydrogen cyanide HCN^(#)			
Response time	T ₉₀ :	<200 sec	
Pressure	800...1200 hPa:	max. ±1ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±1ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±1ppm or ±10% of display	(regarding to 20°C)
Cross sensitivities::		H ₂ S: ≈600% , SO ₂ : 200...400% , NO ₂ : -200...-380% , NO: 0...-40% , C ₂ H ₄ : <25% , CO: <5% (*1)	
Expected lifetime:		2..3 years	

(*1): Displayed value with reference to the supplied gas concentration which lies in the range of the TLV value.

MK353-1 Electrochemical sensor for Phosphine PH₃ ^(#)			
Response time	T ₉₀ :	<90 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,05ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,05ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,05ppm or ±10% of display	(regarding to 20°C)
Cross sensitivities:		H ₂ : ≈3% , SO ₂ : ≈20% , SiH ₄ : ≈90% , GeH ₄ : ≈85% , B ₂ H ₆ : ≈35% , AsH ₃ : 0% , C ₂ H ₄ : <2% , CO: <0,1% (*1)	
Expected lifetime:		2..3 years	
MK369-1 /-2 Electrochemical sensor for Carbon monoxide CO ^(#)			
Response time	T ₉₀ :	<45 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±3ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±3ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±3ppm or ±15% of display	(regarding to 20°C)
Cross sensitivities:		H ₂ : <10% , NO: <9% , H ₂ S: 0% , SO ₂ : 0% (*1)	
Expected lifetime:		2..3 years	
MK377-1 /-2 Electrochemical sensor for Silane SiH₄ ^(#)			
Response time	T ₉₀ :	<70 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,1ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,1ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,1ppm or ±10% of display	(regarding to 20°C)
Cross sensitivities:		PH ₃ : ≈110% , GeH ₄ : ≈95% , AsH ₃ : ≈90% , B ₂ H ₆ : ≈40% , SO ₂ : ≈20% , C ₂ H ₄ : ≈2% , CO: <1% , H ₂ : <0,05% (*1)	
Expected lifetime:		2..3 years	
MK379-2 Electrochemical sensor for Ethylene oxide C₂H₄O ^(#)			
Response time	T ₉₀ :	<120 sec	
Pressure	800...1200 hPa:	max. ±1ppm or ±15% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±2ppm or ±15% of display	(regarding to 50% r.h.)
Temperature	0...+30°C:	max. ±1ppm or ±15% of display	(regarding to 20°C)
	-20...+50°C:	max. ±2ppm or ±20% of display	(regarding to 20°C)
Cross sensitivities:		CO: ≈40% , CH ₄ O: ≈150% , C ₂ H ₂ : ≈125% , CH ₂ O: ≈120% , CH ₄ S: ≈100% , C ₂ H ₄ : ≈80% , C ₂ H ₆ O: ≈55% , C ₇ H ₈ : ≈20% , MEK: ≈10% u.a. (*1)	
Expected lifetime:		2..3 years	
Warm-up time:		Between 4 minutes and 7 days – depending on time the detector has been turned off	
MK393-1 /-2 Electrochemical sensor for Ammonia NH₃ ^(#)			
Response time	T ₉₀ :	<70 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±1ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±1ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±1ppm or ±15% of display	(regarding to 20°C)
Cross sensitivities:		CO: 0% , CO ₂ : 0% , H ₂ : 0% , C ₂ H ₆ O: 0% , Cl ₂ : 0% , HCN: 0% , N ₂ : 0% , H ₂ S: 0% (in minute range) (*1)	
Expected lifetime:		2..3 years	
MK396-1 /-2 Electrochemical sensor for Hydrogen H₂ ^(#) (*2)			
Response time	T ₉₀ :	<90 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ± 5ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ± 5ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±10ppm or ±20% of display	(regarding to 20°C)
Cross sensitivities:		C ₂ H ₄ : ≈80% , NO: ≈30% , HCN: ≈30% , CO: <20% , H ₂ S: <20% , SO ₂ =NO ₂ =Cl ₂ =HCl: 0% (*1)	
Expected lifetime:		2..3 years	
MK399-1 Electrochemical sensor for Ammonia NH₃ ^(#)			
Response time	T ₉₀ :	<90 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ± 5ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ± 5ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±10ppm or ±20% of display	(regarding to 20°C)
Cross sensitivities:		CO: 0% , CO ₂ : 0% , H ₂ : 0% , C ₂ H ₆ O: 0% , Cl ₂ : 0% , HCN: 0% , N ₂ : 0% , H ₂ S: 0% (in minute range) (*1)	
Expected lifetime:		2..3 years	
MK402-2 Electrochemical sensor for Hydrogen H₂ ^(#) (*2)			
Response time	T ₉₀ :	<90 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ± 50ppm or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ± 50ppm or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±100ppm or ±20% of display	(regarding to 20°C)
Cross sensitivities:		CO: <15% , Cl ₂ : ≈800% (*1)	
Expected lifetime:		2..3 years	
MK403-1 /-2 Electrochemical sensor for Hydrogen H₂ ^(#) (*2)			
Response time	T ₉₀ :	<90 sec	(<120 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±0,01Vol% or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±0,01Vol% or ±10% of display	(regarding to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,02Vol% or ±25% of display	(regarding to 20°C)
Cross sensitivities:		CO: <15% (*1)	
Expected lifetime:		2..3 years	
MK405-2 Electrochemical sensor for Tetrahydrothiophen (THT) C₄H₈S ^(#)			
Response time	T ₉₀ :	<45 sec	(<90 sec without diffusion acceleration)
Pressure	800...1200 hPa:	max. ±1mg/m ³ or ±10% of display	(regarding to 1000 hPa)
Humidity	20%...90% r.h.:	max. ±1mg/m ³ or ±10% of display	(regarding to 50% r.h.)
Temperature	-10...+50°C:	max. ±2mg/m ³ or ±15% of display	(regarding to 20°C)
Cross sensitivities:		CO ₂ : 0% , CO: 4mg/m ³ @100ppm , H ₂ : 150mg/m ³ @1Vol% , SO ₂ : 2mg/m ³ @2ppm , CH ₄ O: 216mg/m ³ @1300ppm , NO ₂ : -3mg/m ³ @10ppm (*1)	
Expected lifetime:		2 years	
Warm-up time:		Between 4 minutes and 3 days – depending on time the detector has been turned off	

(*1): Displayed value with reference to the supplied gas concentration which lies in the range of the TLV value.

(*2): Not approved for monitoring of the lower explosion limit for applications of the primary explosion protection.

Alarm thresholds – Standard Setpoints

Standard setpoints of alarm thresholds for combustible gases and oxygen

Detection range	Alarm 1	Alarm 2	Alarm 3
0...2000/5000 ppm H ₂ (*1)	1000 ppm	1500 ppm	2000 ppm
0...2,0/4,0 Vol% H ₂ (*1)	0,20 Vol%	0,40 Vol%	0,60 Vol%
0...100 Vol% CH ₄ (*1)	-	-	-
0...100 %LEL H ₂ (*2)	20,0 %LEL	40,0 %LEL	100,0 %LEL
0...100 %LEL CH ₄ (*2)	20,0 %LEL	40,0 %LEL	100,0 %LEL
0...100 %LEL C ₃ H ₈ (*2)	20,0 %LEL	40,0 %LEL	100,0 %LEL
0...100 %LEL C ₄ H ₁₀ (*2)	20,0 %LEL	40,0 %LEL	100,0 %LEL
0...100 %LEL C ₃ H ₁₂ (*2)	20,0 %LEL	40,0 %LEL	100,0 %LEL
0...100 %LEL C ₇ H ₁₆ (*2)	20 %LEL	40 %LEL	100 %LEL
0...100 %LEL C ₉ H ₂₀ (*2)	20 %LEL	40 %LEL	100 %LEL
0...100 %LEL C ₂ H ₆ O (*2)	20 %LEL	40 %LEL	100 %LEL
0...25,0 Vol% O ₂	19,0 Vol% (↓)	17,0 Vol% (↓)	23,0 Vol% (↑)

(*1): Not approved for monitoring of the lower explosion limit for applications of the primary explosion protection.

(*2): LEL-thresholds concerning to EN 61779-1 (Version 2000):

4,0 Vol% H ₂	1,4 Vol% C ₃ H ₁₂
4,4 Vol% CH ₄	1,1 Vol% C ₇ H ₁₆
1,7 Vol% C ₃ H ₈	0,7 Vol% C ₉ H ₂₀
1,4 Vol% C ₄ H ₁₀	3,1 Vol% C ₂ H ₆ O

Standard setting of alarm thresholds for toxic gases without exposition alarm

Detection range	Alarm 1	Alarm 2	STEL	TWA
0...5 / 25 / 70 Vol% CO ₂	0,5 Vol%	1,0 Vol%	-	-
0...500 / 1000 ppm CO	30 ppm	60 ppm	-	-
0...50 / 100 / 300 ppm H ₂ S	10 ppm	20 ppm	-	-
0...100 ppm NO	25 ppm	50 ppm	-	-
0...100 ppm HCN	10 ppm	20 ppm	-	-
0...50 ppm NO ₂	5 ppm	10 ppm	-	-
0...20 ppm SO ₂	2 ppm	4 ppm	-	-
0...10 ppm CL ₂	1 ppm (*3)	2 ppm (*3)	-	-
0...10 ppm PH ₃	0,3 ppm (*3)	0,4 ppm (*3)	-	-
0...20 ppm SiH ₄	5 ppm	10 ppm	-	-
0...20 ppm C ₂ H ₄ O	2 ppm (*3)	4 ppm	-	-
0...200 ppm NH ₃	20 ppm	50 ppm	-	-
0...100 mg/m ³ C ₄ H ₈ S	25 mg/m ³	50 mg/m ³	-	-

(*3): A reliable TLV (threshold limit value) monitoring is not possible with the sensor technology currently available.

Standard setting of alarm thresholds for toxic gases with exposition alarm following to TRGS900 (Version 2000)

Detection range	Alarm 1	Alarm 2	STEL (15')	TWA (8h)
0...5 / 25 / 70 Vol% CO ₂	0,5 Vol%	3,0 Vol%	2,0 Vol%	0,5 Vol%
0...500 / 1000 ppm CO	30 ppm	120 ppm	60 ppm	30 ppm
0...50 / 100 / 300 ppm H ₂ S	10 ppm	20 ppm	10 ppm	10 ppm
0...100 ppm NO	25 ppm	50 ppm	35 ppm	25 ppm
0...100 ppm HCN	10 ppm	60 ppm	40 ppm	10 ppm
0...50 ppm NO ₂	5 ppm	10 ppm	5 ppm	5 ppm
0...20 ppm SO ₂	2 ppm	4 ppm	2 ppm	2 ppm
0...10 ppm CL ₂	1 ppm (*3)	2 ppm (*3)	1 ppm (*3)	0,5 ppm
0...10 ppm PH ₃	0,3 ppm (*3)	0,4 ppm (*3)	0,2 ppm (*3)	0,1 ppm
0...20 ppm SiH ₄	5 ppm	15 ppm	10 ppm	5 ppm
0...20 ppm C ₂ H ₄ O	2 ppm (*3)	6 ppm	4 ppm	2 ppm (*3)
0...200 ppm NH ₃	20 ppm	100 ppm	50 ppm	20 ppm
0...100 mg/m ³ C ₄ H ₈ S	25 mg/m ³	75 mg/m ³	50 mg/m ³	25 mg/m ³

(*3): A reliable TLV monitoring is not possible with the sensor technology currently available.

Technical Data

Type:	G 750
Detection principle:	Catalytic combustion (CC): for combustible gases/vapours (up to 100 % LEL) Thermal conductivity (TC): for combustible gases/vapours (up to 100 Vol.-%) ^(#) Electrochemical (EC): for oxygen and toxic gases Electrochemical (EC): for low hydrogen concentrations ^(#) Infra-red (IR): for carbon dioxide Infra-red (IR): for hydrocarbons ^(#)
Detection range:	See section „ Sensor type and detection range “
Response time T₉₀:	20... 70 seconds - see „Sensor Specification“
Expected sensor life:	1...5 years - see „Sensor Specification“
Climate effect:	See „Sensor Specification“
Gas supply:	Diffusion, electrical sampling pump
Pump performance:	
Standard pump:	0.6 l/min resp. 1200 mm water column, up to 10 m sampling line 0.5 l/min
HD pump:	0.7 l/min resp. 2400 mm water column, up to 10 m sampling line 0.6 l/min
Display:	Illuminated full graphic LCD, 122x32 Pixel
Alarms:	Audible and visual warning and display indication, depending on kind of gas either 3 or 2 instantaneous alarms and 2 dosi-meter alarms, see „Alarm Thresholds“
Climate conditions:	
for operation:	-20...+40°C / 5...95 % r.h. / 700...1300 hPa (Ex protection) -20...+50°C / 5...95 % r.h. / 700...1300 hPa (function test)
for storage:	-25...+55°C / 0...99 % r.h. / 700...1300 hPa (recommended:0...+30°C)
Zeropoint/Calibration:	Manual or automatically by means of calibration program
Operational time:	8 to 20 hours, depending on number of sensors and pump intervals
Power supply:	Rechargeable NiMH battery pack, 1200 mAh
Casing	
Material:	Polyamide
Dimensions:	210 x 90 x 60 mm (HxWxD)
Weight:	770 g (depending on quantity of sensors)
Protection:	IP54
Approval	
Classification:	EEx ib d IIC T5
Certificate of conformity:	BVS 99.E.2016
Type approval:	BVS 97.Y.4003
Function test:	PFG-Nr. 41300598
:	PFG-Nr. 41300598 NI
	(for tested ranges see page 4)

Operational Hints from the Report PFG-No. 41300598

The portable gas monitor G750 Polytector II of Gesellschaft für Gerätebau mbH is, based on the measurement results and remarks shown in test report PFG-Nr. 41300598P, suitable for measurement of methane and propane in a mixture with air for volume contents up to the lower explosion limit, of oxygen up to 25 % O₂, of carbon monoxide up to 500 ppm CO, of hydrogen sulphide up to 100 ppm H₂S and of carbon dioxide up to 5 % CO₂, if its characteristics and version complies with the documents mentioned in test report PFG-Nr. 41300598P, if it is operated accordingly and if the following points are adhered to:

- The operation manual given to and tested by PFG is to be adhered to in all details. When operating the gas detector, make sure that the specified operational conditions are present.
- Before using the gas detector please check, if the response times are short enough to trigger the alarm so quickly, that hazardous situations will be avoided. If necessary, continuously operate the detector in pump mode and make sure that the alarm thresholds are set to a considerably lower concentration than standard.
- Please consider the high impact of air pressure on the measurement value for carbon dioxide.
- If the battery alarm is activated you have to leave the monitored area or carry on the measurement with a second detector.
- If the detector has been exposed to combustible gases in concentrations beyond the full scale deflection in the range of 0-100 % LEL, it is to be zeroed and calibrated before being used again.
- For correct use as a warning from explosive atmospheres the current nationwide accepted value for the LEL is to be used (6,7).
- The detector has to be checked every day for proper functioning and correct display.
- Maintenance and repair of the gas detector is to be done in accordance with guideline T 031 of the Berufsgenossenschaft der chemischen Industrie, "Maintenance and repair of on-fixed gas warning appliances for explosion protection", (8).
- The detectors have to carry a durable type label, which gives information about the manufacturer, the type and the serial number and is marked with:
 - "PFG-Nr. 41300598"

Other regulations for marks, particularly as per ElexV, are untouched. With this type label the manufacturing company confirms, that the detectors comply with the characteristics and the technical specifications described in this report. Any detector not carrying this type label, does not comply with the present report.

- On his request, the user must receive a complete copy of this report and of the test report PFG-Nr. 41300598P.

Operational Hints from the Report PFG-Nr. 41300598 NI

The portable gas monitor G750 Polytector II of Gesellschaft für Gerätebau mbH is, on the basis of the measurement results and remarks shown in test report PFG-Nr. 41300598P NI, suitable for the use on landfills for measurement of methane in a mixture with air and volume contents up to the lower explosion limit, of oxygen up to 25 % O₂, of hydrogen sulphide up to 100 ppm H₂S and of carbon dioxide up to 5 % CO₂, if its characteristics and version comply to the documents mentioned in test report PFG-Nr. 41300598P NI, if it is operated accordingly and if the following points are adhered to:

- The operational hints from the report on the function test PFG-Nr. 41300598 dated 07.12.1998 are to be adhered to.
- If a methane sensor for the range 0 - 100 % LEL is fit, the detector must only be operated in sampling mode and using the charcoal filter (accessory, part no. 1750206).
- When using the charcoal filter (accessory, part no. 1750206) the detector must not be used for measurement of hydrogen sulphide.
- When using the detector for measurement of oxygen it is to be considered, that high concentrations of carbon dioxide increase the measurement value considerably.
- On his request, the user must receive a complete copy of this report and of the test report PFG-Nr. 41300598P NI.

Worldwide Supplier of Gas Detection Solutions

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Firmware Version 3.31



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