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Dräger Polytron 8100

Instructions for Use

WARNING

Strictly follow the Instructions for Use.
The user must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the Intended use section of this document.

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1 For your safety

1.1 General safety statements

- Before using this product, carefully read the Instructions for Use (IfU).
- Strictly follow the Instructions for Use. The user must fully understand and strictly observe the instructions. Use the product only for the purposes and under the conditions specified in this document.
- Do not dispose of the Instructions for Use. Ensure that they are retained and appropriately used by the product user.
- Only fully trained and competent users are permitted to use this product.
- Comply with all local and national laws, rules and regulations associated with this product.
- Only trained and competent personnel are permitted to inspect, repair and maintain the product as detailed in these Instructions for Use. Further maintenance work that is not detailed in these Instructions for Use must only be carried out by Dräger or personnel qualified by Dräger. Dräger recommends a Dräger service contract for all maintenance activities.
- Maintenance must be performed as described, see Section 6 on Page 28.
- Use only genuine Dräger spare parts and accessories. Otherwise the proper functioning of the product may be impaired.
- The flameproof / explosion proof joints are not in accordance with the relevant minimum or maximum values of EN/IEC 60079-1. The joints are not intended to be re-worked by the user.

WARNING

Substitution of components may impair Intrinsic Safety. This only applies to the instrument or parts of it which are classified as intrinsically safe.

- Only operate the product within the framework of a risk-based alarm signaling concept.

Safe connection of electrical devices

- Before connecting this instrument to electrical devices not mentioned in the IfU consult the manufacturer or an expert.

Using the product in areas subject to explosion hazards:

- Instruments or components for use in explosion-hazard areas which have been tested and approved according to national, European or international Explosion Protection Regulations may only be used under the conditions specified in the approval and with consideration of the relevant legal regulations.
- The instruments or components may not be modified in any manner. The use of faulty or incomplete parts is forbidden. The appropriate regulations must be observed at all times when carrying out repairs on these instruments or components.

1.2 Definitions of alert icons

The following alert icons are used in this document to provide and highlight areas of the associated text that require a greater awareness by the user. A definition of the meaning of each icon is as follows:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in physical injury, or damage to the product or environment.
It may also be used to alert against unsafe practices.

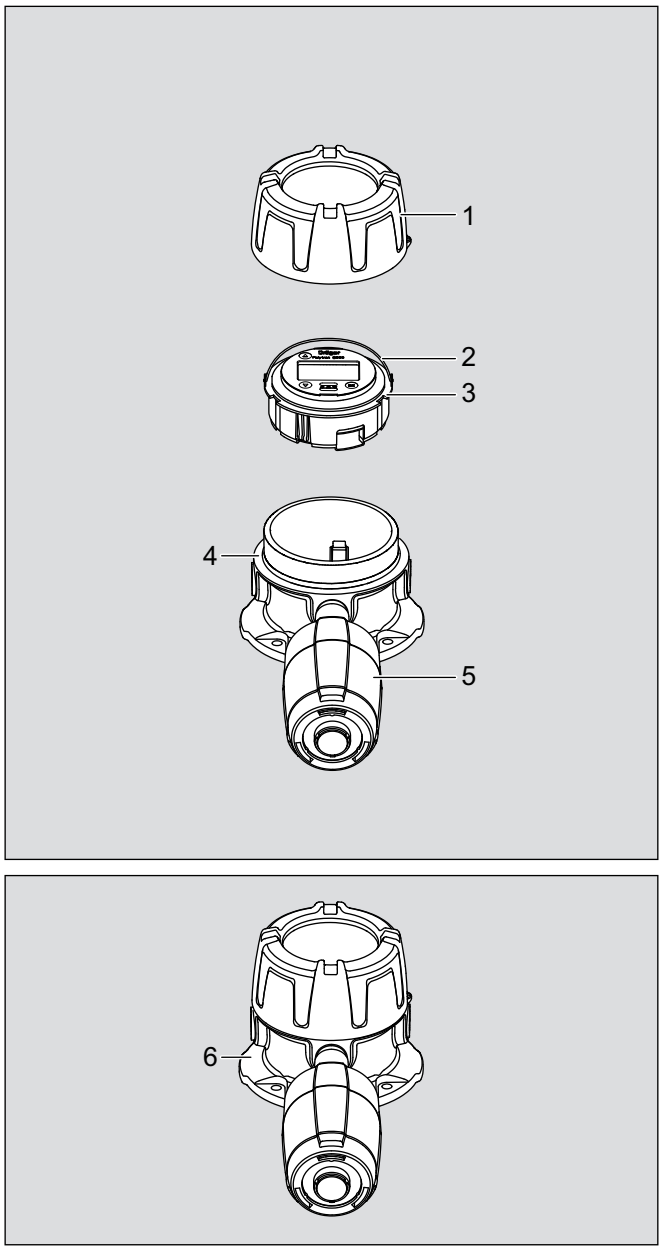
NOTICE

Indicates additional information on how to use the product.

2 Description

2.1 Product overview

2.1.1 Explosion proof instrument



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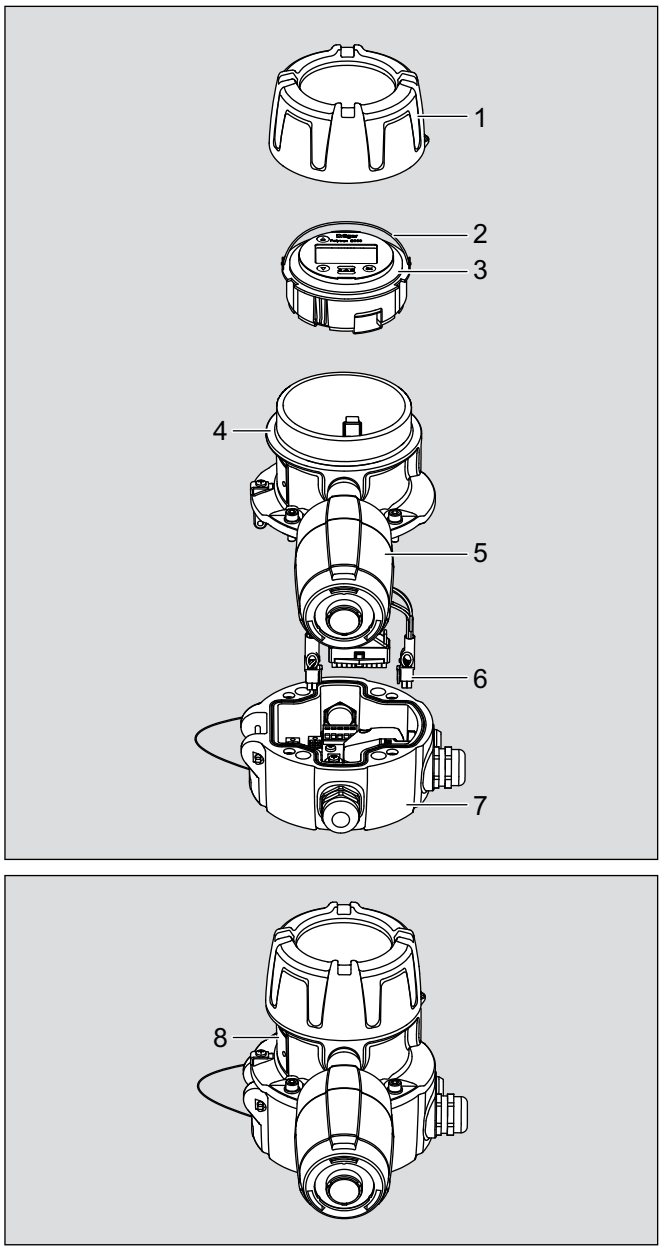
1 Enclosure lid
2 Handle
3 Bucket with main electronics (and optional relay)
4 Enclosure bottom
5 Sensor
6 Assembled instrument

2.1.2 Explosion proof instrument with increased safety wiring compartment (Docking Station)



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1 Enclosure lid
2 Handle
3 Bucket with main electronics (and optional relay)
4 Enclosure bottom
5 Sensor
6 Feed-through cable
7 Docking Station
8 Assembled instrument

2.2 Intended use

The Dräger Polytron 8000 is an explosion proof instrument for continuous monitoring of toxic gases or oxygen in the ambient air. The instrument is housed in a rugged stainless steel or aluminum enclosure for indoor and outdoor applications. The instrument can be connected through a sealed conduit or approved cable gland to a Dräger monitoring system or a Programmable Logic Controller (PLC). With the optional alarm relay configuration, the instrument can be operated as a stand-alone unit. The instrument is designed to be installed in permanent locations and is approved for use in hazardous, classified areas, see Section 10.1 on Page 37. With the optionally integrated relay module, the instrument can be operated without a central controller (with additional local alarm signaling).

For safe operation, the connection to a central controller is necessary. This also applies if all relays are connected because the fault relay is not activated during maintenance. In any case, the analog output must be monitored because it might indicate a special status by a current between 0 and 3.5 mA.

CAUTION

Not tested in oxygen enriched atmospheres (>21% O2). High off-scale readings may indicate an explosive concentration.

WARNING

Danger of explosions. Not to be used in oxygen enriched atmospheres. None of the Polytron 8000 instruments are certified and approved to be operated in oxygen enriched atmospheres.

2.3 Intended operating area and conditions

Hazardous areas classified by zones:

The device is intended to be used only in hazardous areas classified Zone 1 or Zone 2, within a temperature range as marked on the device, where gases of explosion Groups IIA, IIB or IIC and temperature class T4 or T6 (depending on the maximum ambient temperature) or dusts of Groups IIIA, IIIB or IIIC may be present.

Hazardous areas classified by divisions:

The device is intended to be used only in hazardous areas Class I or II, Div. 1 or Div. 2, within a temperature range as marked on the device, where gases or dusts of Groups A, B, C, D or E, F, G and temperature class T4 or T6 (depending on the maximum ambient temperature) may be present.

2.4 Design

The instrument is powered by 10 to 30 VDC (see Section 10.4 on Page 41). Gas concentrations, status messages, and menu choices are displayed on a backlit graphic LC-display and 3 colored LEDs. The measured gas concentration is converted to a 4 to 20 mA analog (per NAMUR recommendation NE43) or a digital HART output signal. The instrument can be operated as current source or sink.

Navigation through the menu is done by taping a magnetic wand on the glass at the appropriate indicator.

The instrument can be configured, calibrated and maintained non-intrusively without declassifying the area.

3 Installation

3.1 General information for installation

To ensure overall system performance and effectiveness, the selection of an installation site for the instrument is one of the most important factors. Strict compliance where possible and considerable thought must be given to every detail of installation, particularly:

- the local, state, national codes and regulations that govern the installation of gas monitoring equipment.
- the electrical codes that govern the routing and connection of electrical power and signal cables to gas monitoring equipment.
- for non-conduit installations, an approved cable gland must be used, see Section 10.1 on Page 37 (e.g. Hawke A501/421/A/¾" NPT or equivalent). It might be necessary to connect the shield of the cable to the cable gland and to the controller in order to improve RFI immunity.
- the full range of environmental conditions to which the instruments will be exposed to.
- the physical data of the gas or vapor to be detected.
- the specifics of the application, (e.g. possible leaks, air movement/draft, etc.).
- the degree of accessibility required for maintenance purposes.
- the types of optional and accessory equipment that will be used with the system.
- any other limiting factors or regulations that would affect system performance or installations.
- the flameproof / explosion proof enclosure provides three ¾" NPT openings, which can be used for field wiring, direct attachment of a sensor or wiring of a remote sensor.
- unused openings must be closed with a plug. For correct tightening torques of conduit hubs, cable glands, plugs and sensor see Section 10.8 on Page 42.
- secondary circuit intended to be supplied from an isolating source (N/A for relay circuits).
- the optional increased safety terminal box provides up to four 20 mm openings, which can be used for field wiring or wiring of a remote sensor. The permissible cable diameter range is 7 to 12 mm.
- when installed at locations exceeding ambient temperatures of 55 °C, use only appropriate wiring, specified for at least 25 °C above the maximum ambient temperature.
- strip wire insulation by 5 to 7 mm.
- connect the wires as indicated in wiring figure Section 3 on Page 8 (also showing grounding conductor terminal).
- the wiring for the optional relay module must be selected and fused according to the rated voltages, currents and environmental conditions.
- if stranded conductors are used, a ferrule must be used.

3.2 Installation restrictions

- The instrument must have between 10 to 30 VDC at the instrument. This ultimately determines the distance the instrument can be mounted from the controller or power supply. The instrument accepts wire sizes of 12 to 24 AWG (0.2 to 2.5 mm2). Use at least a three-conductor, shielded cable.
- The instrument must not be exposed to radiant heat that will cause the temperature to rise beyond the limits stated in see Section 10.6 on Page 41. The use of a reflecting shield is recommended.
- The enclosure is weatherproof within environmental parameters and suitable for outdoor installation. The use of the optional splash guard (6812510) is recommended to protect the sensor from water and dust.
- Each instrument must be installed and operated in an environment that conforms to the specifications, see Section 10 on Page 37.
- To insure proper operation of the instrument, the impedance of the 4 to 20 mA signal loop must not exceed 500 Ohms. Depending on the operating voltage and according to the application (e.g. HART operation), certain minimum impedances must be observed (see Section 3.3 on Page 8). The conductors for the power supply must have an adequately low resistance to insure the correct supply voltage at the instrument.

NOTICE

The instrument may be equipped with a dust plug at the conduit entry. This plug is not explosion proof nor meant to be watertight, and must be removed before connecting the instrument to a sealed conduit or installation of a flameproof cable gland.

3.3 Impedance of signal loop

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Operating mode	Impedance range of the signal loop	Supply voltage range
Operation without HART communication	0 to 230 Ω	at 10 V DC
	Rising linearly with the supply voltage from: 0 to 230 Ω at 10 V to 0 to 500 Ω at 16 V	10 to 18 V DC
	0 to 500 Ω	18 to 30 V DC
Operation with HART communication (HART mode)	230 to 270 Ω	at 13 V DC
	Rising linearly with the supply voltage from: 230 to 270 Ω at 11 V to 230 to 500 Ω at 16 V	11 to 16 V DC
	230 to 500 Ω	18 to 30 V DC
HART Multidrop operation	230 to 500 Ω	10 to 30 V DC

3.4 Mechanical installation

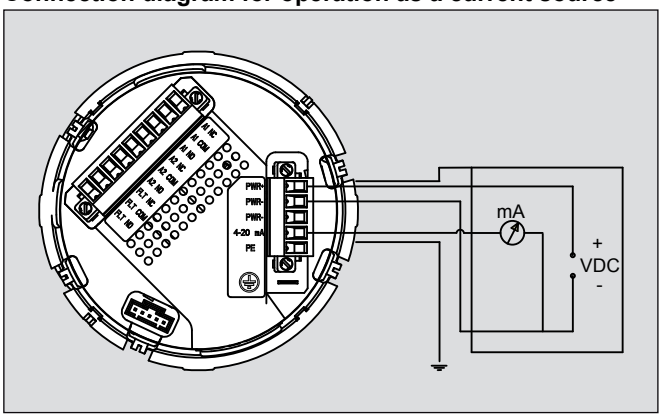
- Use the drilling template for mounting on a flat surface.
- The mounting surface should be even.
- Dräger recommends using M6, 1/4” bolts with hex socket caps.
- The instrument must be accessible for maintenance (e.g. calibration).
- The future use of accessories and maintenance equipment must be kept in mind.
- The access of the gas or vapor to the sensor must not be obstructed.

3.5 Electrical installation without Docking Station

CAUTION

Ensure wiring for relays and connections for sensor are made before applying power.

Connection diagram for operation as a current source



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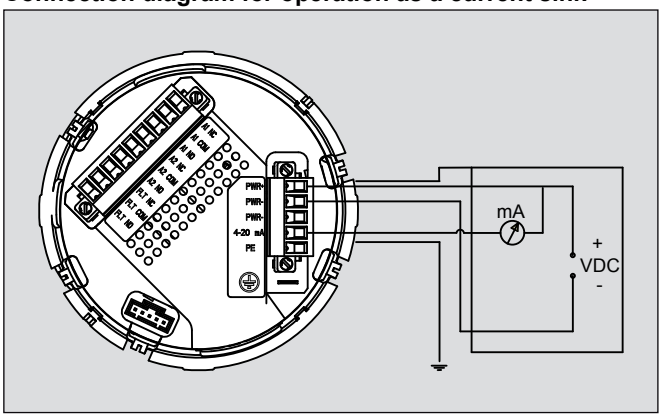
Connection diagram for operation as a current sink



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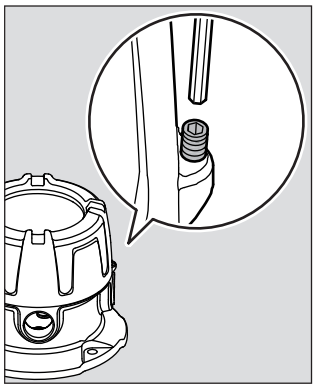
3.5.1 Power and signal wiring



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- Loosen set-screw and un-screw lid from instrument.
- Lift the handle and pull-out the bucket with the main electronics.
- Turn bucket over and pull off the 5-pin connector.
- Connect the three wires for power and signal to the appropriate terminal as indicated in the following wiring table and figure. Fasten terminal screws with the correct torque according to the table tightening torque and wire size for field wiring terminal, see Section 10.9 on Page 42.

5-way Pin connector (power and signal)					
Pin	1	2	3	4	5
Mark	PWR+	PWR-	PWR-	4-20 mA	PE
Function	V+	V-	V-	4 to 20 mA signal (Operation as source or sink)	PE

- If operated as a stand-alone instrument, wire pin 3 to pin 4.
- Plug connector back into socket and tighten screws.
- The cable shielding should only be connected at the controller.
- Place bucket back into the enclosure.
- Screw the lid back on, until it is seated (see Section 10.8 on Page 42) and tighten set-screw.

3.5.2 Relay option

WARNING

At voltages >30 V AC or >42.4 V DC, the relay cables must be enclosed in protective tubing, or double-insulated cables must be used.

If the relay option has been installed, the wires for the alarm devices will be connected to the 9-pin connector. A piece of wire insulation (heat shrink tube) and rubber boot are supplied for extra protection for relay wires.

- Turn bucket over and pull off the 9-pin connector.
- Cut the heat shrink tube as needed and slide over the relay wires before insertion into the 9-pin connector.
- Position the heat shrink tube at the edge of wire insulation and use a heat gun to shrink the tubing securely onto wire insulation.
- Slide rubber boot over the wires.

- Connect the wires for alarm 1 (pre alarm), alarm 2 (main alarm) and fault alarm to the terminals, as indicated in the following wiring table. Fasten terminal screws with the correct torque according to the table tightening torque and wire size for field wiring terminals, see Section 10.9 on Page 42.
- With factory default settings and during normal operation, the relays are energized. This provides “fail-safe” operation. The terminal designators indicated in the following wiring table are shown as factory default and normal operation mode, see Section 7 on Page 34.
- Plug connector back into socket and tighten screws.
- Put rubber boot over connector.

NOTICE

To ensure that a fault is recognized - without having to look at the instrument - an alarm device must be connected to the fault relay.

9-Pin connector (relays)									
	Fault relay			A2 relay			A1 relay		
Pin	1	2	3	4	5	6	7	8	9
Mark	FLT NO	FLT C	FLT NC	A2 NO	A2 C	A2 NC	A1 NO	A1 C	A1 NC

NO = Normally open, NC = Normally closed, C = Common

3.6 Electrical installation with Docking Station

Installing this configuration is a two-step process.

First, the Docking Station is mounted and connected to the field wires. Second, the main instrument enclosure with the electronics and sensor is attached to the Docking Station.

The Docking Station can be pre-mounted, wired and sealed with the supplied cover. Once the site is ready for commissioning, the instrument is then hooked up to the Docking Station and taken into operation; avoiding that the instrument is damaged during the construction phase.

The connection between the Docking Station and the main instrument is realized via a ‘feed-through’. Depending on the instrument selected, there are 2 types of feed-through.

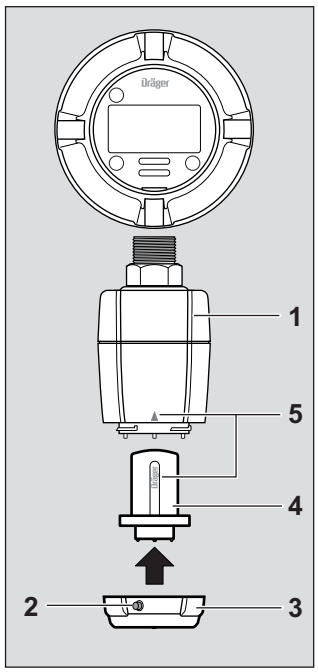
- 3 wire for power (part number 4544182)
- 9 wire for power and relay (part number 4544169)

3.6.1 Field wiring

For field wiring of Docking Station refer to Instructions for use 9033242.

3.7 Installing sensor

- Loosen set-screw (2), 2mm Allen screw.
- Unscrew bayonet ring (3) and remove blank.
- Remove sensor from packaging.
- Insert sensor (4) into the opening. The Dräger logo on the sensor must point to the mark on the sensing head housing (5).
- Lock sensor with bayonet ring.
- Tighten set-screw (2). Mandatory for Zone 22 installations.



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3.8 Installation of EC sensing head remote

3.8.1 Wall or pipe mounting kit

CAUTION

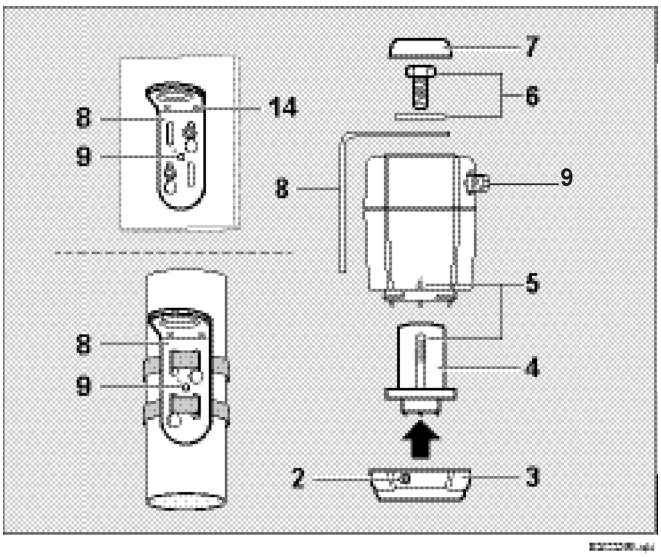
Observe the general installation information, see Section 3 on Page 8.

Multiple EC sensing heads remote must not be daisy-chained.

NOTICE

The EC sensor wall or pipe mount kit (part number. 45 44 213) is required to mount the EC sensor on a wall or pipe.

The sensing head should be mounted at a low-vibration location at even temperature near a potential leakage point (avoid direct sunlight).



- Install wall or pipe mount set (8) as specified in the assembly instructions.
- Screw the EC sensing head to the wall or pipe mount bracket (8) using screw and washer (6).

NOTICE

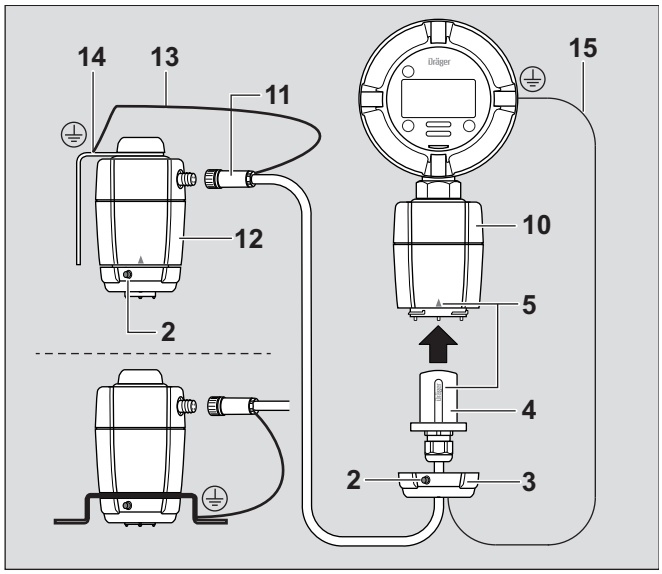
Pay attention to the orientation of the cable connector (9)!

- Select the appropriate protection cap (7) and place it on the screw.

3.8.2 Installing sensor

- Loosen set-screw (2), 2 mm Allen screw.
- Unscrew bayonet ring (3) and remove blank.
- Remove sensor from packaging.
- Insert sensor (4) into the opening. The Dräger logo on the sensor must point to the mark on the sensing head housing (5).
- Lock sensor with bayonet ring.
- Tighten set-screw (2). Mandatory for Zone 22 installations.

3.9 Connecting the EC sensing head remote to Polytron 8000



- Connect remote cable plug (11), to the EC sensing head remote (12) and lock.
- Attach the shield wire (13) to the grounding point (14) of the bracket (M5 thread).
- Loosen set-screw (2), 2 mm Allen screw.
- Unscrew bayonet ring (3) and remove blank. Either bayonet ring can be used: black or silver.
- Insert the remote adapter (4) in the opening. The Dräger logo on the sensor adapter must point to the mark on the sensing head housing (5).
- Lock sensor adapter with bayonet ring.
- Attach the shield wire (15) to the ground lug of the enclosure.
- Tighten set-screw (2). Mandatory for Zone 22 installations.

NOTICE

The EC sensing head remote is automatically recognized by the instrument.

3.10 Connecting the instrument to a controller from Dräger

NOTICE

For hook-up information, please refer to the Instructions for Use which was included with the Dräger controller (e.g. Regard, QuadGard).

Electrical connections at the controller

Connect the shield of the wires to the instrument earth ground of the controller (e.g. chassis, ground busbar, etc.).

3.11 Connecting the instrument to a PC

The separately available Polytron 8000 IR interface connection kit is intended for use with the Polytron 8000 and enables communication between the Polytron 8000 and a PC using the PolySoft 8000 software.

3.12 PolySoft 8000 PC software (optional)

The PolySoft 8000 PC software is used to display instrument information, edit configuration settings and download the instrument memory.

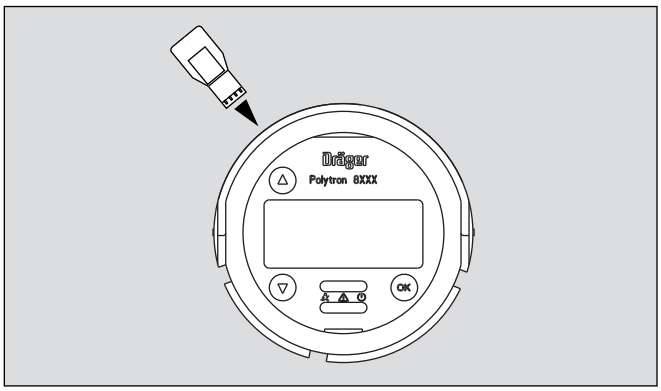
CAUTION

After modifying parameters with the PolySoft 8000 PC-software or another software, verify all parameters by downloading or by checking them on the Polytron 8000.

3.13 Installing software dongles

The following software dongles are available for the Polytron 8000:

Sensor test dongle 83 17 619	Activates the sensor self-test (only for certain sensors)
Diagnostic dongle 83 17 860	Activates the sensor self-test, the display of the sensor vitality and the sensor diagnostic functions (only for certain sensors and functions)



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To install a software dongle:

- Switch off power to the instrument or declassify the area according to the local regulations.
- Loosen set-screw and unscrew lid from instrument.
- Lift the handle and pull-out the bucket with the main electronics.
- Insert the dongle in the slot with the Dräger logo facing upwards.
- Place bucket back into the enclosure.
- Screw the lid back on, until it is seated (see Section 10.8 on Page 42), and tighten set-screw.
- Switch power back on.

4 Operation

4.1 Normal operation

WARNING

Before leaving the instrument for normal operation, check the configuration and calibration for the proper settings.

- Switch power supply on.

The instrument will go through a start-up sequence (LCD / LED test, software version, and initialization) and start the warm-up period. The display shows that the sensor will be ready for measurement in hh:mm:ss (countdown) and the instrument transmits the maintenance signal, see Section 10.3 on Page 41.

After the warm-up period, the instrument goes into normal operation. The display shows the current gas concentration, the selected gas and the units of measurement. The green LED is lit.

NOTICE

The correct date and time settings are important for many functions see Section 5.7.3 on Page 20.

4.1.1 Analog signals

The current output of the instrument during normal operation is between 4 and 20 mA and is proportional to the detected gas concentration.

Polytron 8000 uses different current values to indicate various modes of operation. The factory default settings are user adjustable for application specific requirements, see Section 7 on Page 34. This follows the NAMUR recommendation NE43.

4.1.2 The display and LEDs

In normal operation, the display shows the measured gas concentration, the selected gas and the unit of measurement. The green LED is lit.

The following symbols may also be displayed:

- " ", when the measuring range is exceeded
- " **- - - -** " and " **X** " when a fault has been detected. The yellow LED is lit, see Section 6.3 on Page 31.
- "SIL", when SIL status is activated.

If the optional relay board is installed:

- When the first alarm (pre alarm) has been triggered the red LED blinks in single mode. The A1 relay is asserted.
- When the second alarm (main alarm) has been triggered the red LED blinks in double mode. The A2 relay is asserted.
  If the A2 is configured as acknowledgeable, and the A1 is configured as non-acknowledgeable, then, when an A2 alarm occurs, the red LED will blink in double blink A2 mode. After the alarm is acknowledged, the red LED will blink in single blink mode to indicate A1 is still active.

4.1.3 The LED symbols

NOTICE

The alarm triggering function is only available when the optionally integrated relay module is used.

Symbol	LED	Description
	red	Alarm triggered
	yellow	Fault
	green	Power ON Normal operation

4.1.4 Status indicators in the display

The following status indicators may appear on the right side of the display.

 Warning message available – to display warnings, see Section 5.2.1 on Page 18.

 Error message available – to display errors, see Section 5.2.2 on Page 18.

 Maintenance signal is transmitted, see Section 5.8.2 on Page 22.

 Measuring range of analog interface exceeded

Measurement less than range of analog interface

 Analog interface is set to a fixed value (e.g. Multidrop HART communication) and is not transmitting any measurement signal.

 "Preventive" maintenance: The sensor is ready for operation.

 "Preventive" maintenance: The sensor is ready for operation but is close to the end of its life cycle.

 "Preventive" maintenance: The sensor is still ready for operation but should be changed as soon as possible.

 The data-logger is active in Roll mode.
To activate/deactivate, see Section 5.10.2 on Page 27.

 The data-logger is active in Stack mode.
To activate/deactivate, see Section 5.10.2 on Page 27.

SIL SIL is activated (refer to the Polytron 8000 Safety Manual part number 9033307).

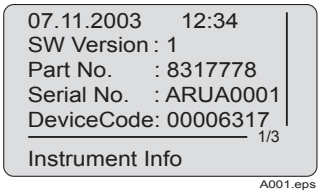
4.2 Activating the Info mode

No password required.
The Info mode is used to show instrument relevant information. This will not interrupt the normal operation of the instrument.

- Tap and hold [UP] for more than 3 seconds.
  The instrument information is shown on several screens. No changes can be made.
- Tap [UP] / [DOWN] to switch between the screens.
- The Info mode can be exited at any time by tapping [OK].
- If no key is tapped within 30 seconds, the instrument will automatically return to normal operation.

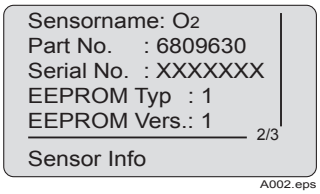
Example of the Info mode
Depending on sensor the screens may vary:

1. Screen - Instrument information:



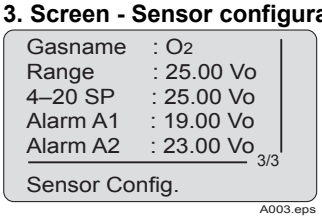
- Date and Time
- Software version
- Part number of the instrument electronics
- Serial number of the instrument electronics
- Instrument code

2. Screen - Sensor information:



- Installed sensor
- Part number of the sensor
- Serial number of the sensor
- Software version
- Software revision

3. Screen - Sensor configuration:



- Selected gas
- Maximum measuring range and units for the sensor
- Measuring range and units for the analog interface. Only shown if the 4 to 20 mA interface is enabled.
- A1 Alarm set point and units[1]
- A2 Alarm set point and units[1]

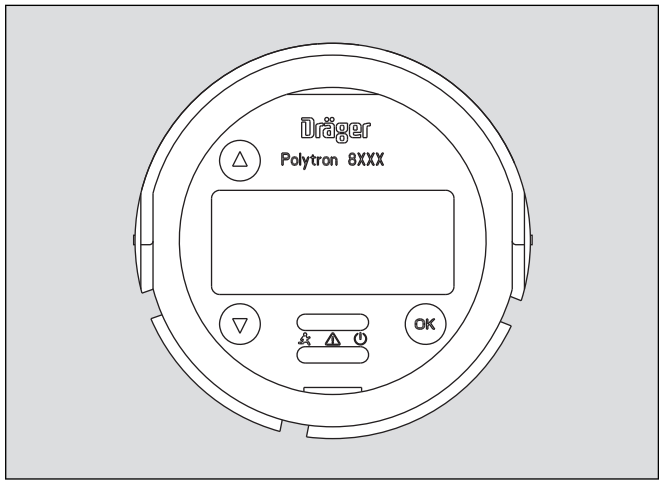
4.3 Activating the Quick Menu

No password required.

- Tap and hold [DOWN] for 1 to 2 seconds.
  The selected information about status or instrument settings can be retrieved (e.g. warning messages, error messages, installed modules and calibration data, time/ concentration graph, see Section 5.7.5 on Page 21.
  No changes can be made.

1 Only displayed if relay is configured.

4.4 Menu navigation



Tapping the magnetic wand (part number 4544101: blue body, white logo) over [UP] / [DOWN] scrolls through the menu selections.
Tapping [OK] confirms a selection.

NOTICE

The instrument is designed for the magnetic wand to be used with the enclosure lid in place. If the enclosure lid is not in place, the magnetic wand may activate two or more buttons at once (cross-talk).

4.4.1 Password

A password consists of a 4-digit alphanumeric value.

- From normal operation, tap and hold [DOWN] for more than 3 seconds.
  The message **"Enter the password"** will be displayed.
- Confirm with [OK].
- The screen to enter the password will be displayed with the first digit on the left blinking.
- Tap [UP] / [DOWN] to increment or decrement this digit, then tap [OK].
- The second digit will blink; set the correct value by tapping [UP] / [DOWN], then tap [OK].
- Repeat the process for the other two digits.
- Tap [OK] when the full password is displayed.

If the displayed value matches the set password, access will be given to the menu. If an incorrect password is entered, the instrument will indicate "wrong password" and show the dashes and blinking digit again, see Section 5.7.2 on Page 20.

Factory default passwords:
Calibration menu: _ _ _ 1
Calibration and **Settings** menu: _ _ _ 2

4.4.2 Graphic symbols

Graphic symbols facilitate navigation in the various menus.

- Combined with the text **» Back «, » Menu «**, etc., exit the menu or go back one step.
- Closed folder
  More functions or sub-menus are available.
- Opened folder
  The available functions and sub-menus are shown.
- Function
  When activated, functions can be executed in one or more steps.
- Selection activated
  For functions that can be selected and activated, the activation is executed by tapping [OK].
- List above closed / complete
  There are no other functions, menus or sub-menus listed above.
- List can be scrolled upwards
  There are more functions, menus or sub-menus listed above.
- List below closed / complete
  There are no other functions, menus or sub-menus listed below.
- List can be scrolled downwards
  There are more functions, menus or sub-menus listed below.
- Next
  Perform context-related action.
- 3/3 Number / total number of steps (screens) within the function.
- 2/2 Entry
  Enter data with [UP] / [DOWN].

4.4.3 Changing parameter values or statuses

Select the menu item to be accessed by tapping [UP] / [DOWN].

- When the intended menu item is displayed, tap [OK].
  The current value or status will be displayed.
- [UP] / [DOWN] allow adjusting the value of a numerical parameter or scrolling through preset choices.
- Once the display shows the intended value or choice, tap [OK] to validate the new parameter and return to the main menu.
- When exiting via **“Back to menu”** or **“Previous”**, all changes will be discarded.

4.4.4 Exiting the menu

- Tap [UP] to **“Back to measurement”** and tap [OK].

5 Menu

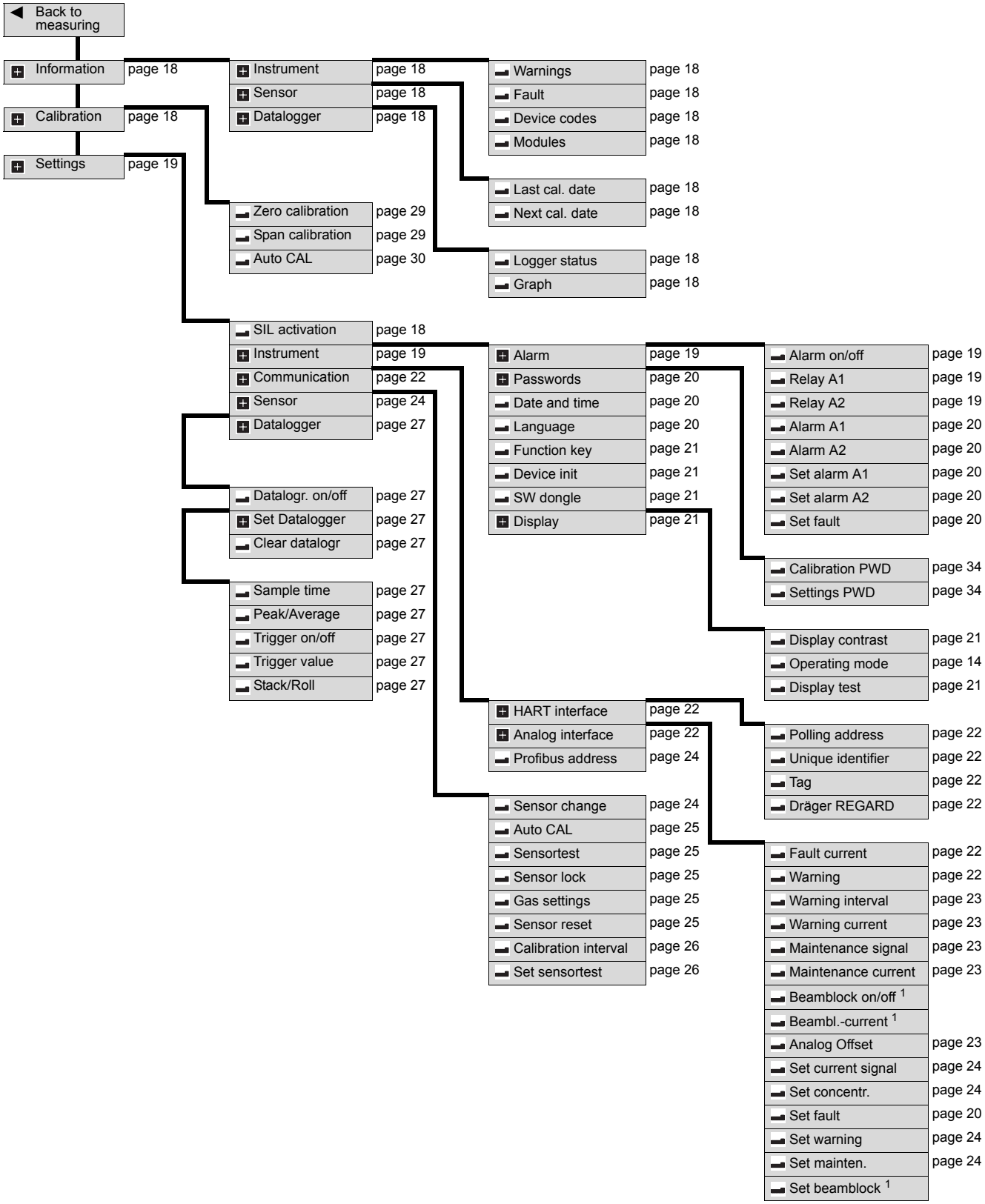
The menu is grouped into three main segments.

Information
Specific data about the instrument, the sensor and the measured gas are summarized in this menu. The menu can be accessed without a password.
No changes can be made.

Calibration
Calibration of the instrument must be performed at regular intervals as detailed in the sensor data sheet.

Settings
This sub-menu contains all functions to configure the instrument to the application specific requirements.

5.1 Menu overview



1 Parameter not used by Dräger Polytron 8000.

5.2 Information instrument

5.2.1 Warning messages

This function displays warning messages in plain text and the corresponding number see Section 6.3.2 on Page 32. The [!] symbol is displayed if there are warning messages available.

- Select **Information > Instrument > Warnings** and confirm.
  If there are several warning messages available, there is an indicator in the upper right-hand corner of the display, e.g. 1/3 = Screen 1 of 3.

5.2.2 Fault messages

This function displays fault messages in plain text and the corresponding number see Section 6.3.1 on Page 31. The [X] symbol is displayed if there are fault messages available.

- Select **Information > Instrument > Faults** and confirm.
- If there are several fault messages available, there is an indicator in the upper right-hand corner of the display e.g. 1/2 = Screen 1 of 2.

5.2.3 Device codes

This function displays warning and fault codes as a table (hexadecimal).

- Select **Information > Instrument > Device codes** and confirm.
  If all codes are 00 there are no warning or fault messages available. The instrument is working to specification.

NOTICE

The device code is essential for technical support. It is important to identify the exact location and values of the codes.

5.2.4 Installed modules

This function displays an overview of the installed hardware modules.

- Select **Information > Instrument > Modules** and confirm.
  The list contains modules. The installed modules are identified by the ■ symbol. The □ symbol means that the module is not installed.
- Highlight a module and access detailed information with [OK].

5.3 Information sensor

This function contains information on calibration dates.

5.3.1 Display last calibration date

- Select **Information > Sensor > Last cal. date** and confirm.

5.3.2 Display next calibration due date

- Select **Information > Sensor > Next cal. date** and confirm.

5.4 Information data-logger

These functions contain information about the data-logger.

5.4.1 Display the data-logger status

- Select **Information > Data logger > Logger status** and confirm.
- To change the status see Section 5.10 on Page 27.

5.4.2 Display graph

Display the history of the past 15-minutes on a time/ concentration graph.

- Select **Information > Data logger > Graph** and confirm.

5.5 Calibration

5.5.1 Zero calibration

Allows adjusting the zero reference point of the sensor, see Section 6.2.1 on Page 29.

5.5.2 Span calibration

Allows adjusting the sensitivity to match the known concentration of an applied calibration gas, see Section 6.2.2 on Page 29.

5.5.3 Auto calibration

Automated sequence reducing the number of steps during calibration; see Section 6.2.3 on Page 30.

5.6 Settings SIL activation

NOTICE

SIL lock is only available for certain sensors (refer to the Polytron 8000 Safety Manual part number 9033307).

SIL lock can only be activated if the sensor test is activated see Section 5.9.9 on Page 26.

This function protects the instrument against unauthorized changes. Changing the configuration (e.g., changing the measuring range from 100 %LEL to 50 %LEL) will force the user to confirm all safety-relevant parameters before the instrument returns to normal operation.

- Select **Settings > Instrument > SIL activation**.
- Select **Enable** or **Disable** and confirm.

NOTICE

When SIL is activated, the instrument displays all safety-relevant parameters and settings before returning to normal operation. Carefully review all parameters and settings and confirm.

5.7 Settings instrument

5.7.1 Alarm settings

CAUTION

This function is only available if the relay module is installed.

With factory default settings and during normal operation, the relays are energized. This provides a “fail-safe” operation.

Switching the alarm On or Off

- Select **Settings > Instrument > Alarm > Alarm on/off**.
- Select **Enable** or **Disable** and confirm.

CAUTION

If the alarm is set to Off, an alarm condition will not be shown by the LEDs or assert the relay!

NOTICE

The maintenance signal is transmitted and the symbol [🔧] is displayed.

Configuring Relay A1 or A2

This function defines whether the alarm relay is energized during normal operation or energized at an alarm condition.
If the configuration of the relay is set to “Normally energized”, the relay contact is asserted during normal operation and changes if an alarm is triggered. At a loss of power this will trigger an alarm (fail-safe). The fault relay is factory-configured to “Normally energized” and cannot be changed.

- Select **Settings > Instrument > Alarm > Relay A1** or **Relay A2** and confirm.
- Select **Normally energ.** or **Energ. on alarm** and confirm.

Configuring Alarm A1 or A2

Latching means that once the alarm level is reached, the instrument will trigger the alarm. It will remain in alarm status even if the gas concentration subsequently does not meet the alarm condition any more. To clear a latching alarm it has to be acknowledged with [OK].

In non-latching mode, the alarm status clears if the gas concentration does not meet the alarm condition anymore.

Acknowledgeable means that the alarm relay can be reset before alarm condition clears.

Non-acknowledgeable means that the alarm relay can not be reset until the alarm condition clears.

NOTICE

The hysteresis function defines an interval where a triggered relay maintains its status until the gas concentration is outside the defined interval. This prevents relays from chattering at an alarm set-point.

Example: A2 at 40 % LEL Methane
Hysteresis: 3 % LEL
Alarm asserts at ≥ 40 % LEL
Alarm de-asserts at
< 37 % LEL(= 40 % LEL - 3 % LEL)

- Select **Settings > Instrument > Alarm > Alarm A1** or **Alarm A2** and confirm.
  The current alarm set-point is displayed.
- Set the alarm set-point and confirm.
- Select **Next** and confirm.
  The current alarm direction is displayed.
- Select **Rising** or **Falling** and confirm.
- Select **Next** and confirm.
  The current alarm latch mode is displayed.
- Select **Latching** or **Non Latching** and confirm.
- Select **Next** and confirm.
  The current acknowledgement mode is displayed.
- Select **Acknowledgeable** or **NonAcknowledgeabl** or **PreAcknowledgeabl** and confirm.
- Select **Next** and confirm.
  The current hysteresis is displayed.
- Set the hysteresis and confirm.
- Select **Next** and confirm.
  A confirmation screen shows all settings.
- Select **Confirm** and confirm with [OK].
  The new settings are now saved.

Repeat settings for A1 and A2.

Explanation of combining latching, acknowledgment and pre-acknowledgment of alarms:

Since the concepts of latching and acknowledgment can be confusing, the following six combinations are offered for clarification:

Latching and acknowledgeable	Relay must be reset manually and can be reset before the alarm condition clears.
Latching and non-acknowledgeable	Relay must be reset manually. Relay cannot be reset before the alarm condition clears.
Latching and pre-acknowledgeable	Relay must be reset manually. Relay can be reset while the alarm condition is still present but relay will not reset until the alarm condition clears.
Non-latching and acknowledgeable	Relay will reset automatically when the alarm condition clears or can be reset manually.
Non-latching and non-acknowledgeable	Relay will reset automatically when the alarm condition clears. Relay cannot be reset manually before the alarm condition clears.
Non-latching and pre-acknowledgeable	Relay will reset automatically when the alarm condition clears. Relay can be reset while the alarm condition is still present but relay will not rest until the alarm condition clears.

NOTICE

For safe operation:

- The relays must be set to “Normally energized” and the A2 alarm (main alarm) must be set to “latching” and “not acknowledgeable” or “pre-acknowledgeable”.
- The A1 alarm (pre alarm) may only be set to “acknowledgeable” if it is used for triggering an acoustic alarm device.

Relay Test

These functions change the status of a relay and LED for test purposes (e.g. to check the function of alarm devices connected to the relay) and the symbol [🔧] is displayed. After exiting this function, the status of the relay and LED will automatically return to their previous status.

NOTICE

When the relays are activated, alarm devices will be switched on.

Set alarm A1

- Select **Settings > Instrument > Alarm > Set alarm A1** and confirm.
- Select **Enable** or **Disable** and confirm.

Set alarm A2

- Select **Settings > Instrument > Alarm > Set alarm A2** and confirm.
- Select **Enable** or **Disable** and confirm.

Set fault

- Select **Settings > Instrument > Alarm > Set fault** and confirm.
- Select **Enable** or **Disable** and confirm.

NOTICE

If the function is activated, the fault relay is asserted and the 4 to 20 mA interface is set to the fault current. The yellow LED is lit, the symbol for maintenance is shown [🔧].

5.7.2 Passwords

These functions change the passwords for calibration (zero and span calibration) and settings (access to all configuration parameters).

- Select **Settings > Instrument > Passwords > Calibration PWD** or **Settings PWD** and confirm.
- Select the line for editing the password and confirm.
- Set the password and confirm.
  The setting for the password is displayed.
- Select **Confirm** and confirm with [OK].

5.7.3 Date and time

NOTICE

The correct date and time settings are important for many functions.

- Select **Settings > Instrument > Date and time** and confirm.
- Select the line for editing the date or time and confirm.
- Set each digit and confirm.
- Select **Confirm** and confirm with [OK].

5.7.4 Language

- Select **Settings > Instrument > Language** and confirm.
- Select the language from the list and confirm.

5.7.5 Function key

This function activates the Quick Menu.
The selected information about status or instrument settings can be retrieved (e.g. warning messages, fault messages, installed modules, calibration data and time/concentration graph.)

- Select **Settings > Instrument > Function key** and confirm.
- Select a function and confirm.
  Repeating the confirmation will deactivate the selected function.

In normal operation, the selected function can be activated by briefly tapping [UP] for 1 to 2 seconds.
If no function key is selected, the Quick Menu is deactivated.

Selection options:

Graph (only with data-logger dongle)	The measurements of the past 15 minutes are displayed as a time/ concentration graph.
Faults	Fault messages are displayed in plain text see Section 5.2.1 on Page 18.
Warnings	Warning messages are displayed in plain text see Section 5.2.2 on Page 18.
Bump-test	The bump-test allows applying gas to the sensor without generating an alarm. The maintenance signal is transmitted.
Sensor vitality (only with diagnostic dongle)	Shows the remaining sensor vitality (only available for certain sensors).

If Bump-test is selected:
The maintenance symbol [🔧] is shown on the display and the maintenance signal is transmitted.

- After 2 minutes or tapping [OK] again will end the bump test and the instrument returns to normal operation.

5.7.6 Device initialization

This function resets the instrument to factory default settings (see Section 7 on Page 34).

- Alarm settings
- Passwords
- Language
- Function key
- HART interface
- Data-logger
- Analog interface
- Relay configuration

- Select **Settings > Instrument > Device init.** and confirm.
- Select **Confirm** and confirm with [OK].

5.7.7 Software dongle

This function deactivates a SW dongle to safely remove the dongle or if the dongle is faulty.

A dongle can only be reactivated by cycling the power to the instrument.

- Select **Settings > Instrument > SW dongle > Sensortest dongle** or **Diagnostic dongle** confirm.
- Select **Deactivate func.** and deactivate **Sensortest dongle** or **Diagnostic dongle** with [OK].

5.7.8 Display settings

Changing the contrast

- Select **Settings > Instrument > Display > Display contrast** and confirm.
- Change the contrast and confirm.

Changing the display mode
This function turns the display off during normal operation.

- Select **Settings > Instrument > Display > Display mode** and confirm.
- Select **Standard** or **non display** and confirm.

If "non display" has been selected, the display shows the start screen and the applicable symbols.

If the relay option is installed and an alarm is triggered: regardless of the selected display mode, the display will show the current gas concentration and the red LED will blink.

Display test
The function tests the display and the LEDs.

- Select **Settings > Instrument > Display > Displaytest** and confirm.
- Select **Enable** or **Disable** and confirm.

When activated, the display is shown inverted and all the LEDs are lit.

5.8 Settings communication

5.8.1 HART interface

These functions change the settings of the HART interface.

Polling address
The polling address configures the instrument for analog operation (4 to 20 mA) or multidrop operation. Setting the polling address to 0 activates analog operation (4 to 20 mA). Setting the polling address to a value between 1 and 15 activates multidrop operation. In multidrop operation the analog interface is deactivated and set to a constant current of approximately 1 mA.
To allow the central controller to request the Unique Identifier (unique HART address) with HART command #0, all the devices on a line must be configured with different polling addresses. It is advised to choose a sequence starting with 1 and continuous increments.
This function corresponds to HART command #6 (Write Polling Address).

- Select **Settings > Communication > HART interface > Polling address** and confirm.
- Select the line for editing the address and confirm.
- Set the polling address and confirm.
- Select **Confirm** and confirm with [OK].

Unique Identifier
This function reads the Unique Identifier (unique HART address). It has to be known for almost all HART addressing commands. However, this information is only required for systems which are not able to read back the Unique Identifier using the HART command #0 in Short-Frame Format or HART command #11. The display corresponds to the address for HART command #0 (Read Unique Identifier) or #11 (Read Unique Identifier associated with Tag).

- Select **Settings > Communication > HART interface > Unique Identifier** and confirm.
  The Unique Identifier is displayed.

Tag
The tag can be used to identify an instrument. It can contain up to 8 alphanumeric characters. The tag can also be used as an address for reading the unique identifier using HART command #11 (Read Unique Identifier Associated with Tag), even if the polling address is unknown. This requires that a unique tag has been configured for each instrument.

- Select **Settings > Communication > HART interface > Tag** and confirm.
- Select the line for editing the tag and confirm.
- Set the tag and confirm.
- Select **Confirm** and confirm with [OK].

Dräger REGARD
This function switches between different HART protocols.

NOTICE

REGARD SW 2.0 is the default setting. REGARD SW 1.4 must be selected for REGARD controllers with SW 1.4.

- Select **Settings > Communication > HART interface > Dräger REGARD** and confirm.
- Select **REGARD SW 2.0** or **REGARD SW 1.4** and confirm.

5.8.2 Analog interface

These functions set currents for special signals on the analog interface and send test currents for validation at the central controller.

Fault current
This function defines the current for the fault signal.

- Select **Settings > Communication > Analog interface > Fault current** and confirm.
- Select the line for editing the current and confirm.
- Set the current and confirm.
- The setting for the fault current is displayed.
- Select **Confirm** and confirm with [OK].

Warning signal

WARNING

This function switches the warning signal On or Off.

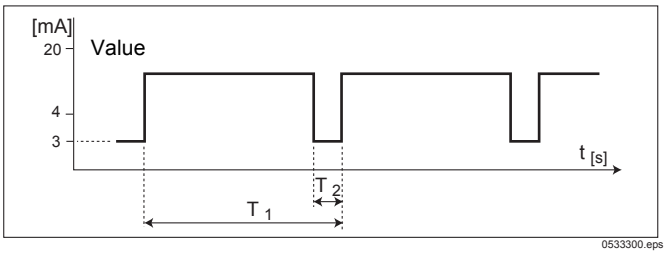
If turned On, the warning signal will be transmitted on the analog interface if a warning message is available. The default setting for the warning signal is “warning current” for one second and the “measurement current” for 9 seconds. These time intervals and the warning current can be changed.

To switch the warning signal on or off:

- Select **Settings > Communication > Analog interface > Warning** and confirm.
- Select **Enable** or **Disable** and confirm.

Warning interval
This function defines the time interval for the warning signal.

- Select **Settings > Communication > Analog interface > Warning interval** and confirm.
- Select the line for editing **T1** and confirm.
- Set the time and confirm.
  The setting for Time T1 is displayed.
- Select **Next** and confirm.
- Select the line for editing **T2** and confirm.
- Set the time and confirm.
  The setting for Time T2 is displayed.
- Select **Confirm** and confirm with [OK].



Warning current
This function defines the current for the warning signal.

- Select **Settings > Communication > Analog interface > Warning current** and confirm.
- Select the line for editing the current and confirm.
- Set the current and confirm.
  The setting for the warning current is displayed.
- Select **Confirm** and confirm with [OK].

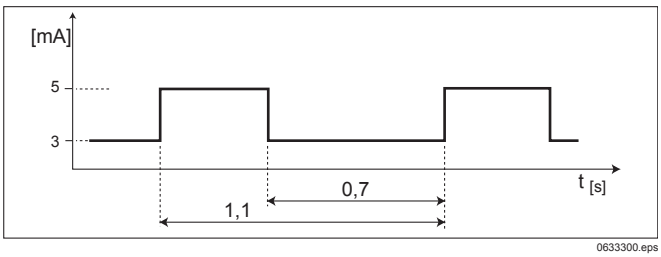
Maintenance signal
This function selects the type of maintenance signal.

- Select **Settings > Communication > Analog interface > Maint. signal** and confirm.
- Select **static** or **dynamic** signal type and confirm.

NOTICE

The **static** signal type is a constant current. However, the current value can be configured.

The **dynamic** signal type is a square wave signal with the following characteristics.



Maintenance current
This function defines the current for the maintenance signal.

- Select **Settings > Communication > Analog interface > Maint. current** and confirm.
- Select the line for editing the current and confirm.
- Set the current and confirm.
  The setting for the maintenance current is displayed.
- Select **Confirm** and confirm with [OK].

NOTICE

The maintenance current can only be set if the maintenance signal has been set to static.

Beam block on or off
This function is only available for Polytron 87X0 (using the sensor PIR 7X00).

Analog offset
This function adds an offset to the analog output. The offset is constant over the entire range of the analog signal.
This function is essential for an installation where the analog current at the instrument differs from the current at the central controller.

- Select **Settings > Communication > Analog interface > Analog offset** and confirm.
- Select the line for editing the offset (range: -0.2 to 1.5 mA) and confirm.
- Set the current and confirm.
  The setting for the analog offset is displayed.
- Select **Confirm** and confirm with [OK].

Test functions for the analog interface

NOTICE

These functions change the current of the analog interface for test purposes (e.g. to check the programming of the central controller). It might be necessary to inhibit the alarms at the central controller to avoid false alarms. After exiting these functions, the currents, if changed, will automatically return to the maintenance signal.
During the test, the maintenance symbol [🔧] is displayed.

Set current
This function sets the current to any value between 0 and 22 mA.

- Select **Settings > Communication > Analog interface > Set current** and confirm.
- Once the alarms at the central controller are inhibited, confirm the message **Inhibit all alarms**.
- Select the line for editing the current and confirm.
- Set the current and confirm.
  The setting for the current is displayed.
- Select **Next** and confirm.
- Select **Set current out** or **Current off** and confirm.
- Select **Next** and confirm.

The function is terminated.

- Once the alarms at the central controller are enabled again, confirm the message **Enable all alarms**.

Set concentration
This function sets the current corresponding to any concentration value between 0 and full-scale.

- Select **Settings > Communication > Analog interface > Set concentr.** and confirm.
- Once the alarms at the central controller are inhibited, confirm the message **Inhibit all alarms**.
- Select the line for editing the concentration and confirm.
- Set the concentration and confirm.
  The setting for the concentration is displayed.
- Select **Next** and confirm.
- Select **Set concentr. out** or **Concentration off** and confirm.
- Select **Next** and confirm.
  The function is terminated.
- Once the alarms at the central controller are enabled again, confirm the message **Enable all alarms**.

Set fault
This function sets the current to the fault current.

- Select **Settings > Communication > Analog interface > Set fault** and confirm.
- Select **Enable** or **Disable** and confirm.

Set warning
This function sets the current to the warning current.

- Select **Settings > Communication > Analog interface > Set warning** and confirm.
- Select **Enable** or **Disable** and confirm.

Set maintenance
This function sets the current to the maintenance current.

- Select **Settings > Communication > Analog interface > Set mainten.** and confirm.
- Select **Enable** or **Disable** and confirm.

Set beam block signal
This function is only available for Polytron 87X0 (using the sensor PIR 7X00).

5.8.3 Profibus address

Not yet active - for future functions.

5.9 Settings sensor

5.9.1 Sensor change

With this function, a sensor can be changed during operation without triggering a fault signal at the central controller. It also ensures that all sensor data in the microprocessor can be saved in the sensor memory (EEPROM) before disconnecting the sensor.

A sensor can be changed at any time. However, for safety reasons a fault alarm is generated when the sensor is disconnected until a new sensor is connected.

1. Select **Settings > Sensor > Sensor change** and confirm.
   The maintenance signal is generated on the analog interface, the following display shows: “Please remove the sensor”.
2. Replace the old sensor with a new sensor, see Section 6.4 on Page 33.

When the new sensor is installed:
Display: “Loading data, please wait”.

When the sensor data are loaded:
Display: “Data loaded”.

3. Select **Back to menu** and confirm.
   The maintenance signal on the analog interface remains pending until the sensor is warmed-up.

The warm-up time depends on the type of sensor and its history. For example, if the sensor has already warmed-up on another instrument and the operation was only interrupted for a short time, the warm-up time can be shorter than the time specified in the Instructions for Use for the sensor.

Maximum warm-up time of a new sensor: see the Instructions for Use for the sensor.

NOTICE

If a sensor of the same type (same part number) was previously installed, the instrument specific configuration is retained (gas type, measurement range, test gas, calibration interval, etc.)
Otherwise the factory default settings of the new sensor (see Instructions for Use for the sensor) are uploaded and will overwrite the instrument specific configuration.
This can be prohibited if the sensor lock function (see Section 5.9.4 on Page 25) is activated.

5.9.2 Auto CAL

NOTICE

This function is only active if enabled here.

- Select **Settings > Sensor > Set auto calibration** and confirm.
- Select **Enable** or **Disable** and confirm.

5.9.3 Sensor test

This function is only active for Polytron 8000 using the EC sensor.

This function is only active if the sensor test or diagnostics dongle is installed.

This function activates the sensor test. The instrument routinely checks the sensor for proper function. If the sensor does not pass the self-test, a warning or fault message will be issued.

- Select **Settings > Sensor > Sensor test** and confirm.
- Select **Enable** or **Disable** and confirm.

5.9.4 Sensor lock

This function is only active for Polytron 8000 using the EC sensor and Polytron 87X0 using the PIR 7X00 sensor.

This function activates the sensor lock feature.

- Select **Settings > Sensor > Sensor lock** and confirm.
- Select **On** or **Off** and confirm

CAUTION

If turned On	the instrument will reject any sensor whose part number does not match the part number of the previously installed sensor.
If turned Off	the instrument will accept any suitable sensor, uploading the default settings of this sensor. However, this will overwrite any customized settings with the default settings of the new sensor.

5.9.5 Sensor type

This function is only active for Polytron 8200 or Polytron 8310 using the DD, LC or DSIR sensor.

5.9.6 Gas settings

This function sets the gas type, measuring range and units of measurement.
Not all sensors offer a selection of values.

- Select **Settings > Sensor > Gas setting** and confirm.
  The current measured gas is displayed.
- Select a measured gas from the list and confirm.
  The current unit of measurement is displayed.
- Select the unit of measurement from the list and confirm.
  The current full scale deflection is displayed.
- Set the full scale deflection and confirm (only for certain sensors, see sensor data sheet).
  The new full scale deflection is displayed.
- Select **Next** and confirm.
  An overview of the new gas settings is displayed.
- After review: Select **Previous** for changes and confirm with [OK].
- Select **Confirm** to accept the settings and confirm with [OK].

Information about units of measurement
Depending on the target gas, the units of measurement can be switched between:

- ppb
- ppm
- Vol%
- %LEL
- %LIE
- %UEG
- L/m3
- mL/L
- mL/m3
- uL/L
- uL/m3

The instrument automatically converts the sensor signal into the selected unit of measurement. Units which are not available for a particular sensor or selected substance will not be shown.

Information about the full scale deflection (measuring range) and the analog output of 20 mA.
Some sensors offer a min/max range for the full scale deflection.
The selected full scale deflection determines the output of the 20 mA signal on the analog interface.

Example:
Required range 0 to 500 ppm CO (e.g. part number 6809605 default 300 ppm, range min/max = 50/1000 ppm).
Select full scale deflection as 500 ppm. The analog output will be linear between 4 mA = 0 ppm and 20 mA = 500 ppm.

5.9.7 Reset sensor

This function resets all sensor parameters to the factory default settings (see Section 7 on Page 34).

- Select **Settings > Sensor > Reset sensor required!** and confirm.
- Select **Confirm** and confirm with [OK].

5.9.8 Calibration interval

NOTICE

The calibration interval can be set between 0 and 720 days.

After the calibration interval expires, the instrument will issue a warning that the calibration is past due.

- Select **Settings > Sensor > Calibration interval** and confirm.
- Set the calibration interval and confirm.

5.9.9 Set sensor test

This function is only active for Polytron 8000 using the EC sensor.
This function is only active it the sensor test or diagnostics dongle is installed.
This function periodically initiates the sensor self-test.

- Select **Settings > Sensor > Set sensor-test** and confirm.
- Select **Enable** or **Disable** and confirm.

5.9.10 Fast Response

This function is only activated for Polytron 87X0 using the PIR 7X00 sensor.

5.10 Data-logger

The data-logger can store up to 3000 values. At a sampling interval of one measurement per minute the data-logger stores the measurement history of approximately 50 hours. This time can be significantly increased if the Trigger function is enabled.

The data-logger can only be downloaded using the PolySoft 8000 PC software. The last 15 minutes as a time/concentration graph can be viewed entering the menu **Information > Datalogger > Graph** (see Section 5.7.5 on Page 21) or via the function key.

5.10.1 Data-logger on or off

- Select **Settings > Datalogger > Datalogr. on/off** and confirm.
- Select **Enable** or **Disable** and confirm.

5.10.2 Set data-logger

Sampling time
This function defines how often a value will be stored.

- Select **Settings > Datalogger > Datalogr. on/off > Sample time** and confirm.
- Select the sample time and confirm.

Setting peak/Average
This function determines which value will be stored.

- Select **Settings > Datalogger > Set datalogger > Peak/ Average** and confirm.
- Select the **Peak** or **Average** and confirm.

Peak	The maximum value (if monitoring falling concentrations, the minimum value) of the measured concentrations within the selected sampling time is stored.
Average	The average value of all the measured concentrations within the selected sampling time is stored.

Trigger on or off

- Select **Settings > Datalogger > Set datalogger > Trigger on/off** and confirm.
- Select **On** or **Off** and confirm.

If turned On	Measurements will be stored if they exceed a threshold beyond the trigger value (relative to the last stored value).
If turned Off	Measurements within the sampling time will be stored.

Trigger value
This function defines the trigger threshold to store a value.
The trigger value is defined as a percentage of the full scale deflection.

Example: A trigger value of 2 % at full scale deflection of 500 ppm will only store values if they deviate by 10 ppm (relative to the previously stored value).

- Select **Settings > Datalogger > Datalogr. on/off > Trigger value** and confirm.
- Set the trigger value and confirm.

Stack/Roll
This function defines whether values are overwritten or top out.

- Select **Settings > Datalogger > Set Datalogger > Stack/ Roll** and confirm.
- Select **Stack** or **Roll** and confirm.

Roll	Once the capacity of the data-logger is reached, the old data will be overwritten by new values.
Stack	Once the capacity of the data-logger is reached, no more data can be stored. The instrument will issue a warning.

5.10.3 Clear data-logger

This function deletes the stored data.

- Select **Settings > Datalogger > Clear Datalogr.** and confirm.
- To clear the data-logger, select **Confirm** and confirm with [OK].

6 Maintenance

6.1 Maintenance intervals

6.1.1 During commissioning

- Check calibration.
- Check signal transmission to the central controller, LEDs and triggering of alarm devices.

6.1.2 Every 6 months

- Inspection by trained service personnel.
- Check signal transmission to the central controller, LEDs and triggering of alarm devices.
- The maintenance intervals must be established for each individual installation. Depending on safety considerations and application specific conditions the instrument is used in, these might need to be shortened.
- Contact Dräger Service to contract regular calibration and maintenance services.

6.1.3 Change sensor on demand

To change the sensor, see Section 6.4 on Page 33.

6.2 Calibration

Calibration of the instrument must be performed at regular intervals as detailed in the sensor data sheet.

WARNING

Calibration gas must not be inhaled! See appropriate Material Safety Data Sheets. Calibration gas should be vented into a fume hood or to the outside of the building.
For proper operation, never adjust the span before completing zero adjustment. Performing these operations out of order will cause the calibration to be faulty.

NOTICE

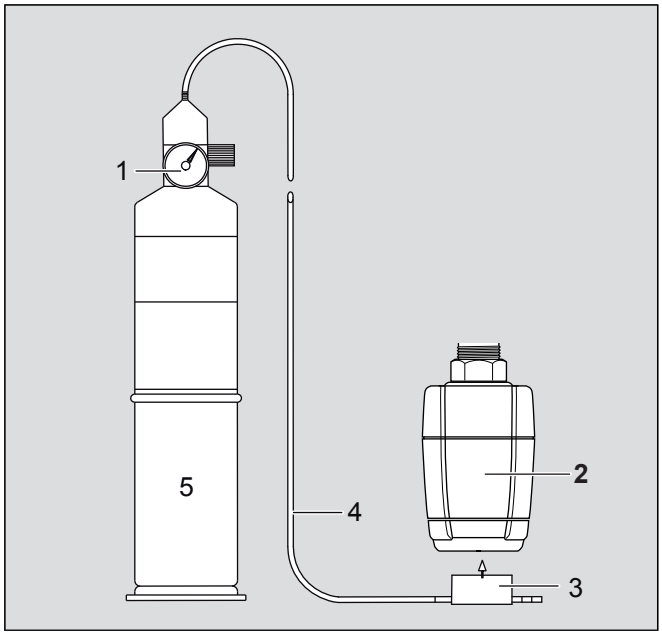
Calibration is not possible if the date and time are not set (see Section 5.7.3 on Page 20).

Dräger recommends calibrating instruments with target gas. This method of target gas calibration is more accurate than a surrogate gas calibration. A surrogate gas calibration may only be performed as an alternative if a target gas calibration is not possible.

The sensor should be fully warmed-up (see sensor data sheet).

General procedure

- Attach the pressure regulator to the calibration gas cylinder.
- Fit calibration adapter to the sensor.
- The gas flow should be approximately 0.5 L/min.
- If the intended operation is at high altitudes, the reading will be lower than the reading at sea level (reduced partial pressure). A new span calibration is recommended if the altitude or the ambient pressure is changed. The factory calibration is set to sea level.
- Connect the tubing to the barbed fitting.



1 Pressure regulator
2 EC sensing head
3 Calibration adapter
4 Tubing
5 Calibration gas cylinder

6.2.1 Zero Calibration

WARNING

Ambient air can be used to zero the sensor instead of Nitrogen or Synthetic Air only if the area is known to be free of the target gas or any gas to which the sensor may be cross-sensitive (as listed on the sensor data sheet). In this case, no cylinder or calibration adapter is needed for the zero calibration.

For Oxygen (O2) sensors the zero cannot be calibrated. For test purposes only Nitrogen (N2) must be used.

- Select **Calibration > Zero Calibration** and confirm.
  The Maintenance signal is transmitted and the symbol [🔧] is displayed.
  The message **Apply zero gas** is displayed.
- Apply Synthetic Air or Nitrogen.
- Select **Next** and confirm.
  The current value is displayed.

After the displayed value is stable:

- Select **Calibrate** and confirm.
  The message **Please wait...** is displayed.
  The new current value is displayed.
- Select **Next** and confirm.
- Turn off gas flow and remove the calibration adapter from the sensor or disconnect tubing.
- If the current value is not within the alarm range:
- Select **Next** and confirm.
  The instrument returns to the calibration menu.

6.2.2 Span calibration

- Select **Calibration > Span calibration** and confirm.
  The Maintenance signal is transmitted and the symbol [🔧] is displayed.
  The parameters for the calibration gas are displayed, e.g.:

Gas	H2S
Unit	ppm
Conc.	25

Depending on the sensor these parameters can be changed:

- Select **Gas** and confirm.
- Select the calibration gas from the list and confirm.
- Select **Unit** and confirm.
- Select the unit of measurement from the list and confirm.
- Select **Conc.** and confirm.
- Set the concentration of the calibration gas.

If the settings are correct:

- Select **Next** and confirm.
  A message like **Gas flow ON H2S** is displayed.
- Apply calibration gas.
- Select **Next** and confirm.
  The current value is displayed.

After the displayed value is stable:

- Select **Next** and confirm.
  The message **Please wait...** is displayed.
  The new current value is displayed.
- Select **Next** and confirm.
- Turn off gas flow and remove the calibration adapter from the sensor or disconnect tubing.
- If the current value is not within the alarm range:
- Select **Next** and confirm.
  The instrument returns to the calibration menu.

A calibration can be aborted at any time.

6.2.3 Auto Calibration

The instrument offers the option of an automatically sequenced calibration. This reduces the number of manual interactions with the instrument. The auto calibration is only suitable for experienced users, because calibration errors can happen due to procedural mistakes.

NOTICE

Not all of the available sensors and gases support auto calibration. If the function is not available, a manual calibration must be performed (see 6.1.1 on Page 28 and 6.1.2 on Page 28).

WARNING

Ambient air can be used to zero the sensor instead of Nitrogen or Synthetic Air if the area is known to be free of the target gas or any gas to which the sensor may be cross-sensitive (as listed on the sensor data sheet). In this case, no cylinder or calibration adapter is needed for the zero calibration.
Dräger recommends performing a second, independent measurement. Some sensors may only be calibrated with Synthetic Air or Nitrogen (see sensor data sheet)

- Select **Settings > Sensor > Autocal. set.** and confirm.
- Select **Enable** or **Disable** and confirm.
- Apply Synthetic Air or Nitrogen.
- Select **Calibration > Auto cal.** and confirm.
  The Maintenance signal is transmitted and the symbol [🔧] is displayed.
- The message **Please wait...** is displayed and the instrument automatically performs the zero calibration.
- After a successful zero calibration, the span calibration is started.

The parameters for the calibration gas are displayed e.g.:

Gas	H2S
Unit	ppm
Conc.	25

Depending on the sensor these parameters can be changed:

- Select **Gas** and confirm.
- Select the calibration gas from the list and confirm.
- Select **Unit** and confirm.
- Select the unit of measurement from the list and confirm.
- Select **Conc.** and confirm.
- Set the concentration of the calibration gas.

If the settings are correct:

- Apply calibration gas.
- Select **Next** and confirm to start the calibration.
- Select **Back to menu** to abort the calibration.

NOTICE

After 10 minutes without confirmation, the instrument reverts to the calibration menu without performing a calibration.

- Once the current value is stable, the instrument automatically performs the span calibration.
- After a successful calibration, the new current value and the message **Value OK?** are displayed.
  If not, select **Redo** and confirm to perform the calibration again.
- If the value is OK, turn off gas flow and remove the calibration adapter from the sensor or disconnect tubing.

If the current value is not within the alarm range:

- Select **Accept value** and confirm to finish the calibration. The instrument returns to the calibration menu.

6.3 Troubleshooting

6.3.1 Fault reference

Fault number	Cause	Remedy
#001 #003 #004 #005 #011 - #014 #020 - #024 #043 #060 #067	Serious instrument fault, various causes.	Have the instrument checked by DrägerService®[1].
#002 #025 - #027 #030 - #034 #041 #042 #044 #050 #052 #081 #085	Serious data error in the instrument, various causes.	Reset the instrument to factory default settings (see Section 7 on Page 34). If this fault occurs again: Have the instrument checked by DrägerService.
#010	4 to 20 mA interface cable not connected.	Disconnect the power supply, connect the 4 to 20 mA interface and reconnect the power supply. If operated as a stand-alone instrument without a central controller, wire pin 3 to pin 4 (see Section 3.5 on Page 9).
#045	Instrument not detecting any sensor.	Check connections. If this fault occurs again: Have the instrument checked by DrägerService.
#051 #054	Faulty zero calibration.	Perform zero calibration (see Section 6.2.1 on Page 29).
#055	Faulty span calibration.	Perform span calibration (see Section 6.2.2 on Page 29).
#076 #080 - #084	Instrument fault.	Check electrical connections. If this fault occurs again: Have the instrument checked by DrägerService.
#090	Sensor lock function is activated. A sensor with a different part number has been connected.	Use a sensor with the same part number or disable the sensor lock function (see Section 5.9.3 on Page 25).
#105	Instrument fault.	Have the instrument checked by DrägerService.
#137	Instrument fault.	Cycle power. If this fault occurs again: Have the instrument checked by DrägerService.

1 DrägerService® is a registered trademark of Dräger.

6.3.2 Warning reference

Warning number	Cause	Remedy
#101	Data-logger in Stack mode is 100 % full and is not logging any more data.	Download the data, clear the data-logger.
#102	Data-logger in Stack mode is 90 % full.	Download the data as soon as possible and clear the data-logger.
#103 #106	Data error in the instrument. Some dongle functions like data-logger, sensor test, etc. may no longer be available.	Reset the instrument to factory default settings (see Section 7 on Page 34). If this error occurs again: Have the instrument checked by DrägerService.
#104	Date or time setting not valid.	Set date and time (see Section 5.7.3 on Page 20).
#107	Battery for data memory empty.	Have the instrument checked by DrägerService.
#110 #111 #112	SW dongle has been removed without being deactivated.	Deactivate SW dongle (see Section 5.10 on Page 27).
#113	Alarms inhibited.	Enable alarms (see Section 5.7.1 on Page 19).
#164 #165	Sensor warm-up phase has not ended. Increased measurement error must be expected.	Wait until the sensor has warmed up. Do not calibrate before sensor is fully warmed-up.
#167 #170	Calibration interval expired.	Recalibrate the instrument (see Section 6.2 on Page 28).

6.4 Replacing the sensor

CAUTION

Always test a newly installed sensor with target gas to verify proper operation

If the sensor is replaced, all settings and parameters must be checked for correctness.

NOTICE

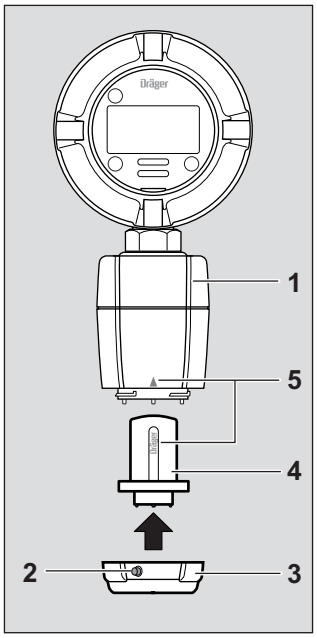
The sensor can be replaced in the hazardous, classified area, without interrupting the power supply.

NOTICE

If a sensor of the same type (same part number) was previously installed, the instrument specific configuration is retained (gas type, measurement range, test gas, calibration interval, etc.)
Otherwise the factory default settings of the new sensor (see Instructions for Use for the sensor) are uploaded and will overwrite the instrument specific configuration.
This can be prohibited if the sensor lock function (see Section 5.9.4 on Page 25) is activated.

To replace the sensor:

- Select **Settings > Sensor > Sensor change** and confirm.
- Loosen set-screw (2) 2 mm Allen screw.
- Unscrew bayonet ring (3).
- Remove sensor from packaging.
- Insert sensor (4) into the opening. The Dräger logo on the sensor must point to the mark on the sensing head housing (5).
- Lock sensor with bayonet ring.
- Tighten set-screw (2). Mandatory for Zone 22 installations.
- If necessary, apply the label included with the sensor to the instrument. This identifies the gas type from a distance, even if the power has failed.



00433243.eps

- Calibrate instrument, if necessary (see Section 6.2 on Page 28).
- Check the installation requirements and instrument for SIL status (see Section 5.6 on Page 18).

6.5 Replacing the main electronics

CAUTION

Always test a newly installed main electronics with target gas to verify proper operation

If the main electronics is replaced, all settings and parameters must be checked for correctness.

To replace the main electronics:

- Turn off power to the instrument or declassify the area according to local regulations.
- Loosen set-screw and unscrew lid from instrument.
- Lift the handle and pull out the bucket with the main electronics.
- Turn bucket over and pull off the power, relay and sensor connectors.
- Replace the main electronics.
- Plug the power, relay and sensor connectors back into appropriate sockets and tighten screws.
- Place bucket back into the enclosure.
- Screw the lid back on until it is seated (see Section 10.8 on Page 42) and tighten set screw.
- Apply power to the instrument.
- Check all settings and parameters.
- Calibrate instrument, if necessary (see Section 6.2 on Page 28).
- Check the installation requirements and instrument for SIL status (see Section 5.6 on Page 18).

7 Factory default settings

7.1 Settings which can be changed via the menu

Menu	Factory Default Setting	Range
Relay active on alarm / No alarm	Active on alarm	On / Off
A1 Alarm	Depending on the sensor	
A2 Alarm	Depending on the sensor	
A1 alarm: direction (falling for DrägerSensor O2)	Rising	Falling / Rising
A2 alarm: direction	Rising	
A1 latch mode	Non-latching	Latching / Non-Latching
A2 latch mode	Latching	
A1 acknowledgement mode	Acknowledgeable	Acknowledgeable / Not acknowledgeable / Pre-acknowledgeable
A2 acknowledgement mode	Not acknowledgeable	
Normal operation A1 relay	Energized	Energized / Not energized
Normal operation A2 relay	Energized	
Hysteresis for A1 alarm at direction rising	0	0 to A1
Hysteresis for A2 alarm at direction rising	0	0 to A2
Calibration password	_ _ _1	
Settings password	_ _ _2	
LCD setting	On	On / Off
SIL status	Off	On / Off
Language	EN	DE / EN / FR / ES / RU / ZH
Fault current	1.2 mA	0 to 3.5 mA
Warning	Off	On / Off
Warning current	3.0 mA	0 to 3.5 mA
Warning cycle time T1	10 sec	5 to 60 sec.
Warning cycle time T2	1 sec	1 to 59 sec.
Maintenance	static	Static / Dynamic
Maintenance current	3.4 mA	0 to 3.5 mA
Analog offset	0 mA	- 0.2 to 1.5 mA
HART address	0	0 to 15
Auto-calibration	Off	On / Off
Calibration interval	Depending on sensor	0 to 720
Function key	Faults	Graph, fault, warning, vitality, bump test

7.2 Fixed settings

Fault	Meaning
Fault relay	Energized / NO
Yellow Fault LED	Lit if a fault message is available (see Section 6.3 on Page 31).
Red Alarm LED	Single blink if A1 condition is present. Double blink if A2 condition is present. If an alarm is configured as acknowledgeable and the alarm is acknowledged, single/double blink changes into continuously lit.
Alarm Hierarchy	A2 overrides A1 on the LED. However, the A1 and A2 relays operate independently. I.e. if A1 is acknowledgeable and A2 is not, and the gas concentration is such that it triggers A1 and A2: acknowledging will cause the A1 relay to release. However, the red LED will still double blink as long as the A2 condition continues to exist.

8 Sensor principle

Dräger electrochemical sensors are measuring the partial pressure of gases under atmospheric conditions. The monitored ambient air diffuses through a membrane into the liquid electrolyte in the sensor. The electrolyte contains a measuring electrode, a counter-electrode and a reference electrode. An electronic potentiostat circuit ensures a constant electrical voltage between measuring electrode and reference electrode. Voltage, electrolyte and electrode material are selected to suit the gas being monitored so that it is transformed electrochemically on the measuring electrode and a current flows through the sensor. This current is proportional to the gas concentration.
At the same time, Oxygen from the ambient air reacts at the counter-electrode electrochemically.
The current flowing through the sensor is amplified electrochemically, digitized and corrected for several parameters (e.g. the ambient temperature).

9 Disposing the instrument

Disposal of electrical and electronic equipment:
EC-wide regulations governing the disposal of electrical and electronic appliances which have been defined in the EC Directive 2002/96/EC and in national laws have been effective since August 2005 and apply to this device.
Common household appliances can be disposed of using special collecting and recycling facilities. However, this device has not been registered for household usage. Therefore it must not be disposed of through these channels. The device can be returned to your national Dräger Sales Organization for disposal. Please do not hesitate to contact Dräger if you have any further questions on this issue.

Disposal of electrochemical sensors:
To be disposed in accordance with the material safety data sheet of the corresponding sensor.

WARNING

Danger of explosions! Do not dispose sensors in fire, risk of chemical burns!

Do not open with force.

Observe the applicable local waste disposal regulations. For information, consult your local environmental agency, local government offices or appropriate waste disposal companies.

10 Technical data

CAUTION

Specifications and restrictions in the Instructions for Use and/or data sheets for the sensors used must be observed. For SIL applications the Dräger Polytron 8X00 Safety Manual must be observed.

The measuring range and performance characteristics are dependent on the installed sensor (see the Instructions for Use and/or data sheet for the installed sensors).

10.1 Approvals

10.1.1 ATEX, IECEx, UL, CSA

See printout of approval label inside the shipping box of the instrument.

10.1.2 DIN EN 50104 for DrägerSensor O_2 (6809720)

Sensor Principle
The DrägerSensor O_2 (6809720) is an electrochemical two-electrode sensor for measuring Oxygen (O_2) in ambient air.

Reaction at electrodes

Measuring electrode	$O_2 + 2\ H_2O + 4\ e^- \Rightarrow 4\ OH^-$
Counter electrode	$2\ Pb \Rightarrow 2\ Pb_2+ + 4\ e^-$

Environmental parameters

Pressure	20.7 to 38.4 in. Hg (700 to1300 hPa)
Humidity	10 to 95 %RH, non-condensing
Temperature	-5 to +40 °C, short term -20 to +55 °C
Storage humidity	30 to 70 %RH, non-condensing
Storage temperature	0 to +40 °C

Response time

$t_{0...20}$	≤ 12 seconds
$t_{0...90}$	≤ 30 seconds

NOTICE

At temperatures below -5 °C, the response time may increase.

Calibration

Flow rate	0.5 L/min
Zero gas	Nitrogen (99.9 Vol% N_2)
Target gas	Oxygen / Nitrogen gas mixture

Warm-up time

Operation	≤ 15 minutes
Calibration	≤ 2 hours

Cross sensitivities for DrägerSensor O_2 (6809720)

Gas / vapor	Chemical symbol	Gas concentration	Measurement value deviation in Vol% O2
acetone	CH_3COCH_3	1 Vol%	≤ 0.1
ethane	C_2H_6	10 Vol%	≤ 0.1
ethanol	C_2H_5OH	1 Vol%	≤ 0.1
ethylene	C_2H_4	5 Vol%	≤ 0.1
ethine	C_2H_2	2 Vol%	≤ 0.1
carbon dioxide	CO_2	5 Vol%	≤ 0.1
carbon monoxide	CO	1 Vol%	≤ 0.1
methane	CH_4	10 Vol%	≤ 0.1
methanol	CH_3OH	1 Vol%	≤ 0.1
propane	C_3H_8	5 Vol%	≤ 0.1
hydrogen	H_2	10 Vol%	≤ 0.1

NOTICE

The table shows the response of the sensor to other gases than the target gas (cross sensitivities). The listed values are typical and are valid for new sensors. The table does not claim to be complete. Gas mixtures can be displayed as the sum of all components.

There are no known cross sensitivities against interfering gases with a concentration up to 100 ppm (see table for concentrations higher than 1 Vol%).

The influence of O_2 displacement is not taken into account (partial pressure measurement).

Increased sensor drift could be caused by high concentrations of acid gases (> 1 Vol%), which might reduce the calibration interval. The sensor service life is reduced depending on the exposure time and the concentration of the acid gases (e.g. lifetime in atmospheres containing CO_2:5000 Vol% CO_2 x hours).

Organic solvents (e.g. acetone, propyl alcohol, etc.) can penetrate into the plastic parts of the sensor. If the sensor is exposed to higher concentrations (> 1 Vol%) over several days, these substances could cause a sensor drift which might reduce the calibration interval. However, these will not reduce the sensor service life.

10.1.3 DIN EN 50104 for DrägerSensor O_2LS (6809630)

Sensor Principle
The DrägerSensor O_2LS (6809630) is an electrochemical three-electrode sensor for measuring Oxygen (O_2) in ambient air.

NOTICE

The sensor cannot be used for Oxygen measurements in the presence of Helium!

Reaction at electrodes

Measuring electrode	$O_2 + 4\ H^+ + 4\ e^- \Rightarrow 2\ H_2O$
Counter electrode	$2\ H_2O \Rightarrow O_2 + 4\ H^+ + 4\ e^-$

Environmental parameters

Pressure	20.7 to 38.4 in. Hg (700 to1300 hPa)
Humidity	5 to 95 %RH, non-condensing
Temperature	-40 to +60 °C, short term up to +65 °C
Storage temperature	0 to +40 °C

Response time

$t_{0...20}$	$\leq$ 12 seconds
$t_{0...90}$	$\leq$ 30 seconds

Calibration

Flow rate	0.5 L/min
Zero gas	Nitrogen (99.9 Vol% N_2)
Target gas	Oxygen / Nitrogen gas mixture

Warm-up time

Operation	$\leq$ 90 minutes
Calibration	$\leq$ 6 hours

Cross sensitivities for DrägerSensor O_2LS (6809630)

Gas / vapor	Chemical symbol	Gas concentration	Measurement value deviation in Vol% with dust filter
acetaldehyde	CH_3CHO	50 ppm	no influence
acrylonitrile	$H_2C=CH–CN$	80 ppm	no influence
ammonia	NH_3	50 ppm	no influence
arseniuretted hydrogen	AsH_3	3 ppm	no influence
butadiene	$CH_2CHCHCH_2$	50 ppm	no influence
tert-butylmercaptane	$(CH_3)_3CSH$	4 ppm	no influence
chlorine	Cl_2	8 ppm	no influence
hydrogen chloride	HCl	20 ppm	no influence
hydrocyanic acid	HCN	20 ppm	no influence
boroethane	B_2H_6	5 ppm	no influence
1.1-dichloroethane	$C_2H_4Cl_2$	50 ppm	no influence
diethylamine	$(C_2H_5)_2NH$	100 ppm	no influence
diethyl ether	$(C_2H_5)_2O$	400 ppm	≤ 0.1 (–) *
epichlorhydrine	$C_2H_3OCH_2Cl$	35 ppm	no influence
ethanol	C_2H_5OH	250 ppm	no influence
ethylene	C_2H_4	2 Vol%	≤ 1 (–) *
ethine	C_2H_2	1 Vol%	≤ 0.5 (–) *
ethylene oxide	C_2H_4O	20 ppm	≤ 2 (–) *
hydrogen fluoride	HF	15 ppm	no influence
formaldehyde	HCHO	40 ppm	no influence
carbon dioxide	CO_2	5 Vol%	no influence
carbon monoxide	CO	100 ppm	≤ 0.1 (–) *
methyl methacrylate	$CH_2C(CH_3)COOCH_3$	50 ppm	no influence
methylamine	CH_3NH_2	100 ppm	no influence
carbonyl chloride	$COCl_2$	1 ppm	no influence
phosphine	PH_3	10 ppm	no influence
i-propyl alcohol	$(CH_3)_2CHOH$	500 ppm	no influence
propylene	CH_3CHCH_2	50 ppm	≤ 0.2 (–) *
sulphur dioxide	SO_2	20 ppm	no influence
hydrogen sulfide	H_2S	20 ppm	no influence
hydrogen selenide	SeH_2	5 ppm	no influence
hydrosilicon	SiH_4	5 ppm	no influence
nitrogen dioxide	NO_2	50 ppm	no influence
nitrogen monoxide	NO	20 ppm	no influence
styrene	$C_6H_5CHCH_2$	30 ppm	no influence
tetrahydrofurane	C_4H_8O	60 ppm	no influence
tetrahydrothiophene	C_4H_8S	5 ppm	no influence
vinyl chloride	C_2H_3Cl	50 ppm	no influence
hydrogen	H_2	1 Vol%	≤ 1.5 (–) *
hydrogen peroxide	H_2O_2	5 ppm	no influence

(–) * Negative display

NOTICE

The table shows the response of the sensor to other gases than the target gas (cross sensitivities). The listed values are typical and are valid for new sensors. The table does not claim to be complete. Gas mixtures can be displayed as the sum of all components.
Gases with a negative cross sensitivity can cancel out a positive sensor signal. The influence of the O_2 displacement is not taken into account (partial pressure measurement).
Example:
2 Vol% ethylene in the air - cross sensitivity (table value) = -1 Vol% O_2.
O_2 displacement caused by 2 Vol% ethylene (2% of 20 Vol% O_2) = -0.4 Vol% O_2
Instrument display (20.9 - 1 - 0.4) = 19.5 Vol% O_2.

CAUTION

The exposure to higher concentrations of unsaturated hydrocarbons, alcohols or hydrogen over an extended period of time (dose approx. 100,000 ppm x hours) could cause the sensor to fail.

10.2 Marking

The marking is reproduced on a separate piece of paper shipped with the instrument.

Serial Number key: The third letter of the serial number specifies the manufacturing year: A = 2009, B = 2010, C = 2011, D = 2012, E = 2013, F = 2014, H = 2015, J = 2016, K = 2017, etc.

Example: Serial Number ARCB-0103: the third letter is C, which means that the unit was manufactured in 2011.

10.3 Signal transmission to central controller

NOTICE

Frequency of measurement calculation: 1 x per second (update of display, analog interface and relays).

10.3.1 Analog signal

Description	Analog output
Normal operation	4 to 20 mA
Drift below zero	3.8 to 4 mA
Measuring range exceeded	20 to 20.5 mA
Instrument fault	≤ 1.2 mA
Fault on analog interface	> 21 mA
Maintenance signal	3.4 mA steady signal or 1 Hz modulation between 3 and 5 mA (selectable)

10.3.2 HART digital communication

10.4 Power supply and relays

Operating voltage	10 to 30 VDC at the instrument
Cable specification	3-core shielded cable
Inrush current	2.3 A for 2 ms at 24 VDC, 10 Ω resistor
Operating current (max.)	80 mA at 24 VDC, without relay, non-remote sensor 100 mA at 24 VDC, with relay, remote sensor
Relay rating (option)	SPDT, 0.1 A - 5 A at 230 VAC, 0.1 A - 5 A at 30 VDC, resistive load. For safety-related applications (SIL 2), the maximum contact rating is reduced (see Dräger Polytron 8X00 Safety Manual).

10.5 Physical specifications

Enclosure material	copper free aluminum or 316 stainless steel	
Enclosure protection	NEMA 4X and IP 65/66/67	
Display	Resolution 128 x 64 pixel, back-lit	
Size (LxWxD, approx.)		
	Without Docking Station 7.1” x 5.8” x 5.1” (180 x 150 x 130 mm)	
	With Docking Station 7.3” x 7.1” x 7.4” (185 x 180 x 190 mm)	
Weight (approx.)		
	Without Docking Station	
	aluminum	4.9 lbs. (2.2 kg)
	stainless steel 316	8.8 lbs. (4.0 kg)
	With Docking Station	
	aluminum	7.7 lbs. (3.5 kg)
	stainless steel 316	11.9 lbs (5.4 kg)

10.6 Environmental parameters

Pressure	20.7 to 38.4 in. Hg (700 to 1300 hPa)
Humidity	0 to 100 %RH, non-condensing
Temperature	-40 to +149 °F (-40 to +65 °C)
Storage temperature	-4 to +149 °F (-20 to +65 °C)
See sensor data sheet for sensor specifications.	

10.7 Environmental influences

For influences on the measurement performance and restrictions of a particular sensor see sensor data sheet.

10.8 Tightening torque for instrument threads

The values are valid for aluminum and stainless steel 316 versions.

Part	Torque Lb. In.	Torque Nm
Enclosure lid	min. 44,3	min. 5
Sensor	min. 266	min. 30
Blind plug	min. 266	min. 30
Feed-through Conduit hub	min. 443	min. 50
Instrument to Docking Station (4 screws)	71	8

10.9 Tightening torque and size for field wiring terminals

Terminal	Torque Lb. In.	Wire size AWG	Wire size mm^2
Power supply and signal	4.4 - 7.0 (0.5 - 0.8 Nm)	24 - 12	0.2 - 2.5
Relay	4.4 - 7.0 (0.5 - 0.8 Nm)	20 - 12	0.5 - 2.5

11 Declaration of Conformity

EG-Konformitätserklärung
EC-Declaration of Conformity

Dokument Nr. / *Document No.* SE23109-04

Wir / *we* Dräger Safety AG & Co. KGaA, Revalstraße 1, 23560 Lübeck, Germany (bis / until 2017-06-30)
Drägerwerk AG & Co. KGaA, Revalstraße 1, 23560 Lübeck Germany (ab / from 2017-07-01)

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product

Gasmess- Transmitter Typ E/I/XTR 04/5 (Polytron 8**0)**
*Gas Detection Instrument type E/I/XTR 04/5** (Polytron 8**0)*

mit der EG-Baumusterprüfbescheinigung / Expertise
is in conformity with the EC-Type Examination Certificate / Expertise

BVS 13 ATEX G 001 X [3) 4)]
PTB 11 ATEX 1005 X
GL 61549-13 HH, 61550-13 HH [3)]

ausgestellt von der benannten Stelle mit der Kenn-Nr. *issued by the Notified Body with Identification No.*	**DEKRA EXAM GmbH** **Dinnendahlstraße 9** **D-44809 Bochum** **0158**	**PTB** **Bundesallee 100** **D-38116 Braunschweig** **0102**	**Germanischer Lloyd** **Brooktorkai 18** **D-20457 Hamburg** **0098**

und mit den folgenden Richtlinien unter Anwendung der aufgeführten Normen übereinstimmt
and is in compliance with the following directives by application of the listed standards

Bestimmungen der Richtlinie *provisions of directive*		**Nummer sowie Ausgabedatum der Norm** *Number and date of issue of standard*
94/9/EG*(EC)* [1)] **2014/34/EU** [2)]	**ATEX-Richtlinie** *ATEX Directive*	EN 60079-0:2012, EN 60079-1:2007, EN 60079-7:2007, EN 60079-11:2012, EN 60079-31:2009, EN 60079-29-1:2007 [3)], EN 50104:2010 [4)], EN 50271:2010 [3) 4)]
96/98/EG*(EC)* **2014/93/EU**	**Schiffsausrüstungs-Richtlinie** *Marine Equipment Directive*	IMO MSC.1/Circ.1370, EN 60079-29-1:2007, IEC 60092-504:2001+Cor:2011, IEC 60533:1999, EN/IEC 60945:2002+Cor:2008, EN 60079-0:2009
2004/108/EG*(EC)* [1)] **2014/30/EU** [2)]	**EMV-Richtlinie** *EMC Directive*	EN 50270:2006 (type 2), EN 61000-6-3:2007+A1:2011+AC:2012
2006/95/EG*(EC)* [1)] **2014/35/EU** [2)]	**Niederspannungs-Richtlinie** *Low Voltage Directive*	EN 61010-1:2010

[1)] gültig bis / valid to 2016-04-19, [2)] gültig ab / valid from 2016-04-20,
[3)] nur für ITR 0*1*, ITR 0*2*, XTR 0*0* und XTR 0*1* / only applicable for ITR 0*1*, ITR 0*2*, XTR 0*0* und XTR 0*1*
[4)] nur für ETR 040*, ETR 050*, Sauerstoff / only applicable for ETR 040*, ETR 050*, oxygen
[4)] gilt nicht für Remote installierten EC-Sensing Head / not applicable for remote installed EC-Sensing Head.

Überwachung der Qualitäts-sicherung Produktion durch *Surveillance of Quality Assurance Production by*	**DEKRA EXAM GmbH** **Dinnendahlstraße 9** **D-44809 Bochum** **0158**	**Germanischer Lloyd** **Brooktorkai 18** **D-20457 Hamburg** **0098**

Lübeck, 2015-09-03

Ort und Datum (jjjj-mm-tt)
Place and date (yyyy-mm-dd)

Ingo Pooch
Leiter
Forschung & Entwicklung
Gasmess-Geräte

Ingo Pooch
Manager
Research & Development
Gas Detection Instruments

12 Control Drawing