



Dräger Polytron 5200/53X0

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 equipment, 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 equipment only for the purposes and under the conditions specified in this document.
- Comply with all local and national laws, rules and regulations associated with this equipment.
- Only trained and competent personnel are permitted to inspect, repair and service 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.
- Use only genuine Dräger spare parts and accessories, otherwise the proper functioning of the equipment 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 reworked by the user.
- Do not dispose of the Instructions for Use. Ensure that they are retained and appropriately used by the equipment user.
- The measuring function of the gas detection transmitter for explosion protection, according to Annex II, clauses 1.5.5, 1.5.6 and 1.5.7 of Directive 94/9/EC is currently not covered.
- Substitution of components may impair Intrinsic Safety. Only if intrinsic safety is involved.

Safe connection of electrical devices

- Never connect this instrument to other electrical devices before consulting 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 Definition of alert icons

To reduce the risk of ignition of a flammable or explosive atmosphere, strictly adhere to the following Caution and Warning statements.

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

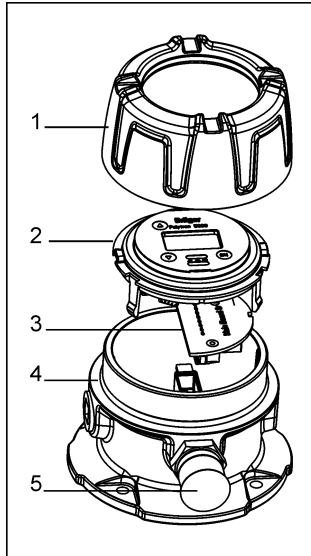
Indicates additional information on how to use the instrument.

2 Description

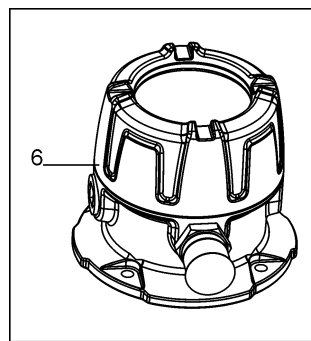
2.1 Product overview

2.1.1 Explosion proof instrument

- 1 Enclosure lid
- 2 Bezel with main electronics
- 3 Relay board (optional)
- 4 Enclosure bottom
- 5 Sensor
- 6 Assembled instrument



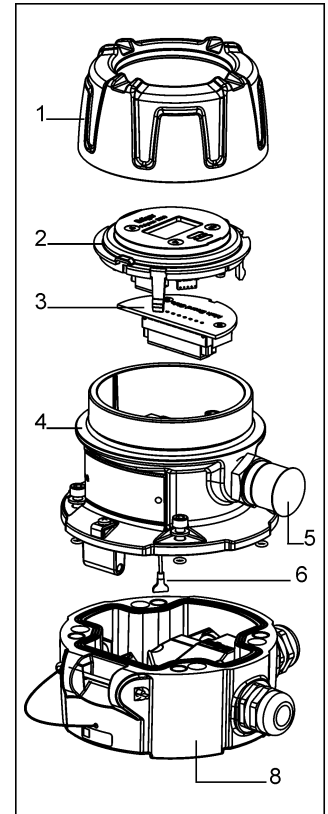
4544256a



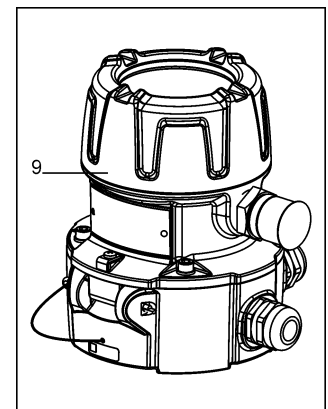
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2.1.2 Explosion proof instrument with increased safety wiring compartment (e-box)

- 1 Enclosure lid
- 2 Bezel with main electronics
- 3 Relay board (optional)
- 4 Enclosure bottom
- 5 Sensor
- 6 Feed-through
- 7 Field wire terminals (not shown)
- 8 e-box
- 9 Assembled instrument



4544256c



4544256d

2.2 Intended use

The Dräger Polytron 5000 is an explosion-proof instrument for the continuous monitoring of combustible gases and vapors containing hydrocarbons. 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 instrument. The instrument is designed to be installed in permanent locations and is approved for use in hazardous, classified areas, see Section 8.1 on Page 24.

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

Dräger Polytron 5200 with DrägerSensor®³⁾ Ex DD

Catalytic bead sensor for monitoring of combustible gases and vapors containing hydrocarbons.

- Measuring range: 0 to 100 %LEL²⁾

Dräger Polytron 5200 with DrägerSensor® Ex LC

Catalytic bead sensor for monitoring of combustible gases and vapors containing hydrocarbons.

- Measuring range: 0 to 10 %LEL²⁾

Dräger Polytron 5310 with DrägerSensor® IR

IR sensor for monitoring of combustible gases and vapors containing hydrocarbons.

- Measuring range: 0 to 100 %LEL²⁾

Dräger Polytron 5300 with Dräger PIR 3000¹⁾

IR sensor for monitoring of combustible gases and vapors containing hydrocarbons.

- Measuring range: 0 to 100 %LEL²⁾

1) not yet available

2) Lower Explosion Limit, depending on the substance and the regulations applicable at the respective location.

3) DrägerSensor® is a registered trademark from Dräger

2.3 Intended operating area and operating 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&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. Gas concentrations, status messages, and menu choices are displayed on a 4 digit LCD display and 3 colored LEDs. The measured gas concentration is converted to a 4 to 20 mA analog output signal. The instrument detects whether it is operating in current source versus sink mode when power is applied.

Navigation through the menu is done by tapping a magnetic wand on the glass at the Up and Down arrows or **OK**.

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



WARNING

Explosive. Not to be used in oxygen enriched atmospheres. None of the Polytron 5000 instruments are certified and approved to be operated in oxygen enriched atmospheres.

3 Operation

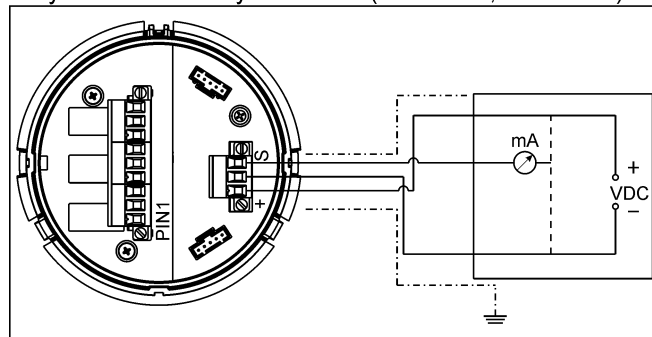
3.1 Installation

To ensure overall system performance and effectiveness, the selection of an installation site for the instrument is the most important factor. Considerable thought must be given to every detail of installation, particularly:

- the local, state, federal codes and requirements 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 (e.g. Hawke A501/421/A/3/4" NPT or equivalent) see Section 8.1 on Page 24. 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 3/4" NPT openings, which can be used for field wiring, direct attachment of a sensor or wiring of a remote sensor. For correct tightening torques of conduit hubs, plugs and sensor see Section 8.5 on Page 24.
- 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 7-12 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 5-7 mm.

- Connect the wires as indicated in wiring figure in section 3.2.2 (also showing grounding conductor terminal).

Polytron 5200 / Polytron 5300 (XTR 02**, XTR 03**)



4544256e

3.1.1 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 8.8 on Page 25. The use of a reflecting shield is recommended.

The enclosure is weatherproof and suitable for outdoor installation. The use of the optional splash guard 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 8 on Page 24.



NOTICE

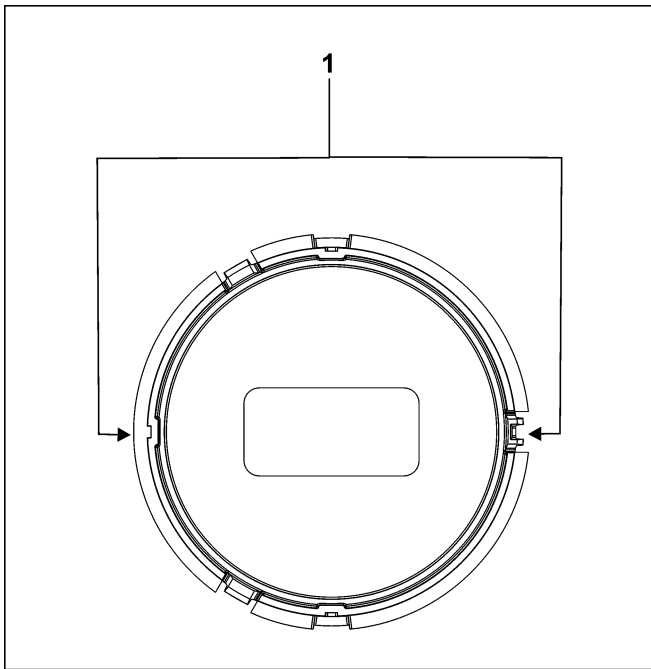
The instrument may be equipped with a dust plug at the conduit entry. This plug is not explosion-proof nor meant to be watertight, and must be removed before connecting the instrument to a sealed conduit.

3.2 Electrical installation without e-box

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

3.2.1 Power and signal wiring

- Loosen set-screw and unscrew lid from instrument.
- 1. Pull out the bezel, by grasping the notches on either side of the display with your fingers and pull it up.



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- Turn bezel over and pull off the 3-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 8.6 on Page 24.

- If operated as a stand-alone instrument, wire pin 1 to pin 3.
- Plug connector back into socket.
- The cable shielding should only be connected at the controller.
- Place bezel back into the enclosure.
- Screw the lid back on, until it is seated (correct torque) see Section 8.5 on Page 24, and tighten set-screw.

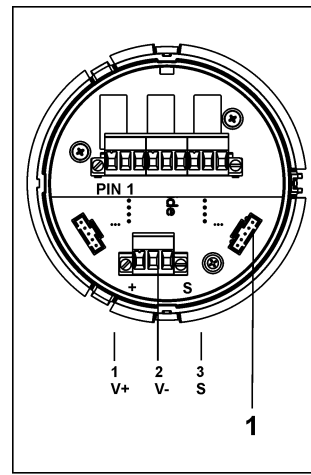
3 Pin Connector (Power and Signal)			
Pin	1	2	3
Mark	+	none	S
Function	V +	V -	4-20 mA signal

3.2.2 Relay option

If the relay option has been installed, the wires for the alarm devices will be connected to the 9-pin connector.

- Turn bezel over and pull off the 9-pin connector.
- Connect the wires for alarm 1, alarm 2 and fault to the terminals, as indicated in the following wiring table.
- 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 5 on Page 22.
- Plug connector back into socket.

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.



4544259g

1 Connector for DrägerSensor DD, LC, and DSIR

9 Pin Connector (Relays)									
	Fault Relay			A2 Relay			A1 Relay		
Pin	1	2	3	4	5	6	7	8	9
Mark	NO	C	NC	NO	C	NC	NO	C	NC

3.2.3 Remote sensor

The remote junction box (part number 4544098 for stainless steel or 4544099 for aluminum) allows sensor installation at a location away from the instrument electronics. This remote installation permits easy setup when the sensor must be located in a difficult to reach or awkward position, see Polytron 5000 Junction Box Instructions for Use 4544286 for more details.

3.3 Electrical installation with e-box

Installing this configuration is a two step process.

First, the e-box is mounted and connected to the field wires. Second, the main instrument enclosure with the electronics and sensor is attached to the e-box.

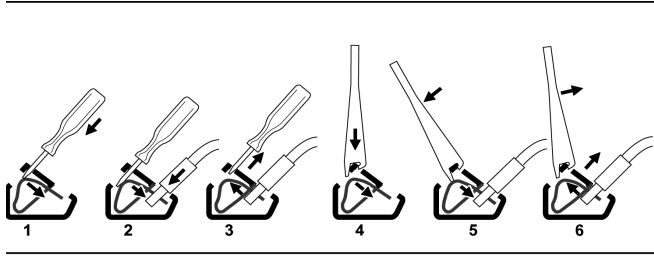
The e-box can be pre-mounted, wired and sealed with the supplied cover. Once the site is ready for commissioning, the instrument is then hooked up to the e-box and taken into operation; avoiding that the instrument is damaged during the construction phase.

The connection between the e-box and the main instrument is realized via a 'feed-through'. Depending on the instrument selected, there are 3 types of feed-through.

- 3 wire for power (part number 4544182)
- 9 wire for power and relay (part number 4544169)
- 14 wire for power, relay and remote sensor (part number 4544168)

In some e-boxes, the field wires are terminated in spring clamp terminals.

Screw driver or special tool



1. Insert screw driver (width 3 mm) into the spring clamp terminal.
2. Press spring down to open the clamp in the lower part. Insert stripped cable end or ferrule (for stranded wires) into the lower part.
3. Remove screw driver. The electrical connection is ensured via the constant pressure of the spring.

or

1. Insert special tool (part number 8318376) into the spring clamp terminal.
2. Press spring down to open the clamp in the lower part. Insert stripped cable end or ferrule (for stranded wires) into the lower part.
3. Remove special tool. The electrical connection is ensured via the constant pressure of the spring.



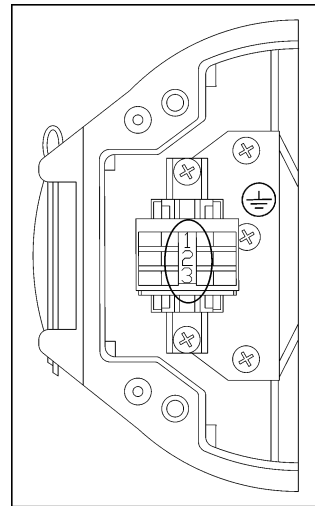
WARNING

Bare cables must not stick out of the spring terminals. The method of explosion protection during maintenance is based on the condition that it is not possible to contact bare cable parts by a probe of 2.5 mm diameter (definition of IP 30).

3.3.1 Field wiring

Connect all applicable field wires to the respective terminals.

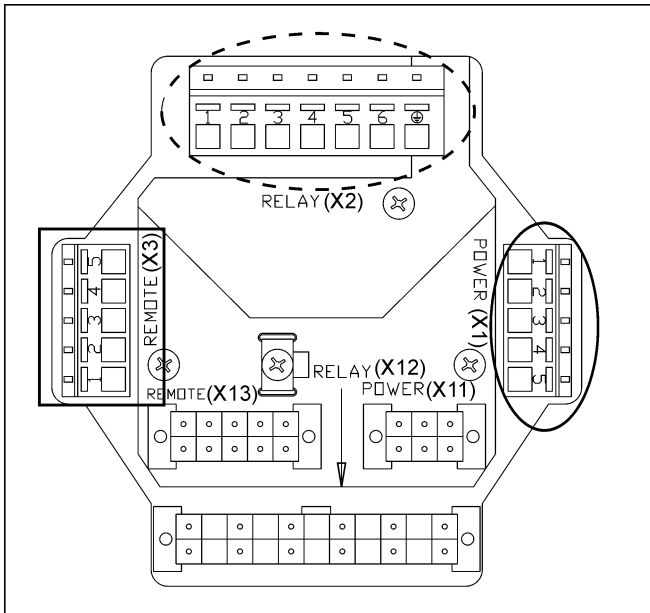
3.3.2 Field wiring: power only version



4544256i

Solid Oval (Power Only)		
Terminal 1 (top)	Terminal 2	Terminal 3
V +	V -	4 to 20 mA Signal

3.3.3 Field wiring: power and relay, or power, relay and remote sensor version



Solid Oval (Power) X1				
Terminal 1 (top)	Terminal 2	Terminal 3	Terminal 4	Terminal 5
V +	V -	V -	4 to 20 mA Signal	Ground

Dashed Oval (Relay) X2						
Terminal						
1 (left)	2	3	4	5	6	7
Fault	Fault	Alarm 2	Alarm 2	Alarm 1	Alarm 1	Ground

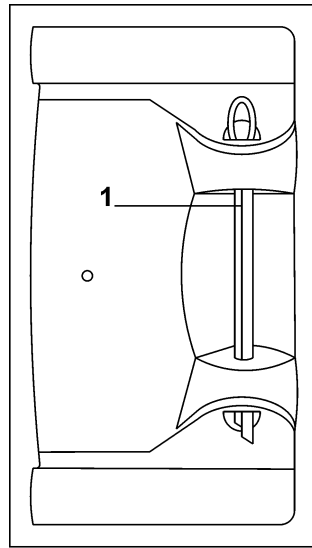
Solid Rectangle (Remote) X3	Sensor Wire Color				
	S1	S2	S3	S4	S5
Sensing Head Polytron SE Ex PR M1 DD 6812711 Sensing Head Polytron SE Ex PR M2 DD 6812710 Sensing Head Polytron SE Ex PR M3 DD 6812718 Sensing Head Polytron SE Ex HT M DD 6812720	Black	Wire S2 to S1	Yellow	Wire S4 to S5	Brown
Sensing Head Polytron SE Ex LC M1 DD 6812722 Sensing Head Polytron SE Ex LC M2 DD 6812721 Sensing Head Polytron SE Ex LC M3 DD 6812719	Black	Wire S2 to S1	Yellow	Wire S4 to S5	Brown
Sensing Head DrägerSensor IR complete Set e 6811165 Sensing Head DrägerSensor IR complete Set e 6811265	Black	Wire S2 to S1	Yellow	Wire S4 to S5	Brown
Sensing Head Dräger PIR 3000 complete Set e 6811160 ¹ Sensing Head Dräger PIR 3000 complete Set e 6811270 ¹	----	----	Brown	Black	Red

1) not yet available

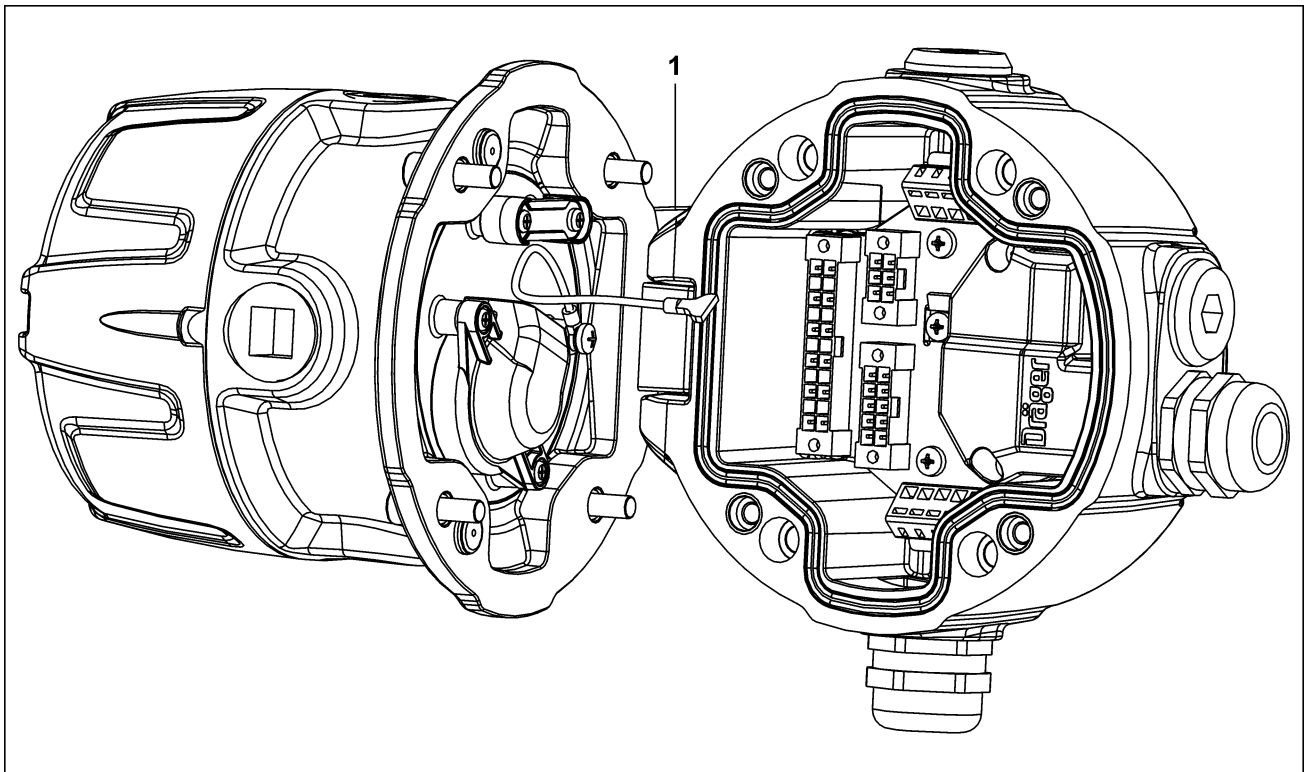
3.3.4 Attaching main instrument to e-box

To attach the main instrument to the e-box, pull the hinge pin out of the e-box. Align the boss of the instrument with the boss of the e-box and push the hinge pin back in. The instrument is now supported and can swivel freely to give access to the wiring.

1 Hinge pin



4544256k

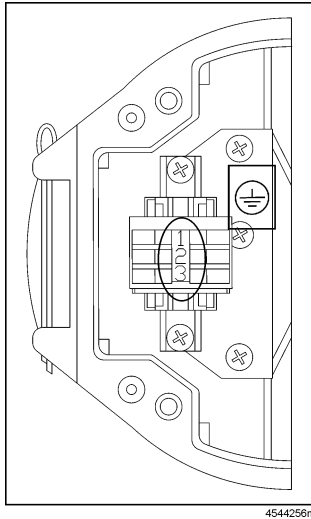


4544256l

3.3.5 Instrument wiring

3.3.6 Instrument wiring: power only version

Connect the instrument wires from the feed-through to the respective terminal in the e-box.



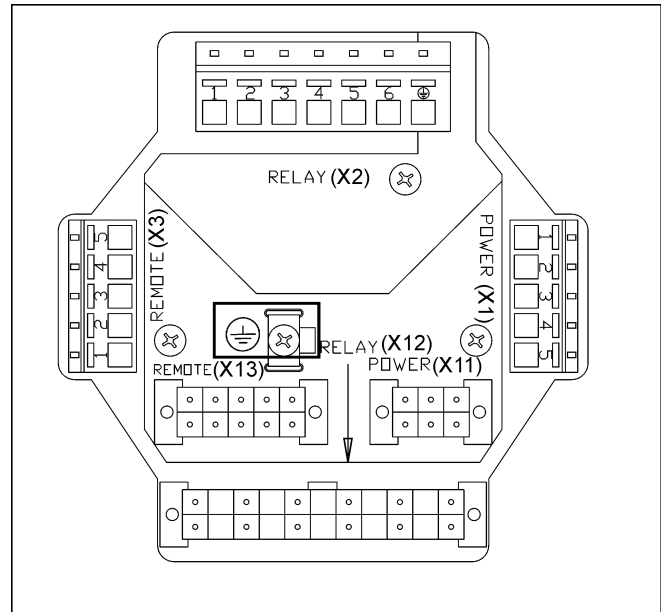
4544256m

Solid Oval (Power Only)		
Terminal 1 (top)	Terminal 2	Terminal 3
V +	V -	4 to 20 mA Signal
Red	Black	Brown

Rectangle (Ground Lug Connection)
Connect ground wire from d-box to ground lug connection

3.3.7 Instrument wiring: power and relay, or power, relay and remote sensor version

Plug the connectors of the feed-through into the sockets of the e-box interface PCB (X11, X12, X13).



4544256t

Rectangle (Ground Lug Connection)
Connect ground wire from d-box to ground lug connection

If a relay option is used, and the default configuration for NO and NC does not fit for the application, the wiring must be changed at the relay board, see Section 5 on Page 22.

- To rewire the Alarm 1 relay, move the **gray** wire from A1-NO to A1-NC.
- To rewire the Alarm 2 relay, move the **blue** wire from A2-NO to A2-NC.
- To rewire the Fault relay, move the **violet** wire from FLT-NO to FLT-NC.
- The wires to A1-C, A2-C and FLT-C should not be moved.

After all connections are made, swing instrument onto e-box (ensuring that no wires are pinched and the seal is not compromised) and tighten all four screws with correct torque see Section 8.5 on Page 24

3.4 Connecting the instrument to a controller from Dräger

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

3.4.1 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.)

3.5 Normal operation



NOTICE

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



and the instrument emits the maintenance signal on the analog output see Section 4.2 on Page 20. After the warm-up period, the instrument goes into normal operation.

Pressing the Down arrow during the warm-up period will display the current sensor selection for example SNR dd.

Pressing the Up arrow will exit the function.

Changing the sensor selection during warm-up will cause



Cycling the power will initialize the instrument to accept the change. All configurations must be checked, and the instrument must be calibrated.

3.5.1 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.

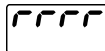
Polytron 5000 uses different current values to indicate various modes of operation, see Section 8.3 on Page 24. This follows the NAMUR NE43 standard.

3.5.2 The display and LEDs

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

The following special symbols may also be displayed:

- when the measuring range of the sensor has been exceeded



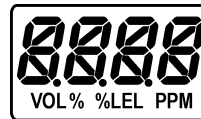
- for the DD and LC sensor an overrange has to be acknowledged with **OK**.
- when a fault has been detected the display toggles between 'Err' and a number and the yellow LED is lit, see Section 4.2 on Page 20

If the optional relay board is installed:

- when the first alarm has been triggered the red LED blinks in single mode
- when the second alarm has been triggered the red LED blinks in double mode

If an alarm is acknowledgeable, and it is acknowledged, the blinking of the red LED changes to steady lit and remains lit until the alarm condition is not present any more, see Section 3.7.10 on Page 17.

The segments of the display and LED symbols.



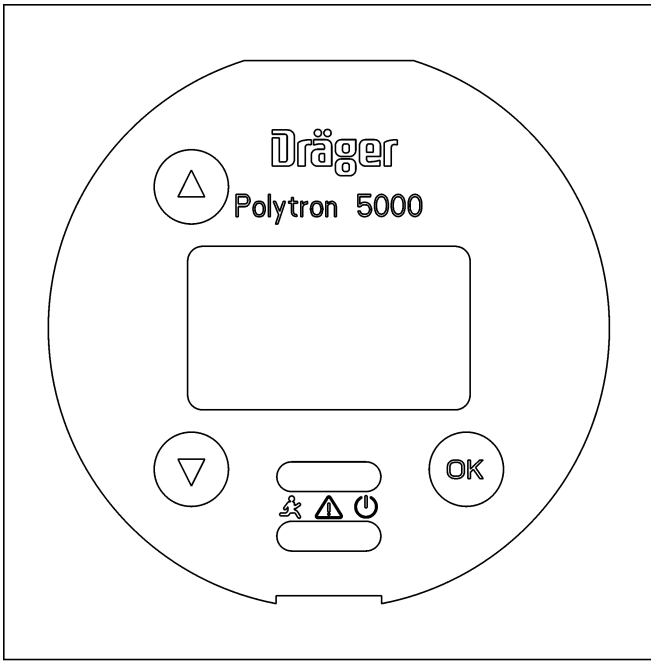
Symbol	LED	Description
	Red	Alarm Triggered
	Yellow	Fault / Warning
	Green	Power ON Normal Operation

3.6 Menu navigation

Tapping the magnetic wand (part number, 4544101, blue body) over the Up and Down arrows scrolls through the menu selections.

When the last menu item is reached, the menu will bottom-out, and the Up arrow has to be used to scroll back up through the menu.

The active menu item as well as its current value or status will flash on the display as it scrolls.



- Tap **OK** when the full password is displayed.

If the displayed value matches the set password, access will be given to the rest of the menu. If an incorrect password is entered, the instrument will return to the measurement mode, see Section 3.7 on Page 15.

3.6.2 Changing parameter values / status

Select the menu item to be accessed using the Up and Down arrows.

- When the desired menu item is displayed, tap **OK** with the magnetic wand.
- The current value or status will flash.
- The Up and Down arrows allow adjusting the value of a numerical parameter or scrolling through preset choices.
- Once the display shows the desired value or choice, tap **OK** to validate the new parameter. This returns to the main menu, where another menu item can be selected.

3.6.3 Exiting the menu

To get back into the measurement mode, tap Up until the menu is exited. The actual gas concentration will be displayed.



NOTICE

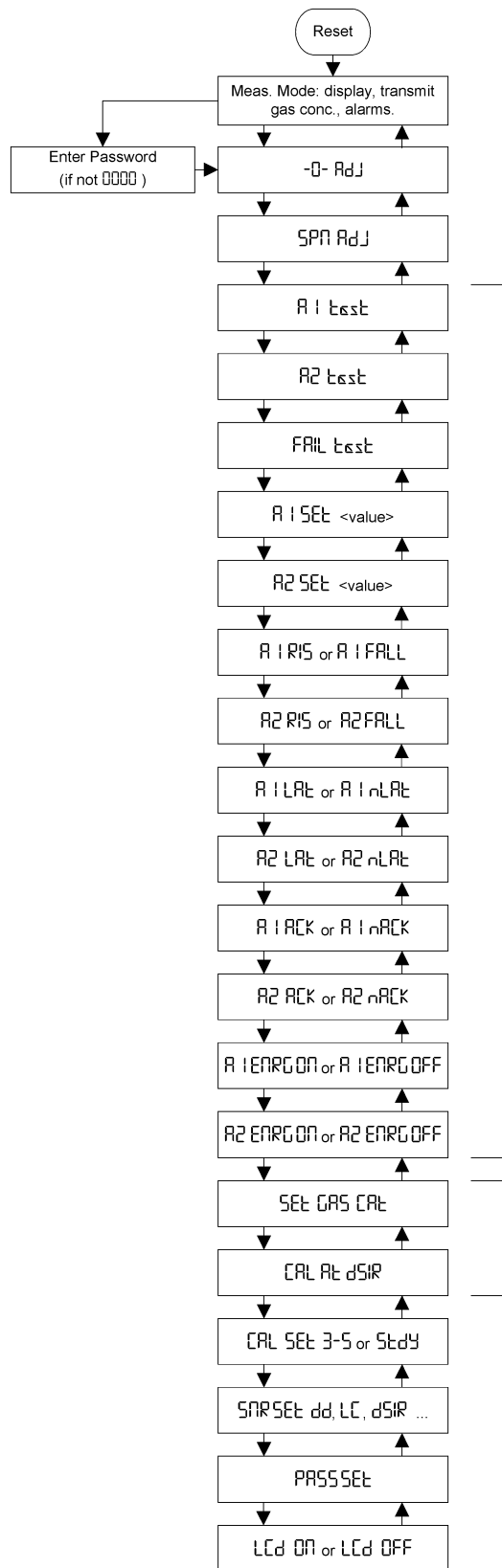
The instrument is designed for the magnetic wand to be used with the enclosure lid in place. If the enclosure lid is not in place, the magnetic wand may activate two or more buttons at once (cross-talk).

3.6.1 Password

The use of a password is optional on the Polytron 5000. A password consists of a 4-digit number from 0000 to 9999; a value of 0000 disables password protection and allows anyone to access the menu.

- If the password is enabled, from measurement mode, tap the Down arrow.
- The 4-digit LCD will then show '0000', with the first zero on the left blinking.
- Use the Up and Down arrows to increment or decrement this digit, then tap **OK**.
- The second digit will blink; set the correct value using the Up and Down arrows.
- Repeat the process for the other two digits.

3.7 Menu

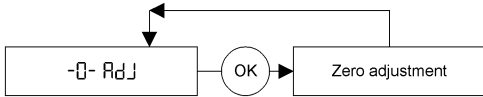


- 1 Only for relay version
- 2 Only for DSIR

4544258q

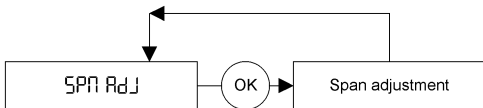
3.7.1 -0- adj

Allows adjusting the zero reference point of the sensor, see Section 4.1.1 on Page 19



3.7.2 Spn adj

Allows adjusting the sensitivity to match the known concentration of an applied calibration gas, see Section 4.1.2 on Page 19.



NOTICE

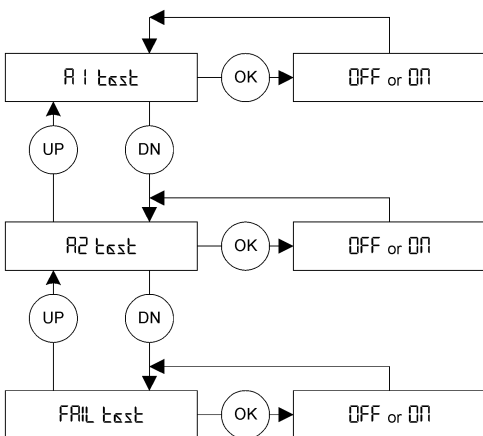
Sections 3.7.3 Relay test to 3.7.14 A2 energized are only for users who have installed the relay option. All other users continue with section 3.7.17. Cal set.

3.7.3 A1 test / A2 test / Fail test

With these functions the status of the relays and LED can be changed for test purposes (e.g. to check the function of alarm devices connected to the relays). After exiting this function, the status of the relays, if changed, will automatically return to their original status.

NOTICE

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

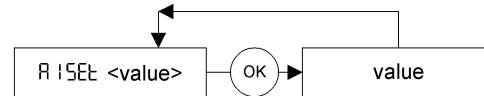


3.7.4 A1 set

Configuring the low level alarm set point.

Leaving the magnet on the arrow will be interpreted as multiple tapping.

An alarm set point of zero disables the alarm.

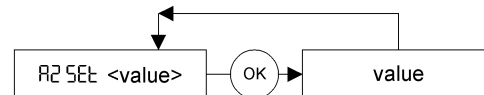


3.7.5 A2 set

Configuring the high level alarm set point.

Leaving the magnet on the arrow will be interpreted as multiple tapping.

An alarm set point of zero disables the alarm.



Alarm hierarchy:

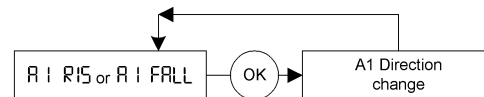
A2 overrides A1 on the LED and display. However, the A1 and A2 relays operate independently, i.e. if A1 is acknowledgeable, A2 is not~, and the gas concentration is such that it triggers A2: Acknowledging will cause the A1 relay to release. However, the red LED will still double blink as long as the A2 condition continues to exist.

Alarm hysteresis:

In order to avoid chatter at an alarm threshold, a fixed hysteresis of 5% of full scale is programmed.

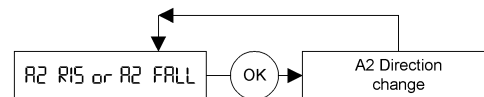
3.7.6 A1 ris or A1 fall

Configuring whether the alarm should be triggered by a rising or falling gas concentration.



3.7.7 A2 ris or A2 fall

Configuring whether the alarm should be triggered by a rising or falling gas concentration.

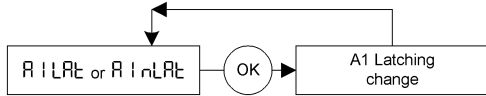


3.7.8 A1 lat

Configuring the A1 alarm level to status latching or non-latching.

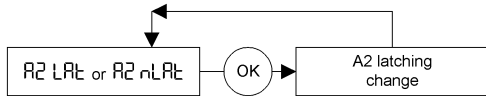
Latching means that once the alarm level is reached, the instrument will trigger the alarm. It will remain in alarm status even if the gas concentration subsequently does not meet the alarm condition any more. To clear a latching alarm it has to be acknowledged with **OK**.

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



3.7.9 A2 lat

Configuring the high level A2 alarm status to latching or non-latching.

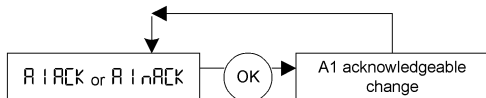


3.7.10 A1 ack

Configuring the A1 alarm as acknowledgeable or non-acknowledgeable.

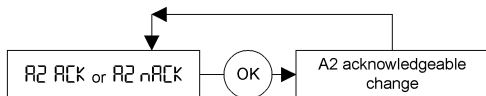
Acknowledgeable means that the alarm relay can be reset before alarm conditions clear.

Non-acknowledgeable means that the alarm relay can not be reset until the alarm conditions clear.



3.7.11 A2 ack

Configuring the A2 alarm as Acknowledgeable or Non-acknowledgeable.



3.7.12 Explanation of combining latching and acknowledgment of alarms

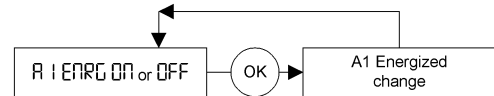
Since the concepts of latching status and acknowledgment can be confusing, the following four combinations are offered for clarification:

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.
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.

3.7.13 A1 energ on or off

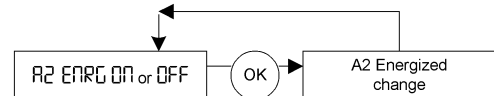
Configuring the A1 alarm relay as energized.

Energized ON means that the alarm relay will change the status in alarm condition or power off (fail safe).



3.7.14 A2 energ on or off

Configuring the A2 alarm relay as energized.

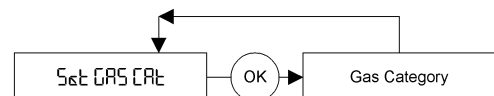


The fault relay is always energized ON (fail safe).

3.7.15 Set gas cat

Only for DSIR. Allows selecting the gas category.

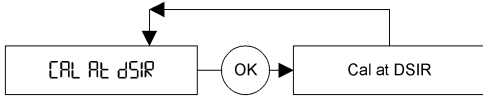
The actual selection is made at the DSIR. While in this menu, the Polytron 5000 will display gas category as it is output from the DSIR. See Instructions for Use for DrägerSensor IR.



3.7.16 Cal at dSIR

Only for DSIR. Allows the user to calibrate directly at the DSIR.

The actual calibration is done at the DSIR. This is recommended for the first time the DSIR is connected to the Polytron 5000. While in the menu, the Polytron 5000 acts as a display device for the DSIR. The Up and Down arrows have no effect on the reading while in this menu. See Instructions for Use Dräger-Sensor.

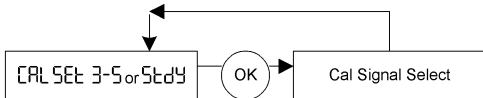


3.7.17 Cal set 3-5 or stdy

Configuring the maintenance signal

The maintenance signal is transmitted on the 4 to 20 mA analog output anytime the menu is accessed. It is user-selectable between:

- a steady 3.4 mA output signal
- an oscillating 3 to 5 mA signal with a frequency of 1 Hz



3.7.18 SNR set dd LC dSIR

Configuring the sensor to be used

Polytron 5000 can use one of the following sensors:

1. DrägerSensor DD
catalytic bead sensor for 0 to 100 %LEL monitoring
2. DrägerSensor LC
catalytic bead sensor for 0 to 10 %LEL monitoring
3. DrägerSensor IR
infrared sensor for 0 to 100 %LEL monitoring

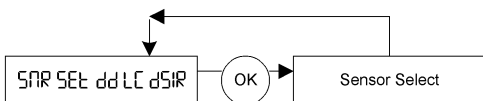


CAUTION

The sensor used with Polytron 5000 has to be selected in this menu item for proper linearization of the sensor signal.

After changing the selected sensor, the instrument will re-start.

When exchanging a sensor for a different type, the instrument must be calibrated.



3.7.19 Pass set

Configuring the password

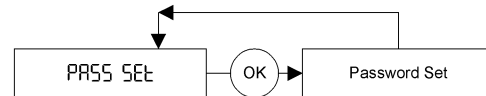
Only numbers 0 to 9 are allowed for the password.

The use of a password is optional on the Polytron 5000.

A password consists of a 4-digit number from 0000 to 9999; a value of 0000 disables password protection and allows anyone to access the menu.

To set/change the password, enter the function

- the 4-digit LCD will show '0000' with the first digit on the left blinking
- use the Up and Down arrows to increment or decrement this digit, then tap **OK**
- the second digit will blink; set the correct value using the Up and Down arrows
- repeat the process for the other two digits
- tap **OK** when the full password is displayed
- once a password is set, it has to be entered to gain access to the menu.



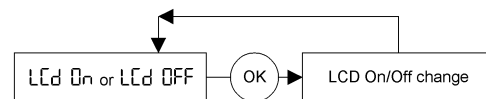
3.7.20 LCD on or LCD off

This feature allows turning the LCD off in measurement mode, effectively turning the Polytron 5000 into a non-display instrument.

The functionality of the instrument remains active, independently of the LCD state.

When in measurement mode and the LCD is set to OFF, pressing the Down arrow still gives complete access to the menu.

In case of an alarm, the red LED will blink. In case of a fault, the yellow LED will lit and the display will toggle between 'Err' and a number.



4 Maintenance

4.1 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.
For proper operation, never adjust the span before completing zero adjustment. Performing these operations out of order will cause the calibration to be faulty.

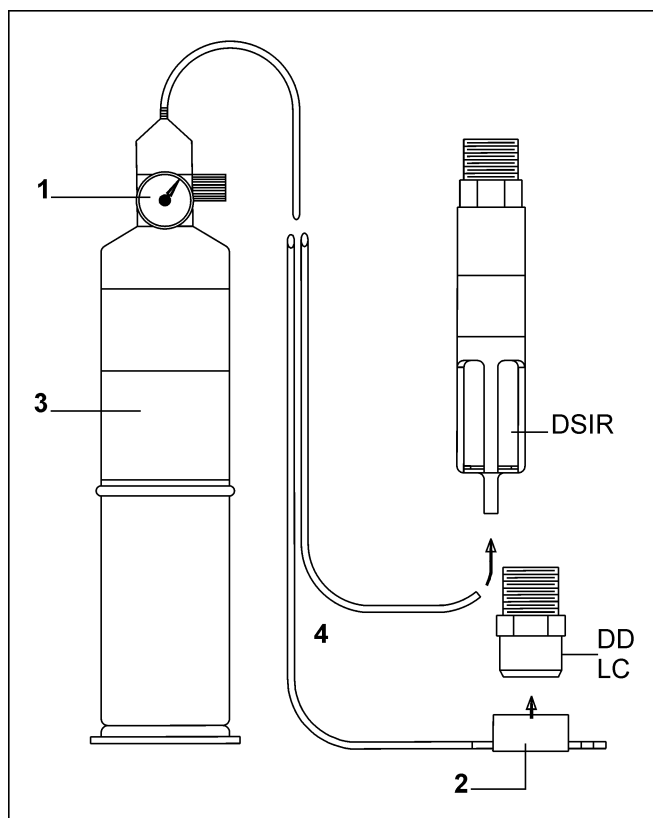
General procedure

1. Attach the pressure regulator to the calibration gas cylinder.
2. Fit calibration adapter to the sensor.
3. The gas flow should be between 0.5 and 2.0 L/min. At higher altitudes, a flow greater than 0.5 l/min might be necessary (reduced partial pressure).
4. Connect the tubing to the barbed fitting.



NOTICE

In some cases (e.g. combustible vapors) a more accurate calibration can be obtained when the Dräger calibration chamber is used instead of a calibration gas cylinder.



4544256r

- 1 Pressure regulator
- 2 Calibration adapter
- 3 Gas cylinder
- 4 Tubing

Only for DSIR

- Place the magnetic wand onto the sensor surface area marked by and hold down for at least 5 seconds. The display will change to a negative value (e.g. -10% LEL) as long as the magnetic wand is held in place. This initiates the auto-zeroing of the sensor.
- Remove the magnetic wand. After 30 seconds, the sensor will exit the auto-zeroing. As confirmation the display will change again to a negative value (e.g. -10% LEL).

After this procedure the zero at the transmitter is adjusted for eventual offsets.

4.1.1 Zero calibration

1. Enter the function with **OK**.
2. Apply synthetic air or Nitrogen.
 - The display will show the current value blinking (e.g. '2').
 - Wait for the value to stabilize.
3. Use the Up / Down arrow to adjust the value to 0.
4. Acknowledge with **OK**; the display will then jump back to the main menu.
5. Turn off the gas flow and remove the calibration adapter from the sensor, or disconnect tubing.



NOTICE


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.

4.1.2 Span calibration

1. Check the set gas category (only for DSIR).
2. Enter the function with **OK**.
3. Apply span gas (e.g. 50 %LEL Methane).
 - The display will show the current value blinking (e.g. '48').
 - Wait for the value to stabilize.
4. Use the Up / Down arrow to adjust the value to 50.
5. Acknowledge with **OK**; the display will then jump back to the main menu.
6. Turn off the gas flow and remove the calibration adapter from the sensor, or disconnect tubing.

4.2 Troubleshooting

Messages in the 100 range are faults; messages in the 300 range are warnings which can easily be cleared.

Display Sequence	Fault	Meaning	Remedies
PLS CONN SNR		Please connect sensor	Remove power; Attach sensor; Reapply power
		Reading is above full scale	Display remains as long as reading is above full scale. For the DD and LC sensors an overrange has to be acknowledged with OK .
Errors			
Err 100	X	Instrument self test error	Call Dräger Service
Err 101	X	Firmware CRC error	Call Dräger Service
Err 102	X	RAM error	Call Dräger Service
Err 103	X	Flash memory error	Call Dräger Service
Err 104	X	EEPROM memory error	Call Dräger Service
Err 105	X	Analog signal converter error	Call Dräger Service
Err 106	X	Incorrect software installed	Call Dräger Service
Err 108	X	4-20 output error	Remove power; check the field wiring from the Polytron 5000 to the control system; Reapply power
Err 109	X	Sensor failure	Remove power; reconnect or replace sensor; reapply power
Err 112	X	Zero calibration failed	Calibrate sensor
Err 113	X	Span calibration failed	Calibrate sensor
Err 115	X	Gas value is under range	Calibrate the sensor zero point Check environment for possible gases with negative cross-sensitivity to the measured gas
Err 117	X	Magnetic key is stuck "on" for more than 1 minute	Call Dräger Service
Err 198	X	Memory error	Call Dräger Service
Err 199	X	Factory calibration required	Call Dräger Service
Warnings			
Info 301		Sensor is warming up	Wait for warm-up phase to end

4.2.1 Replacing the sensor

To replace the sensor:

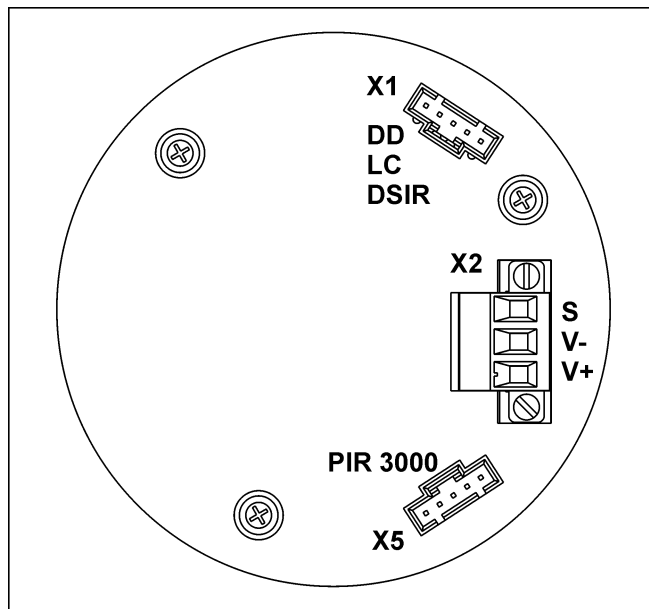
1. Turn off power to the instrument or declassify the area according to local procedures.
2. Loosen set-screw and unscrew lid from instrument.
3. Remove the bezel, by grasping the notches on either side of the display with your fingers and pull it up.
4. Unplug the sensor cable.
5. Unscrew the sensor.
6. Insert the sensor wires through the threaded port in the housing.
7. Screw the sensor into the port.



CAUTION

Five threads must be engaged to ensure explosion-proof status.

8. Plug the sensor wires into the socket as indicated.



9. Re-install sensor electronics by pushing the bezel back into place.
10. Screw the lid back on, until it is seated, and tighten set-screw.
11. Apply power to the instrument.
12. Calibrate instrument, see Section 4.1 on Page 19.
13. Always test a newly-installed sensor with target gas to verify proper operation.

4.3 Replacing the main electronics

To replace the main electronics:

1. Turn off power to the instrument or declassify the area according to local procedures.
2. Loosen set-screw and unscrew lid from instrument.
3. Remove the bezel, by grasping the notches on either side of the display with your fingers and pull it up.
4. Unplug the sensor cable, power and relay wires (if applicable).
5. Replace the main electronics.
6. Plug the sensor cable, power and relay wires (if applicable) into the appropriate sockets.
7. Re-install sensor electronics by pushing the bezel back into place.
8. Screw the lid back on, until it is seated, and tighten set-screw.
9. Apply power to the instrument.
10. Review and modify the configuration if necessary.
11. Calibrate instrument, see Section 4.1 on Page 19.
12. Always test a newly-installed sensor with target gas to verify proper operation.

5 Default settings

5.1 Settings which can be changed via the menu

Menu	Default Setting	
	DD, DSIR	LC
A1 Set	20 %LEL	2.0 %LEL
A2 Set	40 %LEL	4.0 %LEL
A1 Rising/Falling	rising	rising
A2 Rising/Falling	rising	rising
A1 Lat / nLat	nLat	nLat
A2 Lat / nLat	Lat	Lat
A1 Ack / nAck	Ack	Ack
A2 Ack / nAck	nAck	nAck
A1 Enrg / wired in e-box	energized / NO	energized / NO
A2 Enrg / wired in e-box	energized / NO	energized / NO
Cal Set	steady	steady
Pass Set	0000	0000
LCD Set	on	on

5.2 Fixed settings

Fault	Meaning
Fault Relay (cannot be changed)	energized / NO
Yellow Fault LED	Lit when a Warning or Fault condition is present, see Section 4.2 on Page 20.
Red Alarm LED	<p>Single blink when A1 condition is present</p> <p>Double blink when A2 condition is present</p> <p>If an alarm is configured acknowledgeable and the alarm is acknowledged, single/double blink changes into continuous lit</p> <p>Alarm Hierarchy: A2 overrides A1 on the LED. However, the A1 and A2 relays operate independently, i.e. if A1 is acknowledgeable, 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.</p>

6 Sensor principle

6.1 Operating principle for DrägerSensor DD, LC

The DrägerSensor is a transducer for measuring the partial pressure of combustible gases and vapors contained in ambient air. It uses the heat-of-combustion principle.

The monitored air diffuses through the sintered metal disc into the sensor. The mixture of combustible gases and vapors are catalytically combusted at a heated detector element (pellistor). The monitored air supplies the Oxygen required for the combustion (must be greater than 12 Vol%). Due to the resulting heat-of-combustion, the detector element gets hotter. This increase in heat causes a change of resistance in the detector element, which is proportional to the concentration of the mixture of combustible gases and vapors in the monitored air.

In addition to the catalytically active detector element, there is an compensator element. Both elements are parts of a Wheatstone bridge. Thus environmental effects like changes in temperature or humidity are almost entirely compensated.

6.2 Operating principle for DrägerSensor DSIR

The DrägerSensor IR infrared gas sensor is a gas transmitter designed to determine the concentration of gases and vapors in the ambient air. The principle of measurement is based on the concentration-dependent absorption of infrared radiation in measured gases.

The monitored ambient air diffuses through sintered material into the flameproof housing of a measuring cuvette. The broadband light emitted by the radiator passes through the gas in the cuvette and is reflected by the cuvette walls from where it is directed towards the inlet window of a dual element detector. One channel of the detector measures the gas-dependent light transmission of the cuvette (measuring channel), the other channel is used as reference. The ratio between measuring and reference signal is used to determine the gas concentration in the cuvette. The cuvette is heated to avoid condensation of the atmosphere's moisture content.

Internal electronics and software are used to calculate the concentration. As an output signal, the gas sensor emulates the half bridge of a catalytic bead sensor.

6.3 Contaminating gases for DrägerSensor DD, LC



NOTICE

Certain substances in the atmosphere to be monitored may impair the sensitivity of the sensors which are installed in the sensing heads:

a) polymerizing substances such as acrylonitrile, butadiene and styrene,

b) corrosive compounds such as halogenated hydrocarbons (releasing halogens such as bromine, chlorine or fluorine when being oxidized) and halogen hydride acids as well as acidic gaseous compounds such as sulphur dioxide and nitrogen oxides,

c) catalyst poisons such as sulphurous and phosphorous compounds, silicon compounds (especially silicones), and metal-organic vapors. The sensors used are based on measuring elements (pellistors) which are "poison-resistant" (PR) and so have a longer lifetime than conventional sensors if catalyst poisons occur.

A calibration check might be necessary, if the sensor was exposed to a high concentration of combustible gases or vapors for an extended period of time or to contaminants as listed above.

7 Disposing of the instrument

Disposing of electric and electronic equipment:



EC-wide regulations for the disposal of electric 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 instrument.

Special collecting and recycling options have been established for households. However, as this instrument has not been registered for household usage, it must not be disposed of through these means. The instrument can be returned to your national Dräger Sales Organization for disposal. Please do not hesitate to contact the above if you have any further questions on this issue.

8 Technical data

8.1 Approvals



See printout of approval label.

8.2 Marking

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

Serial No. key: The year of manufacture is indicated by the third letter in the serial number: A = 2009, B = 2010, C = 2011, D = 2012, E = 2013, F = 2014, H = 2015, J = 2016, K = 2017, etc.

Example: Serial No. ARBH-0054: the third letter is B, which means that the unit was manufactured in 2010.

8.3 Signal transmission to central control unit

Current	Meaning
4 mA	Zero point
20 mA	Full scale deflection
< 1.2 mA	Fault
3.8 mA to 4 mA	Sensor drift below zero
20 mA to 20.5 mA	Measuring range exceeded
> 21 mA	Fault on the analog output
3.4 mA steady or 1 Hz modulation between 3 and 5 mA (user selectable)	Signal for maintenance mode

8.4 Voltage of power supply

Operating Voltage	3-core shielded cable, 10 to 30 VDC
In-rush Current	300 mA for 140 msec @ 24 VDC 350 mA for 140 msec @ 24 VDC with relay option
Operating Current (maximum)	95 mA @ 24 VDC w/o relay non-remote sensor 145 mA @ 24 VDC with relay remote sensor
Relay Rating	SPDT 5 A @ 230 VAC, 5 A @ 30 VDC, resistive load

8.5 Tightening torque

Part	TQ Lb. In.	TQ Nm
lid	min. 266	min. 30
sensors	min. 266	min. 30
plugs	min. 266	min. 30
conduit hubs	min. 443	min. 50
instrument to e-box	71	8

8.6 Tightening torque and wire size for field wiring terminals

Electronic		
TQ Lb. In.	Wire Size AWG	Wire Size mm ²
All field wiring terminals 4.4 - 7.0 (0.5 - 0.8 Nm)	24 - 12	0.2 - 2.5

In case of optional increased safety terminal box, securely screw the transmitter onto the e-box using 4 screws with a tightening torque of 8 Nm.

8.7 Physical specifications

Enclosure		NEMA 4 x, IP 65/66/67
Size L x W x D approx.	without e-box with e-box	7" x 5.8" x 5.1" (180 x 150 x 130 mm) 7.3" x 7.1" x 7.4" (185 x 180 x 190 mm)
Weight approx.	without e-box, aluminum without e-box, stainless steel 316 with e-box, aluminum with e-box, stainless steel 316	3.9 lbs (1.8 kg) 8.0 lbs. (3.6 kg) 6.9 lbs. (3.1 kg) 11.0 lbs. (5.0 kg)

8.8 Environmental parameters

Pressure	20.7 to 38.4 in. of hg (700 to 1300 mbar)
Humidity	0% to 100% RH, non-condensing

Temperature		
Sensor	without relays	with relays
DD / LC	-40 to 176 °F (-40 to 80 °C)	-40 to 158 °F (-40 to 70 °C)
DSIR / PIR 3000 ¹⁾	-40 to 149 °F (-40 to 65 °C)	-40 to 149 °F (-40 to 65 °C)

¹⁾ not yet available

8.9 Ambient influences

See sensor data sheets.

9 Order list

9.1 Detectors

9.1.1 Transmitter

Description	Part Number
Polytron 5200 DD d A	4544150
Polytron 5200 DD d A Relay	4544151
Polytron 5200 DD d S	4544152
Polytron 5200 DD d S Relay	4544153
Polytron 5200 DD e A	4544154
Polytron 5200 DD e A Relay	4544155
Polytron 5200 Remote DD e A	4544156
Polytron 5200 Remote DD e A Relay	4544157
Polytron 5200 DD e S	4544158
Polytron 5200 DD e S Relay	4544159
Polytron 5200 Remote DD e S	4544160
Polytron 5200 Remote DD e S Relay	4544161

Description	Part Number
Polytron 5200 LC d A	4544130
Polytron 5200 LC d A Relay	4544131
Polytron 5200 LC d S	4544132
Polytron 5200 LC d S Relay	4544133
Polytron 5200 LC e A	4544134
Polytron 5200 LC e A Relay	4544135
Polytron 5200 Remote LC e A	4544136
Polytron 5200 Remote LC e A Relay	4544137
Polytron 5200 LC e S	4544138
Polytron 5200 LC e S Relay	4544139
Polytron 5200 Remote LC e S	4544140
Polytron 5200 Remote LC e S Relay	4544141

Description	Part Number
Polytron 5310 d A	4544370
Polytron 5310 d A Relay	4544371
Polytron 5310 d S	4544372
Polytron 5310 d S Relay	4544373
Polytron 5310 e A	4544374
Polytron 5310 e A Relay	4544375
Polytron 5310 Remote e A	4544376
Polytron 5310 Remote e A Relay	4544377
Polytron 5310 e S	4544378
Polytron 5310 e S Relay	4544379
Polytron 5310 Remote e S	4544380
Polytron 5310 Remote e S Relay	4544381

Description	Part Number
Polytron 5300 d A	4544170 ¹
Polytron 5300 d A Relay	4544171 ¹
Polytron 5300 d S	4544172 ¹
Polytron 5300 d S Relay	4544173 ¹
Polytron 5300 e A	4544174 ¹
Polytron 5300 e A Relay	4544175 ¹
Polytron 5300 Remote e A	4544176 ¹
Polytron 5300 Remote e A Relay	4544177 ¹
Polytron 5300 e S	4544178 ¹
Polytron 5300 e S Relay	4544179 ¹
Polytron 5300 Remote e S	4544180 ¹
Polytron 5300 Remote e S Relay	4544181 ¹

1) not yet available

9.2 Separate sensing head (not included) when ordering

9.2.1 Polytron 5200 DD remote e

Description	Part Number
Sensing Head Polytron SE Ex PR M1 DD	6812711
Sensing Head Polytron SE Ex PR M2 DD	6812710
Sensing Head Polytron SE Ex PR M3 DD	6812718
Sensing Head Polytron SE Ex HT M DD	6812720

9.2.2 Polytron 5200 LC remote e

Description	Part Number
Sensing Head Polytron SE Ex LC M1 DD	6812722
Sensing Head Polytron SE Ex LC M2 DD	6812721
Sensing Head Polytron SE Ex LC M3 DD	6812719

9.2.3 Polytron 5310 remote e

Description	Part Number
Sensing Head DrägerSensor IR complete Set e	6811165
Sensing Head DrägerSensor IR complete Set e2	6811265

9.2.4 Polytron 5300 remote e

Description	Part Number
Sensing Head Dräger PIR 3000 complete Set e	6811160 ¹
Sensing Head Dräger PIR 3000 complete Set e2	6811270 ¹

1) not yet available

9.3 Replacement sensors (all versions except remote e)

Description	Part Number
DrägerSensor Ex DD NPT	6812380
DrägerSensor Ex LC NPT	6810675
DrägerSensor IR NPT	6811901
Dräger PIR 3000 NPT	6811080

9.4 Accessories

Description	Part Number
D Junction Box Aluminum	4544099
D Junction Box Stainless Steel 316	4544098
Duct Mount Kit Polytron 5000 for DD, LC, DSIR, PIR 3000	6812725
Pipe Mount Kit	4544198
IRDA Interface	4544197
Magnetic Wand with Key Chain	4544101

9.4.1 Accessories DD, LC

Description	Part Number
Splash Guard	6812510
Calibration Adapter PE	4509314
Calibration Adapter PE, Europe	6806978
Calibration Adapter Viton	6810536
Process Adapter (stainless steel, with lock nut M30 x 1.5) for DD	6812470
Process Adapter (stainless steel, with lock nut M36 x 1.5) for LC	6812465
Calibration Chamber	6802206

9.4.2 Accessories DSIR, PIR 3000

Description	Part Number
Splash Guard	6810796
Calibration Adapter	6810859
Process Adapter	6811330
Protection Labyrinth	6811135

9.5 Spare parts

Description	Part Number
Bezel Polytron 5200 / 53X0 / 57X0	4544183
PCB Main Polytron 5200 / 53X0	4544186
PCB Relay	4544297
PCB e-box	6812839
Feed-through 3 Wires	4544182
Feed-through 9 Wires	4544169
Feed-through 14 Wires	4544168
Hardware Kit Enclosure	4544167
Hardware Kit e-box	6812838
Cable Gland e-box	6812868

