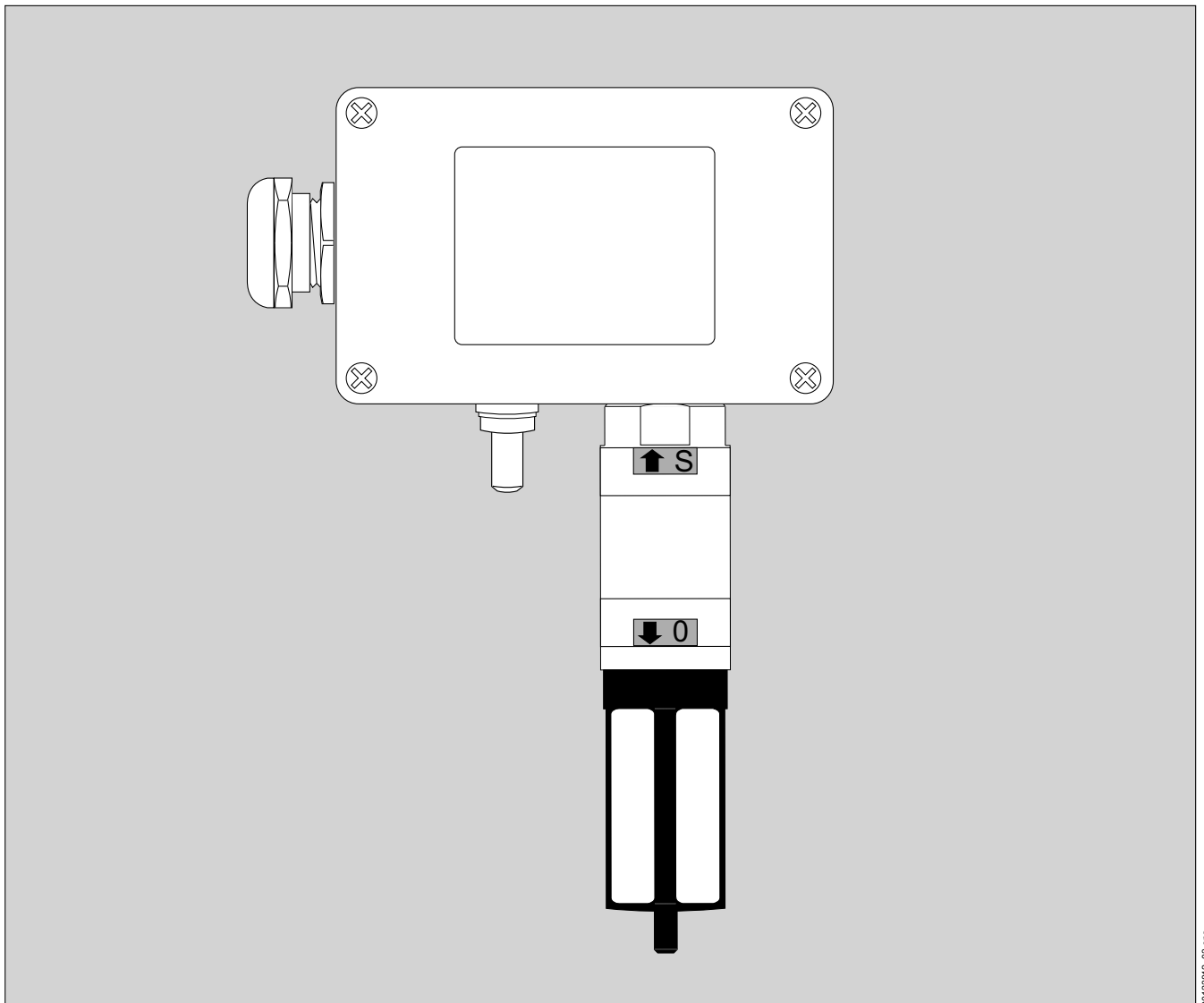


Dräger PIR 3000

en Infrared Gas Transmitter
Instructions for Use



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For Your Safety

Strictly follow these Instructions for Use

Any use of this gas transmitter requires full understanding of the information provided and strict adherence to the instructions given.

The gas transmitter is only to be used for the purposes specified here.

Maintenance

Maintenance jobs may only be carried out by trained service personnel.

We recommend signing a service contract to have all maintenance jobs carried out by Dräger.

Always use original Dräger parts for maintenance.

Be sure to read the information provided in the chapter "Maintenance".

WARNING

Explosion hazard! Do not open sensor housing. There is a risk of ignition in explosive atmospheres. The sensor housing contains live parts. Unauthorised opening can lead to a safety-related failure of the sensor. The sensor does not contain any parts that can be serviced by the user.

Accessories

Only use accessories mentioned in the order list.

Safe Connection of Electrical Devices

Never connect this device to other electrical devices not mentioned in these Instructions for Use before consulting the manufacturer or an expert.

Use in Potentially Explosive Atmospheres

Devices or components used in potentially explosive atmospheres after being tested and approved according to national, European or international regulations may only be used under the conditions specified in the approval and under observation of relevant legal regulations.

Never modify the electrical equipment.

Never use defective or incomplete parts. Always take relevant regulations into account when repairing devices or components.

Safety symbols used in these Instructions for Use

These Instructions for Use contain a number of warnings for risks and hazards which might occur when using the instrument. These warnings contain signal words which will alert you to the degree of hazard you may encounter. These signal words and corresponding hazards are as follows:

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.

Intended Use

The Dräger PIR 3000 infrared gas transmitter is a device used for stationary, continuous monitoring of the concentration of carburetted, combustible gases and vapours in the ambient air.

The gas transmitter is preconfigured for the gases methane, propane and ethylene. The operating range respectively covers 0 to 100 %LEL (**L**ower **E**xplosion **L**imit).

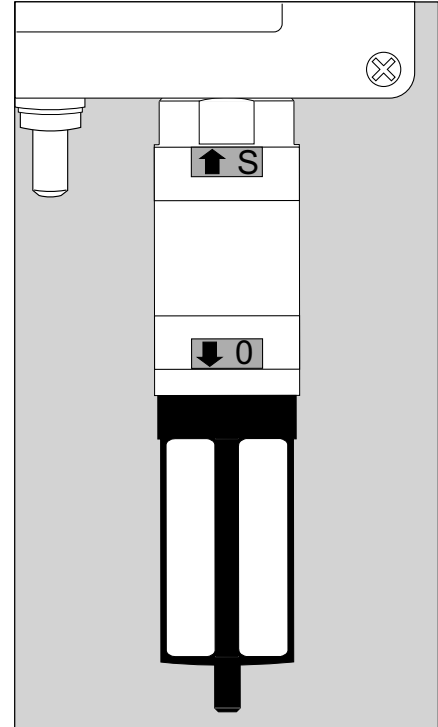
An analogue, 4 to 20 mA output signal is used as measuring value output.

The Dräger PIR 3000 infrared gas transmitter is designed for use in rough ambient conditions and is suited for installation in hazardous areas of zones 1, 2, 21 and 22 according to the device categories 2G, 3G, 2D, 3D or Class I & II, Div. 1 for hazardous areas. For further information, please observe the installation instructions.

In connection with a central device (e.g. Dräger REGARD channel card

4...20 mA):

- warning before explosive concentration level is reached
- automatic initiation of countermeasures which avert the explosion hazard (e.g. switching on a ventilation)
- device error warning




Explosion-Protection Approvals


The explosion-protection approvals are valid for use of the device in gas/vapour-air mixtures of combustible gases and vapours under atmospheric conditions. The explosion-protection approvals are not valid for use in oxygen-enriched atmospheres. Unauthorised opening of the enclosure invalidates the explosion-protection approval.

— ATEX


Type IDS 0001

 II 2G Ex db IIC T6 Gb **CE** 0158
 II 2D Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Type ITR 001X

 II 2G Ex db IIC T6 Gb **CE** 0158
 II 2D Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +60\text{ °C}$

Types IDS 0011 and ITR 000X:

 II 2G Ex db eb IIC T6 Gb **CE** 0158
 II 2D Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +65\text{ °C}$

year of construction (by serial number) ¹⁾

BVS 05 ATEX E 143X

TÜV 19 ATEX 8433 X (measuring function)

— IECEx

Type IDS 0001:

Ex db IIC T6 Gb, Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Type ITR 001X

Ex db IIC T6 Gb, Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +60\text{ °C}$

Types IDS 0011 and ITR 000X:

Ex db eb IIC T6 Gb, Ex tb IIIC T80°C Db IP6X
 $-40\text{ °C} \leq T_a \leq +65\text{ °C}$

BVS 05.0011X

1) Configuration of serial numbers: The third letter of the serial number represents the year of manufacture: M = 2019, N = 2020, P = 2021, R = 2022, S = 2023, T = 2024, U = 2025, W = 2026, X = 2027, Y = 2028, Z = 2029 etc. (letters G, I, O, Q are omitted)
 Example: Serial number ARMB-0001: The third letter is M, i.e. the device was manufactured in 2019.

The appendix has a copy of the ATEX certificate, which offers relevant information on safety regulations under subjects such as "Subject matter and type", "Description", "Characteristic quantity" and "Terms/conditions of safe use".

Installing the Gas Transmitter

Only trained service personnel (e.g. of Dräger) may install the gas transmitter under observation of relevant regulations. Installation and commissioning are described in the "Dräger PIR 3000 Installation Instructions" which are supplied with the gas transmitter.

Mounting Location

The protecting effect of the gas transmitter depends on the selection of the mounting location. By taking the site's air flow conditions into account, the best possible mounting location should be chosen as close as possible to where a decisively noticeable rise in gas concentration can be expected in case of a leakage, i. e.

- as close as possible to the potential leakage place
- when monitoring gases and vapours which are lighter than air:
above the potential leakage place
- when monitoring gases and vapours which are heavier than air:
near to ground.

In addition, it must be assured that:

- the air circulation in the gas transmitter vicinity is not hindered
- the danger of mechanical damage is reduced as far as possible
- the gas transmitter is sufficiently accessible for maintenance purposes. Especially the configuration via magnetic pin requires a clearance of approx. 20 cm around at least half of the sensor perimeter.

The gas transmitter can be mounted horizontally as well as vertically.

Mechanical Installation

When used according to BVS 05 ATEX E 143 X, please note:

- The gas sensor type IDS 0001 (NPT) can be attached to casings with the type of protection flameproof enclosure "d" that have a free volume of 2 litres and a reference pressure that does not exceed 20 bar. The mechanical strength of the attachment and the explosion and construction-related testing of the connection thread must be carried out within the framework of the approval process of the electrical equipment to which the sensor is attached.
- The gas sensor type IDS 0011 (metric thread) is designed for attachment on a casing with the type of protection increased safety "e". The mechanical strength and the degree of protection IP 6X of the attachment must be ensured during approval of the electrical equipment to which it is attached.
- The junction boxes of the gas sensors IDS 00** must feature sufficient mechanical stability to ensure that the vibrations transmitted to the sensor by the casing are not amplified.

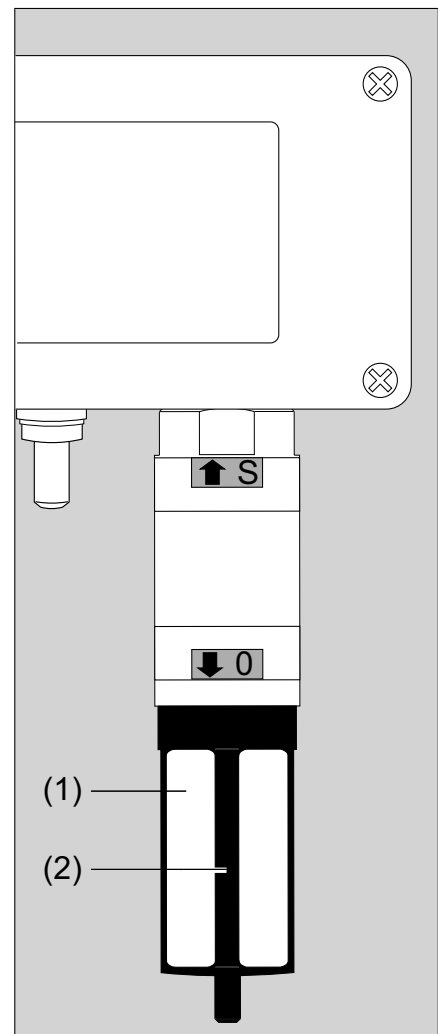
Terminal box

The gas transmitter is designed to be directly attached to a terminal box. Approved connector boxes of the following makes are available as gas transmitter accessories: Ex d (explosion proof, 3/4" NPT) and Ex e (increased safety, M25) - (see "Order List" on page 27).

- To maintain the housing protection class, the enclosed O-ring seal must be used for an Ex e-type explosion protection connection. Use a thread locking adhesive, e.g. Loctite® to prevent the M25 nut (torque of 15 Nm ±3 Nm) from self-loosening.
- Use approved plugs to close any unused cable entry openings at the terminal box.

Splash Guard and Calibration Adapter

We recommend using the supplied accessories - splash guard (1) and calibration adapter (2) - to increase protection against water jets and contamination.



The splash guard is held by a fixture provided with screw-thread, which is also used as calibration adapter.

Make sure that the calibration adapter is correctly seated. To this end, manually tighten the calibration adapter to a point where the sealing line leaves a permanent mark on the splash guard.

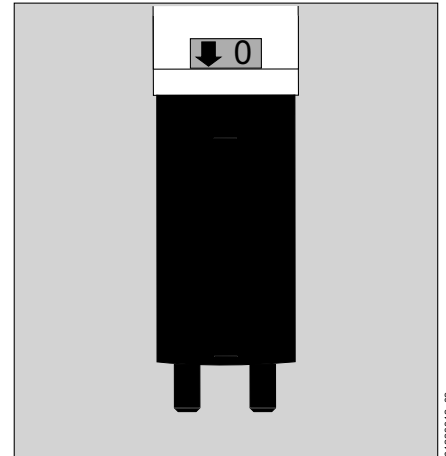
Gas Exposure / Process Adapter (see "Accessories/Spare parts" on page 27)

For continuous flow operation of the gas transmitter, the calibration adapter can be replaced with an optional gas exposure / process adapter.

- Suitable for flow rates between 1 and 3 L/min.
- Within the specified technical measurement characteristics suitable for pressure differences relative to ambient pressure of up to ± 300 hPa.
- Use external pump to ensure gas flow.
- External flow monitoring required.
- Also suitable for calibration gas application.

Assembly:

- Unscrew the calibration adapter from the gas transmitter. While doing so, leave splash guard on the gas transmitter.
- Screw gas exposure / process adapter onto the gas transmitter and tighten firmly by hand.
- In the case of pipelines and hose lines carrying gas ensure that there is stability with regard to ambient conditions and material compatibility for the substances flowing through them.
- With regard to the length of the pipelines or hose lines observe the increase in the response time.
- Ensure the compatibility of the connection spouts to be used regarding the pipeline and hose line dimensions.
- Check the gas-carrying system for leaks, e.g. with a soap bubble test.



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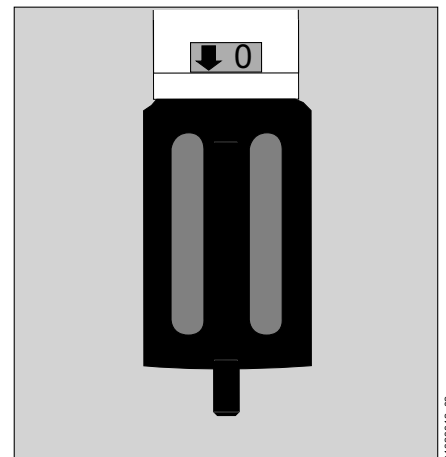
Dirt Deflector (see "Accessories/Spare parts" on page 27)

Instead of the calibration adapter, a double-walled dirt deflector can optionally be fitted to the gas transmitter. This is recommended if there is an increased risk of contamination from e.g. salt crusts, oil films, resin or similar substances, and also generally for outdoor applications. In addition to the dirt deflector, the use of a splash guard is strongly recommended.

- Also suitable for calibration gas application.

Assembly:

- Unscrew the calibration adapter from the gas transmitter. While doing so, leave splash guard on the gas transmitter.
- Manually tighten the dirt deflector on the gas transmitter to a point where the sealing line leaves a permanent mark on the splash guard.



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Electrical Installation

NOTICE

If present: If the connector of the gas transmitter is not required, it must be removed prior to the electrical installation. To do so, cut the cables with a suitable tool directly in front of the connector, strip the insulation, and attach suitable ferrules.

The entire wiring must correspond with applicable local regulations concerning the installation of electrical devices in potentially explosive atmospheres. In case of doubt, consult the responsible authorities before installing the device. We recommend a three-core, screened connection cable (mesh wire shield with a shielding factor of $\geq 80\%$). Connect the protective earthing to the outside of the potential equalization pin (A, see figure). Inside the device, the potential equalization pin is connected to the sensor, the cable gland and the inner coating of the housing. These sub-components of the device can be earthed outside the device using the potential equalization pin.

NOTICE

Earth leakages on two phases can cause EMC problems. To avoid these problems, the cable screen may only be connected to earth potential on one side (either at the central unit or at the gas transmitter). In most cases, connecting the cable screen to the PE terminal of the terminal box has proven to work better than connecting it to the central device.

For applications in accordance with directive 2014/90/EU or the standard DNVGL-CG-0339, the gas transmitter or the gas detection system may not be connected to a DC voltage supply network but rather to a suitable separate power supply unit (see Technical data).

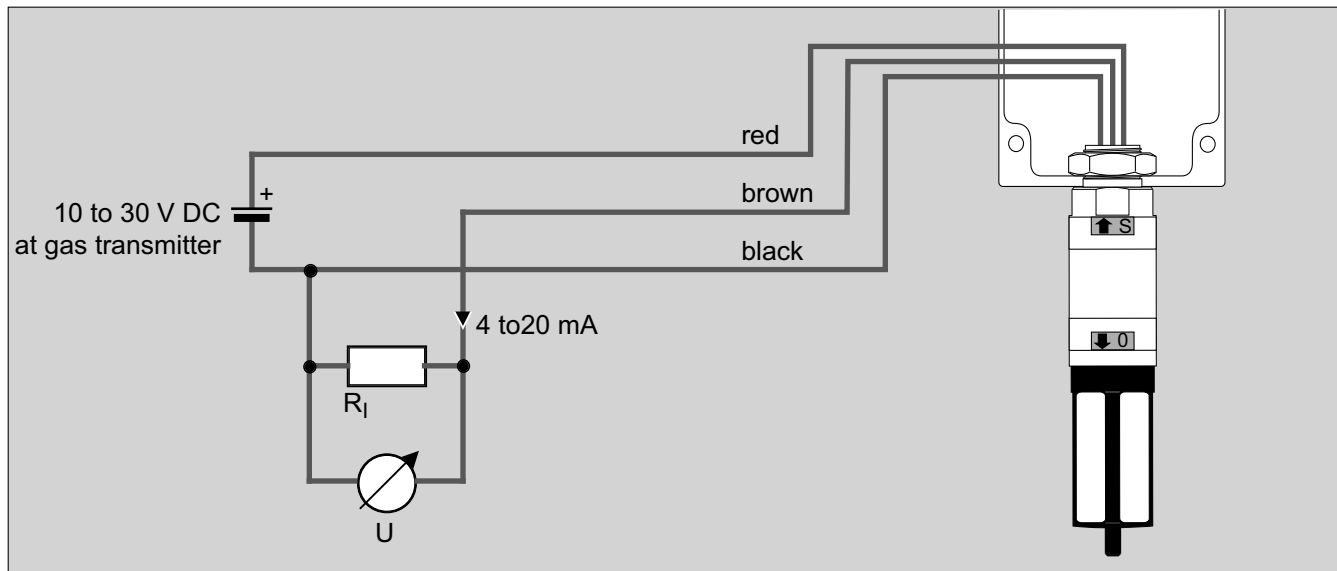
- The leads for the sensor are factory sealed.
- If the corresponding connection is available: Electrically connect the terminal box to earth.
- For installation in conduit: cast conduit seals and allow to harden.
- When installing a complete set (see "Order List" on page 27): depending on the housing type of the terminal box there are the following permissible conductor cross sections:

Order No. 68 11 160: 1.0 to 2.5 mm²

Order No. 68 11 270: 0.5 to 4.0 mm²

Order No. 68 11 180: 0.2 to 4.0 mm²

Connection Diagram:



Colour code of connecting terminals and/or leads at the gas transmitter:

- 1 = black = – (common reference potential)
- 2 = brown = signal output 4 to 20 mA
- 3 = red = + (10 to 30 V DC)

- The leads between central device and gas transmitter must have a sufficiently low resistance to ensure the correct supply voltage at the gas transmitter. The maximum resistance per core is calculated as follows:

$$R = 2.5 \times U_C - 25$$

with R: maximum resistance per core

U_C : voltage supplied by central device in volts (usually depends on the supply voltage of the central device)

Example: With $U_C = 24$ V, the result is a maximum resistance per core of $R = 35$ Ω .

NOTICE

Cable resistance deviations caused by temperature influences, transition resistances of terminals, etc. can also contribute to the fact that the calculated cable length can not be fully used.

- The maximum resistance of the loop R_l (sum of the internal resistance of the central device and of the cable resistance of the signal line) depends on the transmitter supply voltage as described below:

Supply voltage at the transmitter	maximum resistance of the loop R_l
10 V	200 Ω
12 V	300 Ω
14 V	390 Ω
16 V	480 Ω

When used according to BVS 05 ATEX E 143 X, please note:

- After attachment of the sensor to a casing with the type of protection increased safety "e", the air gaps and creepage distances must comply with the requirements specified in 4.3 (Table 1) or 4.4 of EN 60079-7. The single core cables must be routed and connected in a way that is mechanically protected and complies with the temperature resistance of the wires as specified in 4.5, 4.7.2 and 4.8 of EN 60079-7.
- From an electrostatic point of view (transition resistance $< 10^6$ ohm) the sensor casing must be conductively connected to the equipotential bonding of the casing to which it is attached as soon as it is attached. If equipotential bonding is required, it must be provided with the attachment.

Commissioning

The Dräger PIR 3000 infrared gas transmitter is preconfigured and ready for use after installation.

- Deactivate the alarm call to the central device to avoid false alarms.
- When the supply voltage is applied, the gas transmitter automatically performs a self check (10 seconds), then automatically uses the factory-preset calibration (see page 11) and gas category.
For the duration of the self test, a signal of 1 mA is issued.
- Wait for the running-in period of one minute to expire. No settings can be changed at the gas transmitter during this period. The gas transmitter will emit a 1 mA signal for the duration of the running-in period.
- Check signal transmission and adjust if required (see "Checking the signal transmission, checking the alarm trigger and displaying the gas category" on page 17).
- Check setting of the gas category for the intended use. If required, set the gas category (see "Changing the gas category " on page 18).
- Check the calibration of the gas warning system (see "Calibration" on page 11).
- Reactivate the alarm call to put the system back to normal operating state.

NOTICE
To prevent moisture condensation on the optic surfaces of the device, parts of the transmitter housing are heated from the inside. This can increase the surface temperature by approx. 5 °C.

Operational Characteristics

The gas transmitter generates an output signal which is proportional to the measured gas concentration. The factor of proportionality between displayed value and the measured gas concentration is determined by the span calibration of the gas transmitter (see "Manual Span Calibration of the Output Signal." on page 15).

The gas transmitter regularly runs self tests for numerous internal functions. As soon as a divergence from normal operation is detected, the device will issue a fault message.

Output Signals of the Device:

Display of	Output Signal
zero point	4 mA
full scale deflection	20 mA
under-range	3.8 mA to 4 mA
over-range	20.0 mA to 20.5 mA
span gas signal to indicate begin and successful termination of gas transmitter calibration via magnetic pin	3 mA
Fault and inlet signal (during self check and running-in period)	1 mA
Warning (while increasing the Drift of the zero point into the negative range)	2 mA

Calibration

A functional check and - if necessary - a calibration must be carried out regularly for gas warning systems (see page 20, Maintenance).

Zero gas and test gas are to be applied for functional check and calibration of the infrared gas transmitter Dräger PIR 3000. To this end, the gas is applied either with

- the calibration adapter in connection with the splash guard (see page 5, part of the scope of delivery) or
- the gas exposure / process adapter (see page 6 and order list) or
- the dirt deflector in connection with the splash guard (see order list).

The required gas flow rate for functional check and calibration is as follows:

- 0.5 to 1 L/min. for the calibration adapter with splash guard and the dirt deflector with splash guard in closed rooms at wind speeds up to 5 m/s (3 Beaufort),
- 1 to 2 L/min. for the calibration adapter with splash guard and the dirt deflector with splash guard at wind speeds up to 27 m/s (10 Beaufort),
- 0.5 to 3 L/min. for the gas exposure / process adapter.

Make sure that the calibration adapter is correctly seated. To this end, manually tighten the calibration adapter to a point where the sealing line leaves a permanent mark on the splash guard.

Nitrogen, synthetic air or fresh air (hydrocarbon content <50 ppm) can be used for zero point calibration.¹⁾

Commercially available calibration gas can be used to calibrate the respective gas category (methane, propane, ethylene).¹⁾ The highest accuracy is achieved using test gas concentrations of 40 to 70 percent of the measurement span.

The infrared gas transmitter Dräger PIR 3000 can also be used to measure other gases than mentioned above. For detailed information, refer to "Substitute Gas Calibration" on page 16.

- Select the measured gas in the corresponding table and determine the corresponding gas category.
- Set the gas transmitter to the determined gas category.

Where possible, calibration gas should match with the measured gas for span calibration. In exceptional cases, span calibration can be carried out using a suitable substitute gas and the associated calibration factor. The suitable substitute gas as well as the associated calibration factor is shown in the table "Substitute Gas Calibration" on page 16.

- Select the substitute gas (gas category) and the calibration factor in table "Substitute Gas Calibration" on page 16.
- Multiply the concentration of the substitute gas by the calibration factor to get the gas concentration to be set.

Example:

Measured gas:	n-octane
Gas category:	Propane (see table "Substitute Gas Calibration", page 16)
Calibration factor:	1.8 (in table "Substitute Gas Calibration", page 16)
Span gas concentration:	40 %LEL propane (bottle concentration)
Setting:	40 %LEL x 1.8 (calibration factor) = 72 %LEL

 **CAUTION**

Never inhale test gas. Danger to health!
Observe the safety information in the corresponding safety data sheets. Ensure that gases are vented or otherwise guided outside the building.

1) For applications according to BVS 05 ATEX E 143 X, dry test gas may also be used.

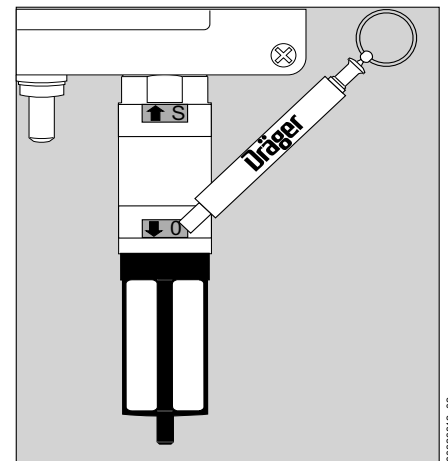
Configuration of the Gas Transmitter via Magnetic Pin

A magnetic pin can be used to change the settings of the Dräger PIR 3000 infrared gas transmitter (see "Accessories/Spare parts" on page 27) as follows:

- Automatic zero setting.
- Manual zero calibration of the output signal. ¹⁾
- Manual span calibration of the output signal. ¹⁾
- Checking the signal transmission, check the alarm trigger and displaying the gas category. ¹⁾
- Changing the gas category. ¹⁾

Automatic Zero setting

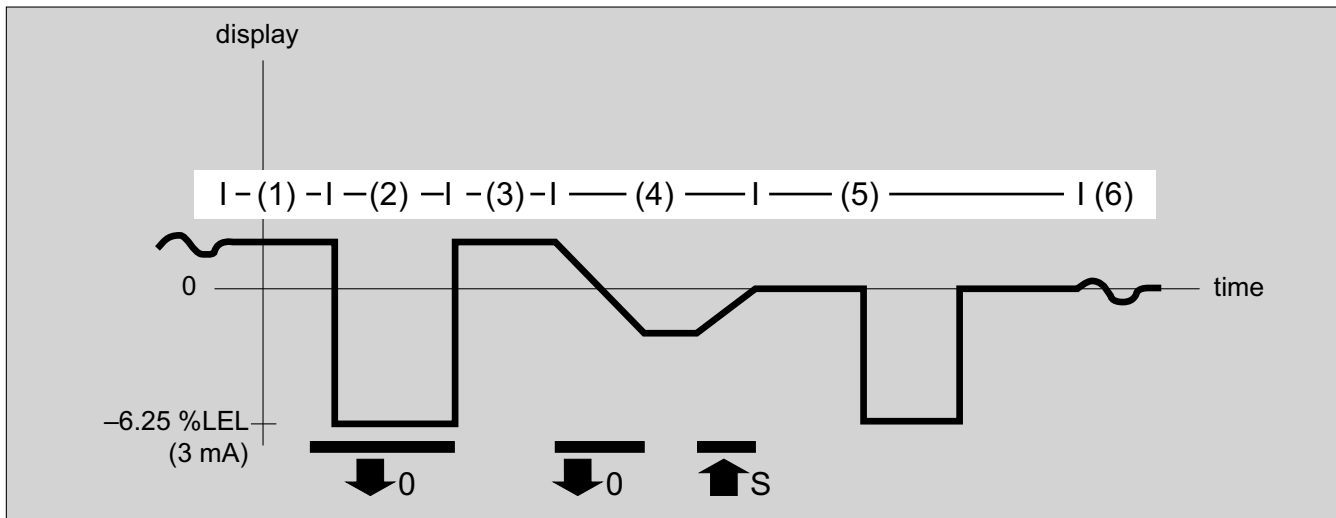
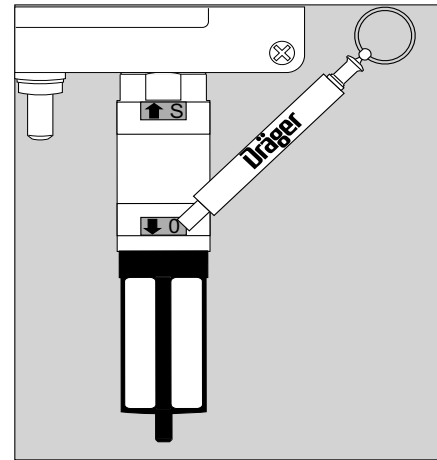
- Deactivate alarm activation of the central device.
- Expose the gas transmitter to nitrogen, synthetic air, and/or fresh air via calibration adapter and wait until measurement value stabilises.
- Place the magnetic pin onto the transmitter surface area marked by the " ↓0 " icon and hold it there (within the black frame) for at least five seconds. After five seconds, the output signal of the gas transmitter switches to the display of the span gas signal (3 mA) for as long as the magnetic pin is held against it. At the same time, a zero setting of the optical measuring unit is carried out automatically.
- Remove the magnetic pin. After 30 seconds, the device exits the automatic zero setting routine. As confirmation of the automatic zero setting, the output signal changes back to the span gas signal (3 mA). This signal is indicated for the same period of time as when starting the automatic zero setting routine.
- Activate alarm activation of the central device.



1) A second person is required as helper for these tasks.

Manual Zero Calibration of the Output Signal.

- Deactivate alarm activation of the central device.
- 1 Expose the gas transmitter to nitrogen, synthetic air, and/or fresh air via calibration adapter and wait until measurement value stabilises.
- 2 Place the magnetic pin onto the transmitter surface area marked by the " ↓0 " icon and hold it there (within the black frame) for at least five seconds. After five seconds, the output signal of the gas transmitter switches to the display of the span gas signal (3 mA) for as long as the magnetic pin is held against it. At the same time, a zero setting of the optical measuring unit is carried out automatically.
- 3 Remove the magnetic pin. The output signal of the gas transmitter moves back to the previously displayed value. The device is now set to zero point calibration routine. Within this routine, the output signal will decrease resp. increase, depending on whether the magnetic pin is placed on one of the areas marked with either the " ↓0 " or the " ↑S " icon.
- 4 Adjust the zero point signal by placing the magnetic pin on one of the areas marked with either the " ↓0 " or the " ↑S " icon.
- 5 Remove the magnetic pin. The device terminates the zero point calibration routine after 30 seconds without further settings being carried out. As confirmation of the successful calibration, the output signal changes back to the span gas signal (3 mA). This signal is indicated for the same period of time as when starting the zero setting calibration routine.
- 6 Terminate exposure to gas.
- Reactivate alarm activation of the central device.



NOTICE

The calibration is automatically terminated and new calibration parameters are not saved if the gas concentration measured by the gas transmitter changes during the calibration procedure (e.g. because the calibration gas cylinder fell empty during the calibration procedure). In this case, the gas transmitter returns to normal operation without displaying the span gas signal as confirmation.

Substitute Gas Calibration

The infrared gas transmitter Dräger PIR 3000 can also be used to measure other gases and vapours. The following table shows the required information (see also "Calibration" on page 11).

Measured gas ¹⁾	CAS-No.	Measuring range ¹⁾ [%LEL]	Gas Category Substitute Gas	Calibration factor ^{2) 3)}	Response time t _{0...50}
acetone	67-64-1	0 to 100	ethylene	0.7	≤ 24 s
i-butane	75-28-5	0 to 100	propane	1.6	≤ 21 s
n-butane	106-97-8	0 to 100	propane	1.2	≤ 23 s
ethanol	64-17-5	0 to 100 ⁴⁾	propane	0.9	≤ 21 s
ethyl acetate	141-78-6	0 to 100	ethylene	0.4	≤ 35 s
ethyl acetate	141-78-6	0 to 100 ⁴⁾	propane	1.4	≤ 35 s
n-hexane	110-54-3	0 to 100	propane	1.8	≤ 32 s
methanol	67-56-1	0 to 100 ⁴⁾	ethylene	0.2	≤ 21 s
n-nonane	111-84-2	0 to 100	propane	1.9	≤ 89 s
n-Octane	111-65-9	0 to 100	propane	1.8	≤ 67 s
n-pentane	109-66-0	0 to 100	propane	1.5	≤ 28 s
i-propyl alcohol	67-63-0	0 to 100	propane	1.3	≤ 24 s
propene (propylene)	115-07-1	0 to 100	ethylene	0.4	≤ 19 s
toluene	108-88-3	0 to 100	ethylene	0.6	≤ 49 s

-
- 1) The measuring function for the explosion protection according to EN 60079-29-1 is proven, see EC-Type Examination certificate BVS 05 ATEX E 143X and associated additions.
 - 2) The LEL values were used according to IEC 60079-20-1. Other LEL values may apply for the device settings at the location of use.
 - 3) Typical tolerance: ±5 %.
 - 4) When the following substances are measured at concentrations above 70 % LEL, the deviations of the measured values exceed the permitted deviations in accordance with EN 60079-29-1.

Checking the Signal Transmission, Checking the Alarm Trigger and Displaying the Gas Category

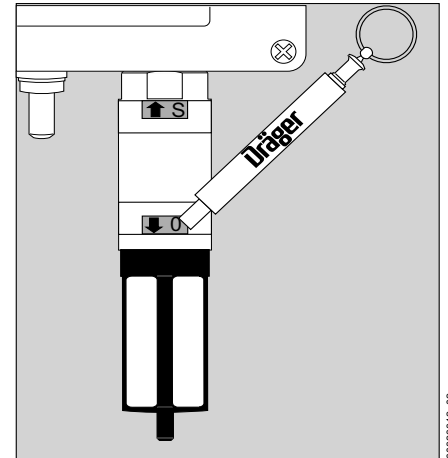
The gas transmitter can create an output signal of 80 % of the full scale value, even without exposure to test gas. This 80% signal can be used to

- check the signal transmission of the central device,
- match central device and sensor signal,
- check the alarm triggering of the gas warning system.

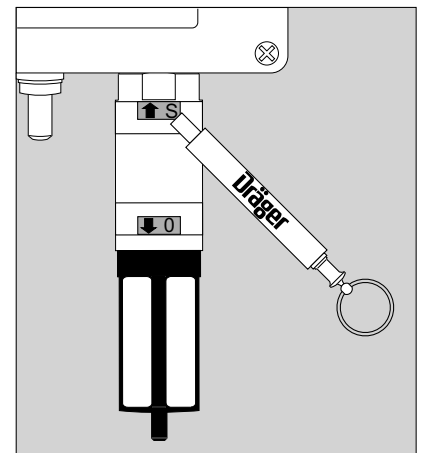
After issuing the 80% signal, the gas category set at the gas transmitter is displayed before the gas transmitter returns to normal operation.

- De-energising the alarm activation of the central device (not during alarm testing).
- Expose the gas transmitter to nitrogen, synthetic air, and/or fresh air via calibration adapter and wait until measurement value stabilises.
- Place the magnetic pin onto the transmitter surface area marked by the " ↓0 " icon and hold it there (within the black frame) for at least 5 seconds. After five seconds, the output signal of the gas transmitter changes to 3 mA (span gas signal) and remains there for as long as the magnetic pin is held against it. At the same time, a zero setting of the optical measuring unit is carried out automatically.
- Remove the magnetic pin. After 30 seconds, the device exits the automatic zero setting routine. As confirmation of the automatic zero setting, the output signal changes back to the span gas signal (3 mA). This signal is indicated for the same period of time as when starting the automatic zero setting routine. After that, the output signal of the gas transmitter changes to 4 mA (0 % signal).
- Check the display of the central device: set point 0 %LEL.
- If required, manually set the zero point at the gas transmitter to a display of 0 %LEL.
- Place the magnetic pin onto the transmitter surface area marked by the " ↑S " icon (within the black frame) and hold it there. After ten seconds, the output signal of the gas transmitter changes to 16.8 mA (80% signal) and remains there for as long as the magnetic pin is held against it.
- Check the display of the central device: set point 80 %LEL.
- If required, adjust the span at the central device until the central device displays 80 %LEL. While doing so, observe the information in the operating manual of the central device pertaining to this subject.
- Remove the magnetic pin. The gas transmitter changes to an output signal which displays the currently set gas category according to the following table:

Gas category	mA	Display [%LEL]
methane	7.2	20
propane	10.4	40
ethylene	13.6	60



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- This signal is maintained for 30 seconds. The gas transmitter will then switch back to normal operation.
- The central device display now matches the output signal of the gas transmitter.
- Reactivate alarm activation of the central device.

NOTICE

Using the 80% signal to match central device and transmitter signal without test gas is no replacement for the span calibration of the gas warning system.

Changing the gas category

The gas transmitter supports the linearized and temperature compensated display of a wide spectrum of gases and vapours. Depending on the measured gas, you can select one of the three gas categories "methane", "propane" or "ethylene" stored in the software. A table which allocates a row of checked gases and vapours is available in the table "Substitute Gas Calibration" on page 16.

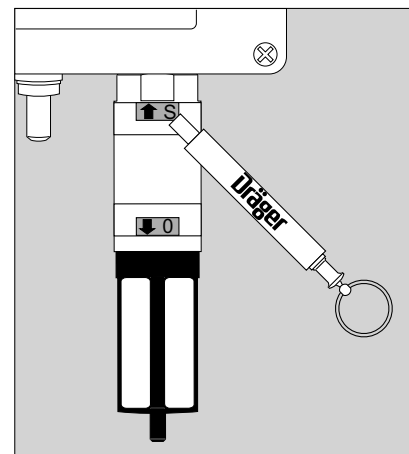
Changing the gas category is only possible under the following conditions:

- The device was less started up less than an hour ago.
- The last zero calibration of the gas transmitter was less than an hour ago.
- The gas concentration measured by the device is below 10 %LEL (expose to zero gas if necessary).

To change the gas category of commissioned gas transmitters, interrupt the power supply for a short period of time, wait for the running-in period of one minute to expire, and then carry out an automatic zero calibration (see "Automatic Zero Calibration" on page 13).

Then:

- Deactivate alarm activation of the central device.
- Place the magnetic pin onto the transmitter surface area marked by the " ↑S " icon (within the black frame) and hold it there.
After ten seconds, the output signal of the gas transmitter changes to 16.8 mA (80% signal) and remains there for as long as the magnetic pin is held against it.



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- Remove the magnetic pin. The gas transmitter changes to an output signal which displays the currently set gas category according to the following table:

Gas category	mA	Display [%LEL]
methane	7.2	20
propane	10.4	40
ethylene	13.6	60

This signal is maintained for 30 seconds. Within this period of time, the magnetic pin can be placed upon the area marked by the " ⬆S " icon to select the next gas listed in the table. In the process, the output signal of the gas transmitter changes to the value which corresponds with the newly selected value which corresponds with the gas category.

The gas transmitter returns to normal operation if no further entry with the magnetic pin is performed for 30 seconds.

- Check span calibration (see page 15).
- Reactivate alarm activation of the central device.

Maintenance

Regular intervals

are to be determined for the following tasks by the persons responsible for the gas warning system while taking local regulations into account:

- Visual inspection to look for damage and contamination. Special attention is required for gas entrance to the gas transmitter. Anything that blocks the gas entrance to the transmitter, e.g. dirt, ice, precipitation, etc., can prolong the response times or even completely disable the gas transmitter. Recommended inspection interval: 3 months.
- Visual inspection of the splash guard. If required, dismount gas exposure / process adapter and/or dirt deflector. Clean or replace damaged splash guard.
- Visual inspection of gas exposure / process adapter. Clean or replace damaged gas exposure / process adapter.
- Visual inspection of the dirt deflector. Clean or replace damaged dirt deflector.
- Check signal transmission and adjust if required (see "Checking the signal transmission, checking the alarm trigger and displaying the gas category" on page 17).
- Check the calibration of the gas warning system (see "Calibration" on page 11). Recommended calibration interval: 6 months.
- Observe standard DIN EN 60079-29-2 (provided binding).

Extending the maintenance intervals is possible if local conditions are taken into account, and if the recommended maintenance intervals require cleaning, maintenance or setup work. However, we do not recommend maintenance intervals that are longer than 12 months.

Yearly

Inspection by competent personnel. The inspection intervals are to be individually determined with regard to safety regulations, process control conditions and device-related requirements. We strongly recommend that a service contract be signed with Dräger to have them handle repairs and maintenance.

Faults, Cause and Remedy

Fault	Cause	Remedy
No output signal	Gas transmitter is not powered up	Check power supply and polarity.
	Gas transmitter defective	Have Dräger check the gas transmitter.
Transmitter output signal and central device display do not match	Central device and gas transmitter are not matched	Match central device and gas transmitter, see "Calibration" on page 11.
Output signal 1 mA	Ambient temperature too high resp. too low	Operate gas transmitter within the specified temperature range, see "Technical Data" on page 22.
	Gas transmitter defective	Have Dräger check the gas transmitter.
High linearity error	Wrong gas category set	Change the gas category, see "Changing the gas category" on page 18.
Possible calibration range at central device exhausted	Calibration range at central device too small	Calibrate system at gas transmitter.

Technical Data

General Details

Functional Principle	Compensated Infrared Absorption
Standard operating range	0 – 100 %LEL
Standard sensitivity	0.16 mA/%LEL
Standard gas categories	methane, propane, ethylene
Output signal	4 to 20 mA
Power supply	10 to 30 V DC
Switch-on current (2 ms)	≤0.5 A
Power consumption	≤2 W
Connecting thread	M25x1.5 or 3/4" NPT
Material	stainless steel SS 316
Weight	approx. 550 g
Dimensions	see "Dimensions" on page 25
Terminal box of complete set:	
Cable gland	M20x1.5 brass, nickel-plated for cable with Ø 7-12 mm (order no. 68 11 160 and 68 11 270) or 3/4" NPT thread (order no. 68 11 180).
Permissible conductor cross-sections:	1.0 to 2.5 mm ² (Order No. 68 11 160) or 0.5 to 4.0 mm ² (Order No. 68 11 270) or 0.2 to 4.0 mm ² (Order No. 68 11 180)
Environmental operating ranges	–40 to 65 °C 700 to 1300 hPa 0 to 95 % rel. hum.
Environmental storage ranges	–40 to 70 °C 700 to 1300 hPa 0 to 95 % rel. hum., non-condensing
Max. duration of storage	10 years
Expected service life	typically 10 years
IP rating	IP 66, IP 67 ¹⁾ , NEMA 4X&7
CE marking	devices and protection systems for intended use in potentially explosive atmospheres (directive 2014/34/EU); electromagnetic compatibility (directive 2014/30/EU)

1) Blockage of the gas entrance to the gas transmitter due to dirt or precipitation can prolong the response times or even completely disable the gas transmitter.

Measuring Technique Characteristics

digital resolution of measurement values	0±0.5 %LEL		
repeatability	≤ ±2 %LEL		
linearity error	≤ ±5 %LEL		
temperature influence, -40 to 65 °C			
zero point	≤ ±3 %LEL		
span (rel. change of display at 50 %LEL)	≤ ±0.06 % / °C		
humidity influence, 0 to 100 % rel. hum. at 40 °C			
zero point	≤ ±3 %LEL		
span	≤ ±5 %LEL		
pressure influence, 700 to 1300 hPa			
zero point	≤ ±2 %LEL		
span (rel. change of display at 50 %LEL)	≤ ±0.17 % / hPa		
time to start up	approx. 60 seconds		
warm-up phase	approx. 2 hours		
Stabilisation time (when feeding test gas)	≥ 45 seconds ¹⁾		
Update rate of the output for measuring value outputs	1 second		
Measurement value setting times ^{2) 3) 4)}	Methane	Propane	Ethene (Ethylene)
without splash guard t _{0...50}	≤ 18 seconds	≤ 18 seconds	≤ 14 seconds
without splash guard t _{0...90}	≤ 30 seconds	≤ 39 seconds	≤ 35 seconds
with splash guard and calibration adapter t _{0...50}	≤ 20 seconds	≤ 24 seconds	≤ 20 seconds
with splash guard and calibration adapter t _{0...90}	≤ 35 seconds	≤ 60 seconds	≤ 59 seconds
with splash guard and mud flap t _{0...50}	≤ 22 seconds	≤ 26 seconds	≤ 31 seconds
with splash guard and mud flap t _{0...90}	≤ 56 seconds	≤ 70 seconds	≤ 79 seconds
with splash guard and process adapter (1.0 to 1.5 l/min.) t _{0...50}	≤ 20 seconds	≤ 22 seconds	≤ 20 seconds
with splash guard and process adapter (1.0 to 1.5 l/min.) t _{0...90}	≤ 46 seconds	≤ 51 seconds	≤ 54 seconds
Expected service life	>10 years		

- 1) The stabilisation time can increase depending on the flow rate and the hose length.
- 2) The response times have been determined by flow when using the process adapter accessory. For all other cases, the response times have been determined by diffusion.
- 3) The setting time for the entire system is determined using the setting times for all parts of the entire gas warning system.
- 4) The response times may vary with other approved substances. Depending on the accessories used longer response times are possible.

Cross Sensitivities

The gas transmitter measures the concentration of hydrocarbons. Factory-preset calibration parameters are available for methane, propane and ethylene gases. However, other hydrocarbons can also be measured. The following text has examples of typical display values for some types of hydrocarbon, with the gas transmitter calibrated in the respectively stated gas category.

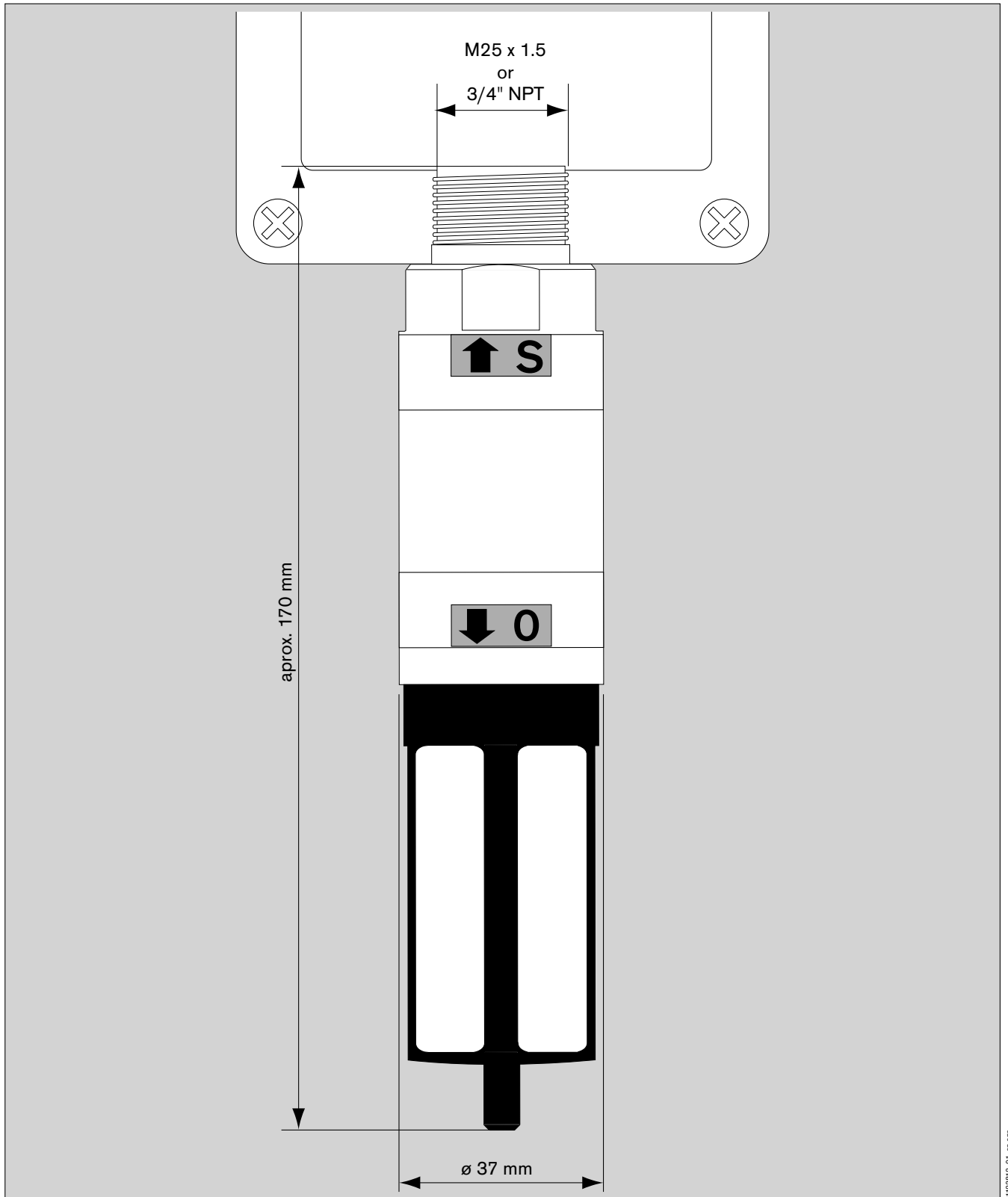
Name of substance ¹⁾	CAS-No.	LEL according to IEC [Vol.%]	Gas category	Display of 50 %LEL ^{2) 3)} in %LEL of target gas category
acetone	67-64-1	2.5	ethylene	75
benzene	71-43-2	1.2	ethylene	58
1.3-butadiene	106-99-0	1.4	ethylene	47
i-butane	75-28-5	1.3	propane	32
n-butane	106-97-8	1.4	propane	42
n-butanol	71-36-3	1.4	propane	30
n-butene	106-98-9	1.6	propane	48
n-butyl acetate	123-86-4	1.3	propane	30
n-butyl acrylate	141-32-2	1.2	propane	31
chlorobenzene	108-28-5	1.3	ethylene	25
cyclopentane	287-92-3	1.4	propane	46
diethyl ether	115-10-6	2.7	propane	64
1.4-dioxane	123-91-1	1.4	propane	21
ethanol	64-17-5	3.1	propane	56
ethylene	74-85-1	2.3	ethylene	50
ethyl acetate	141-78-6	2.0	propane	36
ethyl acetate	141-78-6	2.0	ethylene	>100
ethylbenzene	100-41-4	0.8	propane	26
n-hexane	110-54-3	1.0	propane	28
methane	74-82-8	4.4	methane	50
methanol	67-56-1	6.0	propane	>100
methanol	67-56-1	6.0	ethylene	>100
1-methoxy-2-propanol	107-98-2	1.6	propane	41
methyl-i-butylcetone	108-10-1	1.2	propane	26
methyl ethyl ketone (butanone)	78-93-3	1.5	propane	31
methyl methacrylate	80-62-6	1.7	propane	38
n-nonane	111-84-2	0.7	propane	28
n-octane	111-65-9	0.8	propane	30
i-pentane	78-78-4	1.3	propane	38
n-pentane	109-66-0	1.1	propane	35
propane	74-98-6	1.7	propane	50
i-propyl alcohol	67-63-0	2.0	propane	37
propene (propylene)	115-07-1	2.0	propane	33
propene (propylene)	115-07-1	2.0	ethylene	>100
propylene oxide	75-56-9	1.9	propane	54
styrene	100-42-5	1.0	ethylene	44
tetrahydrofuran	109-99-9	1.5	propane	44
toluene	108-88-3	1.0	ethylene	85
o-xylene	95-47-6	1.0	ethylene	68

1) Substances, for which an explosion protection measuring function has been determined, are listed in the EC-Type Examination certificate BVS 05 ATEX E 143X and the associated addendums.

2) The LEL values were used according to IEC 60079-20-1. Other LEL values may apply for the device settings at the location of use.

3) Typical tolerance: ±5 %.

Dimensions



Description of Design

The Dräger PIR 3000 infrared gas transmitter is a gas transmitter designed to determine the concentration of gases and vapours 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. The gas transmitter sends a standard 4 to 20 mA output signal.

Due to its robust design and the measuring method, the gas transmitter has long maintenance and calibration intervals (see "Maintenance" on page 20). A gas sensitivity drift is very unlikely due to the infrared-optical principle of measurement and in addition, the zero point stability is enhanced by an automatic tracking system.

Order List

Designation and description	Order No.
Dräger PIR 3000 infrared gas transmitter	
Dräger PIR 3000 ¹⁾ connecting thread 3/4" NPT, type IDS 0001	68 11 080
Dräger PIR 3000 compl. set d ²⁾ connecting thread 3/4" NPT, type ITR 0010	68 11 180
Dräger PIR 3000 compl. set d CCCF ²⁾ connecting thread 3/4" NPT, type ITR 0010	68 12 505
Dräger PIR 3000 ¹⁾ connecting thread M 25 x 1.5, type IDS 0011	68 10 810
Dräger PIR 3000 compl. Set e ³⁾ connecting thread M 25 x 1.5, type ITR 0001	68 11 160
Dräger PIR 3000 compl. Set e2 ⁴⁾ connecting thread M 25 x 1.5, type ITR 0002	68 11 270
Accessories/Spare parts ⁵⁾	
Splash guard	68 10 796
Calibration adapter	68 10 859
Gas exposure / process adapter	68 11 330
Dirt deflector	68 11 135
Assembly set e	68 11 427
Assembly set d	68 11 426
Pipe connection set (duct mount)	68 10 995
Magnetic rod	45 44 101
Terminal box design type Ex d (flameproof enclosure, 3/4" NPT, Ø10.0 cm)	68 11 161
Terminal box in Ex e design (increased safety, M25, 11.0 x 7.5 x 5.5 cm)	68 11 299
Terminal box in Ex e design (increased safety, M25, 12.0 x 12.0 x 7.4 cm)	68 11 159
Cable gland set M20	68 11 323
Instructions for Use	90 23 812
Installation Instructions	90 23 813

- 1) Splash guard and calibration adapter belong to the scope of delivery.
- 2) The complete set includes the terminal box (68 11 161), the splash guard as well as the calibration adapter, already preassembled.
- 3) The complete set includes the terminal box (68 11 299), the splash guard as well as the calibration adapter, already preassembled.
- 4) The complete set includes the terminal box (68 11 159), the splash guard as well as the calibration adapter, already preassembled.
- 5) Not included in the EU type examination certificate BVS 05 ATEX E 143 X.

Declaration of Conformity



EU-Konformitätserklärung
EU-Declaration of Conformity



Dokument Nr. / Document No. SE20435-09
Wir / we Dräger Safety AG & Co. KGaA, Revalstraße 1, 23560 Lübeck, Germany

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

Gassensor Typ IDS 00*1 (PIR 3000),
Gasmesstransmitter Typ ITR 00** (PIR 3000 complete set)
Gassensor Typ IDS 00*2 (DrägerSensor IR)
Gasmesskopf Typ ISH 00** (DrägerSensor IR complete set)
Gas Sensor type IDS 00*1 (PIR 3000)
Gas Detection Transmitter type ITR 00** (PIR 3000 complete set)
Gas Sensor type IDS 00*2 (DrägerSensor IR)
Gas Detection Head type ISH 00** (DrägerSensor IR complete set)

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

BVS 05 ATEX E 143 X
TÜV 19 ATEX 8433 X
MEDB00005BZ, MERB00005BZ

ausgestellt von der
notifizierten
Stelle mit der Kenn-Nr.
issued by the Notified Body
with Identification No.

DEKRA Testing
and Certification
GmbH
Handwerkstr. 15
D-70565 Stuttgart
0158

TÜV Rheinland Industrie
Service GmbH
Am Grauen Stein
D-51105 Köln
0035

DNV GL SE
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D-20457 Hamburg
0098

DNV UK Ltd.
30 Stamford Street
London SE1 9LQ
United Kingdom
0097

und mit den folgenden Richtlinien/Verordnungen unter Anwendung der aufgeführten Normen
übereinstimmt

and is in compliance with the following directives/regulations by application of the listed standards

Bestimmungen der Richtlinie/Verordnung provisions of directive/regulation		Nummer sowie Ausgabedatum der Norm Number and date of issue of standard
2014/34/EU	ATEX-Richtlinie ATEX Directive	EN IEC 60079-0:2018+AC:2020, EN 60079-1:2014, EN IEC 60079-7:2015+A1:2018, EN 60079-31:2022, EN 60079-29-1:2016+A1:2022 +A11:2022
2014/30/EU	EMV-Richtlinie EMC Directive	EN 50270:2015+AC:2016 susceptibility: type 2 emission: residential environment
2011/65/EU 2015/863/EU	RoHS-Richtlinie RoHS Directive	EN IEC 63000:2018
2014/90/EU SI 2016/1025	Schiffsausrüstungs-Richtlinie Marine Equipment Directive, (in conjunction with the latest EU implementing Reg.) item No. 3.54b. Merchant Shipping Regulation (in conjunction with the latest implementing Reg.) item No. 3.54b.	EN IEC 60079-0:2018+AC:2020 EN 60079-29-1:2016+A1:2022 +A11:2022, IEC 60092-504:2016, IEC 60533:2015

Überwachung der Qualitäts-
sicherung Produktion durch
(Kategorie III, Modul D)
Surveillance of Quality
Assurance Production by
(Category III, Module D)

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United Kingdom
0097

Zertifikat-Nr.:
Certificate No.:

MEDD00000TF, Rev. No.: xx
Valid until: 2029-02-05

MERD00000TF, Rev. No.: xx
Valid until: 2029-02-05

Lübeck, 2024-07-04
Ort und Datum (jjjj-mm-tt)
Place and date (yyyy-mm-dd)


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Subject to alteration