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Dräger PIR 7000 / Dräger PIR 7200

(certified as IDS 01xx)

Infrared Gas Transmitter

Technical Handbook



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For Your Safety

Strictly follow the Instructions for Use
Any use of the gas transmitter requires full understanding and strict observation of the Instructions for Use provided with the device.
This gas transmitter is only to be used for the purposes specified here.

Maintenance
Repair of the gas transmitter may only be carried out by competent personnel.
We strongly recommend that a service contract be signed with Dräger Safety to have them handle repairs and maintenance.
Only authentic Dräger spare parts may be used for maintenance.
Be sure to read the information contained in the chapter “Maintenance” on page 52.

Accessories
Only use accessories listed in the order list.

Safe connection of electrical devices
Do not connect electrical devices not mentioned in the Instructions for Use or in this Technical Handbook before contacting the manufacturer or an expert.

Use in potentially explosive atmospheres
Devices or components which are used in potentially explosive atmospheres and were tested and approved according to national, European or international regulations may only be used in conditions specified in the approval and under observation of relevant legal regulations. The electrical equipment may not be modified. The use of defective or incomplete parts is not permissible. When making repairs to devices or components of this type, the relevant regulations must be adhered to.

Safety Symbols used in this Manual

While reading this Manual, you will come across a number of warnings concerning some of the risks and dangers you may face while using the device. These warnings contain “signal” words that will alert you to the degree of hazard you may encounter. These words, and the hazard they describe, are as follows:

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

NOTICE
Indicates additional information on how to use the device.

Intended Use

Dräger PIR 7000 Infrared Gas Transmitter

— For stationary, continuous monitoring of the concentration of flammable gases and vapours containing hydrocarbons in a suitable atmosphere.

— **Measuring range type 334: (IDS 01x1)** 0 to 20 ... 100 %LEL *,
0 to 100 % vol. CH_4 (methane).

— **Measuring range type 340: (IDS 01x2)** 0 to 5 ... 100 %LEL *,
e.g. 0 to 850 ppm C_3H_8 (propane).

— Alternatively configurable for various gases and vapours as well as measuring ranges.

Dräger PIR 7200 infrared gas transmitter

For stationary, continuous monitoring of the concentration of carbon dioxide in a suitable atmosphere.

— **Measuring Range: (IDS 01x5)** 0 to 0.2 ... 100 % vol. CO_2 (carbon dioxide).

— With analogue output signal from 4 to 20 mA for measuring mode, bi-directional serial interface and HART® interface (optional) for configuration and measuring mode.
— Suitable for use in rough ambient conditions (e.g. offshore).
— For installation alternatively in Ex areas zone 1, 2 or 21, 22 corresponding to device category 2G, 3G or 2D, 3D or Class I or II, Div. 1 or 2 hazardous areas.

In connection with a central device (e.g. Dräger REGARD 4-20 mA or HART):

— Warning before an explosive concentration level is reached.
— Automatic initiation of countermeasures which avert the explosion hazard (e.g. switching on ventilation).
— Device fault warning.
— Special calibration mode (blocking of alarm triggering, one-man-calibration).

In connection with the Operating and Display Unit Dräger P 3300 / Dräger P 7300:

— Display of the measured value.
— Configuration of the gas transmitter.

® HART is a registered trademark of HCF, Austin, Texas, USA
* **L**ower **E**xplosion **L**imit, depending on the substance and the regulations applicable at the respective location.

Tests and Approvals

The explosion-protection approvals are valid for the use of the gas transmitter in gas/vapour-air mixtures of flammable gases and vapours or dust-air-mixtures of flammable dusts under atmospheric conditions.
The explosion-protection approvals are not valid for use in oxygen enriched atmospheres.

ATEX	Type: IDS 01xx Dräger Safety • 23560 Lübeck • Germany CE 0158 Ex II 2G Ex d IIC T6/T4 – DEMKO 07 ATEX 0654417X II 2D Ex tD A21 IP65 T80 °C/T130 °C PTB 07 ATEX 1016 –40 °C ≤ Ta ≤ +40 °C/+80 °C Year of construction (via serial number) [1]
IECEx	Type: IDS 01xx Dräger Safety • 23560 Lübeck • Germany Ex d IIC T6/T4 – IECEx UL 07.0009X Ex tD A21 IP65 T80 °C/T130 °C – IECEx PTB 07.0016 –40 °C ≤ Ta ≤ +40 °C/+80 °C Year of construction (via serial number) [1]
UL (Classified)	Type: IDS 010x Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class I, Zone 1, Group IIC T-Code T6/T4, –40 °C ≤ Ta ≤ +40 °C/+80 °C 9 to 30 VDC, 9 W • Type 4X
CSA (C-US)	Type: IDS 010x Class I, Div. 1, Groups B, C, D Class II, Div. 1, Groups E, F, G Class I, Zone 1, Group IIB+H2 T-Code T6/T4, –40 °C ≤ Ta ≤ +40 °C/+80 °C C22.2 no. 152 (only Dräger PIR 7000) 9 to 30 VDC, 9 W • Type 4X
TÜV	SIL 2 Certification EN 61508, EN 50402

1) The year of construction is indicated by the third letter of the serial number on the type plate:
Y = 2007, Z = 2008, A = 2009, B = 2010, C = 2011, etc.
example: serial number ARYH-0054, the third letter is Y, so the year of construction is 2007.

Design

The Dräger PIR 7000 is an infrared gas transmitter for the detection of flammable hydrocarbons in the ambient air or in other suitable atmospheres.
The Dräger PIR 7200 is used for detecting carbon dioxide (CO_2) in the ambient air or in other suitable atmospheres.
The optical 4-beam technology ensures utmost signal stability for all models over long periods.
The gas transmitter is available with an M25 or a 3/4 inch NPT thread.

The Dräger PIR 7000 type 334 model provides comparable sensitivity in the measuring range of the **L**ower **E**xplosion **L**imit (LEL) for many gases and vapours containing hydrocarbons such as methane, propane and ethylene.

The Dräger PIR 7000 type 340 model offers a high sensitivity for propane and alcanes of greater length such as octane and nonane. This allows for more sensitive measurements and alarm thresholds in the ppm range. Methane and ethylene are more weakly detectable with this model (see “Cross-Sensitivities Dräger PIR 7000 Type 340” on page 76).

The Dräger PIR 7200 model is used to detect carbon dioxide (CO_2) in a recommended measuring range from 0 to 30 % vol. Lower concentrations are sensitively detected so that even here a measuring range and corresponding alarm thresholds in the ppm range are possible.

The gas transmitters are designed for use under the most adverse conditions (e. g. offshore). A robust stainless steel housing protects the electronic and the optical components. Thus only non-corrosive materials are subjected to the environment.
Due to the extensive range of accessories, the device can be adapted to almost any application.

Status indicator, flowcell and bump test adapter display different device statuses: normal operation is indicated by a continuous green light and faults are indicated by a continuous yellow light.
The device offers a fast and simple possibility for calibration of zero-point and sensitivity (span). The magnetic wand is used to carry out corresponding calibration functions. The lights support the calibration procedure with simple blink patterns.

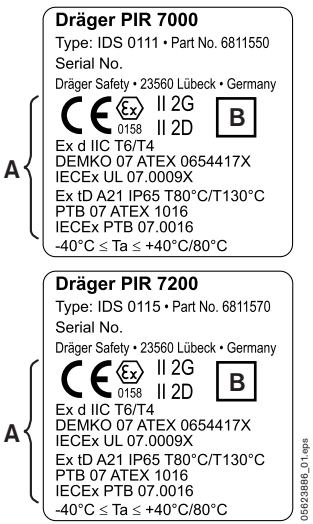
Optionally the Dräger PIR 7000 is available with a HART® interface.
The Dräger PIR 7200 is equipped with the HART® interface in every version.
All models have a 4 to 20 mA current output (current source or current sink, automatically detected) and a serial "one-wire" interface for the configuration via Dräger CC-Vision GDS software.

The software of the Dräger PIR 7000 type 334 contains linearised characteristics for the gases methane, propane and ethylene. The software of the Dräger PIR 7000 type 340 contains linearised characteristics for the gases propane and methane. With the Dräger CC-Vision GDS software, a software based on HART® DD/DTM or a HART® handheld terminal, the gas transmitter can be configured to any of these gases without re-calibration. In addition, the Dräger PIR 7000 offers an internal memory for up to ten substances with individual linearised characteristics which can be loaded additionally (for more information, please refer to page 46).

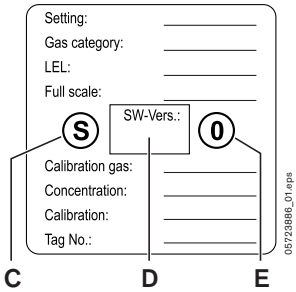
The Dräger PIR 7000 / Dräger PIR 7200 can be switched into "fast response mode" using the Dräger CC-Vision GDS software (or a software based on HART® DD/DTM or a HART® handheld terminal).
In standard configuration ("normal resonse mode") the measured value response time ($t_{0...90}$) is approx. four seconds when the measured gas concentration changes abruptly. In "fast response mode" configuration, the measured value response time ($t_{0...90}$) is less than one second.

Device Label

Dräger PIR 7000:	Model name
Type IDS 0111:	Name for approval
Part no.:	Order code
Serial no.:	Serial number
A:	Approval Code
B:	Field for Data Matrix-Code



Configuration Label



Setting: Substance the gas transmitter is calibrated for

Gas category: Configured linearised characteristics, selection from the gas library

LEL: Lower explosion limit of the "gas category" in % vol.

Full scale: Full-scale deflection in %LEL (Dräger PIR 7000) or in % vol. (Dräger PIR 7200), current output here: 20 mA

Calibration gas: Configured calibration gas, selection from the gas library

Concentration: Configured calibration gas concentration in % vol.

Calibration: Value set by calibration/adjustment in order to detect the substance named in "Setting"

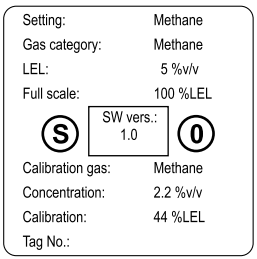
Tag no.: Field for individual device name (tag number) for the Dräger PIR 7000 / Dräger PIR 7200

C: Mark for the span calibration with magnetic wand

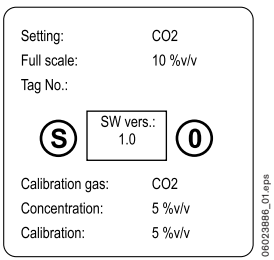
D: Device software version

E: Mark for the zero-point calibration with magnetic wand

Example
Dräger PIR 7000:



Example
Dräger PIR 7200:



SIL (Safety Integrity Level)

The Dräger PIR 7000 / Dräger PIR 7200 gas transmitter complies with the SIL standards EN 61508 and EN 50402 and is SIL Level 2 certified.

Parameterisation of the Dräger PIR 7000 / Dräger PIR 7200 is an essential aspect of the functional safety. Settings such as full-scale deflection, calibration values or the configuration of the lower explosion limit (LEL) significantly influence the measured value output of the gas transmitter.

To protect the gas transmitter parameterisation against unauthorised or accidental changes, the access for device configuration can be locked (SIL lock). In this case, a parameterisation of the device can only be carried out after a SIL passcode has been entered via Dräger CC-Vision GDS Software, via HART® DD/DTM based software or via HART® handheld terminal.

Assembly and Installation

The gas transmitter installation may only be carried out by competent personnel (e.g. Dräger Safety service personnel) under observation of the regulations applicable at the respective location.

Assembly

- Select the mounting location to achieve the maximum detection effect.
  Free air circulation around the gas transmitter must not be hampered.
- The mounting location of the gas transmitter must be selected as near as possible to the location of the possible leakage place:
  - to monitor gases or vapours that are lighter than air, the gas transmitter should be installed above the possible leakage place.
  - to monitor gases or vapours that are heavier than air, the gas transmitter should be installed as near to the ground as possible.
- Local air flow conditions must be considered. Install the gas transmitter at the location at which you can expect the highest gas concentration.
- Install the gas transmitter in a position where there is the lowest risk of mechanical damage.
- The gas transmitter must be sufficiently accessible for maintenance. Observe a clearance of approx. 20 cm (7.9 inch) around the gas transmitter!

Please observe the preferred orientation

- If a splash guard (part no. 68 11 911 or 68 11 912) is used then take care during assembly to ensure that the status indicator lights are in a vertical line. The "Dräger" writing of the splash guard must be able to be read horizontally. A maximum deviation of ±30 ^{o} from the horizontal position is permissible.

- Another assembly method is only permissible for gas transmitters without splash guard, e.g. for applications in ducts – this increases the risk of contamination of the optical surfaces.

NOTICE
Water and/or dirt on the optical surface areas may trip a warning or fault.

Mechanical Installation

NOTICE
On no account should you attempt to open the housing of the gas transmitter! The device does not contain any parts that can be serviced by the user. Opening of the device invalidates all guarantee claims.

– The gas transmitter is designed to be directly attached to a junction box.
– For the model with M25 thread (IDS 011x) we recommend using the junction box Ex e PIR 7000 (EAC 0000, part no. 68 11 898) – assembly: See page 39.
– Furthermore, any approved junction box can be used that has an M25 (Ex e and Ex tD) or 3/4" NPT (Ex d or Explosion Proof and Ex tD) insertion opening (depending on the thread of the gas transmitter) and connection terminals for at least three conductors (four conductors when using the serial interface communication) and earth.
– The junction box must be suitable for the mounting location and the application.

– When mounting the junction box and gas transmitter, make sure that the junction box is not subject to mechanical stress at the location of the connection.
● Close any unused cable entry openings at the junction box using approved plugs.

Dräger Safety recommends to use the mounting set PIR 7000 (part no. 68 11 648). The mounting set is suited for attaching the gas transmitter to level and arched surface areas.
● Assembly: See page 25.
● As an alternative, the joint ring PIR 7000 (part no. 68 11 908) can be used the if the mounting set is not used, see page 26.
– Sufficient distance to the wall, the ceiling and to the floor is ensured by using the PIR 7000 mounting set.
– In case of other assembly types, make sure that the distance between transmitter and wall, ceiling or floor is above 4 cm (1.58 inch).

Orientation
The gas transmitter Dräger PIR 7000 / Dräger PIR 7200 is suited for wall, floor and ceiling assembly.
The mounting set PIR 7000 can be mounted in offset positions of 90°, see page 25.
● Loosen the mounting set, rotate it according to the requirements and fasten the screws again.

For connection in the "flameproof enclosure" (Ex d) or "Explosion Proof" type of explosion protection

- If required: Mount the connecting union approved for the corresponding type of explosion protection between the junction box and the gas transmitter.

For connection in the "increased safety" (Ex e) type of explosion protection in conjunction with an approved, commercially available junction box

– The wall thickness of the junction box must be 4.2 mm to 12 mm at the mounting surface.
– The sealing surface towards the gas transmitter must be level and clean in the range from 28 mm to 32 mm diameter in order to ensure a flawless sealing by means of the provided O-ring.

- Secure the M25 nut against self-loosening.

For connection in the "increased safety" (Ex e) type of explosion protection in conjunction with the junction box Ex e PIR 7000 (EAC 0000, part no. 68 11 648)

– The junction box Ex e PIR 7000 is designed to be connected to the Dräger PIR 7000 / Dräger PIR 7200 gas transmitter with M25 threaded connection (IDS 011x). The cable diameter is between 7 and 12 mm. Cross-section of max. 2.5 mm^2 or 2 x 1 mm^2 may be connected.
– The torque for the terminal screws is at least 0.6 Nm.

- The cover screws must be tightened with a torque of at least 1.5 Nm (see also page 39).

Installation using the Mounting Set PIR 7000 (68 11 648)

- Make ready the corresponding screw fixing – see "Drilling Template – Mounting Set PIR 7000" on page 81.
- Securely affix the mounting bracket of the mounting set.
- Mount the gas transmitter to the mounting bracket and secure it with the provided screws (min. torque 10 Nm).

– Install the gas transmitter so that the status indicator, flowcell or bump test adapter lights and, if applicable, the process adapter and/or process cuvette status lights are clearly visible.

Electrical Installation

Electrical installation to be done only by qualified professional observing all applicable regulations. When installing the cabling, observe national regulations for the separation of mains, low voltage and control current circuits (in Germany: VDE Regulations).

For hazardous area:
When installing, the entire wiring must meet currently valid national regulations regarding the installation of electrical devices, and - if necessary - the national regulations regarding the installation in potentially explosive atmospheres. In case of doubt, the official responsible authorities are to be consulted prior to installation of the device. Devices with a measuring function for explosion protection in accordance to Directive 94/9/EC, Appendix II, 1.5.5 to 1.5.7, must be operated with a power supply that do not transfer power interruptions on the primary side of up to 10 ms to the secondary side.

– Installation using three or more wire cable 0.5 mm^2 (AWG 20) to 2.5 mm^2 (AWG 13). Recommendation: Shielded wire, shield braiding with an average coverage of ≥80 %. Shielding connection: Recommended only at the central device. When operating with HART® communication (HART® operation), it may be necessary to connect the cable shielding to the gas transmitter.

  To ensure proper operation of the gas transmitter, the impedance of the 4 to 20 mA signal loop must not exceed 500 ohms. Depending on the operating voltage and on the application (e.g. HART® operation), certain minimum impedances must be observed – see table on page 20.
  The power conductors must have a sufficiently low resistance to ensure the correct supply voltage at the gas transmitter.

⚠ CAUTION
Do not connect the device to the power supply before the wiring is complete and has been tested. This could damage the device.

Shielding

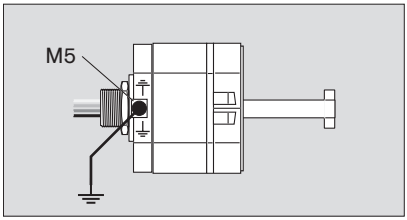
When connecting to central device only (recommended):

- Isolate or shorten shielding in the junction box to make sure any short circuits are avoided.
- Connect the gas transmitter electrically to the external equipotential bonding conductor (M5 screw – provided with the gas transmitter).

When connecting to central device and to gas transmitter (may be required e.g. in HART® operation):

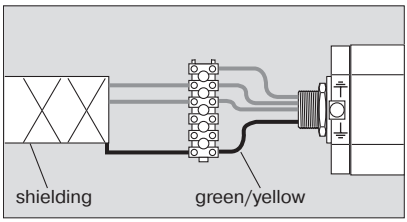
- Connect shielding to internal equipotential bonding of gas transmitter. Isolate shielding such that no short circuits can be generated.
- Connect shielding to earth of central device (e.g. housing, earth bar, etc.).

External equipotential bonding



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Internal equipotential bonding



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- If the HART® communication is used, observe the corresponding manufacturer specifications (only valid for devices with integrated HART® interface).
- Electrically connect the gas transmitter to the external equipotential bonding.

- Connect the gas transmitter.

Pin-out Dräger PIR 7000 / Dräger PIR 7200

Colour code of connection leads to gas transmitter and terminal number for factory-mounted junction box Ex e PIR 7000:

1	red	=	+ (DC supply 9 to 30 V DC, and/or 13 to 30 V DC for HART® operation; power consumption max. 7 W)
2	black	=	– (common reference potential)
4	brown	=	4 to 20 mA and HART® signal output
5	white	=	Serial interface
6	green/yellow	=	Internal equipotential bonding
⏚	–connection, external	=	External equipotential bonding

- Check the electrical installation to ensure that all conductors have been correctly connected.
- Do not shorten the white connection lead when the serial interface is not in use except where corresponding terminals are available in the junction box. In this case, shorten the white connection lead and connect it to a free terminal. Make sure that unused conductors will not contact any part of the housing or other conductors.
- Secure the connection leads within the junction box mechanically.

If the installation has been laid within protective conduits:

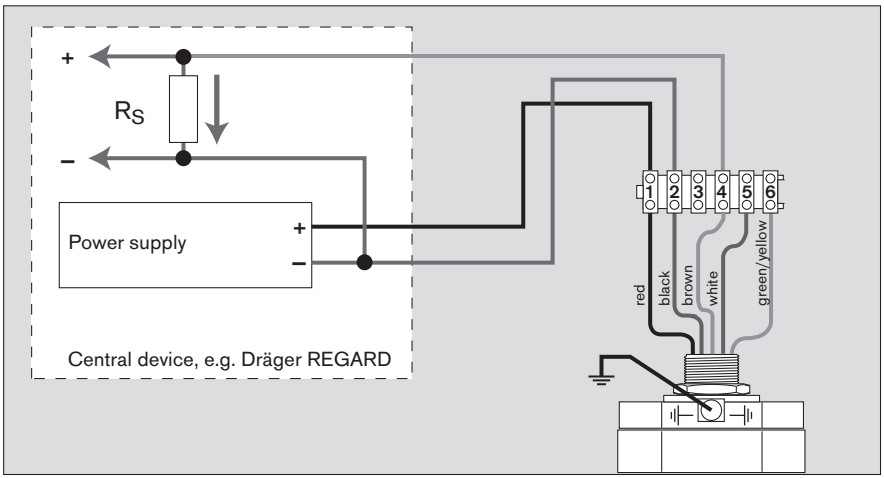
- Cast the protective conduit sealings and allow them to harden.

Current Source / Current Sink Operation

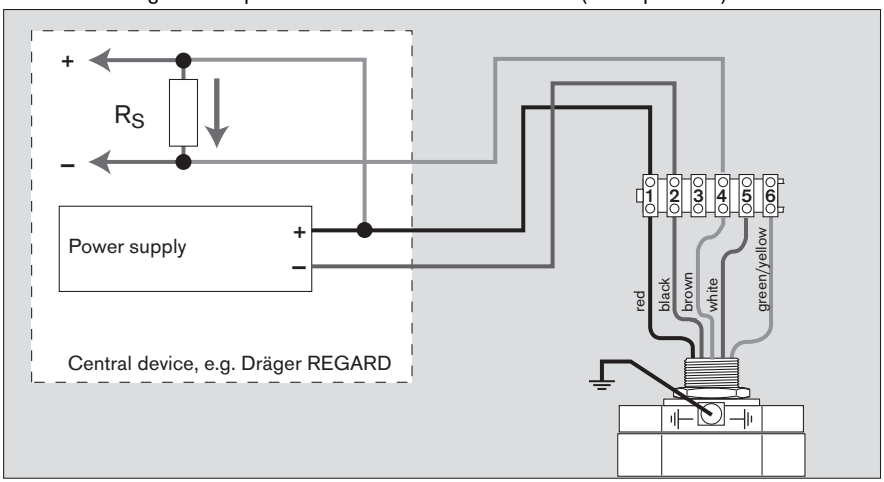
– The 4 to 20 mA signal output of the gas transmitter Dräger PIR 7000 / Dräger PIR 7200 can be switched both as current source (source operation) or as current sink (sink operation). The gas transmitter detects whether the loop resistance is connected to (+) or (–) and then automatically switches into current source operation or into current sink operation.

NOTICE
The gas transmitter monitors the signal output current. If the loop resistance R_S is not present or is too high, the gas transmitter switches into fault and emits the fault signal.

Connection diagram for operation as 4 to 20 mA current source (source operation):



Connection diagram for operation as 4 to 20 mA current sink (sink operation):



Maximum permissible cable resistance of the supply line:

$$R_{Cable}\ (\text{per core}) < \frac{U - 9}{1.8}\ \Omega$$

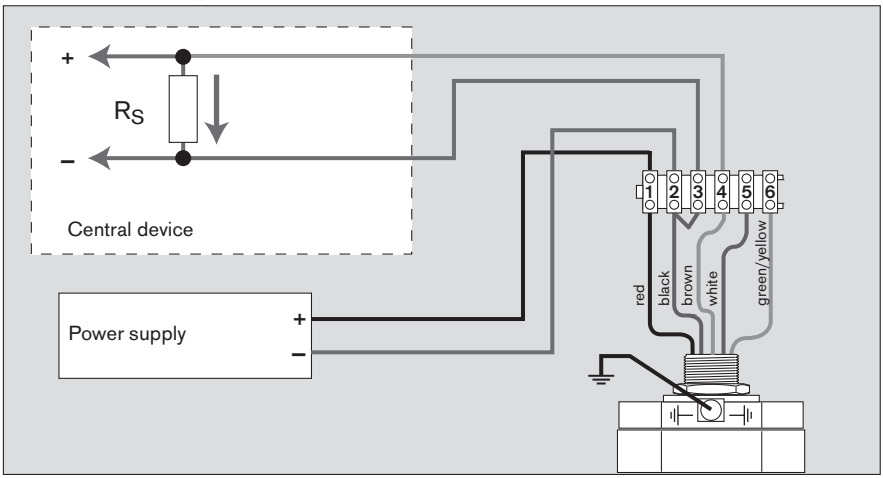
U = voltage output in V of power supply for output current of 0.9 A
Impedance of signal loop: See table on page 20.

Operation with Separation of Power Supply and Signal Lines

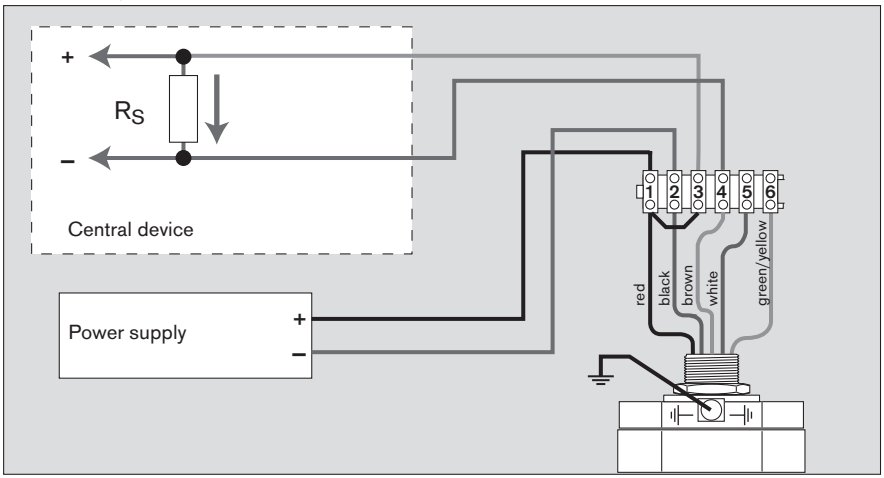
For gas transmitter operation with isolated power supply and signal lines to the central device, the junction box Ex e PIR 7000 (68 11 898) provides an unused terminal (terminal no. 3). Depending on the operating mode of the current output, a bridge between terminal number 2 and terminal number 3 (source operation) or between terminal number 1 and terminal number 3 (sink operation) should be installed in the junction box.

NOTICE
You have to use identical conductors of the same diameter and type for multi-wire connection. Maximally two conductors per terminal (see page 13).

Connection diagram for operation as 4 to 20 mA current source (source operation) with isolated power supply and signal lines to the central device:

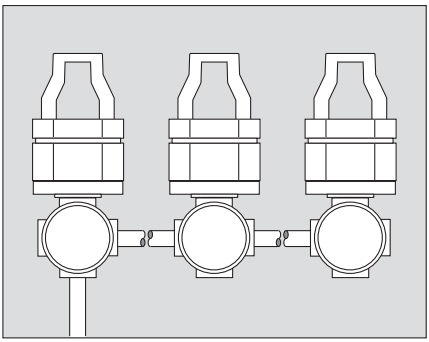


Connection diagram for operation as 4 to 20 mA current sink (sink operation) with isolated power supply and signal lines to the central device:



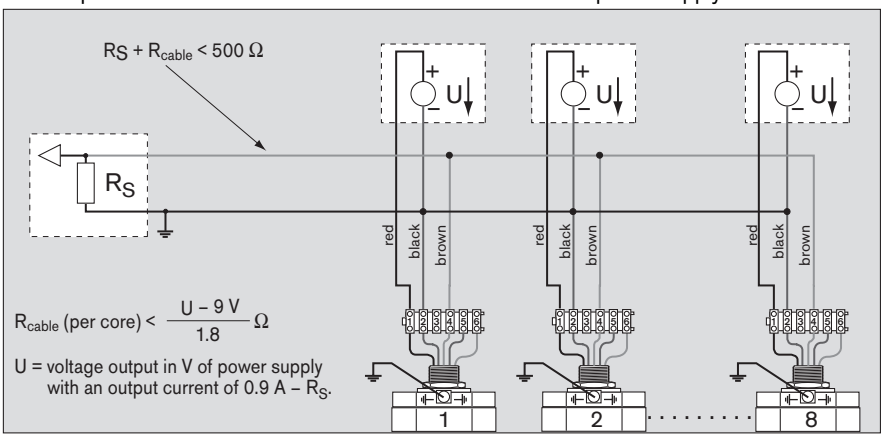
Connection between Several Gas Transmitters and Multidrop-capable HART® Central Device

- Each gas transmitter must first be put into operation separately.
  All gas transmitters which are scheduled for a multidrop line should be configured using a different "Polling Address" in the range from "1" to "15". It is best to assign sequential polling addresses, starting with "1".
- Configuration of "Polling Address": See Instructions for Use of the Dräger CC-Vision GDS software.
- Depending on the power supply, up to a maximum of 8 gas transmitters can be connected to a multidrop line.

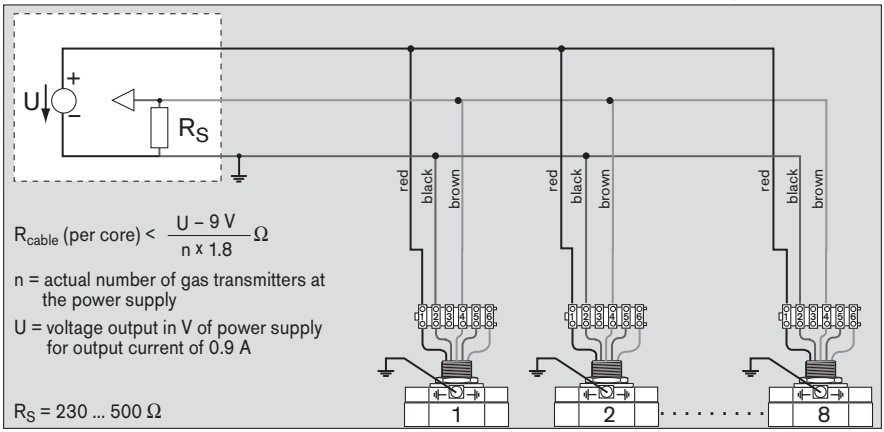


Connection diagrams:

Multidrop installation with HART® communication and isolated power supply units:



Multidrop installation with HART® communication and a (central) power supply:



Impedance Range of Signal Loop

Operating mode	Figure	Impedance range of signal loop [1]	Range of supply voltage
Operation without HART® communication	Figure 1 page 21	0 to 80 Ω	at 9 V DC
		linear rise with supply voltage from: 0 to 80 Ω at 9 V to 0 to 500 Ω at 18 V	9 to 18 V DC
		0 to 500 Ω	18 to 30 V DC
Operation with HART® communication (HART® operation)	Figure 2 page 21	230 to 270 Ω	at 13 V DC
		linear rise with supply voltage from: 230 to 270 Ω at 13 V to 230 to 500 Ω at 18 V	13 to 18 V DC
		230 to 500 Ω	18 to 30 V DC
HART® multidrop operation	Figure 3 page 22	230 to 500 Ω	9 to 30 V DC

[1] The impedance is the addition of the loop resistance R_S and the line resistance R_{cable} of the signal loop.

Figure 1:
Range of permissible signal loop impedance for devices operating without HART® communication, depending on supply voltage

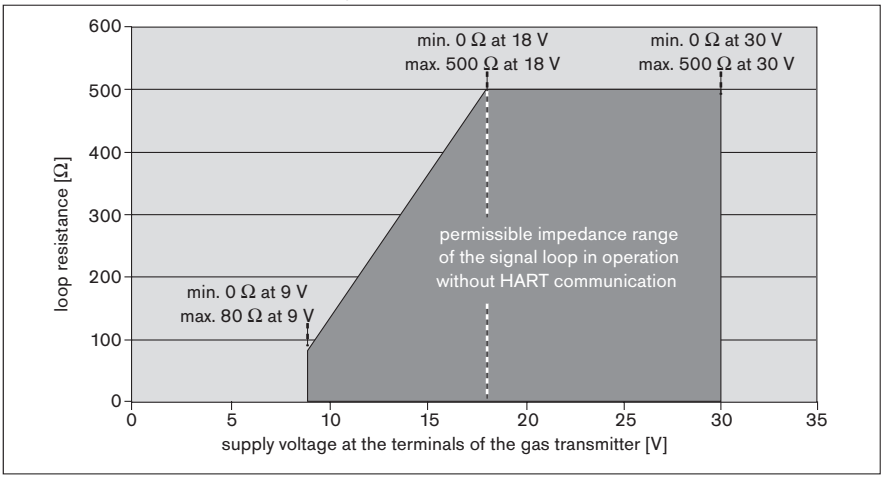


Figure 2:
Range of permissible signal loop impedance for devices operating with HART® communication (HART® operation) depending on supply voltage

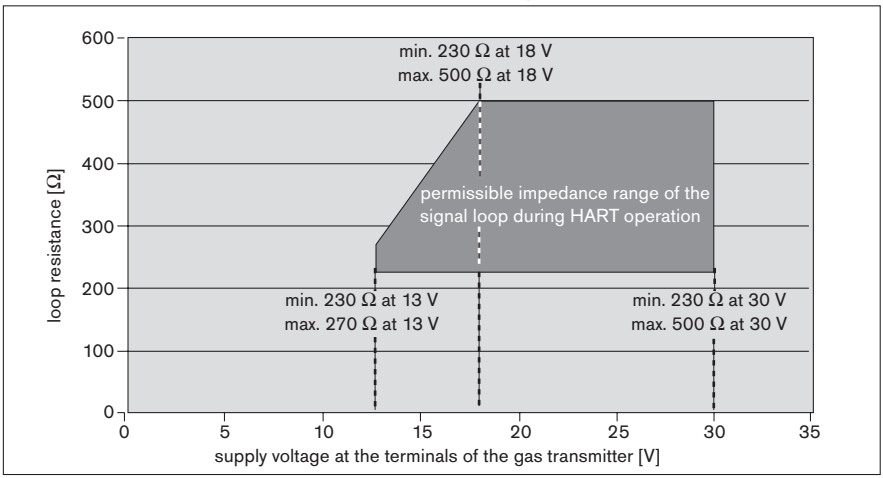
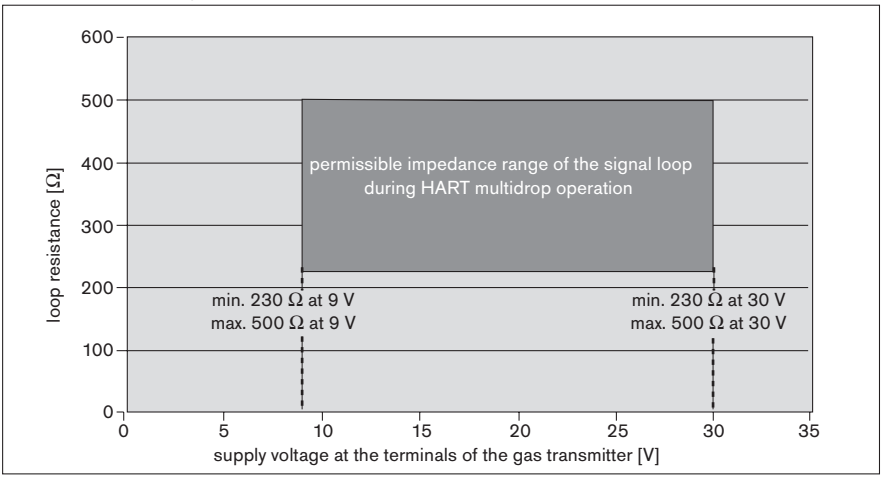


Figure 3:
Range of permissible signal loop impedance for devices in HART® multidrop operation, depending on supply voltage

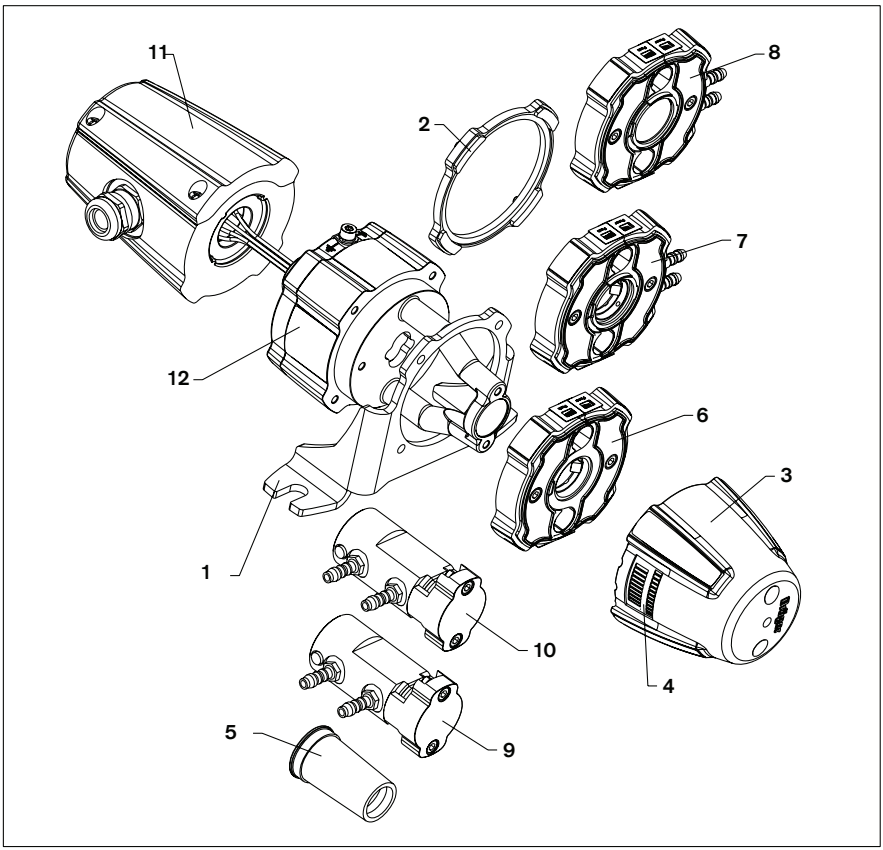


Accessories

The accessories shown in the order list on page 80 are available for the gas transmitter. **Depending on the accessories that have been installed, there may be deviations to the performance characteristics (to some extent see "Performance Characteristics (typical values)" on page 73 and page 74)!**

Overview of Accessories for the Dräger PIR 7000 / Dräger PIR 7200

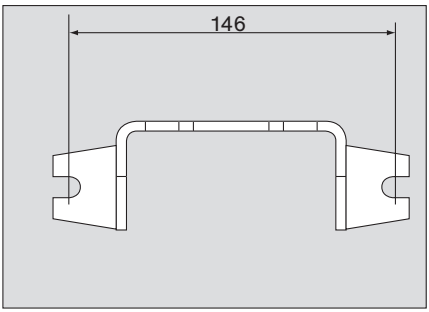
From the technical point of view, the accessories for the Dräger PIR 7000 and the Dräger PIR 7200 gas transmitters described in this chapter are basically identical. The accessories splash guard, status indicator, flowcell and bump test adapter are each available in two models, as the different measurement tasks (Dräger PIR 7000 = flammable gases and vapours and Dräger PIR 7200 = carbon dioxide) are to be distinguished using different colours. For Dräger PIR 7000, the selected colour is red, for Dräger PIR 7200 it is white.



		Part no.	
		Dräger PIR 7000	**Dräger PIR 7200**
1	Mounting set screws (4x) enclosed	68 11 648	
2	Joint ring	68 11 908	
3	Splash guard	68 11 911	68 11 912
4	Insect guard	68 11 609	
5	Hydrophobic filter	68 11 890	
–	Calibration adapter	68 11 610	
6	Status indicator	68 11 625	68 11 920
7	Flowcell	68 11 490	68 11 910
8	Bump test adapter	68 11 630	68 11 930
9	Process adapter	68 11 915	
10	Process cuvette	68 11 415	
11	Junction box Ex e PIR 7000 (EAC 0000)	68 11 898	
–	USB PC adapter PIR 7000	68 11 663	
–	HART® modem	– – –	
–	Duct mount set	68 11 850	
12	Gas transmitter Dräger PIR 7000 / Dräger PIR 7200	see "Order List" on page 79	

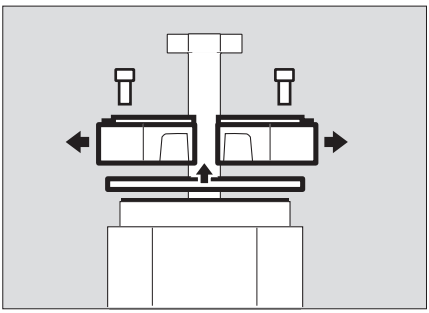
Installing Accessories

Mounting Set PIR 7000[*)]
(Part no. 68 11 648)

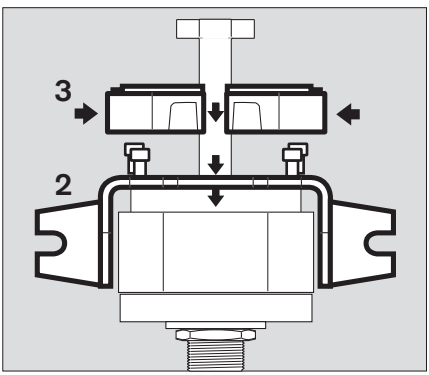


Intended use:
– The mounting set is suited for mounting the gas transmitter to flat and curved surfaces.

Mounting:
- Remove the splash guard PIR 7000 / 7200 (part no. 6811911/6811912), if fitted.
- Attach bracket for wall, ceiling or floor mounting by screws to the prepared boreholes.



1 Remove status indicator PIR 7000 / 7200 (part no. 6811625/6811920), flowcell PIR 7000 / 7200 (part no. 6811490/6811910) or bump test adapter PIR 7000 / 7200 (part no. 6811630/6811930) from the gas transmitter. Remove the joint ring PIR 7000 (part no. 6811908), if fitted.



2 Screw on the holder to the gas transmitter using the four screws in such a way that the gas transmitter is correctly aligned.
If using the splash guard PIR 7000 / 7200 (part no. 6811911/6811912) note the preferred position (see page 27).
3 Fit status display, flow cell or remote test adapter to the gas transmitter.
The joint seal ring must not be fitted if using the mounting set.

The mounting set PIR 7000 is removed in reverse order.

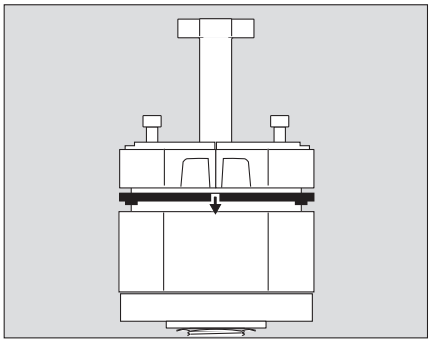
[*)] The mounting set PIR 7000 is also suitable for the use with Dräger PIR 7200.

Joint Ring PIR 7000[*)]

(Part no. 68 11 908)

Intended use:

— The joint ring is needed if the gas transmitter is mounted with PIR 7000 / 7200 status indicator (part no. 6811625/6811920), PIR 7000 / 7200 flowcell (part no. 6811490/6811910) or PIR 7000 / 7200 bump test adapter (part no. 6811630/6811930), however without the PIR 7000 mounting set (part no. 6811648).



Mounting:

● Fit the joint ring between gas transmitter and status indicator, flowcell or bump test adapter.

Splash Guard PIR 7000 / 7200

(Part no. 68 11 911 / 68 11 912)

Intended use:

— The splash guard is designed to protect the optical system against water and dust.

— The splash guard has also been optimised to allow fast gas exchange into the measuring cuvette. For response times, see "Performance Characteristics (typical values)" on page 73.

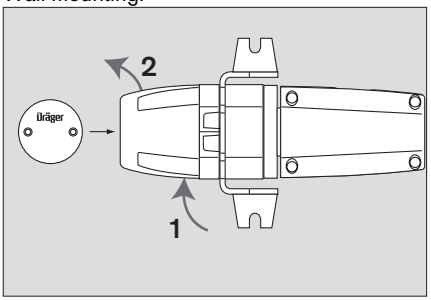
Mounting:

— The splash guard must only be attached to gas transmitters with a fitted status indicator PIR 7000 / 7200 (part no. 6811625/6811920), alternatively with a fitted flowcell PIR 7000 / 7200 (part no. 6811490/6811910) or a fitted bump test adapter PIR 7000 / 7200 (part no. 6811630/6811930).

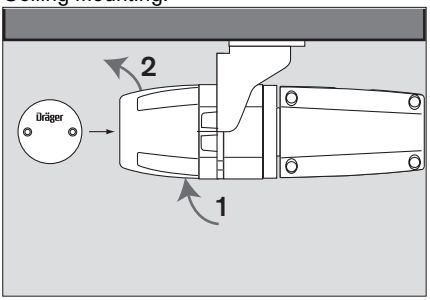
*) The joint ring PIR 7000 is also suitable for the use with Dräger PIR 7200.

- Note the preferred position of the gas transmitter with splash guard.

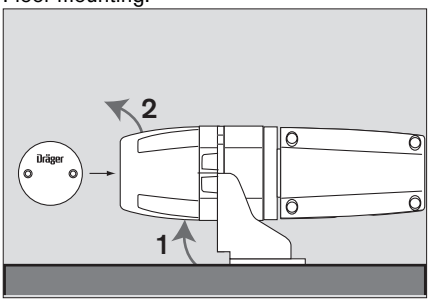
Wall mounting:



Ceiling mounting:



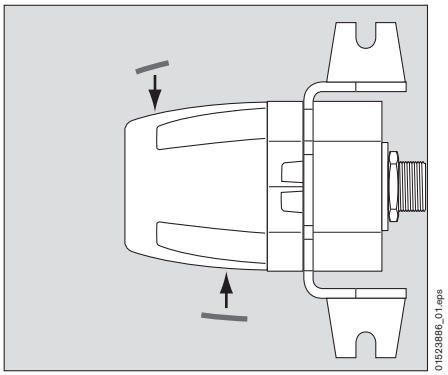
Floor mounting:



1 Measured gas inlet **2** Measured gas outlet

- During mounting, make sure that the lights of the status display are positioned one above the other. The "Dräger" logo of the splash guard must be visible horizontally.
- When using the flow cell PIR 7000/7200 or the remote test adapter PIR 7000/7200, the hose connections should point downwards to avoid the entry of water or dirt.
  Cover flow cell or remote test adapter connections with protective caps when not in use, or connect the inlet and outlet e.g. with a hose connector.
- Fasten the splash guard to the gas transmitter using the two screws. Tighten screws evenly to ensure a good seal.
  Make sure the sealing surfaces on the splash guard, on the status display, on the flow cell or on the remote test adapter are clean, clean sealing surfaces if required.
- Ensure free access for ambient air to the measured gas inlet and gas outlet.

Insect Guard PIR 7000[*)]
(Part no. 68 11 609)



Intended use:
– The insect guard is designed to prevent insects from blocking the gas inlet and outlet apertures as well as the inner gas passages in the splash guard.

Mounting:
● Slot both parts of the insect guard into the openings of the splash guard.

NOTICE
Using the insect guard lengthens the response time of the gas transmitter, see "Performance Characteristics (typical values)" on page 73.

Hydrophobic Filter PIR 7000[**)]
(Part no. 68 11 890)

Intended use:
– The hydrophobic filter is designed to protect the measuring cuvette in applications with extreme dust or dirt accumulation.
Dust and dirt particles can settle on the optical surfaces of the gas transmitter thereby resulting in an early malfunction.
– The hydrophobic filter must only be used in combination with status indicator PIR 7000 / 7200 (part no. 6811625/6811920), the flowcell PIR 7000 / 7200 (part no. 6811490/ 6811910) or the bump test adapter PIR 7000 / 7200 (part no. 6811630/6811930).

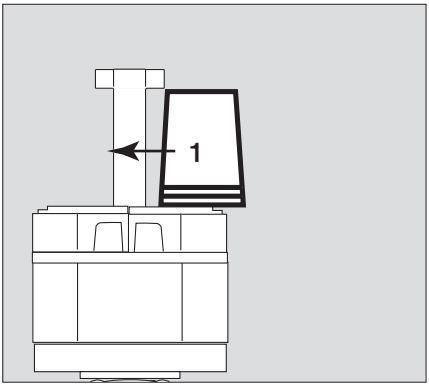
*) The insect guard PIR 7000 is also suitable for the use with Dräger PIR 7200.
**) The hydrophobic filter PIR 7000 is also suitable for the use with Dräger PIR 7200.

Mounting:

- Remove splash guard from gas transmitter (if fitted).

1 Carefully slide the hydrophobic filter onto the status display or flow cell or remote test adapter between the two ridges of the gas transmitter until the filter snaps into place and is positioned centrically.

- Reattach splash guard with screws (if required).



NOTICE
The hydrophobic filter must not be jammed. The response time of the gas transmitter increases with the use of the hydrophobic filter, see "Performance Characteristics (typical values)" on page 73.

- The hydrophobic filter must not be jammed. The response time of the gas transmitter increases with the use of the hydrophobic filter.

Calibration Adapter PIR 7000*)

(Part no. 68 11 610)

Intended use:

– The calibration adapter is designed to calibrate a gas transmitter fitted with a a splash guard PIR 7000 / 7200 (part no. 6811911/6811912).

– The calibration adapter is designed to calibrate a gas transmitter fitted with a process adapter PIR 7000 (part no. 6811915) or process cuvette PIR 7000 (part no. 6811415), see page 36 to page 38.

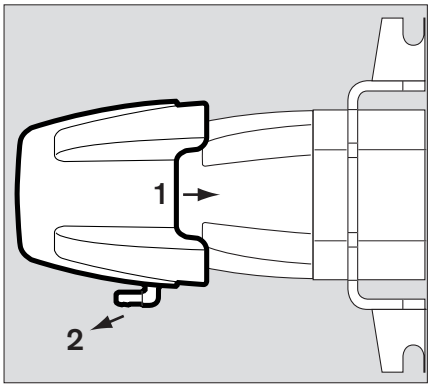
*) The calibration adapter PIR 7000 is also suitable for the use with Dräger PIR 7200.

Mounting:

1 Fit calibration adapter to splash guard of gas transmitter until it snaps into place. Make sure that the sealing surfaces around the openings of the splash guard are clean (clean before gassing, if required). The insect guard PIR 7000 (part no. 6811609) does not need to be removed for gassing.

– Calibrating the gas transmitter is only possible when the supplied test gas concentration in the measuring cuvette of the gas transmitter is sufficiently stabile. Therefore, the time required for calibration is greatly dependent on the gas flow, the hose diameter and the length of the hose between test gas container and calibration adapter.

– The gas rate of the test gas should be between 0.5 and 2.0 L/min and never fall short of 0.5 L/min.



NOTICE
In the case of strong wind (wind speeds greater than 30 m/s, 11 Beaufort) there is a risk of test gas mixing with the ambient air. This may lead to incorrect calibration gas concentrations.

NOTICE
Detach the calibration adapter from the splash guard of the gas transmitter once the calibration has been completed. The gas transmitter is not operational when the calibration adapter is connected.

Remove calibration adapter:

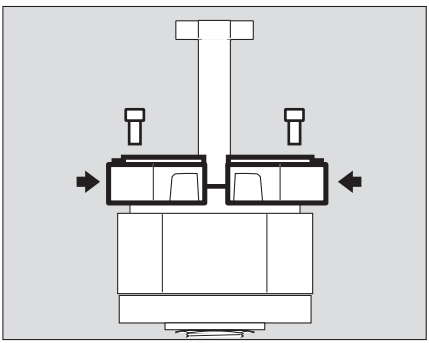
- Gently pull on the hose connector of the calibration adapter; the calibration adapter snaps out.

Status Indicator PIR 7000 / 7200
(Part no. 68 11 625 / 68 11 920)

Intended use:
The status indicator contains light-conducting components for transmitting light signals to the outer edge of the status indicator.
The gas transmitter features two status lights and provides the following information:
— Continuous green for indicating operational readiness
— Continuous yellow for displaying a fault or a warning
— Continuous yellow for displaying an error or a warning.
These light signals are arranged on two opposing sides of the status display.

NOTICE
The positioning of the light signals in relation to the upper side/underside of the gas transmitter may change dependent on how the gas transmitter is mounted. Basically, the colour assignment (yellow/green) is decisive, not the position of the light signals on the status indicator. Dräger Safety recommends that the labels (Power/Fault) are affixed in a such a way that the outlet areas of the light signals are identified unambiguously.

Mounting:
For mounting on a gas transmitter with mounting set PIR 7000 (part no. 6811648):
- Clean sealing surfaces on the gas transmitter, if required. Always allow the sealing surfaces and the base of the measuring cuvette to dry completely.
- Place the two parts of the status display on the gas transmitter and connect together.
  Make sure that no seals are jammed.
- Tighten the two screws.



For mounting on a gas transmitter without mounting set PIR 7000:
- Mount the joint ring PIR 7000 (included with the status indicator) before mounting the status indicator.

Flowcell PIR 7000 / 7200
(Part no. 68 11 490 / 68 11 910)

Intended use:
- The flowcell is designed for testing the function of the gas transmitter with a high test gas concentration and external test gas supply.
- Dräger Safety recommends a test gas flow of 0.5 to 1.0 L/min. It is recommended that you monitor the gas flow rate.
- For gas transmitters with or without splash guard.
- The measuring properties of the gas transmitter are affected by the flowcell. Therefore, after installation or removal of the flowcell, the zero point and sensitivity of the gas transmitter should be calibrated!

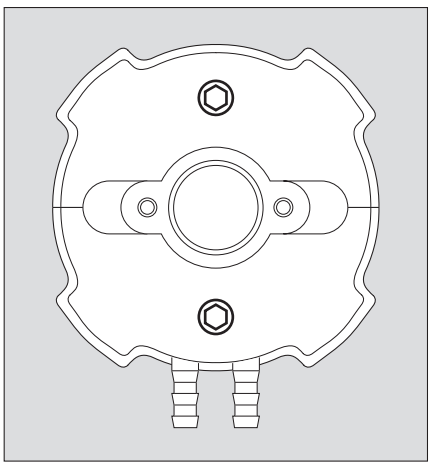
The gas transmitter features two status lights and provides the following information:
- Continuous green for indicating operational readiness
- Continuous yellow for displaying a fault
- Flashing green/yellow for status messages during the calibration procedure.

These light signals are arranged on two opposing sides of the flowcell.

NOTICE
The positioning of the light signals in relation to the upper side/underside of the gas transmitter may change dependent on how the gas transmitter is mounted. Basically, the colour assignment (yellow/green) is decisive, not the position of the light signals on the status indicator. Dräger Safety recommends that the labels (Power/Fault) are affixed in a such a way that the outlet areas of the light signals are identified unambiguously.

Mounting:
For gas transmitters with splash guard and status indicator:
- Remove splash guard together with status indicator.
  Always required:
- Clean sealing surfaces on the gas transmitter, if required.
  Always allow the sealing surfaces and the base of the measuring cuvette to dry completely.

- Fasten flowcell to gas transmitter using the two screws – the connections (two hose connectors dia. 6.5 mm) should point downwards.



If required:
- Attach splash guard to flowcell.
  Always required::
- Check system for sufficient gas-tightness.
  If there are leaks, effluent gas may enter the measuring cuvette and lead to incorrect measurements.

To protect the flowcell from dust and moisture:
- Fit air filter in the connected gas supply system.
- Cover flowcell connections with protective caps when not in use, or connect the inlet and outlet e.g. with a hose connector.

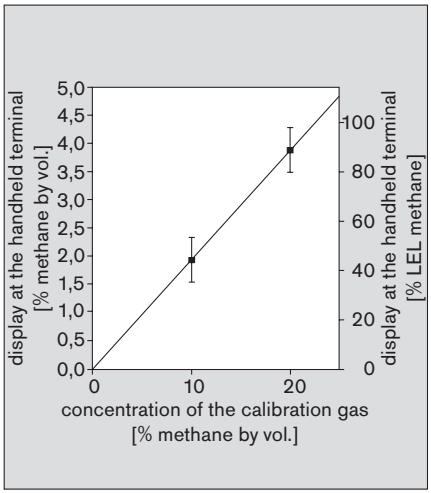
Operation
- Prior to commissioning perform a zero-point and span calibration of the gas transmitter.
- Disable the alarm activation in the central device and/or start maintenance mode of gas transmitter – see "Calibration", on page 57.
- Connect test gas supply to inlet of flowcell.
  Recommended flow rate: 0.5 to 1.0 l/min.
  Make sure no escaped gas can reach the remaining open IR measuring cuvette!
- If test gas flows through flowcell, the gas transmitter generates an analogue output signal corresponding to the concentration.
- All alarm settings should be checked or deactivated during the test.

⚠ **CAUTION**
After the functional test: Purge flowcell using dry air or nitrogen to secure the zero-point.

Theory of operation
- Depending on the optical cuvette length of flowcell, the signal generated by the test gas can be calculated as follows (example for Dräger PIR 7000 type 334, measured gas methane):

$$\text{Display of concentration [\% vol.]} = \frac{\text{Test gas concentration [\% vol.]}}{\text{Conversion factor}}$$

Example for the dependance of the concentration display of methane test gas in the range 0 to 25 % vol.:



– Dräger Safety recommends a test gas flow of 0.5 to 1.0 l/min.

NOTICE
After using flowcell with test gas, the system must be purged carefully using compressed air or nitrogen. Residual test gas in the flowcell or in the feed hoses may cause zero-point deviations over longer periods.

Conversion factors for Dräger models PIR 7000 / Dräger PIR 7200:

	Methane	Propane	Ethylene	Carbon dioxide
Dräger PIR 7000 type 334	4.2	4.2	3.3	– – –
Dräger PIR 7000 type 340	4.4	3.7	– – –	– – –
Dräger PIR 7200	– – –	– – –	– – –	3.8

Bump Test Adapter PIR 7000 / 7200
(Part no. 68 11 630 / 68 11 930)

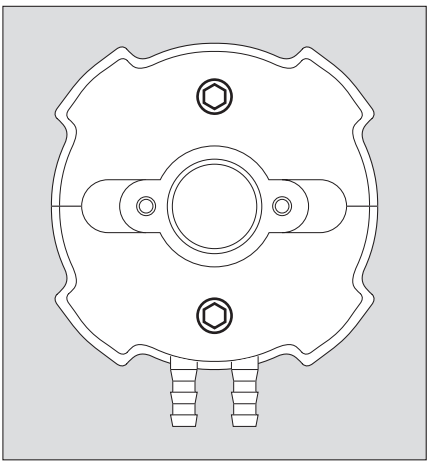
Intended use:
- The bump test adapter is designed for testing the function of the gas transmitter (with splash guard) with a gas/air mixture in concentrations below the lower explosive limit (test gas).
- The remote test adapter is not suitable for calibration purposes because lower concentrations may be set in comparison to those of the test gas in the measuring cuvette of the gas transmitter due to dilution effects (convection current, wind).

The gas transmitter features two status lights and provides the following information:
- Continuous green for indicating operational readiness
- Continuous yellow for displaying a fault
- Flashing green/yellow for status messages during the calibration procedure.

These light signals are arranged on two opposing sides of the bump test adapter.

NOTICE
The positioning of the light signals in relation to the upper side/underside of the gas transmitter may change dependent on how the gas transmitter is mounted. Basically, the colour assignment (yellow/green) is decisive, not the position of the light signals on the status display. Dräger Safety recommends that the labels (Power/Fault) are affixed in a such a way that the outlet areas of the light signals are identified unambiguously.

Mounting:
For gas transmitters with splash guard and status indicator:
- Remove splash guard together with status indicator.
  Always required:
- Clean sealing surfaces on the gas transmitter, if required. Always allow the sealing surfaces and the base of the measuring cuvette to dry completely.
- Fasten remote test adapter to gas transmitter using the two screws – the hose connections (two hose connectors dia. 6.5 mm) should point downwards.
- Fit splash guard to bump test adapter.



Notices on operation
- In order to minimise the effect of wind during function test, gassing of the gas transmitter via the bump test adapter should be done with no less than 10 litres of test gas per minute. Suitable pressure reducers should be used for this purpose.
- Operation with a bump test adapter does not influence the performance characteristics and the approvals of the gas transmitter.

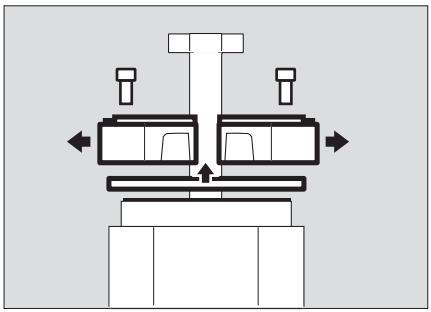
Process Adapter PIR 7000[*)]
(Part no. 68 11 915)

Intended use:
- The process adapter is used to operate the gas transmitter in pump mode when the measured gas is delivered to the gas transmitter via an external pump or in the case of a different active gas supply (e.g. by a process-related pressure difference).
- Only for gas transmitter without splash guard, bump test adapter or flowcell.
- Dräger Safety recommends that you do not exceed a flow rate of 20 L/min. Increasing flow rates may lead to an increase of pressure in the process adapter. Gas flow rate monitoring must be ensured.

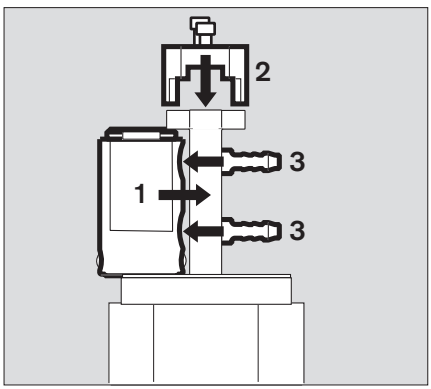
The gas transmitter features two status lights and provides the following information:
- Continuous green for indicating operational readiness
- Continuous yellow for displaying a fault
- Flashing green/yellow for status messages during the calibration procedure.

These light signals are arranged on two opposing sides of the process adapter.

Mounting:
- Remove status indicator PIR 7000 / 7200, flowcell PIR 7000 / 7200 and/or bump test adapter PIR 7000 / 7200 from gas transmitter.
  Remove the joint ring PIR 7000 (if applicable).



1 Carefully insert process adapter between the two ridges of the gas transmitter. Make sure that the sealing ring is fitted between process adapter and gas transmitter. Ensure that the seals and sealing surfaces are tightly fitted and clean.
2 Fit holder to the gas transmitter and fasten using two screws.
3 Screw on connecting bushes.



[*)] The process adapter Dräger PIR 7000 is also suitable for the use with Dräger PIR 7200.

- Connect gas lines to the connecting bushes. During this process, ensure in particular that the material is compatible with the substance to be monitored.
  The gas inlet and gas outlet connection can be freely selected.
- Check system for sufficient gas-tightness.

– The response time is dependent on the set volume flow (see "Performance Characteristics (typical values)" on page 73).

NOTICE
After each installation or removal of process adapter, it is absolutely necessary to calibrate the zero point and sensitivity!

Operating notes
The display of the Dräger PIR 7000/Dräger PIR 7200 depends on the partial pressure of the measured gas component. Alternating gas pressures or gas pressures which differ from the atmospheric pressure may be created in the process adapter due to system-related parameters such as flow rates, nominal diameters of inlets etc.
The maximum allowed internal pressure is 3000 mbar, the minimum allowed internal pressure is 700 mbar.

Process Cuvette PIR 7000[*)]
(Part no. 68 11 415)

Intended use:
– The process cuvette is used to operate the gas transmitter in pump mode when the measured gas is delivered to the gas transmitter via an external pump or in the case of a different active gas supply (e.g. by a process-related pressure difference).
– The process cuvette is made of stainless steel (SS 303) and is better suitable for corrosive substances.
– Only for gas transmitter without splash guard, remote test adapter or flow cell.
– Dräger Safety recommends that you do not exceed a flow rate of 20 L/min. Increasing flow rates may lead to an increase of pressure in the process cuvette. Gas flow rate monitoring must be ensured.

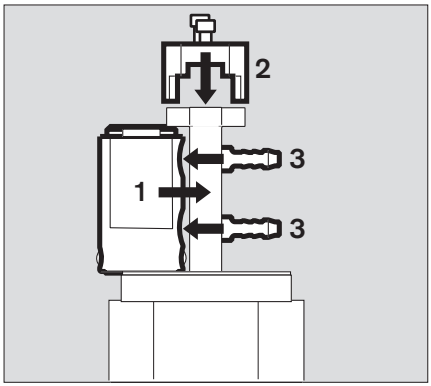
The gas transmitter features two status lights and provides the following information:
– Continuous green for indicating operational readiness
– Continuous yellow for displaying a fault
– Flashing green/yellow for status messages during the calibration procedure.

These light signals are arranged on two opposing sides of the process cuvette.

*) The process cuvette PIR 7000 is also suitable for the use with Dräger PIR 7200.

Mounting:

- Remove status display PIR 7000/7200, flow cell PIR 7000/ 7200 or remote test adapter PIR 7000/7200 from gas transmitter.
  Remove joint seal ring PIR 7000 if applicable.



1 Carefully insert process cuvette between the two ridges of the gas transmitter. Make sure that the sealing ring is fitted between process cuvette and gas transmitter. Ensure that the seals and sealing surfaces are tightly fitted and clean.
2 Fit holder to the gas transmitter and fasten using two screws.
3 Screw on connecting bushes.

- Connect gas lines to the connecting bushes. During this process, ensure in particular that the material is compatible with the substance to be monitored.
  The gas inlet and gas outlet connection can be freely selected.
- Check system for sufficient gas-tightness.

– The response time is dependent on the set volume flow (see "Performance Characteristics (typical values)" on page 73).

NOTICE
After each installation or removal of the process cuvette, it is absolutely necessary to calibrate the zero point and sensitivity!

Operating notes
The display of the Dräger PIR 7000/Dräger PIR 7200 depends on the partial pressure of the measured gas component. Alternating gas pressures or gas pressures which differ from the atmospheric pressure may be created in the process adapter due to system-related parameters such as flow rates, nominal diameters of inlets etc.
The maximum allowed internal pressure is 3000 mbar,
the minimum allowed internal pressure is 700 mbar.

Junction Box Ex e PIR 7000[*)]

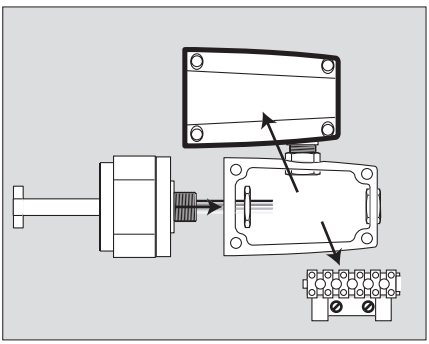
(Part no. 68 11 898)
(certified as type EAC 0000)

Intended use:

- The junction box Ex e PIR 7000 is designed for establishing the electrical connection of the gas transmitters Dräger PIR 7000 and Dräger PIR 7200 with M25 thread connection (type IDS 011X).
- The terminals are suited for connecting wires with cross-sections of maximum 2.5 mm^2 or 2 x 1 mm^2.
- The premounted cable entry point is suitable for cable diameters of 7 to 12 mm.
- The junction box Ex e PIR 7000 is suitable for areas in which the type of protection "Increased safety" is required. The junction box can be mounted in rotations of 90o based on specific local mounting conditions. This ensures the cover of the junction box must can always be opened easily under different mounting conditions. Recommendation: cable entry points downwards.

Mounting:

- Unscrew M25 nut on gas transmitter. Take care not to damage the seal on the housing of the gas transmitter!
- Loosen the four screws on the cover of the junction box lid and remove cover (secured by strap).
- Unscrew terminal block with the connecting terminals in the junction box, loosen two screws (captive).
- Guide the cable of the gas transmitter through the opening of the junction box and fit junction box on the M25 connection of the gas transmitter.



- Screw on junction box to the gas transmitter using the M25 nut and secure it by pushing up the sheet metal lugs or using screw lock.
- Install the terminal block with the connecting terminals again into the junction box.

On completion of the electrical installation:

- On completion of the electrical installation.
- Mechanically secure the connecting lines in the junction box.
- Close the cover of the junction box, making sure you do not jam any cables, and tighten the cover screws with a tightening torque of minimum 1.5 Nm.

NOTICE
To ensure proper operation in explosion-hazard areas, both the sealing surfaces on the gas transmitter and those on the junction box must be kept clean. Make sure the sealing ring between gas transmitter and junction box has been installed and is not damaged.

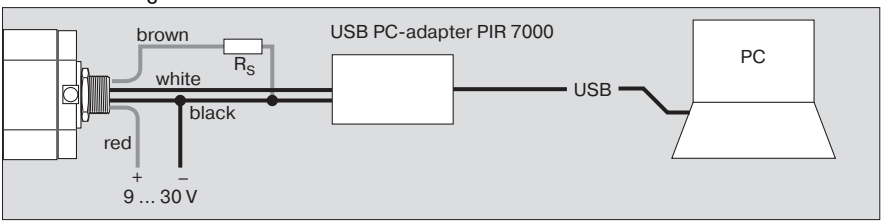
[*)] The junction box Ex e Dräger PIR 7000 is also suitable for the use with Dräger PIR 7200.

USB PC Adapter PIR 7000

(Part no. 68 11 663)

– USB PC adapter PIR 7000 for communication of the gas transmitter with Dräger CC Vision GDS software.
– Maximum distance between USB-PC adapter connection and Dräger PIR 7000 /7200: 25 m (82 feet).

Connection diagram:

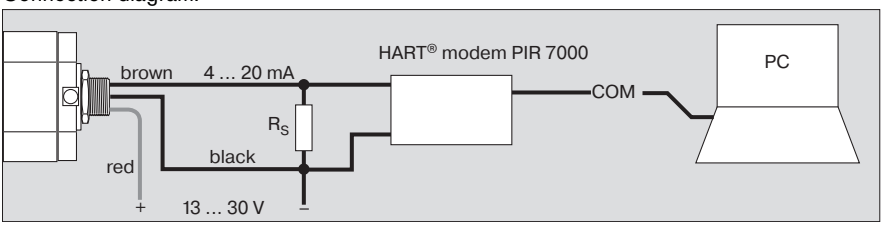


R_S: 230 to 500 Ω

HART® Modem

– HART® modem for communication of the gas transmitter with Dräger CC-Vision GDS software. Any conventional HART® modem is suitable (contact Dräger Safety for further information).
Only for devices with integrated HART® interface.

Connection diagram:



R_S: 230 to 500 Ω

Duct Mount Set PIR 7000[*)]

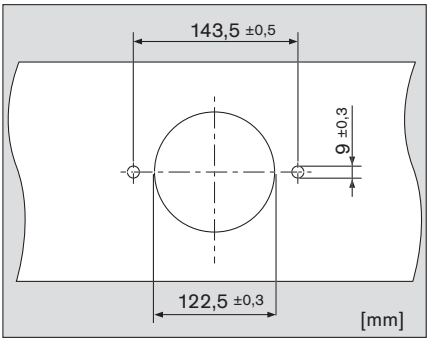
(Part no. 68 11 850)

Intended use:

– The PIR 7000 duct mount set is used for assembly of the gas transmitter in ducts when the gas concentration shall be monitored in the duct.
– For ducts with a minimum diameter of Ø200 mm (Ø7.9 inch) or pipe lines with a square cross-section of at least 170 x 170 mm^2 (6.7 x 6.7 $inch^2$).

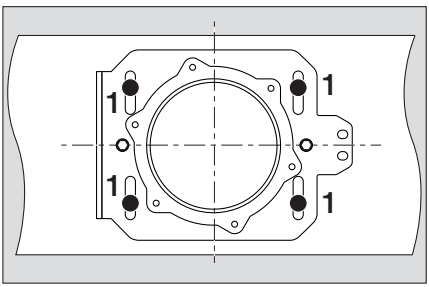
Mounting:

– Except for the two gaskets used for the sealing of duct/duct harness, all listed components (harnesses, gaskets, screws, washers) are included in the PIR 7000 duct mount set.
● Bore mounting holes into the duct.



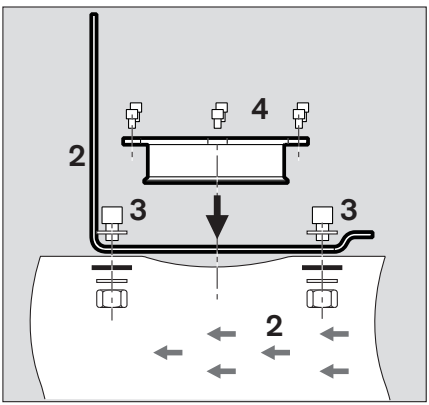
Only ducts with arched surface areas:

1 Insert the four feet into the slotted holes.
● Loosely fix the feet with four screws M6 x 10 and washers M6.
2 Position the duct harness on top of the duct according to the flow direction.
3 Mount the duct harness with two screws M8 x 20, 4 washers, 2 nuts and 2 gaskets (not enclosed).
4 Install the gasket and fix it to the duct harness with six screws M5 x 10. Screw in the screws up to the stop.



Only ducts with arched surface areas:

● Align the four feet so that the feet support the duct harness at the top of the duct.
● Firmly tighten screws.



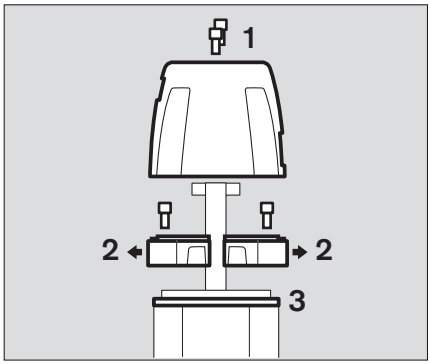
[*)] The duct mount set PIR 7000 is also suitable for the use with Dräger PIR 7200.

Prepare the gas transmitter for installation:

1 Dismount the splash guard PIR 7000 / 7200 (if available).

2 Remove status indicator PIR 7000 / 7200, flowcell PIR 7000 / 7200, bump test adapter PIR 7000 / 7200 (if available).

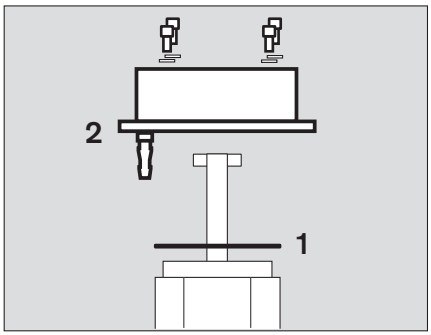
3 Remove the joint ring PIR 7000 (if available).



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Assemble the duct mount set:

- Clean sealing surfaces of gas transmitter, if necessary. It is important to let the sealing surfaces and the bottom of the measuring cuvette dry completely .
- Position the flat gasket **(1)** and the ring with screwed-in nozzles **(2)** onto the gas transmitter and secure it by evenly tighten four screws M5 x 12 with washers.
- If the nozzles (gas inlet and gas outlet) are not needed, close them gastight, e.g. by connecting them with a short piece of hose and moisten slightly, if necessary.



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Assembly of flowcell resp. bump test adapter:

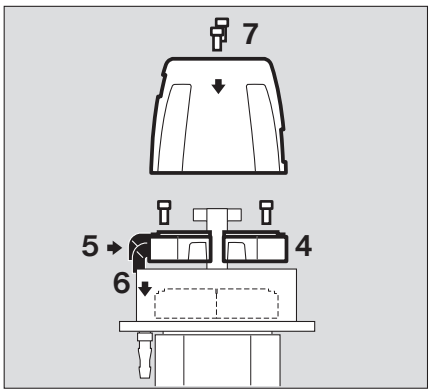
4 Flowcell PIR 7000 duct (part no. 68 11 945, see page 44) and/or bump test adapter PIR 7000 duct (part no. 68 11 990, see page 44).

5 Moisten the inside of the two angled elastomer connectors and slide the connectors onto the flowcell resp. the bump test adapter up to the stop.

6 Fix the flowcell and/or bump test adapter into the ring. Slide the angled connectors onto the nozzles in the ring.

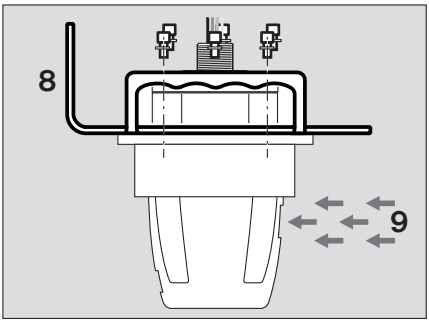
- Then fix the flowcell resp. the bump test adapter by tightening the 2 screws.

7 If required: Mount the splash guard onto the gas transmitter with the two screws.



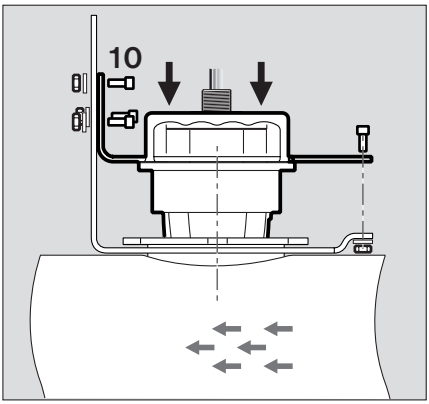
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8 Position the mounting bracket onto the gas transmitter and fix it with six screws M5 x 10 and washers.
9 Consider the flow direction when positioning the mounting bracket and the splash guard (if available).
The gas inlet must point towards the flow direction in the duct.



NOTICE
The flow direction in the duct and the correct orientation of the splash guard are essential for a correct measurement.

10 Put the gas transmitter onto the duct and loosely attach the mounting bracket to the duct harness with the three screws M6 x 16, washers and nuts.
- Moisten the gasket in the duct with water to facilitate the assembly.
- Press the gas transmitter into the gasket up to the stop.
- Tighten the three screws.
- Then mount the gas transmitter to the duct harness on the opposite side using two screws M6 x 16, washers and nuts.
- Check the system for sufficient gas tightness.



Put the gas transmitter into maintenance mode position:

10 Loosen all five screws M6 x 16 at the mounting bracket.
- Pull the gas transmitter out of the gasket and rotate the gas transmitter by 90°.
- Tighten two screws again.

Flowcell PIR 7000 Duct[*)]
(Part no. 68 11 945)

— In combination with the duct mount set PIR 7000, the PIR 7000 Duct flowcell is intended for testing the function of the gas transmitter with high test gas concentration and external test gas feed.
— Dräger Safety recommends a test gas flow of 0.5 to 1.0 L/min. The gas flow should be monitored.
— For gas transmitters with or without splash guard.
— The performance characteristics of the gas transmitter are influenced by flowcell. A calibration of zero-point and sensitivity (span) is therefore necessary after assembly or disassembly of the flowcell!
— For further information, see page 32.

Bump Test Adapter PIR 7000 Duct[*)]
(Part no. 68 11 990)

— In combination with the duct mount set PIR 7000, the bump test adapter PIR 7000 Duct is intended for testing the function of the gas transmitter (with splash guard) with a gas/air mix in concentrations below the lower explosion limit (test gas).
— Since dilution effects (convection current, wind) may lead to concentrations lower than that of the test gas in the measuring cuvette of the gas transmitter, the bump test adapter is not generally suitable for calibration purposes.
Notices on operation:
● In order to minimise the effect of flow during function test, gassing of the gas transmitter via the bump test adapter should be done with no less than 10 litre of test gas per minute. Suitable pressure reducers should be used for this purpose.
● Operation with a bump test adapter does not influence the performance characteristics and the approvals of the gas transmitter.
● For further information, see page 35.

The gas transmitter features two status lights and provides the following information:
— Continuous green for indicating operational readiness
— Continuous yellow for displaying a fault
— Flashing green/yellow for status messages during the calibration procedure.
These light signals are arranged on two opposing sides of the flowcell or the bump test adapter.

NOTICE
The allocation of light signals relative to the upper / lower side of the gas transmitter may be reversed depending on the assembly of the gas transmitter. Basically the colour allocation (yellow/green) does not determine the position of the light signals on the status indicator. Dräger Safety recommends proper attachment of the labels (Power/Fault) at the outlets of the light signals.

*) The flowcell PIR 7000 duct as well as the bump test adapter PIR 7000 duct are also suitable for the use with Dräger PIR 7200.

Operational Characteristics

Commissioning

The Dräger PIR 7000 / Dräger PIR 7200 gas transmitter is either set on delivery in accordance to the details in the table on page 63 and page 64 or is built-to-order. The essential settings of this configuration are specified on the configuration label on the device or on the configuration certificate provided with the device (see page 8).
The device has been factory-calibrated, so after finishing the electrical and mechanical installation, the device is ready to operate.

- To avoid false alarms, the alarm activation in the central device has to be disabled.
- Supply the system with power. The gas transmitter runs an internal self-test during which the status indicator's lights flash alternately for a short time. During the first warm-up phase of 60 seconds, the green status light is on and the yellow status light flashes. Operation then subsequently begins using the configuration set on delivery.
- We recommend checking if the factory-preset calibration and configuration match with the intended use of the gas transmitter. Due to national regulations, it may be necessary to run a calibration of the zero-point and the sensitivity (span).
- After installation, Dräger Safety recommends checking the measured value output within the configured measuring range (to the full-scale deflection) as well as checking if all relevant alarms are triggered.
- Enable the alarm activation in the central device to put the system back to normal operating mode.

— Wait for warm-up time to end.

The gas transmitter distinguishes between two warm-up phases:

Warm-up phase 1:	Duration: 60 seconds. Green status light on, yellow status light flashes. The gas transmitter is in maintenance mode and provides the configured maintenance signal. No digital measured value is output via the serial interface or the HART® interface.
Warm-up phase 2:	Duration: 180 minutes. Green status light on. Gas transmitter is ready for use. A corresponding digital warning is output via the serial and the HART® interface. When warm-up phase 2 is finished, the warm-up phase of the gas transmitter is typically completed. The gas transmitter then reaches the specifications stated in the “Performance Characteristics (typical values)” on page 73.

Configuration

Selecting a Measured Gas

The Dräger PIR 7000 / Dräger PIR 7200 gas transmitter supports the linearised and temperature compensated display of several gases and vapours.
Before commissioning, the measured gas suitable for the application can be selected from the gas library included in the device software. The configuration of the measured gas as well as the measurement unit and measuring range, in which the gas concentration is indicated, can be changed using the Dräger CC-Vision GDS Software as well as a HART® DD/DTM based software or a HART® handheld terminal. The procedure is described in the corresponding Instructions for Use.

Loading Additional Measured Gases (Dräger PIR 7000 only)

The Dräger PIR 7000 gas library is prepared for up to ten additional measured gases. The currently available selection of gases and vapours supported by the gas transmitter will be supplied by Dräger Safety on request. The Dräger Safety service department can perform the upload of additional measured gases.

Selection and Modification of LEL (Dräger PIR 7000 only)

Regionally different conversion factors may apply for the display of measured concentrations in percent of the lower explosion limit LEL. The Dräger PIR 7000 gas transmitter allows you to select one of three LEL categories which basically correspond with common explosion limits in the USA (acc. to NIOSH), Europe (acc. to IEC 60079-20) and Germany (acc. to Brandes / Möller – Sicherheitstechnische Kenngrößen, Band 1: Brennbare Flüssigkeiten und Gase). The stored values are specified in the tables "Cross-Sensitivities" on page 75 to page 76.
In addition, individual conversion factors can be set based on the stored value of the selected LEL category. In this case, the range is always limited to 75 % to 125 % of the value of the selected LEL category.

Calibration Gas

For many gases and vapours, the calibration with the target substance is a major problem because either a suitable calibration gas is not available, or because the vapour pressure of the liquid is too low at the ambient temperature, or because the handling of a calibration chamber in the field is problematic. A calibration using a substitute gas is always a tedious process which can end with a significant linearity error.
The Dräger PIR 7000 gas transmitter allows a free selection of substitute gas calibrations with any commercially available test gas (e. g. methane or propane) without further conversion, provided this gas is listed in the gas library of the gas transmitter.
A calibration gas deviating from the selected measured gas is set for the calibration of sensitivity (span). In calibration mode, the gas transmitter is first calibrated to the actual, currently configured test gas concentration. Calibration data are then automatically converted to the measured gas setting upon exiting the calibration mode. The specified measurement accuracy for the selected measured gas is ensured by means of the specific gas parameters stored in the gas transmitter.
All settings described above can be carried out using Dräger CC-Vision GDS Software as well as using HART® DD/DTM based software or a HART® handheld terminal.

Status Indication

The Dräger PIR 7000 / Dräger PIR 7200 gas transmitter has a green and a yellow status light, which is brought out to two opposite sides of the gas transmitter by means of the status indicator, flowcell or bump test adapter. The status lights are always visible from two sides.

State	Sample	Meaning
After power up	Green/yellow flashing alternately	Internal self-testing and test of status lights
Warm-up	Yellow flashes approx. 1 minute	Warm-up phase after power up
Operational characteristics	Green on	Device operates fault-free (operation/power)
Fault	Yellow on	Fault: See “Faults, Cause and Remedy” on page 66.
Calibration	Various patterns	See “Calibration” on page 54.

NOTICE
Due to the flexible mounting of the gas transmitter, the status lights are not allocated to the label (Power/Fault) of the status indicator, the flowcell and the bump test adapter. The colour of the lights are indicative.

Beam Block Warning (patented by Dräger Safety)

Although the gas transmitter Dräger PIR 7000 / Dräger PIR 7200 is equipped with effective facilities to protect the optic, in rugged environments the beam path may be subject to contamination over time. In order to prevent interruptions of normal operation caused by heavy contamination, a concept has been implemented which provides early warning of impending contamination in the beam path in order to avoid immediate stop of normal operation. For this purpose, the beam block warning can be activated.

In case the light intensity at the input of the optical measurement module falls below a critical value due to increasing contamination so that the stability of the measurement signal can no longer be guaranteed, the gas transmitter outputs a constant current of factory-preset 2 mA at the analogue interface in case the beam block warning has been activated (configurable between 0.7 and 3.6 mA). Since the remaining light intensity is still sufficiently high to ensure a safe detection of alarm states above 15 %LEL (Dräger PIR 7000) or above 15 % of measuring range/15 FSD (Dräger PIR 7200), measurement of the current gas concentration continues in the background.

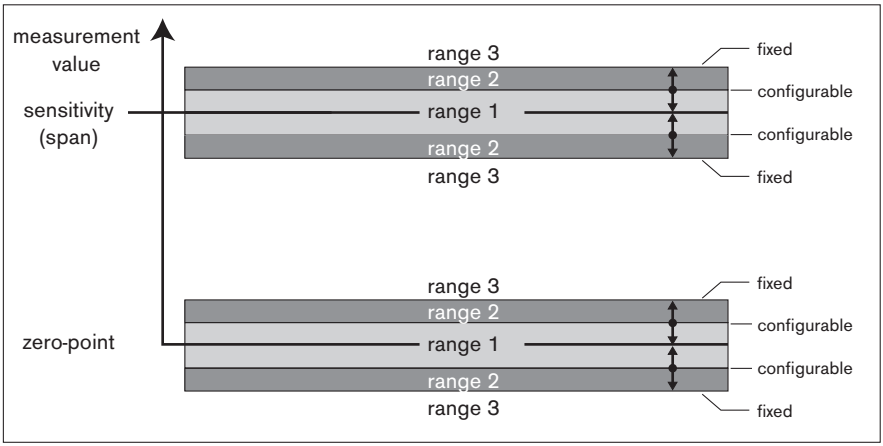
Any arising risk caused by flammable gases or vapours or caused by carbon dioxide above a concentration of 15 %LEL/15 %FSD will still be detected. For this purpose, the gas transmitter switches back to measuring mode and displays the measured value between 4 and 20 mA either digitally or at the analogue output.
This procedure allows for any necessary service measures to be better scheduled and controlled since no immediate intervention / cleaning is required.
In case the contamination should reach a degree which no longer allows for the safe detection of gas concentrations above 15 %LEL/15 %FSD, a fault status will be emitted, either digitally or with the associated factory-preset 1mA analogue signal (configurable between 0.7 and 3.6 mA). In this case the measurement readiness of the system is no longer guaranteed.

Warning

The Dräger PIR 7000 / Dräger PIR 7200 gas transmitter can be set to output a second warning via 4 to 20 mA current interface. This is the device status "Warm-up 2".
If this warning is activated (e.g. via Dräger CC–Vision GDS Software), the current output is switched to "fault signal" for approx. 0.7 seconds. This is repeated every 11 seconds. In the factory-preset configuration of the gas transmitter, the warning is set to "inactive".

Calibration Range Limits

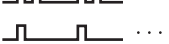
During a calibration using the magnetic wand (part no. 45 43 428), the gas transmitter provides information concerning the measured value of the device relative to the zero-point and the set calibration gas concentration. This information is signalled as pulse sequences via green status light as part of the zero-point and span calibration. This makes possible the detection of a deviation of the zero-point and the sensitivity before a calibration. The deviations are zero after calibration has been completed.



The symmetric range limits between range 1 and range 2 can be configured using the Dräger CC-Vision GDS software, see "Calibration using the Dräger CC-Vision GDS Software" on page 61.
Factory-preset configuration of the range limits: See page 64.

The green status light of the Dräger PIR 7000 resp. Dräger PIR 7200 indicates zero-point and span deviations as follows:

Dräger PIR 7000 (in factory-preset configuration)		**Display of green status light**
Zero-point:		
Range 3:	>3 %LEL	
Range 2:	>1.5 to ≤3 %LEL	
Range 1:	≤1.5 %LEL	
Sensitivity:		
Range 3:	>15 % from last stored calibration value	
Range 2:	>5 to ≤15 % from last stored calibration value	
Range 1:	≤5 % from last stored calibration value	

Dräger PIR 7200 (in factory-preset configuration)		**Display of green status light**
Zero-point:		
Range 3:	>0.03 % vol	
Range 2:	>0.013 to ≤0.03 % vol.	
Range 1:	≤0.013 % vol.	
Sensitivity:		
Range 3:	>15 % from last stored calibration value	
Range 2:	>5 to ≤15 % from last stored calibration value	
Range 1:	≤5 % from last stored calibration value	

Normal Operation

Configuration of the 4 to 20 mA Signal Output

The gas transmitter generates a 4 to 20 mA signal, proportional to the measured gas concentration, when the gas transmitter is configured for analogue signal transmission.

Current	Meaning	Configurable (0.7...3.6 mA)	Factory setting
4 mA	Zero-point	No	– – –
20 mA	Full-scale deflection	No	– – –
<1.2 mA	Fault, non-latching	Yes	– – –
3.8 mA ... 4 mA	Under-range	No	– – –
20 mA ... 20.5 mA	Full-scale deflection exceeded (over-range)	No	– – –
3 mA	Maintenance signal	Yes	– – –
2 mA	Beam block warning (preventive maintenance function)	Yes	Inactive
<1.2 mA	Device in HART® multidrop operation (polling address 1 ... 15)	No	Disabled

For the digital processing of gas transmitter data you can use:

— Dräger REGARD HART®-channel card (part no. 42 05 900), installed in a REGARD control system (Software Version 1.2 Polytron IR)

or

— any HART® communication tool interpreting the HART® commands selected for the Dräger PIR 7000 / Dräger PIR 7200

or

— Operating and display unit Dräger PEX 3300 / PEX 7300.

The gas transmitter periodically runs self tests for numerous internal functions. The gas transmitter outputs a fault signal as soon as a deviation from normal operation is detected.

⚠ CAUTION

Gas transmitters with splash guard must be regularly checked for contamination of the splash guard. Any contamination may cause an increase of the measured value response time.
In case of contamination: Clean splash guard, replace if necessary.

Maintenance

Maintenance Intervals

Observe EN 50073 and respective national regulations.

Daily

- Visual inspection to determine readiness for operation – the green status light must be on.

While commissioning

- During the automatic self-test, check the function of the yellow and green status lights.
- Check zero-point calibration.
- Check the current interface and if required also the HART® communication.
- Check measuring value output and alarm activation by applying suitable test gas.
  Prior to the inspection: Disable the alarm activation in the central device. Re-activate it when the inspection is over.

At regular intervals,
that are to be determined by the persons responsible for the gas detection system – recommended after 6 months:

- Check the zero-point and sensitivity calibration (if necessary, temporarily disable the alarm activation in the central device and re-activate it afterwards).
- Check signal transmission to central device and alarm activation.
- A calibration interval of more than 6 months is possible under the following conditions:
  After an operation period of a maximum of six months, a check should be made of whether an obstruction can occur in the gas entrance to the measuring cuvette within the given application, e.g. due to dust, dirt, etc. If a restriction to the function caused by these effects is excluded then the calibration interval can be prolonged – recommendation: Maximum 24 months.

Yearly

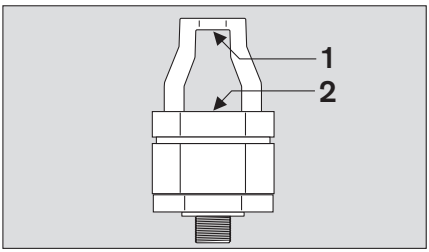
- Inspection by competent personnel.
  The inspection intervals are to be individually determined with regard to safety regulations, process control conditions and device-related requirements.
  We strongly recommend that a service contract be signed with Dräger Safety to have them handle repairs and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

Check the Measuring Cuvette of the Gas Transmitter and Clean if Required

- To avoid false alarms during inspection, set the analogue output signal to maintenance signal and/or ensure that the alarm activation in the central device is disabled.

- Remove the splash guard and, when required, any additional accessories from the gas transmitter.
- Examine the air inlet and air outlet openings for contamination and damage.

- Check optical surface areas (mirror 1 and window 2) and other accessories for contamination, clean with water or alcohol and carefully dry with absorbent cotton or a smooth cloth.
  Do not scratch the mirror or window!
  Completely remove all cleaning agents!
  Do not use sharp tools like scrapers or screwdrivers!



- Install the splash guard and when required any other accessories to the gas transmitter.
- Re-activate the analogue output signal if it has been set to maintenance signal. And/or, enable the alarm activation in the central device.

Calibration

General

The gas transmitter has been factory-calibrated for methane, propane and ethylene (Dräger PIR 7000 type 334) or methane and propane (Dräger PIR 7000 type 340) or carbon dioxide (Dräger PIR 7200). It can be useful and necessary to renew or to check the calibration. Observe national instructions and regulations, if applicable.

The gas transmitter requires a 2-point calibration: A zero-point calibration and a sensitivity calibration at a suitable point within the measuring range (span calibration).
Always use calibration adapter PIR 7000 (part no. 68 11 610).

Zero gas free of measurement gas must basically be used for zero-point calibration. Dräger Safety recommends to use clean compressed air or nitrogen.

If calibration is performed on the Dräger PIR 7000 gas transmitter using ambient air (fresh gas calibration), make sure that no measured gas and no other hydrocarbons are in the ambient air during calibration.
The zero-point calibration of the Dräger PIR 7200 gas transmitter must always be carried out using nitrogen or synthetic compressed air (without carbon dioxide traces, i.e. with a percentage of <0.001 % vol.).

The sensitivity calibration can be performed with gas from the device's internal gas library. In an ideal state of affairs (which is however not essential), the calibration gas is identical with the measured gas.

⚠ CAUTION

The gas transmitter is factory-preset to a calibration gas concentration for the span calibration, see table on page 63. Perform the span calibration with this concentration; otherwise, the risk of getting higher measuring errors during operation increases. The calibration gas concentration can also be found on the configuration label and – if necessary – the calibration value can be changed using the Dräger CC-Vision GDS Software, see “Calibration using the Dräger CC-Vision GDS Software” or the Instructions for Use of the Dräger CC-Vision GDS.

Possible Ways of Calibration for the Dräger PIR 7000 / Dräger PIR 7200

— Locally using the magnetic wand (part no. 45 43 428).
— Using the Dräger CC-Vision GDS Software.
— Using a HART® handheld terminal (only devices with integrated HART® interface).

Dependance of Calibration on Ambient Pressure

The gas transmitter provides a measurement signal which depends on the partial pressure of the gas component to be measured. Variations of atmospheric pressure, or of absolute pressure in dependance of the altitude of the site of operation, cause variations of the partial pressure.

The influence is:

$$\begin{matrix}\text{Dräger PIR 7000 [\%LEL]} \\ \text{Dräger PIR 7200 [\% vol.]}\end{matrix} = \begin{matrix}\text{Measured value [\%LEL]} \\ \text{Measured value [\% vol.]}\end{matrix} \times \frac{P_i}{1013\ \text{mbar}}$$

P_i = current pressure in the measuring cuvette

Example: If the gas transmitter Dräger PIR 7000 has been calibrated under normal air pressure (1013 mbar), a pressure change to 900 mbar would result in the following change of the measuring value:

$$50\ \%\text{LEL} \quad X \quad \frac{900\ \text{mbar}}{1013\ \text{mbar}} = \ 44\ \%\text{LEL}$$

(Remedy: Applying 50 %LEL calibration gas at 900 mbar pressure)

NOTICE
When delivered, the gas transmitter is calibrated with a reference pressure of 1013 mbar. Deviations from this reference pressure can lead to deviating measured values at any concentration.

Preparing Calibration

- Provide calibration gas.

For gas transmitters with mounted splash guard PIR 7000 / 7200:

- Push calibration adapter PIR 7000 onto the splash guard until it locks into place.

For gas transmitters with mounted flowcell PIR 7000 / 7200, bump test adapter PIR 7000 / 7200, process adapter PIR 7000 or process cuvette PIR 7000:

- Connect calibration gas feed directly to the flowcell, the bump test adapter, the process adapter or the process cuvette.

Calibration Using the Magnetic Wand

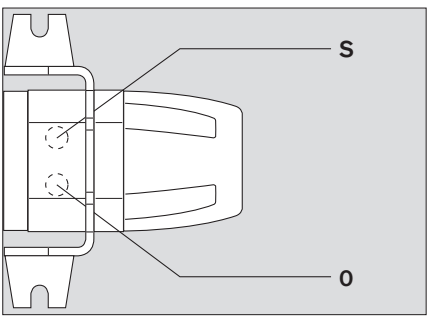
The calibration can be performed directly at the gas transmitter using the magnetic wand (part no. 45 43 428).

⚠ **CAUTION**
Always first calibrate the zero-point before the sensitivity (span).

Calibration using the magnetic wand:

— The gas transmitter has the marks on two opposite sides; **» 0 «** for "Zero-point" and **» S «** for "Sensitivity (span)".

- For calibration, place the magnetic wand onto the respective mark.



NOTICE
If the status lights of the gas transmitter's status indicator, flowcell or bump test adapter are not visible due to the type of installation (e.g. duct installation), the calibration can be performed using Dräger CC-Vision GDS Software or (if the device is equipped with a HART® interface) using a HART® handheld terminal.

After starting the calibration, if no further operation is done, the device automatically switches to normal operation / measuring mode after some time without saving changed calibration values. You can find additional information on this in the tables on page 57 and page 58, column "Timeout".

NOTICE
In case of timeout, or when calibration is aborted, always make sure to disconnect the test gas and to remove the calibration adapter. Otherwise, alarms can be triggered, or the measurement readiness of the system is no longer guaranteed.

Zero-Point Calibration Dräger PIR 7000 / Dräger PIR 7200

Action	Status Indicator	Output Signal	Meaning	Timeout
Prepare the device for zero-point calibration:				
Place the magnetic wand onto the mark » 0 «.	Green/yellow flash alternately and quickly.	Measuring mode	Unlock device for zero-point calibration.	
Remove the magnetic wand.	Green and yellow are on.	Measuring mode	Device waits for the start of calibration.	4 minutes
Initiate the zero-point calibration:				
Place the magnetic wand within 2 seconds onto the mark » 0 « for at least 1 second and then remove it.	Green/yellow flash alternately.	Maintenance signal	The calibration routine is started.	
Place on calibration adapter Dräger PIR 7000.				
Feed nitrogen or synthetic air with at least 0.5 L/min onto the sensor.				
Make sure that the gas transmitter was entirely purged with the chosen zero gas.				≈30 minutes
Put magnetic wand onto the mark » 0 «, then remove again.	Green and yellow are on.	Maintenance signal	Confirmation that the gas transmitter was purged with the chosen zero gas.	
	Green/yellow flash alternately and slowly.	Maintenance signal	The device determines the current zero-point deviation.	
Display of the zero-point deviation:			Deviation from 0.0 %LEL or 0.00 % vol. CO_2:	
	Green flashes at a single rhythm.	Maintenance signal	≤1.5 %LEL resp. ≤0.013 % vol. CO_2 (configurable)	
	Green flashes at a double rhythm.	Maintenance signal	>1.5 %LEL to ≤3 %LEL resp. >0.013 % vol. CO_2 to ≤0.03 % vol. CO_2	
	Green flashes at a triple rhythm.	Maintenance signal	>3 %LEL resp. >0.03 % vol. CO_2	≈30 minutes

Action	Status Indicator	Output Signal	Meaning	Timeout
Carry out the zero-point calibration:				
Place the magnetic wand onto the mark » 0 «.	Green and yellow are on.	Maintenance signal	Acknowledge the adjustment.	
Remove the magnetic wand.	Green/yellow flash alternately.	Maintenance signal	Zero-point calibration is terminated.	
Attention: Turn off the zero gas. Remove calibration adapter PIR 7000.			**Measuring mode is automatically activated after finishing calibration.**	

Sensitivity (Span) Calibration Dräger PIR 7000 / Dräger PIR 7200

Action	Status Indicator	Output Signal	Meaning	Timeout
Prepare the device for sensitivity (span) calibration:				
Place the magnetic wand onto the mark »S «.	Green/yellow flash alternately and quickly.	Measuring mode	Unlock device for span calibration.	
Remove the magnetic wand.	Green and yellow are on.	Measuring mode	Device waits for the start of calibration.	
Initiate the sensitivity (span) calibration:				
Place the magnetic wand within 2 seconds onto the mark » S « for at least 1 second and then remove it.	Green/yellow flash alternately.	Maintenance signal	The calibration routine is started.	
Place on calibration adapter Dräger PIR 7000.				
Feed the calibration gas corresponding to the device configuration at least 0.5 L/min to the sensor.				
Make sure that the gas transmitter was entirely purged with the chosen calibration gas.				≈30 minutes
Put magnetic wand onto the mark » S «, then remove again.	Green and yellow are on.	Maintenance signal	Confirmation that the gas transmitter was purged with the chosen calibration gas.	
	Green/yellow flash alternately and slowly.	Maintenance signal	The current measured value is determined.	

Action	Status Indicator	Output Signal	Meaning	Timeout
Result of the sensitivity (span) calibration:			Deviation from the last stored calibration value:	
	Green flashes at a single rhythm.	Maintenance signal	≤5 % of the last calibration value (configurable)	
	Green flashes at a double rhythm.	Maintenance signal	>7.5 % to ≤15 % of the last stored calibration value	
	Green flashes at a triple rhythm.	Maintenance signal	>15 % of the last stored calibration value	≈30 minutes
Carry out the sensitivity (span) calibration:				
Place the magnetic wand onto the mark » S «.	Green and yellow are on.	Maintenance signal	Acknowledge the adjustment.	
Remove the magnetic wand.	Green/yellow flash alternately.	Maintenance signal	The gas transmitter waits with the termination of the calibration until the gas concentration is the same as prior to calibration with an accuracy of ±5 % of the measured value.	≈30 minutes
Attention: Remove calibration adapter PIR 7000. Turn off the calibration gas. Make sure that the gas transmitter is no longer being purged with the corresponding calibration gas.			**Measuring mode is automatically activated after finishing calibration.**	

Errors/Complications during the Calibration

Action	Status Indicator	Output Signal	Meaning	Timeout
	Yellow flashes quickly.	Maintenance signal	Device has an error or has detected complications.	≈30 minutes
Attention: Turn off the calibration gas. Remove calibration adapter Dräger PIR 7000.				
Place the magnetic wand onto the mark » 0 « when calibrating the zero-point or onto the mark » S « during span calibration.	Green and yellow are on.	Maintenance signal	Display of device's error is acknowledged.	
Remove the magnetic wand.	Green/yellow flash alternately and slowly.	Maintenance signal	The measuring mode is activated with previous settings for zero-point and/or span.	

Terminating the Calibration

Action	Status Indicator	Output Signal	Meaning
Attention: Turn off the calibration gas. Remove calibration adapter PIR 7000.			
Place the magnetic wand onto the mark » S « when calibrating the zero-point or onto » 0 « during span calibration.	Yellow flashes quickly (for approx. 2 seconds).	Maintenance signal	The device has detected a user cancellation.
	Green and yellow are on.	Maintenance signal	The device acknowledges the termination.
Remove the magnetic wand.	Green/yellow flash alternately and slowly.	Maintenance signal	Normal operation is activated using the original calibration settings.

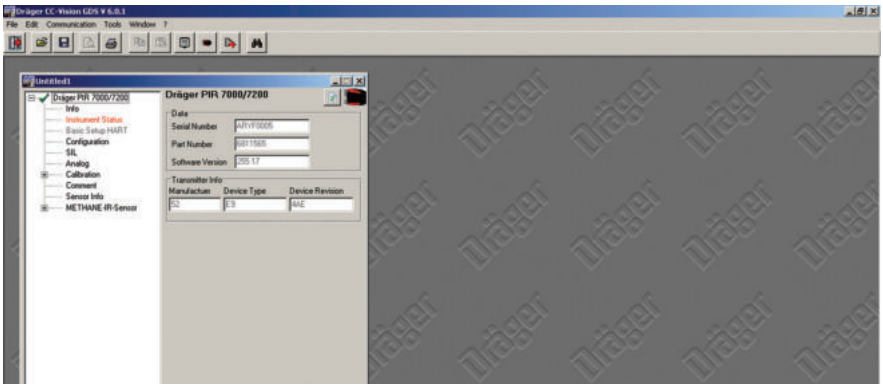
NOTICE

The calibration can be cancelled at any time by placing the magnetic wand onto the mark » S « when calibrating the zero-point or on » 0 « during a span calibration.
The individually selected calibration gas concentration may deviate from the calibration gas concentration set at the factory. The deviating calibration value must be configured using the Dräger CC-Vision GDS Software or a HART® handheld terminal (only devices with integrated HART®-interface) before the calibration procedure in the Dräger PIR 7000 / Dräger PIR 7200 is carried through and must be noted on the configuration label of the device.

Calibration using the Dräger CC-Vision GDS Software

The Dräger CC-Vision GDS software is a calibration and configuration software and is available on request. The software allows for the complete calibration of the gas transmitters Dräger PIR 7000 / Dräger PIR 7200. For detailed information refer to the Instructions for Use Dräger CC-Vision GDS (available on installation CD-ROM of Dräger CC-Vision GDS).

- Install Dräger CC-Vision GDS software on your PC.
- Connect the USB PC adapter PIR 7000 and install the driver software, if necessary (enclosed with the Dräger CC-Vision GDS Software).
- Alternatively, use a HART® modem (only for Dräger PIR 7000 / Dräger PIR 7200 with HART® interface, optional).
- Carry out the electrical installation.
- Provide power supply for the gas transmitter to be calibrated.
- Start Dräger CC-Vision GDS software.
- In the start screen of the software, click the icon of the Dräger PIR 7000.
- If communication to the gas transmitter has been established, select Zero-point or Sensitivity in the Calibration menu.



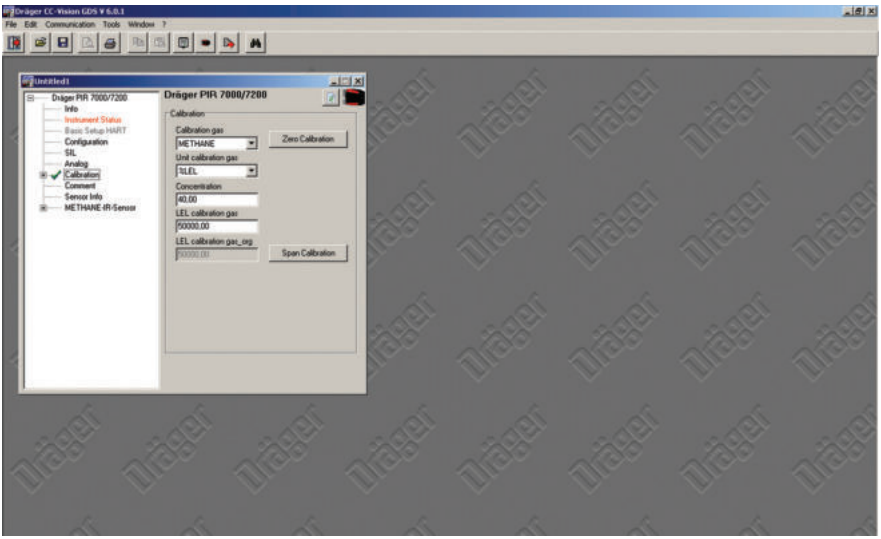
03223886_01_en.eps

⚠ CAUTION
Always first calibrate the zero-point before the sensitivity (span).

– The optional HART® communication allows you to communicate with the gas transmitter via longer distances / cable lengths so that hazardous areas do not have to be declassified.
- While applying zero gas or calibration gas to the gas transmitter, wait for a stable measured value.

If the measured value is stable:

- Click the OK button; the corresponding value is accepted by the gas transmitter.



Configuration of the Gas Transmitter.

The Dräger CC-Vision GDS Software can be used for configuration of the gas transmitter Dräger PIR 7000 / Dräger PIR 7200.

- Install Dräger CC-Vision GDS software on your PC.
- Connect the USB PC adapter PIR 7000 and install the driver software, if necessary (enclosed with the Dräger CC-Vision GDS Software).
- Alternatively, use a HART® modem (only for Dräger PIR 7000 / Dräger PIR 7200 with HART® interface, optional).
- Carry out the electrical installation.
- Provide power supply for the gas transmitter to be configured.
- Start Dräger CC-Vision GDS software.
- In the start screen of the software, click the icon of the Dräger PIR 7000.

The following table provides an overview of the configuration options of the gas transmitter Dräger PIR 7000 / Dräger PIR 7200 using the Dräger CC-Vision GDS software. You can find more detailed information on operation in the Instructions for Use of the Dräger CC-Vision GDS Software.

Factory-preset values are specified "bold" in the following table if not built-to-order. Any individually modified configuration remains stored after switching the gas transmitter off.

	Dräger PIR 7000		**Dräger PIR 7200**
	Type 334	**Type 340**	
Measured gas	**Methane** / Propane / Ethylene max. 10 gases/vapours can be loaded later	Methane / **Propane** max. 10 gases/vapours can be loaded later	**Carbon dioxide**
Measurement unit	%**LEL** / % vol. / ppm		% **vol.** / ppm
Measuring range – Methane:	0-15...**100** %**LEL** 0-1...100 % vol.	0-15...**100** %**LEL**	0-0.2...**10** ...100 % **vol.** 0-2,000...1,000,000 ppm
– Propane:	0-20...**100** %**LEL**	0-5...**100** %**LEL** 0...850 ppm	
– Ethylene:	0-25...**100** %**LEL**		
– Further gases/vapours:	on request	on request	
Calibration			
– Zero-point	**0** %**LEL**		**0** % **vol.**
– Calibration gas	**Methane** / selectable within the measured gases	**Propane** / selectable within the measured gases	**Carbon dioxide**
– Concentration of calibration gas	**50** %**LEL** / selectable within the measuring range		**4** % **vol.** / selectable within the measuring range
– Calibration gas unit	%**LEL** / % vol. / ppm		% **vol.** / ppm

	Dräger PIR 7000			Dräger PIR 7200
	Type 334	Type 340		
LEL values [% vol.][1)]	as per			not applicable
	NIOSH	IEC	PTB	
– Methane:	**5.0**	4.4	4.4	
– Propane:	**2.1**	1.7	1.7	
– Ethylene:	**2.7**	2.3	2.4	
	each individually modifiable by a maximum of ±25 %			
Analogue output				
– Maintenance signal	**3 mA** (constant) (configurable: either constant 0.7 ... 3.6 mA or alternating 3 mA for 0.4 seconds / 5 mA for 0.7 seconds)			
– Fault signal	**<1.2 mA** (configurable: 0.7 ... 3.6 mA)			
– Beam block warning	Active / **inactive** (configurable: 0.7...3.6 mA, factory-preset: 2 mA)			
– Warning signal	Active / **inactive** (when active: fault signal every 10 seconds for 0.7 seconds, otherwise measured-value signal)			
Zero-point capture value				
– Capture value	**0** %**LEL**			**+340 ppm**
	(configurable within the capture value limits)			
– Capture value limits	**±1.5** % **LEL**			**±200 ppm**
	(configurable up to ±50 % of the full-scale deflection)			
Calibration range limits:				
– Zero-point Configuration of ranges 1 and 2 by shifting the limit (see page 49):	0...**50** %...100 % ≙ 0...**1.5** %**LEL**...3 %LEL			0...**45** %...100 % ≙ 0...**0.013** % **vol**....0.03 % vol.
– Sensitivity (span) Configuration of ranges 1 and 2 by shifting the limit (see page 49):	0...**33** %...100 % = 0...**5** %...15 % deviation from last saved calibration value			
SIL lock	ON / **OFF**			
Response mode	**normal** / fast			

1) The LEL values are derived from NIOSH (LEL category 1), in accordance with IEC 60079-20 (LEL category 2) and in accordance with Brandes / Möller – Sicherheitstechnische Kenngrößen, Band 1: Brennbare Flüssigkeiten und Gase (LEL category 3).

Fast Response Mode

In the factory-preset configuration ("normal response mode"), the gas transmitter provides a minimum measured value response time of 4 seconds. The gas transmitter can be switched to "fast response mode" using the Dräger CC-Vision GDS Software or (optional) with a software based on HART® DD/DTM or a HART® handheld terminal. This can be useful when the measured gas is fed via pump or when the gas transmitter is operated in ducts where fast monitoring of gas concentration changes is required.

⚠ CAUTION
When "fast response mode" is set, the repeatability error increases by the factor 2. After changing the response mode, it is absolutely necessary to perform a complete calibration.

Due to the system design, very fast gas changes could lead to increased measured values. Remedy (if necessary): Reduce the gas exchange rate by reducing the flow rate at the process cuvette or at the process adapter, and/or in the duct.

Disposing of the Device

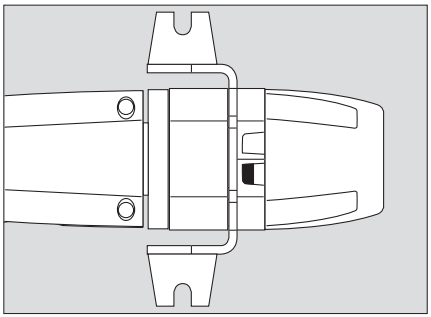


From August 2005, regulations apply to the whole of the EC for the disposal of electrical and electronic devices; these regulations are set in the EU Directive 2002/96/EC and in national laws relating to this device.
Special collection and recycling possibilities have been established for private households. However, since the device has not been registered for use in private households, it cannot be disposed of as special household waste. For disposal, it can be sent back to your national Dräger Safety Sales organisation; if you have any questions requiring disposal, then please contact this location.

Faults, Cause and Remedy

The yellow status light signals errors or faults of the gas transmitter. It is irrelevant which error/fault has occurred. The current output in the factory pre-set configuration is <1.2 mA.
An output signal of 0 mA indicates an error in the current loop or a defective device.

- Check current loop.



Remedy:

- Disassemble splash guard, check optical surfaces (mirror, window) for contamination and clean if required, see “Check the Measuring Cuvette of the Gas Transmitter and Clean if Required” on page 53.
- Calibrate zero-point, see “Zero-Point Calibration Dräger PIR 7000 / Dräger PIR 7200” on page 57.
- Mount splash guard.

If the error persists:

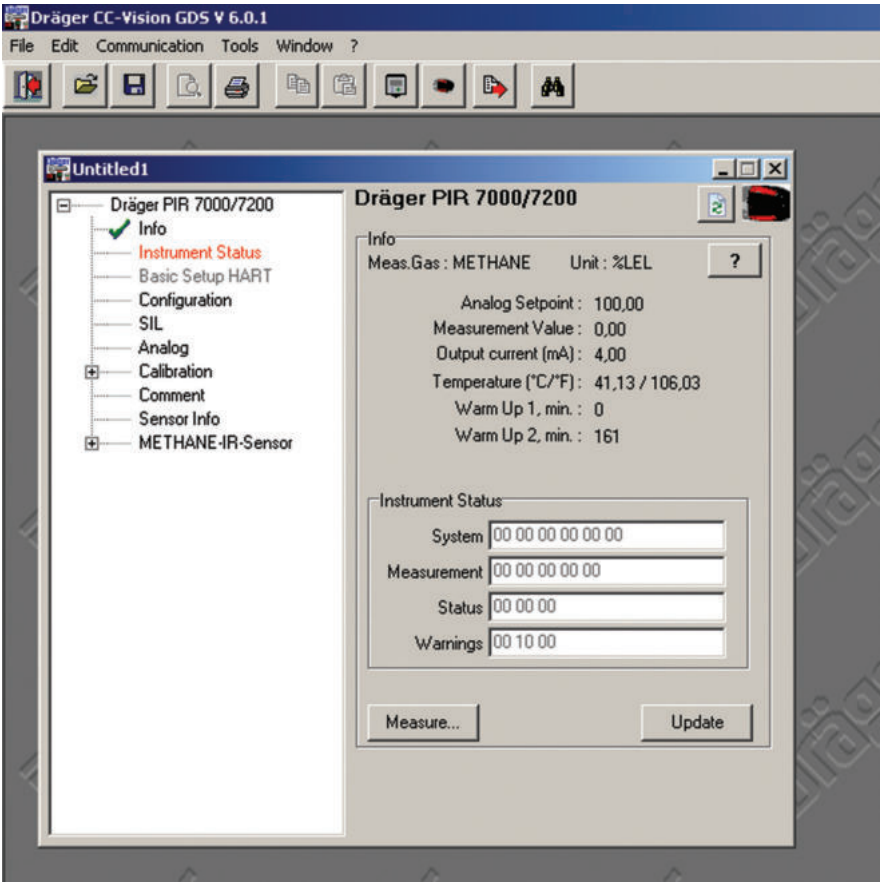
- Check output circuit (load resistance) and power supply.

If the fault can not be rectified with these measures, the error is often a serious one. You can use the Dräger CC-Vision GDS software to read out a detailed fault information.

- To do so, connect the gas transmitter via HART® or the serial interface with the PC (see page 63).
- Start Dräger CC-Vision GDS Software and read out the errors/error code.
- Contact Dräger Safety, if necessary.

The gas transmitter provides detailed information about possible errors which can be read out via the Dräger CC-Vision GDS Software.

Information in the "Info" menu:



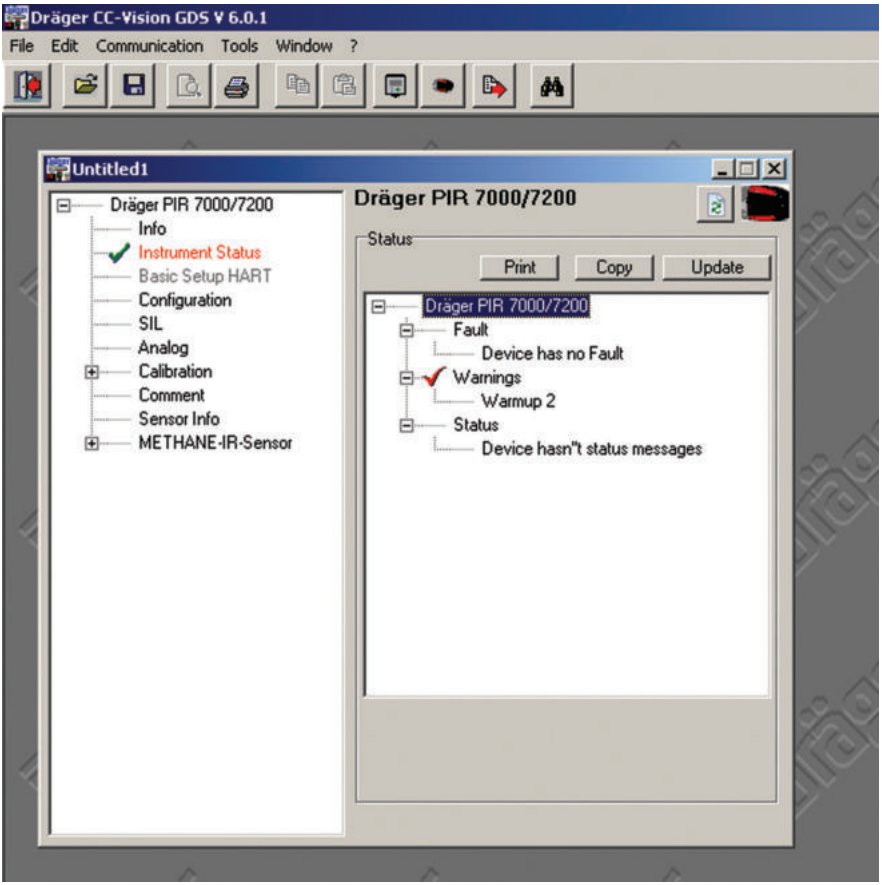
The structure of the error information (error code) is as follows:

(6 byte system error)	(5 byte measurement error)	(3 byte status)	(3 byte warnings)

In case no error is present, all values are set to "0", i.e. the error byte looks as follows:

(00 00 00 00 00 00)	(00 00 00 00 00)	(00 00 00)	(00 00 00)
System error	Measurement error	Status	Warnings

Error messages can also be displayed in plain text.
Information in the "Instrument Status" menu:



In case of fault, Dräger Safety recommends to read out the error information and to make this information available to the Dräger Safety service department. This can be helpful to provide remedy as fast as possible.

It should be possible to rectify faults with the following error information on site:

Measurement error	Meaning	Remedies
(80 00 00 00)	Beam block	Clean optical surfaces, see page 53. If necessary, make sure that hydrophobic filter, process cuvette or process adapter are correctly mounted.
(00 80 00 00)	Calibration error	Perform zero-point calibration, see page 57.
(00 40 00 00)	Calibration error	Perform span calibration, see page 57.
(00 02 00 00)	Result below measuring range	Clean optical surfaces, see page 53. If necessary, make sure that hydrophobic filter, process cuvette or process adapter are correctly mounted. Use the suitable zero gas for calibration.

Warnings	Meaning	Remedies
(20)	Device in warm-up phase 1	Wait for warm-up phase to end.
(10)	Device in warm-up phase 2	Wait for warm-up phase to end.
(02)	Beam block warning	Clean optical surfaces, see page 53.

System error	Meaning	Remedies
(01 00 00 00 04 00)	Faulty 4 to 20 mA operation	Check loop resistance.

Technical Data

Functional principle	Double-compensated infrared absorption, non-imaging optics, 4-beam technology.
Measuring ranges:	
Dräger PIR 7000	0 to 100 %LEL, other measuring ranges and measurement units configurable.
Dräger PIR 7200	0 to 10 % vol. carbon dioxide (CO_2), other measuring ranges and measurement units configurable.
Standard measured gases:	
Dräger PIR 7000 Type 334	Methane, propane, ethylene selectable. Other gases and vapours on request.
Dräger PIR 7000 Type 340	Propane, methane selectable. Other gases and vapours on request.
Dräger PIR 7200	Carbon dioxide
SIL level	2
Signal transmission to central device	
Analogue:	
– Measured-value signal	4 mA to 20 mA
– Deviation below zero point	3.8 mA to 4 mA
– Full-scale deflection exceeded	20 mA to 20.5 mA
– Fault signal	<1.2 mA (configurable between 0.7 and 3.6 mA).
– Maintenance signal	3 mA (configurable between 0.7 and 3.6 mA).
Options to be activated:	
– Warning signal	Fault signal every 10 seconds for 0.7 seconds, measured-value signal in between.
– Beam block warning	2 mA for measured value <15 %LEL, otherwise measured-value signal (configurable between 0.7 and 3.6 mA).
Digital:	HART® interface (semi-duplex).

Supply voltage	9 V DC to 30 V DC For HART® communication: 13 V DC to 30 V DC For HART® communication in multidrop installation: 9 V DC to 30 V DC
– AC residual	<0.5 V_{ss} with analogue 4 to 20 mA signal transmission <0.2 V_{ss} and <2.2 mV_{eff} (500 to 10 000 Hz) for digital HART® communication
Power consumption	5.6 W (typical), <7 W (maximum)
Electrical connection	Cable diameter 7 to 12 mm, Cross-section max. 2.5 mm^2 or 2 x 1 mm^2
Connection thread	3/4" NPT or M 25 x 1.5
Material	Stainless steel SS 316L
Weight	Approx. 2.2 kg / 4.85 lbs. (without accessories)
Size:	Approx. 160 mm x Ø89 mm / 6.3 inch x Ø3.5 inch
Ambient conditions	
For operation	–40 to +77 °C / –40 to +170 °F, 700 to 1300 mbar, 0 to 100% relative humidity
During storage	–40 to +85 °C / –40 to +180 °F, 700 to 1300 mbar, 0 to 100% relative humidity, non-condensing
Ingress protection	IP 65, IP 66 and IP 67, NEMA 4X
CE mark	Equipment and protective systems intended for use in potentially explosive atmospheres (Directive 94/9/EC).

Approvals:

ATEX	Type: IDS 01xx Dräger Safety • 23560 Lübeck • Germany CE 0158 Ex II 2G Ex d IIC T6/T4 – DEMKO 07 ATEX 0654417X II 2D Ex tD A21 IP65 T80 °C/T130 °C PTB 07 ATEX 1016 –40 °C ≤ Ta ≤ +40 °C/+80 °C Year of construction (via serial number) [1]
IECEx	Type: IDS 01xx Dräger Safety • 23560 Lübeck • Germany Ex d IIC T6/T4 – IECEx UL 07.0009X Ex tD A21 IP65 T80 °C/T130 °C IECEx PTB 07.0016 –40 °C ≤ Ta ≤ +40 °C/+80 °C Year of construction (via serial number) [1]
UL (Classified)	Type: IDS 010x Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class I, Zone 1, Group IIC T-Code T6/T4, –40 °C ≤ Ta ≤ +40 °C/+80 °C 9 to 30 VDC, 9 W • Type 4X
CSA (C-US)	Type: IDS 010x Class I, Div. 1, Groups B, C, D Class II, Div. 1, Groups E, F, G Class I, Zone 1, Group IIB+H2 T-Code T6/T4, –40 °C ≤ Ta ≤ +40 °C/+80 °C C22.2 no. 152 (only Dräger PIR 7000) 9 to 30 VDC, 9 W • Type 4X
Safety Integrity Level	SIL 2 Certification EN 61508, EN 50402

1) The year of manufacturing is indicated by the third letter of the serial number on the type plate:
Y = 2007, Z = 2008, A = 2009, B = 2010, C = 2011, etc.
Example: Serial no. ARYH-0054, the third letter is Y, so the year of manufacturing is 2007.

Performance Characteristics (typical values)

	Dräger PIR 7000 Type 334			Dräger PIR 7000 Type 340		Dräger PIR 7200
	Methane	Propane	Ethylene	Propane	Methane	Carbon dioxide
Repeatability in "normal response mode": zero-point 50 %LEL* 5 % vol. in "fast response mode": zero-point 50 %LEL* 5 % vol.	≤ ±0.5 %LEL ≤ ±0.5 %LEL ≤ ±1.0 %LEL ≤ ±1.0 %LEL	≤ ±0.25 %LEL ≤ ±0.25 %LEL ≤ ±0.5 %LEL ≤ ±0.5 %LEL	≤ ±1.0 %LEL ≤ ±1.0 %LEL ≤ ±2.0 %LEL ≤ ±2.0 %LEL	≤ ±0.25 %LEL ≤ ±0.25 %LEL ≤ ±0.5 %LEL ≤ ±0.5 %LEL	≤ ±0.7 %LEL ≤ ±1.0 %LEL ≤ ±1.4 %LEL ≤ ±2.0 %LEL	≤ ±0.01 % vol. ≤ ±0.05 % vol. ≤ ±0.02 % vol. ≤ ±0.1 % vol.
Linearity error (max.), for measuring range **: 0 - 100 %LEL 0 - 5 % vol. 0 - 10 % vol. 0 - 30 % vol. 0 - 100 % vol.	≤ ±1.5 %LEL	≤ ±1.2 %LEL	≤ ±2.4 %LEL	≤ ±1.0 %LEL	≤ ±2.5 %LEL	 ≤ ±0.5 % vol. ≤ ±1.5 % vol. ≤ ±4.5 % vol. ≤±40.0 % vol.
Long-term drift (12 months): zero-point	≤ ±1.0 %LEL	≤ ±1.0 %LEL	≤ ±2.0 %LEL	≤ ±0.6 %LEL	≤ ±2.0 %LEL	≤±0.03 % vol.
Temperature influence, −40 to 77 °C: zero-point 50 %LEL* 1 % vol. 5 % vol. 10 % vol. 30 % vol.	≤ ±1.0 %LEL ≤ ±0.17 %LEL/°C	≤ ±2.0 %LEL ≤ ±0.1 %LEL/°C	≤ ±3.0 %LEL ≤ ±0.13 %LEL/°C	≤ ±1.0 %LEL ≤ ±0.07 %LEL/°C	≤ ±3.0 %LEL ≤ ±0.12 %LEL/°C	≤ ±0.1 % vol. ≤ ±0.003 % vol./°C ≤ ±0.012 % vol./°C ≤ ±0.035 % vol./°C ≤ ±0.25 % vol./°C
Humidity influence, 0 to 100 % rel. humidity at 40 °C: zero-point 50 %LEL* 5 % vol.	≤ ±0.5 %LEL ≤ ±2.4 %LEL	≤ ±0.5 %LEL ≤ ±0.9 %LEL	≤ ±1.7 %LEL ≤ ±1.2 %LEL	≤ ±0.8 %LEL ≤ ±1.1 %LEL	≤ ±1.5 %LEL ≤ ±3.1 %LEL	≤ ±0.005 % vol. ≤ ±0.15 % vol.
Pressure influence:	≤0.16 %/mbar	≤0.13 %/mbar	≤0.16 %/mbar	≤0.13 %/mbar	≤0.16 %/mbar	≤0.16 %/mbar

* based on LEL values acc. to IEC
** for calibration at 50% FSD

Measured value response times ($t_{0...90}$)	Dräger PIR 7000 Type 334 and Type 340			Dräger PIR 7200
	Methane	Propane	Ethylene***	Carbon dioxide
without accessories	≤4 seconds * ≤1 second **	≤4 seconds * ≤1 second **	≤4 seconds * ≤1 second **	≤4 seconds * ≤1 second **
with splash guard	≤8 seconds	≤8 seconds	≤8 seconds	≤8 seconds
with splash guard and insect guard	≤15 seconds	≤15 seconds	≤15 seconds	≤15 seconds
with splash guard and hydrophobic filter	≤40 seconds	≤50 seconds	≤40 seconds	≤40 seconds
with splash guard, insect guard and hydrophobic filter	≤50 seconds	≤60 seconds	≤50 seconds	≤50 seconds
with process adapter and/or process cuvette in normal response mode – flow of 0.5 L/min – flow of 1.0 L/min – flow of 1.5 L/min – max. flow of 10 L/min	 ≤7 seconds ≤5 seconds ≤4 seconds ≤3 seconds	 ≤7 seconds ≤5 seconds ≤4 seconds ≤3 seconds	 ≤7 seconds ≤5 seconds ≤4 seconds ≤3 seconds	 ≤7 seconds ≤5 seconds ≤4 seconds ≤3 seconds
with process adapter and/or process cuvette in fast response mode – flow of 1.5 L/min – max. flow of 10 L/min	 ≤1 second ≤1 second	 ≤1 second ≤1 second	 ≤1 second ≤1 second	 ≤1 second ≤1 second

* response mode: normal
** response mode: fast
*** only Dräger PIR 7000 Type 334

Cross-Sensitivities Dräger PIR 7000 Type 334

The gas transmitter Dräger PIR 7000 Type 334 measures the concentration of many hydrocarbons. It is not specific for the substances which are listed in the gas library with their individual characteristics. Various substance-specific sensitivities must be taken into account when specifying cross-sensitivities.

As an example, typical values for some types of hydrocarbons are listed below.

Substance	CAS no.	LEL according to NIOSH [% vol.] 1)	LEL according to IEC [% vol.] 1)	LEL according to PTB [% vol.] 1)	Recommended category gas	LEL according to IEC [% vol.]	Reading for 50 %LEL in %LEL of category gas 2)
Acetone	67-64-1	2.5	2.5	2.5	Ethylene	2.3	72
Benzene	71-43-2	1.2	1.2	1.2	Ethylene	2.3	78
i-Butane	75-28-5	1.6	1.3	1.5	Propane	1.7	38
n-Butane	106-97-8	1.6	1.4	1.4	Propane	1.7	38
n-Butyl acetate	123-86-4	1.7	1.3	1.2	Propane	1.7	31
Cyclohexane	110-82-7	1.3	1.2	1	Propane	1.7	10
Ethanol	64-17-5	3.3	3.1	3.1	Propane	1.7	68
Ethyl acetate	141-78-6	2	2.2	2	Propane	1.7	54
Methyl ethyl ketone	78-93-3	1.4	1.8	1.5	Propane	1.7	32
n-Octane	111-65-3	1	0.8	0.8	Propane	1.7	32
i-Propyl alcohol	67-63-0	2	2	2	Propane	1.7	45
o-Xylene	95-47-6	0.9	1	1	Ethylene	2.3	78

1) The conversion factors of %LEL to % vol. are indicated according to NIOSH for category 1, according to IEC 60079-20 for category 2, and according to Nabert / Schön (safety characteristics of flammable gases and vapours) for category 3.
2) Based on LEL values acc. to IEC, typical tolerance: ±5 %LEL.

Cross-Sensitivities Dräger PIR 7000 Type 340

The gas transmitter Dräger PIR 7000 Type 340 measures the concentration of many hydrocarbons. It is not specific for the substances which are listed in the gas library with their individual characteristics. Various substance-specific sensitivities must be taken into account when specifying cross-sensitivities.

As an example, typical values for some types of hydrocarbons are listed below.

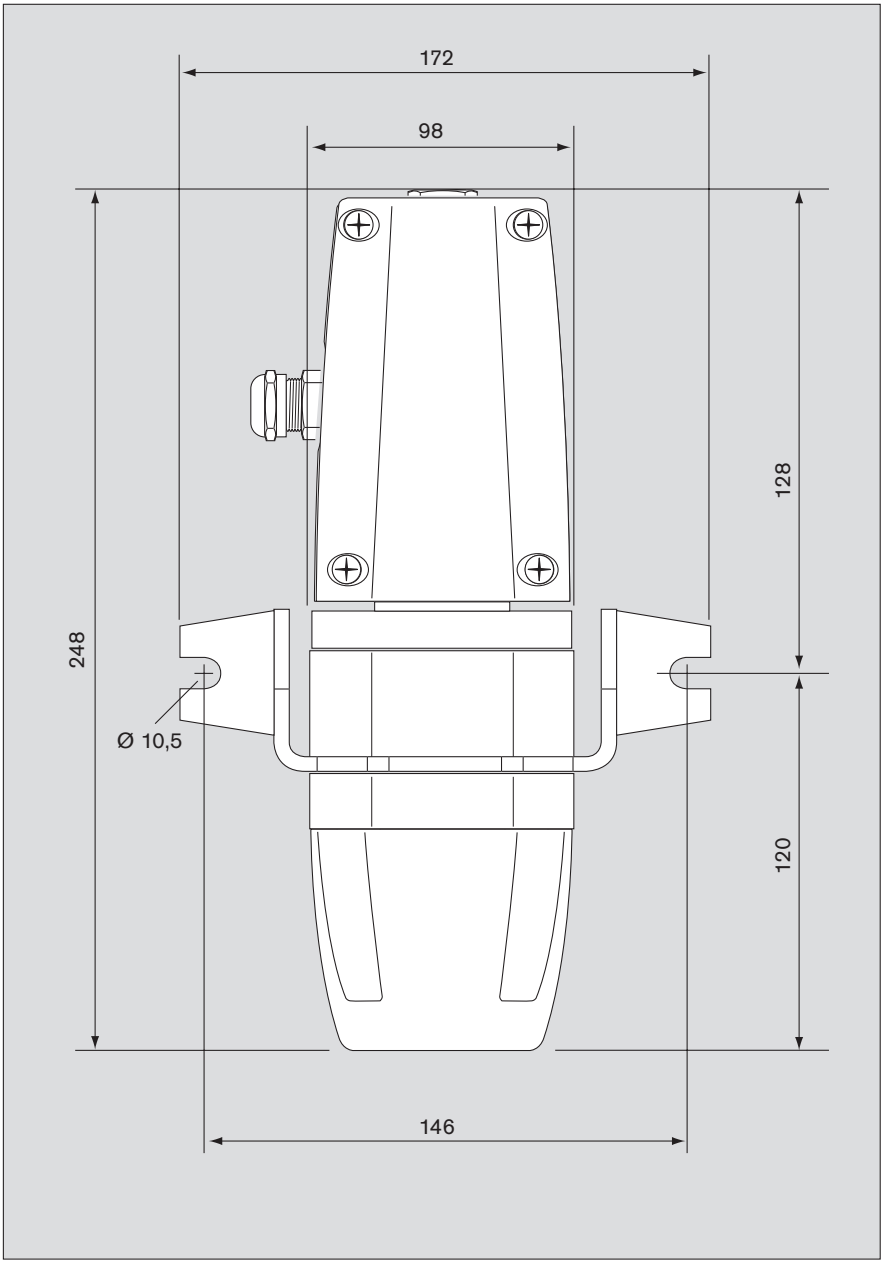
Substance	CAS no.	LEL according to NIOSH [% vol.] 1)	LEL according to IEC [% vol.] 1)	LEL according to PTB [% vol.] 1)	Recommended Category gas	LEL according to IEC [% vol.]	Reading for 50 %LEL in %LEL of category gas 2)
Acetone	67-64-1	2.5	2.5	2.5	Propane	1.7	11
i-Butane	75-28-5	1.6	1.3	1.5	Propane	1.7	57
n-Butane	106-97-8	1.6	1.4	1.4	Propane	1.7	57
n-Butyl acetate	123-86-4	1.7	1.3	1.2	Propane	1.7	30
Cyclohexane	110-82-7	1.3	1.2	1	Propane	1.7	50
Ethanol	64-17-5	3.3	3.1	3.1	Propane	1.7	64
Ethyl acetate	141-78-6	2	2.2	2	Propane	1.7	23
Methyl ethyl ketone	78-93-3	1.4	1.8	1.5	Propane	1.7	22
n-Octane	111-65-3	1	0.8	0.8	Propane	1.7	59
i-Propyl alcohol	67-63-0	2	2	2	Propane	1.7	42
Toluene	108-88-3	1.1	1.1	1.1	Propane	1.7	10
o-Xylene	95-47-6	0.9	1	1	Propane	1.7	15

1) The conversion factors of %LEL to % vol. are indicated according to NIOSH for category 1, according to IEC 60079-20 for category 2, and according to Nabert / Schön (safety characteristics of flammable gases and vapours) for category 3.
2) Based on LEL values acc. to IEC, typically tolerance: ±5 %LEL.

Cross-Sensitivities Dräger PIR 7200

The gas transmitter Dräger PIR 7200 generally measures the concentration of carbon dioxide. The cross-sensitivities to hydrocarbons are typically neglegible.

Size



Description of Design

The gas transmitter Dräger PIR 7000 / Dräger PIR 7200 is a measurement transducer to measure the concentration of hydrocarbons / carbon dioxide in the atmosphere according to the principle of absorption of infrared radiation.

The infrared technology differs from other sensing technologies by:
Clarity of reading for concentrations above the lower explosion limit (resp. up to 100 % vol. carbon dioxide for Dräger PIR 7200), reduced maintenance efforts due to increased long-term stability, fault safety (Fail Safe), insensitivity against flow velocity, insensitivity against polymerising and corrosive substances and catalyst poisons, unlimited measuring sensitivity in oxygen deficient and oxygen free mixtures, no proof of ethine, hydrogen and carbon disulphide.

The microprocessor technology allows for:
Detection of device faults and warning via status indicator and current output and/or digitally, special calibration mode for suppressing the alarm triggering in the central device during maintenance (one-man-calibration), individual linearisation of reading for all characterised measured gases, temperature compensation, measuring range freely selectable.

The ambient air to be monitored gets into the measuring cuvette by diffusion, supported by a thermally generated suction through the splash guard ("chimney effect").
An infrared radiation source generates a wideband modulated radiation (visible part recognised from flashing). The radiation emerges from the stainless steel housing through a sapphire window and passes through the measuring cuvette twice. The mirror reflects the radiation which is guided into the optic module and to the detectors. The measuring cuvette is heated to avoid condensation of the atmospheric humidity.
Compounds of hydrocarbons resp. carbon dioxide in the atmosphere lead to an absorption of radiation at the measured wavelength and thus to a signal decrease of the measuring detector. The zero-point stability is ensured by a reference detector which compensates for the effects of contamination of mirror and window as well as potential variations of intensity of the infrared radiation source.

A second internal radiation source allows for the compensation of thermal drift and ageing processes of both detectors or sources. The combination of these two compensation processes provides optimum signal stability.

Order List

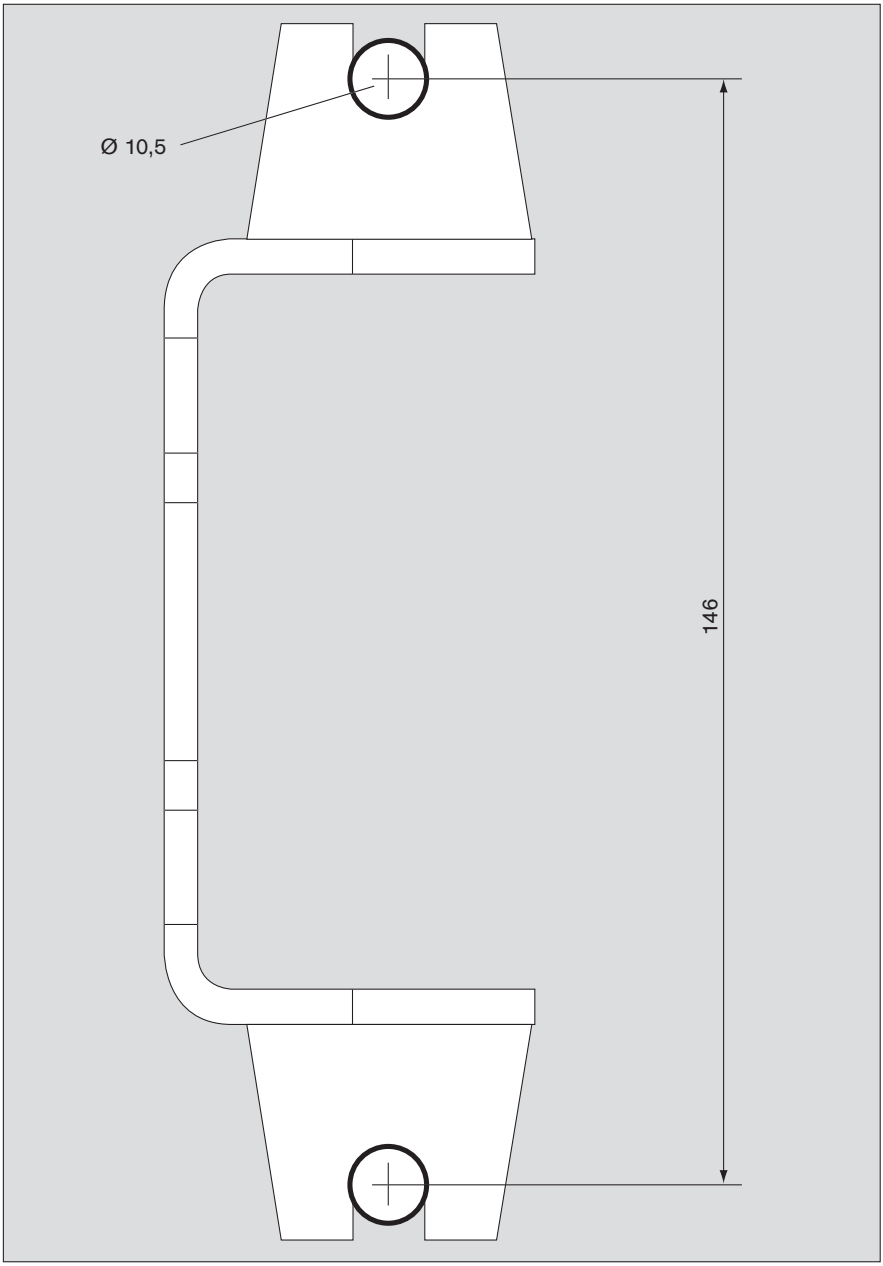
Dräger PIR 7000 / Dräger PIR 7200

Designation and description	**Part no.**
Dräger PIR 7000 Type 334 (M25) HART cpl. Set [1)] Connection thread M 25 x 1.5 / HART® interface	68 11 817
Dräger PIR 7000 Type 334 (M25) HART Connection thread M 25 x 1.5 / HART® interface	68 11 550
Dräger PIR 7000 Type 334 (M25) cpl. Set [1)] Connection thread M 25 x 1.5	68 11 825
Dräger PIR 7000 Type 334 (M25) Connection thread M 25 x 1.5	68 11 820
Dräger PIR 7000 Type 334 (NPT) HART Connection thread 3/4" NPT / HART® interface	68 11 552
Dräger PIR 7000 Type 334 (NPT) Connection thread 3/4" NPT	68 11 822
Dräger PIR 7000 Type 340 (M25) HART cpl. Set [1)] Connection thread M 25 x 1.5 / HART® interface	68 11 819
Dräger PIR 7000 Type 340 (M25) HART Connection thread M 25 x 1.5 / HART® interface	68 11 560
Dräger PIR 7000 Type 340 (M25) Connection thread M 25 x 1.5	68 11 830
Dräger PIR 7000 Type 340 (NPT) HART Connection thread 3/4" NPT / HART® interface	68 11 562
Dräger PIR 7000 Type 340 (NPT) Connection thread 3/4" NPT	68 11 832
Dräger PIR 7200 (M25) HART cpl. Set [1)] Connection thread M 25 x 1.5 / HART® interface	68 12 290
Dräger PIR 7200 (M25) HART Connection thread M 25 x 1.5 / HART® interface	68 11 570
Dräger PIR 7200 (NPT) HART Connection thread 3/4" NPT / HART® interface	68 11 572

[1)] The complete set includes an Ex e junction box, a splash guard and a status indicator as well as a mounting set, already preassembled.

Designation and description	**Part no.**
Accessories	
Mounting set PIR 7000	68 11 648
Splash guard PIR 7000	68 11 911
Splash guard PIR 7200	68 11 912
Insect guard PIR 7000	68 11 609
Hydrophobic filter PIR 7000	68 11 890
Calibration adapter PIR 7000	68 11 610
Status indicator PIR 7000	68 11 625
Status indicator PIR 7200	68 11 920
Flowcell PIR 7000	68 11 490
Flowcell PIR 7200	68 11 910
Flowcell PIR 7000 duct	68 11 945
Bump test adapter PIR 7000	68 11 630
Bump test adapter PIR 7200	68 11 930
Bump test adapter PIR 7000 duct	68 11 990
Process adapter PIR 7000	68 11 915
Process cuvette PIR 7000	68 11 415
Junction box Ex e PIR 7000 (EAC 0000)	68 11 898
Magnetic Wand	45 43 428
USB PC adapter PIR 7000	68 11 663
Duct mount set PIR 7000	68 11 850
Instructions for Use PIR 7000	90 23 885
Dräger CC-Vision GDS Software	68 11 989

Drilling Template – Mounting Set PIR 7000



Declarations of Conformity and Certificates

Dräger safety

Konformitätserklärung
Declaration of Conformity

Wir / We

Dräger Safety AG & Co. KGaA
Revalstraße 1
D-23560 Lübeck
Deutschland / Germany

erklären, dass das Produkt / declare that the product

Gassensor Typ **IDS 01xx (Dräger PIR 7x00)**
Gas Sensor type **IDS 01xx (Dräger PIR 7x00)**

gemäß den Bestimmungen der Richtlinie 94/9/EG (Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen) übereinstimmt mit dem Baumuster der EG-Baumusterprüf-bescheinigungen und nach den in den beigefügten EG-Baumusterprüfbescheinigungen aufgeführten Normen geprüft wurde

following the provisions of Directive 94/9/EC (Equipment and protective systems intended for use in potentially explosive atmospheres) is in conformity with the type of the EC-type-examination certificates and has been tested according to the standards listed in the enclosed EC-type-examination certificates

DEMKO 07 ATEX 0654417X
PTB 07 ATEX 1016

für / for

Gerätegruppe und -kategorie / Equipment Group and Category: **II 2G, II 2D**
Zündschutzart / Type of Protection: **d, tD A21 IP65**
Explosionsgruppe / Explosion Group: **IIC**
Temperaturklasse / Temperature Class: **T6/T4, T80°C/T130°C**

ausgestellt von den benannten Stellen / issued by the notified bodies

UL International DEMKO A/S
Lyskær 8
DK-2730 Herlev
Kenn-Nr. / identification no. 0539

Physikalisch Technische Bundesanstalt
Bundesallee 100
38116 Braunschweig
Kenn-Nr. / identification no. 0102.

Das Produkt wurde unter einem Qualitätssicherungssystem hergestellt, endabgenommen und geprüft, das zugelassen wurde von der benannten Stelle

The product has been manufactured, finally inspected and tested under a quality system which has been approved by the notified body

DEKRA EXAM GmbH
Dinnendahlstraße 9
D-44809 Bochum
Kennnummer / identification number 0158.

Ralf Drews
Vice President
Dräger Safety AG & Co. KGaA

Lübeck, 27.09.2007

Dokument-Nr. / document no.: SE20576 "01"
Seite 1 von 1 / page 1 of 1

[1] # EC-TYPE EXAMINATION CERTIFICATE

[2] Equipment or Protective System intended for use
in Potentially Explosive Atmospheres
Directive 94/9/EC

[3] EC-Type Examination Certificate Number: DEMKO 07 ATEX 0654417X

[4] Equipment or Protective System: Gas Sensor Type IDS 01xx

[5] Manufacturer: Dräger Safety AG & Co. KGaA

[6] Address: Revalstrasse 1, D-23560 Lübeck, Germany

[7] This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

[8] UL International Demko A/S, notified body number 0539 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report no. 06CA54417.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0: 2006 EN 60079-1: 2004

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

[11] This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

[12] The marking of the equipment or protective system shall include the following:

Ex II 2G Ex d IIC T6/T4

On behalf of UL International Demko A/S

Herlev, 2007-10-04

Jan-Erik Storgaard
Certification Manager

UL International Demko A/S
Lyskær 8, P.O. Box 514
DK-2730 Herlev, Denmark
Telephone: +45 44866665
Fax: +45 44856500

Certificate: 07 ATEX 0654417X

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P1

[13] # Schedule

[14] EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 07 ATEX 0654417X

[15] Description of Equipment or protective system

The Type IDS 01xx stationary infrared gas sensor is intended for continuous detection of combustible or non-combustible gases and vapors. The sensor is not for use in oxygen-enriched atmospheres. The gas sensor provides a 4 to 20 mA analog output signal that is proportional to the measured gas concentration and an additional digital output. The sensor assembly consists of a stainless steel enclosure cover and body (cuvette) that houses the main PCB, filter PCB, and other various electronic components. A sapphire window is located at the base of the body (cuvette), centered between two heated arms. The cover of the sensor enclosure is provided with a 3/4" NPT or M25 threaded hub for permanent attachment to an approved terminal box. The integrity of the flameproof enclosure is maintained in the sensor cover by a glass feed-through disc welded to the cover and in the body (cuvette) by flameproof joints.

Performance testing
The measuring function of the Type IDS 01xx gas sensor for explosion protection according to Annex II clause 1.5.5, 1.5.6 and 1.5.7 of the Directive 94/9/EC, is not covered in this certificate.

Nomenclature for type IDS 01xx:

IDS 01 - 0 x
I II III

I - Denotes basic gas sensor designation
IDS 01

II - Denotes threaded hub size located on the cover of the sensor
0 – 3/4" - 14 NPT hub
1 – M25 x 1.5 hub

III - Denotes variants with different measurement wavelengths
x – any combination of numbers or letters

The relation between ambient temperature and the assigned temperature class is as follows:

Ambient temperature range	Temperature class
-40°C ≤ Tamb ≤ +40°C	T6
-40°C ≤ Tamb ≤ +85°C	T4

Electrical data

9-30VDC, 4-20mA analog output, 9W max. (2W per heater and 5W for electronics)

Installation instructions

- The gas sensor shall be directly attached to an approved increased safety or flameproof terminal box with a M25 x 1.5 or 3/4" - 14 NPT opening.

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[13] # Schedule

[14] EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 07 ATEX 0654417X

- The terminal box shall be suitable for the place of installation and application.
- The terminal box shall have connection for at least three wires and earth. When using the serial interface communication, the terminal box shall have connection for at least four wires and earth.
- The wall/post fixing for the terminal box and the gas sensor shall be made in a way such that the terminal box [illegible] to the [illegible] location of the connection.

[16] Report No.

Project Report No. 06CA54417A (Hazardous Location Testing)

Drawings:

Description:	Drawing No.:	Rev. Level:	Date:
IDS 010 Assembly Drawing	SE20448	5	2007-04-27
IDS 011 Assembly Drawing	SE20507	4	2007-09-27
Label Marking	SE20509	3	2007-05-07
Body (Cuvette) (IDS 01xx)	SE20510	1	2007-09-27
Cover NPT (IDS 010x)	SE20511	2	2007-09-27
Cover M25 (IDS 011x)	SE20512	2	2007-09-27
Glass Feed Through (IDS 01xx)	SE20513	1	2007-09-27
Sapphire Window (IDS 01xx)	SE20514	1	2006-09-29
Retainer Ring (IDS 01xx)	SE20518	1	2007-09-27
Splash Guard and Plate	SE20519	0	2006-09-29
Assembly PCB Main (2 pages)	SE20523	1	2007-04-12
PCB Main (7 pages)	SE20524	1	2007-04-11
Schematic PCB Main (13 pages)	SE20525	1	2007-04-12
Assembly PCB Filter (2 pages)	SE20531	1	2007-04-12
PCB Filter (5 pages)	SE20532	1	2007-04-12
Schematic PCB Filter (2 pages)	SE20533	1	2007-04-11
Extract from Instructions for Use (6 pages)	SE20535	1	2007-09-27

[17] Special conditions for safe use:

- Ambient Temperature Range:
  T6 : -40°C ≤ Tamb ≤ +40°
  T4 : -40°C ≤ Tamb ≤ +80°
- The device may not be modified.

[13] # Schedule

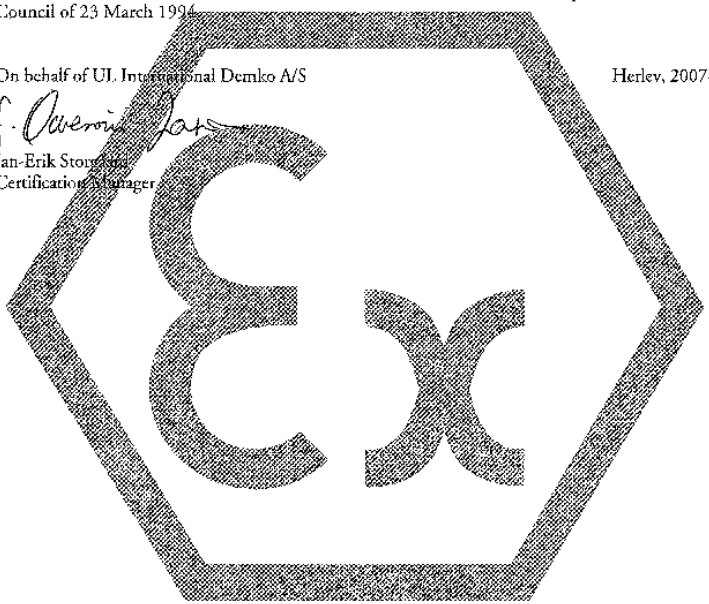
[14] EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 07 ATEX 0654417X

[18] Essential Health and Safety Requirements
Concerning ESR this Schedule verifies compliance with the Ex standards only. The manufacturer's Declaration of Conformity declares compliance with other relevant Directives.

The manufacturer shall inform the notified body concerning all modifications to the technical documentation as described in ANNEX III to Directive 94/9/EC of the European Parliament and the Council of 23 March 1994.

On behalf of UL International Demko A/S — Herlev, 2007-10-04

Jan-Erik Storgaard
Certification Manager



UL International Demko A/S
Lyskaer 8, P.O. Box 514
DK-2730 Herlev, Denmark
Telephone: +45 44856585
Fax: +45 44856500

Certificate: 07 ATEX 0654417X
Report: 06CA54417

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P4/4

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 07 ATEX 1016

(4) Equipment: Gas Detection Transmitter, type IDS 010x and IDS 011x

(5) Manufacturer: Dräger Safety AG & Co. KGaA

(6) Address: Revalstraße 1, 23560 Lübeck, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 07-17101.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 61241-0:2006 **EN 61241-1:2004**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 D Ex tD A21 IP65 T80°C/T130°C

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, July 20, 2007

sheet 1/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 1016**

(15) Description of equipment

The Gas Detection Transmitter Type IDS 010x and IDS 011x serves for the measurement of different gases in dust-hazardous areas. It consists of an enclosure out of stainless steel in the type of protection "tD" with a window and a mirror. The type IDS 010x has a 3/4 " NPT threaded nipple and the type IDS 011x has a M25 threaded nipple, both to be connected to a – separately certified - termination compartment.

Technical Data

Rated voltage	9 up to 30 VDC
Rated current	max. 1 A
Rated wattage	max. 9 W
Rated cross section	max. 2,5 mm^2
Ambient temperature	-40 °C up to +40 °C resp. +80 °C
Protection against dust and water	IP65 according to EN 60529

(16) Test report PTB Ex 07-17101

(17) Special conditions for safe use

None

(18) Essential health and safety requirements

Met by compliance with the aforementioned Standards

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. M. Hyvärinen
Oberregierungsrat

Braunschweig, July 20, 2007

sheet 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

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IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx UL 07.0009X	Issue No.:0	Certificate history:
Status:	Current		
Date of Issue:	2007-10-04	Page 1 of 3	

Applicant: **Dräger Safety AG & Co. KGaA**
Revalstrasse 1
D-23560 Lübeck
Germany

Electrical Apparatus: **Gas Sensor Type IDS 01xx**
Optional accessory:

Type of Protection: d

Marking: **IECEx UL 07.0009X**
Ex d IIC T6/T4
T6: -40°C ≤ Tamb ≤ +40°C
T4: -40°C ≤ Tamb ≤ +80°C

Approved for issue on behalf of the IECEx Certification Body: Paul T. Kelly

Position: Operations Manager

Signature: (for printed version)

Date: 2007-10-04

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

Underwriters Laboratories Inc (UL)
333 Pfingsten Road
Northbrook IL 60062-2096
United States of America

Working for a safer world

IECEx Certificate of Conformity

Certificate No.: IECEx UL 07.0008X

Date of Issue: **2007-10-04** Issue No.: **0**

Page 2 of 3

Manufacturer: **Dräger Safety AG & Co. KGaA**
Revalstrasse 1
D-23560 Lubeck
Germany

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1 : 2003 Edition: 5	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosure 'd'

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

US/UL/ExTR07.0014/00

Quality Assessment Report:
DE/BVS/QAR06.0001/02

IECEx Certificate of Conformity

Certificate No.: IECEx UL 07.0009X

Date of Issue: **2007-10-04** Issue No. **0**

Page 3 of 3

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

Type IDS 010x and IDS 011x gas sensors:

The Type IDS 01xx stationary infrared gas sensor is intended for continuous detection of combustible or non-combustible gases and vapors. The sensor is not for use in oxygen-enriched atmospheres. The gas sensor provides a 4 to 20 mA analog output signal that is proportional to the measured gas concentration and an additional digital output. The sensor assembly consists of a stainless steel enclosure cover and body (cuvette) that houses the main PCB, filter PCB, and other various electronic components. A sapphire window is located at the base of the body (cuvette), centered between two heated arms. The cover of the sensor enclosure is provided with a 3/4" NPT or M25 threaded hub for permanent attachment to an approved terminal box. The integrity of the flameproof enclosure is maintained in the sensor cover by a glass feed-through disc welded to the cover and in the body (cuvette) by flameproof joints.

CONDITIONS OF CERTIFICATION: YES as shown below:

Performance Testing:

The measuring function of the Type IDS 01xx gas sensor for explosion protection is not covered in this certificate.

Conditions of Certificate:

1. Ambient Temperature Range: T6 : -40°C < Tamb < +40°C; T4 : -40°C < Tamb < +80°C
2. The device may not be modified.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx PTB 07.0016 Issue No.:0	History:
Status:	**Current**	
Date of Issue:	**2007-03-13** Page 1 of 4	
Applicant:	**Dräger Safety AG & Co. KGaA** Revalstraße 1 23560 Lübeck Germany **Germany**	
Electrical Apparatus: *Optional accessory:*	**Gas Detection Transmitter Type IDS 010x and 011x**	
Type of Protection:	**Protection by enclosures "tD"**	
Marking:	**Ex tD A21 IP65 T80°C, T130°C**	
Approved for issue on behalf of the IECEx Certification Body:	Dr.-Ing. Uwe Klausmeyer	
Position:	head of Section "Flameproof Enclosure"	
Signature: *(for printed version)*		
Date:	20. 7. 07	

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany

PTB

IECEx Certificate of Conformity

Certificate No.: IECEx PTB 07.0016

Date of Issue: **2007-03-13** Issue No.: **0**

Manufacturer: **Dräger Safety AG & Co. KGaA**
Revalstraße 1
23560 Lübeck
Germany
Germany

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacture'rs quality system, relating to the Ex prodi covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the 'denti documents, was found to comply with the following standards:

IEC 61241-0 : 2004 Edition: 1	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
IEC 61241-1 : 2004 Edition: 1	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than thos expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/PTB/ExTR07.0021/00

Quality Assessment Report:
DE/BVS/QAR06.0001/02

IECEx Certificate of Conformity

Certificate No.: IECEx PTB 07.0016

Date of Issue: **2007-03-13** Issue No.: **0**

Page 3 of 4

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

Description of equipment
The Gas Detection Transmitter Type IDS 010x and IDS 011x consists of an enclosure out of stainless steel in the type of protection "tD" with a window and a mirror. The type IDS 010x has a 3/4 " NPT threaded nipple an the type IDS 011x has a M25 threaded nipple, both to be connected to a termination compartment.

Nomenclature

IDS 01	0 1	x
1	2	3

1: Basic name of the type
2: Thread of connection nipple (0 = ¾" NPT, 1 = M25)
3: Measurement wavelength

CONDITIONS OF CERTIFICATION: NO

IECEx Certificate of Conformity

Certificate No : IECEx PTB 07.0016

Date of Issue **2007-03-13** Issue No.: **0**

EQUIPMENT(continued):

Technical data

Rated voltage	up to. 30 V
Rated current	max 1 A
Rated wattage	max. 9 W
Rated cross section	max. 2,5 mm^2
Ambient temperature	-40 °C up to +40 °C resp. + 80 °C
Protection against dust and water	P 65 according to IEC 60529



NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

2007-10-17

Mr. Thomas Treptow
Drager Safety Ag & Co Kgaa
Revalstrasse 1
Lubeck, 23560
Germany

Fax number: 451-882-7218
E-mail: thomas.treptow@draeger.com

Reference: File E180059 Project No. 06CA04417

Product: USC - Combustible Gas Sensor, Type IDS 010x, for use in Class I, Groups A, B, C, and D; Class II, Groups E, F, and G; Class III Hazardous Locations (w/ a Type 4x rating)

Dear Mr. Treptow:

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

UL's investigation of your product has been completed under the above project number and the subject product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Classification Mark only at the factory under UL's Follow-Up Service Program to the subject product, which is constructed as described per the attached draft procedure file:

> Identical to the subject model, which was submitted to UL for this investigation. The UL Records covering the product will be in the Follow-Up Services Procedure, File E180059, Volume 6, Section 2.

This authorization applies only to the address on this letter.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing location's. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent to the indicated manufacturing locations in the near future. Please note that Follow-Up Services Procedures are sent to the manufacturers only unless the Applicant specifically requests this document.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn.

Sincerely,

Erin O'Shea
Project Engineer
Tel: 847-664-1323
Fax: 847-313-1323
E-mail: Erin.O'Shea@us.ul.com

Reviewed by:

John Chambers
Section Manager
E-mail: John.N.Chambers@us.ul.com



CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1839123 (LR 97594) **Master Contract:** 160220

Project: 1839123 **Date Issued:** 2007/08/24

Issued to: **Draeger Canada Limited**
7555 Danbro Cres
Mississauga, ON L5N 6P9
Canada
Attention: Mr. Sasha Vuksanov

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US'

C US

Issued by: Glenn Black

Authorized by: Patricia Pasemko, Operations Manager

PRODUCTS

CLASS 4828 82 - SIGNAL APPLIANCES-Toxic Gas Detection Instruments - For Hazardous Locations, Certified to U.S. Standards

CLASS 4828 02 - SIGNAL APPLIANCES - Toxic Gas Detection Instruments - For Hazardous Locations

CLASS 4828 81 - SIGNAL APPLIANCES-Combustible Gas Detection Instruments - For Hazardous Location-Certified to U.S. Standards

CLASS 4828 01 - SIGNAL APPLIANCES - - Combustible Gas Detection Instruments-For Hazardous Locations

CLASS 4828 01

The 'C' and 'US' indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. National Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Certificate: 1839123 (LR 97594) **Master Contract:** 160220

Project: 1839123 **Date Issued:** 2007/08/24

CLASS 4828 81

Class I, Div. 1, Groups B, C and D; Class II, Div. 1, Groups E, F and G;

Class I, Zone 1, Group IIB + H2

Type 4X

Model IDS0101, input rated 9 to 30 V dc, 9 W, output rated 4-20 mA . May be used with splash guard, flow cell plate and bump test plate. Temperature code of T6 for -40°C to + 40°C and T4 for -40°C to + 80°C.

Model IDS0102, input rated 9 to 30 V dc, 9 W, output rated 4-20 mA . May be used with splash guard, flow cell plate and bump test plate. Temperature code of T6 for -40°C to + 40°C and T4 for -40°C to + 80°C.

CLASS 4828 02

CLASS 4828 82

Class I, Div. 1, Groups B, C and D; Class II, Div. 1, Groups E, F and G;

Class I, Zone 1, Group IIB + H2

Type 4X

Model IDS0105, input rated 9 to 30 V dc, 9 W, output rated 4-20 mA . May be used with splash guard, flow cell plate and bump test plate. Temperature code of T6 for -40°C to + 40°C and T4 for -40°C to + 80°C.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91 General Requirements – Canadian Electrical Code, Part II

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Certificate:	1839123 (LR 97594)	**Master Contract:**	160220
Project:	1839123	**Date Issued:**	2007/08/24

C22.2 No. 25-1966	Enclosures for Use in Class II, Groups E, F and G Hazardous Locations
CSA Std C22.2 No. 30-M1986	Explosion-Proof Enclosures for Use in Class I Hazardous Locations
CSA Std C22.2 No.152-M1984	Combustible Gas Detection Instruments
CSA Std C22.2 No.142-M1987	Process Control Equipment
UL50, Eleventh Edition,	Enclosures for Electrical Equipment
UL508, Seventeenth Edition,	Industrial Control Equipment
UL 1203 (4th Ed.) Hazardous (Classified) Locations	Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in
IEC E60079-0:04 Requirements	Electrical apparatus for explosive gas atmospheres - Part 0: General
IEC E60079-1:05 Enclosures "d"	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof
CENELEC EN 60079-0:06 Requirements	Electrical apparatus for explosive gas atmospheres - Part 0: General
CENELEC EN60079-1:04 Enclosures "d"	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof
ISA-12-13.01-2000	Performance Requirements for Combustible Gas Detectors

MARKINGS

- CSA Monogram with C US indicator;
- Company name;
- Model number;
- Electrical rating;
- Hazardous locations designation;
- Temperature Code
- Special purpose enclosure designation, "TYPE 4X";

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Certificate:	1839123 (LR 97594)	**Master Contract:**	160220
Project:	1839123	**Date Issued:**	2007/08/24

- Maximum and Minimum ambient;
- Caution re do not open cover while circuits are live;
- Statement: Leads factory sealed
- The wording " C22.2 No. 152" for Models IDS 0101 and IDS 0102;
- Warning: Read Manual before operating

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Supplement to Certificate of Compliance

Certificate: 1839123 **Master Contract:** 160220

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
1839123	2007/08/24	Stationary Gas Detectors Models IDS 0101, IDS 0102 and IDS 0105

History

Supplement Notes

Dräger safety

Konformitätserklärung
Declaration of Conformity

Wir / We

Dräger Safety AG & Co. KGaA
Revalstraße 1
D-23560 Lübeck
Deutschland / Germany

erklären, dass das Produkt / declare that the product

Klemmenkasten Typ **EAC 00xx (Ex e PIR 7000)**
Junction Box type **EAC 00xx (Ex e PIR 7000)**

gemäß den Bestimmungen der Richtlinie 94/9/EG (Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen) übereinstimmt mit dem Baumuster der EG-Baumusterprüfbescheinigung

following the provisions of Directive 94/9/EC (Equipment and protective systems intended for use in potentially explosive atmospheres) is in conformity with the type of the EC-type-examination certificate

PTB 07 ATEX 1019

für / for

Gerätegruppe und -kategorie / Equipment Group and Category: **II 2G, II 2D**
Zündschutzart / Type of Protection: **e, tD A21 IP65**
Explosionsgruppe / Explosion Group: **II**
Temperaturklasse / Temperature Class: **T6/T4, T80°C/T130°C**

ausgestellt von der benannten Stelle / issued by the notified body

Physikalisch Technische Bundesanstalt
Bundesallee 100
38116 Braunschweig
Kennnummer / identification number 0102.

Das Produkt wurde unter einem Qualitätssicherungssystem hergestellt, endabgenommen und geprüft, das zugelassen wurde von der benannten Stelle

The product has been manufactured, finally inspected and tested under a quality system which has been approved by the notified body

DEKRA EXAM GmbH
Dinnendahlstraße 9
D-44809 Bochum
Kennnummer / identification number 0158.

Ralf Draws

Ralf Draws
Vice President
Dräger Safety AG & Co. KGaA

Lübeck, 29.05.2007

Dokument-Nr. / document no.: SF20577 "00"
Seite 1 von 1 / page 1 of 1

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 07 ATEX 1019

(4) Equipment: Terminal box, type EAC 00xx

(5) Manufacturer: Dräger Safety GmbH & Co. KGaA

(6) Address: Revalstraße 1, 23560 Lübeck, Deutschland

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 07-16400.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2004 EN 60079-7:2003 EN 61241-0:2006 EN 61241-1:2004

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

Ex II 2 G Ex e II T6 or T4

Ex II 2 D Ex tD A21 IP65 T 80 °C or T 130 °C

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, May 11, 2007

Dr.-Ing. [illegible]
Direktor und Professor

sheet 1/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 1019**

(15) Description of equipment

The terminal box type EAC 00xx consists of an enclosure out of plastic materia in the type of protection Increased Safety "e". It is equipped with separately certified terminals. The connection is made by separately certified cable glands and a thread M25. It is intended to be assembled to the separately certified gas sensor type IDS 011x.

Technical data

Rated voltage	up to	40 V
Rated current	max.	5 A
Rated cross section	max.	2,5 mm²
Ambient temperature range	depending on temperature class	
	-40°C to +40°C, T6	
	-40°C to +80°C, T4	
Protection against contact, entry of solids and water	IP65 according to EN 60529	

(16) Test report PTB Ex 07-16400

(17) Special conditions for safe use
None

(18) Essential health and safety requirements

Met by compliance with the aforementioned Standards

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, May 11, 2007

Dr.-Ing. U. Klausmeyer
Direktor und Professor

sheet 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx PTB 07.0020**	Issue No.: **0**
Status:	**Current**	
Date of Issue:	**2007-04-03**	Page **1** of **3**

Applicant: **Dräger Safety AG & Co. KGaA**
Revalstraße 1
23560 Lübeck
Germany

Electrical Apparatus: **Terminal box, type EAC 00xx**
Optional accessory:

Type of Protection: **Increased Safety "e", Protection by enclosures "tD"**

Marking: **Ex e II T6 or T4**
Ex tD A21 IP65 T80 °C or T130 °C
Tamb -40 °C - +40 °C or +80 °C

Approved for issue on behalf of the IECEx Certification Body: Dr.-Ing. Uwe Klausmeyer

Position: Head of Section "Flameproof Enclosures"

Signature:
(for printed version)

Date: 11. 5. 07

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany

IECEx Certificate of Conformity

Certificate No.: **IECEx PTB 07.0020**

Date of Issue: **2007-04-03** Issue No.: **0**

Page **2** of **3**

Manufacturer: **Dräger Safety AG & Co. KGaA**
Revalstraße 1
23560 Lübeck
Germany

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacture's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-7 : 2001 Edition: 3	Electrical apparatus for explosive gas atmospheres - Part 7: Increased safety "e"
IEC 61241-0 : 2004 Edition: 1	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
IEC 61241-1 : 2004 Edition: 1	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/PTB/CxTR07.0027/00

Quality Assessment Report:

DE/BVS/QAR06.0001/02

IECEx Certificate of Conformity

Certificate No.: **IECEx PTB 07.0020**

Date of Issue: **2007-04-03** Issue No.: **0**

Page **3** of **3**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

Description of equipment
The terminal box type EAC 00xx consists of an enclosure out of plastic material in the type of protection Increased Safety "e". It is equipped with separately certified terminals. The connection is made by separately certified cable glands and a thread M25. It is intended to be assembled to the separately certified gas sensor type IDS 011x.

Nomenclature

EAC 00	xx
*	2

1: name of the type
2: different variants, no influence on explosion protection

Technical data

Rated voltage	up to	40 V
Rated current	max	5 A
Rated cross section	max	2.5 mm^2
Ambient temperature range	depending on temperature class -40 °C to +40 °C, T6 -40 °C to +80 °C, T4	
Protection against contact, entry of solids and water according to IEC 60529	IP65	

CONDITIONS OF CERTIFICATION: NO

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

No. Z10 07 10 53474 004

Holder of Certificate: **Dräger Safety AG & Co. KGaA**
Revalstr. 1
23560 Lübeck
GERMANY

Factory(ies): 53474

Certification Mark:

Product: **Safety Related Programmable Electronic System**
Infrared Gas Transmitter

Model(s): **Dräger PIR7000 type 334/340 (M25) / (NPT) for hydrocarbon**
Dräger PIR7200 (M25) / (NPT) for carbon dioxide

Parameters:
Structure - Safety Integrity Level: 1oo1 - SIL2
Measuring range: 0 to 5...100%LEL / 0 to 5...100 Vol.%
Nominal current range:
4 to 20 mA current source or current sink
(automatically selected)
Transmitter failure mode: 0...3.6 mA or > 21 mA
Compliance voltage:
9 to 30 VDC / 13 to 30 VDC (HART)
Operating temperature range: -40° C to +77° C

The report no. DL70901 C is a mandatory part of this certificate.
The product complies with the following listed safety requirements only, if the specifications documented in the currently valid revision of this report are met.

Tested according to:
DIN EN 50271:2002
DIN EN 50402:2006
DIN EN 50402/A1:2007
IEC 61508 1-4:2000, SIL 2

The listed product was tested on a voluntary basis and complies with the relating standards or directives. The certification mark shown above can be affixed on the product. The certification mark must not be altered in any way. See also notes overleaf.

Test report no.: DL70901 C

Page 1 of 1
Date, 2007-10-26

TÜV SÜD Product Service GmbH · Zertifizierstelle · Ridlerstrasse 65 · 80339 München · Germany

Hinweise

Grundlage für die Zertifikatserteilung ist die Prüf- und Zertifizierordnung von TÜV SÜD Product Service.

Mit Erhalt des Zertifikates wird der Zertifikatsinhaber Partner im Zertifiziersystem von TÜV SÜD Product Service und anerkennt die jeweils gültige Fassung der Prüf- und Zertifizierordnung und der Geschäftsbedingungen.

Prinzipielle Voraussetzung für die Gültigkeit des Zertifikates:

– Gültigkeit der zitierten normativen Prüfgrundlage(n) ist gegeben

und zusätzlich bei Zertifikaten mit Berechtigung zur Verwendung eines Prüfzeichens bzw. bei Zertifikaten für QM-Systeme:

– Voraussetzungen für vorschriftsmäßige Fertigung werden eingehalten.

– Die Fertigungs- bzw. Betriebsstätten werden regelmäßig überwacht.

Please note

Certification is based on the TÜV SÜD Product Service Testing and Certification Regula-tions.

On receipt of the certificate the certificate holder becomes a partner in the TÜV SÜD Product Service certification system and recognizes the current version of the Testing and Certification Regulations and the Standard Terms and Conditions.

Requirements for the validity of the certificate in principle:

– Validity of the quoted test standard(s)

In addition for Certificates with the right to use a certification mark and for QM certificates:

– Conditions for an adequate manufacturing are maintained

– Regular surveillance of the facility is performed

Akkreditierungen / Accreditations

Deutschland / Germany

Geräte- und Produktsicherheitsgesetz (GPSG) / Equipment and Product Safety Act (GPSG)

Europa / Europe

- Niederspannungsrichtlinie 73/23/EWG
- Spielzeugrichtlinie 88/378/EWG
- Richtlinie für aktive medizinische Implantate 90/385/EWG
- Richtlinie für Medizinprodukte 93/42/EWG
- Richtlinie für In-vitro-Diagnostica 98/79/EG
- Richtlinie für Gasverbrauchseinrichtungen 90/396/EWG
- Richtlinie für persönliche Schutzausrüstungen 89/686/EWG
- EMV-Richtlinie 89/336/EWG
- Richtlinie für Sportboote 94/25/EG
- Richtlinie für Maschinen 98/37/EG
- Richtlinie für Ex-Schutz Geräte 94/9/EG

- Low Voltage Directive 73/23/EEC
- Toys Directive 88/378/EEC
- Directive for Active Implantable Medical Devices 90/385/EEC
- Directive for Medical Devices 93/42/EEC
- Directive on In Vitro Diagnostic Medical Devices 98/79/EC
- Directive for Gas Appliances 90/396/EEC
- Directive for Personal Protective Equipment 89/686/EEC
- EMC Directive 89/336/EEC
- Directive for Recreational Craft 94/25/EC
- Directive for Machinery 98/37/EC
- Directive for Ex Safe Equipment 94/9/EC

- ENEC Agreement for luminaires

USA

- Nationally Recognized Testing Laboratory (NRTL) to 29 CFR 1910.7 by OSHA
- Accredited for FDA 510(k) Third Party Review
- Conformity Assessment Body to the MRA for Medical Devices; FDA QSReg Inspections, FDA 510(k) Third Party Review

Asien-Pazifik Region / Asia Pacific

- Recognized Certification Body to Electrical Products (Safety) Regulation; Hong Kong
- Konformitätsbewertungsstelle / Conformity Assessment Body to the MRA for Medical Devices; Australien / Australia
- Konformitätsbewertungsstelle / Conformity Assessment Body to the MRA for Medical Devices; Neuseeland / New Zealand

Weltweit / Worldwide

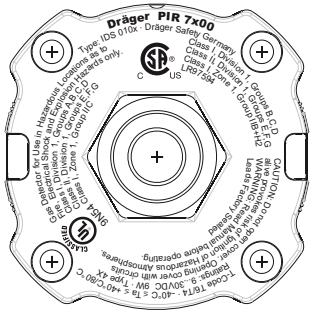
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- Zertifizierung von QMS / Certification of QMS TGA-ZQ-008/93-00
- Medizinprodukte nach / Medical Devices to EN 46003; ISO 13485/88; ZLG-ZQ-999.98.12-46

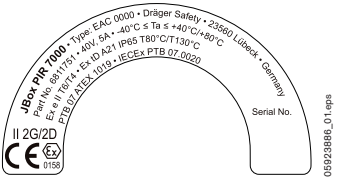
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Notes on Approval

Marking







Serial no.[1)]

In areas regulated by UL standards, the gas detection transmitter shall be supplied by a Limited Voltage/Current Circuit, i.e. the open circuit voltage available to the circuit shall not exceed 42.4 V peak and the current available shall be limited to 8 A measured after 1 minute of operation.

1) The year of manufacturing is indicated by the third letter of the serial number on the type plate:
Y = 2007, Z = 2008, A = 2009, B = 2010, C = 2011, etc.
Example: Serial no. ARYH-0054, the third letter is Y, so the year of manufacturing is 2007.

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