Dräger Polytron 3000

(approved as type P3S)
Transmitter for electrochemical Sensors

Instructions for Use

Contents

For Your Safety

Strictly follow the Instructions for Use
Any use of the apparatus requires full understanding and strict observation of these instructions. The apparatus is only to be used for purposes specified here.

Maintenance
The unit must be inspected and serviced regularly by suitably qualified persons. Repair and general overhaul of the apparatus may only be carried out by trained service personnel.
We recommend that a service contract be obtained with DrägerService and that all repairs also be carried out by them. Only authentic Dräger spare parts may be used for maintenance.
Observe chapter "Maintenance Intervals".

Use in areas subject to explosion hazards
Equipment and components which are used in explosion-hazard areas and which have been inspected and approved in accordance with international or European explosion-protection regulations may be used only under the specified conditions. The equipment or components may not be modified in any manner. The use of faulty or incomplete parts is forbidden.
The appropriate regulations must be observed at all times when carrying out repairs on the equipment or components.
If the transmitter has been installed with a suitable safety barrier, its case may be opened or the sensor may be changed while the transmitter is operating.

⚠ CAUTION
When the transmitter is installed in Ex areas Class II, Div. 1 & 2, Groups E, F, G, the opening of the housing (inclusive sensor replacement) must not be done when connected to power (power must be turned off or the area has to be temporarily declassified). Explosion hazard! In applications where category 1G (Zone 0) or EPL Ga devices are required, intense electrostatic charging processes must be avoided.

Accessories
Use only accessories shown in the Ordering List.

Intended Use

Dräger Polytron® 3000 Transmitter for electrochemical sensors

ST-691-2002-1.eps

— For stationary, continuous monitoring of gas concentrations in ambient air, with built-in DrägerSensor®.

— For indoor and outdoor use.

— Suitable for use either in mines where firedamp may occur in accordance with device category M1 or in potentially explosive atmospheres of Zone 0, Zone 1 or Zone 2 in accordance with device category 1G, 2G or 3G.
For further details, see the installation notes.

— Calibration by one person even in areas subject to explosion hazards.

— For connection to Dräger central units or to a programmable logic controller (PLC) to warn against physiologically harmful gas concentrations.

— The optional display on the transmitter indicates the actual gas concentration and makes calibration easier.
False alarms during calibration are avoided by a special maintenance mode with output of a maintenance signal.

® Polytron is a registered trademark of Dräger.
DrägerSensor is a registered trademark of Dräger.

Design

Polytron 3000 is designed for connection to the Dräger Polytron, Regard, QuadGard or Unigard central units.

The Polytron 3000 transmitter may also be connected to other central units if the following conditions are met:

— Industrial standard 4 to 20 mA input signal
— Operating voltage at the transmitter 12 to 30 V DC.

On delivery, Polytron 3000 is configured for the measuring range and gas to be measured. This information can be found on a sticker below the service port and on the back of the measuring unit. The Order No. of the sensor to be used is also specified there.

Two different versions of the Polytron 3000 transmitter are available:

Polytron 3000 transmitter with display
This version is intended for installations requiring local indication of the measured value.
The transmitter is calibrated with the aid of two potentiometers and the display.

ST-691-2002-1.eps

Polytron 3000 transmitter without display
This version is intended for installations in which local indication of the measured value is not required.
A digital voltmeter is required for calibration.

ST-691-2002-2.eps

Optional extras:

Duct Extension
For mounting the Polytron 3000 transmitter on a duct.
For measuring the gas concentration in the pipe or duct. This option does not affect the explosion-protection approval of the transmitter.

Installing the transmitter

Preparing for installation

The performance and effectiveness of the entire system depends essentially on the position chosen for installing the transmitter.
The following should be noted during installation:

— Local requirements and regulations governing the installation of gas measuring systems.
— Relevant regulations concerning the connection and routing of electric power supply and signal lines.
— The full scope of environmental factors to which the transmitter may be exposed (ambient conditions: see Technical data, page 19).

— Physical properties of the gas to be measured:
For gases with a density lower than that of air, the transmitter must be located above any possible leak or at the highest point at which large concentrations of gas may occur.
For gases and vapours with a density greater than that of air, the transmitter must be located below a possible leak or at the lowest point at which such gases and vapours may occur.

— The specific uses (e.g. possible leaks, ventilation conditions, etc.).
— Accessibility for the necessary maintenance work (see Installation instructions for the Polytron docking station).
— All other factors and conditions which could have a negative effect on the installation and operation of the system (such as vibrations or varying temperatures).
— We recommend installing a reflective shield if the unit is exposed to strong sunlight.
— The transmitter must be installed vertically (sensor facing downwards).
— The transmitter has been tested with regard to its weather-resistance and may be installed out of doors. Use of a splash guard is recommended to protect the sensor from splashing water, dust and wind.

NOTE
In explosion-hazard areas: Observe the national regulations concerning electrical equipment in explosion-hazard areas.

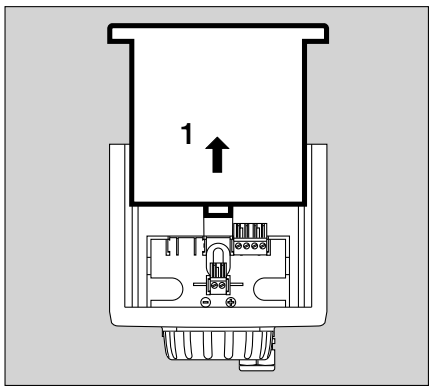
The Dräger Polytron 3000 transmitter consists of two main components:
— Dräger docking station
This can be pre-installed anywhere and contains the electrical installation components.
— The measuring unit Dräger Polytron 3000
contains the electronics of the transmitter.

If the measuring unit is not fitted immediately after installing the docking station, the latter should be covered with the raincover provided (dust and water protection) to protect against dust and splashing water.

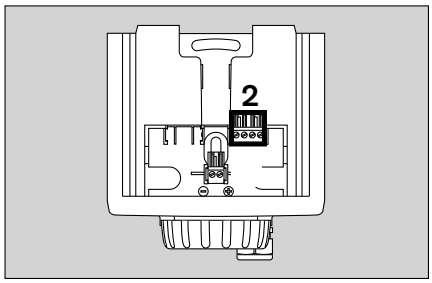
Installing the docking station

— If the transmitter is to be installed in a Zone 2 explosion-hazard area, select a location with low exposure to mechanical risk.
— Docking station is installed vertically (transmitter with sensor facing down) in an area with low vibrations and stable temperatures – near the possible leak.
— A space of at least 15 cm (6") must be maintained above the transmitter for installation of the measuring unit.
— A space of at least 10 cm (4") – preferably 30 cm (12") – must be maintained below the docking station to permit access for maintenance.
Unpack the docking station.

1 Remove raincover (protection against dust and splashing water).



2 Remove the 4-pole terminal block (Part No. 83 16 422), keep it in a safe place and insert it again after completion of the installation work.
A drilling template is provided on page 30. The mounting holes are 66 ±4 mm (2.6 ± 0.16") apart.



⚠ CAUTION
Spacers (e.g. mounting bracket 68 09 951) must be used to prevent any twisting of the housing when installed on uneven surfaces.

If the measuring unit is not to be mounted at this time:
Refit the raincover (protection against dust and splashing water).

How to install the electrical connections

— The electrical wiring may be laid and connected only by a qualified electrician, who must also comply with the appropriate regulations – a screened or unscreened cable (such as LiY, LiYCY) may be used.

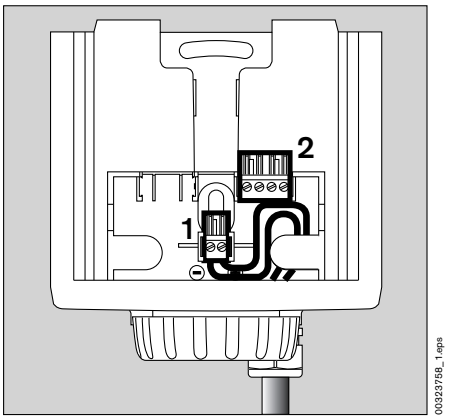
— Connection to central device with at least 2-wire cable, 0.5 to 2.5 mm^2.
— For currents of 0 to 22 mA, a DC voltage between 12.0 V DC and 30 V DC must be present at the transmitter.

Installing the 4 to 20 mA current loop on the transmitter

- Fit 2-wire connecting cable in cable gland, cut to length and strip ends (approx. 80 mm / 3.15").
- Shorten the shield (if installed) to prevent short-circuiting:
- Connect cable

1 2-pin terminal for Polytron 3000 – check polarity (marking in the docking station). Cut excess wires short or
2 Fasten in 4-pin terminal.
1 Slide connecting terminal back into holder.

- Secure cable in holder.
- Fold up the installation notes and place them in the Dräger docking station for future use during commissioning.
- Refit raincover (protection against dust and splashing water).



Connecting to the central unit

- Connect shield to earth of central unit (e.g. housing, earth bar, etc.).

Connecting the Dräger Polytron 3000 transmitter to a Dräger control unit (such as Regard, QuadGard, Unigard or Polytron):
— Further information about the connection can be found in the instructions for the Dräger control unit.

Connecting the Dräger Polytron 3000 transmitter to control units with a 4 to 20 mA interfaced made by other manufacturers:
— For operation together with control units made by other manufacturers, care must be taken that the voltage at the transmitter does not drop below 12 V. The supply voltage, the resistance of the cable and the load and the resistance of any installed safety barrier must be taken into account.
— Further information about the connection can be found in the instructions for the control unit being used.

Installing transmitter in mines where firedamp may occur
— Install a safety barrier with the appropriate explosion protection approval (category M1) between the transmitter and the control unit.
— Only safety barriers or power supply units with the following characteristics may be used:
U_O (V_{OC}) ≤ 30 V, I_O (I_{SC}) ≤ 0.3 A, P_O ≤ 700 mW.
Make sure the maximum permissible capacitance and inductance connected to the safety barrier or power supply are not exceeded (taking into account the line as well). The safety-related input parameters of the transmitter are as follows:
Ci = 0 nF, Li = 50 µH.

Installing the transmitter in areas subject to explosion hazards of zone 0 or zone 1

- Install a safety barrier with the appropriate explosion protection approval (category 1, 2 or Div. 1) between the transmitter and the control unit.

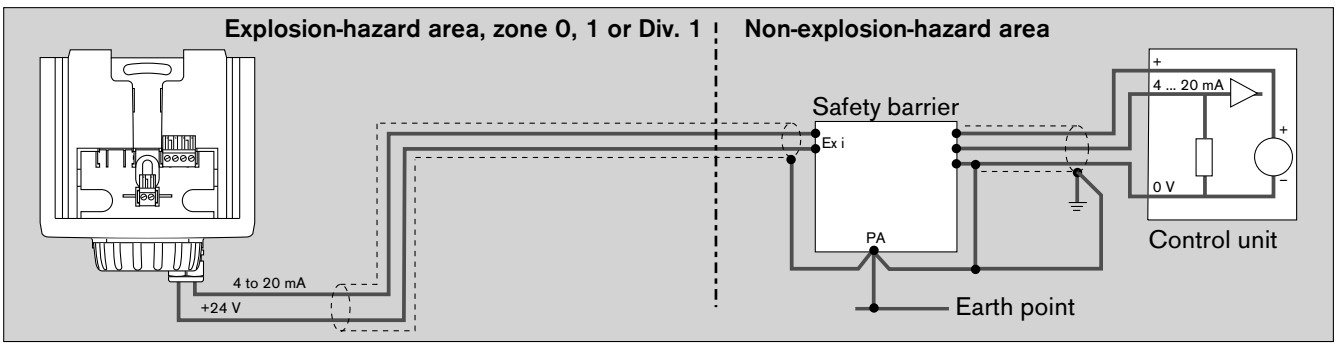
— Only safety barriers with the following characteristics may be used: U_o (V_{oc}) ≤30 V, I_o (Isc) ≤0.3 A, P_o ≤700 mW.

— Take care that the maximum permissible capacitance and inductance of connections to the safety barrier are not exceeded, also taking the cable into account. The safety-related input parameters of the transmitter are: C_i = 0 nF, Li = 50 µH.

Transmitter supply units
(without HART-communication between Ex/Non-Ex area)
The following safety barriers are provided as examples only. Selected barriers must be acceptable to the authority having jurisdiction and comply with the assigned P3S entity parameters also taking the cable into account.

Manufacturer	Type	suitable for	Line (Loop)
MTL	MTL 5041	**Zone 0, Div. 1**	**≤190 Ω**
Pepperl & Fuchs	KFD2–STC4–Ex1	**Zone 0, Div. 1**	**≤140 Ω**
	KFD2–STC1–Ex1	**Zone 0, Div. 1**	**≤140 Ω**

— Connect shielding to earth point and/or 0 V (Ex i).



Installing the transmitters in explosion-hazard areas of zone 2, or in areas not subject to explosion hazards

— Use only supply units or a safety barrier classified as device category 3.

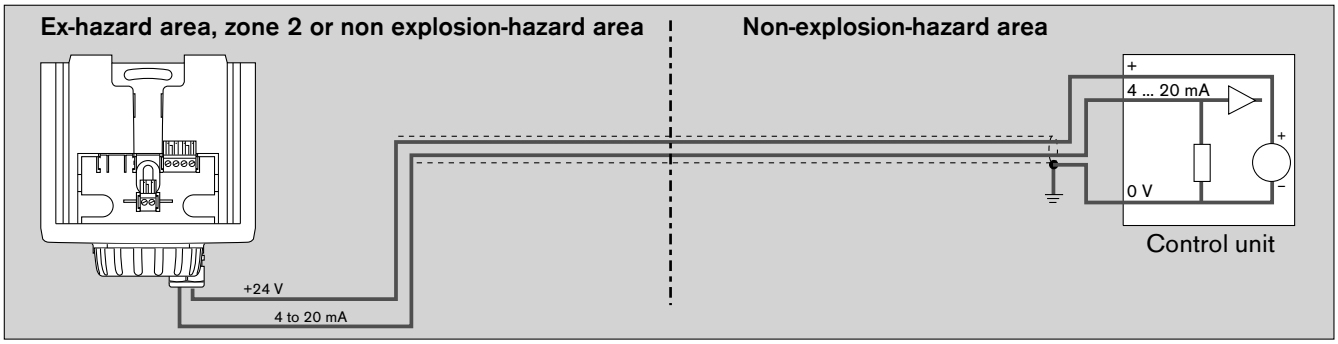
— Only supply units or safety barriers with the following characteristics may be used: U_O (V_{OC}) ≤ 30 V, I_O (I_{SC}) ≤ 0.3 A, P_O ≤ 700 mW.

— Take care that the maximum permissible capacitance and inductance of connections to the supply unit are not exceeded, also taking the cable into account. The safety-related input parameters of the transmitter are: C_i = 0 nF, Li = 50 µH.

⚠ CAUTION
The category 1 marking has to be cut out from the rating-plate label. Once the unit has been used after installation in the above manner, it may never be installed in explosion-hazard areas of zone 0 or zone 1 (device category 1 or 2). Explosion hazard!

Installing the transmitters in non-explosion-hazard areas

⚠ CAUTION
The explosion-protection markings has to be removed from the transmitter. Once the transmitter has been used after installation in this manner, it may never be installed in explosion-hazard areas.



Installing the measuring unit Dräger Polytron 3000

- Remove the rain cover from the previously installed docking station.
- Examine seal for signs of dirt and clean if necessary.

1 Check position of eccentric catches and correct if necessary.
The eccentric opening must point upwards, engaged position.

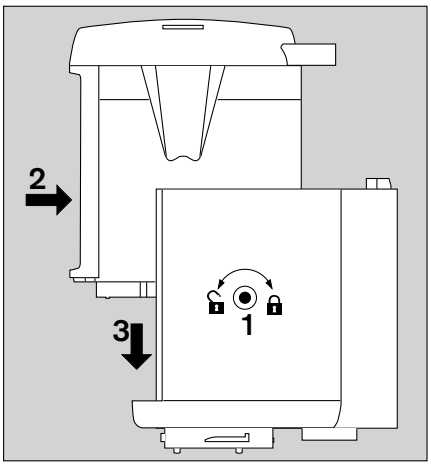
⚠ CAUTION
Use only a 5 mm Allen key without a ball head.

- Check the polarity (marking in the docking station) and cable routing and check that the connector is securely seated; rectify as necessary (see the installation notes for the Polytron docking station).
- Unpack the measuring unit Dräger Polytron 3000.

2 Insert the measuring unit about halfway up the docking station and slide it in as far as it will go.

3 Lower the unit along the front edge of the docking station. About 5 mm before its hits the stop, the resistance will increase as the connector engages with the socket on the printed circuit board.

1 Turn the eccentric catches clockwise with an Allen key to lock the measuring unit (⇒ = approx. 180°).



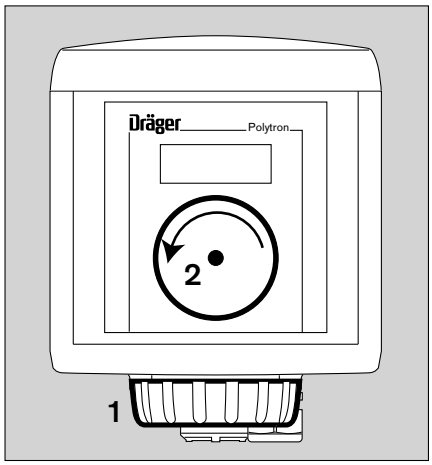
Fitting the sensor

1 Remove bayonet ring from transmitter, remove dummy plate.
2 Open the front cover of the service port with an Allen key by turning anticlockwise (approx. 60°).

⚠ CAUTION
Use only a 5 mm Allen key without a ball head.

3 Only use the DrägerSensor specified on the sticker on the Polytron 3000 measuring unit.

- Remove sensor from packaging.
- Remove short-circuit jumper from sensor if installed.
- There is a coded connector on the back of the sensor. Place the sensor in the opening with the connector at the back and the Dräger logo at the front. Before plugging the connector in the socket, ensure that they are identically coded. Incorrect connection can damage the sensor!
- Secure sensor in transmitter with bayonet ring.

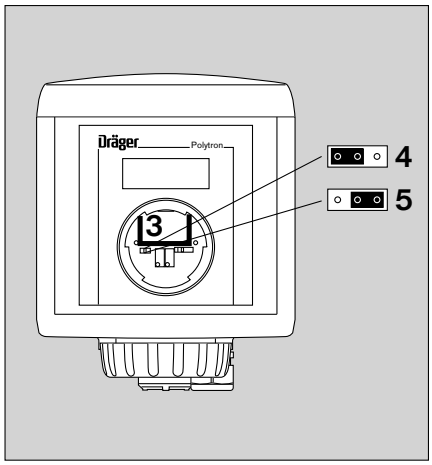


- If the manufacturer's calibration setting for the sensor is to be used:
- Open the front cover of the service port with an Allen key by turning anticlockwise (approx. 60°). The maintenance switches and potentiometers for calibration are now revealed.

4 Jumper J1 must be set over the two left-hand pins or removed completely.

- If the transmitter is specifically to be calibrated with calibration gas:
- Open the front cover of the service port with an Allen key by turning anticlockwise (approx. 60°). The maintenance switches and potentiometers for calibration are now revealed.

5 Jumper J1 must be set over the two right-hand pins.



Start-up

Switch on power supply.
The transmitter begins its warm-up routine.This is indicated by a flashing display. The warm-up phase takes between 5 minutes and 12 hours, depending on the sensor installed. Note the information in the sensor data sheet. The warm-up phase may take longer in extremely high or low temperatures. It is completed when the display stops flashing.

When the sensor has warmed up:

— Transmitters set for specific calibration with calibration gas
- Calibrate sensor, page 14.

— Transmitters set for use of the manufacturer's calibration setting for the sensor
Transmitter is ready for use.
Check signal transmission to the central unit and alarm output.

Analogue signal

— A current between 4 and 20 mA flows through the transmitter during normal operation. This current is proportional to the gas concentration.
— Polytron 3000 uses various current values to indicate the operating status of the transmitter:

Current	Meaning
4 mA	Zero point
20 mA	Full-scale value
<3.2 mA	Transmitter fault
3.8 mA ... 4 mA	Sensor drift below zero point
20 mA ... 20.5 mA	Full-scale value exceeded
3.4 mA ±0.2 mA constant	Maintenance signal

Display (optional)

— In measuring mode, the display shows the actual gas concentration, e.g.:

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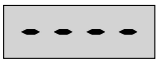
— The following symbols may be displayed during measurement:

— If a fault has been detected:


01023758_1.eps

— If the measuring range has been exceeded:


01123758_1.eps

— If the zero point is too low (sensor drift below the zero point):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Maintenance

Maintenance intervals

Before starting operation:
- Check the calibration, see page 14.
- Check the transmission of signals to the control unit and the triggering of alarms.

At regular intervals,
to be defined by the person responsible for the gas warning installation:
- Check the transmission of signals to the control unit and the triggering of alarms.

If a selective filter specific to the sensor is being used:
- Replace the selective filter –
  See the related operating instructions for the sensor for details of the capacity of the selective filter being used.

At regular intervals defined in accordance with the sensor being used by the person responsible for the gas warning system:
- Calibrate the sensor, see page 14.
  The interval for regular calibration depends on the sensor being used and on the operating conditions.
  Specific calibration data for the sensor, see the operating instructions for the sensor.

Every six months:
- Inspection by specialists.
  The inspection intervals must be established in each individual case and shortened if necessary, depending on technical safety considerations, engineering conditions and the technical requirements of the equipment.
- We recommend that a service agreement be concluded with DrägerService and that repairs also be carried out by them.

As required:
- Replace sensor, page 17.

Unit calibration

⚠ CAUTION
When the transmitter is installed in Ex areas Class II, Div. 1 & 2, Group E, F, G, the opening of the housing (required for calibration) must not be done when connected to power (power must be turned off or the area has to be temporarily declassified). Explosion hazard!

— Ensure that the sensor is warmed up before it is calibrated. See the sensor data sheet for the warming-up time.
— Only the zero point is checked if an oxygen sensor has been fitted. The zero point of an oxygen sensor does not require calibration.
— The transmitter can be calibrated by the operator on site.

— **For critical applications**, the calibration intervals should be defined in accordance with the recommendations in EN 50073[1)], EN45544-4[2)] and national regulations.

Note the calibration sequence!
- First check the zero point and correct it necessary, Immediately after this, check the sensitivity and adjust it as necessary.

— Never calibrate the sensitivity before calibrating the zero point.

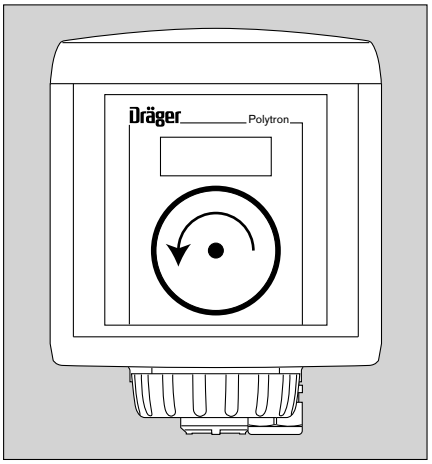
— Zero gas and test gas: see the information in the sensor data sheet.

⚠ CAUTION
Test gas must not be inhaled. Risk to health! Care must be taken about the risks which can arise when using test gas; hazard instructions and safety advice must be observed. For details, see appropriate DIN Safety Data Sheets.

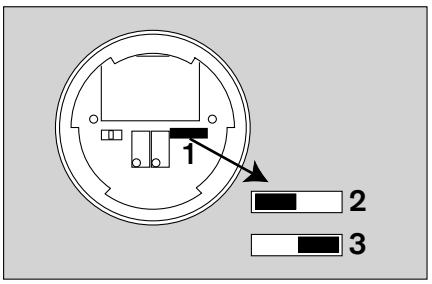
- Open the front cover of the service port with an Allen key by turning anticlockwise (approx. 60°). The maintenance switch and potentiometers for calibration are now revealed.

⚠ CAUTION
Use only a 5 mm Allen key without a ball head.

NOTE
The Dräger Polytron 3000 does not support the storage of calibration data in the sensor data base.



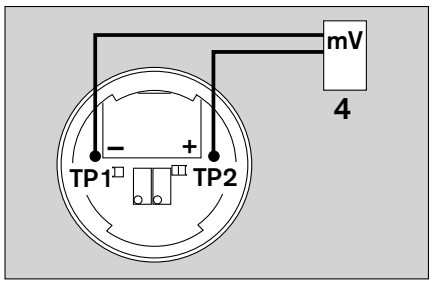
Measuring / maintenance mode
1 Maintenance switch with two positions.
2 Measuring mode position (left-hand position) – measured values are relayed to the analogue output.
3 Maintenance mode position (right-hand position) – a maintenance signal (3.4 mA ±0.2 mA constant) is relayed to the analogue output and prevents alarms being triggered.



1) EN 50073 – Guidelines for selection, installation, use and maintenance of devices for the detection and measurement of flammable gases and oxygen.
2) EN 45544-4 – Electrical devices for the direct detection and direct concentration measurement of toxic gases and vapours – Part 4: Guidelines for selection, installation, use and maintenance.

Output for calibration

4 Connect voltmeter (mV setting, Ri > 10 MΩ) to test points TP1 and TP2 (required for the version without display).



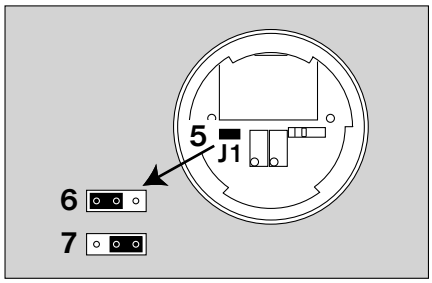
⚠ CAUTION

For operation in explosion-hazard areas:
Only use intrinsically safe voltmeters with electrical parameters to the following specifications:
U_i (V_{max}) ≥ 7.6 V; I_i (I_{max}) ≥ 1 mA; U_o (V_{oc}) ≤ 10.4 V; C_i ≤ 2.5 µF; L_i ≤ 10 mH (C_o (C_a) and L_o (L_a) are not relevant as C_i and L_i of the test point circuit are zero)
MiniGrabber© Test Clips from Pomona Electronics (order no. 4723 or 4826) shall be used for connecting the voltmeter.
The jumper J1 must be connected to the right-hand pin, when connecting the voltmeter.

— If a fault is detected, the voltmeter shows –200 mV.
— Voltage output –200 to 1100 mV:
  –200 mV corresponds to a fault
  –0 mV corresponds to zero concentration
  –1000 mV corresponds to the 100 % measuring range end value

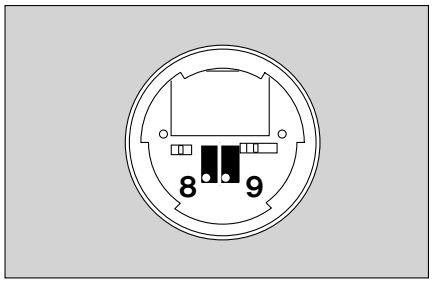
Jumper

5 Jumper J1 can be set to two positions.
6 The left-hand position or complete removal of jumper J1 in order to use the manufacturer's calibration setting for the sensor.
7 The right-hand position for calibration with calibration gas and the potentiometers for zero point and sensitivity.
— Only the manufacturer's calibration setting for the sensor can be used when jumper J1 is set over the two left-hand pins.
— Calibration with calibration gas can be performed when jumper J1 has been set over the two right-hand pins.

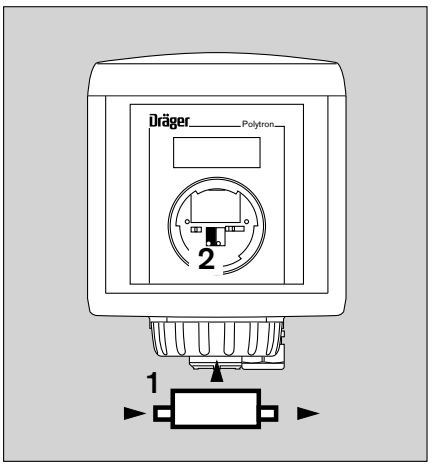


Operating elements

8 Potentiometer (left) for calibration of the zero point.
9 Potentiometer (right) for calibration of the sensitivity.



Calibrating the zero point



For all sensors except oxygen sensor:
The zero point can be calibrated without the use of nitrogen (zero gas) when the ambient air is free from measuring gas and other interfering gases. Alternatively:

1 Use the calibration adapter.
- Set maintenance switch to maintenance position, see page 14.
- Let nitrogen flow through the calibration adapter at a rate of approx. 0.5 L/min. Synthetic air may also be used, except when calibrating oxygen sensors.
- Wait for the measured value to stabilise – approx. 3 minutes. Note the information in the sensor data sheet.

2 Set potentiometer for zero point so that the display shows 0 and the digital voltmeter 0 mV ±2 mV.

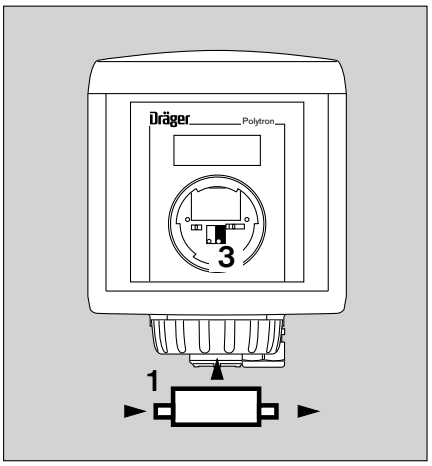
Oxygen sensors:
The zero point cannot be calibrated for these sensors. The zero point is merely checked.

Switch off calibration gas and remove calibration adapter.
Set maintenance switch to measuring position, see page 14.

Calibrating the sensitivity

⚠ CAUTION
Test gas must not be inhaled. Risk to health! Care must be taken about the risks which can arise when using test gas; hazard instructions and safety advice must be observed. For details, see appropriate Safety Data Sheets.

— The recommended calibration gas concentration for optimum accuracy is between 40 % and 100 % of the measuring range end value.



1 Use the calibration adapter.
- Set maintenance switch to maintenance position, see page 14.
- Let calibration gas flow through the calibration adapter at a rate of approx. 0.5 L/min.

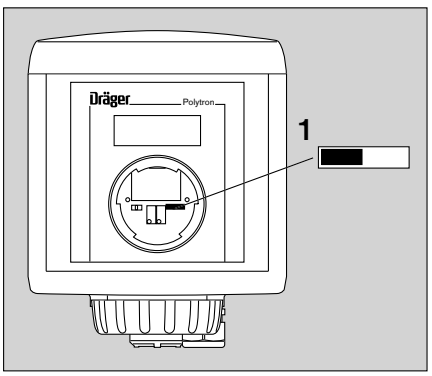
— Wait for the measured value to stabilise – approx. 3 minutes. Note the information in the sensor data sheet.

3 Set the potentiometer for sensitivity so that the display shows the concentration of the calibration gas or the digital voltmeter shows the calculated voltage mV.
Calculation of the voltage V_{exp} between test points TP1 and TP2:
V_{exp} = Concentration of calibration gas ÷ Measuring range x 1000 mV

Example: Concentration of calibration gas 250 ppm CO
Measuring range 0 to 300 ppm CO

Calculated voltage:

$$V_{exp} = \frac{250\ ppm}{300\ ppm} \times 1000\ mV = 833\ mV$$



- Switch off calibration gas and remove calibration adapter.
- Wait until the measured value drops below the alarm threshold set on the central unit. Otherwise an alarm will be triggered when the maintenance switch is returned to the measuring position immediately after calibration.

1 Set maintenance switch to measuring position, left-hand position. The 4 to 20 mA output changes to measuring mode.
- Refit the front cover of the service port and lock it in place by turning clockwise with an Allen key (approx. 60°).

Replacing the sensor

The sensor can be replaced, if necessary, without interrupting the power supply in the explosion-hazard area.
Use only DrägerSensors which are approved for use with the Dräger Polytron 3000 transmitter.

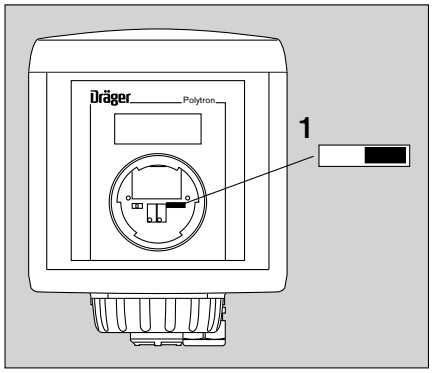
⚠ CAUTION
When the transmitter is installed in Ex areas Class II, Div. 1 & 2, Group E, F, G the opening of the housing (inclusive sensor replacement) must not be done when connected to power (power must be turned off or the area has to be declassified)! Explosion hazard!

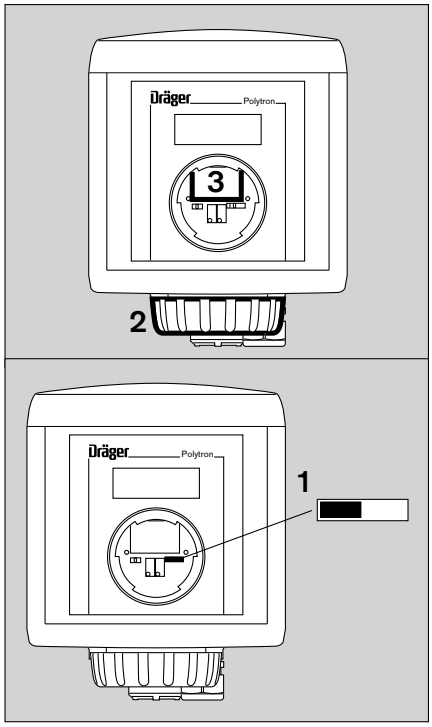
- Open the front cover of the service port with an Allen key by turning anticlockwise (approx. 60°). The maintenance switch and potentiometers for calibration are now revealed.

⚠ CAUTION
Use only a 5 mm Allen key without a ball head.

1 Set maintenance switch to right-hand position. The 4 to 20 mA output changes to maintenance mode. In this position, a maintenance signal is relayed to the analogue output and prevents alarms being triggered.
2 Remove bayonet ring from transmitter; pull out old sensor.
3 Remove sensor from packaging. Ensure that the sensor is of the same type as that specified on the sticker on the measuring unit.
- Remove the short-circuit strap from the sensor (if it is fitted).
- There is a coded connector on the back of the sensor. Place the sensor in the opening with the connector at the back and the Dräger logo at the front.
  Before plugging the connector in the socket, ensure that they are identically coded. Incorrect connection can damage the sensor!

2 Secure sensor in transmitter with bayonet ring.





- Wait until the measured value drops below the alarm threshold set on the central unit. Otherwise an alarm will be triggered when the maintenance switch is returned to the measuring position immediately after the sensor replacement.

1 Set maintenance switch to left-hand position.
The 4 to 20 mA output changes to measuring mode.
- Refit the front cover of the service port and lock it in place by turning clockwise with an Allen key (approx. 60°).

When the sensor has warmed up:
— Transmitters set for specific calibration with calibration gas
- Calibrate sensor, page 14.

— Transmitters set for use of the manufacturer's calibration setting for the sensor.
- Transmitter is ready for use.

Disposal of electrochemical sensors:
— Sensors must be disposed of as special waste.

⚠ CAUTION
Do not throw sensors into the fire – explosion hazard. Do not open sensors forcibly – risk of caustic burns.

Note the relevant waste disposal regulations.
Further information can be obtained from the relevant local authority and from appropriate waste disposal companies.

Fault – Cause – Remedy

Fault	Cause	Remedy
Flashing display	Sensor warms up	Wait for warm-up phase to end.
Display 	Equipment fault, e.g. wrong sensor installed	Only use a sensor with the gas type, Part No. and measuring range indicated on the sticker.
Display 	Measuring range end value exceeded	Wait until the gas concentration is within the measuring range.
Display 	Value too far below zero point	Calibrate zero point if fault occurs frequently.

Technical Data

The measuring range and the measuring properties depend on which type of sensor is installed – see the operating instructions for the sensor being used.

CE markings	— Devices and protective systems for use for the intended purpose in explosion-hazard area (Directive 94/9/EC) — Electromagnetic compatibility (Directive 2004/108/EEC) max. influence on sensor: ≤ 2 x repeatability
Ingress protection	IP 66 / IP 67, according to EN 60 529 / IEC 529 (NEMA 4)
Approvals	**Polytron 3000 is certified as type P3S.**
ATEX	Device markings in accordance with 94/9/EC **P3S** CE 0158 Ex II 1G / I M1 Ex ia IIC T4 Ga (–40 °C ≤ Ta ≤ +65 °C) Ex ia IIC T6 Ga (–40 °C ≤ Ta ≤ +40 °C) Ex ia I Ma CE 0158 Ex II 3G Ex ic IIC T4 Gc (–40 °C ≤ Ta ≤ +65 °C) Ex ic IIC T6 Gc (–40 °C ≤ Ta ≤ +40 °C) BVS 03 ATEX E 406 X Power Supply: U_i = 30 V, I_i = 0,3 A, P_i = 700 mW, C_i = 0 nF, L_i = 50 µH Meter Circuit, II 1G/3G: Uo = 7.6 V, Io = 1 mA, Ui = 10.4 V, Co = 2.5 µF, Lo = 10 mH Year of manufacture (indicated by Serial No.) [1] Dräger Safety, 23560 Lübeck, Germany Safety parameters for the supply-voltage and signalling circuit (centre terminals of the docking station): U_i = 30 V, I_i = 0,3 A, P_i = 700 mW, C_i = 0 nF, L_i = 50 mH
IECEx	**P3S** Ex ia IIC T4 Ga (–40 °C ≤ Ta ≤ +65 °C) Ex ia IIC T6 Ga (–40 °C ≤ Ta ≤ +40 °C) Ex ia I Ma IECEx BVS 04 0003 X Power Supply: U_i = 30 V, I_i = 0,3 A, P_i = 700 mW, C_i = 0 µF, L_i = 50 µH Year of construction (via serial number) [1] Dräger Safety, 23560 Lübeck, Germany

[1] Year of construction is coded by the third letter in the serial number shown on the rating plate: A = 2009, B = 2010, C = 2011, D = 2012, E = 2013 etc.
Example: Serial No. ARDH-0054: the third letter is D, which means that the unit was manufactured in 2012.

UL (Underwriters Laboratories Inc.)	**P3S** Only as to Intrinsic Safety for use in Hazardous Locations Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Use in accordance with Dräger Control Drawing SE20105. T4: –40 ≤ Ta ≤ +65 °C, T6: –40 ≤ Ta ≤ +40 °C. Not tested in oxygen enriched atmospheres (>21 % O_2). Power Supply: V_{max} = 30 V, I_{max} = 0.3 A, P_i = 700 mW, C_i = 0 nF, L_i = 50 µH Meter circuit: V_{oc} = 7.6 V, I_{sc} = 1 mA, V_{max} = 10.4 V, C_a = 2.5 µF, L_a = 10 mH, C_i = 0, L_i = 0
CSA (Canadian Standards Association)	**P3S** Intrinsic safe Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Use in accordance with Dräger Control Drawing SE20106. Power supply: V_{max} = 30 V, I_{max} = 0.3 A, P_{max} = 700 mW, C_i = 5 nF, L_i = 50 µH
Signal transmission to central unit	
Analogue	
— Measured-value signal	4 mA to 20 mA
— Drift below zero point	3.8 mA to 4 mA
— Full-scale value exceeded	20 mA to 20.5 mA
— Unit fault	<3.2 mA
— Maintenance signal	3.4 mA ±0.2 mA constant
Power supply	
Power supply	12 V DC to 30 V DC Protection against polarity reversal. Terminals for 0.5 to 2.5 mm^2 (20 to 14 AWG).
Physical specifications	
Cable inlet	M20x1.5, for cable diameter 6 to 12 mm (0.24" to 0.47")
Dimensions (H x W x D)	166 mm x 135 mm x 129 mm (6.54" x 5.31" x 5.08)
Weight	approx. 0.9 kg / 2.0 lbs.
Ambient conditions	Specifications for the sensor: see sensor data sheet
for operation	–40 to 65 °C (–40 to 160°F) [1)] 700 to 1300 hPa (20.7 to 38.4 inch Hg) 0 to 100 % relative humidity, non condensing
during storage	–40 to 70 °C (–40 to 150°F) 700 to 1300 hPa (20.7 to 38.4 inch Hg) 0 to 100 % relative humidity, non condensing

1) The legibility of the display is restricted at temperatures below –20 °C (–5 °F).

Order List

Part name and description	**Order No.**
Dräger Docking Station	**83 17 990**
Polytron 3000 measuring units and DrägerSensors	**Overview, page 22 and page 24**
Accessories:	
Splash guard	**68 07 549**
Splash guard AC sensor	**68 09 379**
Transmitter feed unit, U0 = 28 V, I0 = 91 mA Messrs. Stahl, type 9303 / 15 – 22 – 11 Safety barriers are not designed for installation in the explosion-hazard area	**18 90 212**
Duct Mount Kit	**83 17 150**
Assembly set	**68 09 951**
Calibration accessories:	
Calibration with ampoules:	
Calibration flask	**68 03 407**
Test-gas ampoules and calibration gas, see operating instructions for the DrägerSensor being used	
Calibration with test gas cylinder:	
Calibration adapter	**68 06 978**
Calibration adapter V	**68 10 536**
Remote calibration adapter	**68 07 955**
AC calibration adapter	**68 09 380**
Pressure reducer	**on request**
Test gas cylinder Test gas = Target gas in nitrogen in concentrations between 40 % and 100 % of the measuring range end value	**Order from gas supplier – note delivery period of 6 – 8 weeks and use-by date**
Test gas cylinder 99.9 % N_2, (zero gas), 4 L, 200 bar	**on request**
Spare parts:	
Dust filter for DrägerSensor ...	**see sensor data sheet**
Selective filter for DrägerSensor ...	**see sensor data sheet**

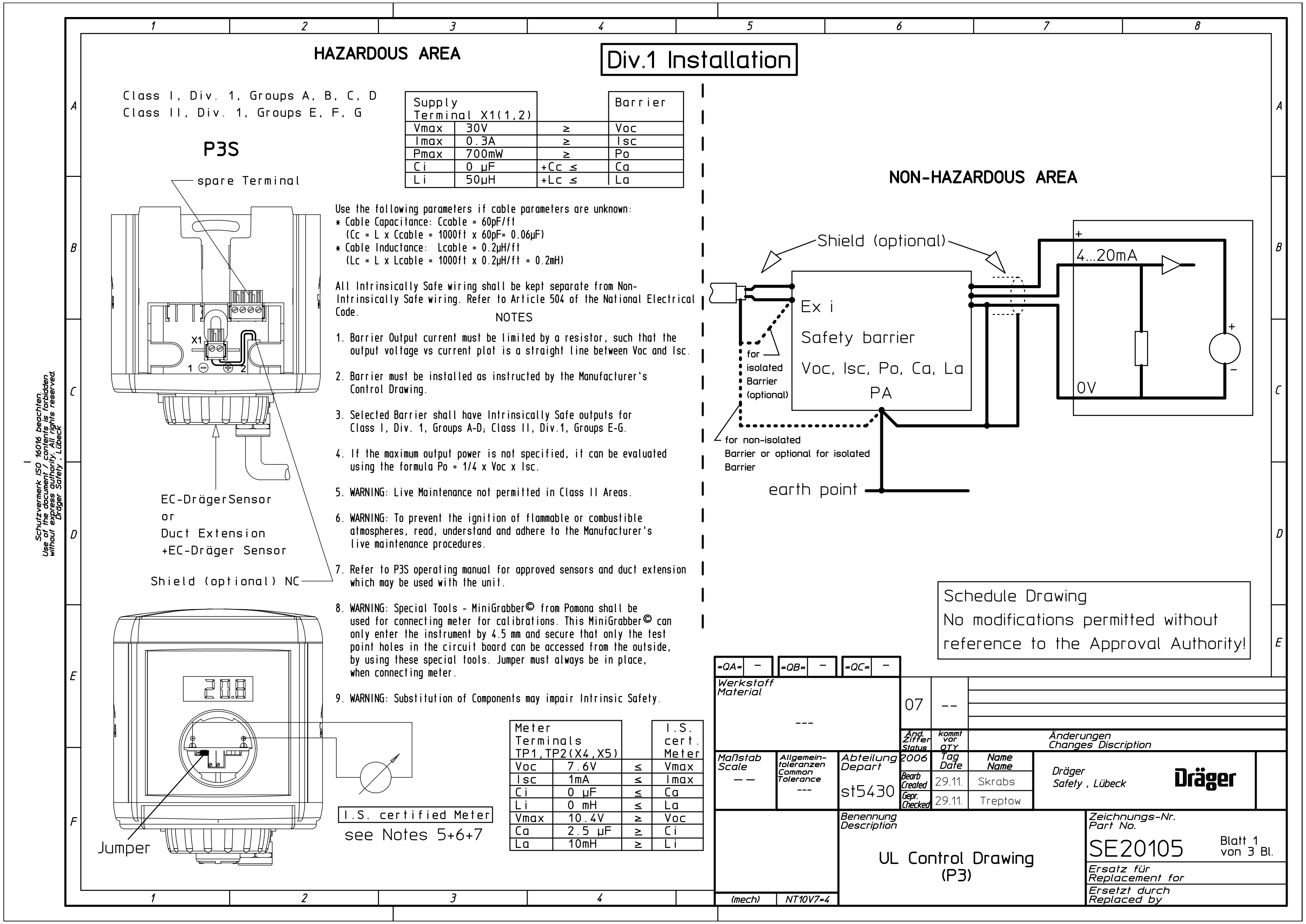
Polytron 3000 measuring units

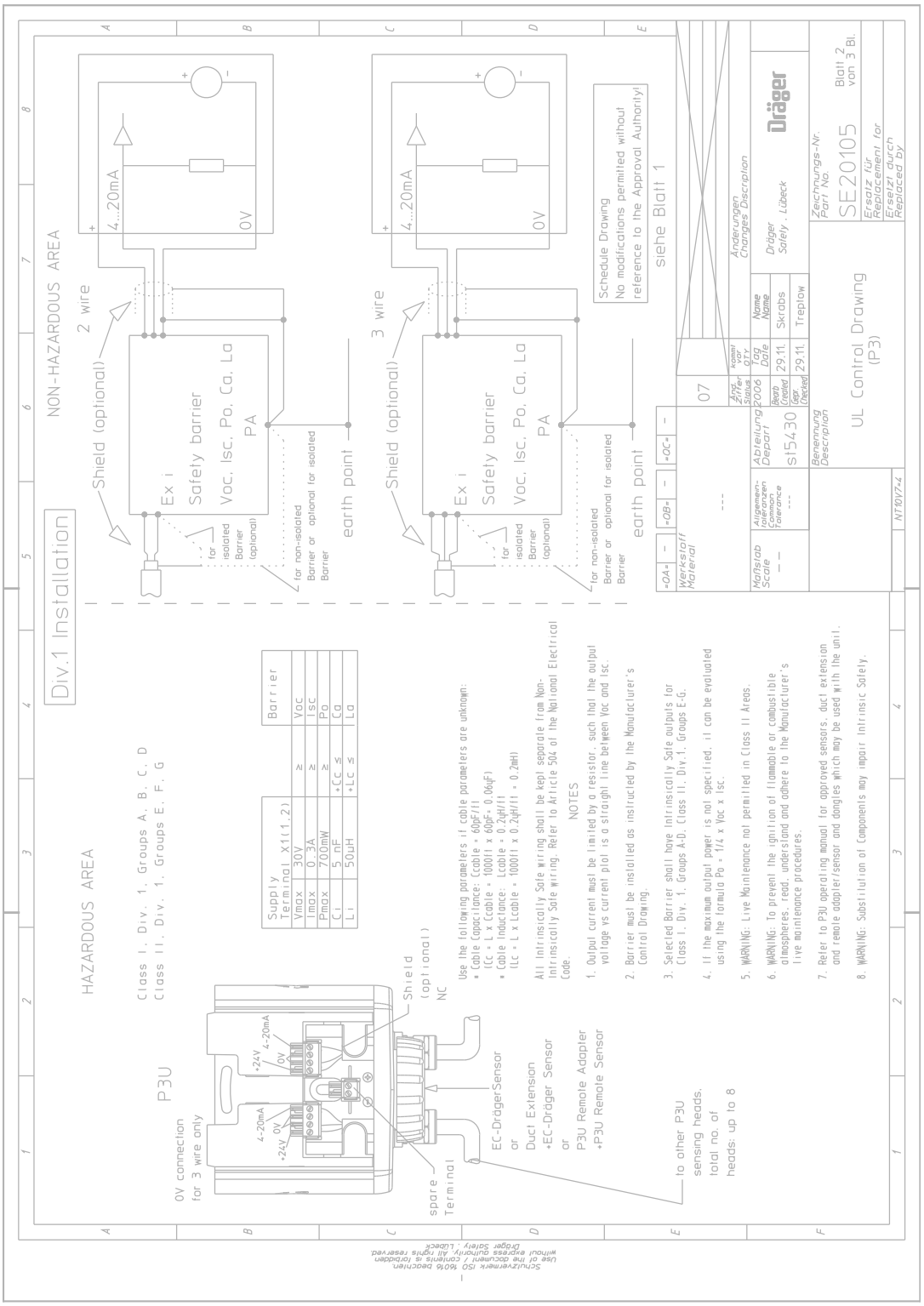
Part name and description	**Order No. with display**	**Order No. without display**	**Order No. DrägerSensor**
For measuring ammonia (NH_3):			
Polytron 3000 measuring unit, Measuring range 0 to 100 ppm NH_3, for DrägerSensor NH_3 LC	**83 16 637**	**83 16 737**	**68 09 680**
Polytron 3000 measuring unit,, Measuring range 0 to 300 ppm NH_3, for DrägerSensor NH_3 HC	**83 16 638**	**83 16 738**	**68 09 645**
Polytron 3000 measuring unit, Measuring range 0 to 1000 ppm NH_3, for DrägerSensor NH_3 HC	**83 16 639**	**83 16 739**	**68 09 645**
For measuring carbon monoxide (CO):			
Polytron 3000 measuring unit, Measuring range 0 to 100 ppm CO, for DrägerSensor CO	**83 16 632**	**83 16 732**	**68 09 605**
Polytron 3000 measuring unit, Measuring range 0 to 300 ppm CO, for DrägerSensor CO	**83 16 631**	**83 16 731**	**68 09 605**
Polytron 3000 measuring unit, Measuring range 0 to 1000 ppm CO, for DrägerSensor CO	**83 16 630**	**83 16 730**	**68 09 605**
Polytron 3000 measuring unit, Measuring range 0 to 300 ppm CO, for DrägerSensor CO LS	**83 16 633**	**83 16 733**	**68 09 620**
For measuring chlorine (Cl_2):			
Polytron 3000 measuring unit, Measuring range 0 to 1 ppm Cl_2, for DrägerSensor Cl_2	**83 16 647**	**83 16 747**	**68 09 665**
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm Cl_2, for DrägerSensor Cl_2	**83 16 648**	**83 16 748**	**68 09 665**
Polytron 3000 measuring unit, Measuring range 0 to 25 ppm Cl_2, for DrägerSensor Cl_2	**83 16 649**	**83 16 749**	**68 09 665**
For measuring hydrogen sulphide (H_2S):			
Polytron 3000 measuring unit, Measuring range 0 to 20 ppm H_2S, for DrägerSensor H_2S	**83 16 634**	**83 16 734**	**68 10 435**
Polytron 3000 measuring unit, Measuring range 0 to 50 ppm H_2S, for DrägerSensor H_2S	**83 16 635**	**83 16 735**	**68 10 435**
Polytron 3000 measuring unit, Measuring range 0 to 100 ppm H_2S, for DrägerSensor H_2S	**83 16 636**	**83 16 736**	**68 10 435**
For measuring nitrogen monoxide (NO):			
Polytron 3000 measuring unit, Measuring range 0 to 50 ppm NO, for DrägerSensor NO LC	**83 16 640**	**83 16 740**	**68 09 625**
For measuring nitrogen dioxide (NO_2):			
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm NO_2, for DrägerSensor NO_2	**83 16 641**	**83 16 741**	**68 09 655**

Part name and description	**Order No. with display**	**Order No. without display**	**Order No. DrägerSensor**
For measuring oxygen (O_2):			
Polytron 3000 measuring unit, Measuring range 0 to 5 Vol.-% O_2, for DrägerSensor O2	**83 16 642**	**83 16 742**	**68 09 720**
Polytron 3000 measuring unit, Measuring range 0 to 25 Vol.-% O_2, for DrägerSensor O_2	**83 16 643**	**83 16 743**	**68 09 720**
Polytron 3000 measuring unit, Measuring range 0 to 100 Vol.-% O_2, for DrägerSensor O_2	**83 16 644**	**83 16 744**	**68 09 720**
Polytron 3000 measuring unit, Measuring range 0 to 25 Vol.-% O_2, for DrägerSensor O_2 LS	**83 16 645**	**83 16 745**	**68 09 630**
For measuring sulphur dioxide (SO_2):			
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm SO_2, for DrägerSensor SO_2	**83 16 646**	**83 16 746**	**68 09 660**
For the measurement of acidic compounds ($SiCl_4$, BCl_3, ClF_3, HBr, SiF_4):			
Polytron 3000 measuring unit, Measuring range 0 to 3 ppm, for DrägerSensor AC	**83 16 652**	**83 16 752**	**68 10 595**
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm, for DrägerSensor AC	**83 16 657**	**83 16 757**	**68 10 595**
For the measurement of boron trichloride (BCl_3):			
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm BCl_3, for DrägerSensor AC	**83 16 666**	**83 16 766**	**68 10 595**
For the measurement of boroethane (B_2H_6):			
Polytron 3000 measuring unit, Measuring range 0 to 0.5 ppm B_2H_6, for DrägerSensor Hydride SC	**83 16 656**	**83 16 756**	**68 09 980**
For the measurement of ethylene oxide (C_2H_4O):			
Polytron 3000 measuring unit, Measuring range 0 to 50 ppm C_2H_4O, for DrägerSensor OV	**83 16 658**	**83 16 758**	**68 09 615**
For the measurement of hydride (PH_3, SiH_4):			
Polytron 3000 measuring unit, Measuring range 0 to 0.3 ppm, for DrägerSensor Hydride	**83 16 653**	**83 16 753**	**68 09 635**
Polytron 3000 measuring unit, Measuring range 0 to 1 ppm, for DrägerSensor Hydride	**83 16 667**	**83 16 767**	**68 09 635**
Polytron 3000 measuring unit, Measuring range 0 to 10 ppm, for DrägerSensor Hydride	**83 16 668**	**83 16 768**	**68 09 635**
For the measurement of hydrogen chloride (HCl):			
Polytron 3000 measuring unit, Measuring range 0 to 30 ppm HCl, for DrägerSensor HCl	**83 16 670**	**83 16 770**	**68 09 640**

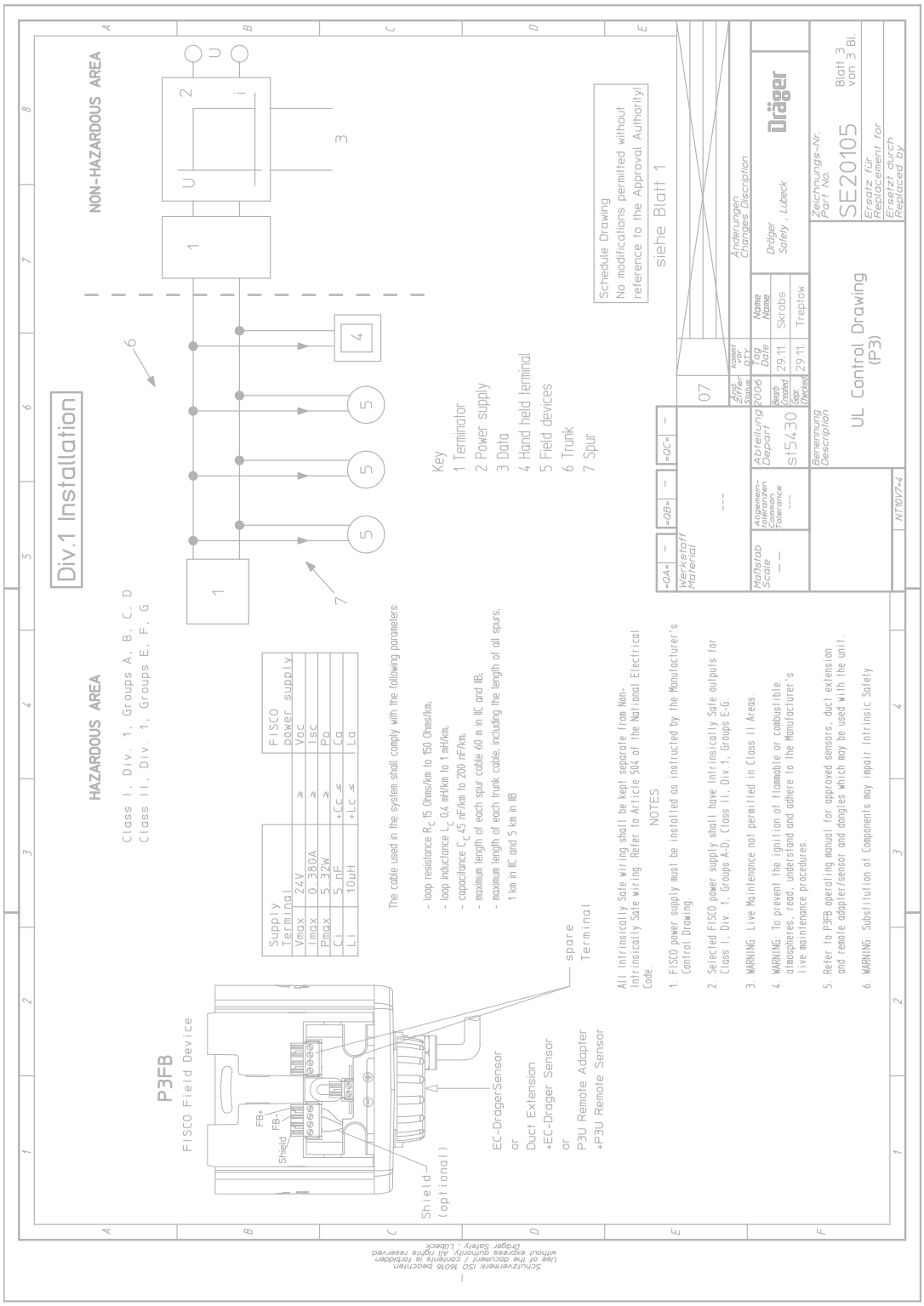
Part name and description	**Order No. with display**	**Order No. without display**	**Order No. DrägerSensor**
For the measurement of hydrogen (H_2):			
Polytron 3000 measuring unit, Measuring range 0 to 1000 ppm, for DrägerSensor H_2	**83 16 669**	**83 16 769**	**68 09 685**
Polytron 3000 measuring unit, Measuring range 0 to 3000 ppm, for DrägerSensor H_2	**83 16 655**	**83 16 755**	**68 09 685**
For the measurement of hydrazine (N_2H_4):			
Polytron 3000 measuring unit, Measuring range 0 to 1 ppm N_2H_4, for DrägerSensor Hydrazine	**83 16 650**	**83 16 750**	**68 10 180**
For the measurement of ozone (O_3):			
Polytron 3000 measuring unit, Measuring range 0 to 0.5 ppm O_3, for DrägerSensor O3	**83 16 665**	**83 16 765**	**68 10 290**
For the measurement of further gases:			
Polytron 3000 measuring unit, Measuring range and DrägerSensor	**on request**	**on request**	**on request**

UL approval


HAZARDOUS AREA
Div.1 Installation
Class I, Div. 1, Groups A, B, C, D
Class II, Div. 1, Groups E, F, G
P3S
spare Terminal
Supply Terminal X1(1,2) | | Barrier
Vmax | 30V | ≥ | Voc
Imax | 0.3A | ≥ | Isc
Pmax | 700mW | ≥ | Po
Ci | 0 µF | +Cc ≤ | Ca
Li | 50µH | +Lc ≤ | La
Use the following parameters if cable parameters are unknown:
* Cable Capacitance: Ccable = 60pF/ft
(Cc = L x Ccable = 1000ft x 60pF= 0.06µF)
* Cable Inductance: Lcable = 0.2µH/ft
(Lc = L x Lcable = 1000ft x 0.2µH/ft = 0.2mH)
All Intrinsically Safe wiring shall be kept separate from Non-Intrinsically Safe wiring. Refer to Article 504 of the National Electrical Code.
NOTES
1. Barrier Output current must be limited by a resistor, such that the output voltage vs current plot is a straight line between Voc and Isc.
2. Barrier must be installed as instructed by the Manufacturer's Control Drawing.
3. Selected Barrier shall have Intrinsically Safe outputs for Class I, Div. 1, Groups A-D; Class II, Div.1, Groups E-G.
4. If the maximum output power is not specified, it can be evaluated using the formula Po = 1/4 x Voc x Isc.
5. WARNING: Live Maintenance not permitted in Class II Areas.
6. WARNING: To prevent the ignition of flammable or combustible atmospheres, read, understand and adhere to the Manufacturer's live maintenance procedures.
7. Refer to P3S operating manual for approved sensors and duct extension which may be used with the unit.
8. WARNING: Special Tools - MiniGrabber© from Pomona shall be used for connecting meter for calibrations. This MiniGrabber© can only enter the instrument by 4.5 mm and secure that only the test point holes in the circuit board can be accessed from the outside, by using these special tools. Jumper must always be in place, when connecting meter.
9. WARNING: Substitution of Components may impair Intrinsic Safety.
X1
EC-DrägerSensor
or
Duct Extension
+EC-Dräger Sensor
Shield (optional) NC
Jumper
I.S. certified Meter
see Notes 5+6+7
Meter Terminals TP1,TP2(X4,X5) | | I.S. cert. Meter
Voc | 7.6V | ≤ | Vmax
Isc | 1mA | ≤ | Imax
Ci | 0 µF | ≤ | Ca
Li | 0 mH | ≤ | La
Vmax | 10.4V | ≥ | Voc
Ca | 2.5 µF | ≥ | Ci
La | 10mH | ≥ | Li
NON-HAZARDOUS AREA
Shield (optional)
Ex i
Safety barrier
Voc, Isc, Po, Ca, La
PA
4...20mA
0V
for isolated Barrier (optional)
for non-isolated Barrier or optional for isolated Barrier
earth point
Schedule Drawing
No modifications permitted without reference to the Approval Authority!
Werkstoff Material ---
Maßstab Scale --
Allgemeintoleranzen Common Tolerance ---
Abteilung Depart st5430
2006 Tag Date Name Name
Bearb Created 29.11. Skrabs
Gepr. Checked 29.11. Treptow
07 --
Änderungen Changes Discription
Dräger Safety, Lübeck
Dräger
Benennung Description
UL Control Drawing (P3)
Zeichnungs-Nr. Part No.
SE20105
Blatt 1 von 3 Bl.
Ersatz für Replacement for
Ersetzt durch Replaced by
(mech) NT10V7=4
Schutzvermerk ISO 16016 beachten. Use of the document / contents is forbidden without express authority. All rights reserved. Dräger Safety, Lübeck



The depicted page is part of the UL-certificate but refers to the Polytron 7000.



The depicted page is part of the UL-certificate but refers to the Polytron 7000.

Declaration of Conformity

CE

EU-Konformitätserklärung
EU-Declaration of Conformity

Dräger

Dokument Nr. / *Document No.* SE20148-11

Wir / *we* Dräger Safety AG & Co. KGaA, Revalstraße 1, 23560 Lübeck, Germany

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

Gasmessgerät Typ P3S (Polytron 3000) / P3U, P3FB (Polytron 7000)
Gas Detection Instrument type P3S (Polytron 3000) / P3U, P3FB (Polytron 7000)

mit der EU-Baumusterprüfbescheinigung / Expertise
is in conformity with the EU-Type Examination Certificate / Expertise **BVS 03 ATEX E 406 X**

ausgestellt von der notifizierten Stelle mit der Kenn-Nr.
issued by the Notified Body with Identification No.
DEKRA Testing and Certification GmbH Handwerkstr. 15 D-70565 Stuttgart 0158

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

Bestimmungen der Richtlinie *provisions of directive*		**Nummer sowie Ausgabedatum der Norm** *Number and date of issue of standard*
2014/34/EU	**ATEX-Richtlinie** *ATEX Directive*	EN IEC 60079-0:2018[1)], EN 60079-11:2012[1)]
2014/30/EU	**EMV-Richtlinie** *EMC Directive*	EN 50270:2015+AC:2016[4)] susceptibility: type 2 emission: type 1 EN 61326-1:2013[3)] susceptibility: industrial environment emission: group 1, class B
2014/35/EU[2)]	**Niederspannungs-Richtlinie** *Low Voltage Directive*	EN 61010-1:2010
2011/65/EU 2015/863/EU	**RoHS-Richtlinie** *RoHS Directive*	EN IEC 63000:2018

[1)] nur für explosionsgeschützte Varianten zutreffend / *only applicable for explosion-protected variants*
[2)] nur für Varianten mit Relais-Modul zutreffend / *only applicable for variants with relay module*
[3)] nur für Varianten mit PROFIBUS, Foundation Fieldbus oder LON / *only applicable for* PROFIBUS, Foundation Fieldbus or LON *variants*
[4)] nicht für Varianten mit PROFIBUS, Foundation Fieldbus oder LON / *not applicable for* PROFIBUS, Foundation Fieldbus or LON *variants*

Überwachung der Qualitätssicherung Produktion nach Modul D durch
Surveillance of Quality Assurance Production by (Module D)
DEKRA Testing and Certification GmbH Handwerkstr. 15 D-70565 Stuttgart 0158

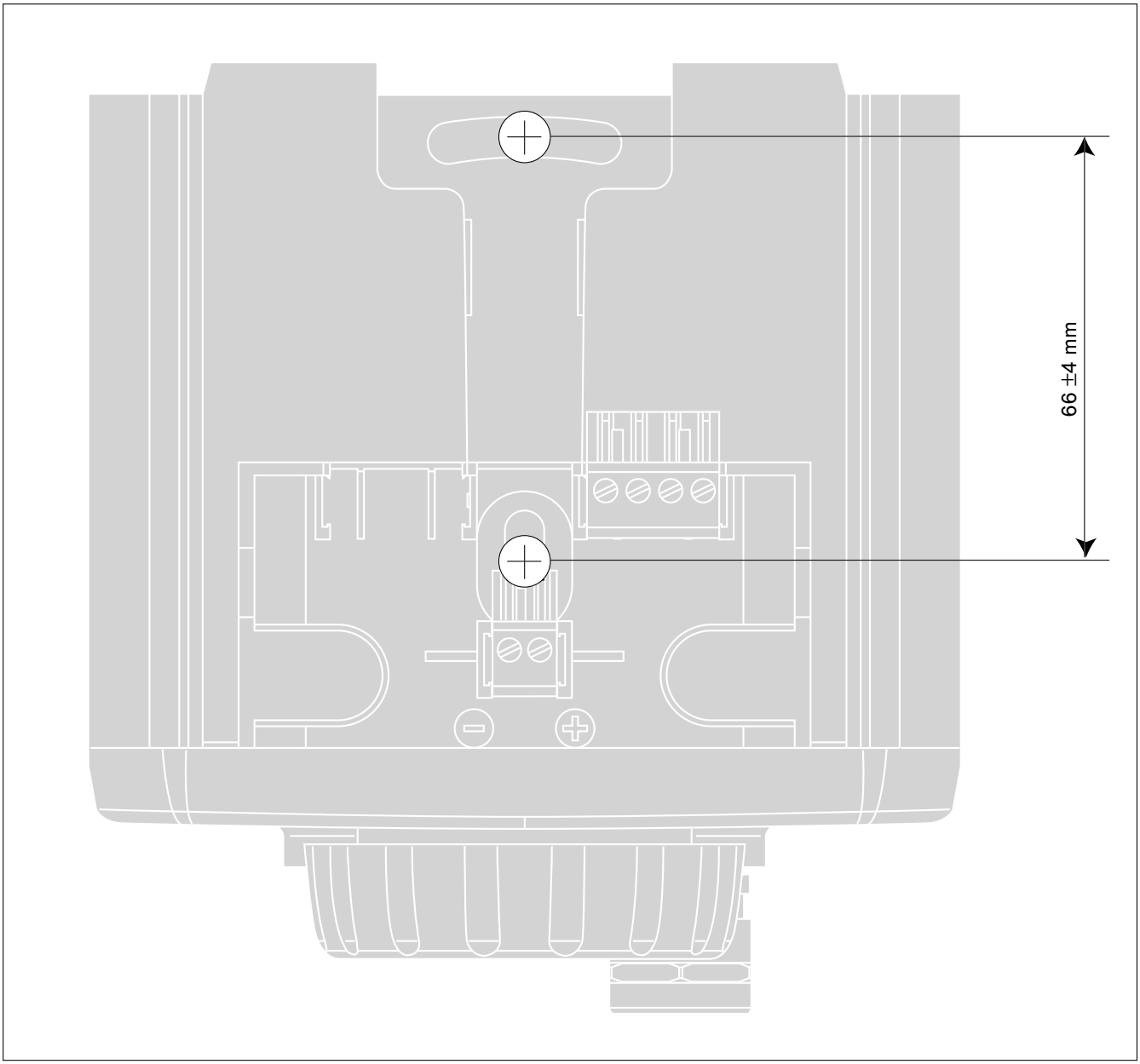
Lübeck, 2023-02-14

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

Dr. Marcus Romba
Head of Product Compliance
Safety Products
Research & Development Safety Division

Drilling templates

Dräger docking station



Dräger Safety AG & Co. KGaA
Revalstraße 1
D-23560 Lübeck
Germany
Tel. +49 451 8 82 - 27 94
Fax +49 451 8 82 - 49 91
www.draeger.com

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