



## OPTIBAR P 1010/2010 C Supplementary instructions

Pressure transmitter

Equipment category II 1G / Ga, II 1D / Da in protection type intrinsic safety Exi



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## 1.1 General notes

These additional instructions apply to explosion-protected versions of the pressure transmitter OPTIBAR P 1010 C / P 2010 C with the marking II 1 G or II 1 D. They complete the standard documentation for non-explosion protected versions.

The information given in these instructions contains only the data relevant to Category 1 explosion protection. The technical details given in the standard documentation for the non-explosion protected versions apply unchanged unless excluded or superseded by these instructions.

## 1.2 EC conformity

The manufacturer declares with the EC declaration of conformity on his own responsibility conformity with the protection goals of directive 94/9/EG acc. to EN 60079-0 and EN 60079-11 for use in hazardous areas with gas.

The EC type test certificate of the Institut für Sicherheitstechnik GmbH forms the basis of the EC declaration of conformity:

**IBExU 13 ATEX 1133 X**

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.

The EC type test certificate may be downloaded from the manufacturer's website as needed.

## 1.3 Approval according to the IECEx scheme

Conformity with IECEx standards was tested in accordance with the IECEx Certification Scheme for Explosive Atmospheres acc. to IEC 60079-0, IEC 60079-11 and IEC 60079-26. The number of the IEC certificate is:

**IECEx IBE 13.0050 X**

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.

The EC type test certificate may be downloaded from the manufacturer's website as needed.

## 1.4 Safety instructions

Assembly, installation, start-up and maintenance may only be performed by personnel trained in explosion protection!



**CAUTION!**

*The operator or his agent is responsible for observing any additional standards, directives or laws if required due to operating conditions or place of installation. This applies in particular to the use of easily detachable process connections when measuring flammable media.*

## 2.1 Device description

The OPTIBAR P 1010 C / P 2010 C pressure transmitters are designed to measure the absolute pressure and gauge pressure in flammable and non-flammable gases and liquids. The pressure transmitters are supplied as standard with 2-wire, 4...20 mA signal outputs.

## 2.2 Marking

The marking of the entire device is on the housing, where the following identification plate can be found.

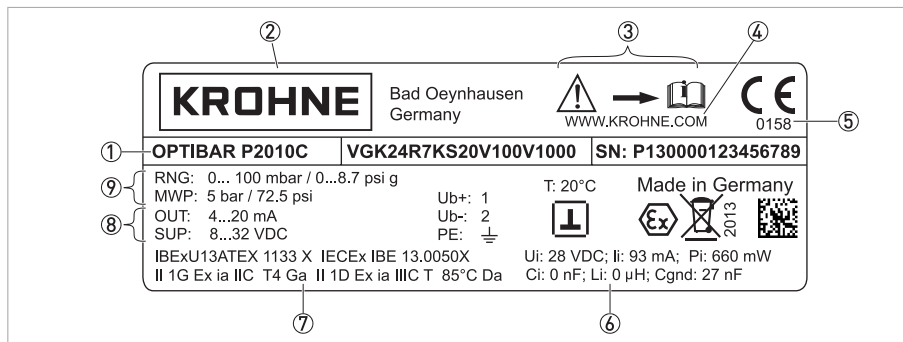


Figure 2-1: Example of an identification plate

- ① Device type
- ② Manufacturer
- ③ Note to observe the documentation
- ④ Manufacturer's website
- ⑤ Identification number for CE marking
- ⑥ Approval-related connection data
- ⑦ Ex approval-related information
- ⑧ Electrical connection data
- ⑨ Rating data: measuring range, MWP

## 2.3 Flammable products

### Atmospheric conditions:

An explosive atmosphere is a mixture of air and flammable gases, vapours, mists or dusts under atmospheric conditions. It is defined by the following values

$T_{\text{atm}} = -20...+60^{\circ}\text{C} / -4...+140^{\circ}\text{F}$  and  $P_{\text{atm}} = 0.8...1.1 \text{ bar} / 11.6...15.9 \text{ psi}$ .

Outside of this range, no key figures are available as to ignition behaviour for most mixtures.

### Operating conditions:

Outside of atmospheric conditions you cannot apply explosion protection according to directive 94/9/EC (ATEX) – regardless of the zone assignment - due to the lack of key safety data.

## 2.4 Equipment category

Pressure transmitters are rated in the Categories II 1G or EPL Ga for use in zone 0 and II 1D or Da for use in zone 20.

## 2.5 Protection types

The pressure transmitter is designed with protection type intrinsic safety, protection level "ia" according to EN 60079-11.

The marking is:

acc. to ATEX:

**II 1G Ex ia IIC T4 Ga or II 1D Ex ia T85°C**

acc. to IECEx:

**Ex ia IIC T4 Ga or Ex ia IIIC T85°C Da**

| The marking contains the following information: |                                                             |
|-------------------------------------------------|-------------------------------------------------------------|
| <b>II</b>                                       | Group II explosion protection                               |
| <b>1</b>                                        | Equipment category 1                                        |
| <b>G</b>                                        | Gas explosion protection                                    |
| <b>Ex ia</b>                                    | Intrinsically safe, level of protection "ia"                |
| <b>IIC</b>                                      | Gas group, suitable for gas groups IIC, IIB and IIA         |
| <b>IIIC</b>                                     | Dust group, suitable for dust groups IIIA, IIIB and IIIC    |
| <b>T4</b>                                       | Temperature class, suitable for temperature classes T4...T1 |
| <b>Ga</b>                                       | EPL, suitable for zone 0                                    |
| <b>Da</b>                                       | EPL, suitable for zone 20                                   |

| The marking contains the following information: |                                          |
|-------------------------------------------------|------------------------------------------|
| <b>II</b>                                       | Group II explosion protection            |
| <b>1</b>                                        | Equipment category 1                     |
| <b>D</b>                                        | Dust explosion protection                |
| <b>T85°C</b>                                    | Maximum surface temperature 85°C / 185°F |

## 2.6 Ambient temperature / temperature classes

Use in **zone 0 / zone 20**, ambient temperature range: -20...+60°C / -4...+140°F  
( $P_{atm}$ : 0.8...1.1 bar / 11.6...15.9 psi)

Use from **zone 1 / zone 21**, ambient temperature range: -20...+70°C / -4...+158°F

## 2.7 Electrical data

Signal output: 4...20 mA, 2-wire  
Nominal voltage: 10...28 VDC  
Nominal current: 4...20 mA

Built-in equipment for the pressure transmitters may only be connected to separate intrinsically safe circuits with the following maximum values:

- $U_i$  [V]: 28 V
- $I_i$  [mA]: 93 mA
- $P_i$  [mW]: 660 mW
- $C_i$  [nF]: ~ 0 nF
- $L_i$  [μH]: ~ 0 μH

The supply connections have a maximum internal capacity of 27 nF to the housing plus circuit inductivities 1 μH/m and circuit capacities 160 pF/m (for factory cable).

### 3.1 Installation

Installation and setup must be carried out according to the applicable installation standards (e.g. EN 60079-14) by qualified personnel trained in explosion protection. The information given in the manuals and the supplementary instructions must be observed at all times.

**Install pressure transmitters so that**

- there is sufficient overvoltage protection in the event of lightning or overvoltage.
- they are not in a pneumatic flow.
- excessive dust deposits (over 5 mm) and complete dust coverage are prevented.
- there is no danger from mechanical impact effects.
- the device is accessible for any necessary visual inspections and can be viewed from all sides.
- the nameplate is clearly visible.
- it can be operated from a location with secure footing.



**CAUTION!**

*The manufacturer is not liable for any damage resulting from improper use or use other than the intended purpose. This applies in particular to hazards due to insufficient corrosion resistance and suitability of the materials in contact with product.*



## 4.1 General notes

### Overvoltage protection

If the pressure transducer is being used as category 1 G equipment, a suitable overvoltage protection device must be installed upstream (see Industrial Safety Regulations [BetrSichV] formerly Technical Regulations for Flammable Liquids [TRbF100] and EN 60079-14).

### Circuits

The circuits are designed in protection type "intrinsically safe".

The connecting cables should be selected according to the applicable installation standards (e.g. EN 60079-14) and the maximum operating temperature. Ensure that no residual current can form between separate intrinsically safe signal circuits.

- The connecting cables must be fixed and laid so they are sufficiently protected against damage.
- Devices with plugs are to be mounted in that way that protection degree IP20 is maintained.
- All cores that are not used must be securely connected to the ground potential of the hazardous area or carefully insulated against each other and against ground (test voltage  $\geq 500 V_{eff}$ ).
- Lay cables so as to ensure that there is sufficient distance between surfaces of the measuring unit and the connecting cable.
- Supplied blind plugs / cable entries guarantee protection against foreign bodies and water (protection category) IP66 / 67 according to EN 60529 in the temperature range  $T_{amb} = -40...+100^{\circ}C / -40...+212^{\circ}F$ .
- The outer diameter of the connecting cable must be within the sealing range of the cable entry (8...13 mm / 0.31...0.51").
- Unused cable entries are to be closed (>IP66 / 67).

Ensure that all seals are tight.

## 4.2 Power supply

The pressure transmitter does not require a separate power supply. The required supply for the built-in electronics is provided via the 4...20 mA current output.

## 4.3 Inputs/outputs

The terminal assignment of the built-in electrical equipment is described in the standard documentation. The pressure transmitter signal circuits may only be connected to certified intrinsically safe slave units or circuits. For more information refer to chapter "Electrical data".

## 4.4 Grounding and equipotential bonding

If the device is not sufficiently electrostatically grounded via the process cables, an additional ground connection must be established using the ground terminal.

Any existing cable shields should be connected to ground according to applicable installation regulations (EN 60079-14). A terminal connection in the terminal compartment permits a short way grounding of the cable shields.

## 5.1 Start-up

**Start-up is only permitted when the pressure transmitter:**

- is correctly installed in the system and connected.
- has been checked for the proper state with regard to its installation and connection requirements.

The user of the system must have it checked before start-up in compliance with the national regulations for checks before startup.

## 5.2 Operation

Pressure transmitter must be operated in such a way that they remain within the maximum and minimum permissible temperatures and pressures and the electrical limit values.

Pressure transmitter may only be operated if the equipment parts necessary for safety are effective in the long run, and are not rendered inoperable during operation.

For more information refer to chapter "Dismantling"

## 5.3 Electrostatic charge

**In order to avoid ignition hazards due to electrostatic charge, pressure transmitter may not be used in areas where the following appear:**

- processes that generate large charges,
- machines with friction and cutting processes,
- spraying of electrons (e.g. in the vicinity of electrostatic painting systems).

## 6.1 Maintenance

Maintenance work of a safety-relevant nature within the meaning of explosion protection may only be carried out by the manufacturer, his authorised representative or under the supervision of authorised inspectors.

To maintain proper condition, regular inspections are required for systems in hazardous areas.

**The following checks are recommended:**

- Checking the housing, the cable entries and the feed lines for corrosion and/or damage.
- Checking the measuring unit and the piping connections for leakage.
- Checking the measuring unit and the indicator for dust deposits.
- Including the pressure transmitters in the regular pressure test of the process line.

## 6.2 Dismantling

Removal and installation are the responsibility of the operator.

Before disconnecting the electric connecting cable of the device, make sure that all cables leading to the indication unit are isolated from the ground of the hazardous area. This also applies to functional earthing conductors (FE) and equipotential bonding conductors (PA).



**WARNING!**

- *Pressurised pipes have to be depressurised before removing the measuring unit.*
- *In the case of environmentally critical or hazardous products, appropriate safety precautions must be taken with regard to residual liquids in the measuring unit.*
- *New gaskets have to be used when re-installing the device in the piping.*



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