



OPTIBAR DP 7060 Supplementary Instructions

Differential pressure transmitter

Category

ATEX II 1G, 1/2G, 2G Ex ia IIC T6/T4

IECEX Ex ia IIC T6/T4 Ga, Ga/Gb, Gb



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1.1 General notes

These safety instructions are valid for the differential pressure transmitter OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics type Z (4...20 mA), H (4...20 mA/HART®), A (4...20 mA/HART® with SIL qualification), without additional electronics (X) according to the EC type-examination certificate BVS 15 ATEX E 047 X.

The differential pressure-based measuring devices OPTIBAR DP 7060 C VGK7*A/W/V C are also used for pressure and level measurement in hazardous areas.

The measured products can also be combustible liquids, gases, mist or vapours.

The OPTIBAR DP 7060 C VGK7*A/W/V C consist of an electronics housing with integrated electronics module, a process connection element and a sensor, the pressure measuring cell with optionally connected chemical seal. As an option, the display and adjustment module can also be mounted.

The OPTIBAR DP 7060 C VGK7*A/W/V C are suitable for use in hazardous atmospheres of all combustible materials of explosion group IIA, IIB and IIC for applications requiring category 1G, 1/2G or 2G equipment.

When the OPTIBAR DP 7060 C VGK7*A/W/V C are installed and operated in hazardous areas, the general Ex installation regulations EN 60079-14 as well as these safety instructions must be observed.

The operating instructions as well as the installation regulations and standards that apply for explosion protection of electrical systems must always be observed.

The installation of potentially explosive systems must always be carried out by qualified personnel.

1.2 EC conformity

The manufacturer declares with the EC declaration of conformity on his own responsibility conformity with the protection goals of directive 2014/34/EU acc. to EN 60079-0, EN 60079-11 and EN 60079-26 for use in hazardous areas with gas.

The EC type test certificate forms the basis of the EC declaration of conformity:

BVS 15 ATEX E 047 X

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

If needed the EC type examination certificate can be downloaded from the manufacturer's website.

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 BVS 15.0036 X

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

If needed, the IEC certificate can be downloaded from the manufacturer's website.

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 differential pressure transmitter of the OPTIBAR 7060 series is designed to measure the differential pressure of vaporous, gaseous and liquid media. The pressure transmitters are supplied as standard with 2-wire, 4...20 mA signal outputs.

2.2 Marking

2.2.1 Marking for ATEX / IECEx

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

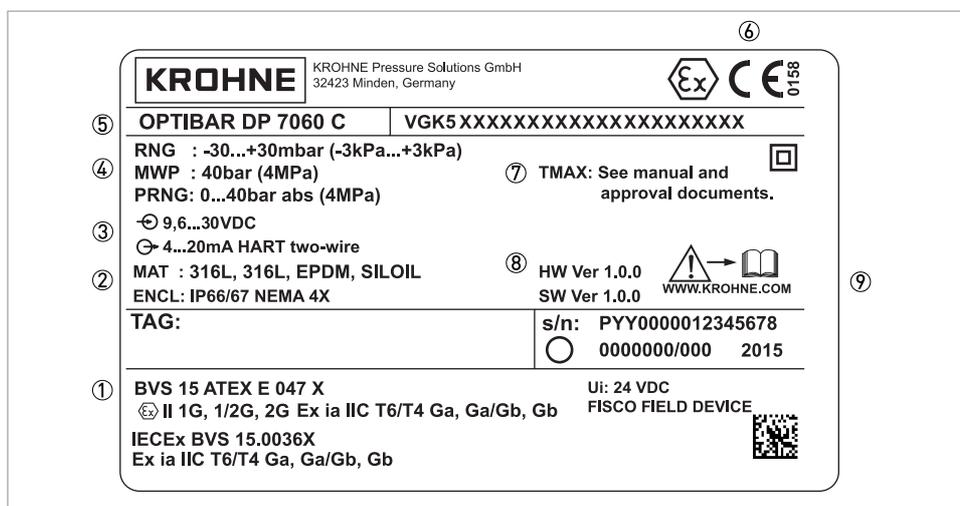


Figure 2-1: ATEX / IECEx nameplate for a OPTIBAR 7060

- ① Approvals and approval guidelines
- ② Ingress protection and material of wetted parts (Diaphragm, process connections, sealing and fill fluid)
- ③ Electronics power supply and signal output
- ④ Nominal range
Permissible process pressure
Nominal range of absolute pressure measurement
- ⑤ Product name and type code
- ⑥ CE marking and marking of notified body
- ⑦ Permissible temperature range
- ⑧ Hardware and Software version
- ⑨ Observe the installation and operating instructions

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, for most mixtures no key figures are available for the ignition behaviour.

Operating conditions:

Outside of atmospheric conditions, the explosion protection according to directive 2014/34/EC (ATEX) – regardless of the zone assignment – is not applicable due to the lack of key safety data.

2.4 Device category

Category 1G equipment (EPL-Ga equipment)

The devices are installed in hazardous areas requiring equipment category 1G.

Category 1/2G equipment (EPL-Ga/Gb equipment)

The process connection element is installed in the separating wall, which separates areas in which equipment of category 2G or 1G are required. The electronics housing is installed in hazardous areas requiring equipment of category 2G. The sensor is installed in hazardous areas requiring equipment of category 1G.

Category 2G equipment (EPL-Ga equipment)

The devices are installed in hazardous areas requiring equipment category 2G.

2.5 Protection types

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

The marking according to ATEX is:

II 1G, 1/2G, 2G Ex ia IIC T6/T4

The marking according to IECEx is:

Ex ia IIC T6/T4 Ga, Ga/Gb, Gb

The marking contains the following information:	
II	Explosion protection, group II
1	Equipment category 1
G	Gas explosion protection
Ex ia	Intrinsically safe, level of protection "ia"
IIC	Gas group, suitable for gas groups IIC, IIB and IIA
1/2	Equipment category 1/2
2	Equipment category 2
Ga	EPL, suitable for zone 0
Ga/Gb	EPL, suitable for zone 0 / zone 1
Gb	EPL, suitable for zone 1
T6/T4	Temperature class T6 suitable for temperature classes T6, T5 Temperature class T4 suitable for temperature classes T4, T3, T2, T1

2.6 Ambient temperature / temperature classes



CAUTION!

The permissible temperature range at the sensor can differ according to the O-ring material used; the permissible limit values are specified in the handbook. The temperature limits of the O-ring material must not be exceeded.

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics Z (4...20 mA), H (4...20 mA/HART®) or A (4...20 mA/HART® with SIL qualification).

The maximum permissible ambient temperatures depending on the temperature classes is specified in the following table.

Category 1G, 1/2G and 2G equipment

Temperature class	Media temperature range at the sensor	Ambient temperature
T6, T5	-40 ... 46°C / -40...114.8°F -40 ... 55°C / -40...131°F ①	-40...46°C / -40...114.8°F
T4, T3, T2, T1	-40 ... 85°C / -40...185°F	-40...80°C / -40...176°F

① Only applicable with remote sensor assembly

For applications requiring equipment category 1G, the process pressure of the media must be between 0.8...1.1 bar. The application conditions in areas without hazardous mixtures are specified in the manufacturer information.

2.7 Electrical data

2.7.1 With electronics Z (4...20 mA), H (4...20 mA/HART®), A (4...20 mA/HART® with SIL qualification)

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics Z (4...20 mA), H (4...20 mA/HART®) or A (4...20 mA/HART® with SIL qualification), version with single chamber housing A, K V or 8	
Supply and signal circuit: (Terminals 1[+], 2[-] in the "Ex-i" electronics compartment or connector	In protection type intrinsic safety Ex ia IIC/IIB
	Only for connection to a certified, intrinsically safe circuit
	Maximum values
	<ul style="list-style-type: none"> • U_i [V]: 30 V • I_i [mA]: 131 mA • P_i [mW]: 983 mW
	The effective internal capacitance C_i is negligibly small.
	In the version with permanently mounted connection cable is $C_{i \text{ wire/wire}} = 150 \text{ pF/m}$ and $C_{i \text{ wire/shield}} = 270 \text{ pF/m}$ must be taken into account.
The effective inner inductance L_i is $L_i \leq 5 \text{ } \mu\text{H}$. In the version with permanently mounted connection cable, $L_i = 0.62 \text{ } \mu\text{H/m}$ must be taken into account additionally.	

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics Z (4...20 mA), H (4...20 mA/HART®) or A (4...20 mA/HART® with SIL qualification), version with double chamber housing D, W or R	
Supply and signal circuit: (Terminals 1[+], 2[-] in "Ex-i" terminal compartment)	In protection type intrinsic safety Ex ia IIC/IIB
	Only for connection to a certified, intrinsically safe circuit
	Maximum values
	<ul style="list-style-type: none"> • U_i [V]: 30 V • I_i [mA]: 131 mA • P_i [mW]: 983 mW
	The effective internal capacitance C_i is negligibly small.
In the version with permanently mounted connection cable is	
$C_{i \text{ wire/wire}} = 150 \text{ pF/m}$ and $C_{i \text{ wire/shield}} = 270 \text{ pF/m}$ must be taken into account.	
The effective inner inductance L_i is $L_i \leq 10 \text{ }\mu\text{H}$. In the version with permanently mounted connection cable, $L_i = 0.62 \text{ }\mu\text{H/m}$ must be taken into account additionally.	

Intrinsically safe circuit for the display and adjustment module OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics Z (4...20 mA), H (4...20 mA/HART®) or A (4...20 mA/HART® with SIL qualification), version with single chamber housing A, K, V or 8	
Circuit for the display and adjustment module: (spring contacts in the "Ex-i" electronics compartment)	In protection type intrinsic safety Ex ia IIC
	Only for connection to the display and adjustment module.

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics Z (4...20 mA), H (4...20 mA/HART®) or A (4...20 mA/HART® with SIL qualification), version with double chamber housing D, W or R	
Circuit for the display and adjustment module: (spring contacts in the "Ex-i" terminal compartment)	In protection type intrinsic safety Ex ia IIC
	Only for connection to the display and adjustment module.
and circuit for the display and adjustment module: (spring contacts in the "Ex-i" electronics compartment)	In protection type intrinsic safety Ex ia IIC
	Only for connection to the display and adjustment module.

The intrinsically safe circuits are galvanically isolated from parts which can be grounded.

The metallic parts of OPTIBAR DP 7060 C VGK7*A/W/V C are electrically connected with the ground terminals.

For applications requiring category 1G or 1/2G equipment, the intrinsically safe supply and signal circuits must correspond to protection level ia.

For applications that require category 1G or 1/2G equipment, it is preferable to connect the OPTIBAR DP 7060 C VGK7*A/W/V C to appropriate equipment with galvanically isolated, intrinsically safe circuits.

2.7.2 With separate cable outlet

OPTIBAR DP 7060 C VGK7*A/W/V C version with separate cable outlet	
Circuit between sensor unit and external electronics (terminal 1 - yellow, terminal 2 - white, terminal 3 - red, terminal 4 - black)	In protection type intrinsic safety Ex ia IIC
	For the OPTIBAR DP 7060 C VGK7*A/W/V C in the version with the permanently mounted cable to the measuring sensor unit and external electronics, the length of the supplied cable between the external housing and the measuring sensor unit should not exceed 180 m.

The intrinsically safe circuits are galvanically isolated from parts which can be grounded.

The metallic parts of OPTIBAR DP 7060 C VGK7*A/W/V C are electrically connected with the ground terminals.

For applications requiring category 1G or 1/2G equipment, the intrinsically safe supply and signal circuits must correspond to protection level ia.

For applications that require category 1G or 1/2G equipment, it is preferable to connect the OPTIBAR DP 7060 C VGK7*A/W/V C to appropriate equipment with galvanically isolated, intrinsically safe circuits.

2.7.3 With electronics P (Profibus PA), F (Foundation Fieldbus)

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics P (Profibus PA), F (Foundation Fieldbus) with single chamber housing A, K V or 8	
Supply and signal circuit: (Terminals 1[+], 2[-] in the "Ex-i" electronics compartment or connector)	Maximum values
	<ul style="list-style-type: none"> • U_i [V]: 17.5 V • I_i [mA]: 500 mA • P_i [mW]: 5.5 mW
	The device can be used in a FICSO system according EN 60079-11, e.g. Profibus PA)
	Alternative maximum values
	<ul style="list-style-type: none"> • U_i [V]: 24 V • I_i [mA]: 250 mA • P_i [mW]: 1.2 mW
	The effective internal capacitance C_i is negligibly small. The effective inner inductance L_i is negligibly small.
	In the version with permanently mounted connection cable is $C_{i \text{ wire/wire}} = 150 \text{ pF/m}$ and $C_{i \text{ wire/shield}} = 270 \text{ pF/m}$ must be taken into account. $L_i = 0.62 \text{ H/m}$ must be taken into account additionally.

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics P (Profibus PA), F (Foundation Fieldbus) with double chamber housing D, W or R	
Supply and signal circuit: (Terminals 1[+], 2[-] in "Ex-i" electronics compartment or connector)	Maximum values <ul style="list-style-type: none"> • U_i [V]: 17.5 V • I_i [mA]: 500 mA • P_i [mW]: 5.5 mW
	The device can be used in a FISCO system according EN 60079-11, e.g. Profibus PA)
	Alternative maximum values <ul style="list-style-type: none"> • U_i [V]: 24 V • I_i [mA]: 250 mA • P_i [mW]: 1.2 mW
	The effective internal capacitance C_i is negligibly small. The effective inner inductance L_i is $L_i \leq 5 \mu\text{H}$.
	In the version with permanently mounted connection cable is $C_{i \text{ wire/wire}} = 150 \text{ pF/m}$ and $C_{i \text{ wire/shield}} = 270 \text{ pF/m}$ must be taken into account $L_i = 0.62 \text{ H/m}$ must be taken into account additionally..

The intrinsically safe circuits are galvanically isolated from parts which can be grounded.

The metallic parts of OPTIBAR DP 7060 C VGK7*A/W/V C are electrically connected with the ground terminals.

For applications requiring category 1G or 1/2G equipment, the intrinsically safe supply and signal circuits must correspond to protection level ia.

For applications that require category 1G or 1/2G equipment, it is preferable to connect the OPTIBAR DP 7060 C VGK7*A/W/V C to appropriate equipment with galvanically isolated, intrinsically safe circuits.

2.7.4 With electronics A (4...20 mA), H (4...20 mA HART[®]), and secondary current output Z (4...20 mA) with double chamber housings D, W or R

OPTIBAR DP 7060 C VGK7*A/W/V C with integrated electronics A (4...20 mA), H (4...20 mA HART [®]) and secondary current output Z (4...20 mA) with double chamber housing D, W or R	
Supply and signal circuit 1: (Terminals 1[+], 2[-] in the "Ex-i" electronics compartment or connector)	Maximum values <ul style="list-style-type: none"> • U_i [V]: 30 V • I_i [mA]: 131 mA • P_i [mW]: 983 mW
	The effective internal capacitance C_i is negligibly small. The effective inner inductance L_i is $L_i \leq 5 \mu\text{H}$.
Supply and signal circuit 2: (Terminals 1[+], 2[-] in the "Ex-i" electronics compartment or connector)	Maximum values <ul style="list-style-type: none"> • U_i [V]: 30 V • I_i [mA]: 131 mA • P_i [mW]: 983 mW
	The effective internal capacitance C_i is negligibly small. The effective inner inductance L_i is $L_i \leq 5 \mu\text{H}$.

The intrinsically safe circuits are galvanically isolated from parts which can be grounded.

The metallic parts of OPTIBAR DP 7060 C VGK7*A/W/V C are electrically connected with the ground terminals.

For applications requiring category 1G or 1/2G equipment, the intrinsically safe supply and signal circuits must correspond to protection level ia.

For applications that require category 1G or 1/2G equipment, it is preferable to connect the OPTIBAR DP 7060 C VGK7*A/W/V C to appropriate equipment with galvanically isolated, intrinsically safe circuits.

3.1 Mounting

**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.

Installation and setup must be carried out according to the applicable installation standards (e.g. EN 60079-14 or IEC 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 differential pressure transmitters so that:

- the process connections are connected tightly to the process
- there is sufficient overvoltage protection in the event of lightning or overvoltage.
- the device is 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.

When used as Ga/Gb components:

The partition wall (diaphragm) between the measuring cell and connection flanges has a wall thickness < 1 mm. When used it must be ensured that an impairment of the diaphragm (i.e. through aggressive media or mechanical hazards) cannot occur.

For versions with diaphragm seals:

Volume reduced process connections are provided for attaching capillary lines for diaphragm seals. The filling holes are used for introducing the filling fluids. It is important to ensure that the pressure transmission system is technically leakproof and the filling holes are tightly sealed.

4.1 Protection against static electricity

The OPTIBAR DP 7060 C VGK7*A/W/V C in versions with electrostatically chargeable plastic parts, such as e.g. plastic housing, metal housing with inspection window or connection cable with the remote version, a caution label points out the safety measures that must be taken with regard to electrostatic charges during operation.

WARNING- POTENTIAL ELECTROSTATIC
CHARGING HAZARD - SEE INSTRUCTION

Caution: Plastic part! Risk of electrostatic charge!

- Avoid friction
- No dry cleaning
- Do not mount in areas with flowing, non-conductive products
- Setup / Installation

The OPTIBAR DP 7060 C VGK7*A/W/V C are to be setup/installed so that electrostatic charges during operation, maintenance and cleaning are excluded and process-related electrostatic charges, e.g. due to medium flowing by, are excluded.

4.2 Use of an overvoltage arrester

If necessary, a suitable overvoltage arrester can be connected in front of the OPTIBAR DP 7060 C VGK7*A/W/V C. When used as category 1G or 1/2G equipment, as far as necessary analogue, a suitable overvoltage arrester must be connected in front as protection against voltage surges according to EN 60079-14 or IEC 60079-14 Chapter 12.3.

4.3 Grounding

To avoid the danger of electrostatic charging of the metallic parts, the OPTIBAR DP 7060 C VGK7*A/W/V C, used as category 1G or 1/2G equipment, must be electrostatically connected to the local equipotential bonding (transfer resistance $\leq 1 \text{ M}\Omega$), e. g. via the ground terminal.

4.4 Impact and friction sparks

When used as category 1G or 1/2G equipment, the OPTIBAR DP 7060 C VGK7*A/W/V C, in versions which use metal parts and add-on parts, must be mounted in such a way that sparks from impact and friction between metal parts and add-on parts cannot occur.

4.5 Material resistance

For applications requiring 1G or 1/2G category equipment the OPTIBAR DP 7060 C VGK7*A/W/V C must only be used in products against which the wetted materials are sufficiently resistant.

4.6 Installation / mounting

The OPTIBAR DP 7060 C VGK7*A/W/V C must be mounted such that the sensor is effectively secured against touching the vessel wall, under consideration of other vessel installations and flow conditions in the vessel.

4.7 Mounting with remote housing

With the version with remote housing of the pressure transmitter OPTIBAR DP 7060 C VGK7*A/W/V C the equipotential bonding must be provided in the complete mounting area of the connection cable between electronics housing and transmitter housing.



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