I Range of application

The enclosure with or without display type HPH Ex d ... is preferably used in conjunction with a certified flameproof encapsulated safety barrier, e. g. SB 1, to connect intrinsically safe sensors (two-wire) to non-intrinsically safe circuits and, if necessary, to visualise the measured value.

The enclosure with display type HPH Ex i D is preferably used in intrinsically safe sensor circuits to visualise a measured value.

II Standards

The equipment is designed according to the following IEC standards

IEC 60079-0:2017-12, Ed. 7.0	Equipment – General requirements
IEC 60079-1:2014-06, Ed. 7.0	Equipment protection by flameproof enclosures "d"
IEC 60079-11:2011-06, Ed. 6.0	Equipment protection by intrinsic safety "i"
IEC 60079-31:2013-11, Ed. 2.0	Equipment dust ignition protection by enclosure “t”

III Instructions for safety

III.a Use

The enclosure HPH Ex d ... is suitable for use in potentially explosive areas in Zone 1 and Zone 20 as well as for all gas groups (IIA, IIB and IIC) and all dust groups (IIIA, IIIB and IIIC).

The enclosure HPH Ex i D is suitable for use in potentially explosive areas in Zone 0 and Zone 20 as well as for all gas groups (IIA, IIB and IIC) and all dust groups (IIIA, IIIB and IIIC).

The certification applies to the following device versions

HPH Ex d	Housing in flameproof enclosure and protection by enclosure without display
HPH Ex d D	Housing in flameproof enclosure and protection by enclosure with display
HPH Ex i D	Enclosure with intrinsically safe display

III.b Assembling and dismantling

The assembly or disassembly may only be carried out without voltage!

For HPH Ex d ... the approved cable glands must be installed in the enclosure according to the manufacturer's instructions. After wiring, the cover must be firmly screwed back onto the enclosure and secured with the M4 locking screw.

With the HPH Ex d ... a threaded hole, preferably M24 × 1.5, can be used to accommodate an approved flameproof safety barrier. The safety barrier is then used to supply an intrinsically safe (Ex i) sensor.

FAFNIR GmbH • Schnackenburgallee 149 c • 22525 Hamburg • Tel.: +49 / (0)40 / 39 82 07-0 • www.fafnir.de • info@fafnir.de

III.c Installation

The wiring may only be carried out without voltage. Special regulations such as IEC 60079-14 or the local installation regulations must be observed.

To ensure that the flameproof enclosure of the HPH Ex d ... is maintained, the cable entries or entries for conduits must be approved in accordance with IEC 60079-1. Two threaded holes are available for this purpose. Possible threads are:

M16 × 1.5; M20 × 1.5; M24 × 1.5; M25 × 1.5; G ⅜; ½" NPT; ¾" NPT

Ensure that the threads are in perfect condition.

A PA connection terminal is provided for integrating the equipment into the equipotential bonding system.

General information (see also IEC 60079-14:2013, clause 6.4.1):

Metallic enclosures of intrinsically safe or energy-limited apparatus need not be connected to the equipotential bonding system, unless required by the apparatus documentation or to prevent accumulation of static charge.

III.d Adjustment

For the operation of the apparatus, no Ex-relevant adjustments are necessary.

III.e Putting into service

Before putting into service, all devices must be checked for correct connection and installation. The electrical supply, including the connected devices, must be checked.

III.f Maintenance, overhaul and repair

The apparatus is generally maintenance-free. In the case of a defect, this must be returned to the manufacturer or one of its representatives.

Repairs to the enclosure HPH Ex d ... may only be carried out by the manufacturer.

If the HPH Ex i D version is installed in a plastic enclosure, it may only be cleaned with a damp cloth to minimise the risk of ignition due to electrostatic charging.

The HPH Ex i D complies with the dielectric strength requirements between the intrinsically safe circuit and a metallic chassis of the display with 500 V_{AC} according to IEC 60079-11, clause 6.3.13.

FAFNIR GmbH • Schnackenburgallee 149 c • 22525 Hamburg • Tel.: +49 / (0)40 / 39 82 07-0 • www.fafnir.de • info@fafnir.de

IV Equipment marking

1	Manufacturer:	FAFNIR GmbH, 22525 Hamburg	
2	Type designation:	HPH Ex …	
3	Certificate number:	IECEx TUN 09.0013X	
		HPH Ex d …:	***HPH Ex i D:***
4	Ex marking:	Ex db IIC T6…T4 Gb Ex ta IIIC T100 °C Da	Ex ia IIC T6…T4 Ga Ex ia IIIC T125 °C Da
5	Technical data:	See instructions for technical data	
6	Warning marking:	WARNING – DO NOT OPEN WHEN ENERGIZED	*WARNING – Potential electro-static charging hazard – See in-structions

V Technical data

The following electrical values are specified:

	HPH Ex d	HPH Ex d D	HPH Ex i D
Voltage	U = 12 V … 26 V	U = 16 V … 29 V	U_i = 30 V
Current	4 mA … 20 mA (Error mode: 3.6 mA / 21.5 mA)		†I_i = 200 mA / 100 mA
Power			P_i = 1 W

Table V.a: Electrical values of the subtypes

The external capacitance and inductance of the type HPH Ex i D are as follows

Inner inductance	L_i	≤	250 µH
Inner capacitance	C_i	≤	25 nF

For use in potentially explosive atmospheres, the maximum temperatures, depending on the temperature class and the equipment protection level, can be found in the following tables.

HPH Ex d …

Temperature class	Ambient temperature T_a
Equipment protection level Gb	
T6	-40 °C … +50 °C
T5	-40 °C … +65 °C
T4, T3, T2, T1	-40 °C … +85 °C

Table V.b: Temperatures of the flameproof enclosure in potentially explosive gas atmospheres

Maximum surface temperature		Ambient temperature T_a
dust layer ≤ 5 mm	Immersed in dust	
Equipment protection level Da		
T_a + 15 °C		-40 °C … +85 °C

Table V.c: Temperatures of the flameproof enclosure in potentially explosive dust atmospheres

* The warning marking is only used if type HPH Ex i D is mounted in a plastic enclosure.
† The permissible input current I_i depends on the ambient temperature T_a

FAFNIR GmbH ● Schnackenburgallee 149 c ● 22525 Hamburg ● Tel.: +49 / (0)40 / 39 82 07-0 ● www.fafnir.de ● info@fafnir.de

Temperature class	Ambient temperature T_a	
	@ $I_i \leq 200$ mA	@ $I_i \leq 100$ mA
Equipment protection level Ga		
T6	-40 °C … +40 °C	
T5	-40 °C … +55 °C	
T4, T3, T2, T1	-40 °C … +60 °C	
Equipment protection level Gb		
T6	-40 °C … +40 °C	
T5	-40 °C … +55 °C	
T4, T3, T2, T1	-40 °C … +65 °C	-40 °C … +85 °C

Table V.d: Temperatures of the intrinsic safety display in potentially explosive gas atmospheres

For use in areas where the equipment protection level Ga is required:

The process pressure of the media must be between 0.8 bar and 1.1 bar if explosive vapour-air mixtures are present. If no explosive mixtures are present, the devices may also be operated outside this area in accordance with their manufacturer's specifications.

Maximum surface temperature		Ambient temperature T_a
dust layer ≤ 5 mm	Immersed in dust	
Equipment protection level Da		
$I_i \leq 200$ mA: T_a + 55 °C $I_i \leq 100$ mA: T_a + 40 °C	Observe IEC 60079-14*	$I_i \leq 200$ mA: -40 °C … +65 °C $I_i \leq 100$ mA: -40 °C … +85 °C

Table V.e: Temperatures of the intrinsic safety display in potentially explosive dust atmospheres

General remark (see also IEC 60079-0, Clause 1):

Zone 0 resp. 20 is given only under atmospheric conditions:

Temperature range:	-20 °C … +60 °C
Pressure range:	0,8 bar … 1,1 bar
Oxidant:	Air (oxygen content approx. 21 %)

VI Specific conditions of use

1. If the type HPH Ex i D is mounted in a plastic enclosure, the danger of ignition by electrostatic generated by friction on the enclosure must be avoided.
2. If the type HPH Ex i D is mounted in an aluminium enclosure, an ignition hazard caused by impact or friction must be avoided.
3. For the electrical connection at type HPH Ex d …, cable glands certified in the type of protection flameproof enclosure must be used.
4. Repair of flameproof joints of enclosure HPH Ex d … is not planned.
5. The equipotential bonding connection of a metallic enclosure must be connected to the equipotential bonding of the potentially explosive area (an equipotential bonding must exist for the entire intrinsically safe area).

* Clause 5.6.3.3 of IEC 60079-14:2013 can be used to assess the temperatures

FAFNIR GmbH • Schnackenburgallee 149 c • 22525 Hamburg • Tel.: +49 / (0)40 / 39 82 07-0 • www.fafnir.de • info@fafnir.de