I Range of application

The interface converter type VPI is used to supply intrinsically safe sensors that can be used in potentially explosive atmospheres. In addition, the converter is used to convert electrical signals between the non-intrinsically safe and intrinsically safe areas. It is mainly used as part of a tank content measurement. The converter is designed as a built-in module with eight intrinsically safe channels.

The power supply type VPI-Supply is used to supply the interface converter.

II Standards

The interface converter and the power supply are designed according to the following IEC standards

IEC 60079-0:2017-12, Ed. 7.0 Equipment – General requirements
IEC 60079-11:2011-06, Ed. 6.0 Equipment protection by intrinsic safety "i"

III Instructions for safety

III.a Use

The interface converter has eight intrinsically safe sensor circuits that may be routed into zone 0 respectively zone 20 and can be used for all gas respectively dust groups.

The power supply type VPI-Supply can be used for the auxiliary power supply of the converter. Under special conditions, any other power supply can be used. For this purpose, the converter must be connected to the potential equalisation.

The non-intrinsically safe control circuit (RS-485 interface) is connected to a four-pole plug. The connection to a higher-level data processing system is made from this plug.

III.b Assembling and dismantling

The interface converter and the power supply are manufactured with an open plastic enclosure for DIN rail mounting. Opening the enclosures is not permitted!

III.c Installation

The wiring may only be done de-energized. Special regulations i. a. IEC 60079-14 or the local installation regulations must be observed.

The interface converter must be installed outside the hazardous area in an enclosure with a degree of protection of at least IP20. Ensure that non-intrinsically safe line connections are at least 50 mm distance away from the intrinsically safe sensor terminals.

When wiring from the sensor to the interface converter (preferably blue cable), the permissible inductance and capacity under section V must not be exceeded.

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Terminal designation:

Connection	Terminal	Pins
Interface converter VPI		
Auxiliary energy	12V=	-, +
Sensor circuits	CH1 … CH8	+, A, B, -
Communication	RS-485	1+, 2A, 3B, 4-
Potential equalisation	PA	PA
Power supply VPI-Supply		
Auxiliary energy	Power	PE, N, L
Voltage output	Output	+, -

Table III.c: Terminal designations

III.d Adjustment

For the operation, 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 apparatuses are generally maintenance-free. In the case of a defect, this corresponding assembly must be returned to the manufacturer FAFNIR or one of its representatives.

There is compliance with the dielectric strength requirements of IEC 60079-11, Clause 6.3.13 between the intrinsically safe sensor circuits and the communication port. When using VPI with VPI-Supply there is compliance and when using VPI without VPI-Supply there is no compliance between the intrinsically safe sensor circuits and the auxiliary power. All sensor connections are galvanically connected to each other.

IV Equipment marking

VPI

1	Manufacturer:	FAFNIR GmbH, 22525 Hamburg
2	Type designation:	VPI
3	Certificate number:	IECEx TUN 10.0027X
4	Ex marking:	[Ex ia Ga] IIC [Ex ia Da] IIIC
5	Technical data:	See instructions for technical data

VPI-Supply

1	Manufacturer:	FAFNIR GmbH, 22525 Hamburg
2	Type designation:	VPI-Supply
3	Certificate number:	IECEx TUN 10.0027X

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V Technical data

The interface converter and the power supply may be used in the following ambient temperature range:

T_a = -20 °C ... +60 °C

The interface converter and the power supply achieve a degree of protection of IP00.

VPI-Supply

The auxiliary power of the power supply VPI-Supply is connected to the PE, N and L terminals. Depending on the version of this module, the auxiliary power is as follows

U = 230 V_{AC} ± 10 %; 50 Hz ... 60 Hz
P ≈ 4 VA
U_m = 253 V

The output voltage is 12 V_{DC} ± 5 %.

Two interface converters type VPI can be connected to one power supply VPI-Supply.

VPI

The auxiliary power supply for the VPI interface converter is connected to a plug underneath the module and is:

U = 12 V_{DC} ± 5 %
P < 2 W
U_m = 253 V

The sensor circuits CH1 ... CH8 are designed in the type of protection "intrinsic safety" (ia) with a linear output characteristic. The output values per circuit are as follows:

U_o ≤ 10.5 V
I_o ≤ 41.0 mA
P_o ≤ 99.8 mW
L_i negligibly small
C_i negligibly small

		IIC		IIB / IIIC	
L_o	≤	10 mH	5 mH	50 mH	20 mH
C_o	≤	550 nF	670 nF	3.1 µF	3.8 µF

The maximum values of the value pairs may be used simultaneously as concentrated capacitance and concentrated inductance.

The intrinsically safe sensor circuits are safely galvanically isolated from the auxiliary power supply circuit up to a peak crest value of 375 V of the nominal voltage.

The intrinsically safe sensor circuits are safely galvanically isolated from the control circuit up to a peak crest value of 190 V of the nominal voltage.

The maximum signal and safety-related voltage of the communication interface is as follows

U = ±5 V
U_m = 100 V

VI Specific conditions of use

1. The potential equalization terminal (PA) on printed circuited board of the interface converter VPI must be connected to the potential compensation of the explosion hazardous location when the power supply VPI-Supply is not used.
2. The interface converter VPI and the power supply VPI-Supply must be installed in an enclosure with degree of protection according to IEC 60529 of at least IP20.
3. At installation of the interface converter VPI with the power supply VPI-Supply the minimum clearance between these two must be 50 mm (tight string length).

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