



Pressure transmitter

HDA 4400

Hydrogen, Ex applications
ATEX, IECEx, dual approval
Intrinsically safe, Non-sparking
Redundant

Relative pressure

Accuracy 0.5 %



Features

- Redundant design
- Specially designed for the measurement of hydrogen
- Parts in contact with the fluid: 1.4435 with a Ni content $\geq 13\%$ (316L)
- ATEX, IECEx, dual approval
- Ignition protection type: Intrinsically safe, Non-sparking

Description

The redundant version of the pressure transmitter series HDA 4400 has been specially developed for measuring tasks with hydrogen. Thanks to the use of two highly accurate and robust stainless steel sensor cells with thin-film strain gauge, each with their own electronics unit, the device has a fully redundant architecture and, thus, two separate and independent output signals. The sensor cell is welded to the process connection, there are no internal seals. The compatibility with hydrogen is ensured by using a particular material. All hydrogen-wetted parts are made of stainless steel 1.4435 with a Ni content of $\geq 13\%$.

The pressure transmitters are applicable in potentially explosive atmospheres, and for this purpose, they are approved for the ignition protection types "intrinsically safe" and "non-sparking" according to ATEX and IECEx.

Application fields

Thanks to its redundant design, the device is ideally suited for the use in systems with increased functional safety requirements. The applications can be found throughout the hydrogen cycle, beginning with systems for hydrogen production (i.e. electrolysers) through to systems for hydrogen fueling stations, but also in test stands for hydrogen system components etc.

ATEX	I M2	Ex ia I Ma
	II 1G	Ex ia IIC T6, T5 Ga
	II 1/2G	Ex ia IIC T6, T5 Ga/Gb
	II 2G	Ex ia IIC T6, T5 Gb
	II 1D	Ex ia IIIC T85 °C, T95 °C Da
	II 3G	Ex nA IIC T6, T5, T4 Gc
	II 3G	Ex ic IIC T6, T5, T4 Gc
	II 3D	Ex ic IIIC T85 °C, T95 °C, T105 °C Dc

IECEx	Ex ia I Ma
	Ex ia IIC T6, T5 Ga
	Ex ia IIC T6, T5 Ga/Gb
	Ex ia IIC T6, T5 Gb
	Ex ia IIIC T85 °C, T95 °C Da
	Ex nA IIC T6, T5, T4 Gc
	Ex ic IIC T6, T5, T4 Gc
	Ex ic IIIC T85 °C, T95 °C, T105 °C Dc

Technical details

Input data												
Measuring ranges signal 1	bar	16	25	40	60	100	200	250	400	500	600	1050
Measuring ranges signal 2	bar	16	25	40	60	100	200	250	400	500	600	1050
Overload pressures	bar	50	50	80	120	200	500	500	800	1000	1000	1400
Burst pressure	bar	125	125	200	300	500	1250	1250	2000	3000	3000	3000
Mechanical connection (Tightening torque, recommended)	SF250CX20, Autoclave (7/16-20 UNF 2B) (15 Nm for measuring range ≤ 600 bar; 20 Nm for measuring range 1050 bar)											
Parts in contact with the fluid	Stainless steel	1.4435 (Ni content ≥ 13 %)										
	Measurement cell	gold-plated										
Output data												
Output signal 1	4 .. 20 mA, 2-conductor											
Output signal 2	20 .. 4 mA, 2-conductor,											
Permitted load resistance, each	$R_{L,max} (U_B - 12 V) / 20 mA [k\Omega]$											
Accuracy acc. to DIN 16086, terminal based	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.											
Accuracy, B.F.S.L	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.											
Temperature compensation zero point	≤ ± 0.015 % FS / °C typ. ≤ ± 0.025 % FS / °C max.											
Temperature compensation span	≤ ± 0.015 % FS / °C typ. ≤ ± 0.025 % FS / °C max.											
Non-linearity acc. to DIN 16086, terminal based	≤ ± 0.3 % FS max.											
Hysteresis	≤ ± 0.4 % FS max.											
Repeatability	≤ ± 0.1 % FS											
Rise time	≤ 2 ms											
Long-term drift	≤ ± 0.3 % FS typ. / year											
Environmental conditions												
Compensated temperature range	-25 .. +85 °C											
Operation / ambient / fluid temperature range ¹⁾	T6, T85 °C	Ta = -40 to +60 °C										
	T5, T95 °C	Ta = -40 to +70 °C										
	T105 °C	Ta = -40 to +80 °C										
	T4	Ta = -40 to +85 °C										
Storage temperature range	-40 .. +100 °C											
CE marking	EN 61006-6-1 / 2 / 3 / 4; EN 60079-0 / 11 / 15 / 26; EN 50303											
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz protection type to DIN EN 60529 ²⁾	≤ 20 g IP 67											
Relevant data for Ex applications					Ex ia, ic				Ex nA			
Supply voltage	12 ..28 V DC				12 ..28 V DC				12 ..28 V DC			
Max. input current	Ii = 100 mA											
Maximum input power	Pi = 0.7 W								max. power consumption ≤ 1 W			
Connection capacitance of the sensor	Ci ≤ 22 nF											
Inductance of the sensor	Li = 0 mH											
Intrinsic safety barrier	2-channel, R _{min} = 280 Ω (e.g. Pepperl & Fuchs Z789)											
Insulation voltage	50 V AC, with integrated overvoltage protection to EN 61000-6-2											
Other data												
Residual ripple of supply voltage	≤ 5 %											
Current consumption	≤ 25 mA											
Life expectancy	> 10 million load cycles (0 .. 100 % FS)											
Weight	~ 210 g											

Note: Reverse polarity protection of the supply voltage, overvoltage, override and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range

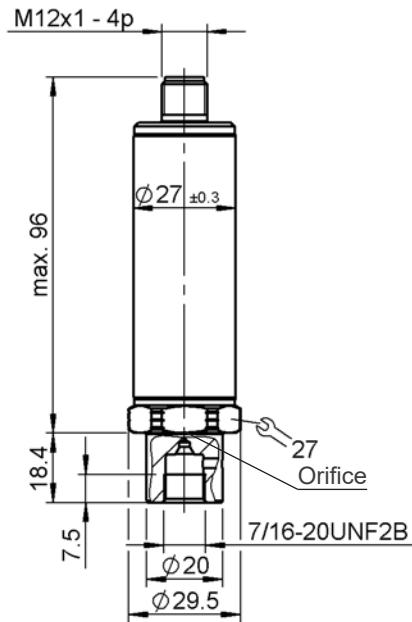
B.F.S.L. = Best Fit Straight Line

¹⁾ For instruments with an M12x1 connector the temperature at the electrical connection may not be lower than -25 °C.

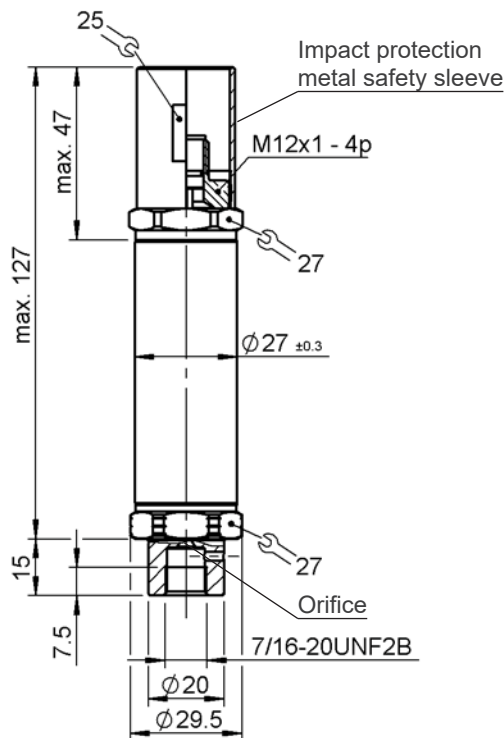
²⁾ With mounted mating connector in corresponding protection type

Dimensions

Version as ignition protection type "intrinsically safe" (Ex ia, Ex ic)



Version as ignition protection type "non-sparking" (Ex nA) with impact protection metal safety sleeve



The impact protection metal safety sleeve is included in delivery. A straight mating connector is required for electrical connection. E.g. mating connector M12x1, 4 pole, straight, with 3 m shielded cable: ZBE 06S-03, Part.no. 6098243

Pin connections

M12x1, 4 pole	Pin	Output signal: AA
	1	+ Signal 1
	2	- Signal 1
	3	+ Signal 2
	4	- Signal 2

Model code

HDA 4 4X X - AA - XXXX - XXXX - E N X - H00

Mechanical connection

C = SF250CX20, Autoclave (7/16-20 UNF 2B)

Electrical connection

6 = Male connector M12X1, 4 pole (mating connector not included)

Output signal

AA = Signal 1: 4 .. 20 mA, 2 conductor

Signal 2: 20 .. 4 mA, 2 conductor

Measuring ranges in bar (output signal 1)

0016; 0025; 0040; 0060; 0100; 0200; 0250; 0400; 0500; 0600; 1050

Measuring ranges in bar (output signal 2)

0016; 0025; 0040; 0060; 0100; 0200; 0250; 0400; 0500; 0600; 1050

Approval

E = ATEX; IECEx

Insulation voltage

N = 50 V AC to housing

Protection types and application fields (code)

(see table below)

Modification number

H00 = for hydrogen applications

Code no. - Model Code	ATEX KEMA 05 ATEX 1016X	IECEx KEM 08.0014X	Application fields
1 =	I M1 Ex ia I Ma II 1G Ex ia IIC T6, T5 Ga II 1/2G Ex ia IIC T6, T5 Ga/Gb II 2G Ex ia IIC T6, T5 Gb II 1D Ex ia IIIC T85 °C, T95 °C Da	Ex ia I Ma Ex ia IIC T6, T5 Ga Ex ia IIC T6, T5 Ga/Gb Ex ia IIC T6, T5 Gb Ex ia IIIC T85 °C, T95 °C Da	Mining protection type: intrinsically safe ia with barrier Gases / conductive dusts protection type: intrinsically safe ia with barrier
9 =	II 3G Ex nA IIC T6, T5 Gc	Ex nA IIC T6, T5 Gc	Gases protection type: non-sparking nA
C =	II 3G Ex ic IIC T6, T5 Gc II 3D Ex ic IIIC T85 °C, T95 °C Dc	Ex ic IIC T6, T5 Gc Ex ic IIIC T85 °C, T95 °C Dc	Gases / conductive dusts protection type: intrinsically safe ic with barrier

Note:

Instruments for other protection types and application fields are available upon request.

Note

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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