Pressure Transmitter
HDA 4700 Ex applications

Relative pressure | **Accuracy 0.25 %**

Intrinsically Safe, Dustproof enclosure
Non-Sparking
ATEX, IECEx, double approval
HART interface
Optional temperature measurement

Description:

HDA 4700 with HART interface is a compact pressure transmitter (intrinsically safe version) which is used to measure relative pressures in hydraulics and pneumatics. The double approval in accordance with ATEX and IECEx enables universal, almost worldwide utilisation of the devices in potentially explosive atmospheres.

The pressure is measured by means of a very accurate and robust sensor cell with a thin-film strain gauge on a stainless steel membrane.

In addition to the analogue 4 .. 20 mA output of the measured value, digital communication is possible by means of the HART protocol.

The instrument provides the option of a temperature sensor. The temperature signal is given out as a digital signal via the HART protocol, the pressure signal is still available as an analogue signal (4 .. 20 mA) .

The main fields of application are in the oil and gas industry. The device is also used in mining applications as well as in locations with high dust contamination.

Protection types and applications:

ATEX

I	M1	Ex ia I Ma
II	1G	Ex ia IIC T6,T5 Ga
II	1/2 G	Ex ia IIC T6,T5 Ga/Gb
II	2 G	Ex ia IIC T6,T5 Gb
II	1D	Ex ia IIIC T85 °C/T95 °C Da
II	1D	Ex ta IIIC T80/90/100 °C T_{500}90/T_{500}100/T_{500}110 °C Da
II	2D	Ex tb IIIC T80/T90/T100 °C Db
II	3G	Ex nA IIC T6, T5, T4 Gc
II	3G	Ex ic IIC T6, T5, T4 Gc
II	3D	Ex tc IIIC T80/T90/T100 °C Dc
II	3D	Ex ic IIIC T80/T90/T100 °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/T95 °C Da
Ex ta IIIC T80/T90/T100 °C T_{500}90/T_{500}100/T_{500}110 °C Da
Ex tb IIIC T80/T90/T100 °C Db
Ex nA IIC T6,T5,T4 Gc
Ex ic IIC T6,T5,T4 Gc
Ex tc IIIC T80/T90/T100 °C Dc
Ex ic IIIC T80/T90/T100 °C Dc

Technical data:

Input data												
Measuring ranges	bar	6	16	40	60	100	250	400	600	1000	1600	2000
Overload pressures	bar	12	32	80	120	200	500	800	1000	1600	2400	3000
Burst pressure	bar	100	100	200	300	500	1000	2000	2000	3000	3000	4000

Mechanical connection	G1/4 A ISO 1179-2 G1/2 B DIN EN 837	
Tightening torque, recommended	20 Nm (G1/4 A), 45 Nm (G1/2 B)	
Parts in contact with fluid	Stainl. steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301, 1.4548 Seal: FKM	
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2-conductor, with HART protocol $R_{Lmax.} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$ for HART communication min. 250 Ω	
HART Communication	Acc. to HART 7 specifications	
HART Common Practice Commands i.e.	Altering of measuring range limits (see table) Zero point adjustment within max. 3 % of the span	
Accuracy acc. to DIN 16086, terminal based	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.	
Accuracy, B.F.S.L.	≤ ± 0.15 % FS typ. ≤ ± 0.25 % FS max.	
Temperature compensation Zero point	≤ ± 0.008 % FS / °C typ. ≤ ± 0.015 % FS / °C max.	
Temperature compensation Span	≤ ± 0.008 % FS / °C typ. ≤ ± 0.015 % FS / °C max.	
Non-linearity acc. to DIN 16086, terminal based	≤ ± 0.3 % FS max.	
Hysteresis	≤ ± 0.1 % FS max.	
Repeatability	≤ ± 0.05 % FS	
Rise time	≤ 25 ms	
Long-term drift	≤ ± 0.1 % FS typ. / year	
Environmental conditions		
Compensated temperature range	-25 .. +85 °C	
Operating/ambient/fluid temperature range [1) 2)]	T6, T80/T85 °C, T_{500}90 °C T5, T90/T95 °C, T_{500}100 °C T100 °C, T_{500}110 °C T4	Ta = -40 .. +60 °C/-20 .. +60 °C Ta = -40 .. +70 °C/-20 .. +70 °C Ta = -40 .. +80 °C/-20 .. +80 °C Ta = -40 .. +85 °C/-20 .. +85 °C
Storage temperature range	-40 .. +100 °C	
CE mark	EN 61000-6-1/2/3/4; EN 60079-0/11/15/26/31; EN 50303	
Vibration resistance acc. to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g	
Protection class acc. to DIN EN 60529	IP 67	

Relevant data for Ex applications	**Ex, ia, ic**	**Ex nA, ta, tb, tc**
Supply voltage	12 .. 28 V DC	12 .. 28 V DC
Max. input current	Ii = 100 mA	
Max. input power	Pi = 0.7 W	Max. power consuption ≤ 1 W
Connection capacitance of the sensor	Ci ≤ 22 nF	
Inductance of the sensor	Li = 0 mH	
Insulation voltage [4)]	50 V AC, with integrated overvoltage protection acc. to EN 61000-6-2	

Other data	
Residual ripple of supply voltage	acc. to FSK Physical Layer Specification (HCF_SPEC-054)
Current consumption	≤ 25 mA
Life expectancy [5)]	> 10 million cycles (0 .. 100 % FS)
Weight	150 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.
FS (**F**ull **S**cale) = relative to complete measuring range; **B.F.S.L.** = **B**est **F**it **S**traight **L**ine

1) -25 °C with FKM seal, -40 °C on request
2) With M12x1 male connector, only up to -25 °C
3) With mounted mating connector in corresponding protection class
4) 500 V AC on request
5) Measuring ranges ≥ 1000 bar: > 1 million cycles (0 .. 100 % FS)

Measuring range limits:

By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring range limits:
Measuring range limits of the primary variable, pressure:

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
0 % FS	112.5 % FS	37.5 % FS	150 % FS	37.5 % FS	150 % FS

Fields of application:

Code no. for use in model code	1			9	A	C
ATEX DEKRA 13ATEX0031X DEKRA 13ATEX0032	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 1D Ex ia IIIC T85/T95°C Da	II 2G Ex ia IIC T6,T5 Gb	II 3G Ex nA IIC T6,T5 Gc	II 1D Ex ta IIIC T80/T90°C T_{500}90/T_{500}100°C Da II 2D Ex tb IIIC T80/T90°C Db	II 3G Ex ic IIC T6,T5 Gc II 3D Ex ic IIIC T80/T90°C Dc
IECEx DEK 14.0011X	Ex ia I Ma	Ex ia IIC T6,T5 Ga Ex ia IIC T6,T5 Ga/Gb Ex ia IIIC T85/T95°C Da	Ex ia IIC T6,T5 Gb	Ex nA IIC T6,T5 Gc	Ex ta IIIC T80/T90°C T_{500}T90/T_{500}T100°C Da Ex tb IIIC T80/T90°C Db	Ex ic IIC T6,T5 Gc Ex ic IIIC T80/T90°C Dc
Application fields	Mining Protection type: intrinsically safe ia with barrier	Gases/conductive dust Protection type: intrinsically safe ia with barrier	Gases Protection type: intrinsically safe ia with barrier	Gases Protection type: non-sparking nA	Conductive dust Protection type: dustproof enclosure	Gases/conductive dust Protection type: intrinsically safe ic with barrier
Electrical connection (see model code)	5.6	5.6	5.6	6	6	5.6

Instruments for other protection types and zones (see cover) are available upon request.

Model code:

HDA 4 7 X X – F21 – XXX – E N X – 000

Mechanical connection
1 = G1/2 B DIN EN 837
(only for measuring ranges ≥ 1600 bar)
4 = G1/4 A ISO 1179-2

Electrical connection
5 = male, EN 175301-803, 3 pole + PE (IP 67 mating connector supplied)
6 = male M12x1, 4 pole (mating connector not supplied)

Output signal
F21 = 4 .. 20 mA, 2-conductor, with HART protocol

Measuring ranges in bar
0006; 0016; 0040, 0060; 0100; 0250; 0400; 0600; 1000 (only with mechanical connection code "4")
1600; 2000 (only with mechanical connection code "1")

Approval
E = **ATEX**
IECEx

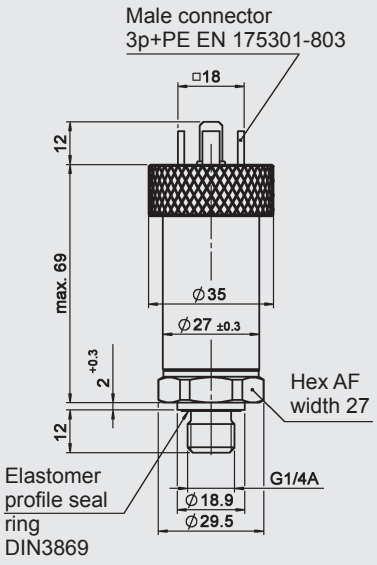
Insulation voltage
N = 50 V AC to housing

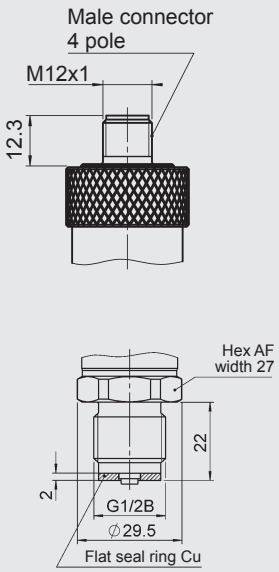
Protection types and applications (code)

	ATEX				IECEx		
1 =	I M1	Ex ia	I	Ma	Ex ia	I	Ma
	II 1G	Ex ia	IIC	T6,T5 Ga	Ex ia	IIC	T6,T5 Ga
	II 1/2 G	Ex ia	IIC	T6,T5 Ga/Gb	Ex ia	IIC	T6,T5 Ga/Gb
	II 2 G	Ex ia	IIC	T6,T5 Gb	Ex ia	IIC	T6,T5 Gb
	II 1D	Ex ia	IIIC	T85/T95 °C Da	Ex ia	IIIC	T85/T95 °C Da
9 =	II 3G	Ex nA	IIC	T6, T5 Gc	Ex nA	IIC	T6, T5 Gc
	Only in conjunction with electr. connection "6" and the impact protection metal safety sleeve (see dimensions)						
A =	II 1D	Ex ta	IIIC	T80/T90 °C T_{500}90/ T_{500}100 °C Da	Ex ta	IIIC	T80/T90 °C T_{500}90/ T_{500}100 °C Da
	II 2D	Ex tb	IIIC	T80/T90 °C Db	Ex tb	IIIC	T80/T90 °C Db
	Only in conjunction with electr. connection "6" and the impact protection metal safety sleeve (see dimensions)						
C =	II 3G	Ex ic	IIC	T6, T5 Gc	Ex ic	IIC	T6, T5 Gc
	II 3D	Ex ic	IIIC	T80/T90 °C Dc	Ex ic	IIIC	T80/T90 °C Dc

Modification number
000 = standard

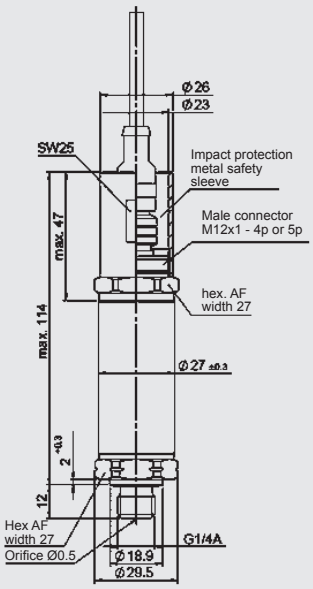
Dimensions:





With impact protection metal safety sleeve:

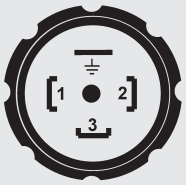
Protection types and applications (code): 9, A



The impact protection metal safety sleeve is included. 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

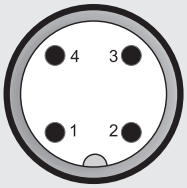
Pin connections:

EN 175301-803



Lead	HDA 47x5-F21
1	Signal +
2	Signal -
3	n.c.
⊥	PE

M12x1



Lead	HDA 47x6-F21
1	Signal +
2	n.c.
3	Signal -
4	n.c.

Additional technical data with temperature measurement option:

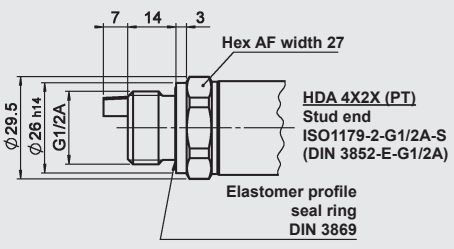
Input data							
Measuring range	-25 .. +100 °C						
Probe length	7 mm						
Mechanical connection	G 1/2 A ISO 1179-2 with probe (45 Nm)						
Measuring ranges pressure in bar	16	40	60	100	250	400	600
Output data							
Output signal pressure	4 .. 20 mA with HART Protocol						
Output signal temperature	Available via HART protocol as a digital signal						
Accuracy at room temperature	≤ ± 0.4 % FS typ. ≤ ± 0.8 % FS max.						
Temperature drift (environment)	≤ ± 0.01 % FS / °C						
Reaction time to DIN EN 60751	t_{50}: ≈ 10 s t_{90}: ≈ 15 s						

Measuring range limits:

Additional measuring range limits of the secondary variable, temperature:

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
-25 °C	75 °C	0 °C	100 °C	25 °C	125 °C

Dimensions with temperature measurement option:



Model code with temperature measurement option:

HDA 4 7 2 X – F21 – XXXX – T – 007 – E N X – XXX

Mechanical connection
2 = G 1/2 A ISO 1179-2

Electrical connection
5 = male, EN 175301-803, 3 pole + PE (IP 67 mating connector supplied)
6 = male M12x1, 4 pole (mating connector not supplied)

Output signal
F21 = 4 .. 20 mA, 2-conductor, with HART protocol

Measuring ranges in bar
0016; 0040; 0060; 0100;0250; 0400; 0600

With temperature measurement

Probe length (in mm)
007 = 7 mm

Approval
E = **ATEX**
IECEx

Insulation voltage
N = 50 V AC to housing

Protection types and applications (code)

	ATEX				IECEx		
1 =	I M1	Ex ia	I	Ma	Ex ia	I	Ma
	II 1G	Ex ia	IIC	T6,T5 Ga	Ex ia	IIC	T6,T5 Ga
	II 1/2 G	Ex ia	IIC	T6,T5 Ga/Gb	Ex ia	IIC	T6,T5 Ga/Gb
	II 2 G	Ex ia	IIC	T6,T5 Gb	Ex ia	IIC	T6,T5 Gb
	II 1D	Ex ia	IIIC	T85 °C/T95 °C Da	Ex ia	IIIC	T85 °C/T95 °C Da
9 =	II 3G	Ex nA	IIC	T6, T5 Gc	Ex nA	IIC	T6, T5 Gc
	Only in conjunction with electr. connection "6" and the impact protection metal safety sleeve (see dimensions)						
A =	II 1D	Ex ta	IIIC	T80/T90 °C T_{500}90/ T_{500}100 °C Da	Ex ta	IIIC	T80/T90 °C T_{500}T90/ T_{500}100 °C Da
	II 2D	Ex tb	IIIC	T80/T90 °C Db	Ex tb	IIIC	T80/T90 °C Db
	Only in conjunction with electr. connection "6" and the impact protection metal safety sleeve (see dimensions)						
C =	II 3G	Ex ic	IIC	T6, T5 Gc	Ex ic	IIC	T6, T5 Gc
	II 3D	Ex ic	IIIC	T80/T90 °C Dc	Ex ic	IIIC	T80/T90 °C Dc

Modification number
000 = standard

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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