HYDAC INTERNATIONAL

# Pressure transmitter
# HDA 4400

Hydrogen, Ex applications
ATEX / IECEx / CSA, triple approval
Flameproof enclosure

**Relative pressure** | **Accuracy 0.5 %**

## Features

- Specially designed for the measurement of hydrogen
- Parts in contact with the fluid: 1.4435 with a Ni content of ≥ 13 % (316L)
- ATEX, IECEx, $_{c}CSA_{US}$ triple approval
- Ignition protection type: Flameproof enclosure

## Description

The pressure transmitter series HDA 8400 has been specially developed for measuring tasks with hydrogen. The transmitters are based on a robust, long-life sensor cell with a thin-film strain gauge on a stainless steel membrane. 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 ≥ 13 %.

The transmitters with the ignition protection type "flameproof enclosure" combine ATEX, IECEx and even $_{c}CSA_{US}$ certification, especially for the North American market. This allows universal world wide use of the sensor in potentially explosive atmospheres.

## Application fields

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 db I Mb
II 2G Ex db IIC T6, T5 Gb
II 2D Ex tb IIIC T110 °C, T120 °C, T130 °C Db

**IECEx**
Ex db I Mb
Ex db IIC T6, T5 Gb
Ex tb IIIC T110 °C, T120 °C, T130 °C Db

**$_{c}CSA_{US}$**
Explosion Proof - Seal not required
Class I Groups A, B, C, D, T6, T5
Class I Zone 1 AEx db IIC T6, T5 Gb [US]
Ex db IIC T6, T5 Gb [C]

Class II Groups E, F, G T110 °C, T120 °C, T130 °C
Zone 21 AEx tb IIIC T110 °C, T120 °C, T130 °C Db [US]
Ex tb IIIC T110 °C, T120 °C, T130 °C Db [C]

Class III

Type 4

# Technical Data

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Input data** | | | | | | | | | | | | |
| Measuring ranges [1] | 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) G 1/4 B DIN EN 837 (20 Nm for measuring range ≤ 600 bar; 40 Nm for measuring range 1050 bar) | | | | | | | |
| Parts in contact with the fluid | | | | | Stainless steel | 1.4435 (Ni content ≥ 13 %) | | | | | | |
| | | | | | Measurement cell | gold-plated | | | | | | |
| | | | | | Seal | Copper (Cu-DHP) (G 1/4 B) | | | | | | |
| **Output data** | | | | | | | | | | | | |
| Output signal, permitted load resistance | | | | | 4 .. 20 mA, 2-conductor, $R_{Lmax}$ ($U_B$ – 8 V) / 20 mA [kΩ] | | | | | | | |
| 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 [2] | | | | | T6, T110 °C<br>T5, T130 °C | Ta = -40 ..+60 °C<br>Ta = -40 ..+80 °C | | | | | | |
| Storage temperature range | | | | | -40 ..+100 °C | | | | | | | |
| CE mark | | | | | EN 61006-6-1 / 2 / 3 / 4; EN 60079-0 / 1 / 31 | | | | | | | |
| Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz | | | | | ≤ 10 g ≤ 5 g with connection head | | | | | | | |
| Protection type | acc. to DIN EN 60529 [3] | | | | IP 65 (Vented Gauge), IP 68 (vers. with connection head, seald gauge) IP 69 (Sealed Gauge) | | | | | | | |
| | acc. to ISO 20653 | | | | IP 6K9K (Sealed Gauge) | | | | | | | |
| **Other data** | | | | | | | | | | | | |
| Supply voltage [4] | | | | | 8 .. 30 V DC | | | | | | | |
| Residual ripple of supply voltage | | | | | ≤ 5 % | | | | | | | |
| Current consumption | | | | | ≤ 25 mA | | | | | | | |
| Life expectancy | | | | | > 10 million load cycles (0 .. 100% FS) | | | | | | | |
| Weight | | | | | ~ 300 g | | | | | | | |

Note: Reverse polarity protection of the supply voltage, overvoltage, 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

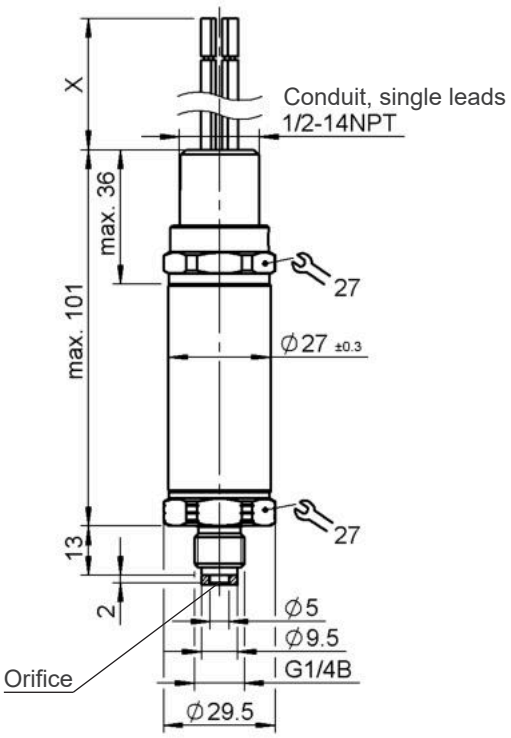
[1] psi measuring ranges on request

[2] T130 °C only available with electrical connection single leads

[3] For connection head: The cable gland must also meet IP 68 and the 1/2-14 NPT thread of the cable gland has to be sealed by means of a thread sealing compound.

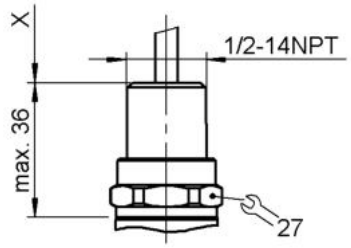
[4] "Limited energy" powered according to CAN/UL 61010 (Clause 9.4), Class 2 UL1310, LPS (CAN/UL 60950)

## Dimensions

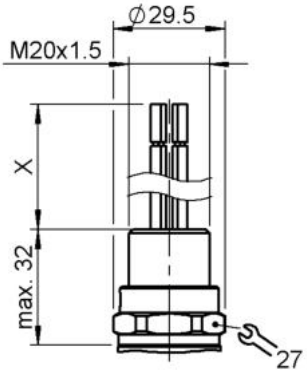



### Electrical Connection Variants

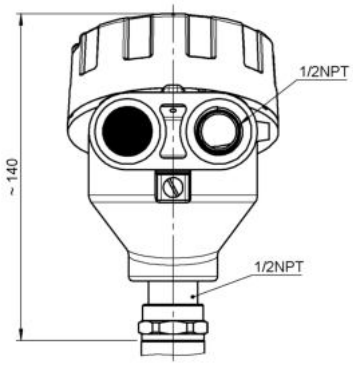
1/2-14 NPT Conduit, jacketed cable

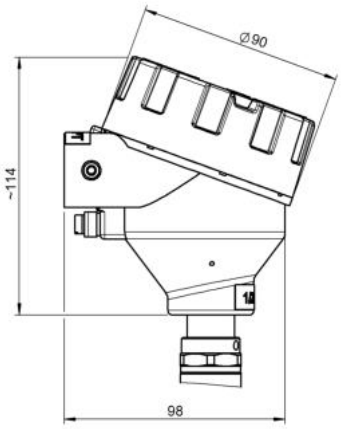



M20x1,5 Conduit, single leads

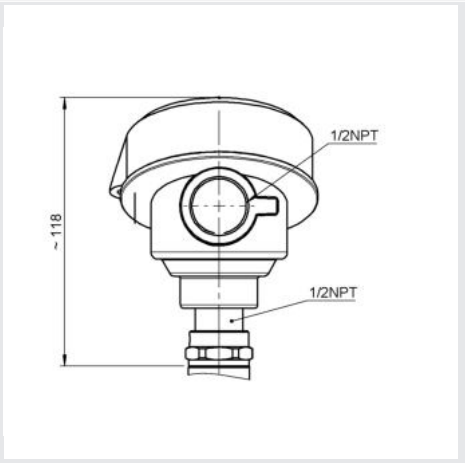


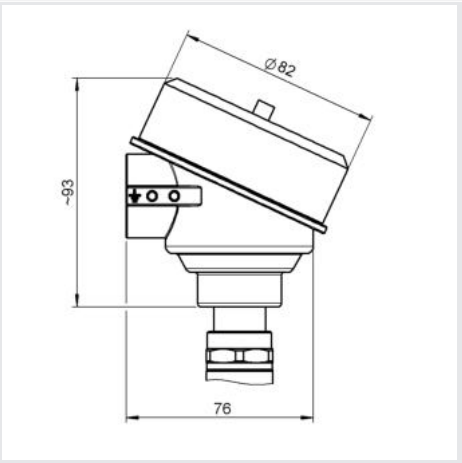

Connection head aluminum



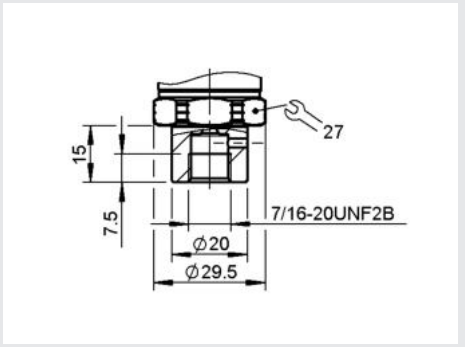
Connection head stainless steel



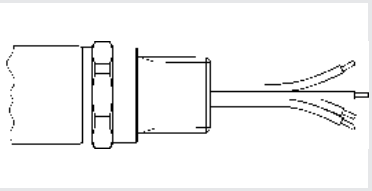



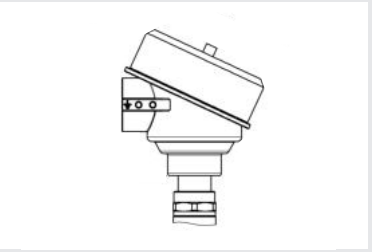

### Mechanical Connection Variants

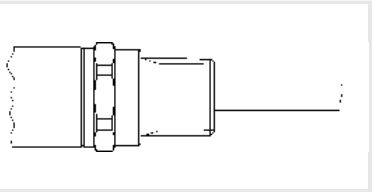
SF250CX20 Autoclave
(7/16-20 UNF 2B female thread)




## PIN connection

| Conduit (single leads) | Lead | Output signal: A |
|---|---|---|
|  | Red | Signal + |
| | Black | Signal - |
| | Green-yellow | Housing |

| Connection head aluminum / stainless steel | Lead | Output signal: A |
|---|---|---|
|  | Red | Signal + |
| | Black | Signal - |
| | Green-yellow | Housing |

| Conduit (jacketed cable) | Lead | Output signal: A |
|---|---|---|
|  | White | Signal - |
| | Brown | Signal + |
| | Green | n.c. |
| | Yellow | n.c. |

## Model code

**HDA 4 4X X - A - XXXX - D X - H00 (2m)**

**Mechanical connection**

C = SF250CX20, Autoclave (7/16-20 UNF 2B)
G = G1/4 B DIN EN 837

**Electrical connection** (details regarding the fields of application, please see table below)

9 = 1/2-14 NPT conduit (male thread), single leads
G = 1/2-14 NPT conduit (male thread), jacketed cable
J = Connection head (aluminum)
Q = Connection head (stainless steel)
W = M20x1,5 conduit (male thread), single leads

**Output signal**

A = 4 .. 20 mA, 2 conductor

**Measuring ranges in bar**

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

**Approval**

D = ATEX Flame Proof
IECEx Flame Proof
CSA Explosion Proof (seal not required)

**Measurement cell type**

S = Sealed Gauge (sealed to atmosphere) ≥ 40 bar
V = Vented Gauge (vented to atmosphere) < 40 bar

**Modification number**

H00 = for hydrogen applications

**Cable length**

Standard = 2 m

**Fields of application for the individual electrical connections**

| | ATEX | IECEx | CSA |
|---|---|---|---|
| **9, W** | I M2 Ex db I Mb<br>II 2G Ex db IIC T6, T5 Gb<br>II 2D Ex tb IIIC T110/T120/T130 °C Db | Ex db I Mb<br>Ex db IIC T6, T5 Gb<br>Ex tb IIIC T110/T120/T130 °C Db | Class I Groups A, B, C, D, T6, T5<br>Class I Zone 1 AEx db IIC T6, T5 Gb [US]<br>Ex db IIC T6, T5 Gb [C]<br>Class II Groups E, F, G T110/T120/T130 °C<br>Zone 21 AEx tb IIIC T110/T120/T130 °C Db [US]<br>Ex tb IIIC T110/T120/T130 °C Db [C]<br>Class III<br>Type 4 |
| **G** | I M2 Ex db I Mb<br>II 2G Ex db IIC T6, T5 Gb<br>II 2D Ex tb IIIC T110 °C Db | Ex db I Mb<br>Ex db IIC T6, T5 Gb<br>Ex tb IIIC T110 °C Db | Class I Groups A, B, C, D, T6, T5<br>Class I Zone 1 AEx db IIC T6, T5 Gb [US]<br>Ex db IIC T6, T5 Gb [C]<br>Class II Groups E, F, G T110 °C<br>Zone 21 AEx tb IIIC T110°C Db [US]<br>Ex tb IIIC T110 °C Db [C]<br>Class III<br>Type 4 |
| **J** | II 2G Ex db IIC T6, T5 Gb<br>II 2D Ex tb IIIC T110/T120/T130 °C Db | Ex db IIC T6, T5 Gb<br>Ex tb IIIC T110/T120/T130 °C Db | Class I Groups A, B, C, D, T6, T5<br>Class I Zone 1 AEx db IIC T6, T5 Gb [US]<br>Ex db IIC T6, T5 Gb [C]<br>Class II Groups E, F, G T110/T120/T130 °C<br>Class III<br>Type 4 |
| **Q** | II 2G Ex db IIC T6, T5 Gb<br>II 2D Ex tb IIIC T110/T120/T130 °C Db | Ex db IIC T6, T5 Gb<br>Ex tb IIIC T110/T120/T130 °C Db | Class I Groups B, C, D, T6, T5<br>Class II Groups E, F, G T110/T120/T130 °C<br>Class III |

## 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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