Explosive Atmosphere Sensors
SENSORS FOR POTENTIALLY EXPLOSIVE ATMOSPHERES

Sensors for Potentially Explosive Locations:

HDA 4700 ATEX, CSA, IECEx Flameproof enclosure
EDS 4400 ATEX, CSA, IECEx Flameproof enclosure, programmable
ETS 4500 ATEX, CSA, IECEx Flameproof enclosure
HDA 4700 ATEX Intrinsically safe
HDA 4400 ATEX Intrinsically safe
HDA 4300 ATEX Intrinsically safe
HDA 4100 ATEX Intrinsically safe
EDS 4400 ATEX Intrinsically safe, programmable
EDS 4300 ATEX Intrinsically safe, programmable
EDS 4100 ATEX Intrinsically safe, programmable
HDA 4700 CSA Intrinsically Safe
HDA 4400 CSA Intrinsically Safe
HDA 4300 CSA Intrinsically Safe
HDA 4100 CSA Intrinsically Safe
HDA 4700 IECEx Intrinsically safe
HDA 4400 IECEx Intrinsically safe
HDA 4300 IECEx Intrinsically safe
HDA 4100 IECEx Intrinsically safe
HDA 4700 Flush membrane ATEX Intrinsically safe
HDA 4400 Flush membrane ATEX Intrinsically safe
HDA 4300 Flush membrane ATEX Intrinsically safe
HDA 4700 Flush membrane IECEx Intrinsically safe
HDA 4400 Flush membrane IECEx Intrinsically safe
HDA 4300 Flush membrane IECEx Intrinsically safe
HDA 4700 Flush membrane ATEX, CSA, IECEx flameproof enclosure
HFS 2100 ATEX Intrinsically safe
HFS 2500 ATEX Intrinsically safe
HFT 3100 ATEX CSA IECEx flameproof enclosure
HFT 3100 ATEX IECEx Intrinsically Safe

Further sensors for potentially explosive locations can be found in the section "OEM Products for Large Volume Production".

<table>
<thead>
<tr>
<th>Sensors for potentially explosive atmospheres</th>
<th>HDA 4700</th>
<th>HDA 4300</th>
<th>HDA 4100</th>
<th>EDS 4400</th>
<th>EDS 4300</th>
<th>EDS 4100</th>
<th>ETS 4500</th>
<th>HFT 3000</th>
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<tr>
<td>ATEX / IECEx flameproof, CSA explosion proof (all in one)</td>
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<td>Flush membrane ATEX / IECEx flameproof, CSA explosion proof (all in one)</td>
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Note: Not all feature combinations are possible. For precise information, please consult the relevant data sheet.
**Electronic Pressure Transmitter**

**HDA 4700 ATEX, CSA, IECEx Flameproof Enclosure**

**Description:**
The HDA 4700 electronic pressure transmitter series with flameproof enclosure has triple approval according to ATEX, CSA and IECEx which ensures the instrument is universally suitable for use in potentially explosive environments around the world.

Each instrument is certified by the three approvals organizations and is labelled accordingly. Therefore there is no longer any need to stock multiple devices with separate individual approvals.

As with the industrial version of the HDA 4700, those with triple approval have a proven, fully-welded stainless steel measurement cell with thin film strain gauge without internal seals.

The main areas of application are in mining and the oil & gas industry, e.g. in underground vehicles, hydraulic power units, blow-out preventers (BOPs), drill drives or valve actuation stations as well as in areas with high levels of dust contamination.

**Protection types and applications:**
cCSAus Explosion Proof - Seal Not Required
- Class I Group A, B, C, D, T6, T5
- Class II Group E, F, G
- Class III

**ATEX** Flame Proof
- Type 4
- I M2 Ex d I Mb
- II 2G Ex d IIIC T6, T5 Gb
- II 2D Ex tb IIIC T110 .. 130 °C Db

**IECEx** Flame Proof
- Ex d I Mb
- Ex d IIIC T6, T5 Gb
- Ex tb IIIC T110 .. 130 °C Db

**Technical data:**

**Input data**
- Measuring ranges: 100, 300, 500, 1000, 1500, 3000, 5000, 6000, 9000, 10000, 15000, 20000, 30000 psi
- Overload pressures: 290, 1160, 1160, 2900, 2900, 7250, 11600, 11600, 14500, 14500, 23200, 38400, 43500 psi
- Burst pressures: 1450, 2900, 2900, 7250, 14500, 29000, 29000, 29000, 43500 psi

- Mechanical connection (torque value):
  - 1/4-18 NPT, male
  - 1/4-18 NPT, female
  - SAE 6, 9/16-18 UNF 2A
  - F 250 C, Autoclave (9/16-18 UNF 2B)
  - 30lb-ft(40Nm) - 1/4 NPT, SF 250 CX20
  - 15 lb-ft(20Nm) - SAE 6, F 250 C

- Parts in contact with medium: Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301
- Seal: FPM

**Output data**
- Output signal, permitted load resistance
  - 4..20 mA, 2 conductor
  - R_{\text{max}} = (U_B - 8 V) / 20 mA [k\Omega]

- Accuracy to DIN 16086,
  - ≤ ± 0.25 % FS typ.
  - ≤ ± 0.5 % FS max.

- Temperature compensation
  - ≤ ± 0.005 % FS typ.
  - ≤ ± 0.008 % FS typ.

- Temperature compensation
  - ≤ ± 0.008 % FS / °F typ.
  - ≤ ± 0.015 % FS / °F max.

- Non-linearity at max. setting
  - ≤ ± 0.3 % FS max.

- Hysteresis
  - ≤ ± 0.1 % FS max.

- Repeatability
  - ≤ ± 0.05 % FS

- Rise time
  - ≤ 1.5 ms

- Long-term drift
  - ≤ ± 0.1 % FS typ. / year

**Environmental conditions**
- Compensated temperature range
  - T5, T130 °C: -13..+176 °F / -4..+176 °F
  - T6, T110 °C: -13..+140 °F / -4..+140 °F

- Operating temperature range
  - T5, T130 °C: -40..+176 °F / -4..+176 °F
  - T6, T110 °C: -40..+140 °F / -4..+140 °F

- Storage temperature range
  - -40..+121 °F

- Fluid temperature range
  - T5, T130 °C: -40..+176 °F / -4..+176 °F
  - T6, T110 °C: -40..+140 °F / -4..+140 °F

- Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz
  - ≤ 20 g

- Protection class to IEC 60529 to ISO 20653
  - IP 65 (Vented Gauge)
  - IP 69K (Sealed Gauge)

**Other data**
- Voltage supply: 8 .. 30 V DC
- Residual ripple of supply voltage
  - ≤ 5 %
- Life expectancy
  - > 10 million cycles
  - 0 .. 100 % FS
- Weight
  - ~ 300 g

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

FS (Full Scale) = relative to the full measuring range
B.F.S.L = Best Fit Straight Line
1 Other mechanical connections on request
2 Other output signals on request
3 -4°F with FPM seal, -40°F on request
Pin connections:

Conduit (single cores)

Core | HDA 47X9-A  
---|---
red | Signal +  
black | Signal -  
green-yellow | Housing

Conduit (flying leads)

Core | HDA 47XG-A  
---|---
white | Signal +  
brown | Signal -  
green | n.c.  
yellow | n.c.

Areas of application:

| Approvals | cCSAUS: Explosion Proof - Seal not required  
ATEX: Flame Proof  
IECEx: Flame Proof
| Certificate | ATEX KEMA 10ATEX100X  
CSA MC 224264  
IECEx KEM 10.0053X
| Applications / Protection types | cCSAUS:  
Class I Group A, B, C, D, T6; T5  
Class II Group E, F, G  
Class III Type 4
ATEX:  
I M2 Ex d I Mb  
II 2G Ex d IIC T6, T5 Gb  
II 2D Ex tb IIIC T110 .. 130 °C Db
IECEx:  
Ex d I Mb  
Ex d IIC T6, T5 Gb  
Ex tb IIIC T110 .. 130 °C Db
| Type of measurement cell | S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi  
V = Vented Gauge (vented to atmosphere) ≤ 300 psi
| Modification number | 000 = Standard
| Cable length in inches | Standard = 72 inches

Model code:

HDA 4 7 X X – A – XXXX – D X – 000 (PSI) 72in

Mechanical connection
7 = SAE 6, 9/16-18 UNF  
2A male  
8 = 1/4-18 NPT, male  
F = 1/4-18 NPT, female  
C = SF 250 CX20, Autoclave  
(7/16-20 UNF2B)  
B = F 250 C, Autoclave  
(9/16-18 UNF 2B, female)

Others on request

Electrical connection
9 = 1/2-14 NPT Conduit (male thread), single cores  
G = 1/2-14 NPT Conduit (male thread), flying leads

Signal
A = 4 .. 20 mA, 2 conductor

Pressure ranges in psi
0100, 0300, 0500, 1500, 3000, 5000, 6000, 9000
10000, 15000 (only with mechanical connection “C”)  
20000, 30000 (only with mechanical connection “B”)

Approval
D = CSA Explosion Proof - Seal not required  
ATEX Flame Proof  
IECEx Flame Proof

Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
Dimensions:

![Diagram of dimensions with various specifications for different models and connections.]

**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. For European mechanical connection and bar ranges see European Catalog.
Description:
The programmable electronic pressure switch EDS 4400 with flameproof enclosure has triple approval according to ATEX, CSA and IECEx which ensures the instrument is universally suitable for use in potentially explosive environments around the world. Each instrument is certified by the three approval organizations and is labelled accordingly. Therefore there is no longer any need to stock multiple devices with separate individual approvals.

As with the industrial version of the EDS 4400, those with triple approval have a proven, fully-welded stainless steel measurement cell with thin film strain gauge without internal seals. The instrument is programmed conveniently and simply using the HPG 3000 HYDAC programming unit. The main areas of application are in mining and the oil & gas industry, e.g. in underground vehicles, hydraulic power units, blow-out preventers (BOPs), drill drives or valve actuation stations as well as in areas with high dust loads.

Protection types and applications:
cSAus Explosion Proof - Seal Not Required
Class I Group A, B, C, D, T6, T5
Class II Group E, F, G
Class III
Type 4
ATEX Flame Proof
I M2 Ex d IIC T6, T5 Gb
II 2D Ex tb IIIC T110 .. 130 °C Db
IECEx Flame Proof
Ex d I Mb
Ex d IIC T6, T5 Gb
Ex tb IIIC T110 .. 130 °C Db

Special features:
- Accuracy ≤ ± 0.5% FS B.F.S.L.
- Certificates:
  ATEX KEMA 10ATEX100 X
  CSA MC 224264
  IECEx KEM 10.0053X
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

Input data

<table>
<thead>
<tr>
<th>Measuring ranges</th>
<th>100, 300, 500, 1000, 1500, 3000, 5000, 6000, 9000, 10000, 15000, 20000, 30000 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressures</td>
<td>290, 1160, 1160, 2900, 2900, 2900, 7250, 11600, 11600, 14500, 14500, 23200, 38400, 43500 psi</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>1450, 2900, 2900, 7250, 7250, 14500, 29000, 29000, 29000, 29000, 43500, 43500, 58000 psi</td>
</tr>
</tbody>
</table>

Mechanical connection (torque value)

1/4-18 NPT, male
1/4-18 NPT, female
SAE 6 9/16-18 UNF 2A
SF 250 CX20, Autoclave(7/16-20-UNF 2B)

SAE 6: 15lb-ft(20Nm)
SF 250 CX20, 1/4 NPT: 30lb-ft(40Nm)

Parts in contact with medium
Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301
Seal: FPM

Conduit and housing material
1.4404; 1.4435 (316L)

Output data

Accuracy to DIN 16086,
Max. setting
≤ ± 0.5 % FS typ.
≤ ± 1.0 % FS max.
Repeatability
≤ ± 0.1 % FS max.
Temperature drift
≤ ± 0.017% FS/°F max. zero point
≤ ± 0.017% FS/°F max. range
Switch output
1 or 2 NPN transistor switch outputs
Output load max. 1.2 A on version with 1 switch output max. 1 A each on version with 2 switch outputs
Switch points / hysteresis / N/C or user-programmable with HYDAC Programming Unit HPG 3000
Switching point and falling switch point delay
8 .. 2000 ms; User-programmable with HYDAC Programming Unit HPG 3000
Long-term drift
≤ ± 0.3 % FS typ. / year

Environmental conditions

Compensated temperature range
T5, T130 °C: -13..+176°F
T6, T110 °C: -13..+140°F
Operating temperature range (°F)
T5, T130 °C: -40..+176°F / -4..+176°F
T6, T110 °C: -40..+140°F / -4..+140°F
Storage temperature range
-40..+212°F
Fluid temperature range (°F)
T5, T130 °C: -40..+176°F / -4..+176°F
T6, T110 °C: -40..+140°F / -4..+140°F

Protection class to IEC 60529
IP 65 (Vented Gauge)
IP 69K (Sealed Gauge)

Vibration resistance to
DIN EN 60068-2-6 at 10 .. 500 Hz
≤ 20 g

Other data

Voltage supply
12 .. 30 V DC
Current consumption
~ 25 mA (plus switching current)
Residual ripple of supply voltage
≤ 5 %
Life expectancy
> 10 million cycles 0 .. 100 % FS
Weight
~ 300 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.
FS (Full Scale) = relative to complete measuring range
1 Other mechanical connection options available on request
2 NPN switching outputs upon request
3 -4 °F with FPM seal, -40 °F on request
**Setting ranges for the switch outputs:**
- Switch point or upper switch value 0.05..100% of the measurement range
- Hysteresis or lower switch value 1%..96% of the measurement range

**Pin connections:**

**Conduit (single cores):**

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<th>Core</th>
<th>EDS 44x9-...-1P</th>
<th>EDS 44x9-...-2P</th>
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<td>red</td>
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<td>+Us</td>
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<td>black</td>
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<tr>
<td>green</td>
<td>1) Programming line</td>
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</table>

**Conduit (flying leads):**

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<td>Switch output 1</td>
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<tr>
<td>brown</td>
<td>n.c.</td>
<td>Switch output 2</td>
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<td>SDA</td>
<td>SDA</td>
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<td>yellow</td>
<td>0 V</td>
<td>0 V</td>
</tr>
<tr>
<td>grey</td>
<td>+Us</td>
<td>+Us</td>
</tr>
</tbody>
</table>

1) Programming line

**Programming Unit:**

(HG3000 – 000 Portable Programming Unit)

Part. No. 909 422

HG3000 Power Supply with connector:

Part #02091103

The pressure switch can be connected to the HG3000 very simply by using the UVM 3000 Connection Adapter (see Accessories Brochure).

**CAUTION!**

The HG3000 Programming Unit may only be used outside the potentially explosive area.

**Areas of application:**

**Approvals**

- cCSAUS: Explosion Proof - Seal not required
- ATEX: Flame Proof
- IECEx: Flame Proof

**Certificate**

- ATEX KEMA 10ATEX100X
- CSA MC 224264
- IECEx KEM 10.0053X

**Applications / Protection types**

- cCSAUS: Class I Group A, B, C, D, T6; T5
- Class II Group E, F, G
- Class III
- Type 4

- ATEX:
  - I II M2 Ex d I Mb
  - II 2G Ex d IIC T6, T5 Gb
  - II 2D Ex tb IIIC T110 .. 130 °C Db

- IECEx:
  - Ex d I Mb
  - Ex d IIC T6, T5 Gb
  - Ex tb IIIC T110 .. 130 °C Db

**Model code:**

EDS 4 4 X X –XXXX – X P – D X – 000 (PSI) 72

**Mechanical connection**

- 7 = SAE 6, 9/16-18 UNF
- 2A male
- 8 = 1/4-18 NPT, male
- F = 1/4-18 NPT, female
- C = SF 250 CX20, Autoclave (7/16-20 UNF2B)
- B = F 250 C, Autoclave (9/16-18 UNF 2B, female)
- Others on request

**Electrical connection**

- 9 = 1/2-14 NPT Conduit (male thread), single cores
- G = 1/2-14 NPT Conduit (male thread), flying leads

**Pressure ranges in psi**

- 0100, 0300, 0500, 1500, 3000, 5000, 6000, 9000
- 10000, 15000 (only with mechanical connection “C”)
- 20000, 30000 (only with mechanical connection “B”)

**Number of switch outputs**

- 1 = 1 switch output
- 2 = 2 switch outputs

**Output type**

- P = Programmable

**Approval**

- D = CSA Explosion Proof - Seal not required
- ATEX Flame Proof
- IECEx Flame Proof

**Type of measurement cell**

- S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi
- V = Vented Gauge (vented to atmosphere) ≤ 300 psi

**Modification number**

- 000 = Standard

**Cable length in inches**

- Standard = 72 inches

**Accessories:**

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
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.
For European mechanical connection and bar ranges see European Catalog.
Description:
The electronic temperature transmitter series ETS 4500 with flameproof enclosure has triple approval according to ATEX, CSA and IECEx which ensures that the device is universally suitable for use in potentially explosive environments around the world. Each device is certified by the three approval organizations and is labelled accordingly. Therefore it is no longer necessary to stock multiple devices with separate individual approvals. Based on a silicon semiconductor device and corresponding evaluation electronics, the temperature sensor is designed to measure temperatures in the range -13 to +212 °F. Its main applications are in mining and the oil and gas industry, e.g. in underground vehicles, hydraulic power units, blow-out preventers (BOPs), drill drives or valve actuation stations as well as in areas with high dust loads.

Protection types and applications:
- **cCSA**s: Explosion Proof - Seal Not Required
  - Class I: Group A, B, C, D, T6, T5
  - Class II: Group E, F, G
  - Class III: Type 4
- **ATEX**: Flame Proof
  - I M2 Ex d I Mb
  - II 2G Ex d IIC T6, T5 Gb
- **IECEEx**: Flame Proof
  - Ex d I Mb
  - Ex d IIC T6, T5 Gb
  - Ex tb IIIC T110 .. 130 °C Db

Special features:
- Accuracy ≤ ± 1.5 % FS B.F.S.L.
- Certificates: ATEX KEMA 10ATEX100 X
- CSA MC 224264
- IECEx KEM 10.0053X
- Robust design
- Pressure resistant to 8700 psi (depending on model)
- Excellent EMC characteristics
- Excellent durability

Technical data:

<table>
<thead>
<tr>
<th>Input data</th>
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<tbody>
<tr>
<td>Measuring principle</td>
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<tr>
<td>Measuring range</td>
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<td>Probe length inch(mm)</td>
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<td>Pressure resistance</td>
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<tr>
<td>Mechanical connection</td>
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<tr>
<td>Parts in contact with medium</td>
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<td></td>
</tr>
<tr>
<td><strong>Output data</strong></td>
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<tr>
<td>Output signal[^1]</td>
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<tr>
<td>R&lt;sub&gt;max&lt;/sub&gt; = (U&lt;sub&gt;B&lt;/sub&gt; - 8 V) / 20 mA [kΩ]</td>
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<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>≤ ± 1.5 % FS typ.</td>
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<tr>
<td>≤ ± 3.0 % FS max.</td>
</tr>
<tr>
<td>Rise time to DIN EN 60751</td>
</tr>
<tr>
<td>t&lt;sub&gt;50&lt;/sub&gt;: ~ 10 s</td>
</tr>
<tr>
<td>t&lt;sub&gt;90&lt;/sub&gt;: ~ 15 s</td>
</tr>
</tbody>
</table>

Environmental conditions:

| Operating temperature range   |
| T5, T130 °C: -40..+176°F / -4..+176°F |
| T6, T110 °C: -40..+140°F / -4..+140°F |

| Storage temperature range     |
| -40..212°F                    |

| Fluid temperature range       |
| T5, T130 °C: -40..+176°F / -4..+176°F |
| T6, T110 °C: -40..+140°F / -4..+140°F |

| Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz                    |
| ≤ 20 g                        |

| Protection class to ISO 20653                                           |
| IP 69K                       |

Other data:

| Voltage supply               |
| 8 .. 30 V DC                 |

| Residual ripple of supply voltage | ≤ 5 %          |

| Life expectancy              |
| > 10 million cycles          |

| Weight                        |
| ~ 280 g (probe length 0.42 in) |
| ~ 315 g (probe length 3.94 in) |
| ~ 350 g (probe length 9.84 in) |
| ~ 385 g (probe length 13.8 in) |

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

[^1]: Other output signals on request
[^2]: -4 °F with FPM seal, -40 °F on request

FS (Full Scale) = relative to the complete measuring range
**Pin connections:**

**Conduit (single cores):**

- **Core:** ETS 45X9-A
- **red:** Signal +
- **black:** Signal -
- **green-yellow:** Housing

**Conduit (flying leads):**

- **Core:** ETS 45XG-A
- **white:** Signal +
- **brown:** Signal -
- **green:** n.c.
- **yellow:** n.c.

**Areas of application:**

| Approvals          | c-CSA:"  Explosion Proof - Seal not required
|--------------------|-----------------------------------|
|                    | ATEX: Flame Proof
|                    | IECEx: Flame Proof
| Certificate        | ATEX KEMA 10-ATEX100X
|                    | CSA MC 224264
|                    | IECEx KEM 10.0053X
| Applications / Protection types | c-CSA:"  Class I Group A, B, C, D, T6; T5
|                    | Class II Group E, F, G
|                    | Class III
|                    | Type 4
| ATEX:             | I M2 Ex d I Mb
|                   | II 2G Ex d IIC T6, T5 Gb
|                   | II 2D Ex tb IIIC T110 .. 130 °C Db
| IECEx:            | Ex d I Mb
|                   | Ex d IIC T6, T5 Gb
|                   | Ex tb IIIC T110 .. 130 °C Db

**Model code:**

ETS 4 5 X X – A – D – XXX – 000 (72in)

**Mechanical connection**

- 7 = SAE 6 9/16 UNF 2A male
- 8 = 1/4-18 NPT male

**Electrical connection**

- 9 = 1/2-14 NPT Conduit (male thread), single cores
- G = 1/2-14 NPT Conduit (male thread), flying leads

**Signal**

- A = 4 .. 20 mA, 2 conductor

**Approval**

- D = CSA Explosion Proof - Seal not required
- ATEX Flame Proof
- IECEx Flame Proof

**Probe length**

- 010 = 0.42" (10.7mm) (SAE 6 only)
- 100 = 3.94" (100mm) (1/4 NPT only)
- 250 = 9.84" (250mm) (1/4 NPT only)
- 350 = 13.8" (350mm) (1/4 NPT only)

**Modification number**

- 000 = Standard

**Cable length in inches**

- Standard = 72 inches

**Accessories:**

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For European mechanical connection see European Catalog.
Description:
The pressure transmitter HDA 4700 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industry model, the HDA 4700 in ATEX version has a stainless steel measurement cell with thin-film strain gauge. Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

Protection types and applications:
I M1 Ex ia I Ma
II 1G Ex ia IIIC T6 Ga
II 1G Ex tb IIIC T80/90/100°C Da
II 2D Ex ia IIIC T6 Gb
II 3G Ex ia IIIC T6, T5, T4 Gc
II 3G Ex ia IIIC T85°C Da
II 1D Ex ta IIIC T80/90/100°C Da
T 500 T90/T100/T110°C Da
II 2D Ex tb IIIC T80/90/100°C Db
II 3D Ex tc IIIC T80/T90/T100°C Dc
II 3D Ex ic IIIC T80/T90/T100°C Dc

Special features:
• Accuracy ≤ ± 0.25 % FS B.F.S.L.
• Certificates: KEMA 05ATEX1016 X
• KEMA 05ATEX1021
• Output signal 4 .. 20 mA
• Very small temperature error
• Excellent EMC characteristics
• Excellent durability

Technical data:

Measuring ranges:
- 150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi

Overload pressures:
- 290, 1160, 1740, 2900, 7250, 11600, 14500, 23200 psi

Burst pressures:
- 1450, 2900, 4350, 7250, 14500, 29000, 34500 psi

Supply voltage:
- Uᵢ = 12 .. 28 V

Max. input current:
- Iᵢ = 100 mA

Burst pressures:
- 1450, 2900, 4350, 7250, 14500, 29000, 34500 psi

Mechanical connection:
- SAE 6/16-18 UNF 2A
- SF 250 CS20, Autoclave

Torque value:
- 15lb-ft(20Nm) - SAE 6
- 30lb-ft(40Nm) SF 250 CX20

Parts in contact with medium:
- Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301

Output signal:
- 4 .. 20 mA, 2 conductor

Accuracy to DIN 16086:
- ≤ ± 0.25 % FS typ.

Accuracy at min. setting:
- ≤ ± 0.5 % FS max.

Temperature compensation:
- 0.0045% FS/Fº typ.

Over range:
- 0.0085% FS/Fº max.

Non-linearity at max. setting:
- ≤ ± 0.1 % FS max.

Hysteresis:
- ≤ ± 0.1 % FS.

Repeatability:
- ≤ ± 0.05 % FS

Rise time:
- ≤ 5 ms

Environmental conditions:

Compensated temperature range:
- -4 .. +185°F

Operating temperature range:
- -40 .. 70°C

Storage temperature range:
- -40 .. 70°C

Fluid temperature range:
- -20 .. +140°F

Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz:
- ≤ 20 g

Protection class to IEC 60529:
- IP 65 (for male EN175301-803 (DIN 43650)
- and Binder 714 M18)
- IP 67 (for M12x1 male when an IP 67 connector is used)

Relevant data for Ex applications:

Supply voltage:
- Uᵢ = 12 .. 28 V

Max. input current:
- Iᵢ = 100 mA

Max. input power:
- Pᵢ = 1 W

Connection capacitance of the sensor:
- Cᵢ = ≤ 22 nF

Inductance of the sensor:
- Lᵢ = 0 mH

Insulation voltage:
- 50 V AC, with integrated overvoltage protection EN 61000-6-2

Other data:

Residual ripple of supply voltage:
- ≤ 5 %

Life expectancy:
- > 10 million cycles

Weight:
- ≤ 150 g

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

1) FS (Full Scale) = relative to the full measuring range.

2) 15000 psi only with mechanical connection SF 250 CX20, Autoclave

3) -4°F with FPM seal, -40°F on request

4) 800 VAC on request
Areas of application:

<table>
<thead>
<tr>
<th>Protection type</th>
<th>Code No. for use in Model code</th>
</tr>
</thead>
<tbody>
<tr>
<td>I M1 Ex ia I Ma</td>
<td>11 1G Ex ia IIC T6 Ga</td>
</tr>
<tr>
<td>II 1/2G Ex ia IIC T6 Ga/Gb</td>
<td></td>
</tr>
<tr>
<td>II 1D Ex ia IIC T85°C Da</td>
<td></td>
</tr>
<tr>
<td>II 2G Ex ia IIC T6 Gb</td>
<td></td>
</tr>
<tr>
<td>II 3G Ex nA IIC T6 Gc</td>
<td></td>
</tr>
<tr>
<td>II 1D Ex ta IIC T80°C C Da</td>
<td></td>
</tr>
<tr>
<td>T 85°C T90°C Da</td>
<td></td>
</tr>
<tr>
<td>II 2D Ex tb IIC T80°C Db</td>
<td></td>
</tr>
<tr>
<td>II 3G Ex ic IIC T6 Gc</td>
<td></td>
</tr>
<tr>
<td>II 3D Ex ic IIC T80°C Dc</td>
<td></td>
</tr>
</tbody>
</table>

Certificate

KEMA 05ATEX1016 X / KEMA 05ATEX1021

**Zones / Categories**

- **Group I**
  - Category M1
  - Mining
  - Protection class: intrinsically safe ia with barrier

- **Group II, III**
  - Category 1G, 1/2G, 1D
  - Gases/conductive dust
  - Protection class: intrinsically safe ia with barrier

- **Group II**
  - Category 2G
  - Gases
  - Protection class: non-sparking

- **Group II**
  - Category 3G
  - Gases
  - Protection class: dustproof enclosure

**Electrical Connection (see model code)**

<table>
<thead>
<tr>
<th>Pin connections:</th>
<th>Model code:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Binder series 714 M18</strong></td>
<td>HDA 4 7 X X – A – XXXX – A X X – 000 (PSI)</td>
</tr>
<tr>
<td><strong>Pin HDA 47X4-A</strong></td>
<td>Mechanical connection</td>
</tr>
<tr>
<td>1 n.c.</td>
<td>7 = SAE 6, 9/16-18 UNF 2A male</td>
</tr>
<tr>
<td>2 Signal +</td>
<td>C = SF 250 CX20, Autoclave</td>
</tr>
<tr>
<td>3 Signal -</td>
<td>(only for “15000 psi” press. range)</td>
</tr>
<tr>
<td>4 n.c.</td>
<td></td>
</tr>
<tr>
<td><strong>EN175301-803 (DIN 43650)</strong></td>
<td>Electrical connection</td>
</tr>
<tr>
<td><strong>Pin HDA 47X5-A</strong></td>
<td>4 = Male, 4 pole Binder series 714 M18 (connector not supplied)</td>
</tr>
<tr>
<td>1 Signal +</td>
<td>5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)</td>
</tr>
<tr>
<td>2 Signal -</td>
<td>6 = Male, M12x1, 4 pole (connector not supplied)</td>
</tr>
<tr>
<td>3 n.c.</td>
<td></td>
</tr>
<tr>
<td>⊥ Housing</td>
<td><strong>Signal</strong></td>
</tr>
<tr>
<td><strong>Pin HDA 47X6-A</strong></td>
<td>A = 4 .. 20 mA, 2 conductor</td>
</tr>
<tr>
<td>1 Signal +</td>
<td><strong>Pressure ranges in psi</strong></td>
</tr>
<tr>
<td>2 n.c.</td>
<td>0150, 0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000</td>
</tr>
<tr>
<td>3 Signal -</td>
<td>15000 psi (only in conjunction with mechanical connection type “C”)</td>
</tr>
<tr>
<td>4 n.c.</td>
<td><strong>Approval</strong></td>
</tr>
<tr>
<td><strong>M12x1</strong></td>
<td>A = ATEX</td>
</tr>
<tr>
<td><strong>Pin HDA 47X6-A</strong></td>
<td><strong>Insulation voltage</strong></td>
</tr>
<tr>
<td>1 Signal +</td>
<td>N = 50 V AC</td>
</tr>
<tr>
<td>2 n.c.</td>
<td></td>
</tr>
<tr>
<td>3 Signal -</td>
<td><strong>Protection types and applications (code)</strong></td>
</tr>
<tr>
<td>4 n.c.</td>
<td>000 = Standard</td>
</tr>
<tr>
<td>⊥ Housing</td>
<td><strong>Notes:</strong></td>
</tr>
<tr>
<td><strong>Pin HDA 47X6-A</strong></td>
<td>* For design and electrical connection see device dimensions</td>
</tr>
</tbody>
</table>

**Areas of application:**

- **15000 psi** (only in conjunction with mechanical connection type “C”)

**Modification number**

000 = Standard

**Notes:**

- For design and electrical connection see device dimensions

**Accessories:**

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
**Dimensions:**
Protection types and applications (code): 1, C

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.
For European mechanical connection and bar ranges see European Catalog.

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243.
**Electronic Pressure Transmitter**

**HDA 4400**

**ATEX Intrinsically Safe**

**ATEX Dustproof Enclosure**

**ATEX Non-sparking**

---

**Description:**
The pressure transmitter HDA 4400 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industry model, the HDA 4400 in ATEX version has a stainless steel measurement cell with thin-film strain gauge.

Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

**Protection types and applications:**
- I M1 Ex ia I Ma
- II 1G Ex ia IIC T6 Ga
- II 1/2G Ex ia IIC T6 GaGb
- II 2G Ex ia IIC T6 Gb
- III Ex nA IIC T6,C T5,T4 Gc
- II 1D Ex ia IIC T85 °C Da
- II 1D Ex ta IIC T80/90/100 °C Da
- T500 T90/T100 °C Da
- II 2D Ex tb IIIC T80/90/100 °C Db
- II 3D Ex tc IIC T80/T90/T100 °C Dc
- II 3D Ex ic IIC T80/T90/T100 °C Dc

**Special features:**
- Accuracy ≤ ± 0.5 % FS B.F.S.L.
- Certificates: KEMA 05ATEX1016 X
- KEMA 05ATEX1021
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

---

**Technical data:**

### Input data
- **Measuring ranges**
  - 500, 750, 1000, 1500, 2000, 3000, 6000, 9000, 15000 psi
- Overload pressures: 1160, 1160, 2900, 2900, 7250, 11600, 14500, 29000, 29000, 43500 psi
- **Burst pressures**
  - 2900, 2900, 7250, 7250, 14500, 29000, 29000, 43500 psi
- **Mechanical connection**
  - SAE 6 9/16-18 UNF2A
  - SF 250 CX20, Autoclave(7/16-20-UNF 2B)
  - other connections upon request
- **Torque value**
  - 15lb-ft(20Nm) - SAE 6
  - 30lb-ft(40Nm) - SF 250 CX20
- **Parts in contact with medium**
  - Stainless steel: 1.4542, 1.4571, 1.4435, 1.4404, 1.4301
  - Seal: FPM
- **Output signal**
  - 4 .. 20 mA, 2 conductor
  - **RL(max.)** = (U_B - 12 V) / 20 mA [kΩ]
- **Pressure compensation**
  - ≤ ± 0.0085% FS/F°F typ.
  - ≤ ± 0.014% FS/F°F max.
- **Zero point**
  - ≤ ± 0.014% FS/F°F max.
  - ≤ ± 0.0085% FS/F°F typ.
- **Over range**
  - ≤ ± 0.014% FS/F°F max.
- **Non-linearity at max. setting**
  - ≤ ± 0.3 % FS max.
- **Temperature compensation**
  - ≤ ± 0.0085% FS/F°F typ.
  - ≤ ± 0.014% FS/F°F max.
- **Over range**
  - ≤ ± 0.014% FS/F°F max.
- **Non-linearity at max. setting**
  - ≤ ± 0.3 % FS max.
- **Accuracy to DIN 16086**
  - ≤ ± 0.5 % FS typ.
  - Max. setting: ≤ ± 1 % FS max.
  - Accuracy at min. setting: ≤ ± 0.25 % FS typ.
  - ≤ ± 0.5 % FS max.
- **Zero point**
  - ≤ ± 0.014% FS/F°F max.
- **Repeatability**
  - ≤ ± 0.1 % FS
- **Rise time**
  - ≤ 1.5 ms
- **Long-term drift**
  - ≤ ± 0.3 % FS typ./ year

### Environmental conditions
- **Compensated temperature range**
  - -4..+185°F
- **Operating temperature range**
  - -4..+140°F
- **Storage temperature range**
  - -40 to 212°F
- **Fluid temperature range**
  - -40..+140°F / -4..+140°F

### Mark
- EN 61000-6-1 / 2 / 3 / 4
- EN 60079-0 / 11 / 26 / 31
- EN 50303

### Vibration resistance to
- DIN EN 60068-2-6 at 10 .. 500 Hz
- ≤ 20 g

### Protection class to IEC 60529
- IP 65 (for male EN175301-803 (DIN 43650) and Binder 714 M18)
- IP 67 (for M12x1 when an IP 67 connector is used)

### Relevant data for Ex applications
- **Ex ia, ic**
  - Supply voltage: U = 12 .. 28 V
  - Max. current: Ii = 100 mA
  - Max. input power: Pi = 1 W
  - Connection capacitance of the sensor: C = ≤ 22 nF
  - Inductance of the sensor: L = 0 mH
  - Insulation voltage:
    - 500 V AC
- **Ex nA, ta, tb, tc**
  - Insulation voltage: 50 V AC, with integrated overvoltage protection EN 61000-6-2

### Other data
- **Residual ripple of supply voltage**
  - ≤ 5 %
- **Life expectancy**
  - > 10 million cycles
  - 0 .. 100 % FS
- **Weight**
  - ~ 150 g

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

**FS** (Full Scale) = relative to the full measuring range, **B.F.S.L.** = Best Fit Straight Line

1. 15000 psi only with mechanical connection SF 250 CX20, Autoclave
2. -4°F with FPM seal, -40°F on request
3. 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th></th>
<th>9</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection type</td>
<td>I M1 Ex ia I Ma</td>
<td>II 1G Ex ia IIC T6 Ga</td>
<td>II 3G Ex nA IIC T6 Gc</td>
</tr>
<tr>
<td></td>
<td>II 1/2G Ex ia IIC T6 Ga/Gb</td>
<td>II 2G Ex ia IIC T6 Gb</td>
<td>II 1D Ex ia IIC T80°C T50/T90°C Da</td>
</tr>
<tr>
<td></td>
<td>II 1/2D Ex ia IIC T85°C Da</td>
<td>II 3G Ex nA IIC T6 Gc</td>
<td>II 1D Ex ia IIC T80°C T50/T90°C Da</td>
</tr>
<tr>
<td>Certificate</td>
<td>KEMA 05ATEX1016 X</td>
<td>KEMA 05ATEX1021</td>
<td></td>
</tr>
<tr>
<td>Zonal / Category</td>
<td>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 2G Gases Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 2G Gases Protection class: Non-sparking nA</td>
</tr>
<tr>
<td>Safety classification</td>
<td>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 2G Gases Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 2G Gases Protection class: Non-sparking nA</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
</tr>
</tbody>
</table>

Model code: HDA 4 4 X X – A – XXXX – A N X – 000 (PSI)

Mechanical connection
7 = SAE 6 9/16-18 UNF2A
C = SF 250 CX20, Autoclave (only for "1500 psi" press. range)

Electrical connection
4 = Male 4 pole Binder series 714 M18 (connector not supplied)
5 = Male 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
6 = Male M12x1, 4 pole (connector not supplied)

Signal
A = 4 .. 20 mA, 2 conductor

Pressure ranges in psi
0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000
15000 psi (only in conjunction with mechanical connection type "C")

Approval
A = ATEX

Insulation voltage
N = 50 V AC

Protection type and applications (code)
1 = I M1 Ex ia I Ma
   II 1G Ex ia IIC T6 Ga
   II 1/2G Ex ia IIC T6 Ga/Gb
   II 2G Ex ia IIC T6 Gb
   II 1D Ex ia IIC T85 °C Da
9 = II 3G Ex nA IIC T6 Gc (only in conjunction with electr. conn. "6")
A = II 1D Ex ta IIC T80 °C T50/T90 °C Da
   (only in conjunction with electr. conn. "6")
   II 2D Ex tb IIC T80 °C Db
C = II 3G Ex ic IIC T6 Gc
   II 3D Ex ic IIC T80 °C Dc

Modification number
000 = Standard

Notes:
* For design and electrical connection see device dimensions

Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Pin connections:

Binder series 714 M18

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 44X4-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>n.c.</td>
</tr>
<tr>
<td>2</td>
<td>Signal +</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

EN175301-803 (DIN 43650)

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 44X5-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>Signal -</td>
</tr>
<tr>
<td>3</td>
<td>n.c.</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
<tr>
<td>5</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

M12x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 44X6-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>
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. For European mechanical connection and bar ranges see European Catalog.

Dimensions:
Protection types and applications (code): 1, C

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243
Description:
The pressure transmitter HDA 4300 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series.
As with the industry model, the ATEX version HDA 4300 has a ceramic measurement cell with thick-film strain gauge.
Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

Protection types and applications:
I M1 Ex ia I Ma
II 1G Ex ia IIIC T6 Ga
II 1G Ex ia IIIC T6 Ga/Gb
II 2G Ex ia IIIC T6 Gb
II 3G Ex nA IIIC T6,T5,Gc
II 3G ic IIIC T6,T5,T4 Gc
II 1D Ex ia IIIC T85 °C Da
II 1 Ex ta IIIC T80/90/100 °C Da
T500/T90/T100/T110 °C Da
II 1D Ex ta IIIC T80/90/100 °C Db
II 3D Ex ic IIIC T80/T90/T100 °C Dc
II 3D Ex ic IIIC T80/T90/T100 °C Dc

Special features:
- Accuracy ≤ ± 0.5 % FS B.F.S.L.
- Certificates: KEMA 05ATEX1016 X
- KEMA 05ATEX1021
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:
Input data:
- Measuring ranges: -14.5 to 135.5, 15, 30, 50, 100, 150, 250, 500 psi
- Overload pressures: 450, 45, 100, 150, 290, 450, 725, 1500 psi
- Burst pressures: 650, 70, 150, 250, 400, 650, 1000, 2500 psi
- Mechanical connection: 1/4-18 NPT male
- Torque value: 30 ft-lb (40 Nm)
- Parts in contact with medium: Sensor: Ceramic, Mech. connection: 1.4301, Seal: FPM / EPDM

Output data:
- Output signal, permitted load resistance: 4 .. 20 mA, 2 conductor
  \[ R_{\text{max}} = \left( \frac{U_b - 12 \text{ V}}{20 \text{ mA}} \right) \text{ [k} \Omega] \]
- Accuracy to DIN 16086, Max. setting: ≤ ± 0.5 % FS typ.
- Accuracy at min. setting: ≤ ± 0.25 % FS typ., ≤ ± 0.5 % FS max.
- Temperature compensation: ≤ ± 0.012 % FS/F typ.
- Zero point: ≤ ± 0.017 % FS/F max.
- Temperature compensation: ≤ ± 0.012 % FS/F typ.
- Over range: ≤ ± 0.017 % FS/F max.
- Non-linearity at max. setting: ≤ ± 0.5 % FS max.
- Hysteresis: ≤ ± 0.4 % FS max.
- Repeatability: ≤ ± 0.1 % FS
- Rise time: ≤ 1.5 ms
- Long-term drift: ≤ ± 0.3 % FS typ. / year

Environmental conditions:
- Compensated temperature range: -4 .. +185 °F
- Operating temperature range: -4 .. +140 °F
- Storage temperature range: -40 to 212 °F
- Fluid temperature range: -40 .. +140 °F / -4 .. +140 °F

Environmental factor:
- Vibration resistance to:
  ≤ 20 g
  DIN EN 60068-2-6 at 10 .. 500 Hz
- Protection class to IEC 60529:
  - IP 65 (for male EN175301-803 (DIN 43650) and Binder 714 M18)
  - IP 67 (for M12x1, when an IP 67 connector is used)

Relevant data for Ex applications:
- Ex ia, Ic
  - Ex nA, ta, tb, tc
  - Supply voltage: 12 .. 28 V
  - Max. input current: 100 mA
  - Max. input power: 1 W
- Connection capacitance of the sensor: ≤ 22 nF
- Inductance of the sensor: ≤ 0 mH
- Insulation voltage: 50 V AC, with integrated overvoltage protection EN 61000-6-2

Other data:
- Residual ripple of supply voltage: ≤ 5 %
- Life expectancy: > 10 million cycles
- Weight: ~ 180 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.
FS (Full Scale) = relative to the full measuring range, B.F.S.L. = Best Fit Straight Line

1) -4°F with FPM or EPDM seal, -40°F on request
2) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th>1</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I M1 Ex ia I Ma</td>
<td>II 1G Ex ia IIC T6 Ga</td>
<td>II 2G Ex ia IIC T6 Gb</td>
<td>II 1D Ex ia IIC T85°C Da</td>
<td>II 3G Ex ia IIC T6 Gc</td>
</tr>
<tr>
<td>II 1/2G Ex ia IIC T6 Ga/Gb</td>
<td>II 3G Ex nA IIC T6 Gc</td>
<td>II 1D Ex ia IIC T80°C Da</td>
<td>II 3G Ex ic IIC T80°C Db</td>
<td></td>
</tr>
<tr>
<td>II 1D Ex ia IIC T85°C Da</td>
<td>II 2D Ex tb IIC T80°C Db</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>KEMA 05ATEX1016 X / KEMA 05ATEX1021</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Zones / Categories

<table>
<thead>
<tr>
<th>Group I Category</th>
<th>M1 Mining Protection class: intrinsically safe ia with barrier</th>
<th>Group II Category 1G, 1/2G, 1D Gases/conductive dust Protection class: intrinsically safe ia with barrier</th>
<th>Group III Category 1D, 2D Conductive dust Protection class: Dustproof enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II Category</td>
<td>2G Gases Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 3G Gases Protection class: Non-sparking nA</td>
<td>Group III Category 3G, 3D Gases/conductive dust Protection class: Intrinsically safe ic with barrier</td>
</tr>
<tr>
<td>Group II Category</td>
<td>3G Gases Protection class: Non-sparking nA</td>
<td>Group III Category 3G, 3D Gases/conductive dust Protection class: Intrinsically safe ic with barrier</td>
<td></td>
</tr>
<tr>
<td>Group II Category</td>
<td>4G Gases Protection class: Non-sparking nA</td>
<td>Group III Category 3G, 3D Gases/conductive dust Protection class: Intrinsically safe ic with barrier</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Connection (see model code)

| 4, 5, 6 | 4, 5, 6 | 4, 5, 6 | 6 | 4, 5, 6 |

Pin connections:

Binder series 714 M18

- Pin HDA 4384-A
  - 1 n.c.
  - 2 Signal +
  - 3 Signal -
  - 4 n.c.

EN175301-803 (DIN 43650)

- Pin HDA 4385-A
  - 1 Signal +
  - 2 Signal -
  - 3 n.c.
  - 4 Housing

M12x1

- Pin HDA 4386-A
  - 1 Signal +
  - 2 Signal -
  - 3 n.c.
  - 4 n.c.

Model code:

HDA 4 3 X X – A – XXXX – A X X – 000 – X1(PSI)

Mechanical connection

8 = 1/4-18 NPT male

Electrical connection

4 = Male, 4 pole Binder series 714 M18 (connector not supplied)
5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
6 = Male, M12x1, 4 pole (connector not supplied)

Signal

A = 4..20 mA, 2 conductor

Pressure ranges in psi

0135 (-14.5 to 135.5 psi), 0015, 0030, 0050, 0100, 0150, 0250, 0500

Approval

A = ATEX

Insulation voltage

N = 50 V AC

Protection types and applications (code)

1 = I M1 Ex ia I Ma
   II 1G Ex ia IIC T6 Ga
   II 1/2G Ex ia IIC T6 Ga/Gb
   II 2G Ex ia IIC T6 Gb
   II 1D Ex ia IIC T85°C Da
2 = II 3G Ex nA IIC T6 Gc
   (only in conjunction with electr. conn. "6")*
   A = II 1D Ex ia IIC T80°C T<sub>oo</sub>T90°C Da
   (only in conjunction with electr. conn. "6")*
   II 2D Ex tb IIC T80°C Db
3 = II 3G Ex ic IIC T6 Gc
   II 3D Ex ic IIC T80°C Dc
4 = II 3G Ex ic IIC T80°C Da

Modification number

000 = Standard

Seal material (in contact with fluid)

F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

Material of connection (in contact with fluid)

1 = Stainless steel

Notes:

* For design and electrical connection see device dimensions

Accessories:

Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
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. For European mechanical connection and bar ranges see European Catalog.

Dimensions:
Protection types and applications (code): 1, C

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com
Description:
The pressure transmitter HDA 4100 in ATEX version has been specially developed for use in potentially explosive atmospheres for absolute measurement in the low pressure range and is based on the HDA 4000 series. As with the industry model, the ATEX version HDA 4100 has a ceramic measurement cell with thick-film strain gauge.

Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

Protection types and applications:
I M1 Ex ia I Ma
II 1G Ex ia IIIC T6 Ga
II 1/2G Ex ia IIIC T6 Ga/Gb
II 2G Ex ia IIIC T6 Gb
II 3G Ex iaIIIC T6,T5,T4 Gc
II 3G Ex ia IIIC T6,T5,T4 Gc
II 1D Ex ia IIIC T85 °C Da
II 1D Ex ta IIIC T80/90/100 °C Da
T<sub>500</sub> T90/T100/T110 °C Da
II 2D Ex tb IIIC T80/90/100 °C Db
II 3D Ex tc IIIC T80/T90/T100 °C Dc
II 3D Ex tc IIIC T80/T90/T100 °C Dc

Special features:
- Accuracy ≤ ± 0.5 % FS B.F.S.L.
- Certificates: KEMA 05ATEX1016 X
- KEMA 05ATEX1021
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

**Input data**
- Measuring ranges 15, 50 psia
- Overload pressures 45, 150 psia
- Burst pressures 70, 250 psia
- Mechanical connection 1/4-18 NPT male
- Torque value 30 ft-lb (40 Nm)
- Parts in contact with medium Sensor: Ceramic
- Mech. connection: 1.4301
- Seal: FPM / EPDM

**Output data**
- Output signal, permitted load resistance 4 .. 20 mA, 2 conductor
  \[ R_{\text{max}} = \left( \frac{U_B - 12 \text{ V}}{20 \text{ mA}} \right) \text{ [k} \Omega \text{]} \]
- Accuracy to DIN 16086, ≤ ± 0.5 % FS typ.
- Max. setting ≤ ± 1 % FS max.
- Accuracy at min. setting ≤ ± 0.25 % FS typ.
- ≤ ± 0.5 % FS max.
- Temperature compensation ≤ ± 0.012% FS°F typ.
- Zero point ≤ ± 0.017% FS°F max.
- Temperature compensation ≤ ± 0.012% FS°F typ.
- Over range ≤ ± 0.017% FS°F max.
- Non-linearity at max. setting to DIN 16086 ≤ ± 0.5 % FS max.
- Hysteresis ≤ ± 0.4 % FS max.
- Repeatability ≤ ± 0.1 % FS
- Rise time ≤ 1.5 ms
- Long-term drift ≤ ± 0.3 % FS typ./ year

**Environmental conditions**
- Compensated temperature range -4, +185°F
- Operating temperature range -4, +140°F
- Storage temperature range -40 to 212°F
- Fluid temperature range \(1)\) -40..+140°F / -4..+140°F

**Emark**
- EN 61000-6-1 / 2 / 3 / 4
- EN 60079-0 / 11 / 26 / 31
- EN 50303

**Protection class to IEC 60529**
- IP 65 (for male EN175301-803 (DIN 43650)
- and Binder 714 M18)
- IP 67 (for M12x1, when an IP 67 connector is used)

**Relevant data for Ex applications**
- Ex ia, ic
- Ex nA, ta, tb, tc

**Supply voltage**
- \( U_i = 12...28 \text{ V} \)
- \( 12...28 \text{ V} \)

**Max. input current**
- \( I_i = 100 \text{ mA} \)

**Max. input power**
- \( P_i = 1 \text{ W} \)
- max. power consumption ≤ 1 W

**Connection capacitance of the sensor**
- \( C_s = \leq 22 \text{ nF} \)

**Inductance of the sensor**
- \( L_s = 0 \text{ mH} \)

**Insulation voltage**
- \( 50 \text{ V AC, with integrated overvoltage protection EN 61000-6-2} \)

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

- FS (Full Scale) = relative to the full measuring range, B.F.S.L. = Best Fit Straight Line
- \( \text{FS} \) = Full Scale
- \( \text{FS} \) = Full Scale

**Other data**
- Residual ripple of supply voltage ≤ ± 5 %
- Life expectancy > 10 million cycles
- 0 ... 100 % FS
- Weight ~ 180 g

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

- FS (Full Scale) = relative to the full measuring range, B.F.S.L. = Best Fit Straight Line
- \( \text{FS} \) = Full Scale
- \( \text{FS} \) = Full Scale

1) -4 °F with FPM or EPDM seal, -40 °F on request

2) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th>1</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection type</td>
<td>I M1 Ex ia I Ma</td>
<td>II 1G Ex ia IIC T6 Ga</td>
<td>II 2G Ex ia IIC T6 Gb</td>
<td>II 1D Ex ia IIC T85ºC Da</td>
</tr>
<tr>
<td></td>
<td>II 1/2G Ex ia IIC T6 Ga/Gb</td>
<td>II 3G Ex nA IIC T6 Gc</td>
<td>II 1D Ex ta IIC T80ºC Da</td>
<td>T≤90ºC Da</td>
</tr>
<tr>
<td></td>
<td>II 1D Ex ia IIC T85ºC Da</td>
<td>II 3G Ex ic IIC T6 Gc</td>
<td>II 3D Ex ic IIC T80ºC Da</td>
<td>II 2D Ex tb IIC T80ºC Db</td>
</tr>
</tbody>
</table>

Certificate

KEMA 05ATEX1016 X / KEMA 05ATEX1021

Zones / Categories

- Group I
  - Category M1
  - Mining
  - Protection class: intrinsically safe ia with barrier

- Group II
  - Category 1G
  - Gases
  - Protection class: intrinsically safe ia with barrier

- Group II
  - Category 2G
  - Gases
  - Protection class: Non-sparking nA

- Group III
  - Category 1D, 2D
  - Conductive dust
  - Protection class: Dustproof enclosure

Electrical Connection (see model code)

- 4, 5, 6
- 4, 5, 6
- 4, 5, 6
- 6
- 6
- 4, 5, 6

Pin connections:

Binder series 714 M18

- Pin HDA 4184-A
  - 1 n.c.
  - 2 Signal +
  - 3 Signal -
  - 4 n.c.

EN175301-803 (DIN 43650)

- Pin HDA 4185-A
  - 1 Signal +
  - 2 Signal -
  - 3 n.c.
  - 1 Housing

M12x1

- Pin HDA 4186-A
  - 1 Signal +
  - 2 Signal -
  - 3 Signal +
  - 4 n.c.

Model code:

HDA 4 1 X X – A – XXXX – A X X – 000 –X1(PSI)

Mechanical connection

8 = 1/4-18 NPT male

Electrical connection

4 = Male, 4 pole Binder series 714 M18 (connector not supplied)
5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
6 = Male, M12x1, 4 pole (connector not supplied)

Signal

A = 4 .. 20 mA, 2 conductor

Pressure ranges in psia

0015, 0050

Approval

A = ATEX

Insulation voltage

N = 50 V AC

Protection types and applications (code)

1 = I M1 Ex ia I Ma
2 = II 1G Ex ia IIC T6 Ga
3 = II 1/2G Ex ia IIC T6 Ga/Gb
4 = II 2G Ex ia IIC T6 Gb
5 = II 1D Ex ia IIC T85 ºC Da
6 = II 3G Ex nA IIC T6 Gc
9 = II 3G Ex nA IIC T6 Gc (only in conjunction with electr. connection "6")
A = II 1D Ex ta IIC T80 ºC T≤90 ºC Da (only in conjunction with electr. connection ,6")
B = II 1D Ex ta IIC T80 ºC T≤90 ºC Da (only in conjunction with electr. connection ,6")
C = II 1D Ex ta IIC T80 ºC Da
D = II 1D Ex ta IIC T80 ºC Da

Modification number

000 = Standard

Seal material (in contact with fluid)

F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

Material of connection (in contact with fluid)

1 = Stainless steel

Notes:

* For design and electrical connection see device dimensions

Accessories:

Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
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.
For European mechanical connection and bar ranges see European Catalog.

Dimensions:
Protection types and applications (code): 1, C

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243
**Description:**
The programmable pressure switch EDS 4400 in ATEX version has been specially developed for use in potentially explosive atmospheres, and is based on the EDS 4000 series.
The switching point and switch-back point, the function of the switching outputs as N/C or N/O and the switching delay are user-programmable in conjunction with the HYDAC Programming Unit HPG 3000.
As with the industry model, the programmable EDS 4400 in ATEX version has a stainless steel measurement cell with thin-film strain gauge for measuring relative pressure in the high pressure range.

With approval for the following Protection types and applications:
- I M1 Ex ia I
- II 1G Ex ia IIIC T4, T5, T6
- II 1/2G Ex ia IIIC T4, T5, T6
- II 2G Ex ia IIIC T4, T5, T6
- II 1 D Ex iaD 20 T100°C

almost all requirements are covered regarding ignition group, error class and temperature class.
Versions for other Protection types and applications are available upon request.

**Special features:**
- Switching point and switch-back point are user-programmable
- Accuracy \(\pm 0.5\% \text{ FS B.F.S.L.}\)
- Certificates: DEKRA EXAM BVS 07 ATEX E 041 X
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

**Technical data:**

**Input data:**
- Measuring ranges: 1000, 3000, 6000, 9000 psi
- Overload pressures: 2900, 7250, 11600, 14500 psi
- Burst pressure: 7250, 14500, 29000, 29000 psi
- Mechanical connection: SAE 6 9/16-18 UNF 2A
- Torque value: 150 lb-ft (20 Nm)
- Parts in contact with medium: Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301

**Output data:**
- Switch output: 1 x PNP N/C or N/O
- Output load: during operation: \(I_{\text{max}} \leq 34 \text{ mA}\)
- Switching points: user-programmable with HYDAC Programming Unit HPG 3000
- Accuracy to DIN 16086: \(\pm 0.5\% \text{ FS typ.}\)
- Max. setting: \(\pm 1\% \text{ FS max.}\)
- Temperature drift: \(\pm 0.017\% \text{ FS/°F max. range}\)
- Rising switch point and falling switch point delay: 8 ms to 2000 ms user-programmable with HYDAC Programming Unit HPG 3000
- Long-term drift: \(\pm 0.3\% \text{ FS typ. / year}\)

**Environmental conditions:**
- Storage temperature range: -40 to 212°F
- Fluid temperature range: -4 to 212°F
- Vibration resistance to DIN EN 60068-2-6 at 10...500 Hz: \(\leq 20 \text{ g}\)
- Protection class to IEC 60529: IP 67 (M12x1, when an IP 67 connector is used)
- Relevant data for Ex applications:
  - Supply voltage: 14...28 V DC
  - Compensated temperature range:
    - T6: \(-4...+140°F\)
    - T5, T4: \(-4...+158°F\)
    - T100: \(-4...+158°F\)
  - Operating temperature range:
    - T6: \(-4...+140°F\)
    - T5, T4: \(-4...+158°F\)
    - T100: \(-4...+158°F\)
  - Max. ambient temperature \(T_a\):
    - T6: \(-4...+140°F\)
    - T5, T4: \(+158°F\)
    - T100: \(+158°F\)
  - Max. input current: 100 mA
  - Max. input power: 0.7 W
  - Max. internal capacitance: 33 nF
  - Max. internal inductance: 0 mH
  - Insulation voltage: \(1000 \text{ V AC on request}\)

**Other data:**
- Residual ripple of supply voltage: \(\leq 5\%\)
- Life expectancy: > 10 million cycles
- Weight: \(~ 150 \text{ g}\)

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

FS (Full Scale) = relative to the complete measuring range

\(^1\) 500 V AC on request
Setting options:
In conjunction with the HYDAC Programming Unit HPG 3000, all the settings are combined in an easy-to-follow menu.

Setting ranges for the switch outputs:
- Measuring range in psi Increment in psi
  - 0 .. 1000 2
  - 0 .. 3000 5
  - 0 .. 6000 10
  - 0 .. 9000 20

The switch point (upper switch value) on all instruments is between 5 % and 100 % of the measuring range and the switch-back point (lower switch value) is between 1 % and 96 % of the measuring range.

Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection Type</td>
<td>I M1 Ex ia I</td>
<td>II 1G Ex ia IIC T4, T5, T6</td>
<td>II 2G Ex ia IIC T4, T5, T6</td>
<td>II 1D Ex iaD 20 T100 °C</td>
</tr>
<tr>
<td>Zones / Categories</td>
<td>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier</td>
<td>Group II Category 1G Gases Protection class: intrinsically safe ia with barrier For use in Zone 0 T4, T5: ( T_a = 70 ) °C T6: ( T_a = 60 ) °C</td>
<td>Group II Category 2G, 1/2G Gases Protection class: intrinsically safe ia with barrier For use in Zone 1 2 For mounting to Zone 0 T4, T5: ( T_a = 70 ) °C T6: ( T_a = 60 ) °C</td>
<td>Group II Category iD Dusts Protection class: intrinsically safe ia with barrier For use in Zone 20, 21, 22 For mounting to Zone 20 T100: ( T_a = 70 ) °C</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Pin connections:
- M12x1, 5 pole

- Pin Process connection HPG connection
  - 1 \(+U_o\) \(+U_o\)
  - 2 0 V Comport 1 *
  - 3 0 V 0 V
  - 4 Out 1 n.c.
  - 5 0 V Comport 2 *

* Comport = programming connection

Areas of application:

--

Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
**Safety instructions:**

- These units must only be programmed outside the potentially explosive location.
- When operating in potentially explosive locations, the programming cables may only be connected to the 0 V outside of the potentially explosive area.
- The switching output draws the switching energy from the power supply to the pressure switch. No additional energy is introduced into the electrical circuit through the switching output.
- The dual Zener barriers specified and approved in the technical data must be used to connect the pressure switch. These have a reverse polarity diode to decouple the signal. The signal path may only be passively loaded.
- Ensure that measured fluids in contact with the pressure switch are compatible with the materials used.

**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. For European mechanical connection and bar ranges see European Catalog.

**Dimensions:**

[Diagram showing dimensions of the unit]

**Programming Unit:**

(must be ordered separately)

**HPG 3000 – 000**
Portable Programming Unit
Part. No. 909 422

**HPG 3000**
Power Supply with connector:
Part no. 02091103

**Caution:**

The HPG 3000 Programming Unit may only be used outside the potentially explosive area.
**Description:**
The programmable pressure switch EDS 4300 in ATEX version was specially developed for use in potentially explosive atmospheres and is based on the EDS 4000 series. The switching point and switch-back point, the function of the switching outputs as N/C or N/O and the switching delay are user-programmable in conjunction with the HYDAC Programming Unit HPG 3000.

As with the industry model, the programmable EDS 4300 in ATEX version has a ceramic measurement cell with thick-film strain gauge for measuring relative pressure in the low pressure range.

With approval for the following Protection types and applications:

- I M1 Ex ia I
- II 1G Ex ia IIC T4, T5, T6
- II 1/2G Ex ia IIC T4, T5, T6
- II 1 D Ex iaD 20 T100 °C

almost all requirements are covered regarding ignition group, error class and temperature class.

Versions for other Protection types and applications are available on request.

**Special features:**
- Switching point and switch-back point user-programmable
- Accuracy ≤ 0.5% FS B.F.S.L.
- Certificates: DEKRA EXAM BVS 07 ATEX E 041 X
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

**Technical data:**

### Input data
- Measuring ranges: 15, 50, 100, 150, 250, 500 psi
- Overload pressures: 45, 150, 290, 450, 725, 1500 psi
- Burst pressures: 70, 250, 400, 650, 1000, 2500 psi
- Mechanical connection: 1/4-18 NPT
- Torque value: 15 lb-ft (20 Nm)

### Parts in contact with medium
- Sensor: Ceramic
- Mech. connection: 1.4301
- Seal: FPM / EPDM

### Output data
- Switch output: 1 x PNP N/C or N/O
- Output load during operation: \( I_{\text{max}} \leq 34 \, \text{mA} \)

### Protection Unit HPG 3000
- Switching points user-programmable with HYDAC

### Accuracy to DIN T6866
- Max. setting: ≤ 0.5% FS typ.
- Max. setting: ≤ 1% FS max.

### Repeatability (at 77 °F)
- ≤ 0.017% /°F max. zero point
- ≤ 0.017% /°F max. range

### Rising switch point and falling switch point delay
- 8 ms to 2000 ms; user-programmable with HYDAC Programming Unit HPG 3000

### Long-term drift
- ≤ 0.3% FS typ. / year

### Environmental conditions
- Storage temperature range: -40 to 212 °F
- Fluid temperature range: 4...+140°F/+158°F/+185°F
- Vibration resistance to DIN EN 60068-2-6 at 10 ... 500 Hz
- Protection class to IEC 60529: IP 67

### Relevant data for Ex applications

<table>
<thead>
<tr>
<th>I M1</th>
<th>II 1 G, 2G, 2G</th>
<th>II 1 D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>14 ... 28 V DC</td>
<td></td>
</tr>
<tr>
<td>Compensated temperature range</td>
<td>T6: -4...+140°F</td>
<td>T100: -4...+158°F</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>T6: -4...+140°F</td>
<td>T100: -4...+158°F</td>
</tr>
<tr>
<td>Max. ambient temperature</td>
<td>T6: -4...+140°F</td>
<td>T100: +158°F</td>
</tr>
<tr>
<td>Max. input current</td>
<td>100 mA</td>
<td>93 mA</td>
</tr>
<tr>
<td>Max. input power</td>
<td>0.7 W</td>
<td>0.65 W</td>
</tr>
<tr>
<td>Max. internal capacitance</td>
<td>33 nF</td>
<td>33 nF</td>
</tr>
<tr>
<td>Max. internal inductance</td>
<td>0 mH</td>
<td>0 mH</td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>50 V AC, with integrated overvoltage protection EN 61000-6-2</td>
<td></td>
</tr>
<tr>
<td>Approved intrinsic safety barriers</td>
<td>Pepperl &amp; Fuchs: Z 787</td>
<td></td>
</tr>
</tbody>
</table>

### Other data
- Residual ripple of supply voltage: ≤ 5%
- Life expectancy: > 10 million cycles
- Weight: ~ 150 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided. FS (Full Scale) = relative to the full measuring range

1) 500 V AC on request
Setting options:
In conjunction with the HYDAC Programming Unit HPG 3000, all the settings are combined in an easy-to-follow menu.

Setting ranges for the switch outputs:

<table>
<thead>
<tr>
<th>Measuring range in psi</th>
<th>Increment in psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..15</td>
<td>0.05</td>
</tr>
<tr>
<td>0..50</td>
<td>0.05</td>
</tr>
<tr>
<td>0..100</td>
<td>0.2</td>
</tr>
<tr>
<td>0..250</td>
<td>0.5</td>
</tr>
<tr>
<td>0..500</td>
<td>1</td>
</tr>
</tbody>
</table>

The switch point (upper switch value) on all instruments is between 5 % and 100 % of the measuring range and the switch-back point (lower switch value) is between 1 % and 96 % of the measuring range.

Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection Type</td>
<td>I M1 Ex ia I</td>
<td>II 1G Ex ia IIC T4, T5, T6</td>
<td>II 2G Ex ia IIC T4, T5, T6</td>
<td>II 1D Ex iaD 20 T100 °C</td>
</tr>
<tr>
<td>Zones / Categories</td>
<td>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier For use in Zone 0</td>
<td>Group II Category 1G Gases Protection class: intrinsically safe ia with barrier For use in Zone 0</td>
<td>Group II Category 2G, 1/2G Gases Protection class: intrinsically safe ia with barrier For use in Zone 0</td>
<td>Group II Category iD Dusts Protection class: intrinsically safe ia with barrier For use in Zone 20, 21, 22 For mounting to Zone 20 T100: ( T_a = 70 °C )</td>
</tr>
<tr>
<td>T4, T5: ( T_a = 70 °C ) T6: ( T_a = 60 °C ) T6: ( T_a = 60 °C )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electrical Connection:

| 8 | 8 | 8 |

Instruments for other Protection types and applications are available on request. Please contact our technical sales department for more information.

Model code:

**EDS 4 3 8 8 – XXXX – X – AX X – 000 – X1(PSI)**

Mechanical connection

8 = 1/4-18 NPT, male

Other connections upon request

Electrical connection

8 = Male M12x1, 5 pole (connector not supplied)

Pressure ranges in psi

0015, 0050, 0100, 0250, 0500

Switching output

P = Programmable

Approval

A = ATEX

Insulation voltage

N = 50 V AC

Protection types and applications (code)

1 = I M1 Ex ia I

2 = II 1G Ex ia IIC T4, T5, T6

3 = II 2G Ex ia IIC T4, T5, T6 / II 1/2G Ex ia IIC T4, T5, T6

8 = II 1D Ex iaD 20 T100 °C

Modification number

000 = Standard

Seal material (in contact with fluid)

F = FPM seal (e.g.: for hydraulic oils)

E = EPDM seal (e.g.: for refrigerants)

Material of connection (in contact with fluid)

1 = Stainless steel

Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
Safety instructions:

- These units must only be programmed outside the potentially explosive location.
- When operating in potentially explosive locations, the programming cables may only be connected to the 0 V outside of the potentially explosive area.
- The switching output draws the switching energy from the power supply to the pressure switch. No additional energy is introduced into the electrical circuit through the switching output.
- Dual Zener barriers specified and approved in the technical data must be used to connect the pressure switch. These have a reverse polarity diode to decouple the signal. The signal path may only be passively loaded.
- Ensure that measured fluids in contact with the pressure switch are compatible with the materials used.

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. For European mechanical connection and bar ranges see European Catalog.

Dimensions:

![Diagram of dimensions](image)

Programming Unit:

(must be ordered separately)

**HPG 3000 – 000**
Portable Programming Unit
Part No. 909 422

**HPG 3000**
Power Supply with connector:
Part No. 02091103

Caution:

The HPG 3000 Programming Unit may only be used outside the potentially explosive area.
**Description:**
The programmable pressure switch EDS 4100 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the EDS 4000 series. The switching point and switch-back point, the function of the switching outputs as N/C or N/O and the switching delay are user-programmable in conjunction with the HYDAC Programming Unit HPG 3000.

As with the industry model, the programmable EDS 4100 in ATEX version has a ceramic measurement cell with thick-film strain gauge for measuring absolute pressure in the low pressure range.

With approval for the following Protection types and applications:

- **I M1** Ex ia I
- **II 1G** Ex ia IIC T4, T5, T6
- **II 1/2G** Ex ia IIC T4, T5, T6
- **II 2G** Ex ia IIC T4, T5, T6
- **II 1 D** Ex iaD 20 T100 °C

almost all requirements are covered regarding ignition group, error class and temperature class.

Versions for other Protection types and applications are available on request.

**Special features:**
- Switching point and switch-back point user-programmable
- Accuracy ± 0.5% FS B.F.S.L.
- Certificates:
  - DEKRA EXAM BVS 07 ATEX E 041 X
  - Very small temperature error
  - Excellent EMC characteristics
  - Excellent durability

**Technical data:**

### Input data

- Measuring ranges: 15, 50 psia
- Overload pressures: 40, 150 psia
- Burst pressures: 70, 250 psia
- Mechanical connection: 1/4-18 NPT
- Torque value: 15lb-ft (20 Nm)

### Output data

- Switch output: 1 x PNP N/C or N/O
- Output load during operation: $I_{\text{max}} \leq 34 \, \text{mA}$
- Switching points user-programmable with HYDAC Programming Unit HPG 3000

### Accuracy to DIN 16086,
- ± 0.5 % FS typ.
- ± 0.1 % FS max.

### Temperature drift
- ± 0.017% /°F max. zero point
- ± 0.017% /°F max. range

### Rising switch point and falling switch point delay
- 8 ms to 2000 ms; user-programmable with HYDAC Programming Unit HPG 3000

### Long-term drift
- ± 0.3 % FS typ. / year

### Environmental conditions

- Storage temperature range: -40 to 212°F
- Fluid temperature range: $-4, +140°F/+158°F/+185°F$
- Vibration resistance to DIN EN 60068-2-6 at 10...500 Hz: $\leq 20 \, \text{g}$
- Protection class to IEC 60529 IP 67

### Relevant data for Ex applications

<table>
<thead>
<tr>
<th>I M1</th>
<th>II 1G, 1/2G, 2G</th>
<th>II 1 D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>14...28 V DC</td>
<td></td>
</tr>
</tbody>
</table>
| Compensated temperature range | T6: $-4, +140°F$
T5, T4: $-4, +158°F$
T100: $-4, +158°F$
| Operating temperature range | T6: $-4, +140°F$
T5, T4: $-4, +158°F$
T100: $-4, +158°F$
| Max. ambient temperature $T_a$ | T6: $+140°F$
T5, T4: $+158°F$
T100: $+158°F$
| Max. input current | 100 mA | 93 mA |
| Max. input power | 0.7 W | 0.65 W |
| Max. internal capacitance | 33 nF | 33 nF |
| Max. internal inductance | 0 mH | 0 mH |
| Insulation voltage $^1$ | 50 V AC, with integrated overvoltage protection EN 61000-6-2 | |
| Approved intrinsic safety barriers | Pepperl & Fuchs: Z 787
Telematic Ex STOCK: MTL 7087 | |

### Other data

- Residual ripple of supply voltage: ≤ 5 %
- Life expectancy: > 10 million cycles
- Weight: ~ 150 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided. FS (Full Scale) = relative to complete measuring range $^1$ 500 V AC on request
Setting options:
In conjunction with the HYDAC Programming Unit HPG 3000, all the settings are combined in an easy-to-follow menu.

Setting ranges for the switch outputs:

<table>
<thead>
<tr>
<th>Measuring range in psia</th>
<th>Increment in psia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 . . 15</td>
<td>0.002 to 0.05</td>
</tr>
<tr>
<td>0 . . 2.5</td>
<td>0.005 to 0.05</td>
</tr>
</tbody>
</table>

The switch point (upper switch value) on all instruments is between 5% and 100% of the measuring range and the switch-back point (lower switch value) is between 1% and 96% of the measuring range.

Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in Model code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection Type</td>
<td>I M1 Ex ia I</td>
<td>II 1G Ex ia IIC T4, T5, T6</td>
<td>II 2G Ex ia IIC T4, T5, T6</td>
<td>II 1D Ex iaD 20 T100 °C</td>
</tr>
<tr>
<td>Zones / Categories</td>
<td>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier For use in Zone 0</td>
<td>Group II Category 1G Gases Protection class: intrinsically safe ia with barrier For use in Zone 0</td>
<td>Group II Category 2G, 1/2G Gases Protection class: intrinsically safe ia with barrier For use in Zone 0, 1, 2</td>
<td>Group II Category iD Dusts Protection class: intrinsically safe ia with barrier For use in Zone 20, 21, 22, 23 For mounting to Zone 20 T100: ( T_a = 70 °C )</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

The increment for all instruments is 8 ms.

Pin connections:

M12x1, 5 pole

Pin | Process connection | HPG connection |
---|--------------------|----------------|
1  | +U_b               | +U_b           |
2  | 0 V                | Comport 1 *    |
3  | 0 V                | 0 V            |
4  | Out 1              | n.c.           |
5  | 0 V                | Comport 2 *    |

* Comport = programming connection

Instruments for other Protection types and applications are available on request. Please contact our technical sales department for more information.

Model code:

EDS 4 1 X 8 – XXXX – X – AXX – 000 – X1(PSI)

Mechanical connection
8 = 1/4-18 NPT, male
Other connections upon request

Electrical connection
8 = Male M12x1, 5 pole (connector not supplied)

Pressure ranges in psia
0015, 0050 psia

Switching output
P = Programmable

Approval
A = ATEX

Insulation voltage
N = 50 V AC

Protection types and applications (code)
1 = I M1 Ex ia I
2 = II 1G Ex ia IIC T4, T5, T6
3 = II 2G Ex ia IIC T4, T5, T6 / II 1/2G Ex ia IIC T4, T5, T6
8 = II 1D Ex iaD 20 T100 °C

Modification number
000 = Standard

Seal material (in contact with fluid)
F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

Material of connection (in contact with fluid)
1 = Stainless steel

Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
Safety instructions:

- These units must only be programmed outside the potentially explosive location.
- When operating in potentially explosive locations, the programming cables may only be connected to the 0 V outside of the potentially explosive area.
- The switching output draws the switching energy from the power supply to the pressure switch. No additional energy is introduced into the electrical circuit through the switching output.
- Dual Zener barriers specified and approved in the technical data must be used to connect the pressure switch. These have a reverse polarity diode to decouple the signal. The signal path may only be passively loaded.
- Ensure that measured fluids in contact with the pressure switch are compatible with the materials used.

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. For European mechanical connection and bar ranges see European Catalog.

Dimensions:

Programming Unit:
(must be ordered separately)

HPG 3000 – 000
Portable Programming Unit
Part. No. 909 422

HPG 3000
Power Supply with connector:
Part No. 02091103

Caution:
The HPG 3000 Programming Unit may only be used outside the potentially explosive area.
**Electronic Pressure Transmitter**

**HDA 4700**

**CSA Intrinsically safe**

**CSA Non Incendive**

### Description:

The pressure transmitter HDA 4700 in CSA version has been specially developed for the North American market for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industry model, the HDA 4700 in CSA version has a stainless steel measurement cell with thin-film strain gauge.

Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust, e.g. in mills.

### Protection types and applications:

**Intrinsically safe:**

- Class I Div. 1 Group A, B, C, D T6
- Class I Zone 0 AEx ia IIC T6
- Class I, II, III Div. 1 Group A, B, C, D, E, F, G T6

**Non incendive:**

- Class I Div. 2 Group A, B, C, D T4A
- Class I Zone 2 AEx nL IIC T4
- Class I, II, III Div. 2 Group A, B, C, D, F, G T4A
- Class I Zone 2 AEx nL II T4
- Class I Zone 2 nA II T4

### Special features:

- Accuracy ≤ ± 0.25 % FS B.F.S.L.
- Certificate: CSA 1760344
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

### Technical data:

#### Input data:

- Measuring ranges(2) 150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
- Overload pressures 290, 1160, 1740, 2900, 2900, 11600, 11600, 14500, 23200 psi
- Burst pressures 1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
- Mechanical connection(3) SAE 6 9/16-18 UNF 2A, SF 250 CS20, Autoclave (7/16-20-UNF 2B)
- Torque value 15lb-ft(20Nm) - SAE 6
- Parts in contact with medium Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301

#### Output data:

- Output signal, 4 .. 20 mA, 2 conductor
- ACM (Rmax) = (Ub - 12 V) / 20 mA [kΩ]
- Accuracy to DIN 16086 ≤ ± 0.25 % FS typ.
- Max. setting ≤ ± 0.0045% FS/°F typ.
- Temperature compensation ≤ ± 0.0045% FS/°F max.
- Temperature compensation ≤ ± 0.005% FS typ.
- Over range ≤ ± 0.005% FS typ.
- Non-linearity at max. setting ≤ ± 0.3 % FS max.
- Hysteresis ≤ ± 0.1 % FS max.
- Repeatability ≤ ± 0.05 % FS
- Rise time ≤ 1.5 ms
- Long-term drift ≤ ± 0.1 % FS typ. / year

#### Environmental conditions:

- Compensated temperature range Intrinsically safe: -4..+140°F
- Operating temperature range(3) Intrinsically safe: -40..+140°F
- Storage temperature range -40 to 212°F
- Fluid temperature range(3) Intrinsically safe: -40..+140°F
- Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz = 20 g
- Protection class to IEC 60529 / NEMA (depending on the electr. connection) Min. IP 65 Min. NEMA 4

#### Relevant data for Ex applications:

- Supply voltage 12 .. 28 V DC
- Max. input current 100 mA
- Max. input power up to 28 V: 1 W
- Connection capacitance of the sensor ≤ 22 nF
- Inductance of the sensor 0 mH
- Insulation voltage 50 V AC, with integrated overvoltage protection EN 61000-6-2

#### Other data:

- Residual ripple of supply voltage ≤ 5 %
- Life expectancy > 10 million cycles
- Weight ~ 150 g

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

FS (Full Scale) = relative to complete measuring range

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

1 Bar pressure ranges on European datasheet

2 15000 psi only with mechanical connection SF 250 CX20, Autoclave

3 -4°F with FPM seal, -40°F on request

4 500 V AC on request
### Pin connections:

**Conduit (single cores)**

![Conduit Diagram]

**Core**
- HDA 47X9-A
- **green** Signal +
- **white** Signal -
- **green/yellow** Housing

**EN175301-803 (DIN 43650)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 47X5-A</th>
<th>HDA 47XA-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>Signal -</td>
<td>Signal -</td>
</tr>
<tr>
<td>3</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>4</td>
<td>Housing</td>
<td>Housing</td>
</tr>
</tbody>
</table>

### Areas of application:

<table>
<thead>
<tr>
<th>Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection Type</strong></td>
<td>Intrinsically safe Gases and dusts</td>
<td>Intrinsically safe Gases</td>
<td>Non incendive (with field cabling) Gases</td>
<td>Non incendive Gases and dusts</td>
</tr>
<tr>
<td><strong>Certificate</strong></td>
<td>CSA 1760344</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zones / Categories</strong></td>
<td>Intrinsically safe - Class I, II, III - Division 1 - Group A, B, C, D, E, F, G T6 Ex ia IIC T6 - Class I - Zone 0 - AEx ia IIC T6 - Class I - Division 1 - Group A, B, C, D T4A - Class I - Zone 2 - AEx nL IIC T4 - Class I - Zone 2 - Ex nA II T4 - Class I - Zone 2 - AEx nA II T4 IP 6x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Electrical Connection** | 9, A |
| **Code for Model Code** | A |

### Model code:

**HDA 4 7 X X – A – XXXX – C X X – 000 (PSI) (48 inch)**

**Mechanical connection**
- 7 = SAE 6, 9/16-18 UNF 2A male
- 8 = 1/4-18 NPT
- C = SF 250 CX20, Autoclave (only for “15000 psi” press. range)

**Electrical connection**
- 5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
- 9 = Conduit connection thread (1/2-14 NPT, male)
- A = Male, EN175301-803 (DIN 43650), 3 pole + PE (1/2” conduit female thread)

**Signal**
- A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**
- 0150, 0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi

**Approval**
- C = CSA

**Insulation voltage**
- N = 50 V AC

**Protection types and applications (code)**
- A = Group 1
- B = Group 2 and 3
- C = Group 4

**Modification number**
- 000 = Standard

**Cable length in inches** (only for electr. connection type 9)
- Standard = 48 inches

**Accessories:**
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
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. For European mechanical connection and bar ranges see European Catalog.
Description:
The pressure transmitter HDA 4400 in CSA version has been specially developed for the North American market for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industry model, the HDA 4400 in CSA version has a stainless steel measurement cell with thin-film strain gauge.

Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
- **Intrinsically safe:**
  - Class I Div. 1 Group A, B, C, D T6
  - Class I Zone 0 AEx ia IIC T6
  - Ex ia IIC T6

- **Non incendive:**
  - Class I Div. 2 Group A, B, C, D T4A
  - Class I Zone 2 AEx nL IIC T4
  - Class I Zone 2 Ex nL IIC T4

Special features:
- Accuracy $\leq 0.5 \%$ FS B.F.S.L.
- Certificate: CSA 1760344
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

**Input data**

- **Measuring ranges**: 150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
- **Overload pressures**: 290, 1160, 1740, 2900, 7250, 11600, 11600, 14500, 23200 psi
- **Burst pressures**: 1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 43500 psi
- **Mechanical connection**: SAE 6 9/16-18 UNF 2A, SF 250 CS20, Autoclave(7/16-20-UNF 2B)
- **Torque value**: 15lb-ft(20Nm) - SF 250 CX20

Parts in contact with medium:
- Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301

**Output data**

- **Output signal, permitted 4 .. 20 mA, 2 conductor load resistance** $R_{\text{max}} = (U_B - 12 \text{ V}) / 20 \text{ mA}$
- **Accuracy to DIN 16086**, $\leq 0.5 \%$ FS typ.
- **Max. setting** $\leq 1 \%$ FS max.
- **Accuracy at min. setting (B.F.S.L.)**, $\leq 0.25 \%$ FS typ., $\leq 0.5 \%$ FS max.
- **Temperature compensation** $\leq 0.0085 \%$ FS/F typ.
- **Zero point** $\leq 0.014 \%$ FS/°F max.
- **Temperature compensation** $\leq 0.0085 \%$ FS/F typ.
- **Over range** $\leq 0.014 \%$ FS/°F max.
- **Temperature compensation** $\leq 0.3 \%$ FS max.
- **Non-linearity at max. setting to DIN 16086** $\leq 0.3 \%$ FS max.
- **Hysteresis** $\leq 0.4 \%$ FS max.
- **Repeatability** $\leq 0.1 \%$ FS
- **Rise time** $\leq 1.5$ ms
- **Long-term drift** $\leq 0.3 \%$ FS typ. / year

**Environmental conditions**

- **Compensated temperature range** Intrinsically safe: $-4..+140$$^\circ$F
  Non incendive: $-4..+185$$^\circ$F
- **Operating temperature range** Intrinsically safe: $-4..+140$$^\circ$F
  Non incendive: $-4..+185$$^\circ$F
- **Storage temperature range** $-40$ to 212$^\circ$F
- **Fluid temperature range**: Intrinsically safe: $-40..+140$$^\circ$F / $-4..+140$$^\circ$F
  Non incendive: $-40..+185$$^\circ$F / $-4..+185$$^\circ$F

**Mark** Certificate No.: CSA 1760344

**Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz** $\leq 20$ g

**Protection class to IEC 60529 / NEMA (depending on the electr. connection)** Min. IP 65

**Other data**

- **Residual ripple of supply voltage** $\leq 5 \%$
- **Life expectancy** $> 10$ million cycles
- **Insulation voltage**: 50 V AC, with integrated overvoltage protection EN 61000-6-2
- **Weight** $\sim 150$ g
**Pin connections:**

- Conduit (single cores)

**Core**
- HDA 44X9-A

**Color**
- Green: Signal +
- White: Signal -
- Green-yellow: Housing

**EN175301-803 (DIN 43650)**

**Core**
- HDA 44X5-A
- HDA 44XA-A

**Pin**
- 1: Signal +
- 2: Signal -
- 3: n.c.
- 4: Housing

### Areas of application:

<table>
<thead>
<tr>
<th>Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection Type</td>
<td>Intrinsically safe Gases and dusts</td>
<td>Intrinsically safe Gases</td>
<td>Non incendive (with field cabling) Gases</td>
<td>Non incendive Gases and dusts</td>
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<td>Intrinsically safe Ex ia IIC T6</td>
<td>Non incendive - Class I - Division 2 - Group A, B, C, D, F, G T4A</td>
<td>Non incendive - Class I - Division 2 - Group A, B, C, D, F, G T4A</td>
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<tr>
<td>Zones / Categories</td>
<td>- Class I - Division 1 - Group A, B, C, D, E, F, G T6</td>
<td>- Class I - Zone 0 - AEx ia IIC T6</td>
<td>- Class I - Zone 2 - AEx nL IIC T4</td>
<td></td>
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<tr>
<td>Pressure ranges in psi</td>
<td>0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000 15000 psi (only in conjunction with mechanical connection type “C”)</td>
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<tr>
<td>Approval</td>
<td>CSA 1760344</td>
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<tr>
<td>Cable length in inches (only for electr. connection code 9)</td>
<td>Standard = 48 inches</td>
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<td></td>
</tr>
</tbody>
</table>

### Model code:

**HDA 4 4 X X – A – XXXX – C X X – 000 (PSI) (48in)**

**Mechanical connection**
- 7 = SAE 6, 9/16-18 UNF 2A male
- C = SF 250 CX20, Autoclave (only for “15000 psi” press. range)

**Electrical connection**
- 5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
- 9 = Conduit connection thread (1/2-14 NPT, male)
- A = Male, EN175301-803 (DIN 43650), 3 pole + PE (1/2” conduit female thread)

**Signal**
- A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**
- 0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000

**Approval**
- C = CSA

**Insulation voltage**
- N = 50 V AC

**Protection types and applications (code)**
- A = Group 1
- B = Group 2 and 3
- C = Group 4

**Modification number**
- 000 = Standard

**Accessories:**
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
Dimensions: electrical connector with 1/2 NPT connection

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. For European mechanical connection and bar ranges see European Catalog.

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com
Description:
The pressure transmitter HDA 4300 in CSA version has been specially developed for the North American market for use in potentially explosive atmospheres and is based on the HDA 4000 series.

As with the industry model, the HDA 4300 in CSA version has a ceramic measurement cell with thick-film strain gauge for measuring relative pressure in the low pressure range.

Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
Intrinsically safe:
- Class I Div. 1 Group A, B, C, D T6 [C, US]
- Class I Zone 0 AEx ia IIC T6 [US]
- Ex ia IIC T6 [C]
- Class I, II, III Div. 1 Group A, B, C, D, E, F, G T6 [C, US]

Non incendive:
- Class I Zone 2 AEx nIIC T4 [US]
- Class I Zone 2 Ex nIIIC T4 [C]
- Class I Zone 2 AEx nII A T4 [US]
- Class I Zone 2 Ex nII A T4 [C]

Special features:
- Accuracy ≤ ± 0.5 % FS B.F.S.L.
- Certificate: CSA 1760344
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

Input data
Measuring ranges
15, 30, 50, 100, 150, 250, 500 psi
Overload pressures
45, 100, 150, 290, 450, 725, 1500 psi
Burst pressures
70, 150, 250, 400, 650, 1000, 2500 psi
Mechanical connection
1/4-18 NPT male
Torque value
30 ft-lb (40 Nm)
Parts in contact with medium
Sensor: Ceramic Al203
Mech. conn.: FPM / EPDM

Output data
Optimal setting
4 .. 20 mA, 2 conductor
R_{max} = (U_B - 12 V) / 20 mA [kΩ]
Accuracy to DIN 16086,
± 0.5 % FS typ.
± 0.5 % FS max.
Accuracy at min. setting
± 0.25 % FS typ.
± 0.5 % FS max.
Temperature compensation
± 0.012% FS/°F typ.
± 0.017% FS/°F max.
Temperature compensation
± 0.012% FS/°F typ.
± 0.017% FS/°F max.
Non-linearity at max. setting
± 0.5 % FS max.
Intrinsically safe: -4..+140°F
Non incendive: -4..+185°F
Hysteresis
± 0.4 % FS max.
Repeatability
± 0.1 % FS
Rise time
1.5 ms
Long-term drift
± 0.3 % FS typ. / year

Environmental conditions
Compensated temperature range
Intrinsically safe: -4..+140°F
Non incendive: -4..+185°F
Operating temperature range
Intrinsically safe: -4..+140°F
Non incendive: -4..+185°F
Storage temperature range
-40 to 212°F
Fluid temperature range
-4..+140°F / -4..+140°F
Non incendive: -40..+185°F / -40..+185°F

Certificate No.: CSA 1760344
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz
± 20 g
Protection class to IEC 60529 / NEMA (depending on the electr. connection)
Min. IP 65
Min. NEMA 4

Relevant data for Ex applications
Supply voltage
12 .. 28 V DC
Max. input current
100 mA
Max. input power
up to 28 V: 1 W
Connection capacitance of the sensor
≤ 22 nF
Inductance of the sensor
0 mH
Insulation voltage
50 V AC, with integrated overvoltage protection EN 61000-6-2

Other data
Residual ripple of supply voltage
≤ 5 %
Life expectancy
> 10 million cycles
Weight
~ 180 g

Note: Reverse polarity protection of the supply voltage, excess voltage, 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 bar ranges see European catalog
2) -4°F with FPM or EPDM seal, -40°F on request
3) 500 V AC on request
**Pin connections:**

- **Conduit (single cores)**
  
- **Core**
  - HDA 43X9-A
  - green: Signal +
  - white: Signal -
  - green-yellow: Housing
  
- **EN175301-803 (DIN 43650)**
  
**Model code:**

- **HDA 4 3 8 X – A – XXX – C X X – XXX – X 1(PSI) (48in)**

**Mechanical connection**
8 = 1/4”-18 NPT male

**Electrical connection**
5 = Male, 3 pole+ PE, EN175301-803 (DIN 43650) (connector supplied)
9 = Conduit connection thread (1/2-14 NPT, male)
A = Male, EN175301-803 (DIN 43650), 3 pole + PE (1/2” conduit female thread)

**Signal**
A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**
0015, 0030, 0050, 0100, 0250, 0500

**Approval**
C = CSA

**Insulation voltage**
N = 50 V AC

**Protection types and applications (code)**
- A = Group 1
- B = Group 2 and 3
- C = Group 4

**Modification number**
000 = Standard

**Seal material** (in contact with fluid)
- F = FPM seal (e.g.: for hydraulic oils)
- E = EPDM seal (e.g.: for refrigerants)

**Material of connection** (in contact with fluid)
- I = Stainless steel

**Cable length in inches** (only for electr. connection type 9)
Standard = 48 inches

**Areas of application:**

- **Group**
  - 1: Intrinsically safe
  - 2: Gases and dusts
  - 3: Non incendive (with field cabling)
  - 4: Gases and dusts

**Certificate**
- Intrinsically safe
- CSA 1760344

**Zones / Categories**
- Class I, II, III
- Division 1
- A, B, C, D, E, F, G
- Class I
- Division I
- A, B, C, D
- T6
- AEx ia IIC T6
- Zone 0
- AEx ia IIC T6
- Class I
- Division 2
- A, B, C, D
- T4A
- Class I
- Zone 2
- AEx nL IIC T4
- Class I
- Zone 2
- Ex nL IIC T4
- Class I
- Zone 2
- Ex nA II T4
- Class I
- Zone 2
- AEx nA II T4 IP 6x

**Electrical Connection**
- 9, A
- 5, 9, A
- 5, 9, A
- 9

**Code for Model Code**
- A
- B
- C

**Areas of application:**

- **Group**
  - 1: Group 1
  - 2: Group 2 and 3
  - 3: Group 4
  - 4: Group 1

**Protection**

- **Type**
  - Intrinsically safe
  - Gases and dusts
  - Non incendive

**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. For European mechanical connection and bar ranges see European Catalog.
**Electronic Absolute Pressure Transmitter**

**HDA 4100**

** CSA Intrinsically safe**

** CSA Non Incendive**

### Description:
The pressure transmitter HDA 4100 in CSA version has been specially developed for the North American market for use in potentially explosive atmospheres and is based on the HDA 4000 series.

As with the industry model, the HDA 4100 in CSA version has a ceramic measurement cell with thick-film strain gauge for measuring absolute pressure in the low pressure range. Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust, e.g. in mills.

### Protection types and applications:
**Intrinsically safe:**
- Class I Div. 1 Group A, B, C, D T6 [C, US]
- Class I Zone 0 AEx ia IIC T6 [US]
- Ex ia IIC T6 [C]

**Non incendive:**
- Class I Zone 2 AEx nL IIC T4 [US]
- Class I Zone 2 Ex nLIIC T4 [C]

### Special features:
- Accuracy ≤ ± 0.5 % FS B.F.S.L.
- Certificate: CSA 1760344
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

### Technical data:

#### Input data:
- Measuring ranges: 15, 50 psia
- Overload pressures: 40, 150 psia
- Burst pressures: 70, 250 psia
- Mechanical connection: 1/4-18 NPT male
- Torque value: 30 ft-lb (40 Nm)

#### Parts in contact with medium:
- Sensor: Ceramic Al203
- Mech. conn.: 1.4301
- Seal: FPM / EPDM

#### Output data:
- Output signal, permitted load resistance: $R_{\text{max}} = (U_B - 12 \text{ V}) / 20 \text{ mA}$ [kΩ]
- Accuracy to DIN 16086: ≤ ± 0.5 % FS typ.
- Max. setting: ≤ ± 1.0 % FS max.
- Accuracy at min. setting: ≤ ± 0.5 % FS max.
- Temperature compensation: ≤ ± 0.012% FS/°F typ.
- Zero point: ≤ ± 0.017% FS/°F max.
- Temperature compensation: ≤ ± 0.012% FS/°F max.
- Over range: ≤ ± 0.017% FS/°F max.
- Non-linearity at max. setting: ≤ ± 0.5 % FS max.
- Hysteresis: ≤ ± 0.4 % FS max.
- Repeatability: ≤ ± 0.1 % FS
- Rise time: ≤ 1.5 ms
- Long-term drift: ≤ ± 0.3 % FS typ. / year

#### Environmental conditions:
- Compensated temperature range: Intrinsically safe: -4..+140°F
- Operating temperature range: Non incendive: -4..+185°F
- Storage temperature range: -40 to 212°F
- Fluid temperature range: Intrinsically safe: -40..+140°F / -4..+140°F
- Non incendive: -40..+185°F / -4..+185°F

#### Relevant data for Ex applications:
- Supply voltage: 12 .. 28 V DC
- Max. input current: 100 mA
- Max. input power: up to 28 V: 1 W
- Connection capacitance of the sensor: ≤ 22 nF
- Inductance of the sensor: 0 mH
- Insulation voltage: 50 V AC, with integrated overvoltage protection EN 61000-6-2

#### Other data:
- Residual ripple of supply voltage: ≤ 5 %
- Life expectancy: > 10 million cycles
- Weight: ~ 180 g

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

1. -4°F with FPM or EPDM seal, -40°F on request
2. 500 V AC on request
Pin connections:

Conduit (single cores)

Core  HDA 41X9-A
green  Signal +
white  Signal -
green-yellow  Housing

EN175301-803 (DIN 43650)

Areas of application:

<table>
<thead>
<tr>
<th>Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection Type</td>
<td>Intrinsically safe</td>
<td>Intrinsically safe</td>
<td>Non incendive</td>
<td>Non incendive</td>
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<td></td>
<td>Gases and dusts</td>
<td>Gases</td>
<td>(with field cabling)</td>
<td>Gases and dusts</td>
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<tr>
<td>Certificate</td>
<td>CSA 1760344</td>
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<tr>
<td>Zones / Categories</td>
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</tr>
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<td>- Class I, II, III</td>
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<td>- Division I</td>
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<td>- Zone 2</td>
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<td>- AEx ia IIC T6</td>
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<td>Electrical Connection</td>
<td>9, A</td>
<td>5, 9, A</td>
<td>5, 9, A</td>
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<tr>
<td>Code for Model Code</td>
<td>A</td>
<td>B</td>
<td>C</td>
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</tbody>
</table>

Model code:

HDA 4 1 X X – A – XXXX – C X X – 000 – X 1 (PSI) (48in)

Mechanical connection
8 = 1/4-18 NPT male

Electrical connection
5 = Male, 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
9 = Conduit connection thread (1/2-14 NPT, male)
A = Male EN175301-803 (DIN 43650), 3 pole + PE (1/2" conduit female thread)

Signal
A = 4 .. 20 mA, 2 conductor

Pressure ranges in psi
0015, 0050

Approval
C = CSA

Insulation voltage
N = 50 V AC

Protection types and applications (code)
A = Group 1
B = Group 2 and 3
C = Group 4

Modification number
000 = Standard

Seal material (in contact with fluid)
F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

Material of connection (in contact with fluid)
1 = Stainless steel

Cable length in inches (only for electr. connection type 9)
Standard = 48 inches

Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
Dimensions:

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. For European mechanical connection and bar ranges see European Catalog.
Description:
The pressure transmitter HDA 4700 IECEx Intrinsically Safe version has been especially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version of the HDA 4700, devices with IECEx Intrinsically Safe approval have a field-proven, all-welded stainless steel measurement cell with thin film strain gauge without internal seal.

Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high dust loads, e.g. in mills.

Protection types and applications:
- **Ex ia l Ma**
- **Ex ia llC T6 Ga**
- **Ex ia llC T6 Ga/Gb**
- **Ex ia llC T6 Gb**
- **Ex nA llC T6,T5,T4 Gc**
- **Ex ic llC T6,T5,T4 Gc**
- **Ex ta llC T80/90/100 °C Da**
- **Ex tb llC T80/90/100 °C Db**
- **Ex tc llC T80/90/100 °C Dc**
- **Ex ic llC T80/90/100 °C Dc**
- **Ex ia llC T85 °C Da**

Special features:
- **Accuracy** ≤ ± 0.25 % FS B.F.S.L.
- **Certificate**: IECEx TSA 09.0041X / IECEx KEM 08.0014X
- **Output signal** 4 .. 20 mA, 2 conductor
- **Robust design**
- **Very small temperature error**
- **Excellent EMC characteristics**
- **Excellent long-term properties**

Technical data:

### Input data
- **Measuring ranges**: 150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
- **Overload pressures**: 290, 1160, 1740, 2900, 2900, 7250, 11600, 29000, 29000, 43500 psi
- **Burst pressure**: 1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
- **Mechanical connection**: SAE 6/9/16-18 UNF 2A
- **Torque value**: 15 lb-ft (20 Nm) - SAE 6
- **Output signal, permitted load resistance**: 4 .. 20 mA, 2 conductor

### Output data
- **Accuracy to DIN 16086**: ≤ ± 0.25 % FS typ.
- **Max. setting**: ≤ ± 0.5 % FS max.

### Environmental conditions
- **Compensated temperature range**: -4 .. +185 °F
- **Operating temperature range**: -4 .. +140 °F
- **Storage temperature range**: -40 .. +212 °F
- **Fluid temperature range**: -40 .. +140 °F

### Relevant data for Ex applications
- **Supply voltage**: U1 = 12 .. 28 V
- **Max. input current**: Ii = 100 mA
- **Max. input power**: Pi = 1 W
- **Inductance of the sensor**: L = 0 mH
- **Insulation voltage**: 50 V AC, with integrated overvoltage protection

### Other data
- **Residual ripple of supply voltage**: ≤ 5 %
- **Life expectancy**: > 10 million cycles
- **Weight**: ~ 150 g

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

FS (Full Scale) = relative to the full measuring range; B.F.S.L. = Best Fit Straight Line
15000 psi only with mechanical connection SF 250 CX20, Autoclave

1) 4°F with FPM seal, -40°F on request
2) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Protection types and applications</th>
<th>Ex ia I Ma</th>
<th>Ex ia IIC T6 Ga</th>
<th>Ex ia IIC T6 Ga/Gb</th>
<th>Ex nA IIC T6 Gc</th>
<th>Ex ta IIC T85 °C T500/900/100 °C Da</th>
<th>Ex ia IIC T85 °C Db</th>
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<tr>
<td>Zones / Categories</td>
<td>Equipment protection level Ma</td>
<td>Equipment protection level Ga, Gb</td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td>Equipment protection level Gc, Gd</td>
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<td>Equipment protection level Da, Db</td>
<td>Protection class: Dustproof enclosure</td>
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<td>Gas, Gc</td>
<td>Gas, Gd</td>
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Zones / Categories

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<th>Mining</th>
<th>Protection class: intrinsically safe ia with barrier</th>
<th>Equipment protection level</th>
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<th>Equipment protection level</th>
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<td>Gases, Gd</td>
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Certificate numbers: IECEx TSA 09.0041X, IECEx KEM 08.0014X

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIC T80/90/100 °C Da T500T90/100/110°C Da, Ex ia IIC T80/90/100 °C Db and Ex ia IIC T80/90/100 °C Db are available with flying leads on request. Devices in the ignition protection class "non-sparking" for protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

Model code:

HDA 4 7 X X – A – XXXX – I X X – 000 (PSI)

Mechanical connection

7 = SAE 6, 9/16-18 UNF 2A male
C = SF 250 CX20, Autoclave (only for "15000 psi" press. range)

Electrical connection

4 = Male 4 pole Binder series T14 M18 (connector not supplied)
5 = Male 3 pole + PE, EN175301-803 (DIN 43650) (connector supplied)
6 = Male M12x1, 4 pole (connector not supplied)

Signal

A = 4 .. 20 mA, 2 conductor

Pressure ranges in psi

0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000
15000 psi (only in conjunction with mechanical connection type "C")

Approval

I = IECEx

Insulation voltage

N = 50 V AC

Protection types and applications (code)

1 = Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
9 = Ex nA IIC T6 Gc (only in conjunction with electr. connection "6")
A = Ex ta IIC T80 °C T500/900 °C Da (only in conjunction with electr. connection "6")
Ex tb IIC T80 °C Db
C = Ex ic IIC T6 Gc
Ex ic IIC T80 °C Dc
D = Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
Ex ia IIC T85 °C Da

Modification number

000 = Standard

Notes:

* For design and electrical connection see Dimensions

Accessories:

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243
Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For European mechanical connection and bar ranges see European Catalog.
Description:
The pressure transmitter HDA 4400 IECEx Intrinsically Safe version has been especially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version of the HDA 4400, devices with IECEx Intrinsically Safe approval have a field-proven, all-welded stainless steel measurement cell with thin film strain gauge without internal seal. Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high dust loads, e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIC T6 Gb
Ex ic IIC T6 Gc
Ex ia IIC T80/90/100 °C Da
Ex tc IIC T80/90/100 °C Dc
Ex ic IIC T80/90/100 °C Dc
Ex ia IIC T85 °C Da
Ex ia IIC T80/90/100 °C Da
T_{soo} 90/100/110 °C Da
Ex Iic T80/90/100 °C Da
Ex Iic T80/90/100 °C Db
Ex Iic T80/90/100 °C Dc
Ex ic IIC T80/90/100 °C Dc
Ex ic IIC T85 °C Da

Special features:
- Accuracy: ≤ ± 0.5 % FS B.F.S.L.
- Certificate:
  - IECEx TSA 09.0041X / IECEx KEM 08.0014X
- Output signal 4 .. 20 mA
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

### Input data
- **Measuring ranges**
  - 150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
- **Overload ranges**
  - 290, 1160, 1740, 2900, 2900, 7250, 11600, 11600, 14500, 23200 psi
- **Burst pressure**
  - 1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
- **Mechanical connection**
  - SAE 6 9/16-18 UNF 2A
  - SF 250 CS20, Autoclave (7/16-20 UNF 2B)
- **Torque value**
  - 15lb-ft (20Nm) - SAE 6
  - 30lb-ft (40Nm) SF 250 CX20
- **Parts in contact with medium**
  - Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301
  - Seal: FPM

### Output data
- **Output signal, permitted load resistance**
  \[ R_{\text{max}} = \frac{(U_B - 12 \text{ V})}{20 \text{ mA}} \] [kΩ]
- **Accuracy to DIN 16086**
  - ≤ ± 0.5 % FS typ.
  - ≤ ± 1.0 % FS max.
- **Accuracy at minimum setting (B.F.S.L)**
  - ≤ ± 0.25 % FS typ.
  - ≤ ± 0.5 % FS max.
- **Temperature compensation**
  - Zero point
  - 0.0085% FS/°F typ.
  - 0.014% FS/°F max.
  - Temperature compensation
  - 0.0085% FS/°F typ.
  - 0.014% FS/°F max.
  - Over range
  - 0.0085% FS/°F typ.
  - 0.014% FS/°F max.
- **Non-linearity at max. setting to DIN 16086**
  - ≤ ± 0.3 % FS max.
- **Hysteresis**
  - ≤ ± 0.4 % FS max.
- **Repeatability**
  - ≤ ± 0.25 % FS
- **Rise time**
  - ≤ 1.5 ms
- **Long term drift**
  - ≤ ± 0.3 % FS typ. / year

### Environmental conditions
- **Compensated temperature range**
  - -4..+185°F
- **Operating temperature range**
  - -4..+140°F
- **Storage temperature range**
  - -40..+212°F
- **Fluid temperature range**
  - -40..+140°F / -4..+140°F

### Relevant data for Ex applications
- **Supply voltage**
  - U_i = 12 .. 28 V
  - 12 .. 28 V
- **Max. input current**
  - I_i = 100 mA
  - max. power consumption ≤ 1 W
- **Max. input power**
  - P_i = 1 W
  - max. power consumption ≤ 1 W
- **Connection capacitance of the sensor**
  - C_i = ≤ 22 nF
- **Inductance of the sensor**
  - L_i = 0 mH
- **Insulation voltage**
  - 500 V AC, with integrated overvoltage protection
  - EN 61000-6-2

Other data
- **Residual ripple of supply voltage**
  - ≤ 5 %
- **Life expectancy**
  - > 10 million cycles
  - 0 .. 100 % FS
- **Weight**
  - ~ 150 g

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

FS (Full Scale) = relative to the full measuring range. B.F.S.L. = Best Fit Straight Line
1) 15000 psi only with mechanical connection SF 250 CX20, Autoclave
2) 4°F with FPM seal, -40°F on request
3) 500 V AC on request
### Areas of application:

<table>
<thead>
<tr>
<th>Protection types and applications</th>
<th>Ex ia I Ma</th>
<th>Ex ia IIC T6 Ga</th>
<th>Ex ia IIC T6 Ga/Gb</th>
<th>Ex ia IIC T6 Gb</th>
<th>Ex nA IIC T6 Gc</th>
<th>Ex ta IIC T80 °C</th>
<th>T90 °C</th>
<th>Da</th>
<th>Ex tb IIC T80 °C</th>
<th>Db</th>
<th>Ex ic IIC T6 Gc</th>
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Certificate numbers: IECEx TSA 09.0041X, IECEx KEM 08.0014X

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ia IIC T80/90/100 °C Da T500/T90/T100/T110°C Da, Ex tb IIC T80/90/100 °C Db and Ex tc IIIC T80/90/100 °C Dc are available with flying leads on request. Devices in the ignition protection class "non-sparking" for protection types Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

### Model code:

**HDA 4 4 X X – A – XXXX – I X X – 000 (PSI)**

#### Mechanical connection

- **7** = SAE 6, 9/16-18 UNF 2A male  
- **C** = SF 250 CX20, Autoclave (only for "15000 psi" press. range)

#### Electrical connection

- **4** = Male 4 pole Binder series 714 M18 (connector not supplied)  
- **5** = Male 3 pole + PE, EN 175301-803 (DIN 43650) (connector supplied)  
- **6** = Male M12x1, 4 pole (connector not supplied)

#### Signal

- **A** = 4 .. 20 mA, 2 conductor

#### Pressure ranges in psi

- 0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000  
- 15000 psi (only in conjunction with mechanical connection type "C")

#### Approval

- **I** = IECEx

#### Insulation voltage

- **N** = 50 V AC

#### Protection types and applications (code)

- **1** = Ex ia I Ma  
  - Ex ia IIC T6 Ga  
  - Ex ia IIC T6 Ga/Gb  
  - Ex ia IIC T6 Gb  
- **9** = Ex nA IIC T6 Gc (only in conjunction with electr. connection "6")  
- **A** = Ex ta IIC T80 °C T90 °C Da (only in conjunction with electr. connection "6")  
  - Ex tb IIC T80 °C Db  
- **C** = Ex ic IIC T6 Gc  
  - Ex ic IIC T80 °C Dc  
- **D** = Ex ia I Ma  
  - Ex ia IIC T6 Ga  
  - Ex ia IIC T6 Ga/Gb  
  - Ex ia IIC T6 Gb  
  - Ex ia IIC T85 °C Da

#### Modification number

- **000** = Standard

#### Notes:

*For design and electrical connection see Dimensions

#### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
**Dimensions:**

Protection types and applications: (code): 1, C, D

![Diagram of Dimensions and Pin Connections]

**Pin connections:**

Binder series 714 M18

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EN 175301-803 (DIN 43650)

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<td>Signal -</td>
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<td>3</td>
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<td>4</td>
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</table>

M12x1, 4 pole

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<tr>
<th>Pin</th>
<th>HDA 44x6-A</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243

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*Note: Diagrams and tables are not transcribed in text format.*
Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For European mechanical connection and bar ranges see European Catalog.
Description:
The pressure transmitter HDA 4300 in IECEx Intrinsically Safe version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series.

As with the industrial version, the HDA 4300 with IECEx Intrinsically Safe approval has the field-proven ceramic measuring cell with thick-film strain gauge.

Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIIC T6 Gb
Ex nA IIIC T6, T5, T4 Gc
Ex ic IIC T6, T5, T4 Gc
Ex ta IIIC T80/90/100°C Da
T<sub>50</sub> 90/100/110°C Da
Ex tb IIIC T80/90/100°C Db
Ex tc IIIC T80/90/100°C Dc
Ex ic IIIC T80/90/100°C Dc
Ex ia IIIC T85°C Da

Special features:
- Accuracy: ≤ ± 0.5 % FS B.F.S.L.
- Certificate: IECEx TSA 09.0041X / IECEx KEM 08.0014X
- Output signal 4 . . 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

Input data:
- Measuring ranges: 15, 30, 50, 100, 150, 250, 500 psi
- Overload pressures: 45, 100, 150, 290, 450, 725, 1500 psi
- Burst pressures: 70, 150, 250, 400, 650, 1000, 2500 psi
- Mechanical connection: 1/4-18 NPT male
- Torque value: 30 ft-lb (40 Nm)
- Parts in contact with medium: Sensor: Ceramic
Mech. connection: FPM / EPDM

Output data:
- Output signal, permitted load resistance: 4 . . 20 mA, 2-conductor
- Accuracy to DIN 16086, max. setting: ≤ ± 0.5 % FS typ. / ± 1 % FS max.
- Accuracy at minimum setting (B.F.S.L.): ≤ ± 0.25 % FS typ. / ± 0.5 % FS max.
- Temperature compensation: ≤ ± 0.012% FS/F°F typ. / ± 0.017% FS/F°F max.
- Temperature compensation: ≤ ± 0.012% FS/F°F typ. / ± 0.017% FS/F°F max.
- Non-linearity at max. setting to DIN 16086: ≤ ± 0.5 % FS max.
- Hysteresis: ≤ ± 0.4 % FS max.
- Repeatability: ≤ ± 0.1 % FS
- Rise time: ≤ 1.5 ms
- Long term drift: ≤ ± 0.3 % FS typ. / year

Environmental conditions:
- Compensated temperature range: -4 . . 185°F
- Operating temperature range: -4 . . 140°F
- Storage temperature range: -40 . . -212°F
- Fluid temperature range: -40 . . +140°F / -4 . . +140°F

Protection class to IEC 60529
- IP 65
- IP 67 (for M12x1 male, when an IP 67 female connector is used)

Relevant data for Ex applications:
- Connection capacitance of the sensor: C = ≤ 22 nF
- Inductance of the sensor: L = 0 mH
- Insulation voltage: 50 V AC, with integrated overvoltage protection

Other data:
- Residual ripple of supply voltage: ≤ 5 %
- Life expectancy: > 10 million cycles / 100 % FS
- Weight: ~ 180 g

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

FS (Full Scale) = relative to the full measuring range, B.F.S.L. = Best Fit Straight Line
1) -4 °F with FPM or EPDM seal, -40 °F on request
2) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Protection types and applications</th>
<th>Ex ia IIC T6 Ga</th>
<th>Ex ia IIC T6 Ga/Gb</th>
<th>Ex ia IIC T6 Gc</th>
<th>Ex ic IIC T6 Gc</th>
<th>Ex ta IIC T80°C T Da</th>
<th>Ex tb IIC T80°C Db</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zones / Categories</td>
<td>Equipment level standard Ma Mining</td>
<td>Equipment level standard Ga, GaGb Gases</td>
<td>Equipment level standard Gc Gases</td>
<td>Equipment level standard Da, Db Conductive dust</td>
<td>Equipment level standard Gc, Dc Gases/conductive dust</td>
<td>Equipment level standard Da Conductive dust</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Code (see model code)</th>
<th>IECEx</th>
<th>IECEx Australia</th>
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<tbody>
<tr>
<td>1</td>
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<td>✓</td>
</tr>
<tr>
<td>9</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>A</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>D</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Certificate numbers: IECEx TSA 09.0041X, IECEx KEM 08.0014X

Devices in the ignition protection class “Dustproof enclosure” for the protection types Ex ta IIC T80/90/100°C Da T500T90/T100/T110°C Da, Ex tb IIC T80/90/100°C Db and Ex tc IIC T80/90/100°C Dc are available with flying leads on request. Devices in the ignition protection class “non-sparking” for protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

Model code:

**Mechanical connection**

8 = 1/4-18 NPT male

**Electrical connection**

4 = Male, 4 pole Binder series 714 M18 (connector not supplied)
5 = Male, 3 pole + PE, EN 175301-803 (DIN 43650) (connector supplied)
6 = Male, M12x1, 4 pole (connector not supplied)

**Signal**

A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**

0015, 0030, 0050, 0100, 0250, 0500

**Approval**

I = IECEx

**Insulation voltage**

N = 50 V AC

**Protection types and applications (code)**

1 = Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb

9 = Ex na IIC T6 Gc (only in conjunction with electr. connection “6”)*

A = Ex ta IIC T80°C T Da (only in conjunction with electr. connection 6”)*
Ex tb IIC T80°C Db

C = Ex ic IIC T6 Gc
Ex ic IIC T80°C Dc

D = Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
Ex ia IIC T85°C Da

**Modification number**

000 = Standard

**Seal material (in contact with fluid)**

F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

**Material of connection (in contact with fluid)**

1 = Stainless steel

**Notes:**

* For design and electrical connection see device dimensions

**Accessories:**

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
Dimensions:
Protection types and applications (code): 1, C, D

Pin connections:
Binder series 714 M18

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 43x4-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>n.c.</td>
</tr>
<tr>
<td>2</td>
<td>Signal +</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

EN 175301-803 (DIN 43650)

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 43x5-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>Signal -</td>
</tr>
<tr>
<td>3</td>
<td>n.c.</td>
</tr>
<tr>
<td>4</td>
<td>Housing</td>
</tr>
</tbody>
</table>

M12x1, 4 pole

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 43x6-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243
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.
For European mechanical connection and bar ranges see European Catalog.
Description:
The pressure transmitter HDA 4100 in IECEx Intrinsically Safe version has been specially developed for use in potentially explosive atmospheres for absolute measurement in the low pressure range and is based on the HDA 4000 series.

As with the industrial version, the HDA 4100 with IECEx Intrinsically Safe approval has the field-proven ceramic measuring cell with thick-film strain gauge without interior seals.

Intended areas of application are, for example, in the oil and gas industry, in mining, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
Ex nA IIC T6,T5,T4 Gc
Ex ic IIC T6,T5,T4 Gc
Ex ta IIC T80/90/100°C Da
Password 90/100/110°C Da
Ex tb IIC T80/90/100°C Db
Ex tc IIC T80/90/100°C Dc
Ex ic IIC T80/90/100°C Dc
Ex ia IIC T85°C Da

Special features:
- Accuracy: ≤ ± 0.5 % FS B.F.S.L.
- Certificate: IECEx TSA 09.0041X / IECEx KEM 08.0014X
- Output signal 4 .. 20 mA
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

**Input data**

<table>
<thead>
<tr>
<th>Measuring ranges</th>
<th>15, 50 psia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressures</td>
<td>40, 150 psia</td>
</tr>
<tr>
<td>Burst pressures</td>
<td>70, 250 psia</td>
</tr>
<tr>
<td>Mechanical connection</td>
<td>1/4-18 NPT male</td>
</tr>
<tr>
<td>Torque value</td>
<td>30 ft-lb (40 Nm)</td>
</tr>
<tr>
<td>Parts in contact with medium</td>
<td>Sensor: Ceramic, Mech. connection: FPM / EPDM, Seal: FPM / EPDM</td>
</tr>
</tbody>
</table>

**Output data**

| Output signal, permitted load resistance | 4 .. 20 mA, 2 conductor |
| Accuracy to DIN 16086, max. setting | ≤ ± 0.5 % FS typ. ≤ ± 1.0 % FS max. |
| Accuracy at minimum setting (B.F.S.L.) | ≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max. |
| Temperature compensation zero point | ≤ ± 0.012% FS/°F typ. ≤ ± 0.017% FS/°F max. |
| Temperature compensation over range | ≤ ± 0.012% FS/°F typ. ≤ ± 0.017% FS/°F max. |
| Non-linearity at max. setting to DIN 16086 | ≤ ± 0.5 % FS max. |
| Hysteresis | ≤ ± 0.4 % FS max. |
| Repeatability | ≤ ± 0.1 % FS |
| Rise time | ≤ 1.5 ms |
| Long term drift | ≤ ± 0.3 % FS typ. / year |

**Environmental conditions**

- Compensated temperature range: -4..+185°F
- Operating temperature range: -4..+140°F
- Storage temperature range: -40..+212°F
- Fluid temperature range: -40..+140°F / -4..+140°F
- C mark: EN 61000-6-1 / 2 / 3 / 4
- EN 60079-0 / 11 / 26 / 36
- EN 60068-2-6 at 10 ..500 Hz: ≤ 20 g
- Protection class to EN 60068-2-6 at 10 ..500 Hz: ≤ 5%
- Life expectancy: > 10 million cycles
- Weight: ~ 180 g
- Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

**Relevant data for Ex applications**

| Ex ia, tc | Ex ia, tc |
| Supply voltage | Ul = 12 .. 28 V |
| Max. input current | Ii = 100 mA |
| Max. input power | Pi = 1 W |
| Connection capacitance of the sensor | Cc = ≤ 22 nF |
| Inductance of the sensor | Lc = 0 nH |
| Insulation voltage | ≤ 50 V AC, with integrated overvoltage protection EN 61000-6-2 |

**Other data**

- Residual ripple of supply voltage ≤ 5 %
- Life expectancy: > 10 million cycles
- Weight: ~ 180 g
- Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to the full measuring range, B.F.S.L. = Best Fit Straight Line
1) 4 .. 20 mA with FPM or EPDM seal, -40 °F on request
2) 500 V AC on request
### Protection types and applications

<table>
<thead>
<tr>
<th>Zones / Categories</th>
<th>Ex ia IIC T6 Ga</th>
<th>Ex ia IIC T6 Ga/Gb</th>
<th>Ex ia IIC T6 Gb</th>
<th>Ex nA IIC T6 Gc</th>
<th>Ex ia IIC T80°C Da</th>
<th>Ex tb IIC T80°C Da</th>
<th>Ex ic IIC T6 Gc</th>
<th>Ex ic IIC T80°C Da</th>
<th>Ex ia IIC T85° C Da</th>
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</thead>
<tbody>
<tr>
<td>Equipment level standard Ma Mining</td>
<td>Equipment level standard Ga, Ga/Gb Gases</td>
<td>Equipment level standard Gc Gases</td>
<td>Equipment level standard Da, Db Gases</td>
<td>Equipment level standard Gc, Gc Gases</td>
<td>Equipment level standard Da, Da Gases</td>
<td>Equipment level standard Gc, Gc Gases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class: intrinsically safe ia with barrier</td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td>Protection class: non-sparking nA Protection class:</td>
<td>Protection class:</td>
<td>Protection class:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>with barrier</td>
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### Electrical connection

<table>
<thead>
<tr>
<th>Code (see model code)</th>
<th>4, 5, 6</th>
<th>4, 5, 6</th>
<th>4, 5, 6</th>
<th>6</th>
<th>6</th>
<th>4, 5, 6</th>
<th>4, 5, 6</th>
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<tr>
<td>9</td>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
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<td>D</td>
<td>✓</td>
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<td>✓</td>
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</tr>
</tbody>
</table>

Certificate numbers: IECEx IECEx Australia TSA 09.0041X, IECEx KEM 08.0014X

Devices in the ignition protection class “Dustproof enclosure” for the protection types Ex ia IIC T80/90/100°C Da T500 T90/T100/T110°C Da, Ex tb IIC T80/90/100°C Db and Ex tb IIC T80/90/100°C Dc are available with flying leads on request. Devices in the ignition protection class “non-sparking” for protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

### Model code:

- **Model code:** HDA 4 1 8 X – A – XXXX – I X X – 000 – X 1 (PSI)

#### Mechanical connection

- **8 =** 1/4-18 NPT male

#### Electrical connection

- **4** = Male, 4 pole Binder series 714 M18 (connector not supplied)
- **5** = Male, 3 pole + PE, EN 175301-803 (DIN 43650) (connector supplied)
- **6** = Male, M12x1, 4 pole (connector not supplied)

#### Signal

- **A =** 4 .. 20 mA, 2 conductor

#### Pressure ranges in psi

- **0015, 0050**

#### Approval

- **I =** IECEx

#### Insulation voltage

- **N =** 50 V AC

#### Protection types and applications (code)

- **1 =** Ex ia I Ma
- **Ex ia IIC T6 Ga**
- **Ex ia IIC T6 Ga/Gb**
- **Ex ia IIC T6 Gb**
- **Ex nA IIC T6 Gc** (only in conjunction with electr. connection “6”)*
- **A =** Ex ia IIC T80°C T150 T90°C Da (only in conjunction with electr. connection “6”)*
- **Ex tb IIC T80°C Db**
- **C =** Ex ic IIC T6 Gc
- **Ex ic IIC T80°C Dc**
- **D =** Ex ia I Ma
- **Ex ia IIC T6 Ga**
- **Ex ia IIC T6 Ga/Gb**
- **Ex ia IIC T6 Gb**
- **Ex ia IIC T85°C Da**

#### Modification number

- **000 =** Standard

#### Seal material (in contact with fluid)

- **F =** FPM seal (e.g.: for hydraulic oils)
- **E =** EPDM seal (e.g.: for refrigerants)

#### Material of connection (in contact with fluid)

- **1 =** Stainless steel

#### Notes:

- For design and electrical connection see device dimensions

#### Accessories:

- Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
Pin connections:

**Binder series 714 M18**

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 41x4-A</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>n.c.</td>
</tr>
<tr>
<td>2</td>
<td>Signal +</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

**EN 175301-803 (DIN 43650)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 41x5-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>Signal -</td>
</tr>
<tr>
<td>3</td>
<td>n.c.</td>
</tr>
<tr>
<td>4</td>
<td>Housing</td>
</tr>
</tbody>
</table>

**M12x1, 4 pole**

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 41x6-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243
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. For European mechanical connection and bar ranges see European Catalog.
Electronic Pressure Transmitter
HDA 4700 with Flush Membrane
ATEX Intrinsically Safe
ATEX Dustproof Enclosure
ATEX Non-sparking

Description:
The pressure transmitter HDA 4700 in ATEX version with flush membrane has been specially developed for use in potentially explosive atmospheres.

Like the standard model, the HDA 4700 with flush membrane has a stainless steel measurement cell with a thin film strain gauge.

The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid.

This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media, or in highly viscous media. Intended areas of application are, for example, the oil and gas industry, in mines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
- I M1 Ex ia I Ma
- II 1G Ex ia IIC T6 Ga
- II 1/2G Ex ia IIC T6 Ga/Gb
- II 2G Ex ia T6 Gb

Special features:
- Pressure connection has a flush membrane
- Accuracy ≤ 0.25 % FS B.F.S.L.
- Certificates:
  - KEMA 05ATEX1016 X
  - KEMA 05ATEX1021
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

Input data
- Measuring ranges: 500, 750, 1000, 1500, 3000, 6000, 9000 psi
- Overload ranges: 1160, 1740, 2900, 2900, 7250, 11600, 14500 psi
- Burst pressure: 2900, 4350, 7250, 7250, 14500, 29000, 29000 psi
- Mechanical connection: G1/2 A DIN 3852

Pressure transfer fluid: Silicon-free oil

Torque value: 33 ft-lb (45 Nm)

Parts in contact with medium:
- Stainless steel: 1.4435; 1.4301
- Seal: FPM
- O-ring: FPM

Output data
- Output signal, permitted load resistance: 4…20 mA, 2 conductor
- Accuracy to DIN 16086:
  - ≤ ± 0.25 % FS typ.
  - ≤ ± 0.5 % FS max.
- Temperature compensation:
  - ≤ ± 0.0545 % FS/F° typ.
  - ≤ ± 0.0085 % FS/F° max.

Environmental conditions
- Compensated temperature range: -4..+185°F
- Operating temperature range:
  - T90/T100/T110 °C Da
  - -4..+140°F
- Storage temperature range:
  - -40..+212°F
- Fluid temperature range:
  - -20..+140°F

Other data
- Residual ripple of supply voltage: ≤ 5 %
- Life expectancy: > 10 million cycles
- Weight: ~ 180 g

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

FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line
1) G1/2 with additional front O-ring seal max. 21750 psi
2) Other seal materials on request
3) -4 °F with FPM seal, -40 °F on request
4) 500 V AC on request
### Areas of application:

<table>
<thead>
<tr>
<th>Code used in Model code</th>
<th>Protection type</th>
<th>Z</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>I M1 Ex ia I Ma</td>
<td>II 1G Ex ia IIC T6 Ga, II 1/2G Ex ia IIC T6 Ga/Gb, II 1D Ex ia IIC T85°C Da</td>
<td>II 3G Ex na IIC T6 Gc</td>
<td>II 1D Ex ta IIC T80°C Tₜₚ₉ T90°C Da, II 2D Ex tb IIC T80°C Db</td>
<td>II 3G Ex ic IIC T6 Gc, II 3D Ex ic IIC T80°C Db</td>
</tr>
</tbody>
</table>

**Certificate**

<table>
<thead>
<tr>
<th>Zones / Categories</th>
<th>Groups</th>
<th>Categories</th>
<th>Protection types and applications (code)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I, Category M1, Mining</td>
<td>Group I, Category 1G, 1/2G, 1D Gases/conductive dust</td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td></td>
</tr>
<tr>
<td>Group II, Category 2G Gases</td>
<td>Group II, Category 3G Gases</td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td></td>
</tr>
<tr>
<td>Group III, Category 1D, 2D Conductive dust</td>
<td>Group III, Category 3G, 3D Conductive dust</td>
<td>Protection class: Intrinsically safe ic with barrier</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical Connection (see model code):

<table>
<thead>
<tr>
<th>Code</th>
<th>Signal</th>
<th>n.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Housing**

### Pin connections:

**EN175301-803 (DIN 43650)**

- **Pin HDA 47Z5-A**
  - 1: Signal +
  - 2: Signal -
  - 3: n.c.

- **Pin HDA 47Z6-A**
  - 1: Signal +
  - 2: n.c.
  - 3: Signal -
  - 4: n.c.

### Model code: **HDA 4 7 X X – A – XXXX – XXX – A X X – 000 (PSI)**

**Mechanical process connection**

- Z = Flush membrane

**Electrical connection**

- 5: Male 3 pole + PE, EN 175301-803 (DIN 43650) (female connector supplied)
- 6: Male M12x1, 4 pole (female connector not supplied)

**Signal**

- A = 4..20 mA, 2 conductor

**Pressure ranges in psi**

0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000

**Mechanical connection**

- G01 = G1/2 A, DIN 3852
- G02 = G1/2 with additional front O-ring seal

**Approval**

- A = ATEX

**Insulation voltage**

- N = 50 V AC

**Protection types and applications (code)**

- 1 = I M1 Ex ia I Ma
- II 1G Ex ia IIC T6 Ga, II 1/2G Ex ia IIC T6 Ga/Gb, II 1D Ex ia IIC T85°C Da
- II 2G Ex ia IIC T6 Gb, II 1D Ex ia IIC T85 °C Da
- II 3G Ex na IIC T6 Gc (only in conjunction with electr. connection "6")
- II 1D Ex ta IIC T80 °C Tₜₚ₉ T90 °C Da (only in conjunction with electr. connection "6")
- II 2D Ex tb IIC T80 °C Db
- II 3G Ex ic IIC T6 Gc, II 3D Ex ic IIC T80 °C Db

**Modification number**

- 000 = Standard

**Notes:**

* For design and electrical connection see Dimensions

**Accessories:**

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

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Devices in ignition protection class "Dustproof enclosure" for the protection types II 1D Ex ta IIC T80/90/100° C Da, II 2D Ex tb IIC T80/90/100°C Db and II 3D Ex ic IIC T80/90/100°C Db are available with flying leads on request.

Devices in the ignition protection class "Non-sparking" for the protection type II 3G Ex na IIC T6, T5, T4 Gc are available with flying leads on request.
Dimensions:
Protection types and applications (code): 1, C

Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For bar ranges see European Catalog

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Dimensions:
Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243
Description:
The pressure transmitter HDA 4400 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version, the HDA 4400 in ATEX version has a stainless steel measurement cell with thin-film strain gauge. The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid. This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media. Intended areas of application are, for example, the oil and gas industry, in mines, or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
I M1 Ex ia I Ma
II 1G Ex ia IIIC T6 Ga
II 1/2G Ex ia IIIC T6 Ga/Gb
II 2G Ex ia IIIC T6 Gb
II 3G Ex na IIIC T6, T5, T4 Gc
II 3G Ex ic IIIC T6, T5, T4 Gc
II 1D Ex ia IIIC T85 °C Da
II 1D Ex ta IIIC T80/90/100 °C Da T_{so} T90/T100/T110 °C Da
II 2D Ex tb IIIC T80/90/100 °C Db
II 3D Ex tc IIIC T80/T90/T100 °C Dc
II 3D Ex ic IIIC T80/T90/T100 °C Dc

Special features:
- Pressure connection has a flush membrane
- Accuracy ≤ 0.5 % FS B.F.S.L.
- Certificates: KEMA 05ATEX1016 X KEMA 05ATEX1021
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

<table>
<thead>
<tr>
<th>Input data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring ranges</td>
<td>500, 750, 1000, 1500, 3000, 6000, 9000 psi</td>
</tr>
<tr>
<td>Overload ranges</td>
<td>1160, 1740, 2900, 2900, 7250, 11600, 14500 psi</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>2900, 4350, 7250, 7250, 14500, 29000, 29000 psi</td>
</tr>
<tr>
<td>Mechanical connection</td>
<td>G1/2A DIN 3852</td>
</tr>
<tr>
<td>Torque value</td>
<td>33 ft-lb (45 Nm) for G1/2, G1/2A</td>
</tr>
<tr>
<td>Pressure transfer fluid</td>
<td>Silicon-free oil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parts in contact with medium</th>
<th>Stainless steel: 1.4435, 1.4301</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal</td>
<td>FPM</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal, permitted load resistance</td>
<td>4 .. 20 mA, 2 conductor</td>
</tr>
<tr>
<td>Accuracy to DIN 16086, max. setting</td>
<td>≤ ± 0.5 % FS typ.</td>
</tr>
<tr>
<td>Accuracy at minimum setting</td>
<td>≤ ± 0.025 % FS typ.</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>≤ ± 0.0085 % FS/F °F typ.</td>
</tr>
<tr>
<td>Temperature compensation Over range</td>
<td>≤ ± 0.014 % FS/F °F max.</td>
</tr>
<tr>
<td>Non-linearity at max. setting to DIN 16086</td>
<td>≤ ± 0.04 % FS max.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤ ± 0.1 % FS</td>
</tr>
<tr>
<td>Rise time</td>
<td>≤ 1.5 ms</td>
</tr>
<tr>
<td>Long term drift</td>
<td>≤ ± 0.3 % FS typ./year</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td></td>
</tr>
<tr>
<td>Compensated temperature range</td>
<td>-4 .. +185 °F</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-4 .. +140 °F</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-40 .. +212 °F</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>-40 .. +140 °F, -4 .. +140 °F</td>
</tr>
<tr>
<td>Vibration resistance to DIN EN 60068-2-6 at 10 ..500 Hz</td>
<td>≤ 20 g</td>
</tr>
<tr>
<td>Protection class to IEC 60529</td>
<td>IP 65 (for male EN 175301-803(DIN 43650)) IP 67 (for M12x1 male, when an IP 67 female connector is used)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevant data for Ex applications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex ia, ic</td>
<td>Ex na, ta, tb, tc</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>U_i = 12 .. 28 V</td>
</tr>
<tr>
<td>Max. input current</td>
<td>I_i = 100 mA</td>
</tr>
<tr>
<td>Max. input power</td>
<td>P_i = 1 W</td>
</tr>
<tr>
<td>Connection capacitance of the sensor</td>
<td>C_s ≤ 22 nF</td>
</tr>
<tr>
<td>Inductance of the sensor</td>
<td>L_s = 0 nH</td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>50 V AC, with integrated overvoltage protection</td>
</tr>
<tr>
<td>Weight</td>
<td>~ 180 g</td>
</tr>
</tbody>
</table>

Other data:
- Residual ripple of supply voltage ≤ 5 %
- Life expectancy > 10 million cycles
- Weight ~ 180 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.
FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line
G1/2 with additional front O-ring seal max. 21750 psi
Other seal materials on request
-5 °F to +40 °F on request
500 V AC on request
## Areas of application:

<table>
<thead>
<tr>
<th>Code used in Model code</th>
<th>Protection type</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>I M1 Ex ia I Ma</td>
<td>II 1G Ex ia IIC T6 Ga</td>
<td>II 1D Ex ia IIC T80°C Da</td>
<td>II 3D Ex ic IIC T80°C Da</td>
<td></td>
</tr>
<tr>
<td>II 2G Ex ia IIC T6 Gb</td>
<td>II 2G Ex ia IIC T80°C Da</td>
<td>II 3D Ex ic IIC T80°C Da</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II 1G Ex ia IIC T85°C Ca</td>
<td>II 1D Ex ia IIC T80°C Da</td>
<td>II 3D Ex ic IIC T80°C Da</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Certificate

<table>
<thead>
<tr>
<th>Zones / Categories</th>
<th>Group I Category M1 Mining Protection class: intrinsically safe ia with barrier</th>
<th>Group II, III Category 1G, 1/2G, 1D Gases/conductive dust Protection class: intrinsically safe ia with barrier</th>
<th>Group II Category 2G Gases Protection class: intrinsically safe ia with barrier</th>
<th>Group II Category 3G Gases Protection class: Non-sparking nA</th>
<th>Group III Category 1D, 2D Conductive dust Protection class: Dustproof enclosure</th>
<th>Group II, III Category 3G, 3D Gases/conductive dust Protection class: Intrinsically safe ic with barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z = Flush membrane</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
<td>6</td>
<td>6</td>
<td>4, 5, 6</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical Connection (see model code)

<table>
<thead>
<tr>
<th>Pin</th>
<th>EN 175301-803 (DIN 43650)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>Signal -</td>
</tr>
<tr>
<td>3</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

### Housing

- M12x1, 4 pole

### Model code:

**HDA 4 4 Z X – A – XXXX – XXX – A X X – 000 (PSI)**

#### Mechanical process connection

- **Z** = Flush membrane

#### Electrical connection

- **5** = Male 3 pole + PE, EN 175301-803 (DIN 43650) (female connector supplied)
- **6** = Male M12x1, 4 pole (female connector not supplied)

#### Signal

- **A** = 4 .. 20 mA, 2 conductor

#### Pressure ranges in psi

- 0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000

#### Mechanical connection

- G01 = G1/2 A, DIN 3852
- G02 = G1/2 with additional front O-ring seal
- G04 = G1/4 with additional front O-ring seal

#### Approval

- **A** = ATEX

#### Insulation voltage

- **N** = 50 V AC

#### Protection types and applications (code)

<table>
<thead>
<tr>
<th>Pin</th>
<th>EN 175301-803 (DIN 43650)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

#### Modification number

- **000** = Standard

### Notes:

- For design and electrical connection see Dimensions

### Accessories:

- Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
Dimensions:
Protection types and applications (code): 1, C

Note:
The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.
For bar ranges see European Catalog

Profile seal ring

male electr. conn.
3p +PE EN 175301-803 (DIN 43650)

male electr. conn. 4p

Elastomer profile seal ring DIN3869

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection. e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com
**Description:**
The pressure transmitter HDA 4300 in ATEX version has been specially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version, the HDA 4300 in ATEX version has the field-proven ceramic measurement cell with thick-film strain gauge. The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid. This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media. Intended areas of application are, for example, the oil and gas industry, mines, or in locations with high levels of dust, e.g. in mills.

**Protection types and applications:**
- I M1 Ex ia I Ma
- II 1G Ex ia IIC T6 Ga
- II 1/2G Ex ia IIC T6 Ga/Gb
- II 2G Ex ia IIC T6 Gb
- II 3G Ex n a IIC T6, T5, T4 Gc
- II 3G Ex ic IIC T6, T5, T4 Gc
- II 1D Ex ia IIC T85°C Da
- II 1D Ex ta IIC T80/90/100°C Da
- II 1G T40°/T90/T100/110°C Da
- II 1D Ex tb IIC T80/90/100°C Db
- II 3D Ex tc IIC T80/T90/T100°C Dc
- II 3D Ex ic IIC T80/T90/T100°C Dc

**Special features:**
- Pressure connection has a flush membrane
- Accuracy: ≤ ± 0.5 % FS B.F.S.L.
- Certificates: KEMA 05ATEX1016 X, KEMA 05ATEX1021
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

**Technical data:**

### Input data
- Measuring ranges: 15, 30, 50, 100, 150, 250, 500 psi
- Overload range: 45, 100, 150, 290, 450, 725, 1500 psi
- Burst pressure: 70, 150, 250, 600, 1000, 2500 psi
- Mechanical connection: GT/2A DIN 3852
- Pressure transfer fluid: Silicon-free oil
- Torque value: 33 ft-lb (45 Nm) for G1/2, G1/2A, 15 ft-lb (20 Nm) for G1/4
- Parts in contact with medium: Stainless steel, FPM O-ring seal

### Output data
- Output signal, permitted load resistance: 4...20 mA, 2 conductor
- Accuracy to DIN 16086:
  - ≤ ± 0.5 % FS typ.
  - ≤ ± 1.0 % FS max.
- Temperature compensation
  - Zero point: ≤ ± 0.012% FS/F. typ.
  - ≤ ± 0.017% FS/F. max.
- Temperature compensation: ≤ ± 0.012% FS/F. typ.
- Over range: ≤ ± 0.017% FS/F. max.
- Non-linearity at max. setting to DIN 16086:
  - ≤ ± 0.5 % FS max.
- Hysteresis:
  - ≤ ± 0.4 % FS max.
- Repeatability:
  - ≤ ± 1 % FS
- Rise time:
  - ≤ 1.5 ms
- Long term drift:
  - ≤ ± 0.3 % FS typ. / year

### Environmental conditions
- Compensated temperature range: -4...+185°F
- Operating temperature range: -4...+140°F
- Storage temperature range: -40 to 212°F
- Fluid temperature range:
  - -40...+140°F
  - -40...+140°F / -4...+140°F

### Relevant data for Ex applications
- Supply voltage: Ui = 12...28 V
- Max. input current: Ii = 100 mA
- Max. input power: Pi = 1 W
- Connection capacitance of the sensor: CG ≤ 22 nF
- Inductance of the sensor: L ≤ 0 mH
- Insulation voltage:
  - 500 V AC on request

### Other data
- Residual ripple of supply voltage:
  - ≤ 5 %
- Life expectancy:
  - > 10 million cycles
- Weight:
  - ~ 180 g

**Note:** Reverse polarity protection of the supply voltage, excess voltage, overload and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line
- Other seal materials on request
- -4 °F with FPM seal, -40 °F on request
- 500 V AC on request
Areas of application:

Code | Model code | 1 | 9 | A | C
--- | --- | --- | --- | --- | ---
Protection type | I M1 Ex ia I Ma | II 1G Ex ia IIC T6 Ga | II 2G Ex ia IIC T6 Gb | II 3G Ex nA IIC T6 Gc | II 1D Ex ta IIC T80°C T<sub>x</sub> = 190°C Da
| II 1/2G Ex ia IIC T6 Ga/Gb | II 1D Ex ia IIC T85°C Da | | | II 2D Ex tb IIC T80°C Db
| II 1D Ex ta IIC T80°C Da | | | | II 3G Ex ic IIC T6 Gc
| II 2G Ex ta IIC T80°C Da | | | | II 3D Ex ic IIC T80°C Dc

Certificate | KEMA 05ATEX1016 X / KEMA 05ATEX1021

Zones / Categories | Group I Category M1 | Group II, III Category 1G, 1/2G, 1D Gases/conductive dust Protection class: intrinsically safe ia with barrier | Group II Category 2G Gases Protection class: intrinsically safe ia with barrier | Group II Category 3G Gases Protection class: Non-sparking nA | Group III Category 1D, 2D Conductive dust Protection class: Dustproof enclosure | Group II, III Category 3G, 3D Gases/conductive dust Protection class: Intrinsically safe ic with barrier

Electrical Connection (see model code) | 4, 5, 6 | 4, 5, 6 | 4, 5, 6 | 6 | 6 | 4, 5, 6

Pin connections:

EN 175301-803 (DIN 43650)

Pin | HDA 43Z5-A | HDA 43Z6-A
--- | --- | ---
1 | Signal + | Signal +
2 | Signal - | n.c.
3 | n.c. | Signal -
4 | Housing | n.c.

Model code:

HDA 4 3 Z X – A – XXXX – XXX – A X X – 000 (PSI)

Pin connections:

EN 175301-803 (DIN 43650)

Pin | HDA 43Z5-A | HDA 43Z6-A
--- | --- | ---
1 | Signal + | Signal +
2 | Signal - | n.c.
3 | n.c. | Signal -
4 | Housing | n.c.

Areas of application:

- **Mechanical process connection**
  - Z = Flush membrane

- **Electrical connection**
  - 5 = Male 3 pole + PE, EN 175301-803 (DIN 43650)
    - (female connector supplied)
  - 6 = Male M12x1, 4 pole
    - (female connector not supplied)

- **Signal**
  - A = 4 .. 20 mA, 2 conductor

- **Pressure ranges in psi**
  - 0015, 0030, 0050, 0100, 0150, 0250, 0500

- **Mechanical connection**
  - G01 = G1/2 A, DIN 3852
  - G02 = G1/2 with additional front O-ring seal
  - G04 = G1/4 with additional front O-ring seal

- **Approval**
  - A = ATEX

- **Insulation voltage**
  - N = 50 V AC

- **Protection types and applications (code)**
  - 1 = I M1 Ex ia I Ma
    - II 1G Ex ia IIC T6 Ga
    - II 1/2G Ex ia IIC T6 Ga/Gb
    - II 2G Ex ia IIC T6 Gb
    - II 1D Ex ia IIC T85 °C Da
  - 9 = II 3G Ex nA IIC T6 Gc
    - (only in conjunction with electr. connection "6")*
  - A = II 1D Ex ta IIC T80 °C T<sub>x</sub> = 190 °C Da
    - (only in conjunction with electr. connection "6")*
    - II 2D Ex tb IIC T80 °C Db
  - C = II 3G Ex ic IIC T6 Gc
    - II 3D Ex ic IIC T80 °C Dc

- **Modification number**
  - 000 = Standard

- **Notes:**
  - * For design and electrical connection see Dimensions

- **Accessories:**
  - Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
**Dimensions:**
Protection types and applications (code): 1, C

![Diagram of dimension details](image)

**Note:**
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For bar ranges see European Catalog

**Protection types and applications (code): 9, A**

![Diagram of protection details](image)

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection. e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243
Electronic Pressure Transmitter
HDA 4700
with Flush Membrane
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

Description:
The pressure transmitter HDA 4700 in IECEx Intrinsically Safe version has been especially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version of the HDA 4700, devices with IECEx Intrinsically Safe approval have a field-proven, all-welded stainless steel measurement cell with thin-film strain gauge without internal seal. The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid.

This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media, or in highly viscous media. Intended areas of application are, for example, the oil and gas industry, in mines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIIC T6 Ga
Ex ia IIIC T6 Ga/Gb
Ex ia IIIC T6 Gb
Ex ia IIIC T6,G, T4 Gc
Ex ic IIIC T6, T5, T4 Gc
Ex ia IIIC T80/90/100°C Da
Ex ta IIIC T80/90/100°C Da
T., 90/100/110°C Da
Ex tb IIIC T80/90/100°C Dc
Ex tc IIIC T80/90/100°C Dc
Ex ic IIIC T80/90/100°C Dc
Ex ia IIIC T85°C Da

Special features:
- Pressure connection has a flush membrane
- Accuracy ≤ 0.25 % FS B.F.S.L.
- Certificate: IECEx KEM 08.0014X
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

Input data

<table>
<thead>
<tr>
<th>Input data</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Measuring ranges</td>
<td>500, 750, 1000, 1500, 3000, 6000, 9000 psi</td>
</tr>
<tr>
<td>Overload ranges (psi)</td>
<td>1160, 1740, 2900, 2900, 7250, 11600, 14500 psi</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>2900, 4350, 7250, 7250, 14500, 29000, 29000 psi</td>
</tr>
<tr>
<td>Mechanical connection</td>
<td>G1/2 A DIN 3852</td>
</tr>
<tr>
<td>G1/2 with additional front O-ring seal</td>
<td></td>
</tr>
<tr>
<td>Pressure transfer fluid</td>
<td>Silicon-free oil</td>
</tr>
<tr>
<td>Torque value</td>
<td>33 ft-lb (45 Nm)</td>
</tr>
<tr>
<td>Parts in contact with medium</td>
<td>2</td>
</tr>
<tr>
<td>Seal</td>
<td>Stainless steel: 1.4435, 1.4301</td>
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<tr>
<td>O-ring</td>
<td>FPM</td>
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</table>

Output data

<table>
<thead>
<tr>
<th>Output data</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Output signal, permitted load resistance</td>
<td>4...20 mA, 2 conductor</td>
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<tr>
<td>Accuracy to DIN 16086, max. setting</td>
<td>≤ 0.25 % FS typ.</td>
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<tr>
<td>Accuracy at minimum setting</td>
<td>≤ 0.15 % FS typ.</td>
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<tr>
<td>Temperature compensation zero point</td>
<td>≤ 0.0045 % FS/F° typ.</td>
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<tr>
<td>Temperature compensation over range</td>
<td>≤ 0.0085 % FS/F° max.</td>
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<tr>
<td>Non-linearity at max. setting to DIN 16086</td>
<td>≤ 0.3 % FS max.</td>
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<tr>
<td>Hysteresis</td>
<td>≤ 0.1 % FS max.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤ 0.05 % FS</td>
</tr>
<tr>
<td>Rise time</td>
<td>≤ 1.5 ms</td>
</tr>
<tr>
<td>Long term drift</td>
<td>≤ 0.1 % FS typ. / year</td>
</tr>
</tbody>
</table>

Environmental conditions

<table>
<thead>
<tr>
<th>Environmental conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensated temperature range</td>
<td>-20...+85°C to -4...+185°F</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40...+60°C / -20...+60°C to -40...+140°F / -4...+140°F</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-40...+100°C to -40...+212°F</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>-40...+60°C / -20...+60°C to -40...+140°F / -4...+140°F</td>
</tr>
</tbody>
</table>

Mark

<table>
<thead>
<tr>
<th>Mark</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-6-1 / 2 / 3 / 4</td>
<td></td>
</tr>
<tr>
<td>EN 60079-0 / 11 / 26 / 36</td>
<td></td>
</tr>
</tbody>
</table>

Vibration resistance to DIN EN 60068-2-6 at 10...500 Hz

| Vibration resistance                   | ≤ 20 g |

Protection class to IEC 60529

<table>
<thead>
<tr>
<th>Protection class to IEC 60529</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 65 (for male EN 175301-803 (DIN 43650))</td>
<td></td>
</tr>
<tr>
<td>IP 67 (for M12x1 male, when an IP 67 female connector is used)</td>
<td></td>
</tr>
</tbody>
</table>

Relevant data for Ex applications

<table>
<thead>
<tr>
<th>Relevant data for Ex applications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>U1 = 12...28 V</td>
</tr>
<tr>
<td>Max. input current</td>
<td>I1 = 100 mA</td>
</tr>
<tr>
<td>Max. input power</td>
<td>P1 = 1 W / max. power consumption ≤ 1 W</td>
</tr>
<tr>
<td>Connection capacitance of the sensor</td>
<td>C2 = ≤ 22 nF</td>
</tr>
<tr>
<td>Inductance of the sensor</td>
<td>L2 = 0 mH</td>
</tr>
</tbody>
</table>

| Insulation voltage                     | 50 V AC, with integrated overvoltage protection EN 61000-6-2 |

Other data

<table>
<thead>
<tr>
<th>Other data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual ripple of supply voltage</td>
<td>≤ 5 %</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>&gt; 10 million cycles</td>
</tr>
<tr>
<td>Weight</td>
<td>~ 180 g</td>
</tr>
</tbody>
</table>

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

FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line
1) G1/2 with additional front O-ring seal max. 21750 psi
2) Other seal materials on request
3) 4°F with FPM seal, -40°F on request
4) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code used in Model code</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection types and applications</td>
<td>Ex ia I Ma</td>
<td>Ex ia IIC T6 Ga</td>
<td>Ex ia IIC T6 Gb</td>
</tr>
<tr>
<td>Certificate</td>
<td>IECEx KEM 08.0014X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zones / Categories</td>
<td>Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier</td>
<td>Equipment protection level Gb Gases/conductive dust Protection class: intrinsically safe ia with barrier</td>
<td>Equipment protection level Gc Gases Protection class: Non-sparking nA</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
<td>4, 6</td>
</tr>
</tbody>
</table>

Pin connections:

EN 175301-803 (DIN 43650)

Model code: HDA 4 7 Z X – A – XXXX – XXX – I X X – 000 (PSI)

**Mechanical process connection**

Z = Flush membrane

**Electrical connection**

5 = Male 3 pole+ PE, EN 175301-803 (DIN 43650) (female connector supplied)

6 = Male M12x1, 4 pole (female connector not supplied)

**Signal**

A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**

0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000

**Mechanical connection**

I = IECEx

**Insulation voltage**

N = 50 V AC

**Protection types and applications (code)**

D = Ex ia I Ma

Ex ia IIC T6 Ga

Ex ia IIC T6 Ga/Gb

Ex ia IIC T6 Gb

Ex ia IIC T85 °C Da

9 = Ex nA IIC T6 Gc (only in conjunction with electr. connection "6") *

A = Ex ta IIC T80 °C T40 T90 °C Da (only in conjunction with electr. conn. "6") *

Ex tb IIC T80 °C Db

C = Ex ic IIC T6 Gc

Ex ic IIC T80 °C Dc

**Modification number**

000 = Standard

**Notes:**

* For design and electrical connection see Dimensions

**Accessories:**

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For bar ranges see European Catalog

Dimensions:
Protection types and applications (code): D, C

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243
Electronic Pressure Transmitter
HDA 4400 with Flush Membrane
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

Description:
The pressure transmitter HDA 4400 in IECEx Intrinsically Safe version has been especially developed for use in potentially explosive atmospheres and is based on the HDA 4000 series. As with the industrial version of the HDA 4400, devices with IECEx Intrinsically Safe approval have a field-proven, all-welded stainless steel measurement cell with thin film strain gauge without internal seal.

The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid.

This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media, or in highly viscous media. Intended areas of application are, for example, the oil and gas industry, in mines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIc T6 Ga
Ex ia IIC T6 Gb
Ex nA IIC T6,T5,T4 Gc
Ex ic IIC T6,T5,T4 Gc
Ex ta IIIC T80/90/100 °C Da
Ex tb IIIC T80/90/100 °C Db
Ex tc IIIC T80/90/100 °C Dc
Ex ic IIIC T80/90/100 °C Dc
Ex ia IIC T85 °C Da

Special features:
• Pressure connection has a flush membrane
• Accuracy: ± 0.5 % BFS typ.
• Certificate: IECEx KEM 08.0014X
• Robust design
• Very small temperature error
• Excellent EMC characteristics
• Excellent durability

Technical data:

<table>
<thead>
<tr>
<th>Input data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring ranges</td>
<td>500, 750, 1000, 1500, 3000, 6000, 9000 psi</td>
</tr>
<tr>
<td>Overload pressures</td>
<td>1160, 1740, 2900, 2900, 7250, 11600, 14500 psi</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>2900, 4350, 7250, 14500, 29000, 29000 psi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/2 A DIN 3852</td>
<td>G1/2 with additional front O-ring seal</td>
</tr>
<tr>
<td>G1/4 with additional front O-ring seal</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure transfer fluid</th>
<th>Silicon-free oil</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Torque value</th>
<th>33 ft-lb (45 Nm) for G1/2, G1/2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 ft-lb (20 Nm) for G1/4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parts in contact with medium</th>
<th>Stainless steel: 1.4435; 1.4301</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal: FPM</td>
<td></td>
</tr>
<tr>
<td>O-ring: FPM</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal, permitted load resistance</td>
<td>4 ... 20 mA, 2 conductor</td>
</tr>
<tr>
<td>R_{load} = (U_{B} – 12 V) / 20 mA [kΩ]</td>
<td></td>
</tr>
<tr>
<td>Accuracy to DIN 16086, max. setting</td>
<td>± 0.5 % FS typ.</td>
</tr>
<tr>
<td>± 1 % FS max.</td>
<td></td>
</tr>
<tr>
<td>Accuracy at minimum setting (B.F.S.L.)</td>
<td>± 0.25 % FS typ.</td>
</tr>
<tr>
<td>± 0.5 % FS max.</td>
<td></td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>± 0.0085 %/°F FS/°F typ.</td>
</tr>
<tr>
<td>± 0.014 %/°F FS/°F max.</td>
<td></td>
</tr>
<tr>
<td>Temperature compensation Over range</td>
<td>± 0.0085 %/°F FS/°F typ.</td>
</tr>
<tr>
<td>± 0.014 %/°F FS/°F max.</td>
<td></td>
</tr>
<tr>
<td>Non-linearity at max. setting to DIN 16086</td>
<td>± 0.3 % FS max.</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>± 0.4 % FS max.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>± 0.1 % FS</td>
</tr>
<tr>
<td>Rise time</td>
<td>≤ 1.5 ms</td>
</tr>
<tr>
<td>Long term drift</td>
<td>± 0.3 % FS typ. / year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensated temperature range</td>
<td>-4...+185°F</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-4...+140°F</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-40...+212°F</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>-40...+140°F / -4...+140°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>C</th>
<th>mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>75301-803(DIN 43650))</td>
<td>IP 67</td>
<td>IP 65</td>
</tr>
<tr>
<td>60079-0</td>
<td>12 / 3 / 4</td>
<td>EN 6600-6-1</td>
</tr>
<tr>
<td>11 / 26 / 36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Vibration resistance to DIN 66008-2-6 at 10...500 Hz | ≤ 20 g |

<table>
<thead>
<tr>
<th>Protection class to IEC 60529</th>
<th>IP 65 (for male EN 175301-803(DIN 43650))</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 67 (for M12x1 male, when an IP 67 female connector is used)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevant data for Ex applications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex ia, ic</td>
<td>Ex nA, ta, tb, tc</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>U_{i} = 12...28 V</td>
</tr>
<tr>
<td>Max. input current</td>
<td>I_{i} = 100 mA</td>
</tr>
<tr>
<td>Max. input power</td>
<td>P_{i} = 1 W</td>
</tr>
<tr>
<td>max. power consumption</td>
<td>≤ 1 W</td>
</tr>
<tr>
<td>Connection capacitance of the sensor C_{i} = ≤ 22 nF</td>
<td></td>
</tr>
<tr>
<td>Insulation of the sensor L_{i} = 0 mH</td>
<td></td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>50 V AC, with integrated overvoltage protection EN 61000-6-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual ripple of supply voltage</td>
<td>≤ 5 %</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>≥ 10 million cycles</td>
</tr>
<tr>
<td>0...100 % FS</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>~ 180 g</td>
</tr>
</tbody>
</table>

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

FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line

1) G1/2 with additional front O-ring seal max. 21750 psi
2) Other seal materials on request
3) ± 4 °F with FPM seal, ± 40 °F on request
4) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code No. for use in</th>
<th>D</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection types and applications</td>
<td>Ex ia I Ma</td>
<td>Ex ia IIC T6 Ga</td>
<td>Ex na IIC T6 Gc</td>
<td>Ex ic IIC T6 Gc</td>
</tr>
<tr>
<td></td>
<td>Ex ia IIC T6 Ga/Gb</td>
<td>Ex ia IIC T6 Gb</td>
<td>Ex ia IIC T80°C C Da</td>
<td>Ex ic IIC T80°C C Da</td>
</tr>
<tr>
<td>Certificate</td>
<td>IECEx KEM 08.0014X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Zones / Categories

<table>
<thead>
<tr>
<th>Equipment protection level</th>
<th>Gas, Gases with barrier</th>
<th>Protection class: intrinsically safe ia with barrier</th>
<th>Equipment protection level</th>
<th>Gases with barrier</th>
<th>Protection class: Non-sparking nA</th>
</tr>
</thead>
</table>

Electrical connection

| 4, 5, 6 | 4, 5, 6 | 4, 5, 6 | 6 | 6 | 4, 5, 6 |

Devices in ignition protection class “Dustproof enclosure” for the protection types Ex ia IIC T80/90/100 °C Da T50/T90/T100/T110 °C Da, Ex tb IIC T80/90/100 °C Db and Ex ic IIC T80/90/100 °C Dc are available with flying leads on request.

Devices in the ignition protection class “Non-sparking” for the protection type Ex na IIC T6, T5, T4 Gc are available with flying leads on request.

Pin connections:

**EN 175301-803 (DIN 43650)**

Pin | HDA 44Z5-A | HDA 44Z6-A |
--- | --- | --- |
1 | Signal + | Signal + |
2 | Signal - | n.c. |
3 | n.c. | Signal - |
4 | Housing | n.c. |

M12x1, 4 pole

<table>
<thead>
<tr>
<th>Pin</th>
<th>HDA 44Z5-A</th>
<th>HDA 44Z6-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal +</td>
<td>Signal +</td>
</tr>
<tr>
<td>2</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>3</td>
<td>Signal -</td>
<td>Signal -</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

Model code:

HDA 4 4 Z X – A – XXXX – XXX – I X X – 000 (PSI)

**Mechanical process connection**

Z = Flush membrane

**Electrical connection**

5 = Male 3 pole+ PE, EN 175301-803 (DIN 43650) (female connector supplied)

6 = Male M12x1, 4 pole (female connector not supplied)

**Signal**

A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**

0500, 0750, 1000, 1500, 3000, 5000, 6000, 9000

**Mechanical connection**

G01 = G1/2 A, DIN 3852

G02 = G1/2 with additional front O-ring seal

G04 = G1/4 with additional front O-ring seal

**Approval**

I = IECEx

**Insulation voltage**

N = 50 V AC

**Protection types and applications (code)**

D = Ex ia I Ma

9 = Ex na IIC T6 Gc (only in conjunction with electr. connection "6")

A = Ex ia IIC T80 °C T50/T90 °C Da (only in conjunction with electr. connection "6")

Ex Ic IIC T80 °C Db

C = Ex ic IIC T6 Gc

Ex ic IIC T80 °C Dc

**Modification number**

000 = Standard

**Notes:**

* For design and electrical connection see Dimensions

**Accessories:**

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
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.
For bar ranges see European Catalog

Dimensions:
Protection types and applications (code): D, C

Profile seal ring

male electr. conn. 3p + PE EN 175301-803 (DIN 43650)

Elastomer profile seal ring DIN3869

Protection types and applications (code): 9, A

The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection; e.g. female connector M12x1. 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part. No. 6098243

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com
Electronic
Pressure Transmitter
HDA 4300
with Flush Membrane
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

Description:
The pressure transmitter HDA 4300 in
IECEx Intrinsically Safe version has been
especially developed for use in potentially
explosive atmospheres and is based on
the HDA 4000 series.
As with the industrial version HDA 4300,
the devices with IECEx Intrinsically Safe
approval have the field-proven ceramic
measuring cell with thick-film strain
gauge.
The pressure connection is achieved
with an all-welded stainless steel
front membrane filled internally with
a pressure transfer fluid. The process
pressure is transmitted hydrostatically to
the measurement cell via the pressure
transfer fluid.
This device is used for applications in
which a standard pressure connection
could become blocked, clogged or
frozen by the particular medium used.
Further applications include processes
where the medium changes regularly
and any residues could cause mixing or
contamination of the media.
Intended areas of application are, for example,
the oil and gas industry, in mines, or in
locations with high levels of dust,
e.g. in mills.

Protection types and applications:
Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
Ex na IIC T6,T5,T4 Gc
Ex ic IIC T6,T5,Gc
Ex ia IIC T80/90/100 °C Da
Ex tb IIC T80/90/100 °C Db
Ex tc IIC T80/90/100 °C Dc
Ex ic IIC T80/90/100 °C Dc
Ex ia IIC T85 °C Da

Special features:
- Pressure connection has a flush
  membrane
- Accuracy: ≤ ± 0.5 % FS B.F.S.L.
- Certificate: IECEx KEM 08.0014X
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

Input data:
Measuring ranges 15, 30, 50, 100, 150, 250, 500 psi
Overload pressures 45, 100, 150, 290, 450, 725, 1500 psi
Burst pressure 70, 150, 250, 400, 650, 1000, 2500 psi
Mechanical connection G1/2 A DIN 3852
G1/2 with additional front O-ring seal
G1/4 with additional front O-ring seal
Pressure transfer fluid Silicon-free oil
Torque value 33 ft-lb (45 Nm) for G1/2, G1/2A
15 ft-lb (20 Nm) for G1/4
Parts in contact with medium \(^1\)
Stainless steel: 1.4435; 1.4301
Seal: FPM
O-ring: FPM

Output data:
Output signal, permitted load resistance 4 .. 20 mA, 2 conductor
Accuracy to DIN 16086, max. setting ≤ ± 0.5 % FS typ.
≤ ± 1.0 % FS max.
Accuracy at minimum setting ≤ ± 0.025 % FS typ.
≤ ± 0.5 % FS max.
Temperature compensation zero point ≤ ± 0.012% FS/FºC typ.
≤ ± 0.017% FS/FºC max.
Temperature compensation over range ≤ ± 0.012% FS/FºC typ.
≤ ± 0.017% FS/FºC max.
Non-linearity at max. setting to DIN 16086 ≤ ± 0.5 % FS max.
Hysteresis ≤ ± 0.4 % FS max.
Repeatability ≤ ± 0.1 % FS
Rise time ≤ ± 1.5 ms
Long term drift ≤ ± 0.3 % FS typ. / year

Environmental conditions:
Compensated temperature range -4, +185°F
Operating temperature range -4, +140°F
Storage temperature range -40, +212°F
Fluid temperature range \(^2\) -40, +140°F / -4, +140°F

C mark
EN 61000-6-1 / 2 / 3 / 4
EN 60079-0 / 11 / 26 / 36
Vibration resistance acc. to DIN EN 60068-2-6 at 10 .. 500 Hz
≤ 20 g
Protection class to IEC 60529
IP 65 (for male EN 175301-803 (DIN 43650))
IP 67 (for M12x1 male, when an IP 67 female connector is used)
Relevant data for Ex applications:
Ex ia, ic
Ex na, ta, tb, tc
Supply voltageUi = 12 .. 28 V
12 .. 28 V
Max. Input current Ii = 100 mA
Max. Input power Pi = 1 W
max. power consumption ≤ 1 W
Connection capacitance of the sensor C ≥ 22 nF
Inductance of the sensor Ls = 0 mH
Insulation voltage \(^3\) 50 V AC, with integrated overvoltage protection
EN 61000-6-2
Other data:
Residual ripple of supply voltage ≤ 5 %
Life expectancy > 10 million cycles
0 .. 100 % FS
Weight ~ 180 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection
are provided.
FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line
\(^1\) Other seal materials on request
\(^2\) -4 °F with FPM seal, -40 °F on request
\(^3\) 500 V AC on request
Areas of application:

<table>
<thead>
<tr>
<th>Code for use in Model code</th>
<th>D</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection types and applications</td>
<td>Ex ia I Ma</td>
<td>Ex ia IIC T6 Ga</td>
<td>Ex ia IIC T6 Gb</td>
<td>Ex nA IIC T6 Gc</td>
</tr>
<tr>
<td></td>
<td>Ex ia IIC T6 Ga/Gb</td>
<td>Ex ia IIC T85°C Da</td>
<td>Ex ia IIC T80°C</td>
<td>Ex lc IIC T6 Gc</td>
</tr>
<tr>
<td></td>
<td>Ex lc IIC T80°C Da</td>
<td>Ex lc IIC T80°C Dc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>IECEx KEM 08.0014X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zones / Categories</td>
<td>Equipment protection level Ma Mining</td>
<td>Equipment protection level Gb Gases/conductive dust</td>
<td>Equipment protection level Gc Gases Protection class: Non-sparking nA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td>Protection class: intrinsically safe ia with barrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
<td>4, 5, 6</td>
<td>6</td>
</tr>
</tbody>
</table>

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ia IIC T80/90/100 °C Da T100 °C Da, Ex ia IIIC T80/90/100 °C Da, Ex ia IIIC T80/90/100 °C Da and Ex lc IIIC T80/90/100 °C Dc are available with flying leads on request. Devices in the ignition protection class "non-sparking" for protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

Model code:

HDA 4 3 Z X – A – XXXX – XXX – I X X – 000 (PSI)

Mechanical process connection
Z = Flush membrane

Electrical connection
5 = Male 3 pole + PE,
EN 175301-803 (DIN 43650)
(female connector supplied)
6 = Male M12x1, 4 pole
(female connector not supplied)

Signal
A = 4 .. 20 mA, 2 conductor

Pressure ranges in psi
0015, 0030, 0050, 0100, 0150, 0250, 0500

Mechanical connection
G01 = G1/2 A, DIN 3852
G02 = G1/2 with additional front O-ring seal
G04 = G1/4 with additional front O-ring seal

Approval
I = IECEx

Insulation voltage
N = 50 V AC

Protection types and applications (code)
D = Ex ia I Ma
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T85 °C Da
Ex ia IIC T80 °C Da
Ex ia IIIC T80 °C T90 °C Da
Ex lb IIIC T80 °C Db
Ex lc IIC T6 Gc
Ex lc IIIC T80 °C Dc

Modification number
000 = Standard

Notes:
* For design and electrical connection see device dimensions

Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
Dimensions:
Protection types and applications (code): D, C

The Impact protected metal safety sleeve is included. A straight female connector is required for electrical connection. e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243

Note:
The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For bar ranges see European Catalog.
Description:
The electronic pressure transmitter HDA 4700 with flush membrane is certified in the ignition protection class Flameproof Enclosure to ATEX, IECEx, and CSA. The devices have triple approval, ensuring that they are universally suitable for use in potentially explosive environments around the world. Therefore it is no longer necessary to stock multiple devices with separate individual approvals.

The pressure connection is achieved with an all-welded stainless steel front membrane filled internally with a pressure transfer fluid. The process pressure is transmitted hydrostatically to the measurement cell via the pressure transfer fluid.

This device is used for applications in which a standard pressure connection could become blocked, clogged or frozen by the particular medium used. Further applications include processes where the medium changes regularly and any residues could cause mixing or contamination of the media, or in highly viscous media. Its main applications are in mining and the oil and gas industry, e.g. in underground vehicles, hydraulic power units (HPU), blow-out preventers (BOPs), drill drives or in lubrication systems.

Protection types and applications:
- CSA: Explosion Proof – Seal Not Required
  - Class I: Group A, B, C, D, T6, T5
  - Class II: Group E, F, G
  - Class III: Type 4
- ATEX Flame Proof
  - I M2 Ex d I Mb
  - II 2G Ex d IIC T6, T5 Gb
  - II 2D Ex tb IIIC T110 .. 130 °C Db
- IECEx Flame Proof
  - Ex d I Mb
  - Ex d IIC T6, T5 Gb
  - Ex tb IIC T110 .. 130 °C Db

Special features:
- Accuracy ≤ 0.25 % FS B.F.S.L.
- Certificates:
  - ATEX KEMA 10ATEX0100 X CSA MC 224264
  - IECEx KEM 10.0053X
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent durability

Technical data:

### Input data

<table>
<thead>
<tr>
<th>Measuring ranges</th>
<th>500, 750, 1000, 1500, 3000, 6000, 9000 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload ranges</td>
<td>1160, 1740, 2900, 2900, 7250, 11650, 14500 psi</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>2900, 4350, 7250, 7250, 14500, 2900, 29000 psi</td>
</tr>
<tr>
<td>Mechanical connection&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>G1/2 A DIN 3852</td>
</tr>
<tr>
<td>Pressure transfer fluid</td>
<td>Silicon-free oil</td>
</tr>
<tr>
<td>Torque value</td>
<td>33 ft-lb (45 Nm)</td>
</tr>
<tr>
<td>Parts in contact with medium</td>
<td>Stainless steel: 1.4435; 1.4301 Seal: FPM O-ring: FPM</td>
</tr>
<tr>
<td>Conduit housing material</td>
<td>1.4404; 1.4435 (316L)</td>
</tr>
</tbody>
</table>

### Output data

<table>
<thead>
<tr>
<th>Output signal, permitted load resistance&lt;sup&gt;2)&lt;/sup&gt;</th>
<th>4 .. 20 mA, 2 conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy to DIN 16086, max. setting</td>
<td>≤ ± 0.25 % FS typ.</td>
</tr>
<tr>
<td>Accuracy at minimum setting (B.F.S.L.)</td>
<td>≤ ± 0.5 % FS max.</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>≤ ± 0.0045% FS°F typ.</td>
</tr>
<tr>
<td>Zero point</td>
<td>≤ ± 0.0085% FS°F max.</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>≤ ± 0.0045% FS°F typ.</td>
</tr>
<tr>
<td>Over range</td>
<td>≤ ± 0.0085% FS°F max.</td>
</tr>
<tr>
<td>Non-linearity at max. setting to DIN 16086</td>
<td>≤ ± 0.3 % FS max.</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>≤ ± 0.1 % FS max.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤ ± 0.05 % FS</td>
</tr>
<tr>
<td>Rise time</td>
<td>≤ 1.5 ms</td>
</tr>
<tr>
<td>Long term drift</td>
<td>≤ ± 0.1 % FS typ. / year</td>
</tr>
</tbody>
</table>

### Environmental conditions

<table>
<thead>
<tr>
<th>Compensated temperature range</th>
<th>T5: -13..+176°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>T5: -40..+176°F</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Fluid temperature range&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>T5: -40..+176°F</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Vibration resistance to DIN EN 60068-2-6 at 10 ..500 Hz</td>
<td>≤ 20 g</td>
</tr>
<tr>
<td>Protection class to IEC 60529 to ISO 20653</td>
<td>IP 65 (Vented Gauge)</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Other data</td>
<td>IP 69K (Sealed Gauge)</td>
</tr>
</tbody>
</table>

### Other data

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>8 .. 30 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual ripple of supply voltage</td>
<td>≤ 5 %</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>&gt; 10 million load cycles, 0 .. 100 % FS</td>
</tr>
<tr>
<td>Weight</td>
<td>~ 300 g</td>
</tr>
</tbody>
</table>

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

FS (Full Scale) = relative to complete measuring range
B.F.S.L. = Best Fit Straight Line

<sup>1)</sup> Other mechanical connections on request
<sup>2)</sup> Other output signals on request
<sup>3)</sup> -4 °F with FPM seal, -40 °F on request
**Pin connections:**

**Conduit (single cores):**

Core: HDA 47Z9-A
- red: Signal +
- black: Signal -
- green: Housing
- yellow

**Conduit (flying leads):**

Core: HDA 47ZG-A
- white: Signal -
- brown: Signal +
- green: n.c.
- yellow: n.c.

**Areas of application:**

<table>
<thead>
<tr>
<th>Approvals</th>
<th>cCSAUS: Explosion Proof - Seal not required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ATEX: Flame Proof</td>
</tr>
<tr>
<td></td>
<td>IECEx: Flame Proof</td>
</tr>
<tr>
<td>Certificate</td>
<td>ATEX KEMA 10ATEX100X</td>
</tr>
<tr>
<td></td>
<td>CSA MC 224264</td>
</tr>
<tr>
<td></td>
<td>IECEx KEM 10.0053X</td>
</tr>
<tr>
<td>Applications /</td>
<td></td>
</tr>
<tr>
<td>Protection types</td>
<td></td>
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<tr>
<td></td>
<td>cCSAUS:</td>
</tr>
<tr>
<td></td>
<td>Class I Group A, B, C, D, T6; T5</td>
</tr>
<tr>
<td></td>
<td>Class II Group E, F, G</td>
</tr>
<tr>
<td></td>
<td>Class III</td>
</tr>
<tr>
<td></td>
<td>Type 4</td>
</tr>
<tr>
<td>ATEX:</td>
<td>I M2 Ex d I Mb</td>
</tr>
<tr>
<td></td>
<td>II 2G Ex d IIC T6, T5 Gb</td>
</tr>
<tr>
<td></td>
<td>II 2D Ex tb IIC T110 .. 130 °C Db</td>
</tr>
<tr>
<td>IECEx:</td>
<td>Ex d I Mb</td>
</tr>
<tr>
<td></td>
<td>Ex d IIC T6, T5 Gb</td>
</tr>
<tr>
<td></td>
<td>Ex tb IIC T110 .. 130 °C Db</td>
</tr>
</tbody>
</table>

**Model code:**

HDA 4 7 Z X – A – XXXX – XXX – D X – 000 (PSI) (72in)

**Mechanical process connection**
- Z = Flush membrane

**Electrical connection**
- 9 = 1/2-14 NPT Conduit (male thread), single cores
- G = 1/2-14 NPT Conduit (male thread), flying leads

**Signal**
- A = 4 .. 20 mA, 2 conductor

**Pressure ranges in psi**
- 500, 750, 1000, 1500, 3000, 5000, 6000, 9000

**Mechanical connection**
- G01 = G1/2 A, DIN 3852
- G02 = G1/2 with additional front O-ring seal

**Approval**
- CSA Explosion Proof – Seal not required
- ATEX Flame Proof
- IECEx Flame Proof

**Type of measurement cell**
- S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi
- V = Vented Gauge (vented to atmosphere) ≤ 300 psi

**Modification number**
- 000 = Standard

**Cable length in inches**
- Standard = 72 inches

**Accessories:**

Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.
Dimensions:

* optional, depending on gauge type "Sealed Gauge" / "Vented Gauge"

Note:

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications. For bar ranges see European Catalog
**Description:**
The HYDAC HFS 2100 flow switch in ATEX version has been specially developed for use in potentially explosive atmospheres. Like the standard version it is based on the variable area float principle, and can be mounted in any position.

The test medium moves a spring-loaded float in the direction of flow, depending on the flow rate. A fully encapsulated reed contact is fitted to the outside of the instrument and is therefore separate from the flow circuit. When the magnet inside the float reaches the preset position, the reed contact switches.

Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust contamination, e.g. in mills.

**Protection types and applications:**
- II 2G Ex mb II T6 / T5
- II 2D Ex tD A21 IP67 T80 °C / T100 °C

**Medium:**
- Oils / viscous fluids

**Special features:**
- Accuracy ± 10 % FS
- Viscosity compensation from 30 .. 600 cSt
- Any mounting position
- High level of functional reliability
- High level of switching accuracy
- Stepless switch point setting by user
- High pressure resistance
- Threaded connection
- Certificate: PTB 03 ATEX 2159 X
- PTB 03 ATEX N056-3

**Technical data:**

### Input data

<table>
<thead>
<tr>
<th>Switching ranges [l/min]</th>
<th>Size 1</th>
<th>Size 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 .. 1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.8 .. 3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0 .. 7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 .. 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 .. 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 .. 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 .. 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 .. 45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 .. 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 .. 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 .. 110</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operating pressure

- Brass version: 300 bar
- Stainless steel version: 350 bar

### Pressure drop

- 0.02 .. 0.2 bar
- 0.02 .. 0.4 bar

### Mechanical connection

- See dimensions

### Parts in contact with medium

- Brass version: St. steel 1.4571; FPM 1); brass nickel-pl.; brass; hard ferrite
- Stainless steel version: Stainless steel 1.4571; FPM 1); hard ferrite

### Output data

- Switching outputs: 1 or 2 Reed contacts
- Change-over or normally open type 2)
- Accuracy 3): ± 10 % FS
- Repeatability: 2 % FS max.

### Switching capacity

- Change-over contact: max. 250 V / 1 A / 30 W
- Back-up fuse 1 A (outside the hazardous area)
- N/O contact: max. 250 V / 2 A / 60 W
- Back-up fuse 2 A (outside the hazardous area)

### Environmental conditions

- Operating temperature range:
  - T6 / T80 °C: -20 .. +75 °C
  - T5 / T100 °C: -20 .. +90 °C
- Fluid temperature range:
  - T6 / T80 °C: -20 .. +75 °C
  - T5 / T100 °C: -20 .. +90 °C
- Max. surface temperature:
  - T6 / T80 °C: +75 °C
  - T5 / T100 °C: +90 °C
- Viscosity range: 30 .. 600 cSt
- CE - mark: Directive 2006 / 95 / EC
- Directive 2004 / 108 / EC
- Directive 94 / 9 / EC
- EN 60079-0:2006 / EN 60079-18:2004
- EN 61241-0:2006 / EN 61241-1:2004
- Protection class to IEC 60529: IP 67

### Other data

- Housing material: Brass (nickel-plated) or stainless steel 1.4571
- Electrical connection: Flying leads (2 m cable length)

Note: 1) Other seal materials available on request
2) The contact opens / switches when the flow falls below the pre-set switching point.
3) 3% possible with calibration to a certain viscosity.
Pin assignment:

<table>
<thead>
<tr>
<th>Core</th>
<th>HFS 21X1-XS</th>
<th>HFS 21X1-XW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/O contact</td>
<td>Centre</td>
</tr>
<tr>
<td>2</td>
<td>N/C contact</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N/O contact</td>
<td></td>
</tr>
</tbody>
</table>

Notes on installation:
- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors).

Safety instructions:
- The circuits must not incorporate any effective inductance or capacitance.
- The maximum ratings stipulated in the technical data must never be exceeded, not even for a short time.
- To protect the switching contact, a fuse for the circuit must be provided outside the hazardous area, unless the switching unit is connected to an intrinsically safe circuit.
- Unless the device is connected to an intrinsic safe circuit, special safety precautions have to be implemented.
- The device may be used in hazardous areas designated as category 2.
- The device must not be used in areas where there is a possibility that an electrostatic charge can be caused in the plastic housing.
- The device must not be used in machinery, systems or medical apparatus where, in the event of a malfunction, persons, animals or equipment could be harmed or damaged.

Model code:

<table>
<thead>
<tr>
<th>HFS 2 1 X 1 – XX – XXXX–XXXX – 7 – X – X – A00</th>
</tr>
</thead>
</table>

Measuring principle
2 = Variable area float

Test medium
1 = Oils / viscous fluids

Mechanical connection
1 = 1/4 "
2 = 3/8 "
3 = 1/2 "
4 = 3/4 "
5 = 1 "

Electrical connection
1 = Flying leads (2m in length)

Switching contacts
1S = 1 N/O contact
2S = 2 N/O contacts
1W = 1 Change-over contact
2W = 2 Change-over contacts

Switching ranges in l/min
- Oil 10 % - Size 1-
  0.5-0.8, 0.8-1.6, 1.6-3.2, 3.2-7.0
- Oil 10 % - Size 2-
  0.5-0.8, 0.8-1.5, 1.5-3.0, 3.0-6.0, 6.0-10.0

Accuracy
7 = ≤ 10.0 % FS

Housing material
B = Brass (nickel-plated)
S = Stainless steel

Mechanical indicator
0 = Without indicator
1 = With indicator

Modification number
A00 = ATEX version for potentially explosive areas

Notes:

1) Mechanical connection options depend on housing type (see Dimensions).
2) When the model with 2 switching contacts is selected, the second contact is mounted on the side of the instrument, at 90° to the first contact.
3) Other models available on request.

Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.
### Dimensions without indicator:

**OIL -Size 1- without indicator**

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>SW</td>
</tr>
<tr>
<td>0.5 .. 1.6</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>0.8 .. 3.0</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>2.0 .. 7.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) Standard

---

**OIL -Size 2- without indicator**

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>SW</td>
</tr>
<tr>
<td>0.5 .. 1.5</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>1 .. 4</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>1 .. 8</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>2 .. 30</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>3 .. 10</td>
<td>15</td>
<td>34</td>
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<tr>
<td></td>
<td>20</td>
<td>40</td>
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<tr>
<td>5 .. 15</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>8 .. 24</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>10 .. 30</td>
<td>20</td>
<td>34</td>
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<td></td>
<td>25</td>
<td>40</td>
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<tr>
<td>15 .. 45</td>
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<td>34</td>
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<td>25</td>
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<tr>
<td>20 .. 60</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>40</td>
</tr>
</tbody>
</table>

*) Standard
### Dimensions with indicator:

#### OIL -Size 1- with indicator

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>SW</td>
</tr>
<tr>
<td>0.5 .. 1.6</td>
<td>15</td>
<td>30</td>
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<tr>
<td>0.8 .. 3.0</td>
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<td>35</td>
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<tr>
<td>2.0 .. 7.0</td>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

#### OIL -Size 2- with indicator

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>SW</td>
</tr>
<tr>
<td>0.5 .. 1.5</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>1 .. 4</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>2 .. 8</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>3 .. 10</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
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<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>5 .. 15</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
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<tr>
<td>8 .. 24</td>
<td>15</td>
<td>34</td>
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<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>10 .. 30</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>15 .. 45</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>20 .. 60</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>30 .. 90</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>35 .. 110</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

* Standard

### Note:

The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.
Description:
The HYDAC HFS 2500 flow switch in ATEX version has been specially developed for use in potentially explosive atmospheres. Like the standard version it is based on the variable area float principle, and can be mounted in any position.
The test medium deflects a spring-loaded float in the direction of flow, depending on the flow rate. A fully encapsulated reed contact is fitted to the outside of the device and is therefore separate from the flow circuit. When the magnet inside the float reaches the preset position, the reed contact switches.

Intended areas of application are, for example, the oil and gas industry, on gas turbines or in locations with high levels of dust, e.g. in mills.

Protection types and applications:
II 2G Ex mb II T6 / T5
II 2D Ex tD A21 IP67 T80 °C / T100 °C

Medium:
• Water / water-based media

Special features:
• Accuracy ≤ ± 5 % or ≤ ± 10 % FS
• Any mounting position
• High level of functional reliability
• High level of switching accuracy
• Stepless switch point setting by user
• High pressure resistance
• Threaded connection
• Certificate:
  PTB 03 ATEX 2159 X
  PTB 03 ATEX N056-3

Technical data:

Input data:

<table>
<thead>
<tr>
<th>Switching ranges [l/min]</th>
<th>5 % accuracy</th>
<th>10 % accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size 2</td>
<td>Size 3</td>
</tr>
<tr>
<td>0.2 .. 4.0</td>
<td>0.02 .. 0.2</td>
<td>10 .. 30</td>
</tr>
<tr>
<td>0.6 .. 5.0</td>
<td>0.2 .. 0.6</td>
<td>15 .. 45</td>
</tr>
<tr>
<td>0.5 .. 8.0</td>
<td>0.4 .. 1.8</td>
<td>20 .. 60</td>
</tr>
<tr>
<td>1 .. 14</td>
<td>0.8 .. 3.2</td>
<td>30 .. 90</td>
</tr>
<tr>
<td>1 .. 28</td>
<td>2 .. 7</td>
<td>60 .. 150</td>
</tr>
<tr>
<td>2 .. 40</td>
<td>3 .. 13</td>
<td></td>
</tr>
<tr>
<td>4 .. 55</td>
<td>4 .. 20</td>
<td></td>
</tr>
<tr>
<td>1 .. 70</td>
<td>8 .. 30</td>
<td></td>
</tr>
</tbody>
</table>

Operating pressure
Brass version 200 bar
Stainless steel version 300 bar
Pressure drop [bar] 0.02 .. 0.8
Mechanical connection See dimensions

Parts in contact with medium
Brass version Stainless steel 1.4571; NBR
Stainless steel version Stainless steel 1.4571; FPM

Output data:
Switching outputs 1 or 2 reed contacts
Change-over or normally open type ²)
Accuracy ≤ ± 5 % or ≤ ± 10 % FS
Repeatability 2 % FS max.

Switching capacity
Change-over contact max. 250 V / 1 A / 30 W
Back-up fuse 1 A (outside the hazardous area)
N/O contact max. 250 V / 2 A / 60 W
Back-up fuse 2 A (outside the hazardous area)

Environmental conditions
Operating temperature range T6 / T80 °C: -20 .. +75 °C
T5 / T100 °C: -20 .. +90 °C
Fluid temperature range T6 / T80 °C: -20 .. +75 °C
T5 / T100 °C: -20 .. +90 °C
Max. surface temperature T6 / T80 °C: +75 °C
T5 / T100 °C: +90 °C

CE mark Directive 2006 / 95 / EC
Directive 2004 / 108 / EC
Directive 94 / 9 / EC
EN 60079-0:2006 / EN 60079-18:2004
EN 61241-0:2006 / EN 61241-1:2004

Protection class to IEC 60529 IP 67

Other data
Housing material Brass (nickel-plated) or stainless steel 1.4571
Electrical connection Flying leads (2 m cable length)

Note: ¹) Other seal materials available on request
²) The contact opens / switches when the flow falls below the pre-set switching point.
Model code:


Measuring principle
2 = Variable area float

Test medium
5 = Water or water-based

Mechanical connection
1 = 1/4”
2 = 3/8”
3 = 1/2”
4 = 3/4”
5 = 1”
6 = 1 1/4”
7 = 1 1/2”

Electrical connection
1 = Flying leads (2m in length)

Switching contacts
1S = 1 N/O contact
2S = 2 N/O contacts
1W = 1 Change-over contact
2W = 2 Change-over contacts

Switching ranges in l/min

Water 5%
00.2-04.0; 00.6-05.0; 00.5-08.0;
01.0-0014; 01.0-0028; 02.0-0040; 04.0-0055;
01.0-0070; 08.0-0090; 0005-0110; 0010-0150;
0035-0220; 0035-0250;

Water 10% - Size 2 -
0.02-00.2; 00.2-00.6; 00.4-01.8; 00.8-03.2;
02.0-07.0; 03.0-0013; 04.0-0020; 08.0-0030

Water 10% - Size 3 -
0010-0030; 0015-0045; 0020-0060;
0030-0090; 0060-0150

Accuracy
6 = ≤ 5.0 % FS
7 = ≤ 10.0 % FS

Housing material
B = Brass, nickel-plated
S = Stainless steel

Mechanical indicator
0 = Without indicator
1 = With indicator

Modification number
A00 = ATEX version for potentially explosive areas

3) Mechanical connection options depend on housing type (see Dimensions)
4) When the model with 2 switching contacts is selected, the second switching contact is mounted on the side of the instrument, at 90° to the first contact.
5) Other models available on request.

Notes on installation:

- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

Safety instructions:

- The circuits must not incorporate any effective inductance or capacities.
- The maximum ratings stipulated in the technical data must never be exceeded, even for a short time.
- To protect the switching contact, a fuse for the circuit must be provided outside the hazardous area, unless the switching unit is connected to an intrinsically safe circuit.
- Unless the device is connected to an intrinsic safe circuit, special safety precautions have to be implemented.
- The device may be used in hazardous areas designated as category 2.
- The device must not be used in areas where an electrical charge in the plastic housing is likely.
- The device must not be used in machinery, systems or medical apparatus where, in the event of a malfunction, persons, animals or equipment could be harmed or damaged.

Pin connections:

<table>
<thead>
<tr>
<th>Pin</th>
<th>HFS 25X1-XS</th>
<th>HFS 25X1-XW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/O contact</td>
<td>Centre</td>
</tr>
<tr>
<td>2</td>
<td>N/C contact</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N/O contact</td>
<td></td>
</tr>
</tbody>
</table>

Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.
### Dimensions without indicator:

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SW  D  B  G  DN  T  L</td>
<td></td>
</tr>
<tr>
<td>Water 5 % accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2 .. 4.0</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>0.6 .. 5.0</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>0.8 .. 8.0</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>1 .. 15</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>2 .. 40</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>4 .. 55</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

### Water 10 % Accuracy - Size 2-

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
<td>31</td>
</tr>
</tbody>
</table>

### Water 10 % Accuracy - Size 3-

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 .. 30</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>15 .. 45</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>20 .. 60</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>30 .. 90</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>60 .. 150</td>
<td>34</td>
<td>47</td>
</tr>
</tbody>
</table>

* Standard
### Dimensions with indicator:

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SW</td>
<td>D</td>
</tr>
<tr>
<td>Water 5 % accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2 ... 4.0</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>0.6 ... 5.0</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td>0.5 ... 8.0</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td>1 ... 14</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>1 ... 28</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>2 ... 40</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>4 ... 55</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>8 ... 90</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>5 ... 110</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>10 ... 150</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>35 ... 220</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>35 ... 250</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

### Water 10 % Accuracy - Size 2-

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02 ... 0.2</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>0.2 ... 0.6</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>0.4 ... 1.8</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>0.8 ... 3.2</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2.0 ... 7.0</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3.0 ... 13.0</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4.0 ... 20.0</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>8.0 ... 30.0</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

### Water 10 % Accuracy - Size 3-

<table>
<thead>
<tr>
<th>Type [l/min]</th>
<th>Installation dimensions [mm]</th>
<th>Weight (approx.) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ... 30</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>15 ... 45</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>20 ... 60</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>30 ... 90</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

1) Standard

---

**Note:**

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications.

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**HYDAC ELECTRONICS**

90 Southland Dr. Bethlehem, PA 18017

Telephone +1 (610) 266-0100

E-mail: electronics@hydacusa.com

Website: www.hydacusa.com
Flow Rate Transmitter
HFT 3100
ATEX, IECEx, CSA
Flameproof enclosure with HART Interface

Description:
HFT 3100 with HART interface is a compact flow rate transmitter with flameproof enclosure specially developed for applications in hydraulic systems and other fluid power systems. The triple approval in accordance with ATEX, IECEx and CSA enables universal, world-wide utilisation of the devices in potentially explosive atmospheres. HFT 3100 operates in accordance with the turbine principle, which means that the rpm of an impeller wheel rotating in the flow of the media is recorded and converted into a 4 – 20 mA analogue signal. In addition with the analogue output of the measured value, digital communication is possible by means of the HART protocol.

Two additional SAE 6 threaded bore holes in the turbine housing provide the flow rate transmitter with additional connection options, e.g. for temperature and pressure sensors.

Technical data:

Input data

<table>
<thead>
<tr>
<th>Measuring ranges and operating pressure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX- F21-0020</td>
<td>0.32...5.28 gpm</td>
</tr>
<tr>
<td>HFT 31XX- F21-0060</td>
<td>1.59...15.85 gpm</td>
</tr>
<tr>
<td>HFT 31XX- F21-0300</td>
<td>3.96...79.25 gpm</td>
</tr>
<tr>
<td>HFT 31XX- F21-0600</td>
<td>10.57...158.5 gpm</td>
</tr>
</tbody>
</table>

Additional connection options
2 x SAE 6 female threads for pressure or temperature sensors

Parts in contact with fluid
Stainless steel: 316L, 329, tungsten carbide

Output data

4...20 mA, 2 conduits, with HART Protocol
R_{\text{max}} = (U_B - 12 V) / 20 mA [k\Omega]

HART Communication
According to HART 7 specification
Altering of measuring range limits (see table)

Accuracy
≤ 2 % of the actual value

Ambient conditions

Compensated temperature range
-40...+158 °F

Operating/ Ambient temperature range
T6, T110: Ta = -40..140 °F
T5: Ta = -40..158 °F

Storage temperature range
-40...+212 °F

Fluid temperature range
T6, T110: Ta = -40..140 °F
T5: Ta = -40..158 °F

Vibration resistance
dIN EN 60068-2-6 at 10...500 Hz

Protection class
IEC 60529
IP 69
ISO 20653
IP 69K

Other data

Viscosity range
1...100 cSt

Calibration viscosity
30 cSt

Supply voltage
12...30 VDC

Residual ripple of supply voltage
46 bis 125 Hz: < 0.2 Vpp
> 125 Hz < 1.2 mVRMS

Current consumption
≤ 25mA

Weight:
HFT 318X- F21-0020, SAE 8: approx. 2.5 kg
HFT 319X- F21-0060, SAE 14: approx. 4.0 kg
HFT 31AX- F21-0300, SAE 20: approx. 5.5 kg
HFT 31BX- F21-0600, SAE 24: approx. 7.0 kg

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

* not for measuring range: 0.32...5.28 gpm

**T120 °C at Ta = -40..+158 °F with electrical connection single leads available
Measuring Range Limits:
By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring ranges:

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Lower measuring range limit</th>
<th>Upper measuring range limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 3100</td>
<td>0 % FS</td>
<td>25% FS</td>
</tr>
<tr>
<td></td>
<td>75 % FS</td>
<td>100 % FS</td>
</tr>
</tbody>
</table>

Areas of applications:

<table>
<thead>
<tr>
<th>CSA</th>
<th>Single leads Electrical connection &quot;9&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>Jacketed cable Electrical connection &quot;G&quot;</td>
</tr>
<tr>
<td>IECEx</td>
<td>EXPLOSION PROOF - seal not required</td>
</tr>
<tr>
<td>cCSA US</td>
<td>EXPLOSION PROOF - seal not required</td>
</tr>
<tr>
<td>ATEX</td>
<td>EXPLOSION PROOF - seal not required</td>
</tr>
<tr>
<td>IECEx</td>
<td>EXPLOSION PROOF - seal not required</td>
</tr>
</tbody>
</table>

Dimensions:

<table>
<thead>
<tr>
<th>Pin connections:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit (single leads)</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Conduit (jacketed cable)</td>
</tr>
</tbody>
</table>

Pin connections:

<table>
<thead>
<tr>
<th>Lead</th>
<th>HFT 31x9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Signal</td>
</tr>
<tr>
<td>red</td>
<td>Signal +</td>
</tr>
<tr>
<td>black</td>
<td>Signal -</td>
</tr>
<tr>
<td>green-yellow</td>
<td>Housing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>white</td>
<td>Signal -</td>
</tr>
<tr>
<td>brown</td>
<td>Signal +</td>
</tr>
<tr>
<td>green</td>
<td>n.c.</td>
</tr>
<tr>
<td>yellow</td>
<td>n.c.</td>
</tr>
</tbody>
</table>
Without threaded holes for temperature and pressure sensors:

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement range</th>
<th>L</th>
<th>H</th>
<th>D / SW</th>
<th>G</th>
<th>Tightening torque</th>
<th>DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX-F21-0020</td>
<td>0.32 .. 5.28 gpm</td>
<td>117 mm</td>
<td>158 mm</td>
<td>60 / 56 mm</td>
<td>SAE 8 (3/4 -16 UNF 2B)</td>
<td>60 Nm</td>
<td>7 mm</td>
</tr>
</tbody>
</table>

With threaded holes for temperature and pressure sensors:

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement range</th>
<th>L</th>
<th>H</th>
<th>D / SW</th>
<th>G</th>
<th>Tightening torque</th>
<th>DN</th>
<th>Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX-F21-0060</td>
<td>1.59 .. 15.85 gpm</td>
<td>144 mm</td>
<td>160 mm</td>
<td>63 / 60 mm</td>
<td>SAE 14 (1 3/16 -12 UN 2B)</td>
<td>140 Nm</td>
<td>11 mm</td>
<td>SAE 6</td>
</tr>
<tr>
<td>HFT 31XX-F21-0300</td>
<td>3.96 .. 79.25 gpm</td>
<td>155 mm</td>
<td>173 mm</td>
<td>75.5 / 72 mm</td>
<td>SAE 20 (1 5/8 -12 UN 2B)</td>
<td>290 Nm</td>
<td>22 mm</td>
<td>SAE 6</td>
</tr>
<tr>
<td>HFT 31XX-F21-0600</td>
<td>10.57 .. 158.5 gpm</td>
<td>181 mm</td>
<td>178 mm</td>
<td>81 / 76 mm</td>
<td>SAE 24 (1 7/8 -12 UN 2B)</td>
<td>325 Nm</td>
<td>30 mm</td>
<td>SAE 6</td>
</tr>
</tbody>
</table>

**Model code:**

HFT 31 X X – F21 – XXXX – S- X - D - 000  (72”)

**Mechanical Process Connection**

- **8** = 3/4 -16 UNF 2B (SAE8 female)
  - only for mr: 1.2 .. 20 l/min
- **9** = 3/16 -12 UN 2B (SAE14 female)
  - only for mr: 6 .. 60 l/min
- **H** = 1 5/8 -12 UN 2B (SAE 20 female)
  - only for mr: 15 .. 300 l/min
- **B** = 1 7/8 -12 UN 2B (SAE24 female)
  - only for mr: 40 .. 600 l/min

**Electrical connection**

- **9** = 1/2-14 NPT Conduit (male thread), single leads
- **G** = 1/2-14 NPT Conduit (male thread), jacketed cable

**Signal**

- **F21** = 4 .. 20 mA (with HART Interface)

**Measuring ranges**

- **0020** = 0.32 .. 5.28 gpm
- **0060** = 1.59 .. 15.85 gpm
- **0300** = 3.96 .. 79.25 gpm
- **0600** = 10.57 .. 158.5 gpm

**Housing material**

- **S** = Stainless steel

**Housing design**

- **1** = without threaded bore (measuring ranges 0020)
- **3** = with two additional female threads 9/16-18 UNF 2B (SAE 6), (measuring ranges 0060, 0300, 0600)

**Approval**

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

**Modification number**

- **000** = standard

**Cable length in inch**

- Standard = 72 inch

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

Status 2015-04-14
Flow Rate Transmitter HFT 3100

ATEX, IECEx
Intrinsically safe
Dustproof housing
Non-sparking
With HART Interface

Description:
HFT 3100 with HART interface is a compact flow rate transmitter with intrinsically safe specialty developed for applications in hydraulic systems and other fluid power systems. The double approval in accordance with ATEX and IECEx enables universal, almost world-wide utilisation of the devices in potentially explosive atmospheres.

The current flow is determined by means of a sensor according to the turbine principle. In addition with the analogue 4-20 mA output of the measured value, digital communication is possible by means of the HART protocol.

The main fields of application are in the oil & gas industry, gas turbines. The device is also used in mining applications as well as in areas with high dust loads.

Two additional threaded bore holes in the turbine housing provide the flow rate transmitter with additional connection options, e.g. for temperature and pressure sensors.

Protection types and applications

<table>
<thead>
<tr>
<th>ATEX</th>
<th>I</th>
<th>Ex ia I Ma</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1G</td>
<td></td>
<td>Ex ia IIC T6,T5 Ga</td>
</tr>
<tr>
<td>I1D</td>
<td></td>
<td>Ex ia IIC T6,T5 Ga/Gb</td>
</tr>
<tr>
<td>I2G</td>
<td></td>
<td>Ex ia IIC T6,T5 Gb</td>
</tr>
<tr>
<td>I2D</td>
<td></td>
<td>Ex ia IIC T6,T5,Gc</td>
</tr>
<tr>
<td>I3G</td>
<td></td>
<td>Ex ia 3IE T6,T5,Gc</td>
</tr>
<tr>
<td>I3D</td>
<td></td>
<td>Ex ia IIC T80/90/100°C</td>
</tr>
<tr>
<td>I4G</td>
<td></td>
<td>Ex ia IIC T80/90/100°C</td>
</tr>
<tr>
<td>I4D</td>
<td></td>
<td>Ex ia IIC T80/90/100°C</td>
</tr>
</tbody>
</table>

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 IIC T6,T5 Gc
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C
Ex ia IIC T80/90/100°C

Technical Details

**Input data**

<table>
<thead>
<tr>
<th>Measuring range and operating pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX- F21-0020 0.32  ..  5.28 gpm 6090psi</td>
</tr>
<tr>
<td>HFT 31XX- F21-0060 1.59  ..  15.85 gpm 6090psi</td>
</tr>
<tr>
<td>HFT 31XX- F21-0300 3.96  ..  79.25 gpm 6090 psi</td>
</tr>
<tr>
<td>HFT 31XX- F21-0600 10.57 ..  158.5 gpm 6090 psi</td>
</tr>
</tbody>
</table>

**Additional connection options**

2 x 9AE female threads for pressure or temperature sensors with relevant approvals

**Parts in contact with fluid**

Stainless steel: 316L, 329, tungsten carbide

**Output data**

<table>
<thead>
<tr>
<th>Output signal, max. load resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA, 2 conductor, with HART Protocol</td>
</tr>
<tr>
<td>$R_{\text{ref}} = (U_{\text{ref}} - 12 \text{ V}) / 20 \text{ mA}$ (1mA)</td>
</tr>
<tr>
<td>With HART communication min. 250 Ω</td>
</tr>
</tbody>
</table>

**HART Communication**

According to HART 7 specifications

**Common Practice Commands i.e.**

Tuning of measuring range limits (see table)

**Accuracy**

$\leq 2\%$ of the actual value

**Ambient conditions**

<table>
<thead>
<tr>
<th>Compensated temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-40 \ldots +158^\circ \text{ F}$</td>
</tr>
</tbody>
</table>

**Operating temperature range**

<table>
<thead>
<tr>
<th>T6, T80, T85°C, T100°C Da</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-13 \ldots 140^\circ \text{ F}$</td>
</tr>
<tr>
<td>$-13 \ldots 158^\circ \text{ F}$</td>
</tr>
<tr>
<td>$-13 \ldots 176^\circ \text{ F}$</td>
</tr>
</tbody>
</table>

**Storage temperature range**

<table>
<thead>
<tr>
<th>T6, T80, T85°C, T100°C Da</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-40 \ldots +212^\circ \text{ F}$</td>
</tr>
</tbody>
</table>

**Fluid temperature range**

<table>
<thead>
<tr>
<th>T6, T80, T85°C, T100°C Da</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-13 \ldots 140^\circ \text{ F}$</td>
</tr>
<tr>
<td>$-13 \ldots 158^\circ \text{ F}$</td>
</tr>
<tr>
<td>$-13 \ldots 176^\circ \text{ F}$</td>
</tr>
</tbody>
</table>

**Voltage class IEC 60529**

IP 67

**Relevant data for Ex-applications**

| $U = 12 \ldots 28 \text{ V}$ |
| $I = 100 \text{ mA}$ |
| $P_{\text{max}} = 0.7 \text{ W}$ |
| $C_{\text{max}} = 22 \text{ nF}$ |
| $L = 0 \text{ mH}$ |

**Isolation voltage**

$50 \text{ VA}, \text{ with integrated overvoltage protection according to EN 61000-6-2}$

**Other data**

<table>
<thead>
<tr>
<th>Residual ripple of supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$46 \text{ Hz} &lt; 0.2 \text{ Vpp}$</td>
</tr>
<tr>
<td>$&gt; 125 \text{ Hz} &lt; 1.2 \text{ mV RMS}$</td>
</tr>
<tr>
<td>$\leq 25 \text{ mA}$</td>
</tr>
<tr>
<td>Measuring medium</td>
</tr>
<tr>
<td>Hydraulic oil, water based fluid</td>
</tr>
<tr>
<td>Viscosity range</td>
</tr>
<tr>
<td>$1 \ldots 100 \text{ cSt}$</td>
</tr>
<tr>
<td>Calibration viscosity</td>
</tr>
<tr>
<td>$30 \text{ cSt}$</td>
</tr>
</tbody>
</table>

**Weight**

| HFT 31XX- F21-0020 2.5 kg |
| HFT 31XX- F21-0060 4.0 kg |
| HFT 31XX- F21-0300 5.7 kg |
| HFT 31XX- F21-0600 7.0 kg |

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

1) not available for size 1.2.. 20 l/min
Measuring Range Limits:
By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring ranges:

<table>
<thead>
<tr>
<th>Lower measuring range limit</th>
<th>Upper measuring range limit</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>min</td>
<td>max</td>
<td>min</td>
</tr>
<tr>
<td>0 % FS</td>
<td>75 % FS</td>
<td>25% FS</td>
</tr>
</tbody>
</table>

Applications:

<table>
<thead>
<tr>
<th>Code for use in model code</th>
<th>1</th>
<th>9</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX DEKRA 13ATEX0031X DEKRA 13ATEX0032</td>
<td>II 1G</td>
<td>II 2G</td>
<td>II 1D</td>
<td>II 3G</td>
</tr>
<tr>
<td></td>
<td>Ex ia IIC T6,T5 Ga</td>
<td>Ex ia IIC T6,T5 Ga/Gb</td>
<td>Ex ia III T85/T95°C Da</td>
<td>Ex ia IIC T6,T5 Ga</td>
</tr>
<tr>
<td></td>
<td>Ex ia IIC T6,T5 Ga</td>
<td>Ex ia IIC T6,T5 Ga/Gb</td>
<td>Ex ia III T85/T95°C Da</td>
<td>Ex ia IIC T6,T5 Ga</td>
</tr>
<tr>
<td>IECEx DEK 14.0011X</td>
<td>Ex ia I Ma</td>
<td>Ex ia IIC T6,T5 Ga</td>
<td>Ex ia IIC T6,T5 Ga/Gb</td>
<td>Ex ia IIC T6,T5 Ga</td>
</tr>
<tr>
<td></td>
<td>Ex ia III T85/T95°C Da</td>
<td>Ex ia III T85/T95°C Da</td>
<td>Ex ia III T85/T95°C Da</td>
<td>Ex ia IIC T6,T5 Ga</td>
</tr>
</tbody>
</table>

Application areas:
- Mining
- Protection class: Intrinsically safe ia with barrier
- Gases
- Protection class: Intrinsically safe ia with barrier
- Gases
- Protection class: Intrinsically safe ia with barrier
- Gases
- Protection class: Non-sparking nA
- Conductive dust
- Protection class: Intrinsically safe ic with barrier
- Gases
- Conductive dust
- Protection class: Intrinsically safe ic with barrier
- Gases
- Conductive dust
- Protection class: Intrinsically safe ic with barrier

Electrical connection (See model code):
- 6

Dimensions:

**Impact protection / Safety sleeve:**
Protection types and applications:
(code): 9, A
The impact protection / safety sleeve is included in the scope of supply. A straight female connector is required for electrical connection. E.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part.no. 6098243
Without threaded holes for temperature and pressure sensors:

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement range</th>
<th>L</th>
<th>H</th>
<th>D/SW</th>
<th>G</th>
<th>Tightening torque</th>
<th>DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX-F21-0020</td>
<td>0.32 .. 5.28 gpm</td>
<td>117 mm</td>
<td>158 mm</td>
<td>60 / 56 mm</td>
<td>SAE 8 (3/4 -16 UNF 2B)</td>
<td>60 Nm</td>
<td>7 mm</td>
</tr>
</tbody>
</table>

With threaded holes for temperature and pressure sensors:

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement range</th>
<th>L</th>
<th>H</th>
<th>D/SW</th>
<th>G</th>
<th>Tightening torque</th>
<th>DN</th>
<th>Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFT 31XX-F21-0060</td>
<td>1.59 .. 15.85 gpm</td>
<td>144 mm</td>
<td>160 mm</td>
<td>63 / 60 mm</td>
<td>SAE 14 (1 3/16 -12 UN 2B) SAE 20 (1 5/8 -12 UN 2B) SAE 24 (1 7/8 -12 UN 2B)</td>
<td>140 Nm</td>
<td>11 mm</td>
<td>SAE 6</td>
</tr>
<tr>
<td>HFT 31XX-F21-0300</td>
<td>3.96 .. 79.25 gpm</td>
<td>155 mm</td>
<td>173 mm</td>
<td>75.5 / 72 mm</td>
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<td>290 Nm</td>
<td>22 mm</td>
<td>SAE 6</td>
</tr>
<tr>
<td>HFT 31XX-F21-0600</td>
<td>10.57 .. 158.5 gpm</td>
<td>181 mm</td>
<td>178 mm</td>
<td>81 / 76 mm</td>
<td>SAE 14 (1 3/16 -12 UN 2B) SAE 20 (1 5/8 -12 UN 2B) SAE 24 (1 7/8 -12 UN 2B)</td>
<td>325 Nm</td>
<td>30 mm</td>
<td>SAE 6</td>
</tr>
</tbody>
</table>

### Model code:

**HFT 31 X X – F21 – XXXX – S- X-XXX-XXX**

#### Mechanical Process Connection

- **8 =** 3/4 -16 UNF 2B (SAE 8 female) only for mr: 1.2 .. 20 l/min
- **9 =** 1 3/16 -12 UN 2B (SAE 14 female) only for mr: 6 .. 60 l/min
- **H = 1 5/8 -12 UN 2B (SAE 20 female) only for mr: 15 .. 300 l/min
- **B = 1 7/8 -12 UN 2B (SAE 24 female) only for mr: 40 .. 600 l/min

#### Electrical connection

- **6 =** M12x1, 4 pole, male

#### Signal

- **F21 =** 4 .. 20 mA (with HART Interface)

#### Measuring ranges

- **0020 =** 1.2 .. 20 l/min (0.32 .. 5.28 gpm)
- **0060 =** 6.0 .. 60 l/min (1.59 .. 15.85 gpm)
- **0300 =** 15.0 .. 300 l/min (3.96 .. 79.25 gpm)
- **0600 =** 40.0 .. 600 l/min (10.57 .. 158.5 gpm)

#### Housing material

- **S =** Stainless steel

#### Housing design

- **1 =** without threaded bore (measuring ranges 0020)
- **3 =** with two additional female threads 9/16-18 UNF 2B (SAE 6), (measuring ranges 0060, 0300, 0600)

#### Approval

- **E =** ATEX and IECEx see Applications/ Protection Types (Overview)
- **N =** 50 V AC

#### Isolation voltage

- ** Protection types and applications: (code) **

<table>
<thead>
<tr>
<th>ATEX</th>
<th>IECEx</th>
</tr>
</thead>
<tbody>
<tr>
<td>I M1</td>
<td>Ex ia I Ma</td>
</tr>
<tr>
<td>II G</td>
<td>Ex ia IIC T6, T5 Gb</td>
</tr>
<tr>
<td>II 1D</td>
<td>Ex ia IIC T80°C/T95°C Da</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>II 3G</th>
<th>Ex ia IIC T6, T5 Gc</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>II 3G</td>
<td>only in conjunction with electric connection “G”</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>II 1D</td>
<td>Ex ia IIC T80°C/T90°C T300/T90°C T100 Da</td>
</tr>
<tr>
<td>II 2D</td>
<td>Ex ia IIC T80°C/T90°C Da</td>
<td></td>
</tr>
</tbody>
</table>

| **C** | II 3G | Ex ia IIC T6, T5 Gc |
| **C** | II 3D | Ex ia IIC T80°C/T90°C Da |

#### Modification number

- **000 =** standard

---

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