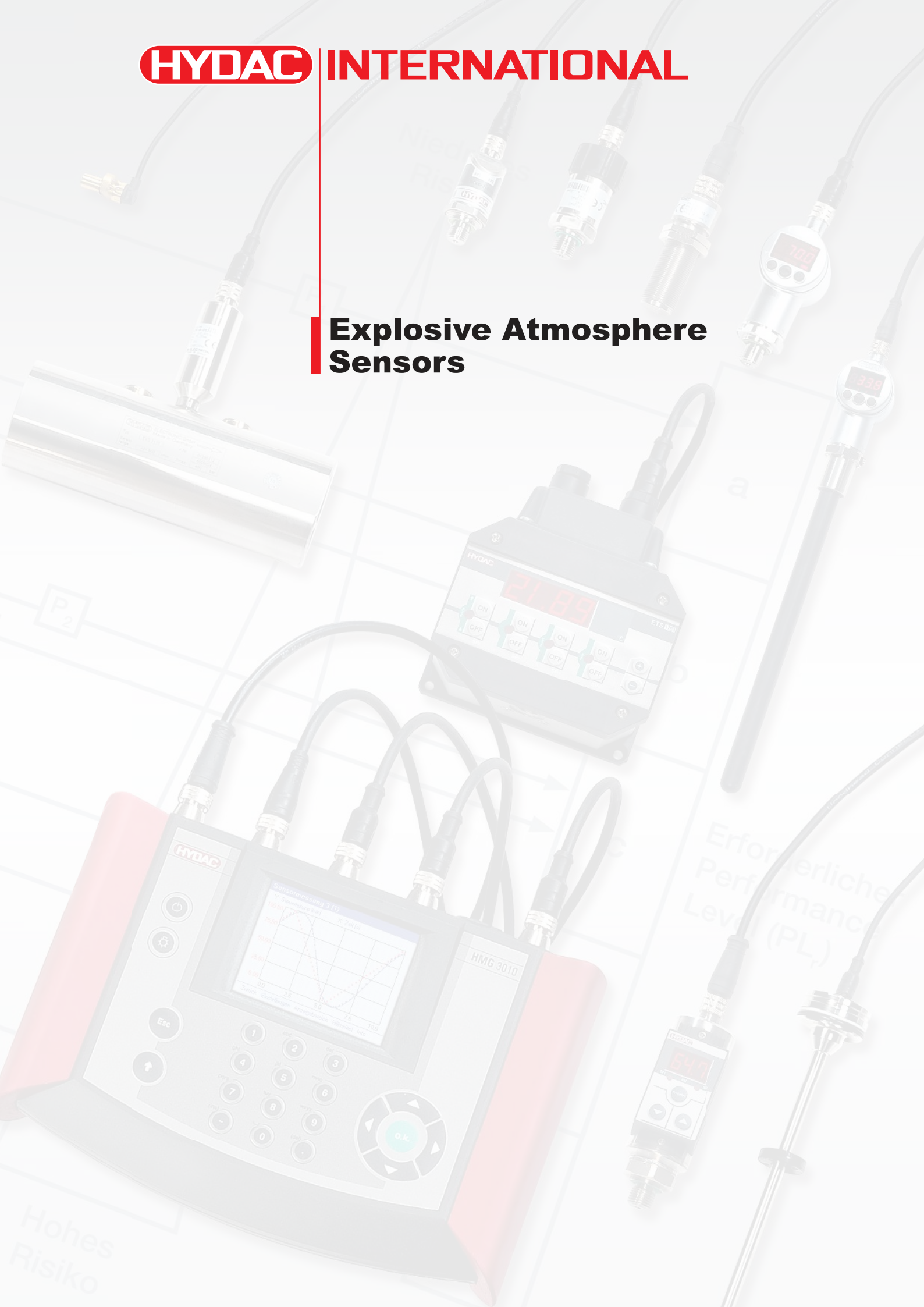
HYDAC INTERNATIONAL

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

For several years HYDAC ELECTRONIC has been systematically stepping up the expansion of its range of sensors for potentially explosive locations.
The sensors for potentially explosive locations can be supplied with a variety of output signals, connectors and fluid port connection options.
This versatility, combined with certification to ATEX, CSA and IECEx, ensures worldwide acceptance of our products.

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

Sensors for potentially explosive atmospheres	**HDA 4700** 	**HDA 4300** 	**HDA 4100** 	**EDS 4400** 	**EDS 4300** 	**EDS 4100** 	**ETS 4500** 	**HFT 3000** 	**HFS 2500** 	**HFS 2100** 
Measured variable	Pres-sure	Pres-sure	Pres-sure	Pres-sure	Pres-sure	Pres-sure	Temp.	Flow	Flow	Flow
Accuracy *(max. error)*	0.5	1.0	1.0	1.0	1.0	1.0	2.0	2.0	5, 10	10
Number of switching outputs				1 or 2	1	1			1 or 2	1 or 2
Analog output	✓	✓	✓				✓			
Available as individual units	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OEM product for lrg. vol. prod.				✓	✓	✓				
Flush membrane	✓	✓								
HART	✓						✓	✓		
ATEX Intrinsically safe	✓	✓	✓	✓	✓	✓		✓	✓	✓
Flush membrane ATEX Intrinsi-cally safe	✓	✓								
CSA Intrinsically safe	✓	✓	✓							
IECEx Intrinsically safe	✓	✓	✓					✓		
Flush membrane IECEx Intrin-sically safe	✓	✓								
ATEX / IECEx flameproof, CSA explosion proof *(all in one)*	✓						✓	✓		
Flush membrane ATEX / IECEx flameproof, CSA explosion proof *(all in one)*	✓									

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
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 IIIC 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

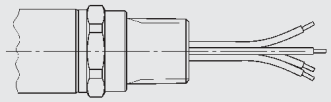
Technical data:

Input data	
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, 7250, 14500, 29000, 29000, 29000, 29000, 43500, 43500, 58000 psi
Mechanical connection[1] (torque value)	1/4-18 NPT, male 1/4-18 NPT, female SAE 6 9/16-18 UNF 2A SF 250 CS20, Autoclave(7/16-20-UNF 2B) 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
Conduit and housing material	1.4404; 1.4435 (316L)
Output data	
Output signal, permitted load resistance [2]	4 .. 20 mA, 2 conductor $R_{Lmax.} = (U_B - 8\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086, Max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.
Accuracy at min. setting (B.F.S.L.)	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Temperature compensation Zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Temperature compensation Over range	≤ ± 0.008 % FS / °C typ. ≤ ± 0.015 % FS / °C max.
Non-linearity at max. setting to DIN 16086	≤ ± 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 T6, T110 °C: -13..+140°F
Operating temperature range [3]	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 [3]	T5, T130 °C: -40..+176°F / -4..+176°F T6, T110 °C: -40..+140°F / -4..+140°F
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 1 / 31
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 (**F**ull **S**cale) = relative to the full measuring range
B.F.S.L.= **B**est **F**it **S**traight **L**ine
[1] Other mechanical connections on request
[2] Other output signals on request
[3] -4°F with FPM seal, -40°F on request

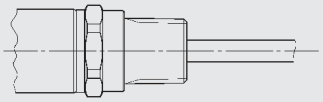
Pin connections:

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	c**CSA**us: 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:

HDA 4 7 X X – A – XXXXX – 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

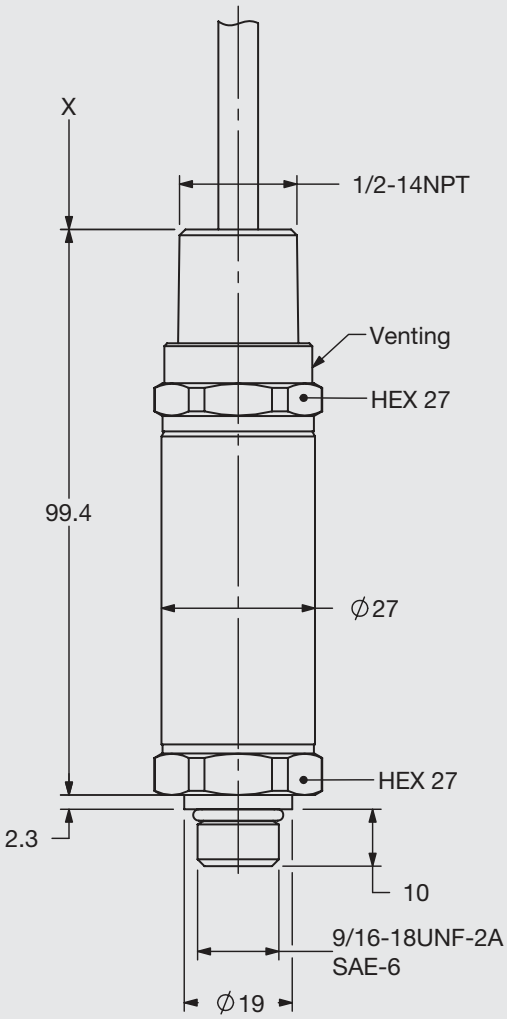
Type of measurement cell
S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi
V = Vented Gauge (vented to atmosphere) ≤ 300 psi

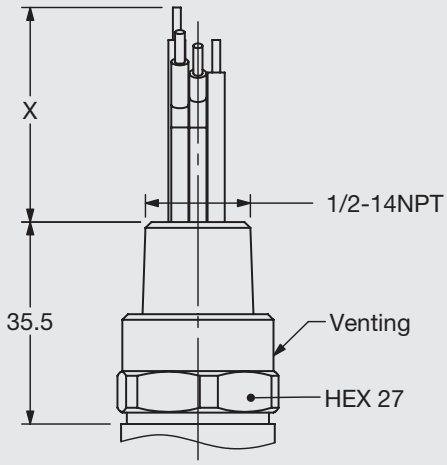
Modification number
000 = Standard

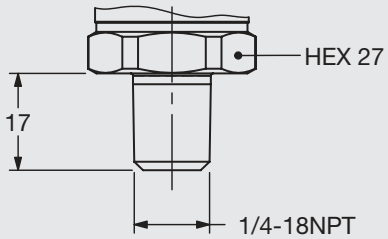
Cable length in inches
Standard = 72 inches

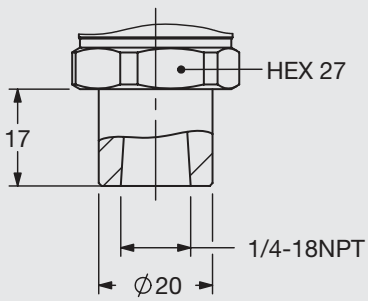
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

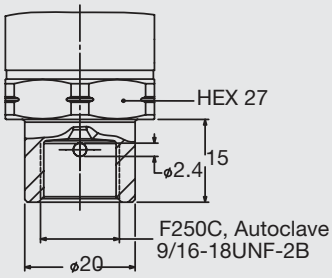
Dimensions:

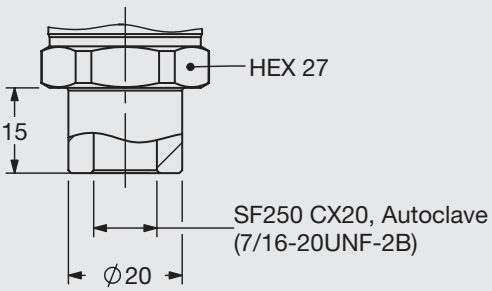












Note:

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

HYDAC ELECTRONICS
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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Pressure Switch

EDS 4400 Programmable
ATEX, CSA, IECEx
Flameproof Enclosure

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:

cCSAus 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 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	
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 pressure	1450, 2900, 2900, 7250, 7250, 14500, 29000, 29000, 29000, 29000, 43500, 43500, 58000 psi
Mechanical connection[1] (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 [2]	1 or 2 PNP 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 N/O function	user-programmable with HYDAC Programming Unit HPG 3000
Rising switch 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[3]	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[3]	T5, T130 °C: -40..+176°F / -4..+176°F T6, T110 °C: -40..+140°F / -4..+140°F
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 1 / 31
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	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

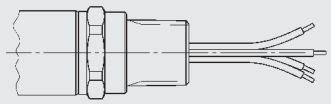
Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.
FS (**F**ull **S**cale) = relative to complete measuring range
[1] Other mechanical connection options available on request
[2] NPN switching outputs upon request
[3] -4 °F with FPM seal, -40 °F on request

Setting ranges for the switch outputs:

- Switch point or upper switch value
  5% .. 100% of the measurement range
- Hysteresis or lower switch value
  1% .. 96% of the measurement range

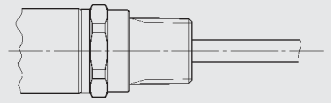
Pin connections:

Conduit (single cores)



Core	EDS 44x9-*-1P	EDS 44x9-*-2P
red	+U_B	+U_B
white	Switch output 1	Switch output 1
brown	---------	Switch output 2
black	0 V	0 V
green	SDA[1)]	SDA[1)]

Conduit (flying leads)



Core	EDS 44xG-*-1P	EDS 44xG-*-2P
white	Switch output 1	Switch output 1
brown	n.c.	Switch output 2
green	SDA[1)]	SDA[1)]
yellow	0 V	0 V
grey	+U_B	+U_B

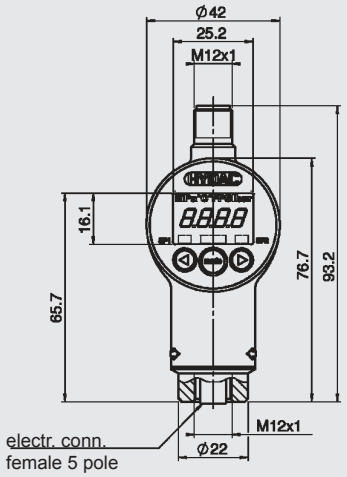
1) Programming line

Programming Unit:

(must be ordered separately)

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

HPG 3000 Power Supply with connector:
Part #02091103



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

CAUTION!
The HPG 3000 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	c**CSA**us: 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:

EDS 4 4 X X –XXXX – X P – 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

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

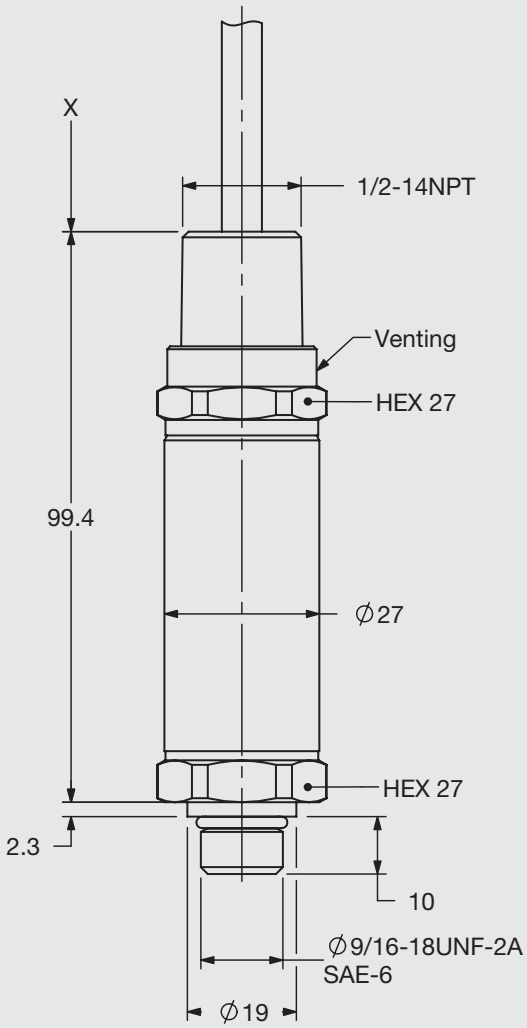
Type of measurement cell
S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi
V = Vented Gauge (vented to atmosphere) ≤ 300 psi

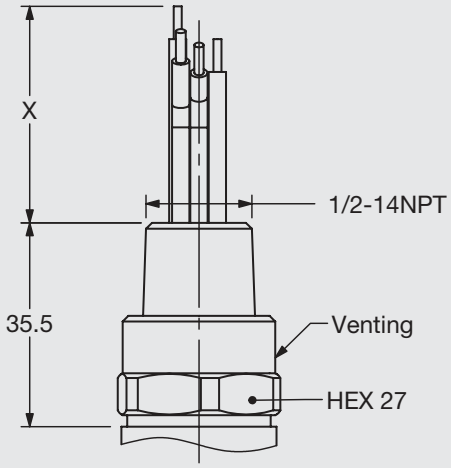
Modification number
000 = Standard

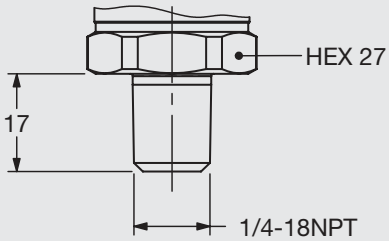
Cable length in inches
Standard = 72 inches

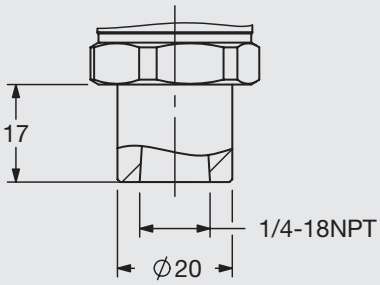
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

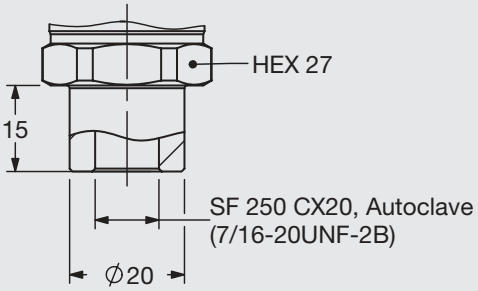
Dimensions:

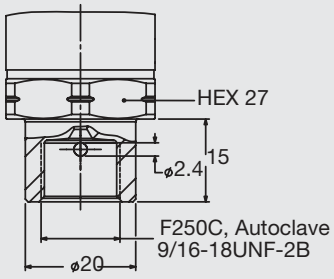












Note:

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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

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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

US 18.386.1/10.17

Electronic Temperature Transmitter

ETS 4500
ATEX, CSA, IECEx
Flameproof Enclosure

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:

cCSAus 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 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

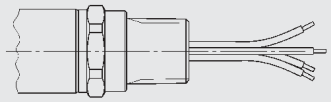
Technical data:

Input data	
Measuring principle	Silicon semiconductor device
Measuring range	-13 to 212°F(-25..+100°F)
Probe length inch(mm)	0.42(10.7), 3.94(100), 9.84(250), 13.8(350)
Pressure resistance	8700 psi (probe length 0.42) 1812 psi (probe length 3.94) 1812 psi (probe length 9.84) 1812 psi (probe length 13.8)
Mechanical connection	1/4-18 NPT male (30 ft-lb (40 Nm)) SAE 6 9/16-UNF 2A (15 ft-lb (20 Nm))
Parts in contact with medium	Stainless steel: 1.4571; 1.4301 (316Ti; 304) Seal: FPM
Conduit and housing material	1.4404; 1.4435 (316L)
Output data	
Output signal[1)]	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 8\ V) / 20\ mA\ [k\Omega]$
Accuracy	≤ ± 1.5 % FS typ. ≤ ± 3.0 % FS max.
Rise time to DIN EN 60751	t_{50}: ~ 10 s t_{90}: ~ 15 s
Environmental conditions	
Operating temperature range [2)]	T5, T130 °C: -40..+176°F / -4..+176° T6, T110 °C: -40..+140°F / -4..+140°F
Storage temperature range	-40..212°F
Fluid temperature range [2)]	T5, T130 °C: -40..+176°F/ -4..+176°F T6, T110 °C: -40..+140°F/ -4..+140°F
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 1 / 31
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 0 .. 100 % FS
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.
FS (**F**ull **S**cale) = relative to the complete measuring range
[1)] Other output signals on request
[2)] -4 °F with FPM seal, -40 °F on request

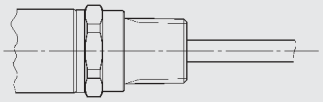
Pin connections:

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	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	c**CSA**us: 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

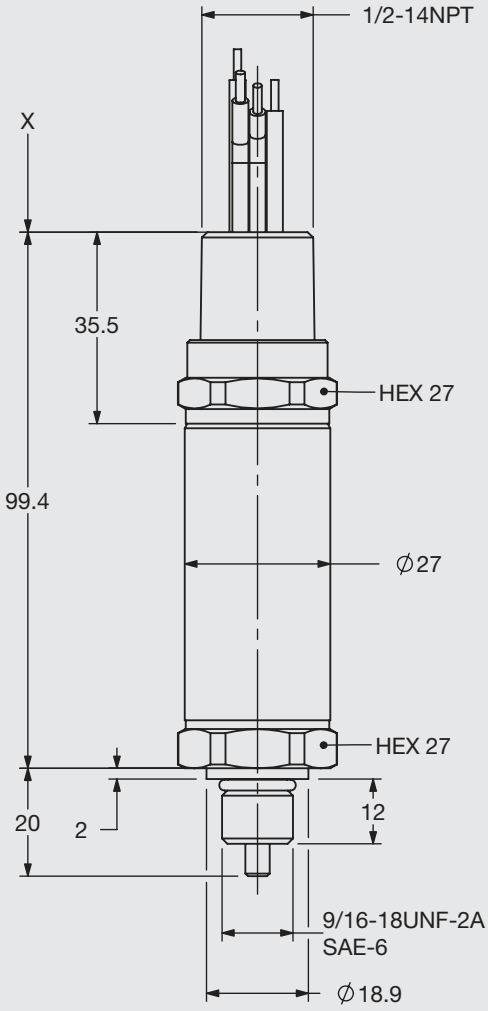
Probe length
010 = 0.42“ (10.7mm) (SAE 6 only)
100 = 3.94“ (100mm) (1/4 NPT only)
250 = 9.84“ (250mm) (1/4 NPT only)
350 = 13.8“ (350mm) (1/4 NPT only)

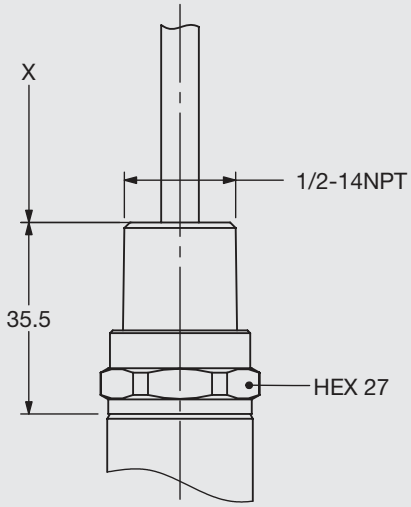
Modification number
000 = Standard

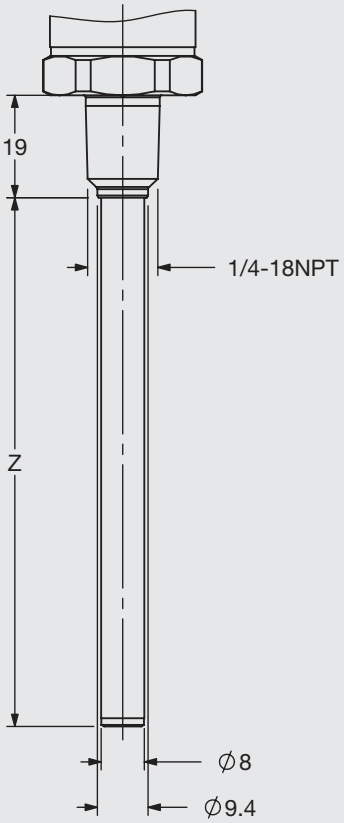
Cable length in inches
Standard = 72 inches

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

Dimensions:







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

HYDAC ELECTRONICS
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Website: www.hydacusa.com

US 18.387.1/10.17

Electronic Pressure Transmitter

HDA 4700
ATEX Intrinsically Safe
ATEX Dustproof Enclosure
ATEX Non-sparking

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 IIC T6 Ga
II 1/2G Ex ia IIC T6 Ga/Gb
II 2G Ex ia IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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:

Input data	
Measuring ranges[1)]	150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
Overload pressures	290, 1160, 1740, 2900, 2900, 7250, 11600, 11600, 14500, 23200 psi
Burst pressures	1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
Mechanical connection[1)]	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	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086, Max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.
Accuracy at min. setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.3 % FS max.
Temperature compensation Zero point	0.0045% FS/°F typ. 0.0085% FS/°F max.
Temperature compensation Over range	0.0045% FS/°F typ. 0.0085% FS/°F max.
Non-linearity at max. setting to DIN 16086	≤ ± 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	-4..+185°F
Operating temperature range[2)]	-40..+140°F/ -4..+140°F
Storage temperature range	-40 to 212°F
Fluid temperature range[2)]	-20..+140°F
	40..+140°F / -4..+140°F
CE 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 male when an IP 67 connector is used)

Relevant data for Ex applications	**Ex ia, ic**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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	~ 150 g

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

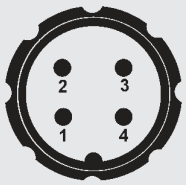
Areas of application:

Code No.for use in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100°C Dc 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.

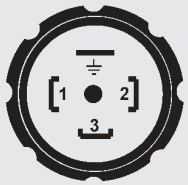
Pin connections:

Binder series 714 M18



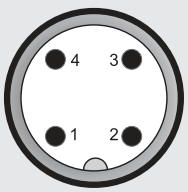
Pin	HDA 47X4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN175301-803 (DIN 43650)



Pin	HDA 47X5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1



Pin	HDA 47X6-A
1	Signal +
2	n.c.
3	Signal -
4	n.c.

Model code:

HDA 4 7 X X – A – XXXX – A 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, 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
0150, 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 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 IIIC T85 °C Da
9 = II 3G Ex nA IIC T6 Gc (only in conjunction with electr. connection “6“)*
A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. connection "6")*
II 2D Ex tb IIIC T80 °C Db
C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

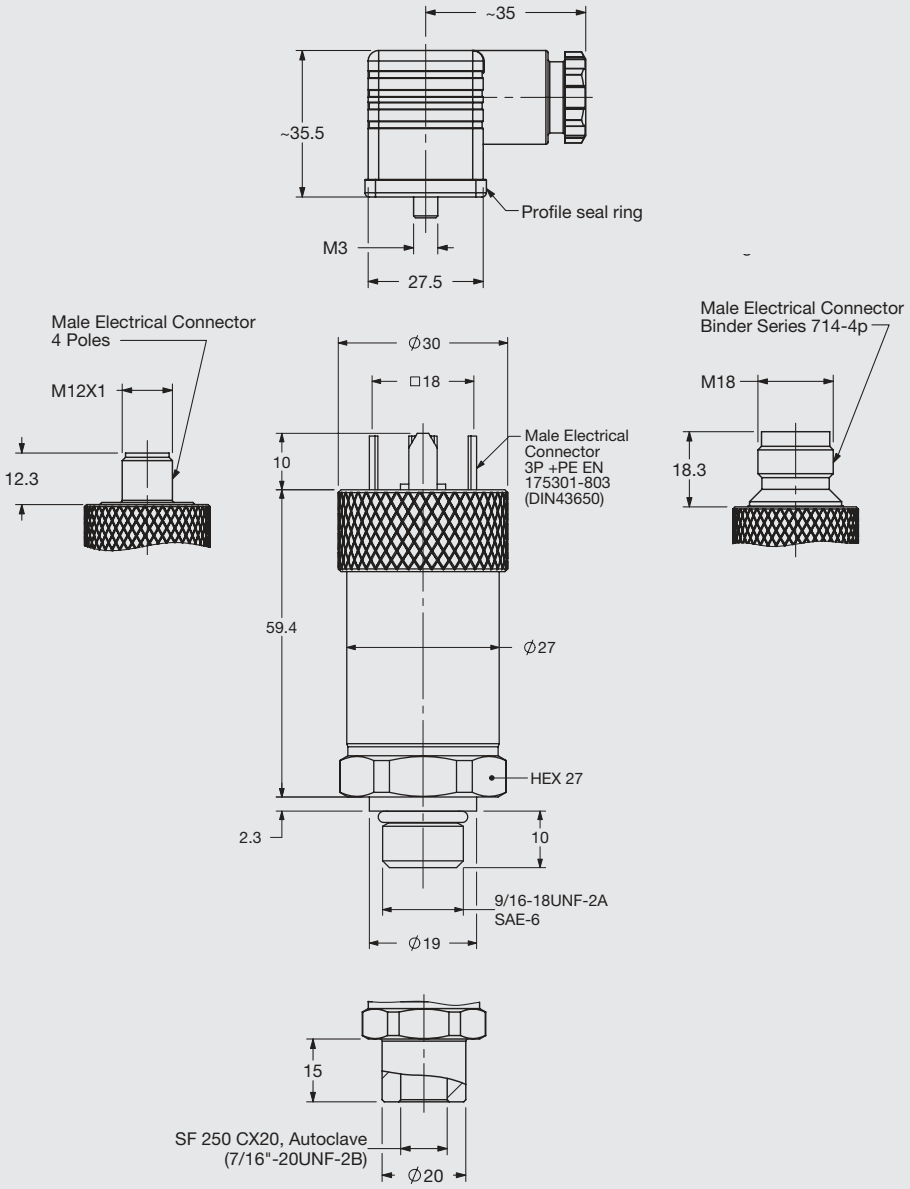
Modification number
000 = Standard

Notes:
* For design and electrical connection see device dimensions

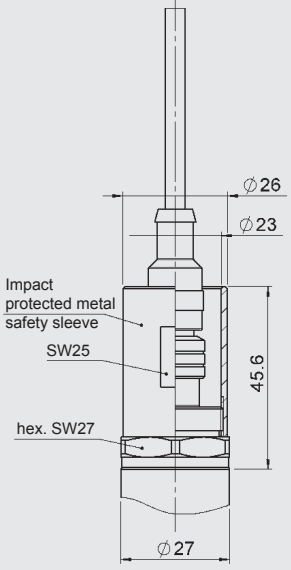
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Dimensions:

Protection types and applications (code): 1, C



Protection ratings and areas of application (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

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Website: www.hydacusa.com

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 Ga/Gb
II 2G Ex ia IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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 ≤ ± 0.5 % 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[1)]	500, 750, 1000, 1500, 3000, 6000, 9000, 15000 psi	
Overload pressures	1160, 1160, 2900, 2900, 7250, 11600, 14500, 23200 psi	
Burst pressures	2900, 2900, 7250, 7250, 14500, 29000, 29000, 43500 psi	
Mechanical connection[1)]	SAE 6 9/16-18 UNF2A SF 250 CS20, 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 data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $RL_{max.}$= (U_B - 12 V) / 20 mA [kΩ]	
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.	
Accuracy at min. 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 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	≤ ± 0.1 % 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[2)]	-40..+140°F / -4..+140°F	
CE 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**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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	~ 150 g	

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

Code No. for use in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

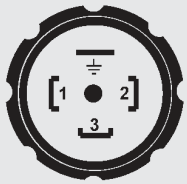
Devices in ignition protection class "Dustproof enclosure" for the protection types II 1D Ex ta IIIC T80/90/100° C Da T_{500}T90/T100/T110°C Da, II 2D Ex tb IIIC T80/90/100°C Db and II 3D Ex tc IIIC T80/90/100°C Dc are available with flying leads on request.
Devices in the ignition protection class "Non-sparking" for the protection type II 3G Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

Pin connections:

Binder series 714 M18

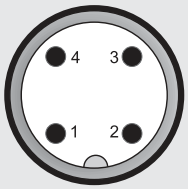
Pin	HDA 44X4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN175301-803 (DIN 43650)



Pin	HDA 44X5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1



Pin	HDA 44X6-A
1	Signal +
2	n.c.
3	Signal -
4	n.c.

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 "15000 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 IIIC T85 °C Da
9 = II 3G Ex nA IIC T6 Gc (only in conjunction with electr. conn. "6")*
A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. conn. "6")*
II 2D Ex tb IIIC T80 °C Db
C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

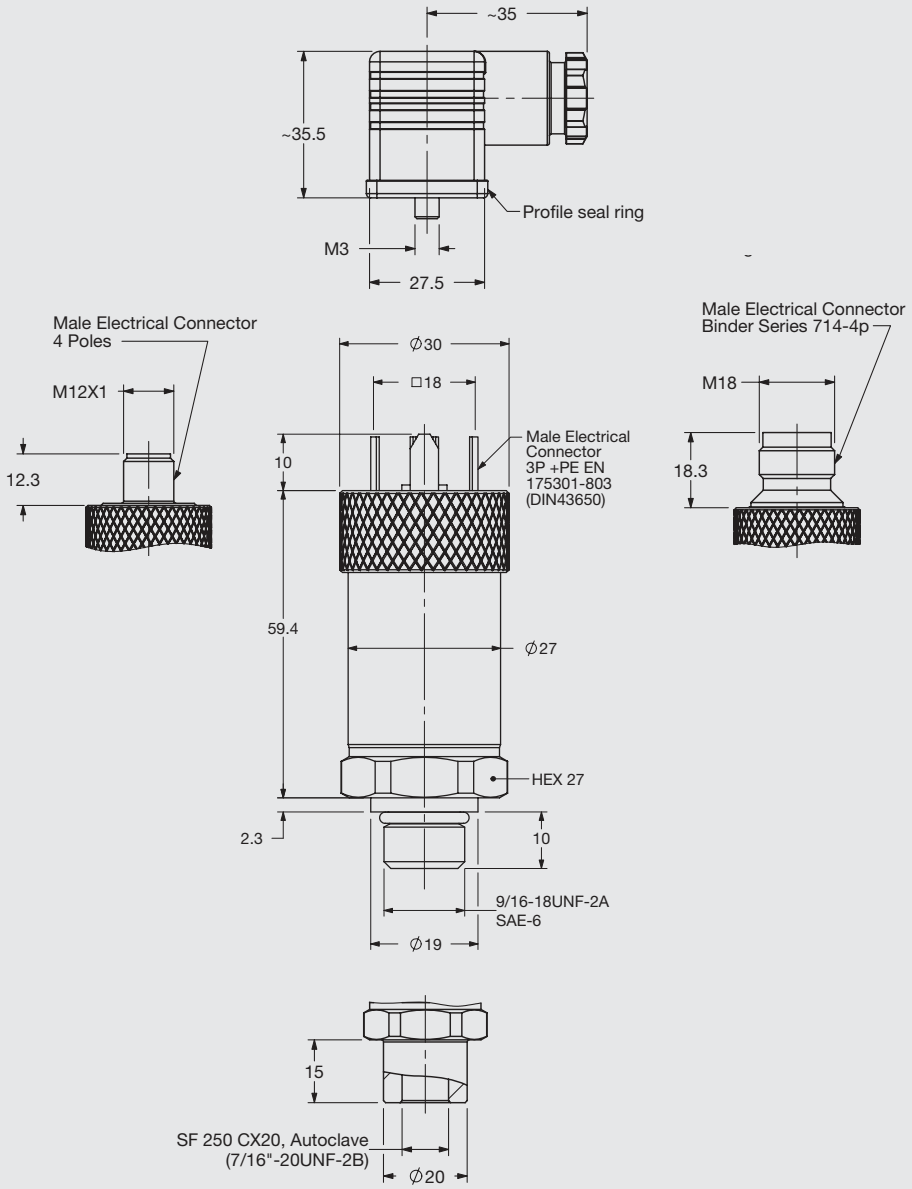
Modification number
000 = Standard

Notes:
* For design and electrical connection see device dimensions

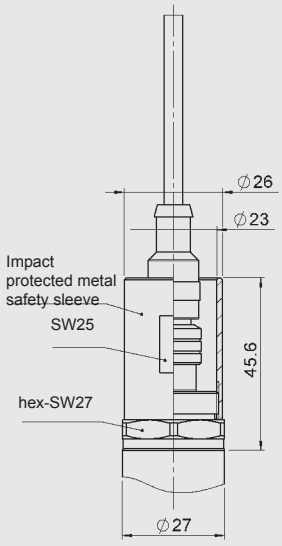
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

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

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

Electronic Pressure Transmitter

HDA 4300
ATEX Intrinsically Safe
ATEX Dustproof Enclosure
ATEX Non-sparking

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 IIC T6 Ga
II 1/2G Ex ia IIC T6 Ga/Gb
II 2G Ex ia IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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 ≤ ± 0.5 % 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: Mech. connection: Seal:	Ceramic 1.4301 FPM / EPDM
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax.}$= (U_B - 12 V) / 20 mA [kΩ]	
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.	
Accuracy at min. 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 to 212°F	
Fluid temperature range [1]	-40..+140°F / -4..+140°F	
CE 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**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [2]	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 (**F**ull **S**cale) = relative to the full measuring range, **B.F.S.L.**= **B**est **F**it **S**traight **L**ine

[1] -4°F with FPM or EPDM seal, -40°F on request
[2] 500 V AC on request

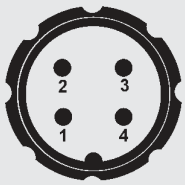
Areas of application:

Code No.for use in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100 °C Dc 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.

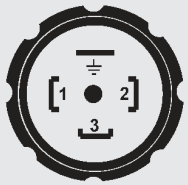
Pin connections:

Binder series 714 M18



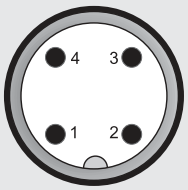
Pin	HDA 4384-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN175301-803 (DIN 43650)



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

M12x1



Pin	HDA 4386-A
1	Signal +
2	n.c.
3	Signal -
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 IIIC T85°C Da
9 = II 3G Ex nA IIC T6 Gc
(only in conjunction with electr. conn. "6")*
A = II 1D Ex ta IIIC T80°C T_{500}T90°C Da
(only in conjunction with electr. conn. "6")*
II 2D Ex tb IIIC T80°C Db
C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80°C Dc

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)

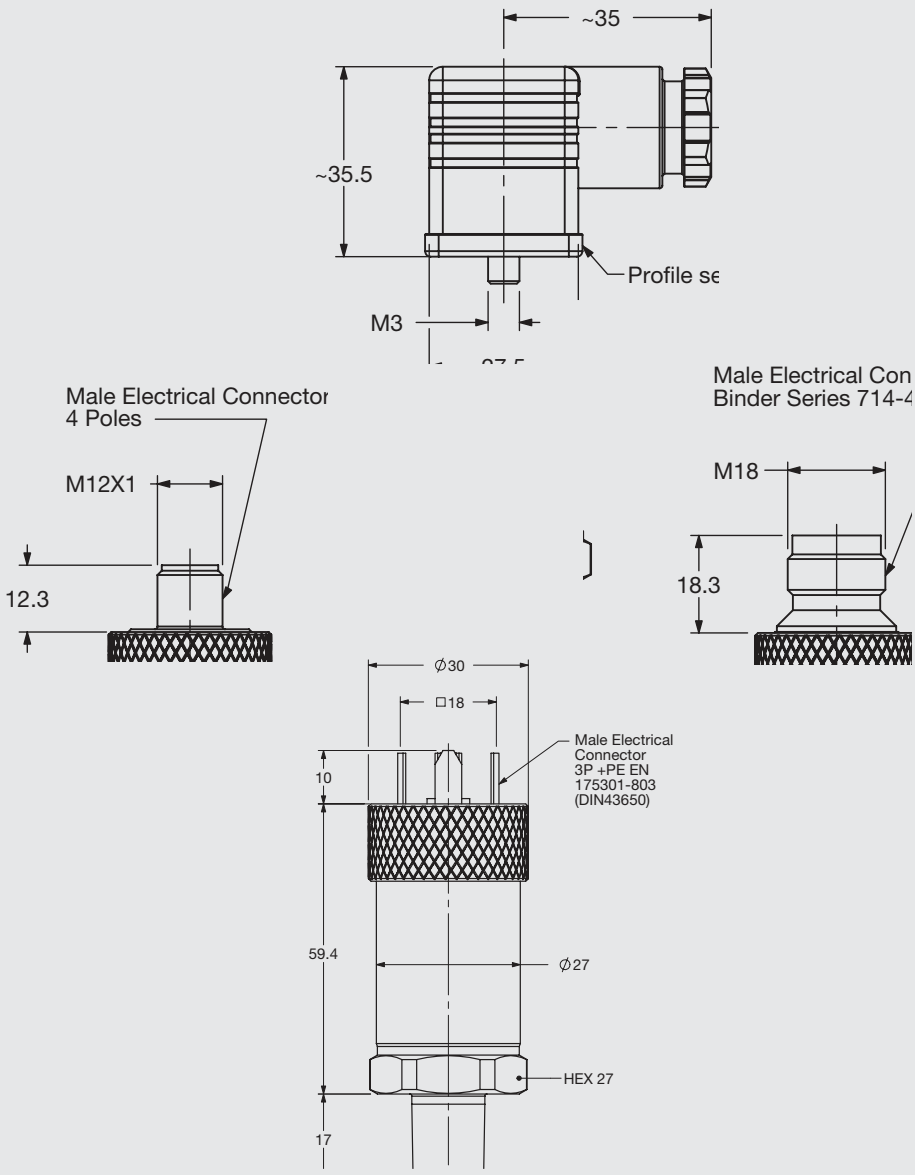
Material of connection (in contact with fluid)
1 = Stainless steel

Notes:
* For design and electrical connection see device dimensions

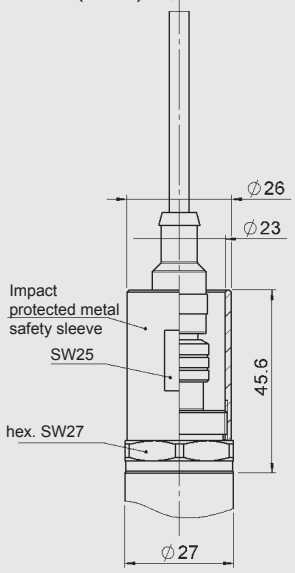
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

Dimensions:

Protection types and applications (code): 1, C



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.

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Absolute Pressure Transmitter

HDA 4100
ATEX Intrinsically Safe
ATEX Dustproof housing
ATEX Non-sparking

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 IIC T6 Ga
II 1/2G Ex ia IIC T6 Ga/Gb
II 2G Ex ia IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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 ≤ ± 0.5 % 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 $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.	
Accuracy at min. 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 to 212°F	
Fluid temperature range[1)]	-40..+140°F / -4..+140°F	
CE 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**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [2)]	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 (**F**ull **S**cale) = relative to the full measuring range, **B.F.S.L.**= **B**est **F**it **S**traight **L**ine
[1)] -4 °F with FPM or EPDM seal, -40 °F on request
[2)] 500 V AC on request

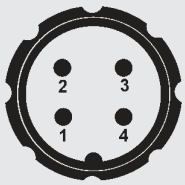
Areas of application:

Code No.for use in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100°C Dc 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.

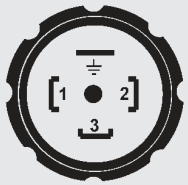
Pin connections:

Binder series 714 M18



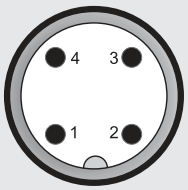
Pin	HDA 4184-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN175301-803 (DIN 43650)



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

M12x1



Pin	HDA 4186-A
1	Signal +
2	n.c.
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
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 IIIC T85 °C Da
9 = II 3G Ex nA IIC T6 Gc
(only in conjunction with electr. connection "6")*
A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da
(only in conjunction with electr. connection „6“)*
II 2D Ex tb IIIC T80 °C Db
C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

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

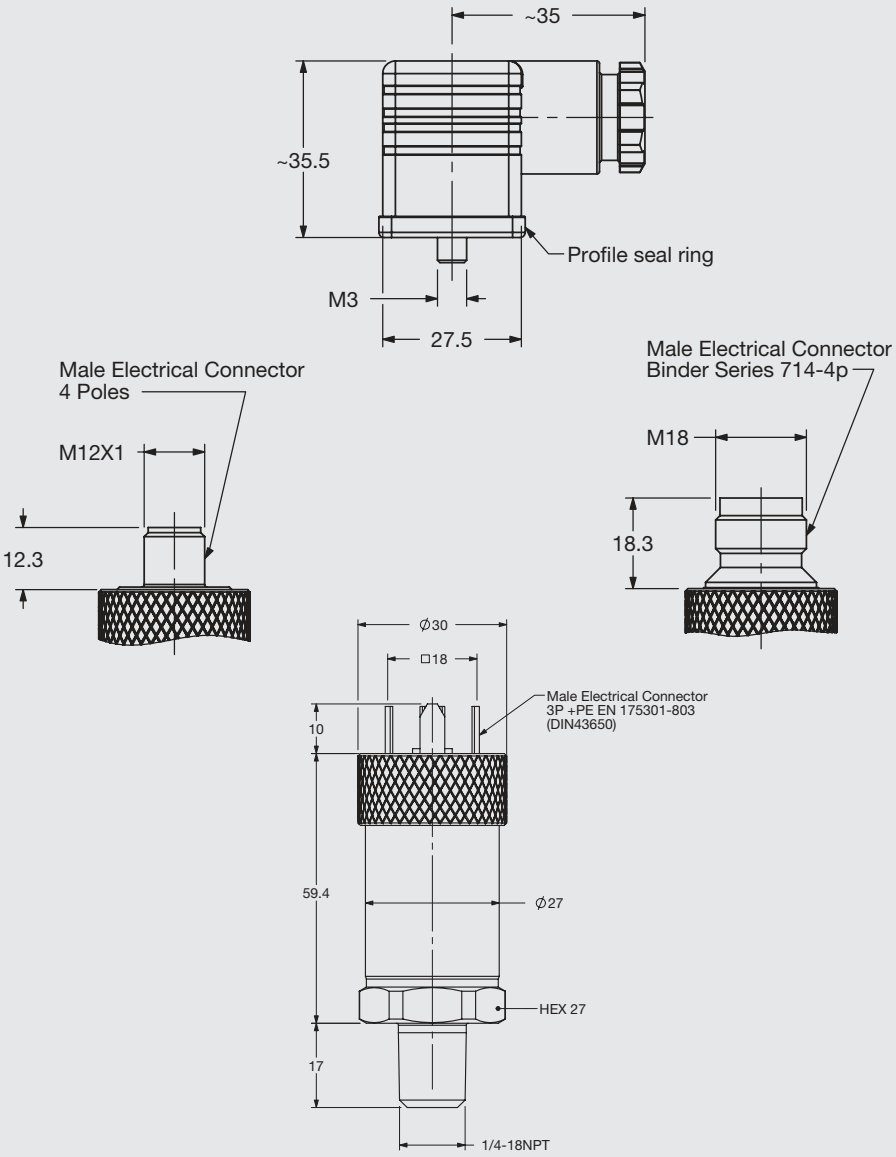
Notes:

* For design and electrical connection see device dimensions

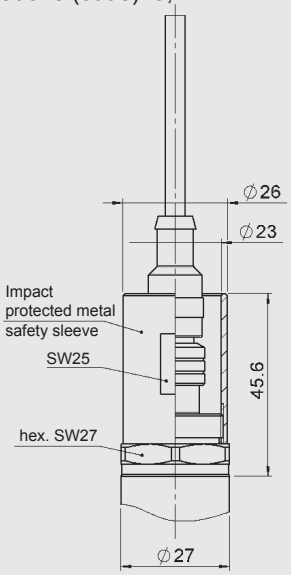
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

Dimensions:

Protection types and applications (code): 1, C



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.

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

Electronic Pressure Switch

EDS 4400 Programmable ATEX Intrinsically Safe

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 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 upon request.

Special features:

- Switching point and switch-back point are 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	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	15lb-ft(20Nm)	
Parts in contact with medium	Stainless steel: 1.4542; 1.4571; 1.4435; 1.4404; 1.4301 Seal: FPM	
Output data		
Switch output	1 x PNP N/C or N/O	
Output load	during operation: I_{max} ≤ 34 mA	
Switching points	user-programmable with HYDAC Programming Unit HPG 3000	
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.	
Repeatability (at 77 °F)	≤ ± 0.1 % FS max.	
Temperature drift	≤ ± 0.017% FS/°F max. zero point ≤ ± 0.017% 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	≤ ± 0.3 % FS typ. / year	
Environmental conditions		
Storage temperature range	-40 to 212°F	
Fluid temperature range	-4...+140°F/+158°F/+185°F	
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 EN 61241-0 / 11 EN 50303	
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g	
Protection class to IEC 60529	IP 67 (M12x1, when an IP 67 connector is used)	
Relevant data for Ex applications		
	I M1 II 1G, 1/2G, 2G	**II 1 D**
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: +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 0 .. 100 % FS	
Weight	~ 150 g	

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided. **FS** (**F**ull **S**cale) = relative to 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

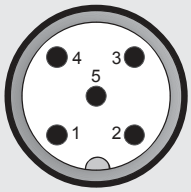
The switch point (upper switch value) on all instruments is between 5 % and 100 % of the measuring range and the switch-back point (lower switch value) is between 1 % and 96 % of the measuring range.

	Minimum value in ms	Maximum value in ms
Switch-on delay Ton1/Ton2	8	2040
Switch-off delay ToF1/ToF2	8	2040

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

Areas of application:

Code No. for use in Model code	1	2	3	8
Protection Type	I M1 Ex ia I	II 1G Ex ia IIC T4, T5, T6	II 2G Ex ia IIC II 1/2G Ex ia IIC T4, T5, T6	II 1D Ex iaD 20 T100 °C
Certificate	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X
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 For use in Zone 0 T4, T5: T_a = 70 °C T6: T_a = 60 °C	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	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
Electrical Connection	8	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 4 7 8 – XXXX – X – A X X – 000 (PSI)

Mechanical connection
7 = SAE 6 9/16-18 UNF2A

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

Pressure ranges in psi
1000, 3000, 6000, 9000

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

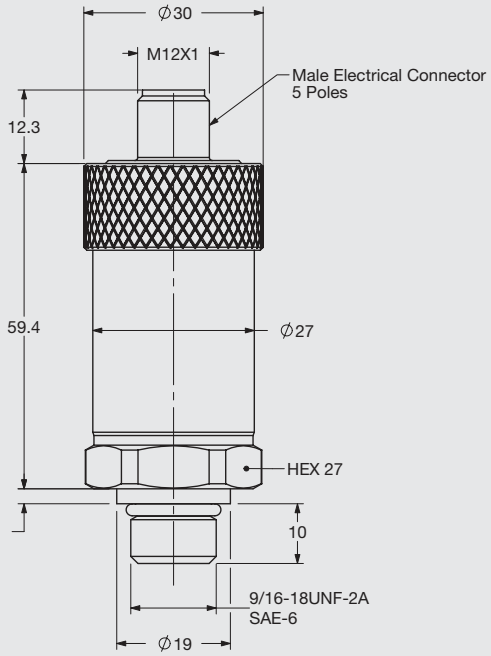
Accessories:

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.

Dimensions:

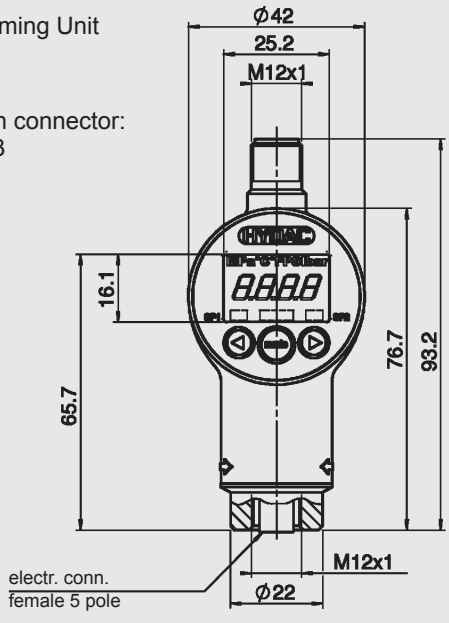


Programming Unit:

(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.

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.

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Electronic Pressure Switch

EDS 4300 Programmable ATEX Intrinsically Safe

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 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	15lb-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_{max} ≤ 34 mA	
Switching points Programming Unit HPG 3000	user-programmable with HYDAC	
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.	
Repeatability (at 77 °F)	≤ ± 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	
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 EN 61241-0 / 11 EN 50303	
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g	
Protection class to IEC 60529	IP 67 (M12x1, when an IP 67 connector is used)	
Relevant data for Ex applications		
	I M1 II 1G, 1/2G, 2G	**II 1 D**
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: +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 0 .. 100 % FS	
Weight	~ 150 g	

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided. **FS** (**F**ull **S**cale) = relative to 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:

Measuring range in psi	Increment in psi
0 .. 15	0.05
0 .. 50	0.05
0 .. 100	0.2
0 .. 250	0.5
0 .. 500	1

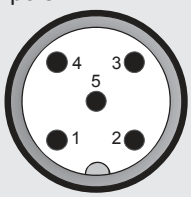
The switch point (upper switch value) on all instruments is between 5 % and 100 % of the measuring range and the switch-back point (lower switch value) is between 1 % and 96 % of the measuring range.

	Minimum value in ms	Maximum value in ms
Switch-on delay Ton1/Ton2	8	2040
Switch-off delay ToF1/ToF2	8	2040

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

Areas of application:

Code No. for use in Model code	1	2	3	8
Protection Type	I M1 Ex ia I	II 1G Ex ia IIC T4, T5, T6	II 2G Ex ia IIC II 1/2G Ex ia IIC T4, T5, T6	II 1D Ex iaD 20 T100 °C
Certificate	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X
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 For use in Zone 0 T4, T5: T_a = 70 °C T6: T_a = 60 °C	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	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
Electrical Connection	8	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

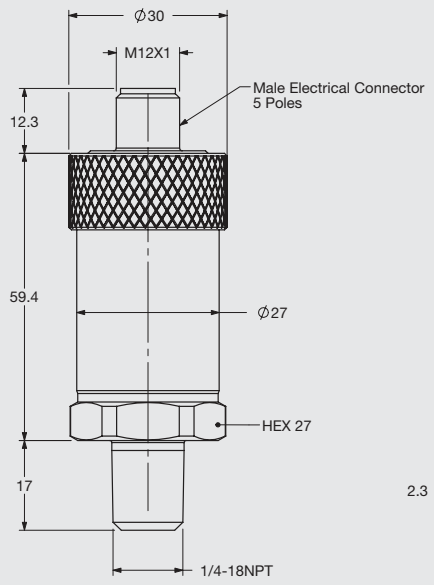
Accessories:

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.

Dimensions:

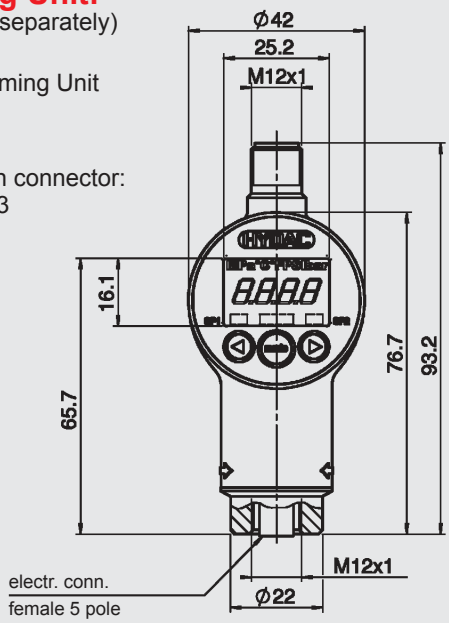


Programming Unit:

(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.

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

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Electronic Absolute Pressure Switch

EDS 4100 Programmable ATEX Intrinsically Safe

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)		
Parts in contact with medium	Sensor: Mech. connection: Seal:	Ceramic 1.4301 FPM / EPDM	
Output data			
Switch output	1 x PNP N/C or N/O		
Output load	during operation: I_{max} ≤ 34 mA		
Switching points HPG 3000	user-programmable with HYDAC Programming Unit		
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.		
Repeatability (at 77 °F)	≤ ± 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		
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 EN 61241-0 / 11 EN 50303		
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g		
Protection class to IEC 60529	IP 67 (M12x1, when an IP 67 connector is used)		
Relevant data for Ex applications			
	I M1 II 1G, 1/2G, 2G		**II 1 D**
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: +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: Telematic Ex STOCK:	Z 787 MTL 7087	
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, override and short circuit protection are provided. **FS** (**F**ull **S**cale) = 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:

Measuring range in psia	Increment in psia
0 .. 15	0.002 to 0.05
0 .. 2.5	0.005 to 0.05

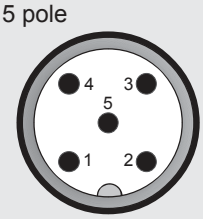
The switch point (upper switch value) on all instruments is between 5 % and 100 % of the measuring range and the switch-back point (lower switch value) is between 1 % and 96 % of the measuring range.

	Minimum value in ms	Maximum value in ms
Switch-on delay Ton1/Ton2	8	2040
Switch-off delay ToF1/ToF2	8	2040

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

Areas of application:

Code No. for use in Model code	1	2	3	8
Protection Type	I M1 Ex ia I	II 1G Ex ia IIC T4, T5, T6	II 2G Ex ia IIC II 1/2G Ex ia IIC T4, T5, T6	II 1D Ex iaD 20 T100 °C
Certificate	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X	DEKRA EXAM BVS 07 ATEX E 041 X
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 For use in Zone 0 T4, T5: T_a = 70 °C T6: T_a = 60 °C	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	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
Electrical Connection	8	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 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

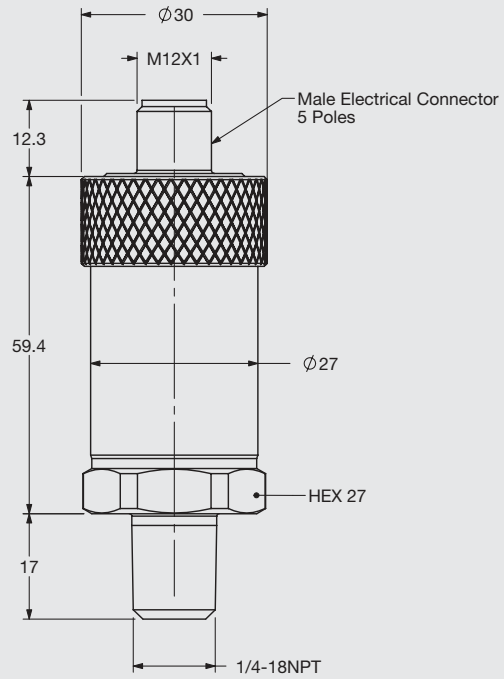
Accessories:

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.

Dimensions:

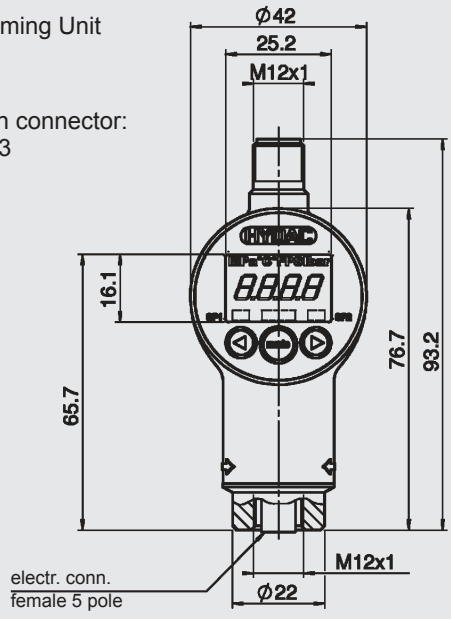


Programming Unit:

(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.

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
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Electronic Pressure Transmitter

HDA 4700
CSA Intrinsically safe
CSA Non Incendive

C US

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 [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 Div. 2 Group A, B, C, D T4A [C, US]
- Class I Zone 2 AEx nL IIC T4 [US]
- Class I Zone 2 Ex nL IIC T4 [C]

- Class I, II, III Div. 2 Group A, B, C, D, F, G T4A [C, US]
- Class I Zone 2 AEx nA II T4 [US]
- Class I Zone 2 Ex nA II T4 [C]

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:

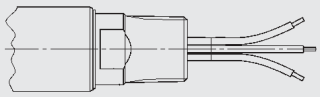
Input data	
Measuring ranges[1)2)]	150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
Overload pressures	290, 1160, 1740, 2900, 2900, 7250, 11600, 11600, 14500, 23200 psi
Burst pressures	1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
Mechanical connection[2)]	SAE 6 9/16-18 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	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086 Max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.
Accuracy at min. setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.25 % FS max.
Temperature compensation Zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Temperature compensation Over range	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Non-linearity at max. setting to DIN 16086	≤ ± 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 Non incendive: 4..+185°F
Operating temperature range[3)]	Intrinsically safe: -40..+140°F/ -4..+140°F Non incendive: -40..+185°F/ -4..+185°F
Storage temperature range	-40 to 212°F
Fluid temperature range[3)]	Intrinsically safe: -40..+140°F / -4..+140°F Non incendive: -40..+185°F / -4..+185°F
mark	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 [4)]	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, override and short circuit protection are provided.
FS (**F**ull **S**cale) = relative to complete measuring range
B.F.S.L.= **B**est **F**it **S**traight **L**ine

1) 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

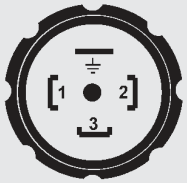
Pin connections:

Conduit (single cores)



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

EN175301-803 (DIN 43650)



Pin	HDA 47X5-A	HDA 47XA-A
1	Signal +	Signal +
2	Signal -	Signal -
3	n.c.	n.c.
⊥	Housing	Housing

Areas of application:

Group	1	2	3	4
Protection Type	Intrinsically safe Gases and dusts	Intrinsically safe Gases	Non incendive (with field cabling) Gases	Non incendive Gases and dusts
Certificate	CSA 1760344			
Zones / Categories	Intrinsically safe - Class I, II, III - Division 1 - Group A, B, C, D, E, F, G T6	Intrinsically safe Ex ia IIC T6 - Class I - Zone 0 - AEx ia IIC T6 - Class I - Division I - Group A, B, C, D T6	Non incendive - Class I - Division 2 - Group A, B, C, D T4A - Class I - Zone 2 - AEx nL IIC T4 - Class I - Zone 2 - Ex nL IIC T4	Non incendive - Class I, II, III - Division 2 - Group A, B, C, D, F, G T4A - 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

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
(only in conjunction with mechanical connection type “C”)

Approval
C = CSA

Insulation voltage
N = 50 V AC

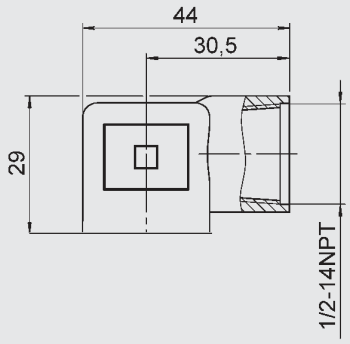
Protection types and applications (code)
A = Group 1
B = Group 2 and 3
C = Group 4

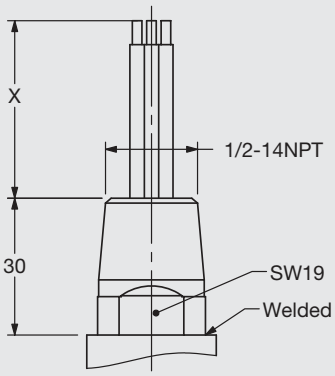
Modification number
000 = Standard

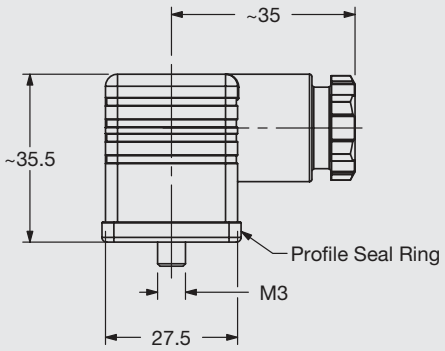
Cable length in inches (only for electr. connection type 9)
Standard = 48 inches

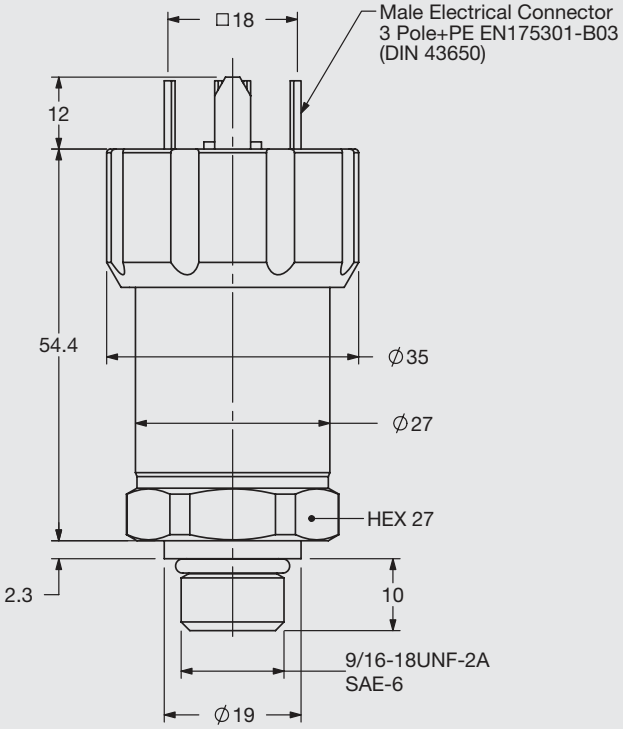
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

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.

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 4400
CSA Intrinsically safe
CSA Non Incendive

C US

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 [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 Div. 2 Group A, B, C, D T4A [C, US]
- Class I Zone 2 AEx nL IIC T4 [US]
- Class I Zone 2 Ex nL IIC T4 [C]

- Class I, II, III Div. 2 Group A, B, C, D, F, G T4A [C, US]
- Class I Zone 2 AEx nA II T4 [US]
- Class I Zone 2 Ex nA II 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

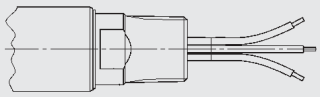
Technical data:

Input data	
Measuring ranges[1)]	150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi
Overload pressures	290, 1160, 1740, 2900, 2900, 7250, 11600, 11600, 14500, 23200 psi
Burst pressures	1450, 2900, 4350, 7250, 7250, 14500, 29000, 29000, 29000, 43500 psi
Mechanical connection[1)]	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[2)]	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 $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1 % FS max.
Accuracy at min. 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 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	≤ ± 0.1 % 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[3)]	Intrinsically safe: -40..+140°F / -4..+140°F Non incendive: -40..+185°F / -4..+185°F
mark	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 [4)]	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, override and short circuit protection are provided.
FS (**F**ull **S**cale) = relative to complete measuring range, **B.F.S.L.**= **B**est **F**it **S**traight **L**ine
[1)] 15000 psi only with mechanical connection SF 250 CX20, Autoclave
[2)] Other seal materials available on request
[3)] -4°F with FPM seal, -40°F on request
[4)] 500 V AC on request

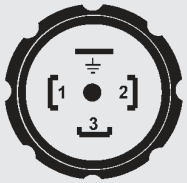
Pin connections:

Conduit (single cores)



Core	HDA 44X9-A
green	Signal +
white	Signal -
green-yellow	Housing

EN175301-803 (DIN 43650)



Pin	HDA 44X5-A	HDA 44XA-A
1	Signal +	Signal +
2	Signal -	Signal -
3	n.c.	n.c.
⊥	Housing	Housing

Areas of application:

Group	1	2	3	4
Protection Type	Intrinsically safe Gases and dusts	Intrinsically safe Gases	Non incendive (with field cabling) Gases	Non incendive Gases and dusts
Certificate	CSA 1760344			
Zones / Categories	Intrinsically safe - Class I, II, III - Division 1 - Group A, B, C, D, E, F, G T6	Intrinsically safe Ex ia IIC T6 - Class I - Zone 0 - AEx ia IIC T6 - Class I - Division I - Group A, B, C, D T6	Non incendive - Class I - Division 2 - Group A, B, C, D T4A - Class I - Zone 2 - AEx nL IIC T4 - Class I - Zone 2 - Ex nL IIC T4	Non incendive - Class I, II, III - Division 2 - Group A, B, C, D, F, G T4A - 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

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

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

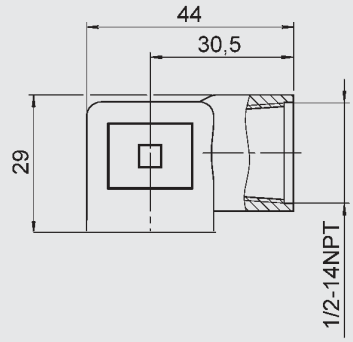
Modification number
000 = Standard

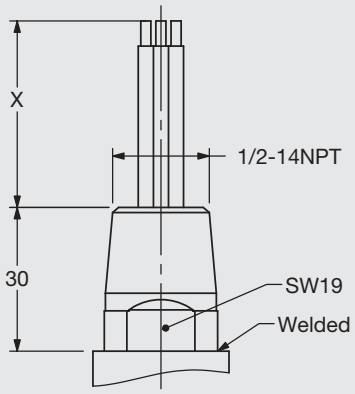
Cable length in inches (only for electr. connection code 9)
Standard = 48 inches

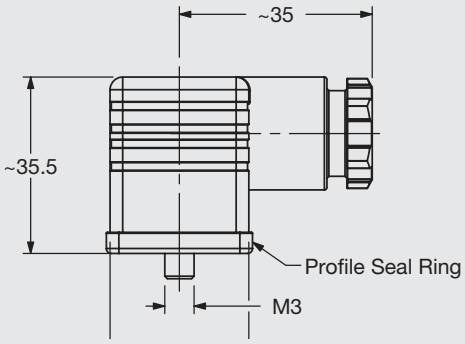
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

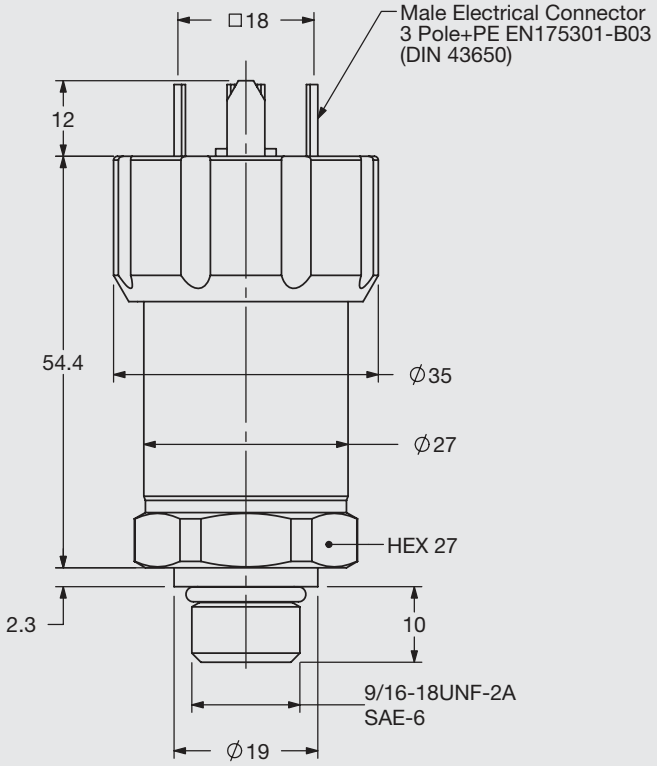
Dimensions:

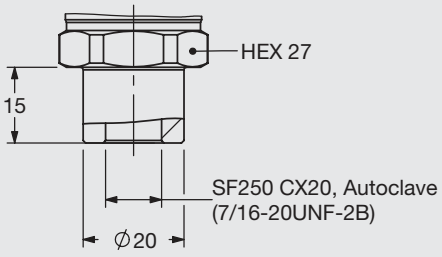
electrical connector with 1/2 NPT connection











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
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Website: www.hydacusa.com

US 18.342.1.0/10.17

Electronic Pressure Transmitter

HDA 4300
CSA Intrinsically safe
CSA Non Incendive

C US

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 Div. 2 Group A, B, C, D T4A [C, US]
- Class I Zone 2 AEx nL IIC T4 [US]
- Class I Zone 2 Ex nL IIC T4 [C]

- Class I, II, III Div. 2 Group A, B, C, D, F, G T4A [C, US]
- Class I Zone 2 AEx nA II T4 [US]
- Class I Zone 2 Ex nA II 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:

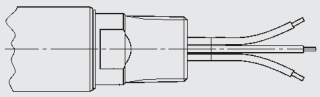
Input data	
Measuring ranges[1)]	15, 30, 50, 100, 150, 250, 500 psi
Overload pressures	45, 100, 150, 290, 450, 725, 1500 psi
Burst pressures	70, 150, 250, 400, 650, 1000, 2500 psi
Mechanical connection	1/4-18 NPT male
Torque value	30 ft-lb (40 Nm)
Parts in contact with medium	Sensor: Ceramic Al203 Mech. conn.: 1.4301 Seal: FPM / EPDM
Output data	
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086, Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1.0 % FS max.
Accuracy at min. 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	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[2)]	Intrinsically safe: -40..+140°F / -4..+140°F Non incendive: -40..+185°F / -4..+185°F
mark	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 [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 (**F**ull **S**cale) = relative to complete measuring range
B.F.S.L.= **B**est **F**it **S**traight **L**ine

[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

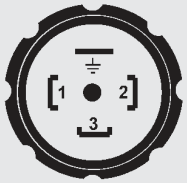
Pin connections:

Conduit (single cores)



Core	HDA 43X9-A
green	Signal +
white	Signal -
green-yellow	Housing

EN175301-803 (DIN 43650)



Pin	HDA 43X5-A	HDA 43XA-A
1	Signal +	Signal +
2	Signal -	Signal -
3	n.c.	n.c.
⊥	Housing	Housing

Areas of application:

Group	1	2	3	4
Protection Type	Intrinsically safe Gases and dusts	Intrinsically safe Gases	Non incendive (with field cabling) Gases	Non incendive Gases and dusts
Certificate	CSA 1760344			
Zones / Categories	Intrinsically safe - Class I, II, III - Division 1 - Group A, B, C, D, E, F, G T6	Intrinsically safe Ex ia IIC T6 - Class I - Zone 0 - AEx ia IIC T6 - Class I - Division I - Group A, B, C, D T6	Non incendive - Class I - Division 2 - Group A, B, C, D T4A - Class I - Zone 2 - AEx nL IIC T4 - Class I - Zone 2 - Ex nL IIC T4	Non incendive - Class I, II, III - Division 2 - Group A, B, C, D, F, G T4A - 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

Model code:

HDA 4 3 8 X – A – XXXX – 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

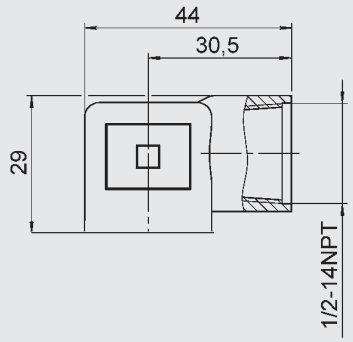
Seal material (in contact with fluid)
F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

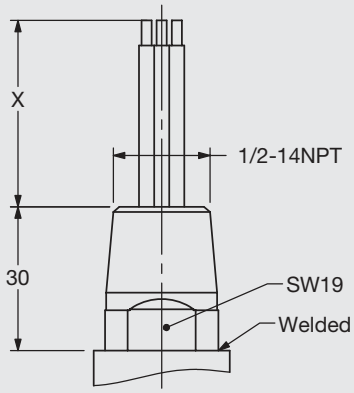
Material of connection (in contact with fluid)
1 = Stainless steel

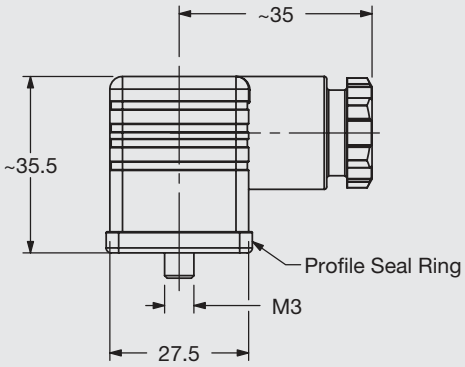
Cable length in inches (only for electr. connection type 9)
Standard = 48 inches

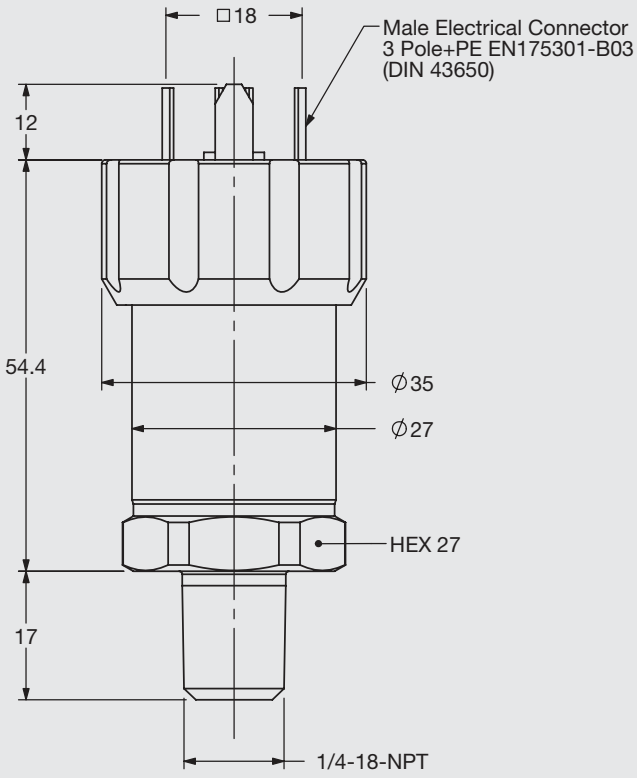
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

Dimensions:









Note:

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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

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]

- Class I, II, III Div. 1 Group A, B, C, D, E, F, G T6 [C, US]

Non incendive:

- Class I Div. 2 Group A, B, C, D T4A [C, US]
- Class I Zone 2 AEx nL IIC T4 [US]
- Class I Zone 2 Ex nL IIC T4 [C]

- Class I, II, III Div. 2 Group A, B, C, D, F, G T4A [C, US]
- Class I Zone 2 AEx nA II T4 [US]
- Class I Zone 2 Ex nA II 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

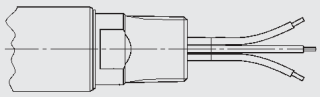
Technical data:

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	4 ..20 mA, 2 conductor $R_{Lmax.} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086 Max. setting	≤ ± 0.5 % FS typ. ≤ ± 1.0 % FS max.
Accuracy at min. 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	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[1]	Intrinsically safe: -40..+140°F / -4..+140°F Non incendive: -40..+185°F / -4..+185°F
mark	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 [2]	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 (**F**ull **S**cale) = relative to complete measuring range
B.F.S.L.= **B**est **F**it **S**traight **L**ine
[1] -4°F with FPM or EPDM seal, -40°F on request
[2] 500 V AC on request

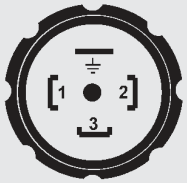
Pin connections:

Conduit (single cores)



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

EN175301-803 (DIN 43650)



Pin	HDA 41X5-A	HDA 41XA-A
1	Signal +	Signal +
2	Signal -	Signal -
3	n.c.	n.c.
⊥	Housing	Housing

Areas of application:

Group	1	2	3	4
Protection Type	Intrinsically safe Gases and dusts	Intrinsically safe Gases	Non incendive (with field cabling) Gases	Non incendive Gases and dusts
Certificate	CSA 1760344			
Zones / Categories	Intrinsically safe - Class I, II, III - Division 1 - Group A, B, C, D, E, F, G T6	Intrinsically safe Ex ia IIC T6 - Class I - Zone 0 - AEx ia IIC T6 - Class I - Division I - Group A, B, C, D T6	Non incendive - Class I - Division 2 - Group A, B, C, D T4A - Class I - Zone 2 - AEx nL IIC T4 - Class I - Zone 2 - Ex nL IIC T4	Non incendive - Class I, II, III - Division 2 - Group A, B, C, D, F, G T4A - 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

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

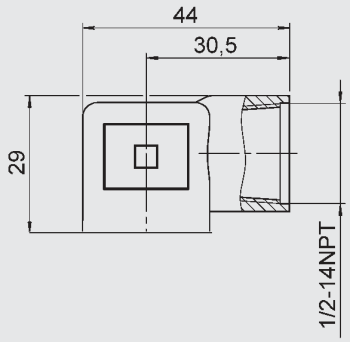
Seal material (in contact with fluid)
F = FPM seal (e.g.: for hydraulic oils)
E = EPDM seal (e.g.: for refrigerants)

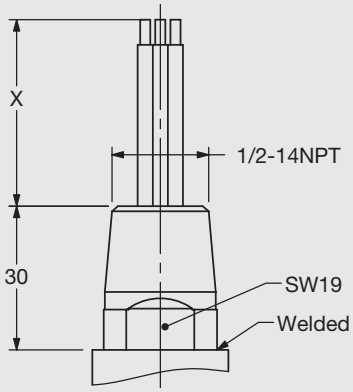
Material of connection (in contact with fluid)
1 = Stainless steel

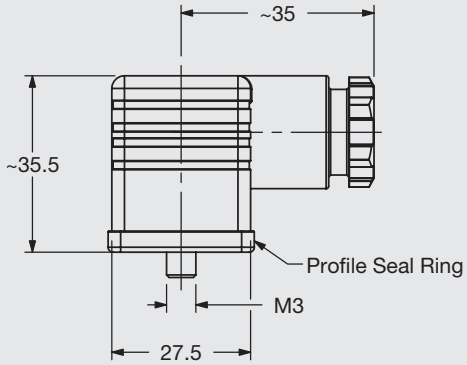
Cable length in inches (only for electr. connection type 9)
Standard = 48 inches

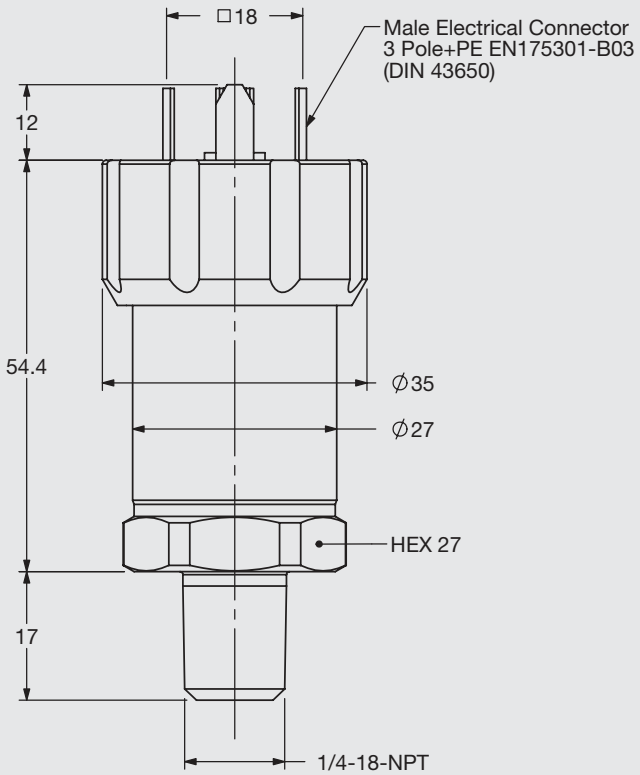
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

Dimensions:









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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

Electronic Pressure Transmitter

HDA 4700
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

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 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 IIIC T80/90/100 °C Da
T_{500} 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 ≤ ± 0.25 % 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[1)]	150, 500, 750, 1000, 1500, 3000, 5000, 6000, 9000, 15000 psi	
Overload pressures	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[1)]	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	Stainl. 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 $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
Accuracy to DIN 16086, Max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.	
Accuracy at min. setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.3 % FS max.	
Temperature compensation Zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Temperature compensation Over range	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Non-linearity at max. setting to DIN 16086	≤ ± 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	-4..+185°F	
Operating temperature range[2)]	-40..+140°F/ -4..+140°F	
Storage temperature range	-40..+212°F	
Fluid temperature range[2)]	-40..+140°F/ -4..+140°F	
CE mark	EN 61000-6-1 / 2 / 3 / 4; EN 60079-0 / 11 / 26 / 36	
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 female connector is used)	

Relevant data for Ex applications	**Ex ia, ic**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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	~ 150 g

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

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 Gc	Ex ta IIIC T80 °C T_{500}T90 °C Da Ex tb IIIC T80 °C Db	Ex ic IIC T6 Gc Ex ic IIIC T80 °C Dc	Ex ia IIIC T85 °C Da
Zones / Categories			Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier	Equipment protection level Ga, Ga/Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gc Gases Protection class: non-sparking nA	Equipment protection level Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment protection level Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier	Equipment protection level Da Conductive dust Protection class: intrinsically safe ia with barrier
Electrical connection			4, 5, 6	4, 5, 6	4, 5, 6	6	6	4, 5, 6	4, 5, 6
Code for use in Model code	IECEx	IECEx Australia							
1	✓	✓	✓	✓	✓				
9	✓					✓			
A	✓						✓		
C	✓							✓	
D	✓		✓	✓	✓				✓

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

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIIC T80/90/100 °C Da T500T90/T100/T110°C Da, Ex tb IIIC 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 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 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
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 IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. connection "6")*
Ex tb IIIC T80 °C Db
C = Ex ic IIC T6 Gc
Ex ic IIIC 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 IIIC T85 °C Da

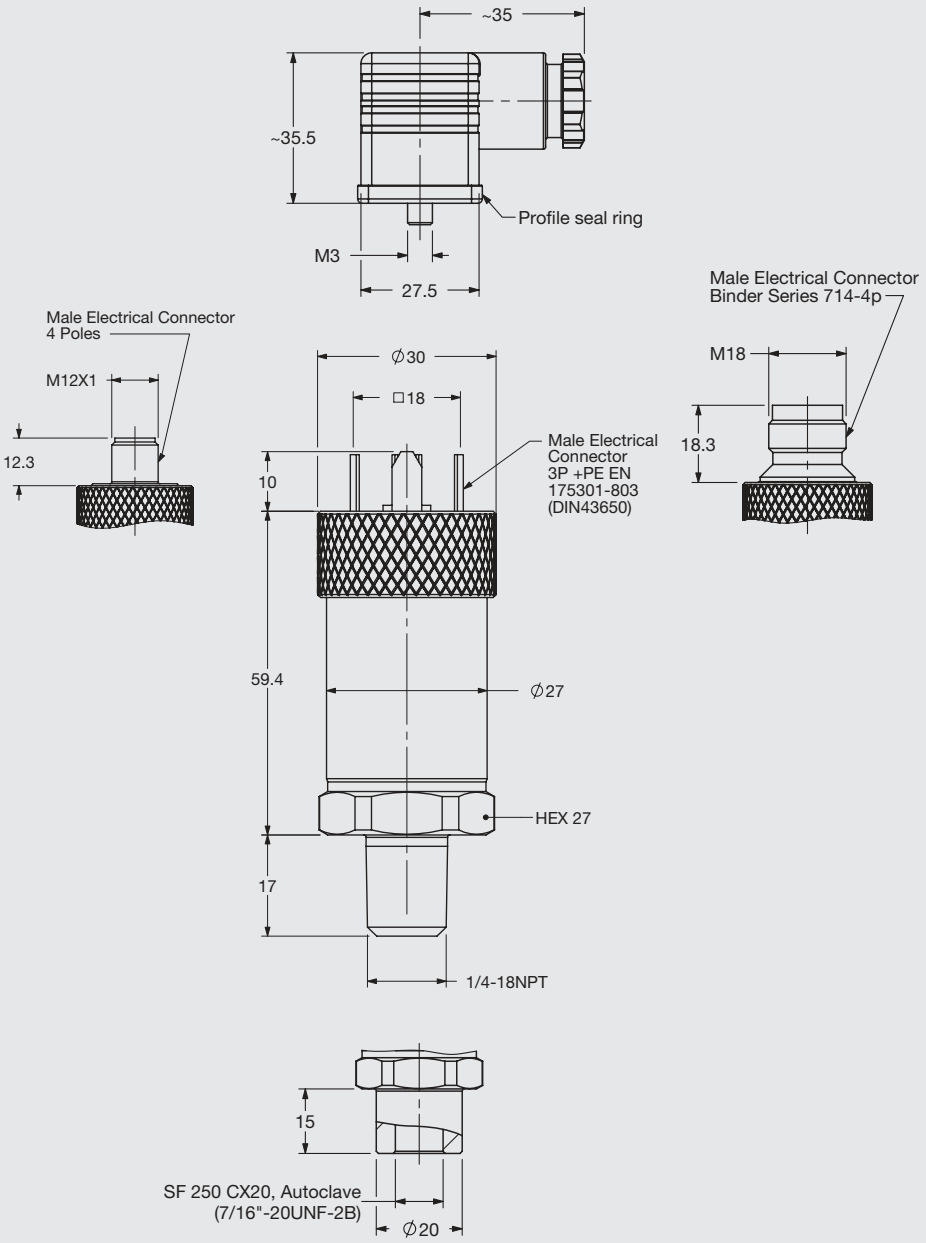
Modification number
000 = Standard

Notes:
* For design and electrical connection see Dimensions

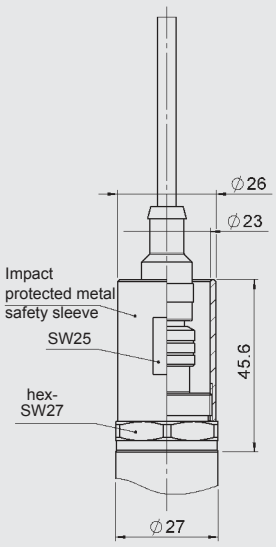
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

Dimensions:

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



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



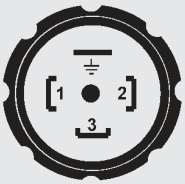
The impact protected metal safety sleeve is included. A straight female connector is required for electrical connection, e.g. female connector M12x1, 4 pole, straight, with 3m shielded cable: ZBE 06S-03, Part No. 6098243

Pin connections:

Binder series 714 M18

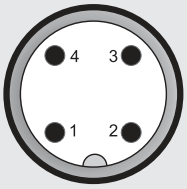
Pin	HDA 47x4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN175301-803 (DIN 43650)



Pin	HDA 47x5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1



Pin	HDA 47x6-A
1	Signal +
2	n.c.
3	Signal -
4	n.c.

Note:

The information in this brochure relates to the operating conditions and applications described.
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Subject to technical modifications.
For European mechanical connection and bar ranges see European Catalog

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Pressure Transmitter

HDA 4400
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

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 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 IIIC T80/90/100 °C Da
T_{500} 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
- Robust design
- Very small temperature error
- Excellent EMC characteristics
- Excellent long-term properties

Technical data:

Input data		
Measuring ranges[1)]	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[1)]	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	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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	0.0085% FS/°F typ. 0.014% FS/°F max.	
Temperature compensation 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[2)]	-40..+140°F / -4..+140°F	
CE - mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 / 36	
Vibration resistance 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) and Binder 714 M18) 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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	~ 150 g

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

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 Gc	Ex ta IIIC T80 °C T_{500}T90 °C Da Ex tb IIIC T80 °C Db	Ex ic IIC T6 Gc Ex ic IIIC T80 °C Dc	Ex ia IIIC T85 °C Da
Zones / Categories			Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier	Equipment protection level Ga, Ga/Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection evel Gc Gases Protection class: non-sparking nA	Equipment protection level Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment protection level Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier	Equipment protection level Da Conductive dust Protection class: intrinsically safe ia with barrier
Electrical connection			4, 5, 6	4, 5, 6	4, 5, 6	6	6	4, 5, 6	4, 5, 6
Code for use in Model code	IECEx	IECEx Australia							
1	✓	✓	✓	✓	✓				
9	✓					✓			
A	✓						✓		
C	✓							✓	
D	✓		✓	✓	✓				✓

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

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIIC T80/90/100 °C Da T500T90/T100/T110°C Da, Ex tb IIIC 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 IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. connection "6")*
Ex tb IIIC T80 °C Db
C = Ex ic IIC T6 Gc
Ex ic IIIC 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 IIIC T85 °C Da

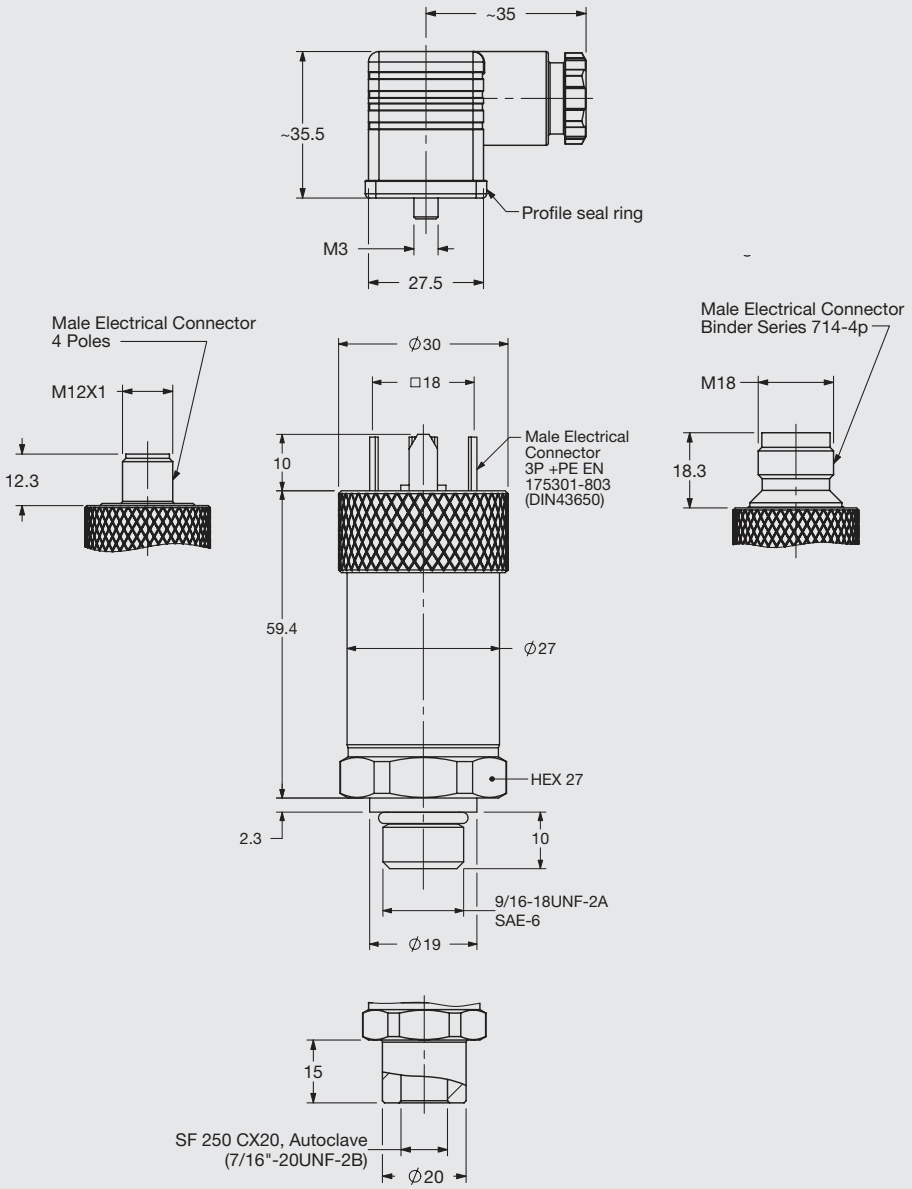
Modification number
000 = Standard

Notes:
*For design and electrical connection see Dimensions

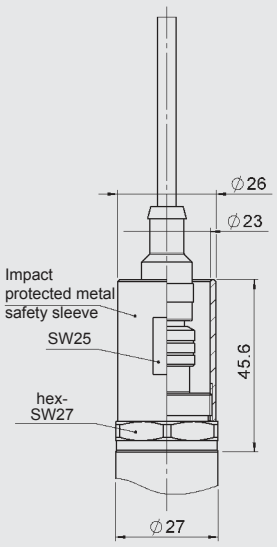
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Dimensions:

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



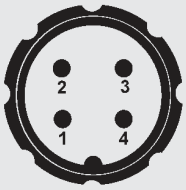
Protection types and applications: (code): 9, A



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

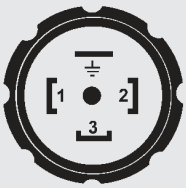
Pin connections:

Binder series 714 M18



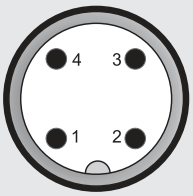
Pin	HDA 44x4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN 175301-803 (DIN 43650)



Pin	HDA 44x5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



Pin	HDA 44x6-A
1	Signal +
2	n.c.
3	Signal -
4	n.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 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

Electronic Pressure Transmitter

HDA 4300
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

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 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
T_{500} 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: 1.4301 Seal: FPM / EPDM	
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2-conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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[1)]	-40..+140°F / -4..+140°F	
CE - mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 / 36	
Vibration resistance 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) and Binder 714 M18) 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [2)]	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 (**F**ull **S**cale) = relative to the full measuring range, **B.F.S.L.**= **B**est **F**it **S**traight **L**ine
[1)] -4 °F with FPM or EPDM seal, -40 °F on request
[2)] 500 V AC on request

Areas of application:

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 Gc	Ex ta IIIC T80°C T_{500}T90°C Da Ex tb IIIC T80°C Db	Ex ic IIC T6 Gc Ex ic IIIC T80°C Dc	Ex ia IIIC T85° C Da
Zones / Categories			Equipment level standard Ma Mining Protection class: intrinsically safe ia with barrier	Equipment level standard Ga, Ga/Gb Gases Protection class: intrinsically safe ia with barrier	Equipment level standard Gb Gases Protection class: intrinsically safe ia with barrier	Equipment level standard Gc Gases Protection class: non-sparking nA	Equipment level standard Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment level standard Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier	Equipment level standard Da Conductive dust Protection class: intrinsically safe ia with barrier
Electrical connection			4, 5, 6	4, 5, 6	4, 5, 6	6	6	4, 5, 6	4, 5, 6
Code (see model code)	IECEx	IECEx Australia							
1	✓	✓	✓	✓	✓				
9	✓					✓			
A	✓						✓		
C	✓							✓	
D	✓		✓	✓	✓				✓

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

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIIC T80/90/100° C Da T500T90/T100/T110°C Da, Ex tb IIIC 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 type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

Model code:

HDA 4 3 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, 0030, 0050, 0100, 0150, 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 IIIC T80°C T_{500}T90°C Da (only in conjunction with electr. connection 6")*
Ex tb IIIC T80°C Db

C = Ex ic IIC T6 Gc
Ex ic IIIC 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 IIIC 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)

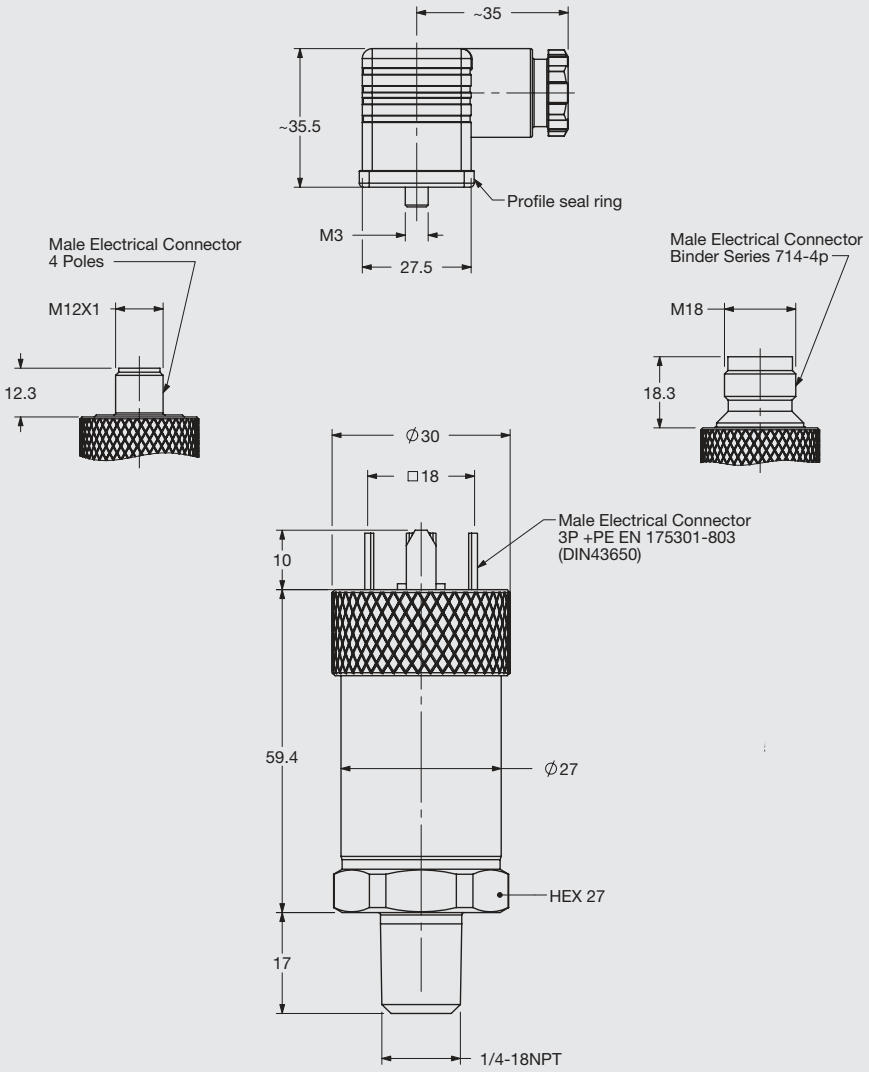
Material of connection (in contact with fluid)
1 = Stainless steel

Notes:
* For design and electrical connection see device dimensions

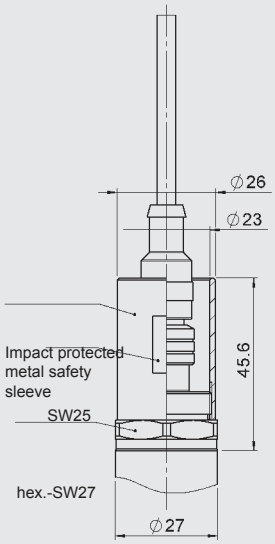
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Dimensions:

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



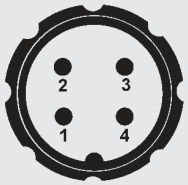
Protection types and applications (code): 9, A



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

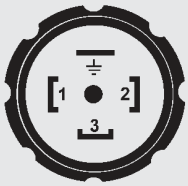
Pin connections:

Binder series 714 M18



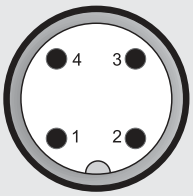
Pin	HDA 43x4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN 175301-803 (DIN 43650)



Pin	HDA 43x5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



Pin	HDA 43x6-A
1	Signal +
2	n.c.
3	Signal -
4	n.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

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Absolute Pressure Transmitter

HDA 4100
IECEx Intrinsically Safe
IECEx Dustproof Enclosure
IECEx Non-sparking

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 IIIC T80/90/100°C Da
T_{500} 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, 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 Mech. connection: 1.4301 Seal: FPM / EPDM	
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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[1)]	-40..+140°F / -4..+140°F	
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 / 36	
Vibration resistance 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) and Binder 714 M18) 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [2)]	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 (**F**ull **S**cale) = relative to the full measuring range, **B.F.S.L.**= **B**est **F**it **S**traight **L**ine
[1)] -4 °F with FPM or EPDM seal, -40 °F on request
[2)] 500 V AC on request

Areas of application:

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 Gc	Ex ta IIIC T80°C T_{500}T90°C Da Ex tb IIIC T80°C Db	Ex ic IIC T6 Gc Ex ic IIIC T80°C Dc	Ex ia IIIC T85° C Da
Zones / Categories			Equipment level standard Ma Mining Protection class: intrinsically safe ia with barrier	Equipment level standard Ga, Ga/Gb Gases Protection class: intrinsically safe ia with barrier	Equipment level standard Gb Gases Protection class: intrinsically safe ia with barrier	Equipment level standard Gc Gases Protection class: non-sparking nA	Equipment level standard Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment level standard Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier	Equipment level standard Da Conductive dust Protection class: intrinsically safe ia with barrier
Electrical connection			4, 5, 6	4, 5, 6	4, 5, 6	6	6	4, 5, 6	4, 5, 6
Code (see model code)	IECEx	IECEx Australia							
1	✓	✓	✓	✓	✓				
9	✓					✓			
A	✓						✓		
C	✓							✓	
D	✓		✓	✓	✓				✓

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

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIIC T80/90/100° C Da T500T90/T100/T110°C Da, Ex tb IIIC 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 type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

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

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

A = Ex ta IIIC T80°C T_{500}T90°C Da (only in conjunction with electr. connection "6")*
Ex tb IIIC T80°C Db

C = Ex ic IIC T6 Gc
Ex ic IIIC 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 IIIC 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)

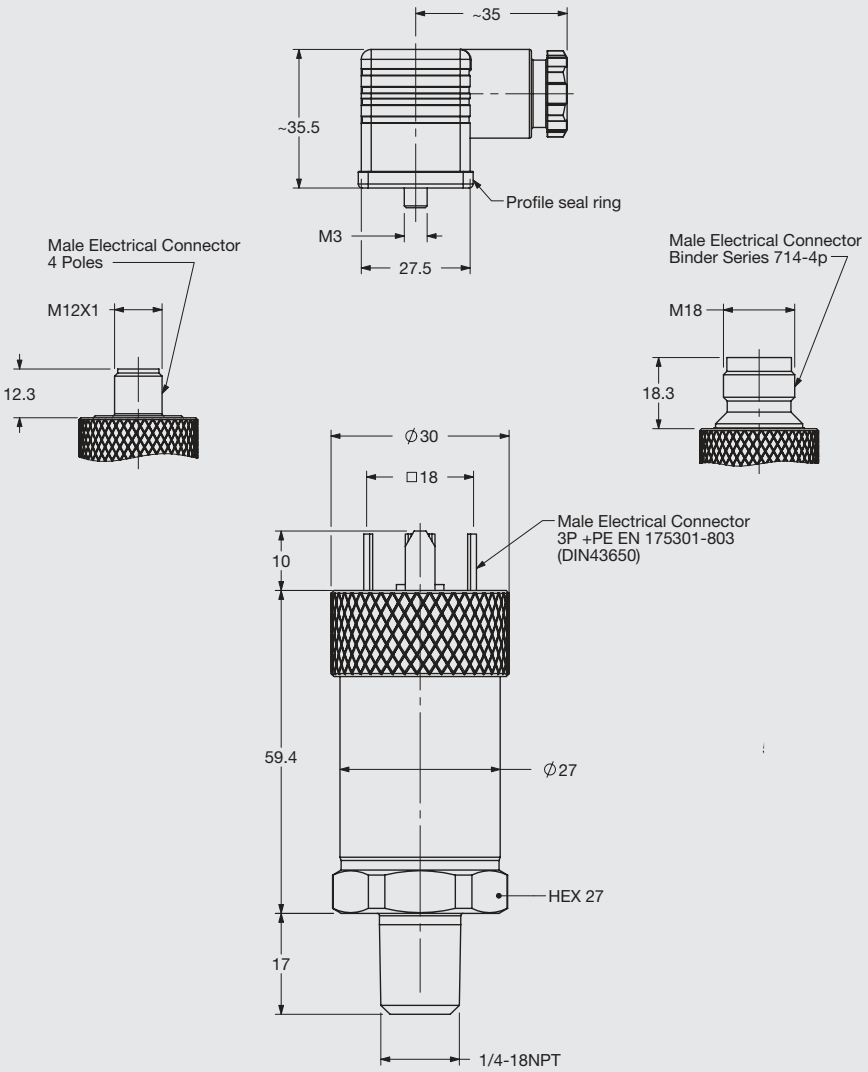
Material of connection (in contact with fluid)
1 = Stainless steel

Notes:
* For design and electrical connection see device dimensions

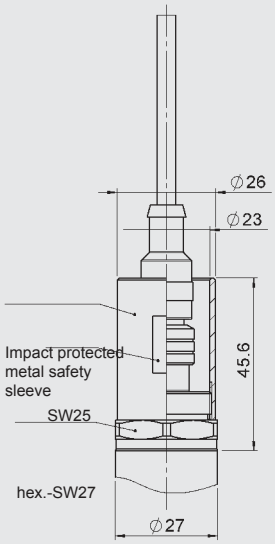
Accessories:
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Dimensions:

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



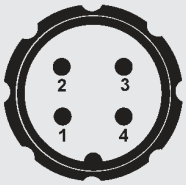
Protection types and applications (code): 9, A



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

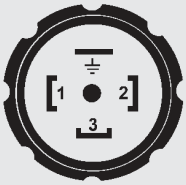
Pin connections:

Binder series 714 M18



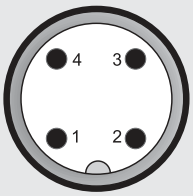
Pin	HDA 41x4-A
1	n.c.
2	Signal +
3	Signal -
4	n.c.

EN 175301-803 (DIN 43650)



Pin	HDA 41x5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



Pin	HDA 41x6-A
1	Signal +
2	n.c.
3	Signal -
4	n.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

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

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 IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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:

- 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 [1]	2900, 4350, 7250, 7250, 14500, 29000, 29000 psi	
Mechanical connection	G1/2 A DIN 3852 G1/2 with additional front O-ring seal	
Pressure transfer fluid	Silicon-free oil	
Torque value	33 ft-lb (45 Nm)	
Parts in contact with medium [2]	Stainless steel: Seal: O-ring:	1.4435; 1.4301 FPM FPM
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
Accuracy to DIN 16086, max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.	
Accuracy at minimum setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.25 % FS max.	
Temperature compensation Zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Temperature compensation Over range	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Non-linearity at max. setting to DIN 16086	≤ ± 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	-4..+185°F	
Operating temperature range[3]	-40..+140°F/ -4..+140°F	
Storage temperature range	-40..+212°F	
Fluid temperature range[3]	-20..+140°F -40..+140°F / -4..+140°F	
CE 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 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [4]	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 (**F**ull **S**cale) = 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

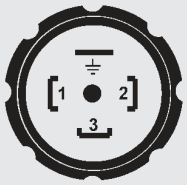
Areas of application:

Code used in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100°C Dc 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.

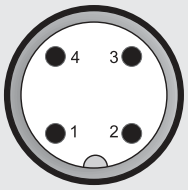
Pin connections:

EN175301-803 (DIN 43650)



Pin	HDA 47Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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 2G Ex ia IIC T6 Gb
II 1D Ex ia IIIC T85 °C Da

9 = II 3G Ex nA IIC T6 Gc
(only in conjunction with electr. connection “6“)*

A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da
(only in conjunction with electr. connection “6“)*
II 2D Ex tb IIIC T80 °C Db

C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

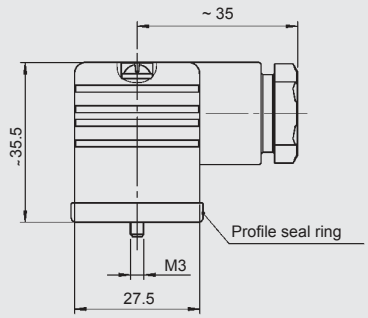
Modification number
000 = Standard

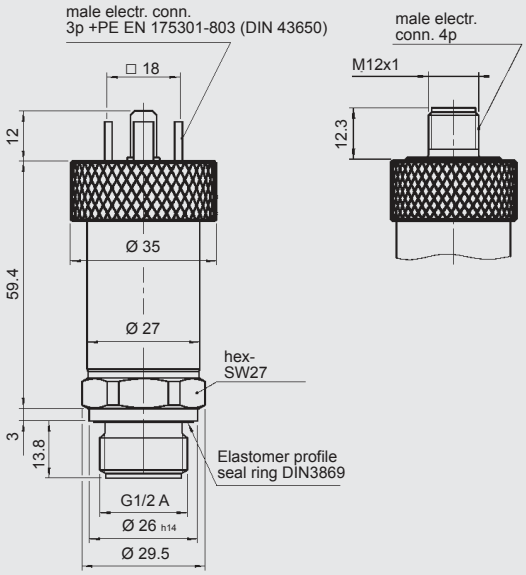
Notes:
* For design and electrical connection see Dimensions

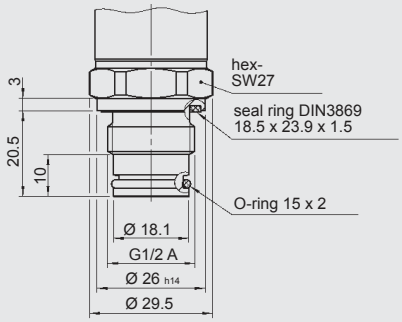
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

Dimensions:

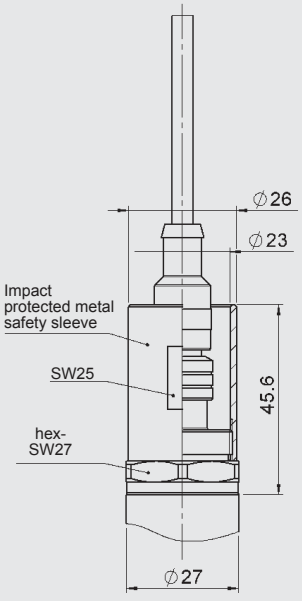
Protection types and applications (code): 1, C







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 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

Electronic Pressure Transmitter

HDA 4400
with Flush Membrane
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 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 IIC T6 Ga
II 1/2G Ex ia IIC T6 Ga/Gb
II 2G Ex ia IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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:

- 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:

Input data		
Measuring ranges	500, 750, 1000, 1500, 3000, 6000, 9000 psi	
Overload ranges	1160, 1740, 2900, 2900, 7250, 11600, 14500 psi	
Burst pressure [1]	2900, 4350, 7250, 7250, 14500, 29000, 29000 psi	
Mechanical connection	G1/2A DIN 3852 G1/2 with add. front O-ring seal G1/4 with add. 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 [2]	Stainless steel: 1.4435; 1.4301 Seal: FPM O-ring: FPM	
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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	≤ ± 0.0085% FS/°F typ. ≤ ± 0.014% FS/°F max.	
Temperature compensation 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	≤ ± 0.1 % 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[3]	-40..+140°F / -4..+140°F	
CE 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 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [4]	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 (**F**ull **S**cale) = 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

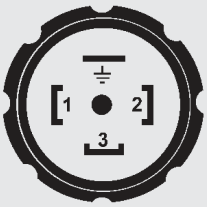
Areas of application:

Code used in Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100°C Dc 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.

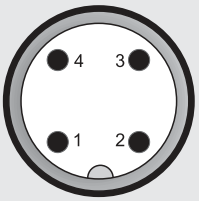
Pin connections:

EN 175301-803 (DIN 43650)



Pin	HDA 44Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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

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)
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 IIIC T85 °C Da

9 = II 3G Ex nA IIC T6 Gc
(only in conjunction with electr. connection “6“)*

A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da
(only in conjunction with electr. connection “6“)*
II 2D Ex tb IIIC T80 °C Db

C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

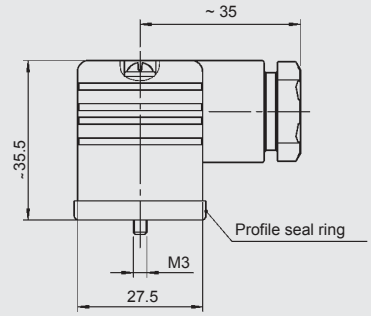
Modification number
000 = Standard

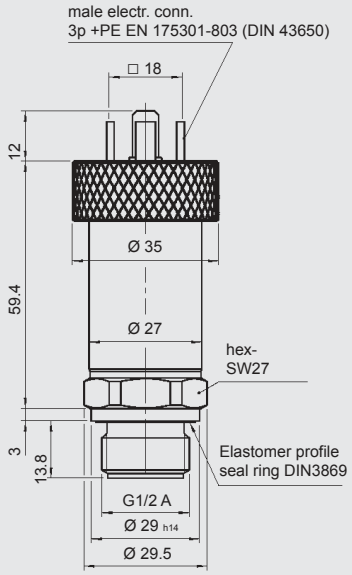
Notes:
* For design and electrical connection see Dimensions

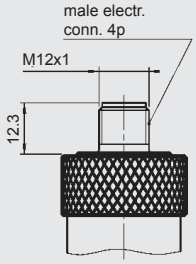
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

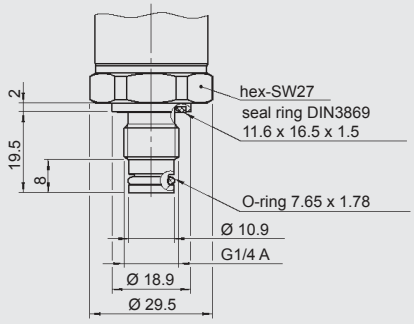
Dimensions:

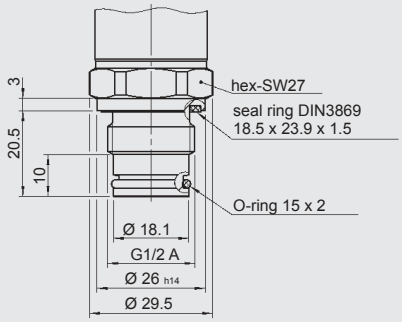
Protection types and applications (code): 1, C



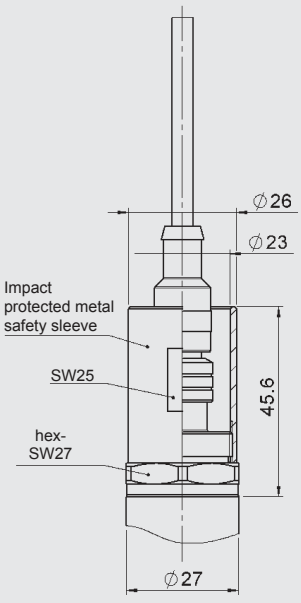








Protection types and applications (code): 9, A



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 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
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E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Pressure Transmitter

HDA 4300
with Flush Membrane
ATEX Intrinsically Safe
ATEX Dustproof Enclosure
ATEX Non-sparking

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, 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 IIC T6 Gb
II 3G Ex nA IIC T6,T5,T4 Gc
II 3G Ex ic IIC T6,T5,T4 Gc

II 1D 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:

- 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, 400, 650, 1000, 2500 psi	
Mechanical connection	G1/2A 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 R_{Lmax} = (U_B – 12 V) / 20 mA [kΩ]	
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 to 212°F	
Fluid temperature range[2]	-40..+140°F / -4..+140°F	
CE - 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 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 voltage	U_i = 12 .. 28 V	12 .. 28 V
Max. input current	I_i = 100 mA	
Max. input power	P_i = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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 (**F**ull **S**cale) = 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

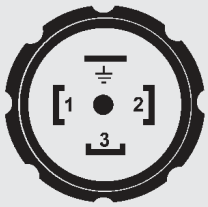
Areas of application:

Code Model code	1			9	A	C
Protection type	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 IIIC T85°C Da	II 2G Ex ia IIC T6 Gb	II 3G Ex nA IIC T6 Gc	II 1D Ex ta IIIC T80°C T_{500}T90°C Da II 2D Ex tb IIIC T80°C Db	II 3G Ex ic IIC T6 Gc II 3D Ex ic IIIC T80°C Dc
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: 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

Devices in ignition protection class "Dustproof enclosure" for the protection types 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 and II 3D Ex tc IIIC T80/90/100°C Dc 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.

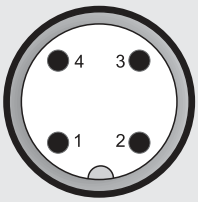
Pin connections:

EN 175301-803 (DIN 43650)



Pin	HDA 43Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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

Model code:

HDA 4 3 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
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 IIIC T85 °C Da

9 = II 3G Ex nA IIC T6 Gc
(only in conjunction with electr. connection “6“)*

A = II 1D Ex ta IIIC T80 °C T_{500}T90 °C Da
(only in conjunction with electr. connection “6“)*
II 2D Ex tb IIIC T80 °C Db

C = II 3G Ex ic IIC T6 Gc
II 3D Ex ic IIIC T80 °C Dc

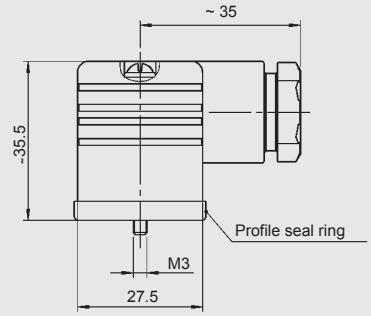
Modification number
000 = Standard

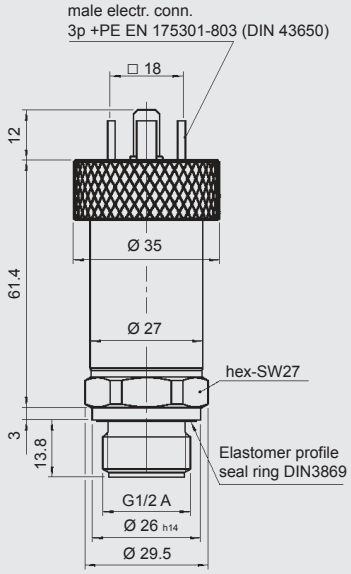
Notes:
* For design and electrical connection see Dimensions

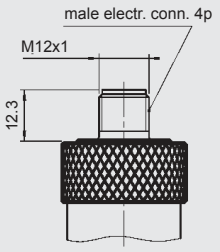
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

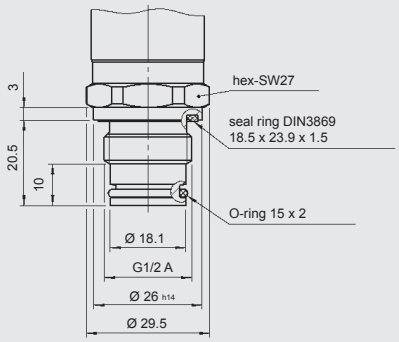
Dimensions:

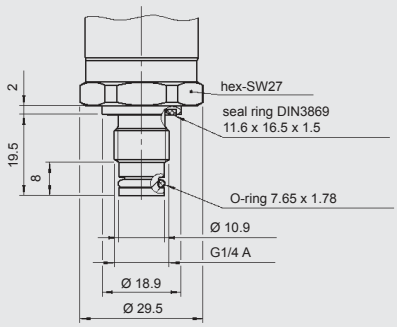
Protection types and applications (code): 1, C



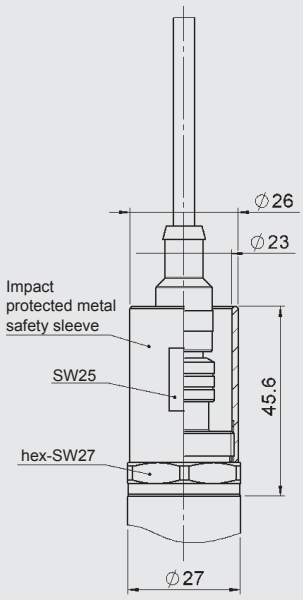








Protection types and applications (code): 9, A



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 and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.
For bar ranges see European Catalog

HYDAC ELECTRONICS
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Website: www.hydacusa.com

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 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 IIIC T80/90/100°C Da
T_{500} 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:

- 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		
Measuring ranges	500, 750, 1000, 1500, 3000, 6000, 9000 psi	
Overload ranges	1160, 1740, 2900, 2900, 7250, 11600, 14500 psi	
Burst pressure[1]	2900, 4350, 7250, 7250, 14500, 29000, 29000 psi	
Mechanical connection	G1/2 A DIN 3852 G1/2 with additional front O-ring seal	
Pressure transfer fluid	Silicon-free oil	
Torque value	33 ft-lb (45 Nm)	
Parts in contact with medium [2]	Stainless steel: Seal: O-ring:	1.4435; 1.4301 FPM FPM
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
Accuracy to DIN 16086, max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.	
Accuracy at minimum setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.25 % FS max.	
Temperature compensation zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Temperature compensation over range	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.	
Non-linearity at max. setting to DIN 16086	≤ ± 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	-20..+85 °C to -4..+185°F	
Operating temperature range [3]	-40..+60°C / -20..+60°C to -40..+140°F/ -4..+140°F	
Storage temperature range	-40..+100°C to -40 to 212°F	
Fluid temperature range [3]	-40..+60°C / -20..+60°C to -40..+140°F / -4..+140°F	
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 / 36	
Vibration resistance 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 voltage	U_i = 12 .. 28 V	12 .. 28 V
Max. input current	I_i = 100 mA	
Max. input power	P_i = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [4]	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 (**F**ull **S**cale) = 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

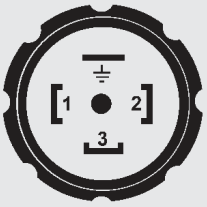
Areas of application:

Code used in Model code	D			9	A	C
Protection types and applications	Ex ia I Ma	Ex ia IIC T6 Ga Ex ia IIC T6 Ga/Gb Ex ia IIIC T85 °C Da	Ex ia IIC T6 Gb	Ex nA IIC T6 Gc	Ex ta IIIC T80 °C T_{500}T90 °C Da Ex tb IIIC T80 °C Db	Ex ic IIC T6 Gc Ex ic IIIC T80 °C Dc
Certificate	IECEx KEM 08.0014X					
Zones / Categories	Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier	Equipment protection level Ga, Ga/Gb, Da Gases/conductive dust Protection class: intrinsically safe ia with barrier	Equipment protection level Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gc Gases Protection class: Non-sparking nA	Equipment protection level Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment protection level Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier
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 ta IIIC T80/90/100 °C Da T_{500}T90/T100/T110 °C Da, Ex tb IIIC 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 the protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

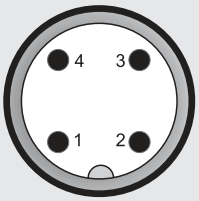
Pin connections:

EN 175301-803 (DIN 43650)



Pin	HDA 47Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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

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
G01 = G1/2 A, DIN 3852
G02 = G1/2 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 T6 Gb
Ex ia IIIC T85 °C Da
9 = Ex nA IIC T6 Gc (only in conjunction with electr. connection “6“) *
A = Ex ta IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. conn. “6“) *
Ex tb IIIC T80 °C Db
C = Ex ic IIC T6 Gc
Ex ic IIIC T80 °C Dc

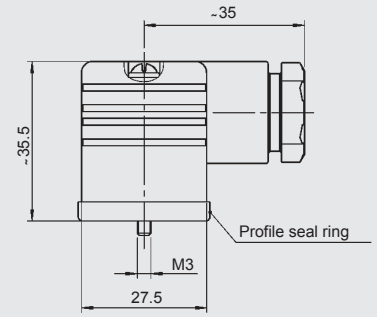
Modification number
000 = Standard

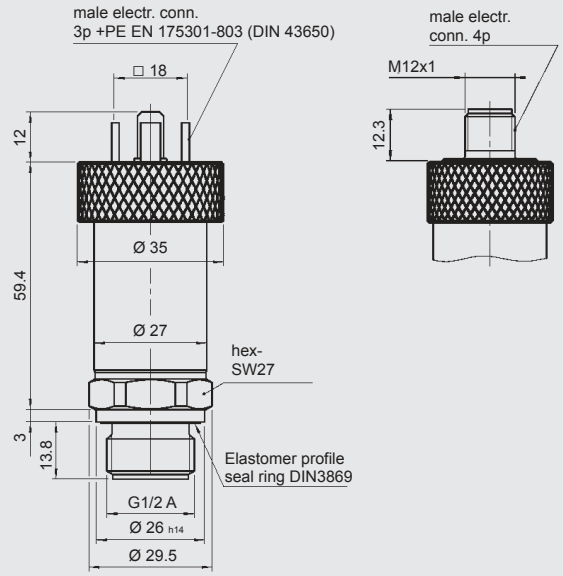
Notes:
* For design and electrical connection see Dimensions

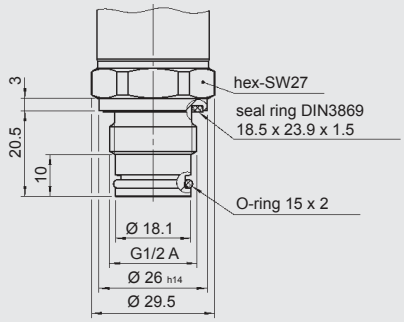
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

Dimensions:

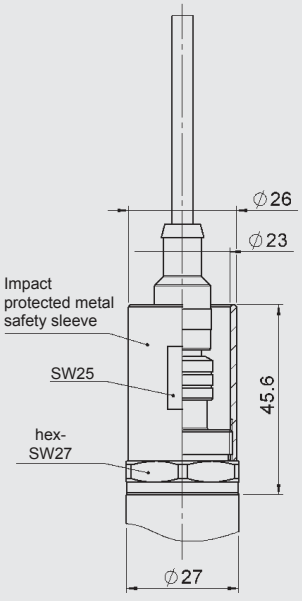
Protection types and applications (code): D, C







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

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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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 levls 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,T4 Gc

Ex ta IIIC T80/90/100 °C Da
T_{500} 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:

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

Technical data:

Input data		
Measuring ranges	500, 750, 1000, 1500, 3000, 6000, 9000 psi	
Overload pressures	1160, 1740, 2900, 2900, 7250, 11600, 14500 psi	
Burst pressure [1]	2900, 4350, 7250, 7250, 14500, 29000, 29000 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 [2]	Stainless steel: 1.4435; 1.4301 Seal: FPM O-ring: FPM	
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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 Zero point	≤ ± 0.0085% FS/°F typ. ≤ ± 0.014% FS/°F max.	
Temperature compensation 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	≤ ± 0.1 % 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 [3]	-40..+140°F / -4..+140°F	
CE - mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 11 / 26 / 36	
Vibration resistance 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 voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Max. input power	Pi = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	
Insulation voltage [4]	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 (**F**ull **S**cale) = 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

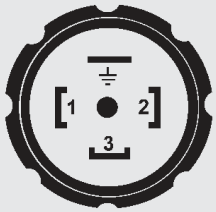
Areas of application:

Code No. for use in Model code	D			9	A	C
Protection types and applications	Ex ia I Ma	Ex ia IIC T6 Ga Ex ia IIC T6 Ga/Gb Ex ia IIIC T85°C Da	Ex ia IIC T6 Gb	Ex nA IIC T6 Gc	Ex ta IIIC T80°C T_{500}T90°C Da Ex tb IIIC T80°C Db	Ex ic IIC T6 Gc Ex ic IIIC T80°C Dc
Certificate	IECEx KEM 08.0014X					
Zones / Categories	Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier	Equipment protection level Ga, Ga/Gb, Da Gases/conductive dust Protection class: intrinsically safe ia with barrier	Equipment protection level Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gc Gases Protection class: Non-sparking nA	Equipment protection level Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment protection level Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier
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 ta IIIC T80/90/100 °C Da T_{500}T90/T100/T110 °C Da, Ex tb IIIC 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 the protection type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

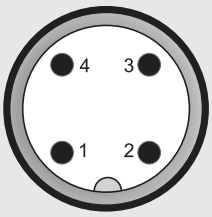
Pin connections:

EN 175301-803 (DIN 43650)



Pin	HDA 44Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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

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
Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIC T6 Gb
Ex ia IIIC T85 °C Da
9 = Ex nA IIC T6 Gc (only in conjunction with electr. connection "6")*
A = Ex ta IIIC T80 °C T_{500}T90 °C Da (only in conjunction with electr. connection "6")*
Ex tb IIIC T80 °C Db
C = Ex ic IIC T6 Gc
Ex ic IIIC T80 °C Dc

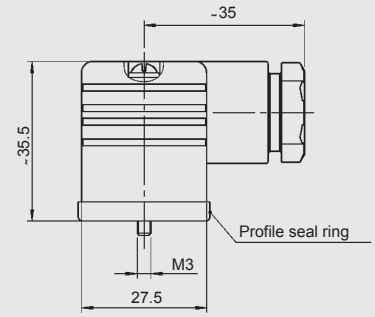
Modification number
000 = Standard

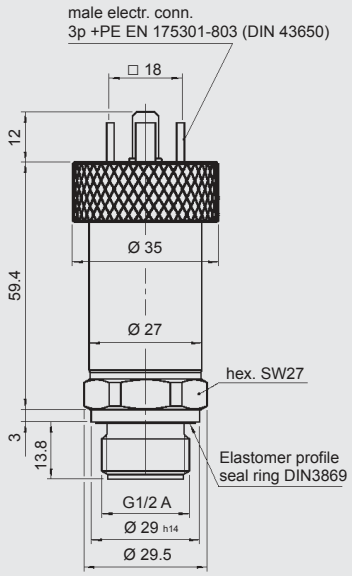
Notes:
* For design and electrical connection see Dimensions

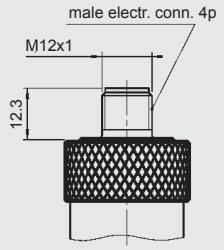
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

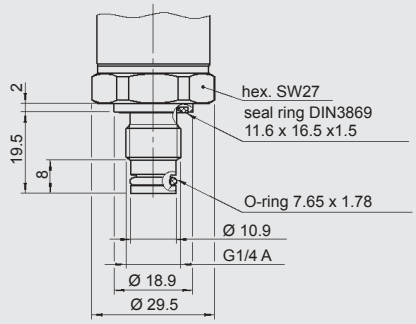
Dimensions:

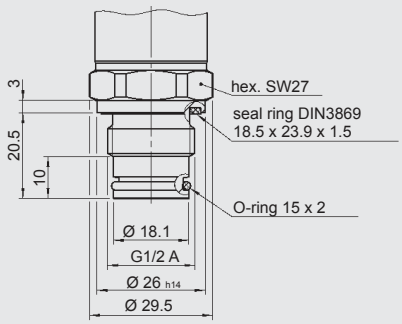
Protection types and applications (code): D, C



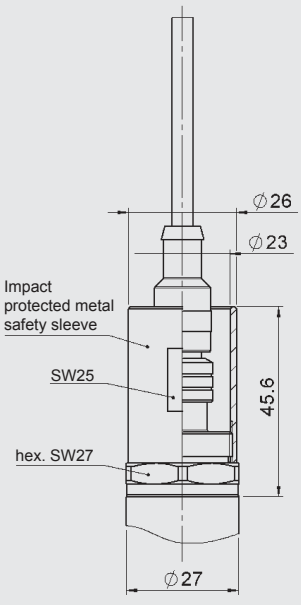








Protection types and applications (code): 9, A



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

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

HYDAC ELECTRONICS
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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,T4 Gc

Ex ta IIIC T80/90/100 °C Da
T_{500} 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:

- 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: Seal: O-ring:	1.4435; 1.4301 FPM FPM
Output data		
Output signal, permitted load resistance	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 12\ V) / 20\ mA\ [k\Omega]$	
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 [2]	-40..+140°F / -4..+140°F	
CE 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 voltage	U_i = 12 .. 28 V	12 .. 28 V
Max. input current	I_i = 100 mA	
Max. input power	P_i = 1 W	max. power consuption ≤ 1 W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 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 (**F**ull **S**cale) = 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

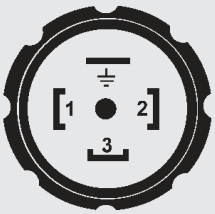
Areas of application:

Code for use in Model code	D			9	A	C
Protection types and applications	Ex ia I Ma	Ex ia IIC T6 Ga Ex ia IIC T6 Ga/Gb Ex ia IIIC T85°C Da	Ex ia IIC T6 Gb	Ex nA IIC T6 Gc	Ex ta IIIC T80°C T_{500}T90°C Da Ex tb IIIC T80°C Db	Ex ic IIC T6 Gc Ex ic IIIC T80°C Dc
Certificate	IECEx KEM 08.0014X					
Zones / Categories	Equipment protection level Ma Mining Protection class: intrinsically safe ia with barrier	Equipment protection level Ga, Ga/Gb, Da Gases/conductive dust Protection class: intrinsically safe ia with barrier	Equipment protection level Gb Gases Protection class: intrinsically safe ia with barrier	Equipment protection level Gc Gases Protection class: Non-sparking nA	Equipment protection level Da, Db Conductive dust Protection class: Dustproof enclosure	Equipment protection level Gc, Dc Gases/conductive dust Protection class: Intrinsically safe ic with barrier
Electrical Connection	4, 5, 6	4, 5, 6	4, 5, 6	6	6	4,5,6

Devices in the ignition protection class "Dustproof enclosure" for the protection types Ex ta IIIC T80/90/100° C Da T_{500}T90/T100/T110°C Da, Ex tb IIIC 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 type Ex nA IIC T6, T5, T4 Gc are available with flying leads on request.

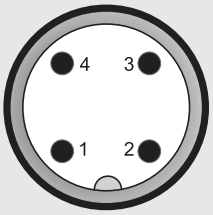
Pin connections:

EN 175301-803 (DIN 43650)



Pin	HDA 43Z5-A
1	Signal +
2	Signal -
3	n.c.
⊥	Housing

M12x1, 4 pole



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

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 T6 Gb
Ex ia IIIC T85 °C Da

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

A = Ex ta IIIC T80 °C T_{500}T90 °C Da
(only in conjunction with electr. connection “6“)*
Ex tb IIIC T80 °C Db

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

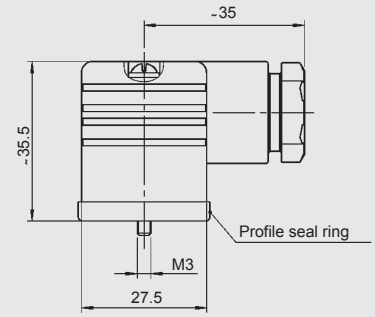
Modification number
000 = Standard

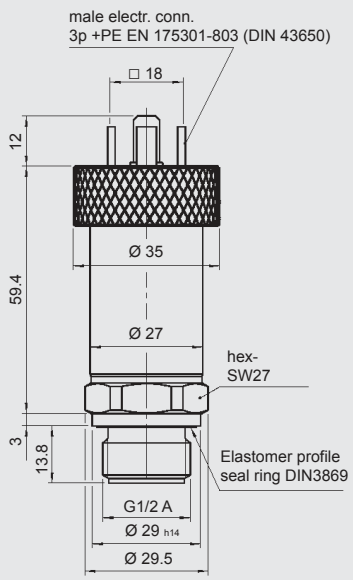
Notes:
* For design and electrical connection see device dimensions

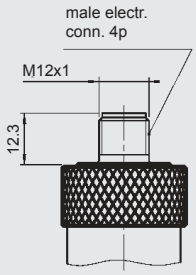
Accessories:
Appropriate accessories, such as electrical female connectors, can be found in the Accessories brochure.

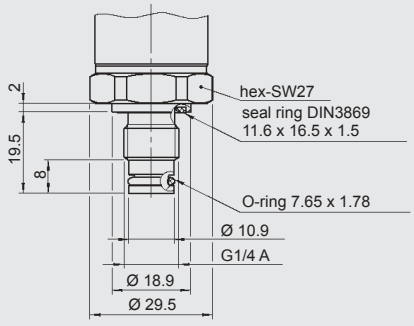
Dimensions:

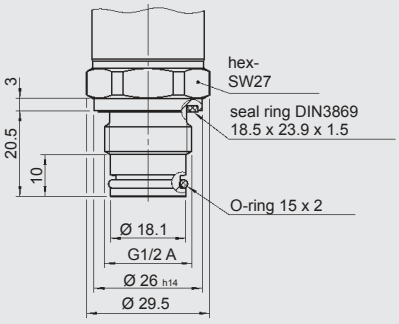
Protection types and applications (code): D, C



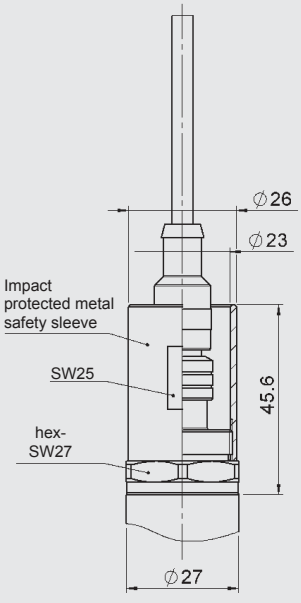








Protection types and applications (code): 9, A



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 and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.
For bar ranges see European Catalog

HYDAC ELECTRONICS
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Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Electronic Pressure Transmitter

HDA 4700
with Flush Membrane
ATEX, IECEx, CSA
Flameproof Enclosure

Description:

The electronic pressure transmitter HDA 4700 with flush membrane is certified in the ignition protection class Flameproof Enclosure to ATEX, IECIx 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:

$_{C}$**CSA**$_{US}$ 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 IIIC 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:

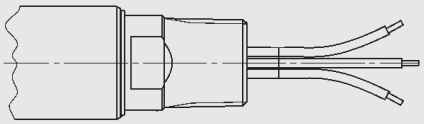
Input data	
Measuring ranges	500, 750, 1000, 1500, 3000, 6000, 9000 psi
Overload ranges	1160, 1740, 2900, 2900, 7250, 11600, 14500 psi
Burst pressure	2900, 4350, 7250, 7250, 14500, 29000, 29000 psi
Mechanical connection[1)]	G1/2 A DIN 3852 G1/2 with add. front O-ring seal
Pressure transfer fluid	Silicon-free oil
Torque value	33 ft-lb (45 Nm)
Parts in contact with medium	Stainless steel: 1.4435; 1.4301 Seal: FPM O-ring: FPM
Conduit, housing material	1.4404; 1.4435 (316L)
Output data	
Output signal, permitted load resistance[2)]	4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 8\ V) / 20\ mA\ [k\Omega]$
Accuracy to DIN 16086, max. setting	≤ ± 0.25 % FS typ. ≤ ± 0.5 % FS max.
Accuracy at minimum setting (B.F.S.L.)	≤ ± 0.15 % FS typ. ≤ ± 0.25 % FS max.
Temperature compensation Zero point	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Temperature compensation Over range	≤ ± 0.0045% FS/°F typ. ≤ ± 0.0085% FS/°F max.
Non-linearity at max. setting to DIN 16086	≤ ± 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: -13..+176°F T6: -13..+140°F
Operating temperature range [3)]	T5: -40..+176°F T6: -40..+140°F
	-40..+212°F
Fluid temperature range [3)]	T5: -40..+176°F T6: -40..+140°F
CE mark	EN 61000-6-1 / 2 / 3 / 4 EN 60079-0 / 1 / 31
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	
Supply voltage	8 .. 30 V DC
Residual ripple of supply voltage	≤ 5 %
Life expectancy	> 10 million load 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 (**F**ull **S**cale) = relative to complete 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

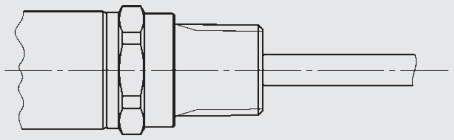
Pin connections:

Conduit (single cores)



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

Conduit (flying leads)



Core	HDA 47ZG-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	c**CSA**us: 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:

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

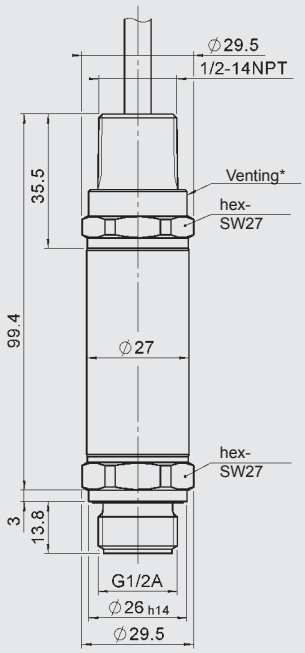
Type of measurement cell
S = Sealed Gauge (sealed to atmosphere) ≥ 500 psi
V = Vented Gauge (vented to atmosphere) ≤ 300 psi

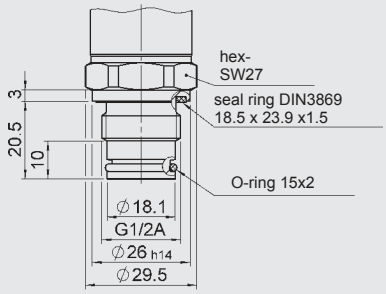
Modification number
000 = Standard

Cable length in inches
Standard = 72 inches

Accessories:
Appropriate accessories, such as electrical 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

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Electro-Mechanical Flow Switch

HFS 2100
ATEX Encapsulation for Oils / Viscous Fluids

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		
Switching ranges [l/min]	Size 1	Size 2
	0.5 .. 1.6	0.5 .. 1.5
	0.8 .. 3.0	1 .. 4
	2.0 .. 7.0	2 .. 8
		3 .. 10
		5 .. 15
		8 .. 24
		10 .. 30
		15 .. 45
		20 .. 60
		30 .. 90
		35 .. 110
Operating pressure		
Brass version	300 bar	250 bar
Stainless steel version	350 bar	300 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.: **FS** (**F**ull **S**cale) = relative to the complete measuring range
[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:

Flying leads

Core	HFS 21X1-XS	HFS 21X1-XW
1	N/O contact	Centre
2		N/C contact
3		N/O contact

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:

HFS 2 1 X 1 – XX – XXXX–XXXX – 7 – X – X – A00

Measuring principle
2 = Variable area float

Test medium
1 = Oils / viscous fluids

Mechanical connection [4] [6]
1 = 1/4 "
2 = 3/8 "
3 = 1/2 "
4 = 3/4 "
5 = 1 "

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

Switching contacts [5]
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 [6]
Oil 10 % -Size 1-
00.5-01.6; 00.8-03.0; 02.0-07.0

Oil 10 % - Size 2-
00.5-01.5; 0001-0004; 0002-0008; 0003-0010; 0005-0015; 0008-0024; 0010-0030; 0015-0045; 0020-0060; 0030-0090; 0035-0110

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

[4] Mechanical connection options depend on housing type (see Dimensions).
[5] 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.
[6] Other models available on request.

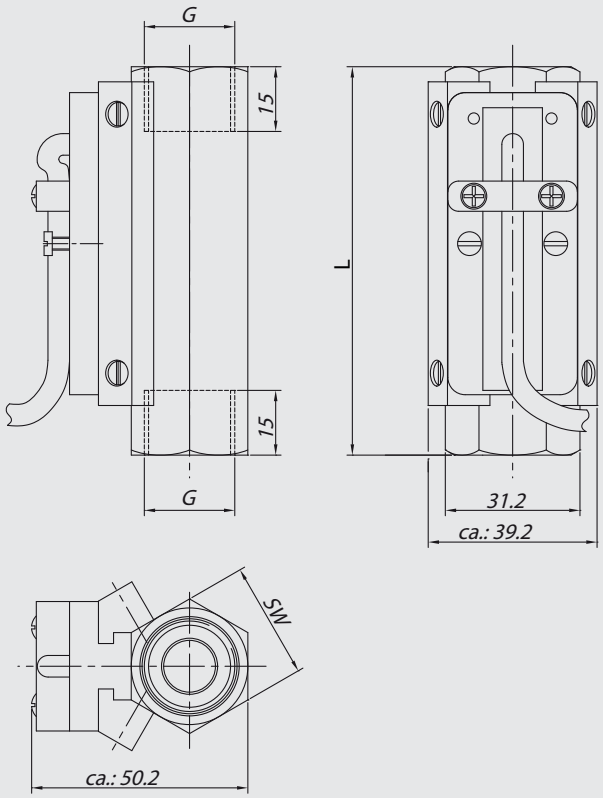
Accessories:
Appropriate accessories, such as electrical connectors can be found in the Accessories brochure.

Dimensions without indicator:

OIL -Size 1- without indicator

Type [l/min]	Installation dimensions [mm]				Weight (approx.) [g]
	DN	SW	G	L	
0.5 .. 1.6	8 10 15	24 24 27	1/4“ 3/8“ 1/2“ *)	98 119 90	450 500 400
0.8 .. 3.0	15	27	1/2“	90	400
2.0 .. 7.0					

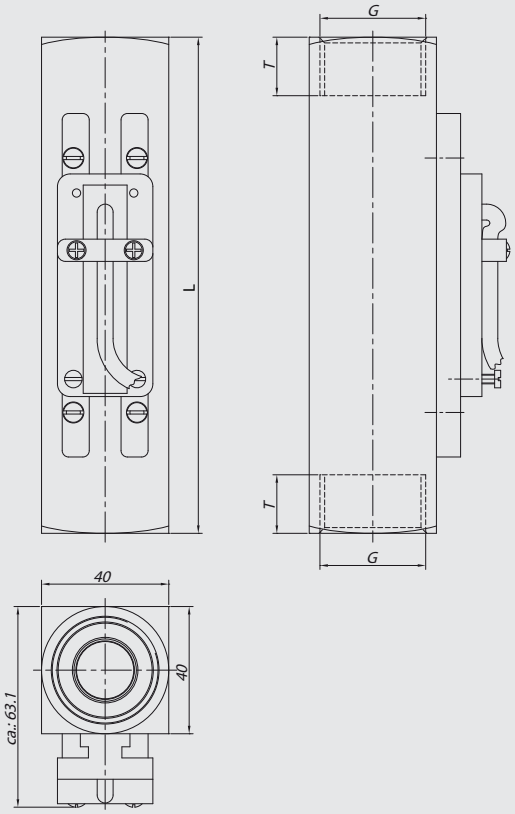
*) Standard



OIL -Size 2- without indicator

Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	T	
0.5 .. 1.5	8	34	1/4"	152	10	1500
1 .. 4	15	34	1/2"	152	14	1425
	20	34	3/4"	152	15	1340
	25	40	1" *)	130	17	1160
2 .. 8	15	34	1/2"	152	14	1425
3 .. 10	20	34	3/4"	152	15	1340
5 .. 15	25	40	1" *)	130	17	1160
8 .. 24						
10 .. 30	20	34	3/4"	152	15	1340
15 .. 45	25	40	1" *)	130	17	1160
20 .. 60						
30 .. 90	25	40	1"	130	17	1160
35 .. 110						

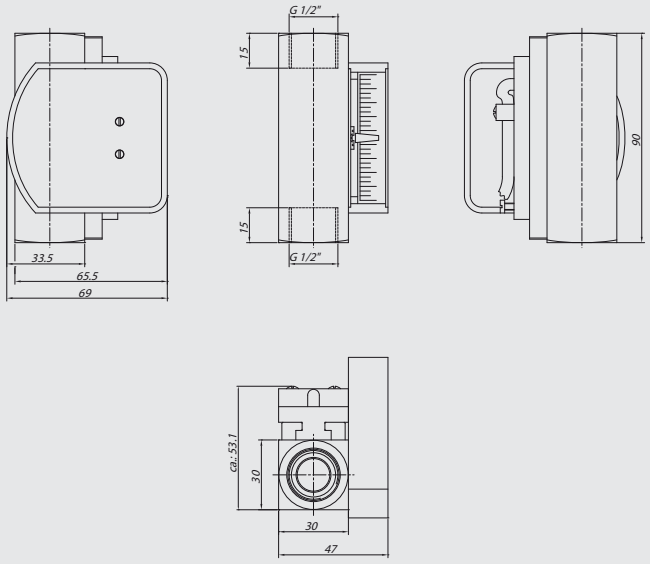
*) Standard



Dimensions with indicator:

OIL -Size 1- with indicator

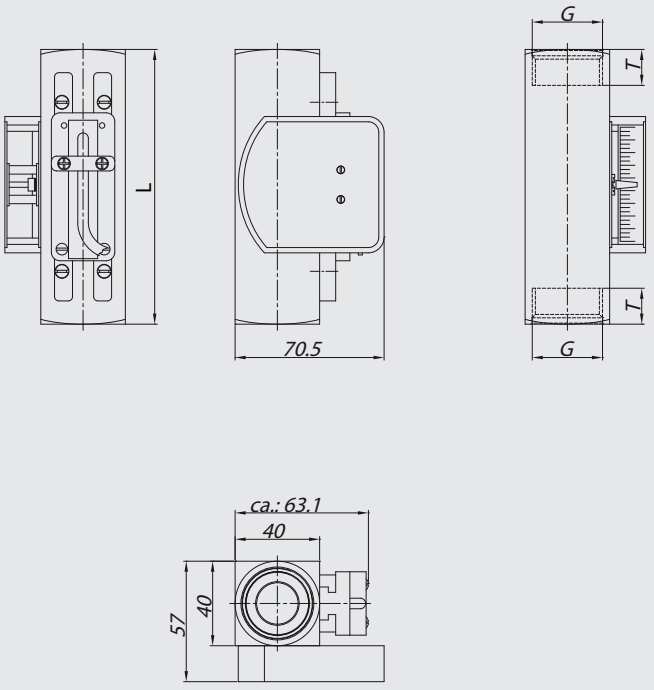
Type [l/min]	Installation dimensions [mm]				Weight (approx.) [g]
	DN	SW	G	L	
0.5 .. 1.6	15	30	1/2"	90	570
0.8 .. 3.0					
2.0 .. 7.0					



OIL -Size 2- with indicator

Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	T	
0.5 .. 1.5	8	34	1/4"	152	10	1590
1 .. 4	15	34	1/2"	152	14	1515
	20	34	3/4"	152	15	1430
	25	40	1" *)	130	17	1250
2 .. 8	15	34	1/2"	152	14	1515
3 .. 10	20	34	3/4"	152	15	1430
5 .. 15	25	40	1" *)	130	17	1250
8 .. 24						
10 .. 30	20	34	3/4"	152	15	1430
15 .. 45	25	40	1" *)	130	17	1250
20 .. 60						
30 .. 90	25	40	1"	130	17	1250
35 .. 110						

*) 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.
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Electro-Mechanical Flow Switch

HFS 2500
ATEX Encapsulation
for Water or Water-based Media

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				
Switching ranges [l/min]	**5 % accuracy**		**10 % accuracy**	
			Size 2	**Size 3**
	0.2 .. 4.0	8 .. 90	0.02 .. 0.2	10 .. 30
	0.6 .. 5.0	5 .. 110	0.2 .. 0.6	15 .. 45
	0.5 .. 8.0	10 .. 150	0.4 .. 1.8	20 .. 60
	1 .. 14	35 .. 220	0.8 .. 3.2	30 .. 90
	1 .. 28	35 .. 250	2 .. 7	60 .. 150
	2 .. 40		3 .. 13	
	4 .. 55		4 .. 20	
	1 .. 70		8 .. 30	
Operating pressure				
Brass version	200 bar		300 bar	250 bar
Stainless steel version	300 bar		350 bar	300 bar
Pressure drop [bar]	0.02 .. 0.8		0.02 .. 0.3	0.02 .. 0.4
Mechanical connection	See dimensions			
Parts in contact with medium Brass version Stainless steel version	 Stainless steel 1.4571; NBR [1]; Brass; nickel-plated; Brass; Hard ferrite 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	≤ ± 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: T5 / T100 °C:	-20 .. +75 °C -20 .. +90 °C		
Fluid temperature range	T6 / T80 °C: T5 / T100 °C:	-20 .. +75 °C -20 .. +90 °C		
Max. surface temperature	T6 / T80 °C: T5 / T100 °C:	+75 °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.: **FS** (**F**ull **S**cale) = relative to the complete measuring range
[1] Other seal materials available on request
[2] The contact opens / switches when the flow falls below the pre-set switching point.

Model code:

HFS 2 5 X 1 – XX – XXXX–XXXX – X – X – X – A00

Measuring principle
2 = Variable area float

Test medium
5 = Water or water-based

Mechanical connection 3)5)
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 4)
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 5)
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.

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

Pin connections:

Flying leads

Pin	HFS 25X1-XS	HFS 25X1-XW
1	N/O contact	Centre
2		N/C contact
3		N/O contact

Notes on installation:

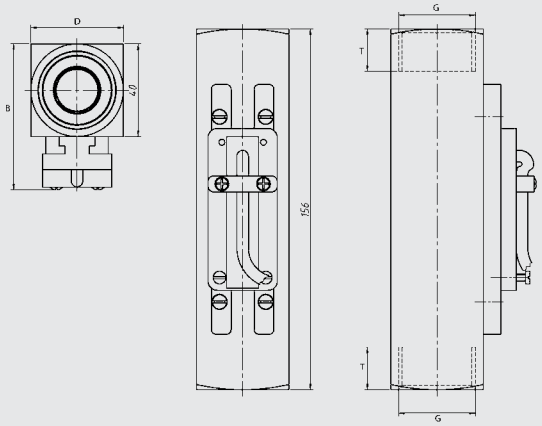
- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact.
  Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

Safety instructions:

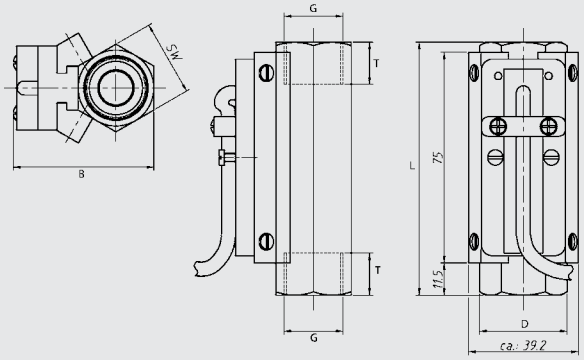
- The circuits must not incorporate any effective inductance or capacities.
- The maximum ratings stipulated in the technical data must never be exceeded, even for a short time.
- To protect the switching contact, a fuse for the circuit must be provided outside the hazardous area, unless the switching 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.

Dimensions without indicator:

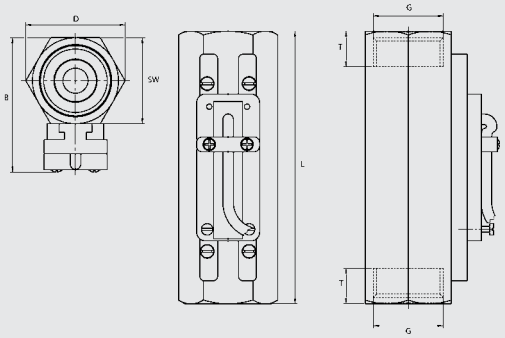
Type [l/min]	Installation dimensions [mm]							Weight (approx.) [g]
	SW	D	B	G	DN	T	L	
Water 5 % accuracy								
0.2 .. 4.0	27	30	53	1/4" 3/8" 1/2"	8 10 15	14	131	850
0.6 .. 5.0								
0.5 .. 8.0								
1 .. 14								
1 .. 28								
2 .. 40	27 32	30 35	53	1/2" 3/4"	15 20	14 16	146 174	900
4 .. 55								
1 .. 70	34 40	40 40	63 63	3/4" 1"	20 25	18 19	152 156	1400 1100
8 .. 90								
5 .. 110								
10 .. 150	50	50	73	1 1/4"	32	21	200	2750
35 .. 220	50	50	73	1 1/4"	32	21	200	3000
35 .. 250	60	60	78	1 1/2"	40	24	200	3800



Water 10 % Accuracy - Size 2-								
0.02 .. 0.2	27	31	67	1/2 ”	15	15	90	400
0.2 .. 0.6								
0.4 .. 1.8								
0.8 .. 3.2								
2.0 .. 7.0								
3.0 .. 13.0								
4.0 .. 20.0								
8.0 .. 30.0								



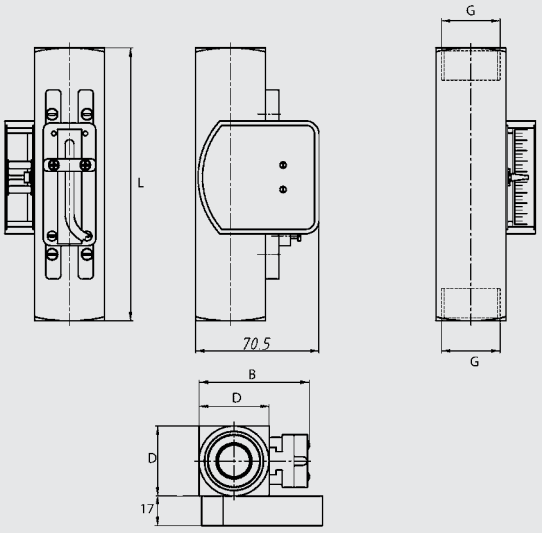
Water 10 % Accuracy - Size 3-								
10 .. 30	34	47	93	3/4 „ 1" *)	20 25	21 17	152 130	1200 1050
15 .. 45								
20 .. 60								
30 .. 90								
60 .. 150	41	47	93	1"	25	17	130	1050



*) Standard

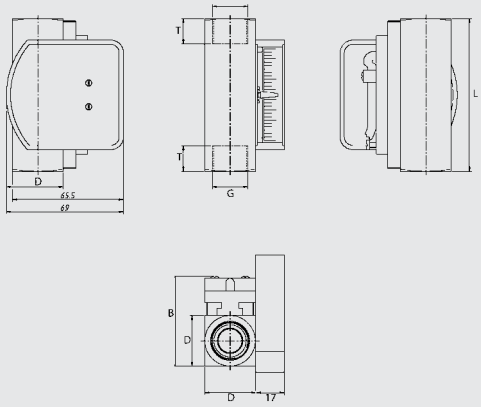
Dimensions with indicator:

Type [l/min]	Installation dimensions [mm]							Weight (approx.) [g]
	SW	D	B	G	DN	T	L	
Water 5 % accuracy								
0.2 .. 4.0	27	30	53	1/4" 3/8" 1/2"	8 10 15	14	131	940
0.6 .. 5.0								
0.5 .. 8.0								
1 .. 14								
1 .. 28								
2 .. 40	27 32	30 35	53	1/2" 3/4"	15 20	14 16	146 174	990
4 .. 55								
1 .. 70	34 40	40 40	63 63	3/4" 1"	20 25	18 19	152 156	1490 1190
8 .. 90								
5 .. 110								
10 .. 150	50	50	73	1 1/4"	32	21	200	2840
35 .. 220	50	50	73	1 1/4"	32	21	200	3090
35 .. 250	60	60	78	1 1/2"	40	24	200	3890



Water 10 % Accuracy - Size 2-

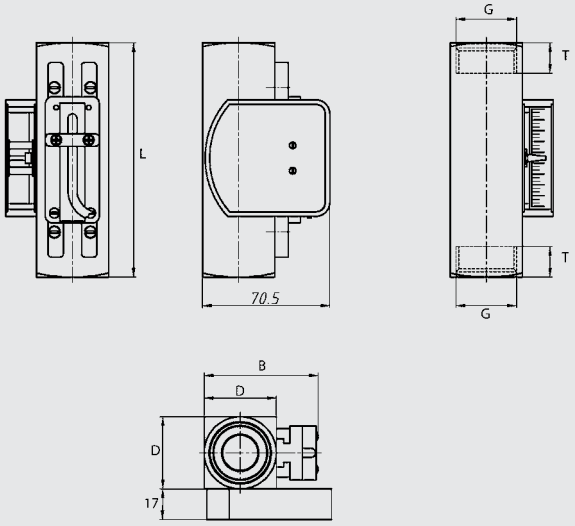
0.02 .. 0.2	30	30	70	1/2 ”	15	15	90	570
0.2 .. 0.6								
0.4 .. 1.8								
0.8 .. 3.2								
2.0 .. 7.0								
3.0 .. 13.0								
4.0 .. 20.0								
8.0 .. 30.0								



Water 10 % Accuracy - Size 3-

10 .. 30	34 40	40	93	3/4 „ 1" *)	20 25	15 17	152 130	1430 1250
15 .. 45								
20 .. 60								
30 .. 90								
60 .. 150	40	40	93	1"	25	17	130	1250

*) 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 INTERNATIONAL

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.

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
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 .. 120 °C Db

IECEx Flame Proof
Ex d I Mb
Ex d IIC T6, T5 Gb
Ex tb IIIC T110 .. 120 °C Db

Technical data:

Input data		
Measuring ranges and operating pressure		
HFT 31XX- F21-0020	0.32 .. 5.28 gpm	6090 psi
HFT 31XX- F21-0060	1.59 .. 15.85 gpm	6090psi
HFT 31XX- F21-0300	3.96 .. 79.25 gpm	6090 psi
HFT 31XX- F21-0600	10.57 .. 158.5 gpm	6090psi
Additional connection options [1]	2 x SAE 6 female threads for pressure or temperature sensors	
Parts in contact with fluid	Stainless steel: 316L, 329, tungsten carbide	
Output data		
Output signal, permitted load resistance	4...20 mA, 2 conduits, with HART Protocol $R_{Lmax}=(U_B - 12\ V) / 20\ mA\ [k\Omega]$ for HART communikation min. 250 Ω	
HART Communication	according to HART 7 specification	
HART Common Practice Commands i.e.	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 [2]	T6, T110 T5	Ta = -40 .. 140 °F Ta = -40 .. 158 °F
Storage temperature range	-40 .. +212 °F	
Fluid temperature range [2]	T6, T110 T5	Ta = -40 .. 140 °F Ta = -40 .. 158 °F
CE- mark	EN 61000-6-1, EN 61000-6-2 EN 61000-6-3, EN 61000-6-4	
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	10g	
Protection class to IEC 60529 ISO 20653	IP 69 IP 6K9K	
Other data		
Measuring medium	hydraulic fluids, water-based media	
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.
[1] not for measuring range: 0.32 .. 5.28 gpm
[2] T120 °C at Ta = -40 .. +158 °F with electrical connection single leads available

Status 2015-04-14

Measuring Range Limits:

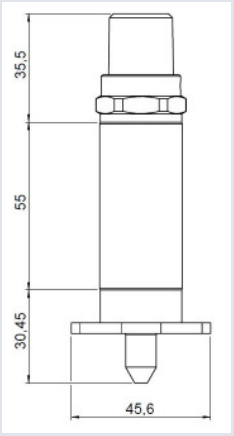
By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring ranges:

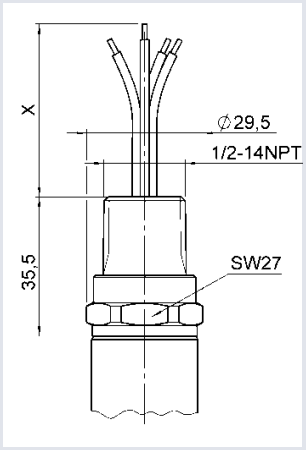
	Lower measuring range limit		Upper measuring range limit		Measuring range	
	min	max	min	max	min	max
HFT 3100	0 % FS	75 % FS	25% FS	100 % FS	25% FS	100 % FS

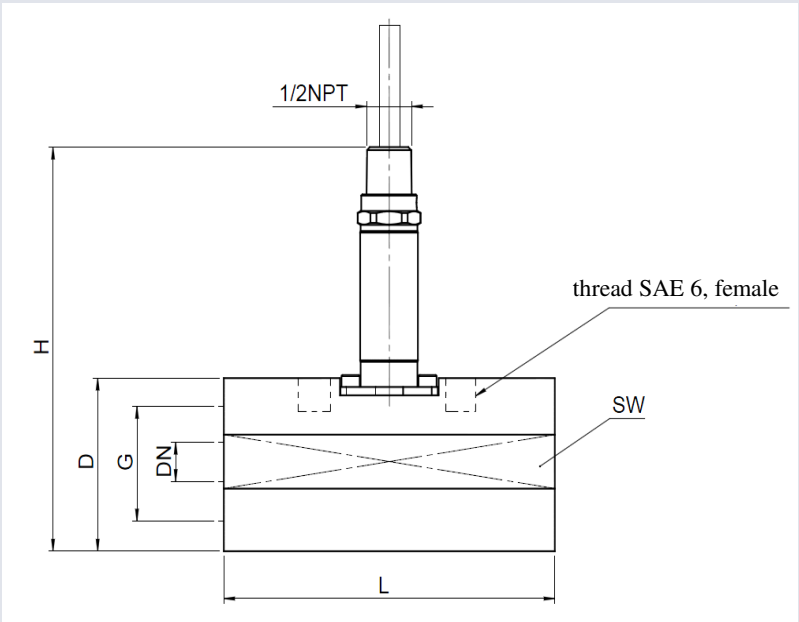
Areas of applications:

	Single leads Electrical connection "9"	Jacketed cable Electrical connection "G"
CSA **ATEX** **IECEx**	**Explosion Proof - seal not required** **Flame Proof**	
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 ...120 °C Db	**II 2D Ex tb IIIC T110 °C Db**
IECEx	**Ex d I Mb** **Ex d IIC T6, T5 Gb**	
	Ex tb IIIC T110...120 °C Db	**Ex tb IIIC T110 °C Db**

Dimensions:

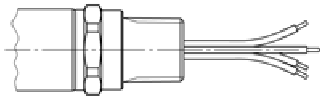






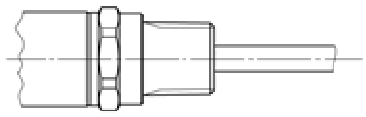
Pin connections:

Conduit (single leads)



Lead	HFT 31x9
red	Signal +
black	Signal -
green-yellow	Housing

Conduit (jacketed cable)



Lead	HFT 31xG
white	Signal -
brown	Signal +
Green	n.c.
yellow	n.c.

Status 2015-04-14

Without threaded holes for temperature and pressure sensors:

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

With threaded holes for temperature and pressure sensors:

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

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 = 1 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

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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 specially 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

ATEX	I M1	Ex ia I Ma
	II 1G	Ex ia IIC T6,T5 Ga
	II 1/2 G	Ex ia IIC T6,T5 Ga/Gb
	II 2 G	Ex ia IIC T6,T5 Gb
	II 1D	Ex ia IIIC T85°C/T95°C Da
	II 1D	Ex ta IIIC T80/90/100°C T_{500}T90/ T_{500}T100/ T_{500}T110°C Da
	II 2D	Ex tb IIIC T80/T90/T100°C Db
	II 3G	Ex nA IIC T6, T5, T4 Gc
	II 3G	Ex ic IIC T6, T5, T4 Gc
	II 3D	Ex tc IIIC T80/T90/T100°C Dc
	II 3D	Ex ic IIIC T80/T90/T100°C Dc
IECEx		Ex ia I Ma
		Ex ia IIC T6,T5 Ga
		Ex ia IIC T6,T5 Ga/Gb
		Ex ia IIC T6,T5 Gb
		Ex ia IIIC T85/T95°C Da
		Ex ta IIIC T80/T90/T100°C Da T_{500}T90/ T_{500}T100/T_{500}T110°C Da
		Ex tb IIIC T80/T90/T100°C Db
		Ex nA IIC T6,T5,T4 Gc
		Ex ic IIC T6,T5,T4 Gc
		Ex tc IIIC T80/T90/T100°C Dc
		Ex ic IIIC T80/T90/T100°C Dc

Technical Details

Input data		
Measuring range and operating pressure		
HFT 31XX- F21-0020	0.32 .. 5.28 gpm	6090psi
HFT 31XX- F21-0060	1.59 .. 15.85 gpm	6090psi
HFT 31XX- F21-0300	3.96 .. 79.25 gpm	6090 psi
HFT 311X- F21-0600	10.57 .. 158.5 gpm	6090 psi
Additional connection options [1]	2 x SAE6 female threads for pressure or temperature sensors with relevant approvals	
Parts in contact with fluid	Stainless steel: 316L, 329, tungsten carbid	
output data		
Output signal, max. load resistance	4...20 mA, 2 conductor, with HART Protocol $R_{Lmax.}=(U_B - 12\ V) / 20\ mA$ [kΩ] With HART communication min. 250 Ω	
HART Communication	According to HART 7 specifications	
HART Common Practice Commands i.e.	Altering of measuring range limits (see table)	
Accuracy	≤ 2 % of the actual value	
Ambient conditions		
Compensated temperature range	-40 .. +158° F	
Operating temperature range	T6, T80, T85°C, T_{500}90: T5, T90, T95°C,T_{500}100: T100, T_{500}110 : T4 :	Ta = -13 .. 140°F Ta = -13 .. 158°F Ta = -13 .. 176°F Ta = -13 .. 185°F
Storage temperature range	-40 .. +212 °F	
Fluid temperature range	T6, T80, T85°C, T_{500}90: T5, T90, T95°C,T_{500}100: T100, T_{500}110 : T4 :	Ta = -13 .. 140°F Ta = -13 .. 158°F Ta = -13 .. 176°F Ta = -13 .. 185°F
CE-mark	EN 61000-6-1/-2/-3/-4, EN 61079-0/11/15/26/31, EN 50303	
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500Hz	10 g	
Protection class to IEC 60529	IP 67	

Relevant data for Ex-applications	**Ex ia, ic**	**Ex nA, ta, tb, tc**
Supply voltage	Ui = 12 .. 28 V	12 .. 28 V
Max. input current	Ii = 100 mA	
Maximum input power	Pi = 0.7W	Max. power consuption ≤ 1W
Connection capacitance of the sensor	C_i = ≤ 22 nF	
Inductance of the sensor	L_i = 0 mH	

Isolation voltage	50 V AC, with integrated overvoltage protection according to EN 61000-6-2
Other data	
Residual ripple of supply voltage	46 to 125 Hz:< 0.2 Vpp > 125 Hz: <1.2 mvRMS
Current consumption	≤ 25 mA
Measuring medium	Hydraulic oil, water based fluid
Viscosity range	1 .. 100 cSt
Calibration viscosity	30 cSt
Weight:	
HFT 311X- F21-0020	2.5 kg
HFT 311X- F21-0060	4.0 kg
HFT 311X- F21-0300	5.7 kg
HFT 311X- 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:

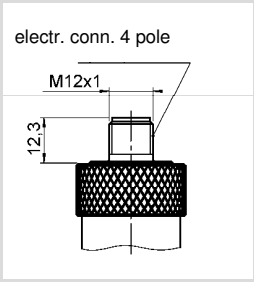
Lower measuring range limit		Upper measuring range limit		Measuring range	
min	max	min	max	min	max
0 % FS	75 % FS	25% FS	100 % FS	25% FS	100 % FS

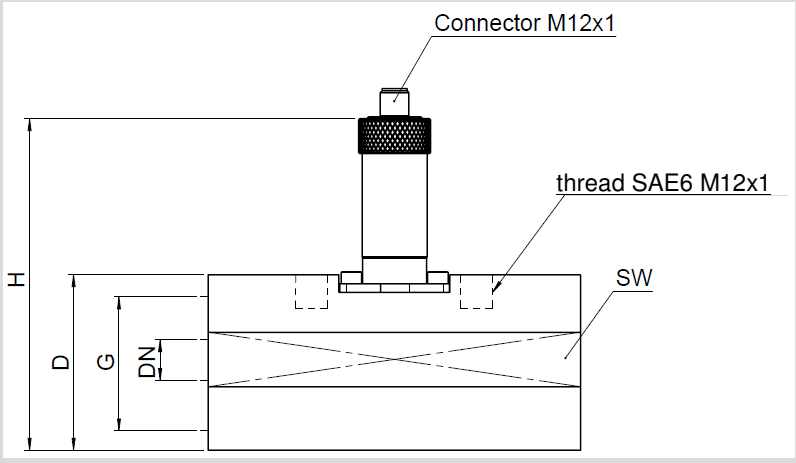
Applications:

Code for use in model code	1			9	A	C
ATEX DEKRA 13ATEX0031X DEKRA 13ATEX0032	I M1 Ex ia I Ma	II 1G Ex ia IIC T6,T5 Ga II 1/2G Ex ia IIC T6,T5 Ga/Gb II 1D Ex ia IIIC T85/T95 °C Da	II 2G Ex ia IIC T6,T5 Gb	II 3G Ex nA IIC T6,T5 Gc	II 1D Ex ta IIIC T80/T90 °C T_{500}T90/T_{500}T100 °C Da II 2D Ex tb IIIC T80/T90 °C Db	II 3G Ex ic IIC T6,T5 Gc II 3D Ex ic IIIC T80/T90 °C Dc
IECEx DEK 14.0011X	Ex ia I Ma	Ex ia IIC T6,T5 Ga Ex ia IIC T6,T5 Ga/Gb Ex ia IIIC T85/T95 °C Da	Ex ia IIC T6,T5 Gb	Ex nA IIC T6,T5 Gc	Ex ta IIIC T80/T90 °C T_{500}T90/T_{500}T100 °C Da Ex tb IIIC T80/T90 °C Db	Ex ic IIC T6,T5 Gc Ex ic IIIC T80/T90 °C Dc
Application areas	Mining Protection class: Intrinsically safe ia with barrier	Gases conductive dust 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: Dustproof enclosure	Gases Conductive dust Protection class: Intrinsically safe ic with barrier
Electrical connection (See model code)	6	6	6	6	6	6

Instruments for other protection types and zones are available upon request (see also page 1).

Dimensions:





connections:

M12x1 plug

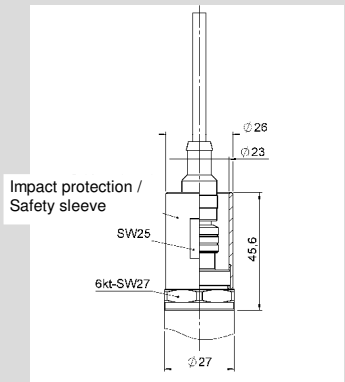
HFT 31x6-F21

1	Signal+
2	n.c.
3	Signal-
4	n.c.

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



Status 2016-03-02

Without threaded holes for temperature and pressure sensors:

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

With threaded holes for temperature and pressure sensors:

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

Model code:

HFT 31 X X – F21 – XXXX – S- X-XXX-XXX

Mechanical Process Connection
8 = 3/4 -16 UNF 2B (SAE8 female)
only for mr: 1.2 .. 20 l/min
9 = 1 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
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)

Isolation voltage
N = 50 V AC

Protection types and applications: (code)

	ATEX	IECEx
1 =	I M1 Ex ia I Ma II 1G Ex ia IIC T6,T5 Ga II 1/2 G Ex ia IIC T6,T5 Ga/Gb II 2 G Ex ia IIC T6,T5 Gb II 1D Ex ia IIIC T85°C/T95°C Da	Ex ia I Ma Ex ia IIC T6,T5 Ga Ex ia IIC T6,T5 Ga/Gb Ex ia IIC T6,T5 Gb Ex ia IIIC T85°C/T95°C Da
9 =	II 3G Ex nA IIC T6, T5 Gc only in conjunction with electr. connection "6"	Ex nA IIC T6, T5 Gc
A =	II 1D Ex ta IIIC T80/T90°C T_{500}T90/ T_{500}T100 Da II 2D Ex tb IIIC T80/T90°C Db only in conjunction with electr. connection "6"	Ex ta IIIC T80/T90°C Da T_{500}T90/ T_{500}100°C Da Ex tb IIIC T80/T90°C Db
C =	II 3G Ex ic IIC T6, T5 Gc II 3D Ex ic IIIC T80/T90°C Dc	Ex ic IIC T6, T5 Gc Ex ic IIIC T80/T90°C Dc

Modification number
000 = standard

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

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