HYDAC ELECTRONIC

Operating Instructions
Pressure Transmitter, Series HDA 4000
Pressure Switch, Series EDS 410
with Explosion Proof approval

(Original manual)

Protection ratings and applications

Explosion Proof $_{C}$CSA$_{US}$ enclosures for use in:

- Class I	**Div 1**	**Group A, B, C, D T6, T5**	**[C, US]**
- Class II	**Div 1**	**Group E, F, G**	**[C, US]**
- Class III			**[C, US]**
- Type 4			**[C, US]**

Certificate Nr.: CSA 2032612

Table of content

1. General Remarks

If you have any questions pertaining to the technical specifications or suitability for your applications, please contact our **Technical Sales Dept**. The series HDA 4000 pressure transmitters and series EDS 410 pressure switches are factory-calibrated and subjected to final testing on teststands employing proprietary software. If any malfunction is occurring, please contact the **HYDAC Service Dept.** Any tampering with the sensor will cause all warranty claims to become null and void. The same is valid for the approval.

2. Function

The pressure signal measured by the sensor is converted into an proportional analogue signal (pressure transmitter) or in a switching signal (pressure switch).

3. Installation and Commissioning information

The units can be mounted directly to the hydraulic system via the thread connection. In order to prevent mechanical damage when dealing with critical applications involving heavy vibrations or blows, for example, we recommend securing the unit with an elastomer clamp and decoupling the hydraulic ports via a Minimess hose.
Tightening torque see dimensions.

Units with a rated pressure of ≤ 100 bar (≤ 1500 psi) provide breathing for pressure equalization with ambient pressure. This is enabled by a vent wire at the conduit with single leads or via a vent tube inside of a cable at conduit with jacketed cable.
On the inside of the sensor, the venting is covered by a special membrane which prevents moisture from seeping into the unit from outside. In order to prevent the hole from becoming clogged, mounting should be done in horizontal position in moist or dusty environments, or vertically with the pressure port pointing downwards.

Connection is to be done from qualified personal in accordance with the pertinent regulations and standards pertaining to potentially explosive environments.

The certificate of conformity is to be found in the Annex. The requirements of the standards (see technical data) cannot be satisfied unless the unit's housing is properly grounded. Potential equalization has to be provided.

When using hose mounting, the housing has to be grounded separately.

The devices must be grounded during installation.

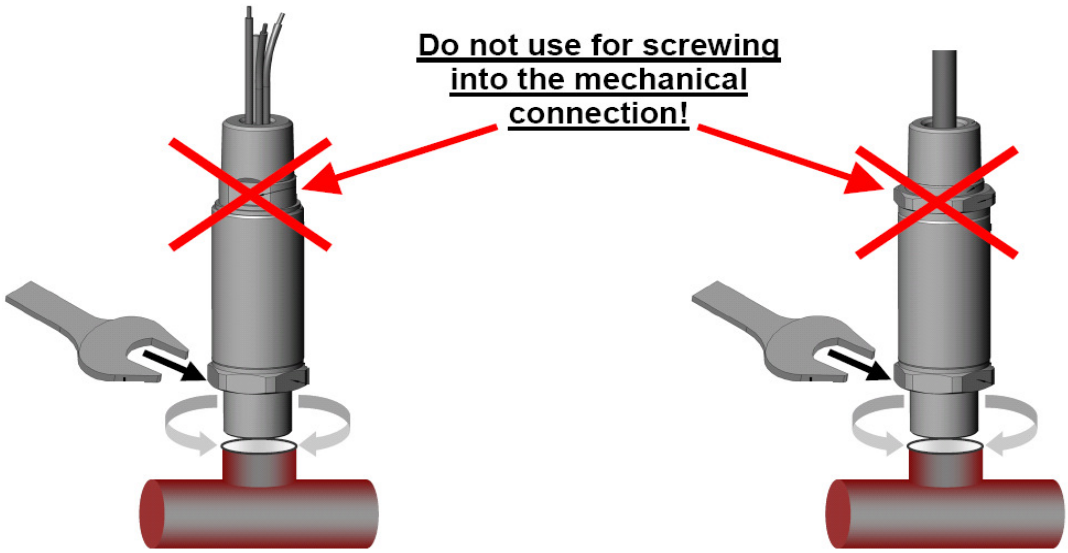
The suitability of the grounding shall be subject to the acceptance of the local inspection authority having jurisdication.

The fitting of sensors with a conduit connection may only be carried out utilising the tightening nut on the mechanical connection and not using the flats on the cable outlet.

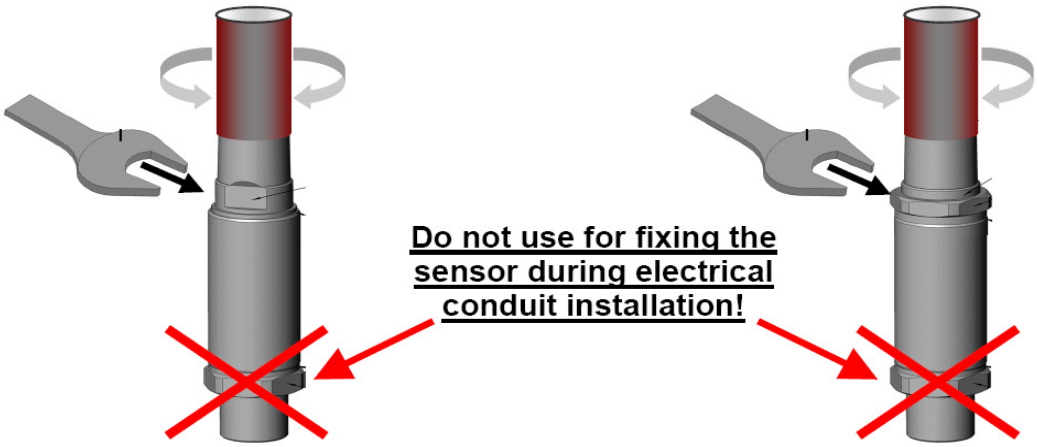
The General Safety Precautions (cf. section 4) are to be heeded in any event.

4. Important mounting instructions for Conduit connection

Mechanical installation



Electrical installation



5. General Safety Precautions

The pressure transmitters / pressure switches may no longer be used when the label becomes illegible.

Seals and gaskets are to be checked to see that they function properly prior to mounting and at regular intervals in keeping with the climatic conditions and the influence of the media, and to be changed as needed. This check is to be conducted at least every three years. Replacement seals and gaskets can be obtained from HYDAC ELECTRONIC GMBH.

The unit is to be replaced , if there is damage to the unit or to the electrical connection.
Compatibility with the following is to be checked in any event: the media being measured and the materials used to make the pressure transmitter / switch. The overload and bursting pressures are also to be adhered to (for details, see technical data).

The internal measurement membrane of the pressure transmitter is to be protected against mechanical damage.

The devices must be grounded during installation. The suitability of the grounding shall be subject to the acceptance of the local inspection authority having jurisdiction.

The data pertaining to use in Hazardous Location is to be heeded in any event (see technical data).

For the cable version:
The vent tube was not to pass through the explosion proof seal that is to be installed within 18 inches of the devices.

6. Technical Data (Only valid for standard products)

6.1 Pressure transmitter HDA 4xxx

Input data		**HDA 4400**				**HDA 4700**				
Measuring ranges *)	psi	100	200	300	500	600	700	1000	1500	2000
	psi	3000	5000	6000	9000	10000				
Overload ranges	psi	290	460	1200	1200	1200	1740	2900	2900	4600
	psi	7250	11600	11600	14500	14500				
Burst pressures	psi	1450	2900	2900	2900	2900	4350	7250	7250	11600
	psi	14500	29000	29000	29000	29000				
Mechanical connection *)		1/4-18 NPT male or female								
Torque value		20 Nm (1/4 NPT)								
Parts in contact with medium		Stainless steel								
Output data										
Output signal		see model code								
Accuracy to DIN 16086, Max. setting	Max. Typ.	≤ ± 1.0 % FS ≤ ± 0.5 % FS				≤ ± 0.5 % FS ≤ ± 0.25 % FS				
Accuracy at min. setting (B.F.S.L.)	Max. Typ.	≤ ± 0.5 % FS ≤ ± 0.25 % FS				≤ ± 0.25 % FS ≤ ± 0.15 % FS				
Temperature compensation Zero point	Max. Typ.	≤ ± 0,014% FS / °F [0.025 % FS/°C] ≤ ± 0,0085% FS / °F [0.015 % FS/°C]				≤ ± 0,0085 % FS / °F [0.015 % FS/°C] ≤ ± 0,0045 % FS / °F [0.008 % FS/°C]				
Temperature compensation Over range	Max. Typ.	≤ ± 0,014% FS / °F [0.025 % FS/°C] ≤ ± 0,0085% FS / °F [0.015 % FS/°C]				≤ ± 0,0085 % FS / °F [0.015 % FS/°C] ≤ ± 0,0045 % FS / °F [0.008 % FS/°C]				
Non-Linearity at max. setting to DIN 16086	Max.	≤ ± 0.3 % FS				≤ ± 0.3 % FS				
Hysteresis	Max.	≤ ± 0.4 % FS				≤ ± 0.1 % FS				
Repeatibility		≤ ± 0.1 % FS				≤ ± 0.05 % FS				
Rise time		≤ 1 ms				≤ 1 ms				
Long time stability	Typ.	≤ ± 0.3 % FS / year				≤ ± 0.1 % FS / year				
Ambient conditions										
Compensated temperature range **)		T6: -13 .. +140 °F [-25 .. +60 °C] T5: -13 .. +176 °F [-25 .. +80 °C]								
Operating temperature range **)		T6: -40 .. +140 °F [-40 .. +60 °C] T5: -40 .. +176 °F [-40 .. +80 °C]								
Storage temperature range		-40 .. +212 °F [-40 .. +100 °C]								
Fluid temperature range		T6: -13 .. +140 °F [-25 .. +60 °C] T5: -13 .. +176 °F [-25 .. +80 °C]								
- mark		Certificate Nr. : CSA 2032612								
Vibration resistance to DIN EN 60068-2-6 at 10 ..500Hz		≤ 20 g								
Safety type to DIN 40050		IP 65 / IP 67 / IP 6K9K								
Other data										
Supply voltage		8 .. 30 V DC (2-conductor) 12 .. 30 V DC (3-conductor)								
Current consumption (3-conductor)		approx. 25 mA								
Residual ripple supply voltage		≤ 5 %								
Electrical connection		to be defined								
Reverse polarity protection of the supply voltage, excess voltage override and short circuit protection		standard								
Life expectancy		> 10 million cycles (0 .. 100 % FS)								
Weight		approx. 280 g								

Notes:
FS (**F**ull **S**cale) = relative to the full measuring range
B.F.S.L. = Best **F**it **S**traight **L**ine

*) Other measuring ranges or pressure ports are available on request
**) Minus temperature range depends on sealing of pressure port

6.2 Pressure switch EDS 410

Input data		**EDS 410**								
Measuring ranges *)	psi	100	200	300	500	600	1000	1500	2000	3000
	psi	5000	6000	9000	10000					
Overload ranges	psi	290	460	1200	1200	1200	2900	2900	4600	7250
	psi	11600	11600	14500	14500					
Burst pressures	psi	1450	2900	2900	2900	2900	7250	7250	11600	14500
	psi	29000	29000	29000	29000					
Mechanical connection *)		1/4-18 NPT male or female								
Torque value		20 Nm (1/4 NPT)								
Parts in contact with medium		Stainless steel								
Output data										
Switching output		1 or 2 PNP or NPN switching outputs								
Output load		1,2 A (each)								
Switching points		to be defined								
Switch-back points		to be defined								
Accuracy to DIN 16086, Max. setting	Max. Typ.	≤ ± 1.0 % FS ≤ ± 0.5 % FS								
Repeatability	Max.	≤ ± 0,5 % FS								
Temperature drift	Max. Max.	≤ ± 0,017% FS / °F [0.03 % FS/°C] Zero Point ≤ ± 0,017% FS / °F [0.03 % FS/°C] Over range								
Switch delay time	Min. Max.	32 ms 2000 ms (depending on customization)								
Long term drift	Max.	≤ ± 0.3 % FS / year								
Ambient conditions										
Nominal temperature range,		T6: -13 .. +140 °F [-25 .. +60 °C] T5: -13 .. +176 °F [-25 .. +80 °C]								
Operating temperature range		T6: -40 .. +140 °F [-40 .. +60 °C] T5: -40 .. +176 °F [-40 .. +80 °C]								
Storage temperature range		-40 .. +212 °F [-40 .. +100 °C]								
Fluid temperature range		T6: -13 .. +140 °F [-25 .. +60 °C] T5: -13 .. +176 °F [-25 .. +80 °C]								
c US - mark		Certificate Nr. : CSA 2032612								
Vibration resistance to DIN EN 60068-2-6 at 10 ..500Hz		≤ 20 g (196.2 m/s²)								
Safety type to DIN 40050		IP 67								
Other data										
Supply voltage		12 .. 30 V DC fuse: 5 A normal or 5 A slow								
Residual ripple supply voltage		≤ 5 %								
Electrical connection		to be defined								
Reverse polarity protection of the supply voltage, excess voltage override and short circuit protection		standard								
Life expectancy		> 10 million cycles (0 .. 100 % FS)								
Weight		approx. 280 g								

Notes:
FS (**F**ull **S**cale) = relative to the full measuring range
B.F.S.L. = Best **F**it **S**traight **L**ine

*) Other measuring ranges or pressure ports are available on request (see dimensions)
**) Minus temperature range depends on sealing of pressure port

7. Model code to identify the delivered part

7.1 Pressure transmitter HDA 4xxx

HDA 4 X X X - X - XXXXX - E - 000 (psi) XX inch

Accuracy
4 = 1,0 % FS max.
7 = 0,5 % FS max.

Mechanical Connection
6 = 7/16-20 UNF 2A (SAE 4), male
7 = 9/16-18 UNF 2A (SAE 6), male
8 = 1/4-18 NPT, male
F = 1/4-18 NPT, female

Others on request

Electrical Connection
9 = Conduit connection (1/2-14 NPT male), single leads
G = Conduit connection (1/2-14 NPT male), cable with flying leads

Signal
A = 4 .. 20 mA (2-conductor)
B = 0 .. 10 V
C = 4 .. 20 mA (3-conductor, rising)
E = 0 .. 20 mA
G = 1 .. 5 V
H = HSI interface
K = CAN protocol

Measuring Ranges
Measuring ranges are shown in bar or psi
(in case of psi see additional “psi” declaration in model code)

Approval
E = Explosion Proof (standard, see first page)

Modification Number *
000 = Standard

(psi)
Additional declaration for psi version (escaped for bar version)

Cable length (e.g. for Conduit connection or flying leads)
Shown in cm or inch

Note: * On units with a different modification number, please read the label or the technical amendment details supplied with the unit.

7.2 Pressure switch EDS 410

EDS 410 - XXXXX - X - E - XXX (psi) XX inch

Pressure ranges
Pressure ranges are shown in bar or psi

Switch function
0 = normally open
1 = normally closed
2 = 2 switching outputs
P = programmable

Approval
E = Explosion Proof (standard, see first page)

Modification Number
Used e.g. for switch point definitions, PNP or NPN output function, customer name on the label, etc.

(psi)
Additional declaration for psi version (escaped for bar version)

Cable length (e.g. for Conduit connection or flying leads)
Shown in cm or inch

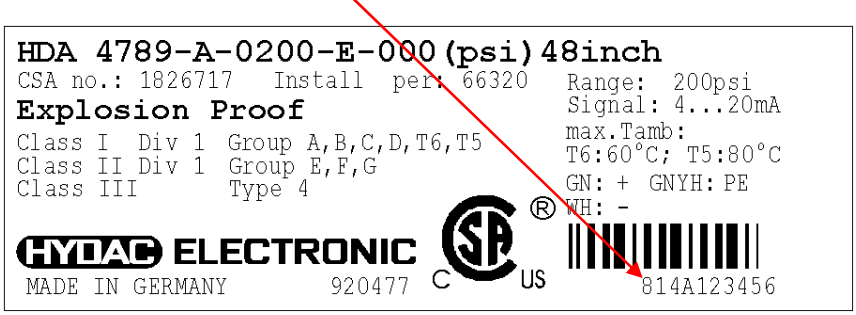
Note: * On units with a different modification number, please read the label or the technical amendment details supplied with the unit.

8. Serial number

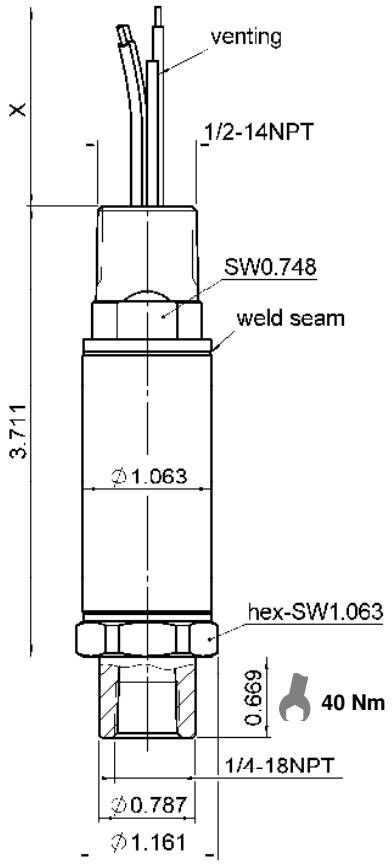
The serial number includes the calendar week and year of manufacture of the unit, adjacent to the sequential serial number.

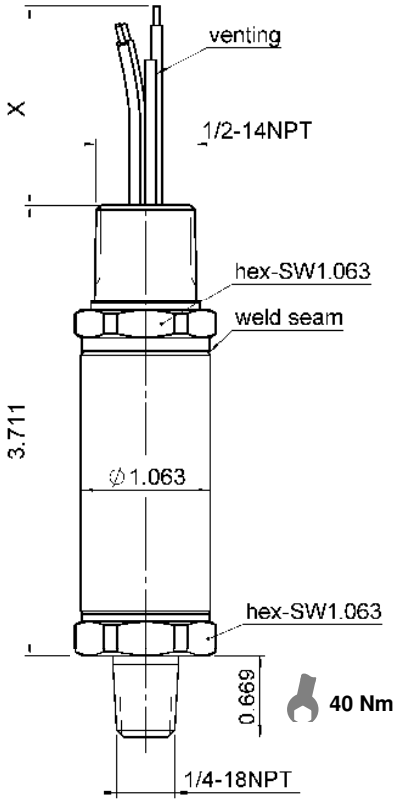
Configuration of serial number:

XX	Manufacturing date	e.g. : 8 → 2008
yy	Calendar week	e.g. : 14
k	Change control status	e.g. : A
zzzzz	Sequential serial number	e.g. : 123456

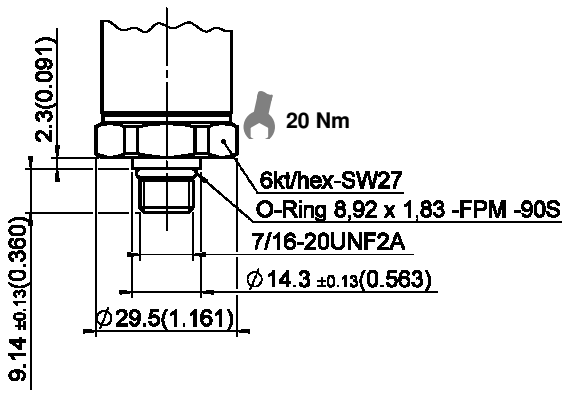


9. Dimensions

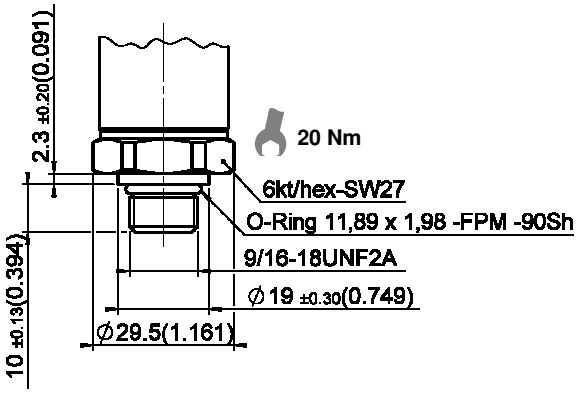




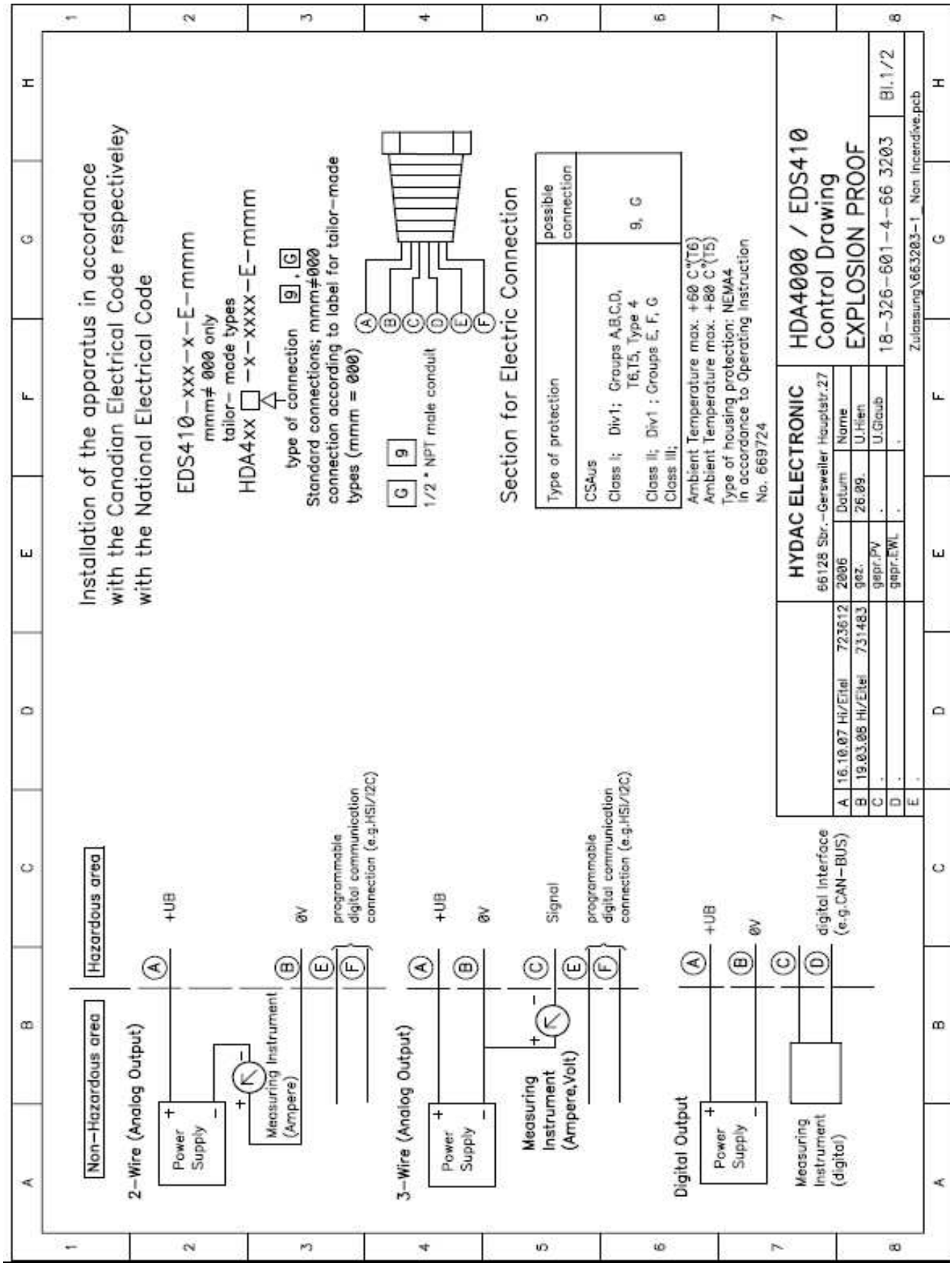
HDA 4X6X
Einschraubzapfen/
Screwed end
SAE4

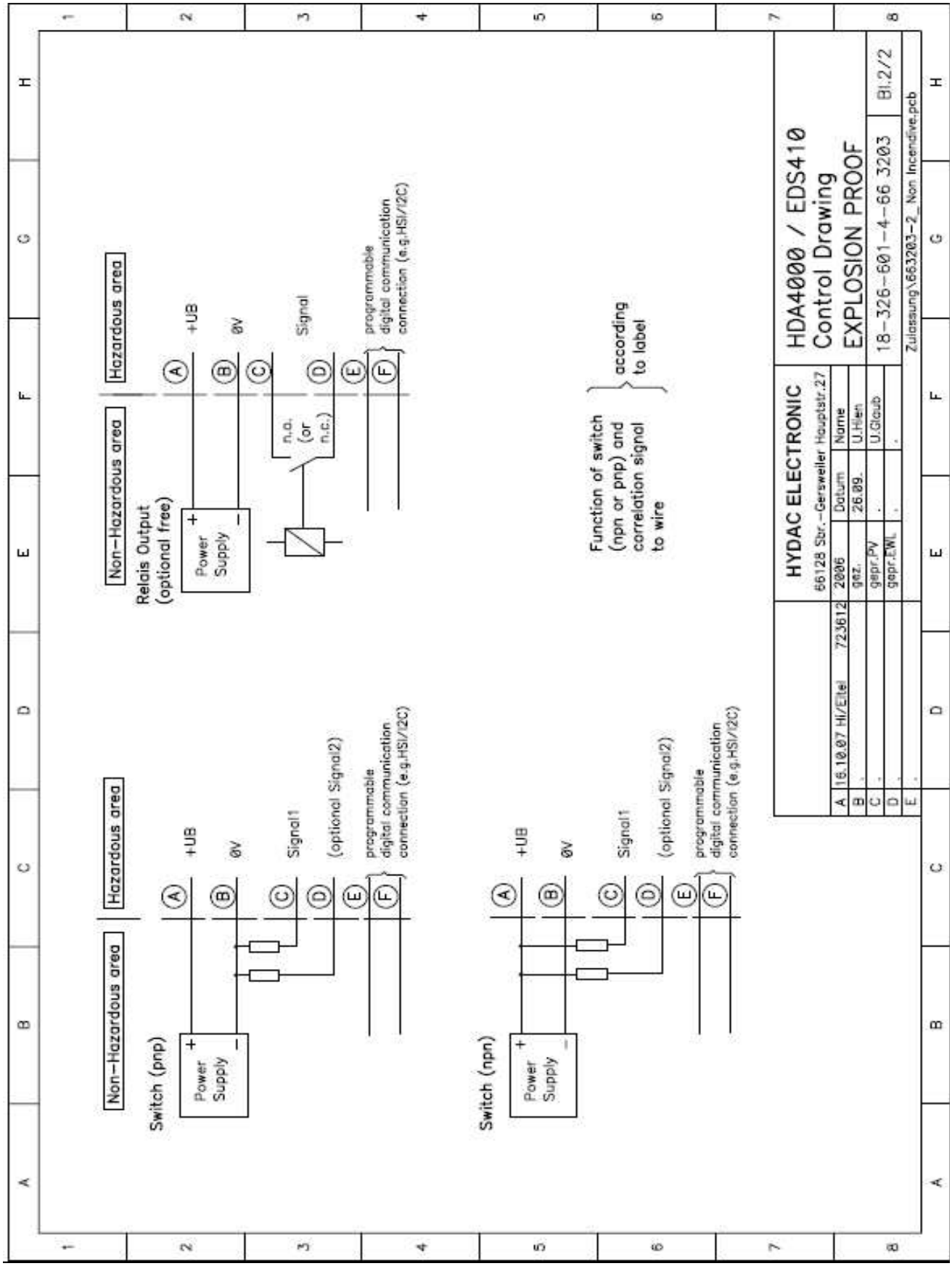


HDA 4X7X
Einschraubzapfen/
Screwed end
SAE6



10. Control drawing




Non-Hazardous area
Hazardous area
Switch (pnp)
Power Supply
+
–
+UB
0V
Signal1
(optional Signal2)
programmable digital communication connection (e.g.HSI/I2C)
Switch (npn)
Non-Hazardous area
Hazardous area
Relais Output (optional free)
n.o. (or n.c.)
Signal
Function of switch (npn or pnp) and correlation signal to wire
according to label
HYDAC ELECTRONIC
66128 Sbr.-Gersweiler Hauptstr.27
HDA4000 / EDS410
Control Drawing
EXPLOSION PROOF
18-326-601-4-66 3203
Bl.2/2
Zulassung\663203-2_ Non Incendive.pcb
A 16.10.07 HI/EIel 723612
B
C
D
E
2006 Datum Name
gez. 26.09. U.Hlen
gepr.PV . U.Glaub
gepr.EWL .

11. Certificate

CSA INTERNATIONAL

Certificate of Compliance

Certificate:	2032612	**Master Contract:**	224264
Project:	2230756	**Date Issued:**	2009/12/18

Issued to: **Hydac Electronic GmbH**

Hauptstrasse 27
Saarbruecken, 66128
Germany
Attention: A. Eitel

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

Andrea Holbeche

Issued by: Andrea Holbeche

PRODUCTS

CLASS 2258 82 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations - Certified to US Standards

CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III; Temperature coded; Type 4

Pressure Transducer, Series HDA4x00 rated 30 Vdc max input; 0-10 V, 4-20 mA output. Ambient temperature from -40°C to +60°C for T6 temperature code; from -40 °C to +80 °C for T5 temperature code. Pressure Range up to 10000 psi max.

Pressure Switch, Series EDS410 rated 30 Vdc input; 1.2 A max (per output). Ambient temperature from -40°C to +60°C for T6 temperature code; from -40 °C to +80 °C for T5 temperature code. Pressure Range up to 10000 psi max.

Note: Basic model designation is followed by alpha/numeric suffixes denoting type code.

DQD 507 Rev. 2009-09-01

CSA INTERNATIONAL

Certificate:	2032612	**Master Contract:**	224264
Project:	2230756	**Date Issued:**	2009/12/18

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91 - General Requirements-Canadian Electrical Code, Part II

CAN/CSA-C22.2 No 94-M91 - Special Purpose Enclosures

CSA Std C22.2 No 142-M1987 - Process Control Equipment

CSA Std C22.2 No 30-M1986 - Explosion-Proof Enclosures for Use in Class I Hazardous Locations

CSA Std C22.2 No 25-1966 - Enclosures for Use in Class II, Groups E, F and G Hazardous Locations

UL 50 (11th Ed) - Enclosures for Electrical Equipment

UL 916 (3rd Ed) - Energy Management Equipment

UL 1203 (4th Ed) - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations

DQD 507 Rev. 2009-09-01

CSA INTERNATIONAL

Supplement to Certificate of Compliance

Certificate: 2032612 **Master Contract:** 224264

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
2230756	2009/12/18	Update Report 2032612 to include modified weld seam on 1/2" conduit.
2032612	2008/05/12	Transfer Certification Project 1826717 from Hydac Technology Corp Bethlehem, PA M/C 201919 to Hydac Electronic GmbH Germany M/C 224264

History

2008813 March 27, 2007 Update Report 1826717, Expansion of min. ambient temp. range to -40C.

1826717 October 26, 2007 New Certification of HDA4x00 Pressure Transducer and EDS410 Pressure Switch for Class I, Class II, Class III, Type 4

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HYDAC SERVICE

If you have any questions concerning repairwork, please don't hesitate to contact HYDAC SERVICE:

HYDAC SERVICE GMBH

Hauptstr. 27

D-66128 Saarbrücken

Germany

Tel.: +49-(0)6897-509-1936

Fax: +49-(0)6897-509-1933

Notice

The information and particulars provided in this manual apply to the operating conditions and applications described herein. In the event of deviating applications and/or operating conditions, please contact the respective HYDAC department concerned.

If you have any questions, suggestions, or encounter any problems of a technical nature, please contact your HYDAC representative.

All technical details are subject to change without notice.