HYDAC ELECTRONIC

Bedienungsanleitung (Originalanleitung)
Druckmessumformer Serie HDA 4000
für das Medium Wasserstoff mit HART Schnittstelle
für eigensichere Stromkreise und Schutz durch Gehäuse mit
ATEX und **IECEx**-Zulassung

Operating Instructions (Translation of original instructions)
Pressure Transmitter Series HDA 4000
for hydrogen applications with HART interface
for intrinsically safe circuits and protection by enclosure
with **ATEX** and **IECEx** approval

Schutzklassen und Einsatzbereiche / Protection types and zones:

ATEX		
13ATEX0031X	**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 or T95 °C Da**
	II 1D	**Ex ta IIIC T80/90/100 °C T_{500} T90/T100/T110 °C Da**
	II 2D	**Ex tb IIIC T80/90/100 °C Db**
13ATEX0032	**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		
IECEx DEK 14.0011X	**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 or T95 °C Da	
	Ex ta IIIC T80/90/100 °C Da T_{500} 90/100/110 °C Da	
	Ex tb IIIC T80/90/100 °C Db	
	Ex nA IIC T6/ T5 T4 Gc	
	Ex ic IIC T6/ T5/T4 Gc	
	Ex tc IIIC T80/90/100 °C Dc	
	Ex ic IIIC T80/90/100 °C Dc	

ATEX certificate: DEKRA 13ATEX0031 X
DEKRA 13ATEX0032
Testing laboratory: DEKRA, Test Report No.NL/DEK/ExTR13.0001/xx
IECEx certificate: IECEx DEK 14.0011X
Testing laboratory: DEKRA, Test Report NL/DEK/ExTR13.0001/01

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1 Allgemeines

Falls Sie Fragen bezüglich der technischen Daten oder Eignung für Ihre Anwendungen haben, wenden Sie sich bitte an unseren **technischen Vertrieb**. Die Druckmessumformer HDA 4000 werden einzeln auf einem rechnergesteuerten Prüfplatz abgeglichen und einem Endtest unterzogen. Sie sind wartungsfrei und sollten beim Einsatz innerhalb der Spezifikationen (siehe Technische Daten) einwandfrei arbeiten. Falls trotzdem Fehler auftreten, wenden Sie sich bitte an den **HYDAC-Service**. Nicht vorschriftgemäße Montage oder Fremdeingriffe in das Gerät führen zum Erlöschen jeglicher Gewährleistungsansprüche sowie der ATEX und IECEx Zulassung.

2 Funktion

Das vom Sensor gemessene Drucksignal wird in ein, dem Druck proportionales, analoges 4..20 mA Signal umgewandelt. Neben der analogen Ausgabe des Messwertes ist eine digitale Kommunikation mit Hilfe des HART Protokolls möglich.

3 Montage und Inbetriebnahme

Die Druckmessumformer können auf Prozess-Seite direkt über den Gewindeanschluss montiert werden.

Um in kritischen Anwendungsfällen (z.B. starke Vibrationen oder Schläge) einer mechanischen Zerstörung vorzubeugen, empfehlen wir das Gerät mittels einer Schelle mit Elastomereinsatz zu befestigen, sowie den Hydraulikanschluss über eine Minimess-Leitung zu entkoppeln.

Anzugsdrehmoment siehe Abmessungen.

Bei Druckmessumformern mit der Option Temperaturmessung ist der Temperaturfühler im Zapfen vor dem Gewinde integriert. Um eine korrekte Messung durchzuführen muss sichergestellt werden, dass der Zapfen sich im Strömungsmediumedium befindet.

Druckmessumformer mit einem Nenndruck ≤ 100 bar (≤ 1500 psi) besitzen einen Druckausgleich zum Umgebungsdruck. Hierzu befindet sich unter der Steckerbefestigung eine kleine Bohrung. Diese ist von innen mit einer speziellen Membrane abgedeckt, die verhindert, dass Feuchtigkeit von außen in das Gerät eindringen kann. Um eine Verstopfung der Bohrung zu verhindern, sollte bei feuchter und staubhaltiger Umgebung die Montage daher waagerecht oder senkrecht mit dem Druckanschluss nach unten erfolgen. Bei einem fest angeschlossenen Mantelkabel kann der Druckausgleich als kundenspezifische Modifikation auch über einen, im Kabel integrierten, Entlüftungsschlauch ausgeführt sein. Bei der Zündschutzart nA, ta und tb ist sicherzustellen, dass diese Entlüftung in den Nicht-Ex-Bereich erfolgt.
Bei Druckmessumformern mit einem Nenndruck von ≤100 bar (≤1500 psi) und einem elektrischen Anschluss mittels ½-14 NPT oder M20x1,5 Conduit ist der Druckausgleich bei Einzeladern entweder mittels einer kurzen Entlüftungslitze oder durch eine Bohrung realisiert, welche sich am elektrischen Anschluss befindet.

Die Installation muss von einem Fachmann nach den jeweiligen Landesvorschriften zu potentiell explosionsgefährdeten Umgebungen durchgeführt werden (z.B. IEC / EN 60079-14). Die Druckmessumformer der Serie HDA 4000 tragen das CE - Zeichen. Die Konformitätserklärung befindet sich im Anhang.

Die Forderungen der Normen (siehe techn. Daten) werden nur bei ordnungsgemäßer und fachmännischer Erdung des Druckmessumformergehäuses mittels des Prozessanschlusses oder dem ½ NPT Conduit erreicht. Sofern eine grün/gelbe Ader vorhanden ist, darf diese zusätzlich, aber nicht zur alleinigen Erdung verwendet werden. Bei Schlauchmontage des Druckmessumformers muss das Gehäuse separat geerdet werden.

Die zugehörigen eigensicheren Geräte (z.B. Zenerbarrieren) sind ebenfalls zu erden. Ein Potentialausgleich entlang des eigensicheren Stromkreises ist in der Ausführungsvariante N (Isolationsspannung <= 50 VAC) erforderlich.

Bei der Serie HDA 4000 in der Ausführungsform H (Isolationsspannung ≤ 500 VAC) darf die Kabellänge zum Druckmessumformer maximal 30m betragen (Überspannungsschutz nach DIN EN 61000-6-2). Wenn die Kabellänge 30 m überschreitet, muss der Überspannungsschutz kundenseitig sichergestellt werden.

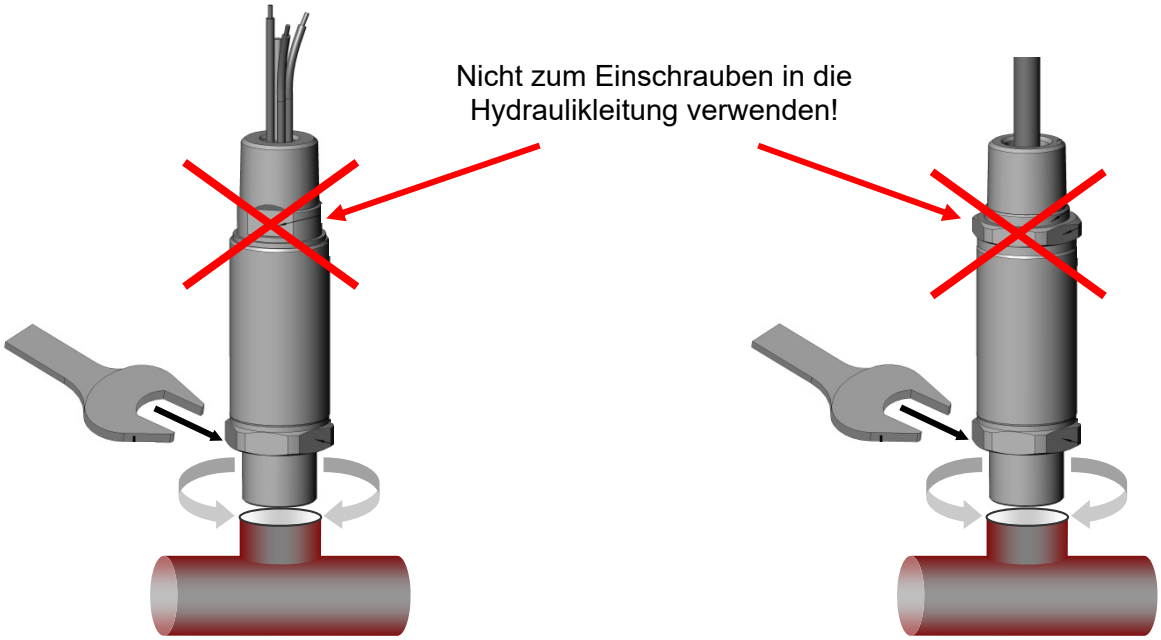
Allgemeine Sicherheitshinweise (vgl. Kapitel 5) sind in jedem Fall zu beachten.

4 Wichtige Hinweise für die Conduit-Installation

4.1 Installationshinweise für Geräte mit 1/2 “ NPT Conduit

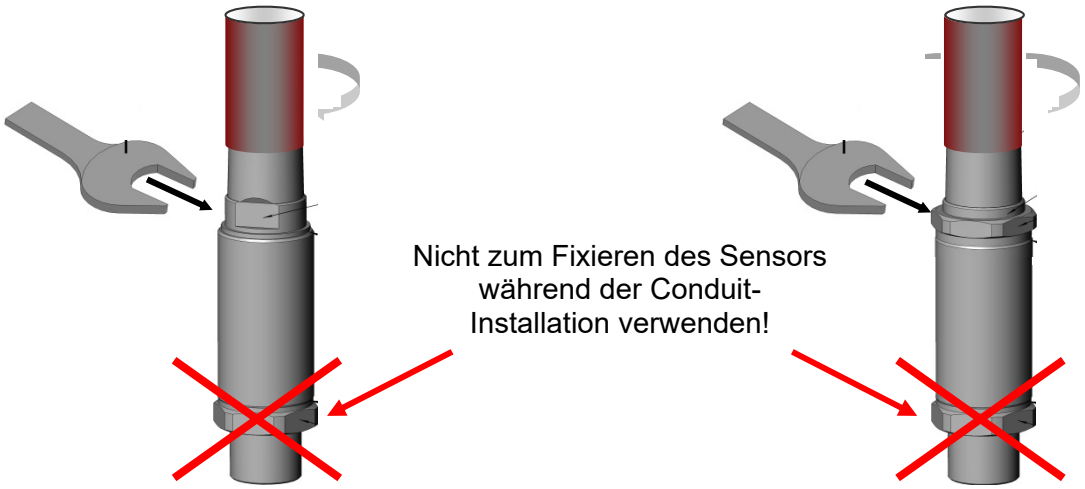
Mechanische Installation

Für die Montage des Prozessanschlusses darf nur die Schlüsselfläche an der Prozessanschlussseite des Druckmessumformers verwendet werden.



Elektrische Installation

Die Schlüsselfläche an der Seite des elektrischen Anschlusses dient nur zum Fixieren des Druckmessumformers bei der Conduit-Installation.



4.2 Installationshinweise für Geräte mit Schlagschutz

Installationshinweise für Geräte mit M12×1 Stecker mit Schlagschutz-/Sicherungs- Metallhülse für den Einsatz in:

ATEX

II 3G Ex nA IIC T6,T5 Gc

II 1D Ex ta IIIC T80/T90 °C T_{500}90/ T_{500}100 °C Da

II 2D Ex tb III C T80/T90 °C Db

IECEx

Ex nA IIC T6,T5 Gc

Ex ta IIIC T80/T90 °C T_{500}90/ T_{500}100 °C Da

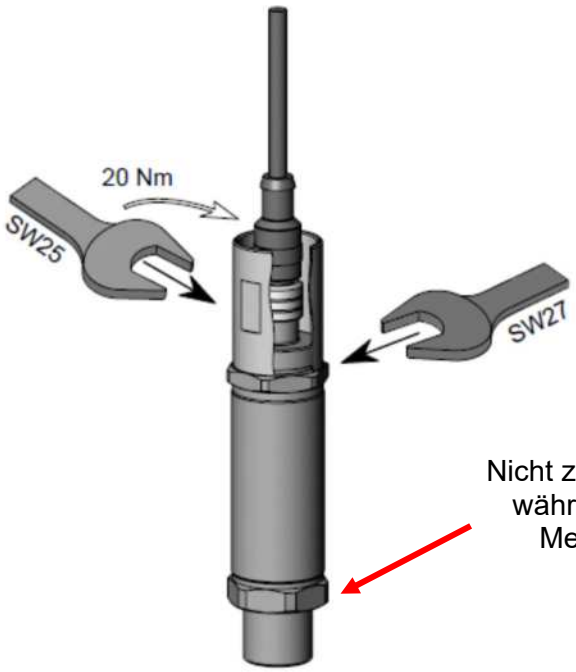
Ex tb III C T80/T90 °C Db

Zur Einhaltung der Sicherheitsrichtlinien in diesen Schutzklassen und Einsatzbereichen ist die Verwendung der Schlagschutz-/ Sicherungs- Metallhülse zwingend erforderlich.

Die Schlagschutz-/Sicherungs- Metallhülse ist mit einem Anzugsdrehmoment von 20 Nm anzuziehen.

Die Schlüsselfläche 27mm an der Seite des elektrischen Anschlusses dient nur zum Fixieren des Druckmessumformers bei Installation der Schlagschutz-/Sicherungs-Metallhülse.

Das Anschlusskabel mit M12x1 Stecker muss im spannungslosen Zustand ordnungsgemäß angeschlossen und die mitgelieferte Schlagschutz-/Sicherungs-Metallhülse montiert werden. Auch die Trennung des M12x1 Steckers darf nur im Spannungslosen Zustand erfolgen.



Nicht zum Fixieren des Sensors während der Installation der Metallhülse verwenden!

5 Allgemeine Sicherheitshinweise

Wenn das Etikett nicht mehr lesbar ist, muss der Druckmessumformer außer Betrieb gesetzt werden.

Die Druckmessumformer mit der Zündschutzart Eigensicherheit sind generell mit einer geeigneten, eigensicheren Barriere zu betreiben.

Die Dichtungen sind in regelmäßigen Abständen, in Abhängigkeit der klimatischen Bedingungen und dem Medieneinfluss, auf ihre Funktionstüchtigkeit zu kontrollieren, und wenn erforderlich auszutauschen. Ersatzdichtungen und –flachdichtungen können von der HYDAC ELECTRONIC GMBH bezogen werden. (Standarddichtungen siehe Technische Daten) Diese Überprüfung muss mindestens alle drei Jahre durchgeführt werden.

Bei gleichzeitigem Einsatz in Zone 0 und 1 wirkt die Metall-Messmembrane des Druckmessumformers als "Trennwand" zwischen Zone 0 und Zone 1. Die Dicke dieser "Trennwand" ist generell ≤ 1 mm und bei Nenndruck unter 100 bar ≤ 0,2 mm. Zur Sicherstellung dieser Trennfunktion ist unbedingt auf die Verträglichkeit der Messmedien mit den verwendeten Werkstoffen und Dichtungen des Druckmessumformers zu achten, ebenso sind die Überlast- und Berstdrücke unbedingt einzuhalten (Angaben hierzu siehe "Technische Daten").

Die im Zertifikat angegebenen "Sicherheitstechnische Daten" sind einzuhalten.

Die interne Messmembrane des Druckmessumformers ist unbedingt vor mechanischer Beschädigung zu schützen.

Ebenso ist auf eine ausreichende Dichtung zwischen den Zonen zu achten.

Die Daten hinsichtlich der Nutzung in explosionsgefährdeten Umgebungen sind in jedem Fall zu berücksichtigen.

Der Betrieb ist nur zulässig, wenn anwendungs- und prozessbedingte intensive elektrostatische Aufladungsprozesse ausgeschlossen sind.

Bei Einsatz in Atmosphären von brennbaren Stäuben ist der Druckmessumformer geschützt vor Beschädigungen und Schlag anzubringen.

Zur Einhaltung der Sicherheitsrichtlinien ist für die Schutzklassen und Einsatzbereiche:

ATEX: II 3G Ex nA IIC T6,T5 Gc
IECEx: Ex nA IIC T6,T5 Gc
die Verwendung der Schlagschutz-/ Sicherungs- Metallhülse zwingend erforderlich. Die Schlagschutz-/Sicherungs- Metallhülse ist mit einem Anzugsdrehmoment von 20 Nm anzuziehen.

Der Betrieb in Bereichen die Kategorie 1G Betriebsmittel erfordern, ist nur zulässig, wenn anwendungs- und prozessbedingte intensive elektrostatische Aufladungsprozesse ausgeschlossen sind.

6 Technische Daten

6.1 HDA 4000 Standard

Eingangskenngrößen												
Messbereiche	bar	16	25	40	60	100	200	250	400	500	600	1050
Überlastbereiche	bar	50	50	80	120	200	500	500	800	1000	1000	1400
Berstdruck	bar	125	125	200	300	500	1250	1250	2000	3000	3000	3000
Messbereiche	psi	300	500	750	1500	3000	5000	6000	9000	15000		
Überlastbereiche	psi	725	1160	1740	2900	7250	11600	14500	14500	20300		
Berstdruck	psi	1800	2900	4350	7250	18000	29000	43500	43500	43500		
Mechanischer Anschluss (Anzugsdrehmoment, empfohlen)	SF250CX20, Autoclave (7/16-20 UNF 2B) (15 Nm für Messbereich ≤ 600 bar/9000 psi) (20 Nm für Messbereich 1050 bar/15000 psi) G 1/4 B DIN EN 837 (20 Nm für Messbereich ≤ 600 bar/ 9000 psi) (40 Nm für Messbereich 1050 bar/15000 psi)											
Medienberührende Teile	Edelstahl	1.4435; (Ni Gehalt ≥13%)										
	Messzelle	goldbeschichtet										
	Dichtung	Kupfer (Cu-DHP) (G 1/4 B) Zurcon ® Z22 (SAE 8)										

Ausgangsgrößen		**HDA 4400**	**HDA 4700**
Ausgangssignal, zulässige Bürde		4...20 mA, 2-Leiter, mit HART Protokoll $R_{Lmax.}$=(UB - 12 V) / 20 mA [kΩ] für HART Kommunikation min. 250 Ω	
HART Kommunikation		gemäß HART 7 Spezifikation	
HART Common Practice Commands z. B.		Ändern der Messbereichsgrenzen (siehe Tabelle), Nullpunktabgleich im Bereich max. 3 % der Spanne	
Genauigkeit nach DIN 16086, Grenzpunkteinstellung	Typ. Max.	≤ ± 0,5 % FS ≤ ± 1,0 % FS	≤ ± 0,25 % FS ≤ ± 0,5 % FS
Genauigkeit bei Kleinstwerteinstellung (B.F.S.L)	Typ. Max.	≤ ± 0,25 % FS ≤ ± 0,5 % FS	≤ ± 0,15 % FS ≤ ± 0,25 % FS
Temperaturkompensation Nullpunkt	Typ. Max.	≤ ± 0,015 % FS/°C [0,0085 % FS/°F] ≤ ± 0,025 % FS/°C [0,014 % FS/°F]	≤ ± 0,008 % FS/°C [0,0045 % FS/°F] ≤ ± 0,015 % FS/°C [0,0085 % FS/°F]
Temperaturkompensation Spanne	Typ. Max.	≤ ± 0,015 % FS/°C [0,0085 % FS/°F] ≤ ± 0,025 % FS/°C [0,014 % FS/°F]	≤ ± 0,008 % FS/°C [0,0045 % FS/°F] ≤ ± 0,015 % FS/°C [0,0085 % FS/°F]
Nicht-Linearität bei Grenzpunkt-einstellung nach DIN 16086	Max.	≤ ± 0,3% FS	≤ ± 0,3% FS
Hysterese	Max.	≤ ± 0,4 % FS	≤ ± 0,1 % FS
Wiederholbarkeit		≤ ± 0,1 % FS	≤ ± 0,1 % FS
Anstiegszeit		≤ 25 ms	≤ 25 ms
Langzeitdrift	Typ.	≤ ± 0,3 % FS / Jahr	≤ ± 0,3 % FS / Jahr

Umgebungsbedingungen			
Kompensierter Temperaturbereich		-25 .. +85 °C [-13 .. +185 °F] gelb für englisch erweitern	
Betriebs-/ Umgebungs-Mediumstemperaturbereich		T6, T80/T85 °C : Ta = -40 .. +60 °C [-40 .. +140 °F] T5, T90/T95 °C : Ta = -40 .. +70 °C [-40 .. +158 °F] T100 °C : Ta = -40 .. +80 °C [-40 .. +176 °F] T4 : -40 .. +85 °C [-40 .. +185 °F]	
Lagertemperaturbereich		-40 .. +100 °C	
CE - Zeichen		EN 61000-6-1/ 2/ 3/ 4 ; EN 60079-0/ 11/ 15/ 26; EN 50303	
Vibrationsbeständigkeit nach DIN EN 60068-2-6 bei 10 ..500Hz		≤ 20 g ≤ 10 g bei Geräten mit elektr. Anschluss ½ NPT Conduit	
Schockfestigkeit nach DIN EN 60068-2-27		≤ 100 g / 6 ms	
Schutzart nach [1)] DIN EN 60529 ISO 20653		IP 67 (Stecker EN175301-803 und Stecker M12x1) IP6K9K (½-14 NPT Conduit)	

Relevante Daten für die Ex-Anwendung		**Ex ia, ic**	**Ex nA**
Versorgungsspannung		Ui = 12 .. 28 V	12 .. 28 V
Maximaler Speisestrom		Ii = 100 mA	
Maximale Speiseleistung		Pi = 0,7 W	Max. Leistungsaufnahme ≤ 1W
Anschlusskapazität des Sensors		C_i = ≤ 22 nF	
Induktivität des Sensors		L_i = 0 mH	
Isolationsspannung [2)]		50 V AC, mit integriertem Überspannungsschutz nach EN 61000-6-2 oder 500 VAC	
Sonstige Größen			
Restwelligkeit Versorgungsspannung		Gemäß FSK Physical Layer Specification (HCF_SPEC-054)	
Stromaufnahme		≤ 25 mA	
Lebensdauer		> 10 Mio. Lastwechsel 0 .. 100 % FS	
Gewicht		ca. 150 g (Gerätestecker) ca. 300 g (Conduit)	

Anmerkung: **FS** (**F**ull **S**cale) = bezogen auf den vollen Messbereich

B.F.S.L. = **B**est **F**it **S**traight **L**ine

Verpolungsschutz der Versorgungsspannung, Überspannung-, Übersteuerungsschutz Lastkurzschlussfestigkeit sind vorhanden.

[1)] Bei montierter Kupplungsdose entsprechender Schutzart

[2)] Siehe Typenschlüssel „Isolationsspannung“

6.2 HDA 4000 mit Option Temperaturmessung

Zusätzliche technische Daten mit Option Temperaturmessung:

Eingangsgrößen									
Messbereich		Standard: -25 .. +100 °C [-13 .. +212 °F] Modifikation H01: -40 .. +100 °C [-40 .. +212 °F]							
Fühlerlänge		7 mm							
Anschlussart mechanisch		G 1/2 A ISO 1179-2 mit Messzapfen							
Anzugsdrehmoment, empfohlen		45 Nm							
Messbereich Druck	bar	16	40	60	100	250	400	500	
	psi	300	500	1000	3000	5000	6000		
Ausgangsdaten		**HDA 4400**				**HDA 4700**			
Ausganssignal Temperatur		Das Temperatursignal ist als Sekundärvariable über HART-Protokoll als digitales Signal verfügbar							
Genauigkeit bei Raumtemperatur	Typ. Max.	≤ ± 1,0 % FS ≤ ± 2,0 % FS				≤ ± 0,4 % FS ≤ ± 0,8 % FS			
Temperaturdrift (Umgebung)		≤ ± 0,02 % FS/ °C [0,01 % FS/ °F]				≤ ± 0,01 % FS/ °C [0,005 % FS/ °F]			
Anstiegszeit nach DIN EN 60751		t_{50}: ~ 10 s t_{90}: ~ 15 s							

6.3 Messbereichsgrenzen:

Mittels HART Common Practice Commands haben Sie die Möglichkeit folgende Messbereichsgrenzen einzustellen:

Messbereichsgrenzen der Primärvariablen (PV) Druck für die Standargeräte mit Modifikation H00):

Untere Messbereichsgrenze		Obere Messbereichsgrenze		Messspanne	
min	max	min	max	min	max
0 % FS	112,5 % FS	37,5 % FS	150 % FS	37,5 % FS	150 % FS

Messbereichsgrenzen der Primärvariablen (PV), Druck für das Gerät mit 500 bar Messbereich und Modifikation H01:

Untere Messbereichsgrenze		Obere Messbereichsgrenze		Messspanne	
min	max	min	max	min	max
0 % FS	62,5 % FS	37,5 % FS	100 % FS	37,5 % FS	100 % FS

Für Geräte mit Option Temperaturmessung HDA 4000-T

Messbereichsgrenzen der Sekundärvariablen (SV) Temperatur für die Standardgeräte mit Messbereich Temperatur -25 .. +100°C:

Untere Messbereichsgrenze		Obere Messbereichsgrenze		Messspanne	
min	max	min	max	min	max
-25 °C	75 °C	0 °C	100 °C	25 °C	125 °C

Messbereichsgrenzen der Sekundärvariablen (SV) Temperatur für das Gerät mit Modifikation H01 mit Messbereich Temperatur -40 .. +100 °C:

Untere Messbereichsgrenze		Obere Messbereichsgrenze		Messspanne	
min	max	min	max	min	max
-40 °C	112 °C	28 °C	140 °C	28 °C	140 °C

6.4 Protokolldaten

HART Version: 7
Manufacturer Code: 0x605E
Manufacturer String: HYDAC ELECTRONIC
Device Type Code: 0xE1BC Variante mit Druck als PV
0xE2A7 Variante mit Druck als PV und Temperatur als SV

7 Typenschlüssel zur Identifikation des gelieferten Gerätes

7.1 Standard HDA 4000

HDA 4 X X X - F21 - XXXXX - **E** X X - HXX (XXX)

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

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

Anschlussart elektrisch
5 = Gerätestecker, EN 175301-803, 3 pol. + PE
6 = Gerätestecker, M 12 x 1, 4 pol.
9 = 1/2-14 NPT Conduit, Einzeladern

Ausgangssignal
F21 = 4 .. 20 mA, 2-Leiter, mit HART Protokoll

Messbereiche
4 stellig für bar-Version
5 stellig für psi-version

Zulassung
E = ATEX + IECEx (genauere Angaben siehe Zertifikate)

Isolationsspannung
H = 500 V AC gegen Gehäuse
N = 50 V AC gegen Gehäuse

Schutzklassen und Einsatzgebiete

	ATEX	IECEx
1 =	I M1 Ex ia I Ma	Ex ia I Ma
	II 1G Ex ia IIC T6,T5 Ga	Ex ia IIC T6,T5 Ga
	II 1/2 G Ex ia IIC T6,T5 Ga/Gb	Ex ia IIC T6,T5 Ga/Gb
	II 2 G Ex ia IIC T6,T5 Gb	Ex ia IIC T6,T5 Gb
	II 1D Ex ia IIIC T85/T95 °C Da	Ex ia IIIC T85/T95 °C Da
9 =	II 3G Ex nA IIC T6, T5 Gc	Ex nA IIC T6, T5 Gc
	nur in Verbindung mit elektrischem Anschluss „6“ und der Schlagschutz-Sicherungs-Metallhülse, siehe auch Kapitel 4.2	
C=	II 3G Ex ic IIC T6, T5 Gc	Ex ic IIC T6, T5 Gc
	II 3D Ex ic IIIC T80/T90 °C Dc	Ex ic IIIC T80/T90 °C Dc

Modifikationsnummer
H00 = Standard

Bei Geräten mit anderer Modifikationsnummer ist das Typenschild bzw. die mitgelieferte technische Änderungsbeschreibung zu beachten.

Kabellänge (für Conduit Versionen, entfällt bei Gerätesteckern)
Angabe in m oder “(inch)

7.2 Typenschlüssel HDA 4400 / HDA 4700 mit Option Temperaturmessung

HDA 4 X 2 X – F21 - XXXXX - T - 007 – XXX - HXX

Anschlussart, mechanisch
2 = G 1/2 A ISO 1179-2

Optional mit Temperaturmessung
Über HART Protokoll als digitales Signal

Fühlerlänge
007 = 7mm [0,276 inch]

Modifikationsnummer
H00 = Standard
H01 = Messbereich Temperatur -40 .. +100°C

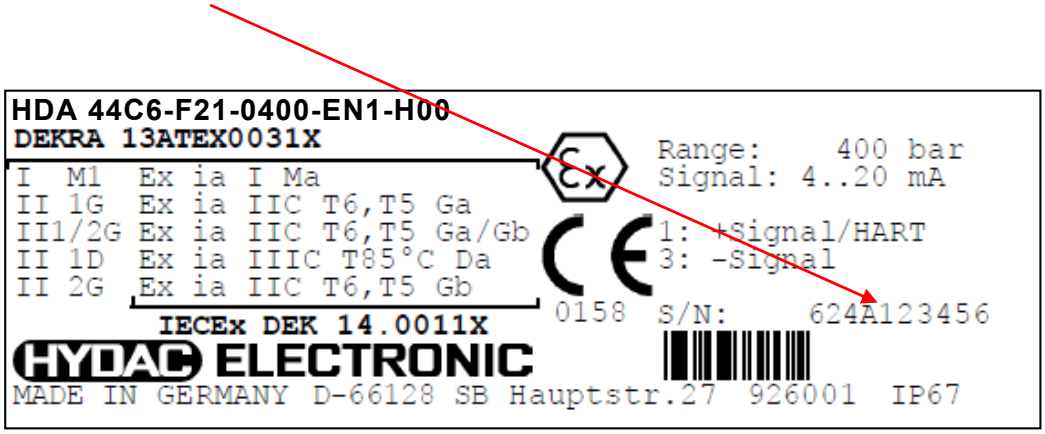
8 Seriennummer

Die Seriennummer enthält die Kalenderwoche und das Jahr, in dem das Gerät hergestellt wurde, neben der sequentiellen Seriennummer.

xxyykzzzzzz

Aufbau der Seriennummer:

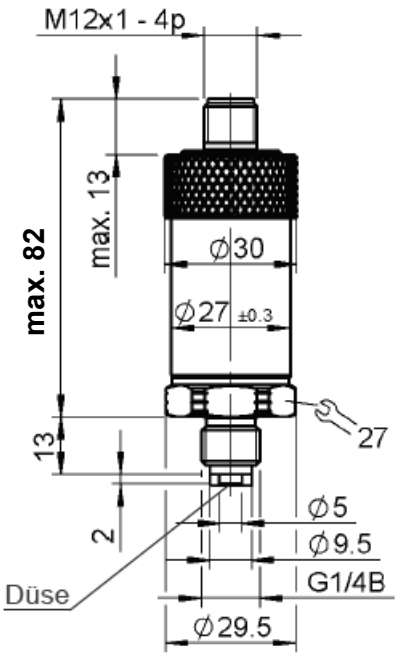
X	Fertigungsjahr	z. B. : 6 → 2016
yy	Kalenderwoche	z. B.: 24→ KW24
k	Seriennummer-Index	z. B : -,A,B
zzzzzz	fortlaufende Seriennummer	z. B.: 123456

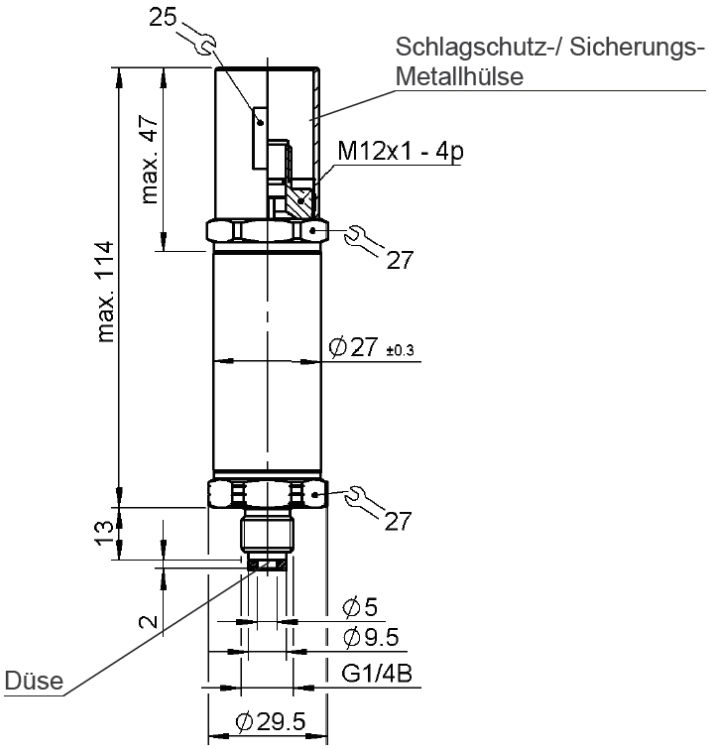


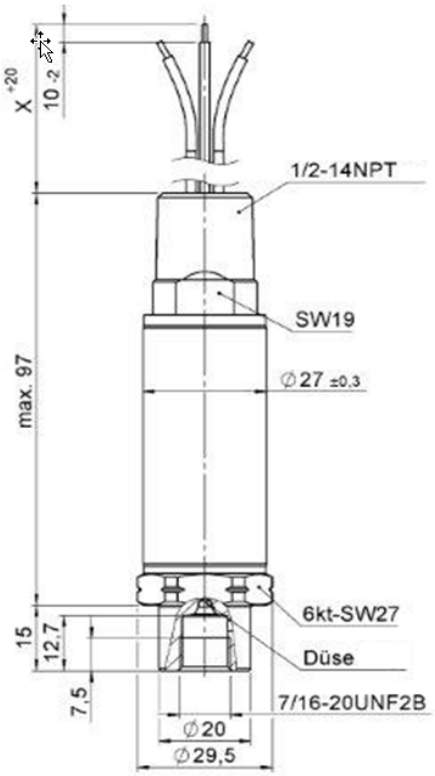
9 Anschlussbelegung

Die Anschlussbelegung für den elektrischen Anschluss ist sowohl im Kapitel “Kontrollzeichnung“, als auch auf dem Typenschild des Druckmessumformers dargestellt.

10 Abmessungen

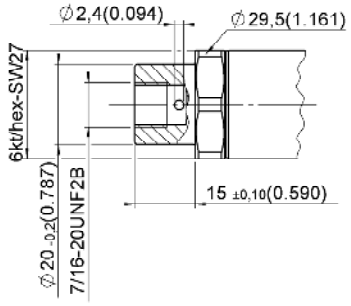




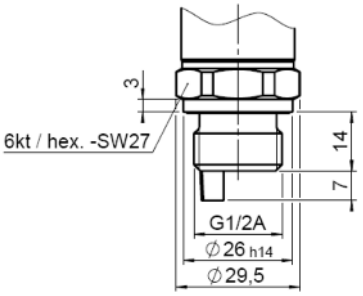


10.1 Mechanische Anschlussvarianten

SF 250CX20, Autoclave, (7/16-20 UNF 2B), Innengewinde

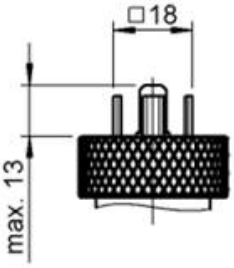


Mechanischer Anschluss G 1/2 A ISO 1179-2 mit Option Temperaturmessung



10.2 Elektrische Anschlussvarianten

Gerätestecker EN175301-803 3-pol.+PE



Notizen

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Anmerkung

Die Angaben in diesem Handbuch beziehen sich auf die beschriebenen Betriebsbedingungen und Einsatzfälle. Bei abweichenden Einsatzfällen und/oder Betriebsbedingungen wenden Sie sich bitte an die entsprechende Fachabteilung.

Bei technischen Fragen, Hinweisen oder Störungen nehmen Sie bitte Kontakt mit Ihrer HYDAC-Vertretung auf.

Technische Änderungen sind vorbehalten.

1 General

If you have any queries regarding technical details or the suitability of the unit for your application, please contact our **Technical Sales Department**. The series HDA 4000 pressure transmitters are individually tested and calibrated at a computer operated test station. They are maintenance-free and operate perfectly when used according to the data (see Technical Data). However, if there is a cause for complaint, please contact **HYDAC Service**. Incorrect use or interference by anyone other than HYDAC personnel will cause all warranty claims and ATEX and IECEx approvals to become null and void.

2 Function

The pressure signal measured by the sensor is converted into a proportional analogue 4..20 mA signal. In addition with the analogue output of the measured value, digital communication is possible by means of the HART protocol.

3 Installation and Commissioning Information

The pressure transmitters can be installed directly on the process side via the threaded 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.

In pressure transmitters with additional temperature measurement the temperature probe is integrated into the stem in front of the thread. To perform correct measurements, it must be ensured that the stem is placed in the flow of the medium.

Pressure transmitters with a rated pressure of < 100 bar (≤ 1500 psi) provide for pressure equalisation with the ambient pressure. This is enabled by a small hole underneath the plug connector. The connector is covered by a special membrane from the inside which prevents moisture from seeping into the unit from the outside. In order to prevent the hole from becoming clogged, mounting should be done in a horizontal position in moist or dusty environments, or vertically with the pressure port pointing downwards. In the case of a firmly connected jacket cable, the pressure compensation can also be designed as a customer-specific modification via a ventilation hose integrated inside of the cable. For the ignition protection type nA, it must be ensured that the venting only takes place outside of the hazardous area.
On units with a rated pressure of ≤ 100 bar (≤ 1500 psi) and a ½“ -14 NPT electrical connection, or M20x1.5 conduit, the pressure equalisation with single conductor is realised by means of a short vent line on the one hand or a bore on the other, which is located at the electrical connection conduit.

Connection must be carried out by a properly qualified specialist in accordance with the pertinent regulations pertaining to potentially explosive atmospheres (e.g. EN 60079-14).
The pressure transmitters of the HDA 4000 series carry the CE - mark. The declaration of conformity can be found in the annex.

The requirements of the standards (see technical data) cannot be satisfied unless the pressure transmitter housing is properly grounded via the mechanical connection or the ½ NPT Conduit. If a green-yellow wire is available, it can be used additionally for grounding, but may not be used alone as the only grounding connection. When using hose mounting the housing has to be grounded separately.

The related intrinsically safe devices (e.g. zener barriers) must also be grounded.
A potential equalisation is required along the intrinsically safe electrical circuit in the N type model (insulation voltage ≤ 50 VAC).

On the HDA 4000 series, type H (insulation voltage ≤ 500 VAC), the cable length to the pressure transmitter must be max. 30 m (overvoltage protection to DIN EN 61000-6-2). If the cable length exceeds 30 m, overvoltage protection must be provided by the customer.

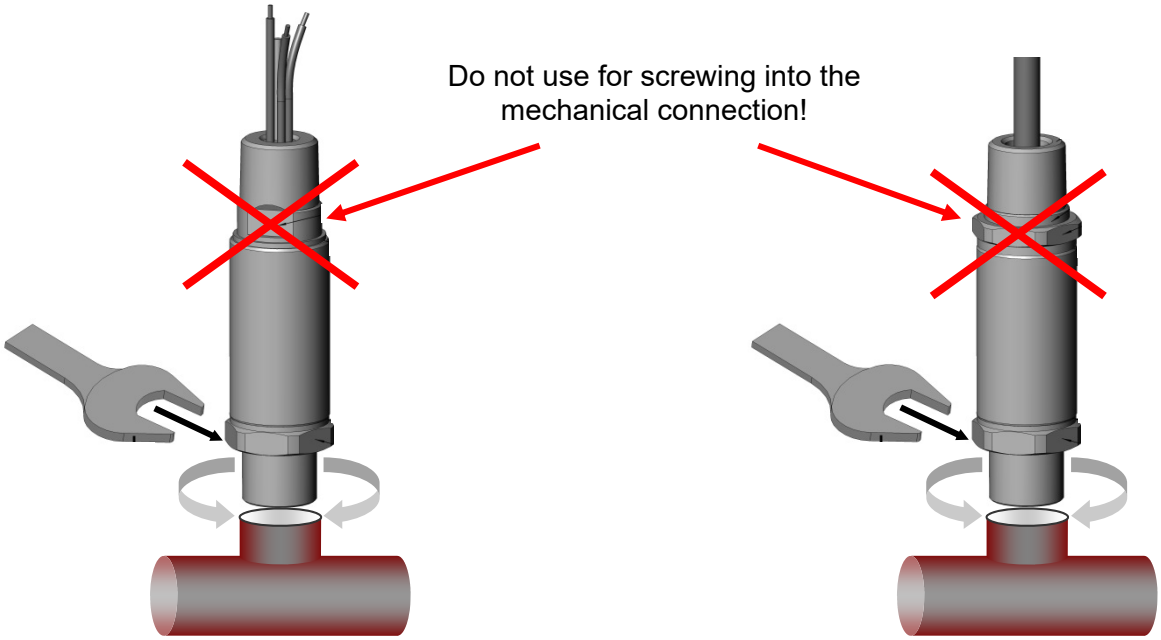
The General Safety Precautions (cf. section 5) must be adhered to in any event.

4 Important Mounting Instructions for Conduit Connection

4.1 Installation Instructions for Units with 1/2 “ NPT Conduit

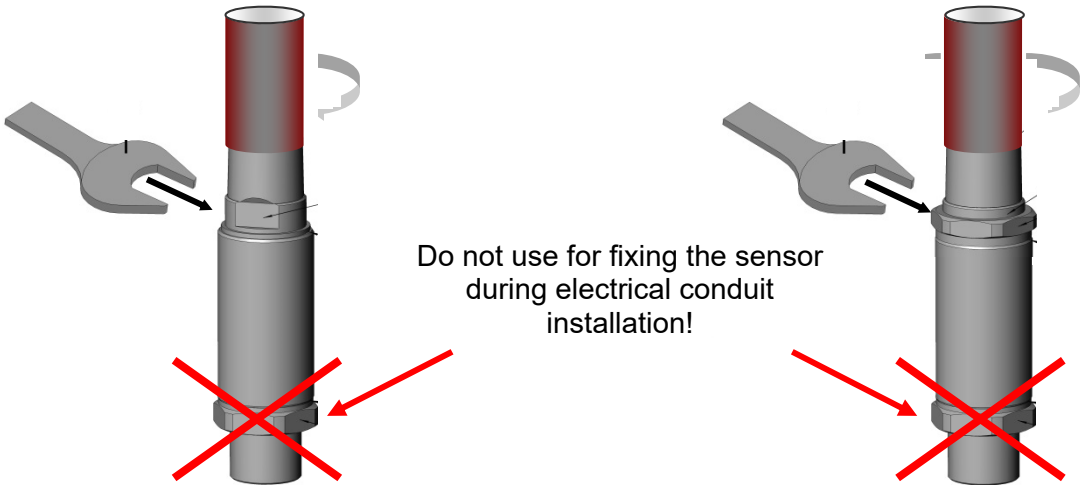
Mechanical Connection

The process installation of the transmitters may only be carried out utilizing the flats on the process connection side.



Electrical Installation

The flat at the electrical connection side only serves in order to fix the pressure transmitter during conduit installation.



4.2 Installation Instructions for units with impact protection

Installation instructions for units with M12x1 plug connector with an impact protection metal safety sleeve for the use in zones:

ATEX

II 3G Ex nA IIC T6,T5 Gc

II 1D Ex ta IIIC T80/T90 °C T_{500}90/ T_{500}100 °C Da

II 2D Ex tb III C T80/T90 °C Db

IECEx

Ex nA IIC T6,T5 Gc

Ex ta IIIC T80/T90 °C T_{500}90/ T_{500}100 °C Da

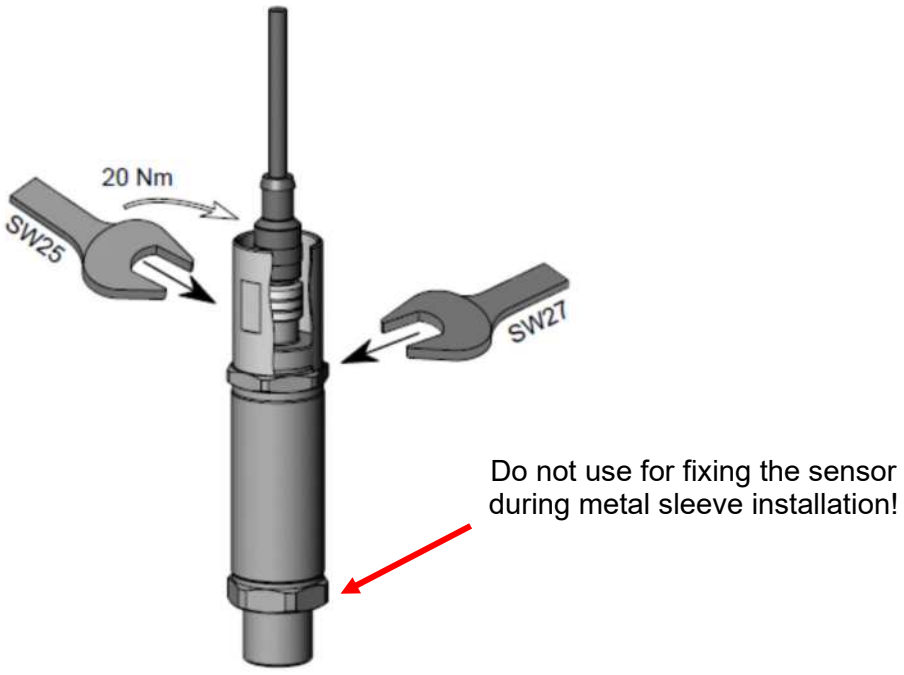
Ex tb III C T80/T90 °C Db

By adherence to safety guidelines in these protection types and applications: the usage of the impact protection metal safety sleeve is stringently required.

The impact protection metal safety sleeve must be tightened with a torque of 20 Nm.

The hex. 27 mm flats on the electrical connection side exclusively serves for fixing of the pressure transmitter during the installation of the the impact protection metal safety sleeve.

The connection of the cable with M12x1 plug may only be carried out in de-energized state and in combination with the impact protection metal safety sleeve. Also the separation of the M12x1 connector may only be carried out if the system is switched off.



5 General safety precautions

The pressure transmitter may no longer be used when the label becomes illegible.

The pressure transmitters with ignition protection type "intrinsically safe" should always be operated in combination with the suited intrinsically safe barrier.

The 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. Replacement seals and gaskets can be obtained from HYDAC ELECTRONIC GMBH. (Standard seal see technical data) This check is to be carried out at least every three years.

If used simultaneously in zones 0 and 1, the metal membrane of the pressure transmitter serves as a partition wall between zones 0 and 1. The thickness of this partition wall is generally ≤ 1 mm, and with a nominal pressure ranging below 100 bar, ≤ 0.2 mm. In order to ensure this partition function, the compatibility of the measuring fluids with the used materials and seals is compulsory, as well as the overload and bursting pressures must absolutely be complied with (further details, please see "Technical Data").

The "Safety-relevant Data" specified in the certificate must be adhered to.

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

Please ensure sufficient sealing between the zones as well.

The data pertaining to use in a hazardous location is to be heeded in any event.

Operation is only permitted when operational and process related intensive electrostatic changes are eliminated.

When used in atmospheres containing combustible dusts, the pressure transmitter must be installed in such a way that it is protected from damage and knocks.

By adherence to safety guidelines in the protection types and applications:

ATEX: II 3G Ex nA IIC T6,T5 Gc
IECEx: Ex nA IIC T6,T5 Gc
The usage of the impact protection metal safety sleeve is stringently required. The impact protection metal safety sleeve must be tightened with a torque of 20 Nm.

Operations in areas requiring category 1G equipment, are only permitted when operational and process related intensive electrostatic charges are eliminated.

6 Technical Data

6.1 HDA 4000 Standard

Input data												
Measurement ranges	bar	16	25	40	60	100	200	250	400	500	600	1050
Overload pressures	bar	50	50	80	120	200	500	500	800	1000	1000	1400
Burst pressure	bar	125	125	200	300	500	1250	1250	2000	3000	3000	3000

Measurement ranges	psi	300	500	750	1500	3000	5000	6000	9000	15000
Overload pressures	psi	725	1160	1740	2900	7250	11600	14500	14500	20300
Burst pressure	psi	1800	2900	4350	7250	18000	29000	43500	43500	43500

Mechanical connection (Tightening torque, recommended)	SF250CX20, autoclave (7/16-20 UNF 2B) (15 Nm for measuring range ≤ 600 bar/9000 psi) (20 Nm for measuring range 1050 bar/15000 psi) G 1/4 B DIN EN 837 (20 Nm for measuring range ≤600 bar/9000 psi) (40 Nm for measuring range 1050 bar/15000 psi)	
Parts in contact with fluid	Stainless steel	1.4435 (Ni content ≥ 13 %)
	Measurement cell	gold-plated
	Seal	Copper (Cu-DHP) (G 1/4 B) Zurcon ® Z22 (SAE 8)

Output data		**HDA 4400**	**HDA 4700**
Output signal, permitted load resistance		4...20 mA, 2 conductor, with HART Protocol $R_{Lmax.}$=(UB - 12 V) / 20 mA [kΩ] With HART communication min. 250 Ω	
HART Communication		According to HART 7 specifications	
HART Common Practice Commands e.g.		Altering of measuring range limits (see table), offset adjustment within max. 3 % of the range	
Accuracy acc. to DIN 16086, terminal based	Typ. Max.	≤ ± 0.5 % FS ≤ ± 1.0 % FS	≤ ± 0.25 % FS ≤ ± 0.5 % FS
Accuracy, B.F.S.L	Typ. Max.	≤ ± 0.25 % FS ≤ ± 0.5 % FS	≤ ± 0.15 % FS ≤ ± 0.25 % FS
Temperature compensation Offset	Typ. Max.	≤ ± 0.015 % FS/°C [0.0085 % FS/°F] ≤ ± 0.025 % FS/°C [0.014 % FS/°F]	≤ ± 0.008 % FS/°C [0.0045 % FS/°F] ≤ ± 0.015 % FS/°C [0.0085 % FS/°F]
Temperature compensation Span	Typ. Max.	≤ ± 0.015 % FS/°C [0.0085 % FS/°F] ≤ ± 0.025 % FS/°C [0.014 % FS/°F]	≤ ± 0.008 % FS/°C [0.0045 % FS/°F] ≤ ± 0.015 % FS/°C [0.0085 % FS/°F]
Non-linearity acc. to DIN 16086 terminal based	Max.	≤ ± 0.3 % FS	≤ ± 0.3 % FS
Hysteresis	Max.	≤ ± 0.4 % FS	≤ ± 0.1 % FS
Repeatability		≤ ± 0.1 % FS	≤ ± 0.1 % FS
Rise time		≤ 25 ms	≤ 25 ms
Long-term drift	Typ.	≤ ± 0.3 % FS / Year	≤ ± 0.3 % FS / year

Environmental conditions			
Compensated temperature range		-25 .. +85 °C [-13 .. +185 °F]	
Operation / ambient / fluid temperature range		T6, T80/T85 °C : Ta = -40 .. +60 °C [-40 .. +140 °F] T5, T90/T95 °C : Ta = -40 .. +70 °C [-40 .. +158 °F] T100 °C : Ta = -40 .. +80 °C [-40 .. +176 °F] T4 : -40 .. +85 °C [-40 .. +185 °F]	
Storage temperature range		-40 .. +100 °C	
CE - mark		EN 61000-6-1/ 2/ 3/ 4 ; EN 60079-0/ 11/ 15/ 26; EN 50303	
Vibration resistance acc. to DIN EN 60068-2-6 at 10 .. 500Hz		≤ 20 g ≤ 10 g in devices with electrical connection ½ NPT Conduit	
Shock resistance acc. to DIN EN 60068-2-27		≤ 100 g / 6 ms	
Protection type to [1)]	DIN EN 60529 ISO 20653	IP67 (connector) IP6K9K (Conduit)	

Relevant data for Ex Application		**Ex ia, ic**	**Ex nA**
Supply voltage		Ui = 12 .. 28 V	12 .. 28 V
Max. input current		Ii = 100 mA	
Maximum input power		Pi = 0.7 W	Max. power consuption ≤ 1W
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 acc. to EN 61000-6-2 or 500 V AC	
Other data			
Residual ripple of supply voltage		According to FSK Physical Layer Specification (HCF_SPEC-054)	
Current consumption		≤ 25 mA	
Life expectancy		> 10 million load cycles 0 .. 100 % FS	
Weight		approx. 150 g (connector) approx. 300 g (Conduit)	

Note: **FS** (**F**ull **S**cale) = relative to the full measuring range

B.F.S.L. = **B**est **F**it **S**traight **L**ine

Reverse polarity protection of the supply voltage, overvoltage, override and short circuit protection are provided.

[1)] With mounted mating connector in corresponding protection type

[2)] See model code for "insulation voltage"

5.2 HDA 4000 with the option of temperature measurement

Additional parameters temperature measurement:

Input data									
Measurement range		Standard: -25 .. +100 °C [-13 .. +212 °F] Modification H01: -40 .. +100 °C [-40 .. +212 °F]							
Probe length		7 mm							
Mechanical connection		G 1/2 A ISO 1179-2 with probe							
Tightening torque, recommended		45 Nm							
Measuring range pressure	bar	16	40	60	100	250	400	500	
	psi	300	500	1000	3000	5000	6000		
Output data		**HDA 4400**				**HDA 4700**			
Output signal temperature		The temperature signal is available as a secondary variable via the HART protocol as a digital signal.							
Accuracy at room temperature	Typ. Max.	≤ ± 1.0 % FS ≤ ± 2.0 % FS				≤ ± 0.4 % FS ≤ ± 0.8 % FS			
Temperature drift (environment)		≤ ± 0.02 % FS/°C [0.01 % FS/°F]				≤ ± 0.01 % FS/°C [0.005 % FS/°F]			
Rise time acc. to DIN EN 60751		t_{50}: ~ 10 s t_{90}: ~ 15 s							

6.3 Measuring Range Limits:

By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring ranges:
Measuring range limits of the primary variable (PV), pressure: for standard devices with modification H00):

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

Measuring range limits of the primary variable (PV), pressure: for devices with 500 bar measuring range and modification H01):

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
0 % FS	62.5 % FS	37.5 % FS	100 % FS	37.5 % FS	100 % FS

For devices with optional temperature measurement HDA 4000-T

Measuring range limits of the secondary variable (SV), temperature for standard devices with measuring range Temperature -25 .. +100 °C:

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

Measuring range limits of the secondary variable (SV), temperature for the device with modification H01 with Measuring range temperature -40 .. +100 °C:

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
-40 °C	112 °C	28 °C	140 °C	28 °C	140 °C

6.4 Protocol data

HART Version: 7
Manufacturer Code: 0x605E
Manufacturer String: HYDAC ELECTRONIC
Device Type Code: 0xE1BC variant with pressure as PV
0xE2A7 variant with pressure as PV and temperature as SV

7 Model code to identify the delivered part

7.1 Standard HDA 4000

HDA 4 X X X - F21 - XXXXX - **E** X X - HXX (XXX)

Accuracy
4 = 1 % FS max.
7 = 0.5 % FS max.

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

Electrical connection
5 = plug connector, EN175301-803, 3 pole + PE
6 = plug connector, M 12 x 1, 4 pole
9 = 1/2-14 NPT conduit, single leads

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

Measurement ranges
4 digits for bar version
5 digits for psi version

Approval
E = ATEX and IECEx (further details, see certificates)

Insulation voltage
H = 500 V AC to housing
N = 50 V AC to housing

Protection types and application fields

	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/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/T95 °C Da
9 =	II 3G Ex nA IIC T6, T5 Gc Only in conjunction with electrical connection “6” and the impact protected metal safety sleeve (see also chapter 4.2)	Ex nA IIC T6, T5 Gc
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
H00 = Standard

For devices with a different modification number, please read the label or the technical amendment details supplied with the device.

Cable length (for Conduit versions, not applicable for devices with connectors)
Indications in m or "(inch)

7.2 Model code HDA 4400 / HDA 4700 with additional option of temperature measurement

HDA 4 X 2 X – F21 - XXXXX - T - 007 – XXX - HXX

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

Temperature measurement available as an option
Available via HART protocol as a digital signal

Probe length
007 = 7 mm [0.276 inch]

Modification number
H00 = Standard
H01 = Measuring range temperature -40 .. +100 °C

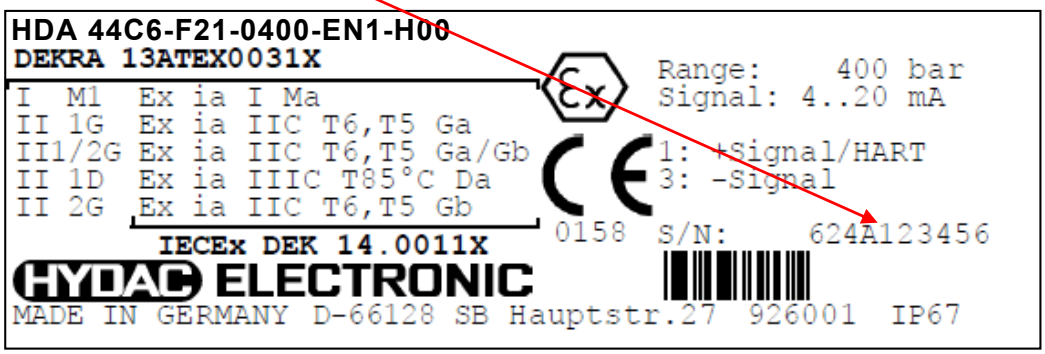
8 Serial number

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

xxyykzzzzzz

Configuration of serial number (SN):

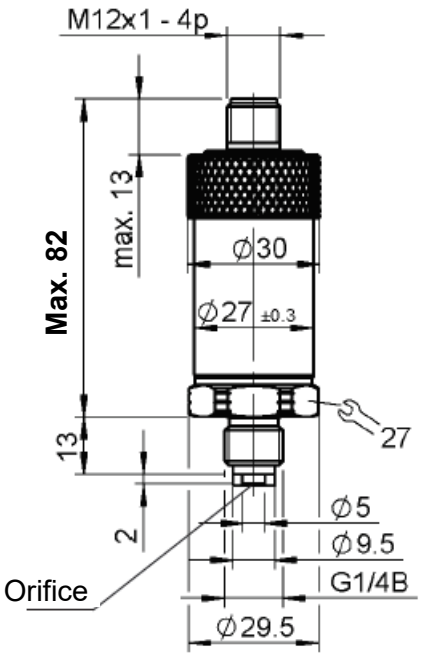
X	Manufacturing year	e.g.: 6 → 2016
yy	Calendar week	e.g.: 24→ KW24
k	Change control status	e.g.: -,A,B
zzzzzz	Sequential serial number	e.g.: 123456

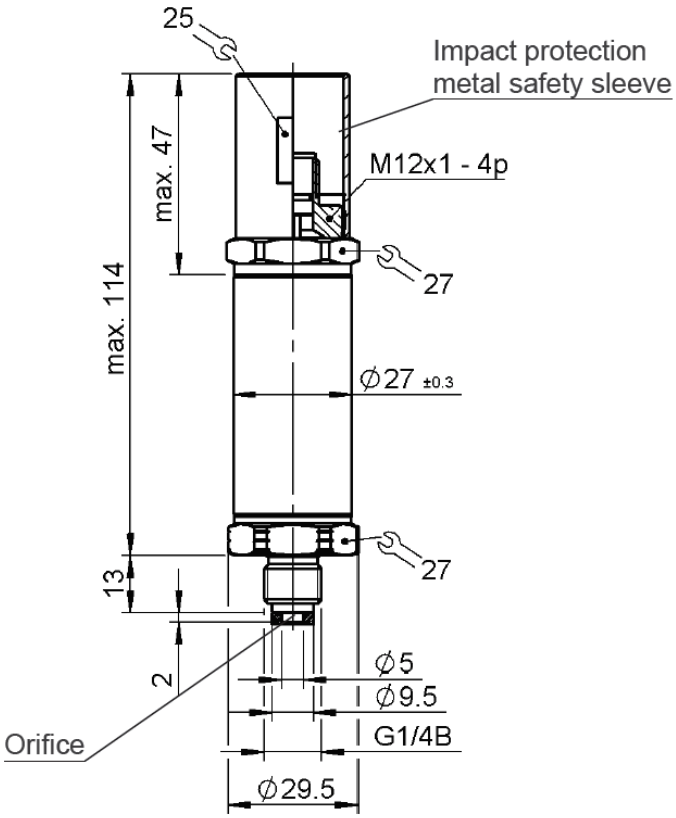


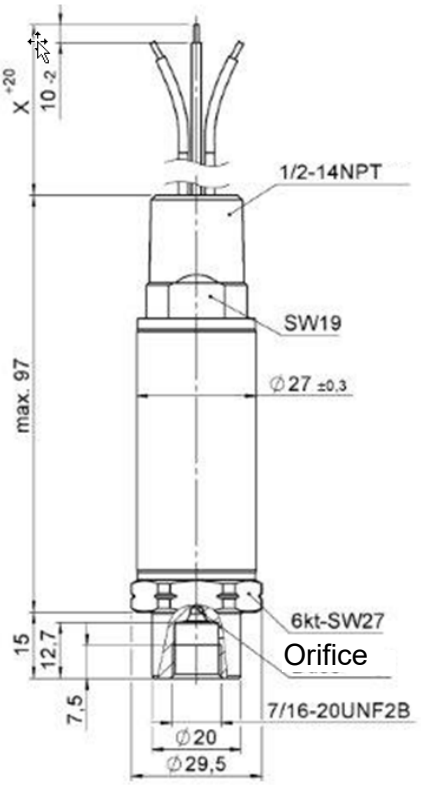
9 PIN connection

The pin assignment for the electrical connection is shown in the chapter "Control Drawing" as well as on the type label of the pressure transmitter.

10 Dimensions

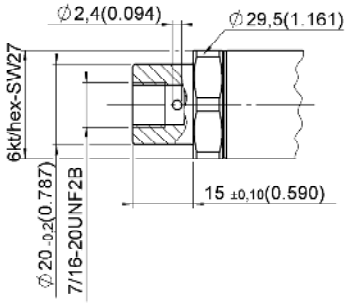




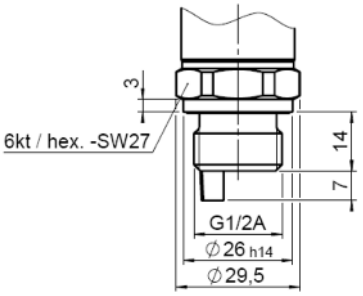


10.1 Mechanical Connection Variants

SF 250CX20, Autoclave, (7/16-20 UNF 2B), internal thread

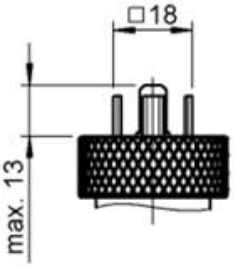


Mechanical connection: G 1/2 A ISO 1179-2 with temperature measurement option



10.2 Electrical Connection Variants

Plug connector EN175301-803 3 pole +PE



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Note

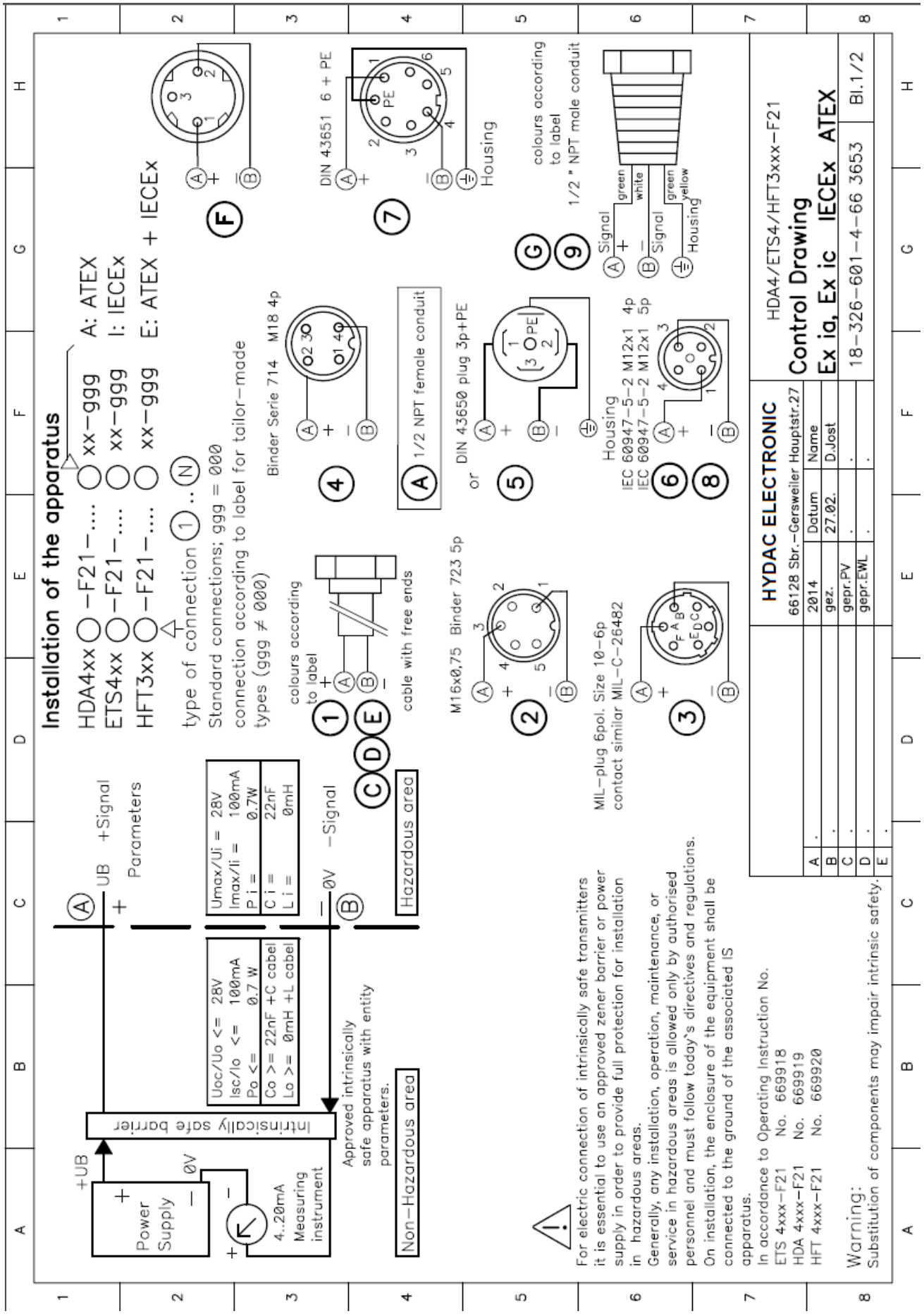
The information and particulars provided in this manual apply to the operating conditions and applications described herein. For applications and/or operating conditions not described please contact the relevant technical department.

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

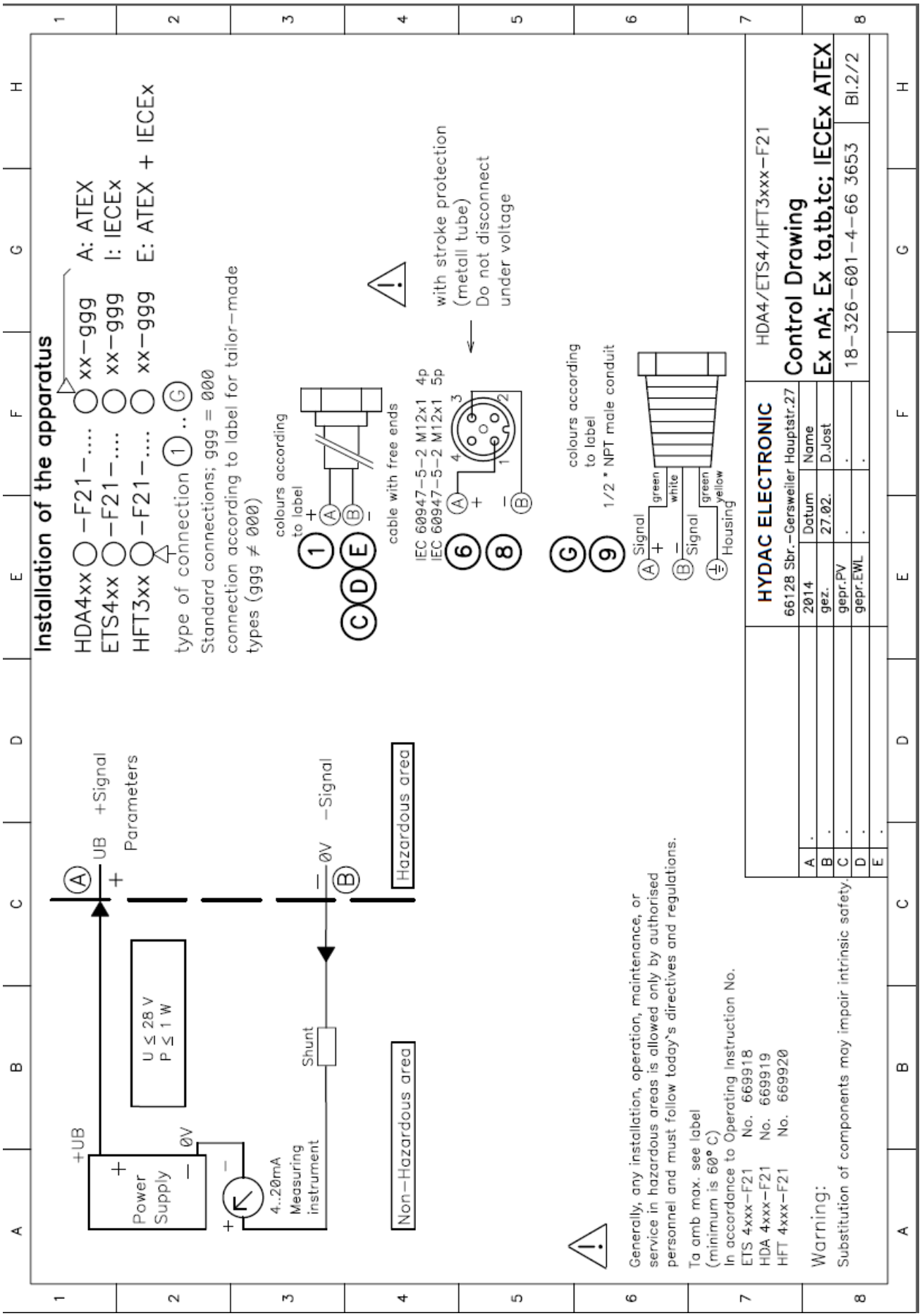
Subject to technical modifications.

11 Kontrollzeichnung / Control Drawing

11.1 Kontrollzeichnung Ex ia, Ex ic / Control Drawing Ex ia, Ex ic



11.2 Kontrollzeichnung Ex nA, Ex ta, tb, tc / Control Drawing Ex nA, Ex ta, tb, tc



12 Zertifikate / Certificates

12.1 ATEX

CERTIFICATE

EC-Type Examination

(1)

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) EC-Type Examination Certificate Number: **DEKRA 13ATEX0031 X** Issue Number: **2**

(4) Equipment: **Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...)**

(5) Manufacturer: **HYDAC Electronic GmbH**

(6) Address: **Hauptstraße 27, 66128 Saarbrücken, Germany**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR13.0001/xx.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 **EN 60079-11 : 2012** **EN 60079-26 : 2007**
EN 60079-31 : 2009 **EN 50303 : 2000**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

I M 1	Ex ia I Ma	or
II 1 G	Ex ia IIC T5, T6 Ga	or
II 1/2 G	Ex ia IIC T5, T6 Ga/Gb	or
II 2 G	Ex ia IIC T5, T6 Gb	or
II 1 D	Ex ta IIIC T80 °C ... T100 °C and T_{500} 90 °C ... T_{500} 110 °C Da or	
II 1 D	Ex ia IIIC T85 °C or T95 °C Da or	
II 2 D	Ex tb IIIC T80 °C ... T100 °C Db	

This certificate is issued on 28 March 2014 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

DEKRA Certification B.V.

M. Erdhuizen
Certification Manager

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DEKRA

(13) **SCHEDULE**

(14) to EC-Type Examination Certificate DEKRA 13ATEX0031 X Issue No. 2

(15) **Description**

Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...) are two wire transmitters used to convert a Pressure, Temperature and/or Flow Rate signal into a 4 - 20 mA output signal with digital communication (HART).
Optionally, a breathing input for pressure equalisation is available.
The electrical connections are made by a connector or via a permanently connected cable.

The enclosure provides a degree of protection of at least IP64 in accordance with EN 60529.

Ambient temperature range:
- apparatus in types of protection Ex ia IIC and Ex ia IIIC: -40 °C to +70 °C;
- apparatus in types of protection Ex ta IIIC and Ex tb IIIC: -40 °C to +80 °C.

The temperature class and the maximum surface temperature of the enclosure is depending on the maximum ambient temperature:

Max. ambient temperature	Temperature class (Ex ia/ic IIC)	Max. surface temperature "T" (Ex ta/tb/tc IIIC)	Max. surface temperature "T" (Ex ia IIIC)	Max. surface temperature "T_{500}" (Ex ta IIIC)
60 °C	T6	80 °C	85 °C	90 °C
70 °C	T5	90 °C	95 °C	100 °C
80 °C	--	100 °C		110 °C

Marking

The marking of the Transmitters includes the following codes, depending on the model:

HDA 4...-F21-(...)-..1-(...), ETS 4...-F21-(...)-..1-(...) or HFT 3...-F21-(...)-..1-(...):	I M 1 Ex ia I Ma or II 1 G Ex ia IIC T5, T6 Ga or II 1/2 G Ex ia IIC T5, T6 Ga/Gb or II 2 G Ex ia IIC T5, T6 Gb II 1 D Ex ia IIIC T85 °C or T95 °C Da
HDA 4...-F21-(...)-..2-(...), ETS 4...-F21-(...)-..2-(...) or HFT 3...-F21-(...)-..2-(...):	I M 1 Ex ia I Ma or II 2 G Ex ia IIC T5, T6 Gb
HDA 4...-F21-(...)-..3-(...), ETS 4...-F21-(...)-..3-(...) or HFT 3...-F21-(...)-..3-(...):	II 2 G Ex ia IIC T5, T6 Gb
HDA 4...-F21-(...)-..4-(...), ETS 4...-F21-(...)-..4-(...) or HFT 3...-F21-(...)-..4-(...):	II 1 G Ex ia IIC T5, T6 Ga or II 1/2 G Ex ia IIC T5, T6 Ga/Gb or II 2 G Ex ia IIC T5, T6 Gb
HDA 4...-F21-(...)-..5-(...), ETS 4...-F21-(...)-..5-(...) or HFT 3...-F21-(...)-..5-(...):	I M 1 Ex ia I Ma
HDA 4...-F21-(...)-..A-(...), ETS 4...-F21-(...)-..A-(...) or HFT 3...-F21-(...)-..A-(...):	II 1 D Ex ta IIIC T80 °C T_{500} 90 °C or T90 °C T_{500} 100 °C or T100 °C T_{500} 110 °C Da II 2 D Ex tb IIIC T80 °C or T90 °C or T100 °C Db

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0031 X** Issue No. 2

Electrical data

Equipment in type of protection Intrinsic safety "i"

Supply/output circuit.(Connection + and -):
in type of protection intrinsic safety Ex ia I, Ex ia IIC and Ex ia IIIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 100 mA; P_i = 0,7 W; C_i = 22 nF; L_i = 0 mH.

Equipment in type of protection Equipment dust ignition protection by enclosure "t"

Supply/output circuit.(Connection + and -):
$U \leq$ 28 V; P_{max} = 1 W.

From a safety point of view, the circuits of the Pressure and/or Temperature and/or Flow Rate Transmitters type … ....-F21-(...)-AN.-... shall be considered to be connected to earth.

Installation instructions

The instructions provided with the equipment shall be followed in detail to assure safe operation.

(16) **Test Report**

No. NL/DEK/ExTR13.0001/xx.

(17) **Specific conditions of use**

1. Transmitters with an enclosure containing light metals, when used in a potentially explosive atmosphere requiring apparatus of equipment category 1 G or M 1, shall be installed such, that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.

2. For installation of the transmitter between areas where the use of category 1 apparatus is required and areas where the use of category 2 apparatus is required, the following applies: The internal separation element shall be protected against environmental stress, which might adversely affect the separation element. The material of the separation element shall be obtained from the data supplied by the manufacturer.

3. The transmitter may alternatively be used with separately supplied certified cable entries or conduit entries that are rated for the intended application.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. NL/DEK/ExTR13.0001/xx.

CERTIFICATE

Type Examination

(1)

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) Type Examination Certificate Number: **DEKRA 13ATEX0032** Issue Number: **2**

(4) Equipment: **Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...)**

(5) Manufacturer: **HYDAC Electronic GmbH**

(6) Address: **Hauptstraße 27, 66128 Saarbrücken, Germany**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report no. NL/DEK/ExTR13.0001/xx.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 **EN 60079-11 : 2012** **EN 60079-15 : 2010**
EN 60079-31 : 2009

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This Type Examination Certificate relates only to the design, examination and tests of the specified equipment and not to the manufacturing process and supply of this equipment.

(12) The marking of the equipment shall include the following:

II 3 G Ex nA IIC T4 ... T6 Gc or Ex ic IIC T4 ... T6 Gc
II 3 D Ex tc IIIC T80 °C ... T100 °C Dc or Ex ic IIIC T80 °C ... T100 °C Dc

This certificate is issued on 28 March 2014 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

DEKRA Certification B.V.

M. Erdhuizen
Certification Manager

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DEKRA

(13) **SCHEDULE**

(14) to Type Examination Certificate DEKRA 13ATEX0032 Issue No. 2

(15) Description

Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...) are two wire transmitters used to convert a pressure signal into a 4 - 20 mA analogue output signal. Optionally, a breathing input for pressure equalisation is available.

Ambient temperature range -40 °C to +80 °C. (Category 3 D)
Ambient temperature range -40 °C to +85 °C. (Category 3 G)

The enclosure provides a degree of protection of at least IP64 in accordance with EN 60529.

The temperature class and the maximum surface temperature of the enclosure is depending on the maximum ambient temperature:

Max. ambient temperature	Temperature class	Max. surface temperature "T"
60 °C	T6	80 °C
70 °C	T5	90 °C
80 °C	--	100 °C
85 °C	T4	--

Marking

The marking of the Pressure Transmitter includes the following codes, depending on the model:

HDA 4...-F21-(...)-..9-(...), ETS 4...-F21-(...)-..9-(...) or HFT 3...-F21-(...)-..9-(...):	II 3 G Ex nA IIC T6, T5, T4 Gc
HDA 4...-F21-(...)-..B-(...), ETS 4...-F21-(...)-..B-(...) or HFT 3...-F21-(...)-..B-(...):	II 3 D Ex tc IIIC T80 °C/T90 °C/T100 °C Dc IP6X
HDA 4...-F21-(...)-..C-(...), ETS 4...-F21-(...)-..C-(...) or HFT 3...-F21-(...)-..C-(...):	II 3 G Ex ic IIC T6, T5, T4 Gc II 3 D Ex ic IIIC T80 °C/T90 °C/T100 °C Dc IP6X

Electrical data

Apparatus in type of protection intrinsic safety "i"

Supply/output circuit (connections + and -):
in type of protection intrinsic safety Ex ic IIC, only for connection to an energy limited or intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 100 mA; P_i = 0,7 W; C_i = 22 nF; L_i = 0 mH.

Apparatus in types of protection Ex nA and Ex tc

Supply/output circuit.(Connection + and -):
$U \leq$ 28 V; P_{max} = 1 W.

(13) **SCHEDULE**

(14) to Type Examination Certificate DEKRA 13ATEX0032 Issue No. 2

Installation instructions

The manual provided with the equipment shall be followed in detail to assure safe operation.

(16) **Test Report**

No. NL/DEK/ExTR13.0001/xx.

(17) **Special conditions for safe use**

None.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. NL/DEK/ExTR13.0001/xx.

12.2 IECEx

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx DEK 14.0011X issue No.:0
Status:	Current
Date of Issue:	2014-03-28 Page 1 of 3
Applicant:	**HYDAC Electronic GmbH** Hauptstrasse 27 66128 Saarbrücken **Germany**
Electrical Apparatus: *Optional accessory:*	**Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...)**
Type of Protection:	**Ex ia, Ex ic, Ex nA, Ex ta, Ex tb, Ex tc**
Marking:	Ex ia I Ma Ex ia IIC T5, T6 Ga Ex ia IIC T5, T6 Ga/Gb Ex ia IIC T5, T6 Gb Ex ia IIIC T85 °C or T95 °C Da Ex ta IIIC T80 °C T_{500} 90 °C or T90 °C T_{500} 100 °C or T100 °C T_{500} 110 °C Da Ex tb IIIC T80 °C or T90 °C or T100 °C Db Ex nA IIC T6, T5, T4 Gc Ex tc IIIC T80 °C/T90 °C/T100 °C Dc Ex ic IIC T6, T5, T4 Gc Ex ic IIIC T80 °C/T90 °C/T100 °C Dc
Approved for issue on behalf of the IECEx Certification Body:	M. Erdhuizen
Position:	Certification Manager
Signature: *(for printed version)*	
Date:	2014-03-28

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

DEKRA Certification B.V.
Meander 1051,
6825 MJ Arnhem
The Netherlands

DEKRA

IECEx Certificate of Conformity

Certificate No.: IECEx DEK 14.0011X

Date of Issue: **2014-03-28** Issue No.: **0**

Page 2 of 3

Manufacturer: **HYDAC Electronic GmbH**
Hauptstrasse 27
66128 Saarbrücken
Germany

Additional Manufacturing location (s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
IEC 60079-26 : 2006 Edition: 2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga
IEC 60079-31 : 2008 Edition: 1	Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure 't'

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
NL/DEK/ExTR13.0001/01

Quality Assessment Report:

DE/BVS/QAR06.0017/05

IECEx Certificate of Conformity

Certificate No.: IECEx DEK 14.0011X

Date of Issue: **2014-03-28** Issue No.: **0**

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Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...) are two wire transmitters used to convert a Pressure and/or Temperature and/or Flow Rate signal into a 4 - 20 mA output signal with digital communication (HART). Optionally, a breathing input for pressure equalisation is available.
The electrical connections are made by a connector or via a permanently connected cable.

The enclosure provides a degree of protection of at least IP64 in accordance with IEC 60529.

Ambient temperature range, depending on type of protection:
- Ex ia IIC and Ex ia IIIC: -40 °C to +70 °C;
- Ex ic IIC and Ex nA IIC: -40 °C to +85 °C;
- Ex ta IIIC, Ex tb IIIC, Ex tc IIIC and Ex ic IIIC: -40 °C to +80 °C.

For more detailed information see annex.

CONDITIONS OF CERTIFICATION: YES as shown below:

1. Transmitters with an enclosure containing light metals, when used in a potentially explosive atmosphere requiring apparatus of equipment protection level Ga or Ma, shall be installed such, that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.

2. For installation of the Transmitter between areas where the use of equipment protection level Ga is required and areas where the use of equipment protection level Gb is required, the following applies:
The internal separation element shall be protected against environmental stress, which might adversely affect the separation element. The material of the separation element shall be obtained from the data supplied by the manufacturer.

3. The pressure transmitter may alternatively be used with separately supplied certified cable entries or conduit entries that are rated for the intended application.

Annex: 215811500-14.0011.00-Annex to CoC.pdf

DEKRA

Annex 1 to Certificate of Conformity IECEx DEK 14.0011, issue 0

Description

Pressure and/or Temperature and/or Flow Rate Transmitters Model Series HDA 4...-F21-(...)-...-(...), ETS 4...-F21-(...)-...-(...) and HFT 3...-F21-(...)-...-(...) are two wire transmitters used to convert a Pressure and/or Temperature and/or Flow Rate signal into a 4 - 20 mA output signal with digital communication (HART). Optionally, a breathing input for pressure equalisation is available.
The electrical connections are made by a connector or via a permanently connected cable.

The enclosure provides a degree of protection of at least IP64 in accordance with IEC 60529.

Thermal data

Ambient temperature range, depending on type of protection:
- Ex ia IIC and Ex ia IIIC: -40 °C to +70 °C;
- Ex ic IIC and Ex nA IIC: -40 °C to +85 °C;
- Ex ta IIIC, Ex tb IIIC, Ex tc IIIC and Ex ic IIIC: -40 °C to +80 °C.

The temperature class and the maximum surface temperature of the enclosure is depending on the maximum ambient temperature, as listed in following table:

Max. ambient temperature	Temperature class (Ex nA IIC, Ex ia/ic IIC)	Max. surface temperature "T" (Ex ta/tb/tc IIIC, Ex ic IIIC)	Max. surface temperature "T" (Ex ia IIIC)	Max. surface temperature "T_{500}" (Ex ta IIIC)
60 °C	T6	80 °C	85 °C	90 °C
70 °C	T5	90 °C	95 °C	100 °C
80 °C	--	100 °C		110 °C
85 °C	T4	--	--	--

Electrical data

Equipment in type of protection Intrinsic safety "i"

Supply/output circuit.(Connection + and -):
in type of protection intrinsic safety Ex ia I, Ex ia IIC, Ex ia IIIC, Ex ic IIC and Ex ic IIIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 100 mA; P_i = 0.7 W; C_i = 22 nF; L_i = 0 mH.

Equipment in type of protection Equipment dust ignition protection by enclosure "t" and type "n" (non-sparking nA)

Supply/output circuit.(Connection + and -):
U ≤ 28 V; P_{max} = 1 W.

From a safety point of view, the circuits of the transmitters type ... .-F21-(...)-.N.-... shall be considered to be connected to earth.

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T +31 88 9683000 F +31 88 9683100 www.dekra-certification.com Registered Arnhem 09085396

DEKRA

Annex 1 to Certificate of Conformity IECEx DEK 14.0011, issue 0

Marking

The marking of the Transmitters includes the following codes, depending on the model:

HDA 4...-F21-(...)-..1-(...), ETS 4...-F21-(...)-..1-(...) or HFT 3...-F21-(...)-..1-(...):	Ex ia I Ma or Ex ia IIC T5, T6 Ga or Ex ia IIC T5, T6 Ga/Gb or Ex ia IIC T5, T6 Gb Ex ia IIIC T85 °C or T95 °C Da
HDA 4...-F21-(...)-..2-(...), ETS 4...-F21-(...)-..2-(...) or HFT 3...-F21-(...)-..2-(...):	Ex ia I Ma or Ex ia IIC T5, T6 Gb
HDA 4...-F21-(...)-..3-(...), ETS 4...-F21-(...)-..3-(...) or HFT 3...-F21-(...)-..3-(...):	Ex ia IIC T5, T6 Gb
HDA 4...-F21-(...)-..4-(...), ETS 4...-F21-(...)-..4-(...) or HFT 3...-F21-(...)-..4-(...):	Ex ia IIC T5, T6 Ga or Ex ia IIC T5, T6 Ga/Gb or Ex ia IIC T5, T6 Gb Ex ia IIIC T85 °C or T95 °C Da
HDA 4...-F21-(...)-..5-(...), ETS 4...-F21-(...)-..5-(...) or HFT 3...-F21-(...)-..5-(...):	Ex ia I Ma
HDA 4...-F21-(...)-..A-(...), ETS 4...-F21-(...)-..A-(...) or HFT 3...-F21-(...)-..A-(...):	Ex ta IIIC T80 °C T_{500} 90 °C or T90 °C T_{500} 100 °C or T100 °C T_{500} 110 °C Da Ex tb IIIC T80 °C or T90 °C or T100 °C Db
HDA 4...-F21-(...)-..9-(...), ETS 4...-F21-(...)-..9-(...) or HFT 3...-F21-(...)-..9-(...):	Ex nA IIC T6, T5, T4 Gc
HDA 4...-F21-(...)-..B-(...), ETS 4...-F21-(...)-..B-(...) or HFT 3...-F21-(...)-..B-(...):	Ex tc IIIC T80 °C/T90 °C/T100 °C Dc
HDA 4...-F21-(...)-..C-(...), ETS 4...-F21-(...)-..C-(...) or HFT 3...-F21-(...)-..C-(...):	Ex ic IIC T6, T5, T4 Gc Ex ic IIIC T80 °C/T90 °C/T100 °C Dc

13 Konformitätserklärungen / Declaration of conformity

HYDAC ELECTRONIC

HYDAC ELECTRONIC GMBH, Hauptstraße 27, 66128 Saarbrücken

HYDAC ELECTRONIC GMBH
Hauptstraße 27
66128 Saarbrücken, Deutschland

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Internet: www.hydac.com
siehe dort auch: Allgemeine Geschäftsbedingungen (AGB)

Datum
Ihr Zeichen
Ihre Nachricht
Unser Zeichen

Telefon direkt
Telefax direkt
E-Mail

CE 0158

Betreff

EU-Konformitätserklärung / EC declaration of conformity 18 / 119b / 17

Hiermit erkären wir, dass das nachfolgend bezeichnete Produkt auf Grund seiner Konzeption und Bauart, sowie in der von uns in Verkehr gebrachten Ausführung, den grundlegenden Sicherheits- und Gesundheitsanforderungen der unten aufgeführten Normen entspricht.
Bei einer nicht mit uns schriftlich abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit.

We herewith declare that, with regard to its design and construction and to the model brought onto the market by us, the product designated below conforms with the fundamental safety and health requirements of the standards listed below.
This declaration ceases to be valid if the product is modified without our written consent.

Bezeichnung / Designation	Druckmessumformer / Pressure Transducer
Typ	HDA 4xxx-F21-xxxx-(T-xxx)-**A/E**xx....
EMV Richtlinie / EMC Guideline	2014/ 30 EU
Normen	DIN EN 61000-6 -1 Okt 07/ -2-März05/ - 3 /4 Sept 11
Geräte für explosionsgefährdete Bereiche / Equipment for use in potentially explosive atmospheres	2014/34 EU
Normen	EN 60079-0: 2012 ; -11: 2012 ; -26 2007 EN 60079-31: 2009 ; EN 50303 : 2000
EG Baumusterprüfbescheinigung / EC -Type Examination Certificate :	DEKRA 13 ATEX 0031X Issue: 2
	DEKRA Certifikation B.V Utrechtseweg 310; NL 6812 AR Arnheim
Prüfstelle / notified body :	DEKRA EXAM Nr. : no: 0158

Schutzartkennzeichen / Code for Type protection :
I M1 Exia I Ma ; II 1G Ex ia IIC T5, T6 Ga; II 1/2G Ex ia IIC T5 ,T6 Ga/Gb;
II 2G Ex ia IIC T5, T6 Gb
II 1D Ex ta IIIC T80..100°C and T_{600} 90...110°C Da ; II 1D Ex ia IIIC T85°C or 95°C Da ;
II 2D Ex tb IIIC T80...100°C Db

21.07.2017 ppa J. Morsch
Datum / Date Name / (CE-Beauftragter) /(CE-authorized person)

HYDAC ELECTRONIC

HYDAC ELECTRONIC GMBH, Hauptstraße 27, 66128 Saarbrücken

HYDAC ELECTRONIC GMBH

Hauptstraße 27
66128 Saarbrücken, Deutschland

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Fax Verkauf 06897 509-1735

Internet: www.hydac.com
siehe dort auch: Allgemeine Geschäftsbedingungen (AGB)

Datum
Ihr Zeichen
Ihre Nachricht
Unser Zeichen

Telefon direkt
Telefax direkt
E-Mail

CE 0158

Betreff

EU-Konformitätserklärung / EC declaration of conformity 18 / 120a / 17

Hiermit erkären wir, dass das nachfolgend bezeichnete Produkt auf Grund seiner Konzeption und Bauart, sowie in der von uns in Verkehr gebrachten Ausführung, den grundlegenden Sicherheits- und Gesundheitsanforderungen der unten aufgeführten Normen entspricht.

Bei einer nicht mit uns schriftlich abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit.

We herewith declare that, with regard to its design and construction and to the model brought onto the market by us, the product designated below conforms with the fundamental safety and health requirements of the standards listed below.

This declaration ceases to be valid if the product is modified without our written consent.

Bezeichnung / Designation	Druckmessumformer / Pressure Transducer
Typ	HDA 4xxx-F21-xxxx-(T-xxx)-**A/E**xx....
EMV Richtlinie / EMC Guideline	2014/ 30 EU
Normen	DIN EN 61000-6 -1 Okt 07/ -2-März06/ - 3 /4 Sept 11
Geräte für explosionsgefährdete Bereiche / Equipment for use in potentially explosive atmospheres	2014/34 EU
Normen	EN 60079-0: 2012 ; -11: 2012 ; -15: 2010 EN 60079-31: 2009
EG Baumusterprüfbescheinigung / EU -Type Examination Certificate :	DEKRA 13 ATEX 0032 Issue: 2
	DEKRA Certifikation B.V Utrechtseweg 310; NL 6812 AR Arnheim
Prüfstelle / notified body :	DEKRA EXAM Nr. : no: 0158

Schutzartkennzeichen / Code for Type protection ;

II 3G Ex nA IIC T4..T6 Gc or Ex ic IIC T4...T6 Gc
II 3D Ex tc IIIC T80..100°C Dc or Ex ic IIIC T80..100°C Dc

21.07.2017 ppa. J. Morsch

Datum / Date Name / (CE-Beauftragter) /CE authorized person)

Notes