



# UNIK5000H

## Hydrogen Focused Pressure Sensor

The UNIK5000H takes the existing and widely trusted UNIK5000 configurable pressure sensor and adds Hydrogen compatibility. The use of micromachined silicon technology and analogue circuitry enables best in class performance for stability, low power and frequency response. The new platform enables you to easily build up your own sensor to match your own precise needs. This high performance, configurable solution to pressure measurement employs modular design and lean manufacturing techniques.

### Challenges in hydrogen pressure measurement

As a market leader in pressure measurement for the past 50 years, Druck is fully aware of the challenges that hydrogen applications pose for pressure sensors due to the unique behaviour of the medium. Exposure to hydrogen gas can impact the performance of a pressure sensor, specifically via the processes of hydrogen permeation and embrittlement, hence key design aspects need to be considered with a hydrogen pressure sensor to maintain accuracy and stability.

### Optimised for hydrogen applications

The stainless steel 316L construction of the UNIK5000H provides excellent resistance to hydrogen embrittlement. Permeation can affect the performance of all sensor technologies and the UNIK5000H uses an optimised barrier coating that limits hydrogen permeation and is unaffected by the presence of impurities.

### Bespoke as standard

Custom-built from standard components, manufacturing sensors to your requirement is fast and simple; each UNIK 5000 is a “bespoke” pressure sensing solution, but with the short lead times and competitive pricing you would expect from standard products.

### Features

- Ranges from 700 mbar (10.2 psi) to 700 bar (10000 psi)
- Accuracy to  $\pm 0.04\%$  Full Scale (FS) Best Straight Line (BSL)
- Stainless steel construction
- Hydrogen compatible wetted materials
- Frequency response to 3.5 kHz
- High over pressure capability
- Hazardous area certifications
- mV, mA, voltage and configurable voltage outputs
- Multiple electrical and pressure connector options
- Operating temperature ranges from  $-55$  to  $+125^{\circ}\text{C}$  ( $-67$  to  $+257^{\circ}\text{F}$ )
- Meets the requirements of EC134 compliant systems

# UNIK5000H specifications

## Measurement

### Operating pressure ranges

#### Gauge ranges

Any zero based range 700 mbar to 70 bar (10.2 to 1000 psi)

Note: All psi values are approximate.

#### Sealed gauge ranges

Any zero based range 10 to 700 bar (146 to 10000 psi)

#### Absolute ranges

Any zero based range 700 mbar to 700 bar (10.2 to 10000 psi)

#### Non-zero based ranges

Non-zero based ranges are available. For non-zero based gauge ranges, please contact Druck to discuss your requirements.

#### Over pressure

- 4 × FS (up to 200 bar for ranges ≤70 bar and up to 1200 bar for ranges >70 bar)\*

#### Containment pressure

- 6 × FS (200 bar (2900 psi) max) for ranges up to 70 bar (1000 psi) gauge
- Ranges up to 70 bar (1000 psi) absolute 200 bar (2900 psi)
- Ranges above 70 bar (1000 psi) 1200 bar (17400 psi)\*

\*600 bar (8700 psi) for pressure connector options PX, RA and RF

## Supply and outputs

Electronics option	Description	Supply voltage (V)	Output	Current consumption (mA)
0	mV Passive	2.5 to 12	10 mV/V <sup>Λ</sup>	<2 at 10 V
1	mV Linearised	7 to 12	10 mV/V <sup>Λ</sup>	<3
2	mA	7 to 28**	4–20 mA	<30
3	0 to 5 V 4-wire	7 to 16**	0 to 5 V	<3
4	0 to 5 V 3-wire	7 to 16**	0 to 5 V*	<3
5	Basic Configurable (3-wire)	See below	See below	<3
6	0 to 10 V 4-wire	12 to 16**	0 to 10 V	<3
7	0.5 V to 4.5 V Ratiometric	5.0 ± 0.5	0.5 to 4.5 V	<3
8	Configurable (4-wire)	7 to 36	See below	See below
9	Configurable (3-wire)	7 to 36	See below	See below

<sup>Λ</sup> with a 10 V supply mV output sensors give 100 mV over the full scale pressure.

- Output is ratiometric to the supply voltage
- Output reduces pro-rata for pressure ranges below 350 mbar (5 psi)

\* 0 to 5 V 3-wire output is non true zero. At pressures below 1% of span the output will be fixed at approximately 50 mV

\*\*32 V in non-hazardous area operation

Supply voltage is between [Maximum output + 1 V] (7 V minimum) to 16 V (32 V in non-hazardous area operation)

### Basic configurable (option 5), configurable 4-wire (option 8), configurable 3-wire (option 9)

Any pressure signal output configurations will be available, subject to the following limitations:

Output specification	Basic configurable (option 5)	Configurable (options 8, 9)
Minimum span:	4 V	2 V
Maximum span:	10 V	20 V
Maximum output limit:	11 V	±10 V
Maximum zero offset:	Span / 2	±Span
Current consumption:	< 3 mA	< 20 mA @ 7 Vdc decreasing to < 5 mA @ 32 Vdc
Reverse output response available:	No	Yes
Maximum operating temperature:	+125°C	+80°C

Output voltage range can be specified to a resolution of 0.1 V.

The output will continue to respond to 110% FS. e.g. if a 0 to 10 V output is specified, the output will continue to increase proportionally to applied pressure until at least 11 V.

Option 5: Not true zero, the output will saturate at < 50 mV.

Options 8, 9: On startup <100 mA drawn for 10 ms typically.

Options 8, 9: Shunt calibration: not available with reverse output.

#### Examples

Configuration	Allowed	Not Allowed
Basic Configurable (Option 5)	0 to 5 V	1 to 4 V (span too small)
	0.5 to 4.5 V	4 to 11 V (offset too big)
	1 to 6 V	
	1 to 11 V	
Configurable (Options 8, 9)	-10 to 0 V	0 to 12 V (outside ±10 V limits)
	0 to 5 V	6 to 10 V (offset too big)
	-5 to 5 V	0 to 0.5 V (span too small)
	-2 to 10 V	
	1 to 6 V	
	10 to 0 V	

#### Power-up time

- mV, Voltage and current versions: 10 ms
- Configurable 3-wire and 4-wire versions: 500 ms

#### Insulation

- 500 Vdc: > 100 MΩ
- 500 Vac: < 5 mA leakage current (mV and mA versions only)

#### Shunt calibration

Shunt calibration provides a customer accessible connection which, when applied, causes a shift in output of 80% FS in order to simulate applied pressure. It is fitted to the mV, configurable 4-wire and configurable 3-wire versions as standard. It is not available with DIN, M12 x 1 or M20 x 1.5 electrical connectors (options 7, D, G and R).

Shunt calibration is activated in different ways depending on the electrical connector and version:

- mV versions: connect shunt cal to -ve supply or where available, connect both shunt cal connections together.
- Configurable 4-wire and configurable 3-wire versions: connect Shunt cal to -ve output or, where available, connect both shunt cal connections together.

Note: Not available with reverse output.

## Performance specifications

There are three grades of performance specification: Industrial, Improved and Premium.

### Accuracy

#### Voltage, current and mV linearised

Combined effects of non-linearity, hysteresis and repeatability:

- Industrial:  $\pm 0.2\%$  FS BSL
- Improved:  $\pm 0.1\%$  FS BSL
- Premium:  $\pm 0.04\%$  FS BSL

#### mV passive

$\leq 70$  bar

Industrial/Improved:  $\pm 0.25\%$  FS BSL

Premium not available

$> 70$  bar

Industrial/Improved:  $\pm 0.5\%$  FS BSL

Premium not available

Note 1: For the barometric pressure range, accuracy is of span, not full scale.

Note 2: For bi-directional ranges, accuracy is specified for each direction separately.

### Zero offset and span setting

Demountable electrical connector options allow access to potentiometers that give at least  $\pm 5\%$  FS adjustment (see Electrical connector section).

#### Factory set to:

Product Description	Industrial	Improved and Premium
Current and voltage versions (Demountable electrical connections and cable gland)	$\pm 0.5\%$ FS	$\pm 0.2\%$ FS
Current and voltage versions (All other electrical connections)	$\pm 1.0\%$ FS	$\pm 1.0\%$ FS
mV versions	$\pm 3.0$ mV	$\pm 3.0$ mV

### Long term stability

$\pm 0.05\%$  FS typical ( $\pm 0.1\%$  FS maximum) per year increasing pro-rata for pressure ranges below 350 mbar

### Temperature effects

Four compensated temperature ranges can be chosen.

Industrial accuracy performance:

- $-10$  to  $+50^{\circ}\text{C}$  ( $+14$  to  $+122^{\circ}\text{F}$ ):  $\pm 0.75\%$  FS TEB\*
- $-20$  to  $+80^{\circ}\text{C}$  ( $-4$  to  $+176^{\circ}\text{F}$ ):  $\pm 1.5\%$  FS TEB
- $-40$  to  $+80^{\circ}\text{C}$  ( $-40$  to  $+176^{\circ}\text{F}$ ):  $\pm 2.25\%$  FS TEB
- $-40$  to  $+125^{\circ}\text{C}$  ( $-40$  to  $+257^{\circ}\text{F}$ ):  $\pm 2.25\%$  FS TEB

\*TEB = Temperature Error Band

Improved and Premium accuracy performance:

- $-10$  to  $+50^{\circ}\text{C}$  ( $+14$  to  $+122^{\circ}\text{F}$ ):  $\pm 0.5\%$  FS TEB
- $-20$  to  $+80^{\circ}\text{C}$  ( $-4$  to  $+176^{\circ}\text{F}$ ):  $\pm 1.0\%$  FS TEB
- $-40$  to  $+80^{\circ}\text{C}$  ( $-40$  to  $+176^{\circ}\text{F}$ ):  $\pm 1.5\%$  FS TEB
- $-40$  to  $+125^{\circ}\text{C}$  ( $-40$  to  $+257^{\circ}\text{F}$ ):  $\pm 1.5\%$  FS TEB

Temperature effects increase pro-rata for pressure ranges below 350 mbar (5 psi) and double for barometric ranges.

## Physical specifications

### Environmental protection

See Electrical connector section

### Operating temperature range

See Electrical connector section

### Pressure media

Fluids compatible with stainless steel 316L and gold

Do not use with oxygen rich media or other strong oxidizing agents.

This product contains materials or fluids that may degrade or combust in the presence of strong oxidizing agents.

### Enclosure materials

Stainless steel (body), nitrile- or silicone-rubber (o-rings, gaskets), EPDM (gaskets), PTFE (vent filter), nickel plated brass (lock rings), glass filled nylon (electrical connector assemblies).

### Pressure connector

Refer to ordering information for available options.

### General certifications

CRN Certified 0F13650.517890YTN ADD1/REV1, 0F13828.2 (sensor types C and K) and CSA 0F13650.56 ADD1 for pressure ranges up to and including 350 bar (5000 psi).

## Electrical connector

Various electrical connector options are available offering different features:

Code	Description	Maximum operating temperature range		IP rating	Zero/ span adjust
		°C	°F		
1	Cable Gland	-40 to +80	-40 to +176	65	N
2	Raychem Cable	-55 to +125	-67 to +257	65	N
6/E	Bayonet MIL-C-26482	-55 to +125	-67 to +257	67	N
7	DIN 43650 Form A Demountable	-40 to +80	-40 to +176	65	Y
A/F	Bayonet MIL-C-26482 Demountable	-55 to +125	-67 to +257	65	Y
C	1/2 NPT Conduit	-40 to +80	-40 to +176	65	N
D	Micro DIN (9.4 mm pitch)	-40 to +80	-40 to +176	65	N
G	M12x1 4-pin	-55 to +125	-67 to +257	67	N
K	Zero Halogen Cable Demountable	-40 to +80	-40 to +176	65	Y
R	M20 x 1.5 Inline	-40 to +80	-40 to +176	65	Y

Note 1: Electronics output options 8 and 9 are restricted to a maximum operating temperature of 80°C (176°F).

Note 2: Hazardous area approved versions are restricted to a maximum operating temperature range of -40°C to +80°C (-40°F to +176°F).

Note 3: Electrical connector option R IP65 rating only with suitable conduit/ cable fitting.

## CE conformity

- RoHS 2011/65/EU
- Pressure equipment directive 2014/68/EU sound engineering practice
- ATEX 2014/34/EU (Optional)
- EMC directive 2014/30/EU
- BS EN 61000-6-1: 2007: Susceptibility - light industrial
- BS EN 61000-6-2: 2005: Susceptibility - heavy industrial\*
- BS EN 61000-6-3: 2007+A1:2011: Emissions - light industrial
- BS EN 61000-6-4: 2007+A1:2011: Emissions - heavy industrial
- BS EN 61326-1: 2013: Electrical equipment for measurement, control and laboratory use
- BS EN 61326-2-3: 2013: Particular requirements for pressure transducers

\*PMP/PTX models with electrical connector options 6, A, C, E, F, G and R with cable screen connected to case.

## Hazardous area approvals (optional)

General applications:

- IECEx/ATEX/UKEX intrinsically safe 'ia' group IIC

For full certification details, refer to the type-examination certificates (or approval listings) and supplied hazardous area installation instructions.

## Wiring details

Connector type	Option code		Electronics option					
			4 to 20 mA	Voltage (3-wire) and basic configurable	Voltage (4-wire)	Configurable voltage (4-wire)	Configurable voltage (3-wire)	mV
Cable (Not Raychem)	I, C	Red	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		Yellow	-	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		Blue	-	-	-ve Output	-ve Output	0V Common	-ve Output
		White	-ve Supply	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		Orange	-	-	-	Shunt Cal	Shunt Cal	Shunt Cal
		Black	-	-	-	-	-	-
		Screen	-	-	-	-	-	-
Raychem Cable	2	Red	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		White	-	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		Green	-	-	-ve Output	-ve Output	0V Common	-ve Output
		Blue	-ve Supply	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		Black	-	-	-	Shunt Cal	Shunt Cal	Shunt Cal
		Screen	-	-	-	-	-	-
MIL-C-26482 Bayonet	6, A	A	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		B	-ve Supply	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		C	-	-	-ve Output	-ve Output	0V Common	-ve Output
		D	-	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		E	-	-	-	Shunt Cal	Shunt Cal	Shunt Cal
		F	-	-	-	-	-	Shunt Cal
DIN 43650 Form A Micro DIN	7 D	1	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		2	-ve Supply	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		3	-	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		E	Case	Case	-ve Output	-ve Output	0V Common	-ve Output
Bayonet Alternative Wiring Options	E, F	A	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		B	-	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		C	-	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		D	-ve Supply	-	-ve Output	-ve Output	0V Common	-ve Output
		E	-	-	-	Shunt Cal	Shunt Cal	Shunt Cal
		F	-	-	-	Shunt Cal	Shunt Cal	-
M12 x 1 4-Pin	G	1	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		2		+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		3	-ve Supply	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		4	Case	Case	-ve Output	-ve Output	0V Common	-ve Output
Zero Halogen Cable (Demountable)	K	Pink	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply	+ve Supply
		White	-	+ve Output	+ve Output	+ve Output	+ve Output	+ve Output
		Green	-	-	-ve Output	-ve Output	0V Common	-ve Output
		Blue	-ve Supply	0V Common	-ve Supply	-ve Supply	0V Common	-ve Supply
		Grey	-	-	-	Shunt Cal	Shunt Cal	Shunt Cal
		Brown	-	-	-	-	-	-
		Yellow	-	-	-	-	-	-
		Screen	-	-	-	-	-	-
M20 x 1.5 Female Demountable	R	+ve	+ve Supply	-	-	-	-	-
		-ve	-ve Supply	-	-	-	-	-

Ordering information (see the online configuration tool at [Druck.com](#))

(1) Select model number

Main Product Variant

- PMP Amplified Pressure Transducer
- PDCR mV Pressure Transducer
- PTX 4-20 mA Pressure Transmitter

Product Series

- 5 UNIK 5000

Diameter and Material

- 0 25mm Stainless Steel

Electrical Connector (Note 6)

- 1 Cable Gland (Polyurethane Cable)
- 2 Raychem Cable
- 6 MIL-C-26482 (6-pin Shell Size 10) (Mating connector not supplied)
- 7 DIN 43650 Form A Demountable (Mating connector supplied)
- A Demountable MIL-C-26482 (6-pin Shell Size 10) (Mating connector not supplied)
- C 1/2" NPT Conduit (Polyurethane cable)
- D Micro DIN (9.4 mm Pitch) (Mating connector supplied)
- E MIL-C-26482 (6 pin Shell Size 10) Alternative Wiring (Mating connector not supplied)
- F Demountable MIL-C-26482 (6 pin Shell Size 10) Alternative Wiring (Mating connector not supplied)
- G M12 x 1 4-pin male (Mating connector not supplied)
- K Zero Halogen Cable Demountable
- R M20 x 1.5 Inline Female Conduit Demountable (Note 8)

Electronics Option

- 0 mV Passive 4-wire (PDCR) (Note 1)
- 1 mV Linearised 4-wire (PDCR)
- 2 4 to 20 mA 2-wire (PTX)
- 3 0 to 5 V 4-wire (PMP)
- 4 0 to 5 V 3-wire (PMP)
- 5 Basic Configurable 3-wire (PMP)
- 6 0 to 10 V 4-wire (PMP)
- 7 0.5 to 4.5 V Ratiometric 3-wire (PMP) (Note 5)
- 8 Configurable 4-wire (PMP) (Note 4, 5)
- 9 Configurable 3-wire (PMP) (Note 4, 5)

H Hydrogen use

Compensated Temperature Range

- TA -10 to +50 °C (14 to +122 °F)
- TB -20 to +80 °C (-4 to +176 °F)
- TC -40 to +80 °C (-40 to +176 °F)
- TD -40 to +125 °C (-40 to +257 °F) (Note 2, 5)

Accuracy

- A1 Industrial
- A2 Improved
- A3 Premium

Calibration

- CA Zero/Span Data
- CB Room Temperature
- CC Full Thermal
- CR Room Temperature/Measured Reading

Hazardous Area Approval (Note 6)

- H0 None
- H1 IECEx/ATEX/UKEX Intrinsically Safe 'ia' Group IIC

Pressure Connector

- PA G1/4 Female (Note 3)
- PB G1/4 Male Flat
- PC G1/4 Male 60° Internal Cone
- PD G1/8 Male 60° Internal Cone
- PE 1/4 NPT Female (Note 3)
- PF 1/4 NPT Male
- PG 1/8 NPT Male
- PH M20x1.5 Male (3 mm bore)
- PJ M14x1.5 60° Internal Cone
- PK M12x1 Internal Cone
- PL 7/16-20 UNJF Male 74° External Cone
- PN G1/2 Male via Adaptor (Note 3)
- PQ G1/4 Quick Connect
- PR 1/2 NPT Male via Adaptor (Note 3)
- PS 1/4 Swagelok Bulkhead
- PT G1/4 Male Flat Long
- PU 7/16-20 UNF Long 37° Flare Tip (Note 3)
- PV 7/16-20 UNJF Female (Note 3)
- PX 7/16-20 UNF Male Short Flat (Note 3, 9)
- P58 7/16-20 UNF Female Autoclave (Note 10)
- PZ M10 x 1 80° Internal Cone
- RA VCR Female (Note 3, 9)
- RD M12 x 1.0 74° External Cone
- RE Quick Release Male
- RF VCR Male (Note 3, 9)
- RJ M20 x 1.5 Male (8 mm bore)
- RT 1/8-27 NPT Female
- RU R3/8 Male
- RV R1/4 Male

PTX 5 0 7 2 H - TA - A2 - CB - H0 - PA (Example Model Number)

Ordering notes

- Note 1: Premium accuracy is not available on this version
- Note 2: Please ensure that the electrical connector selected is option 2, 6, A, E, F or G.
- Note 3: Select one of these pressure connectors for pressure ranges over 70 bar
- Note 4: Maximum operating temperature is 80°C (176°F)
- Note 5: Hazardous area certifications not available
- Note 6: Hazardous area certifications are restricted by electrical connector options in line with the following table:

Electrical connector										
Approval	1	2	6/E	7	A/F	C	D	G	K	R
H0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HI	Y	Y	Y	Y	Y	Y	Y	Y	-	Y

- Note 8: Electronics option 2 only
- Note 9: Pressure ranges less than 500 bar
- Note 10: Only available on pressure ranges of 500 bar and over.

2) State pressure range and units  
(e.g., 0 to 10 bar)

Pressure unit options are:

Symbol	Description
bar	bar
mbar	millibar
psi	pounds/sq. inch
Pa	Pascal
hPa	hectoPascal
kPa	kiloPascal
MPa	MegaPascal
mmH <sub>2</sub> O	mm water
cmH <sub>2</sub> O	cm water
mH <sub>2</sub> O	metres water
inH <sub>2</sub> O	inches water
ftH <sub>2</sub> O	feet water
mmHg	mm mercury
inHg	inches mercury
kgf/cm <sup>2</sup>	kg force/sq. cm
atm	atmosphere
Torr	torr

3) State pressure reference (e.g., gauge)

Reference options are:

- gauge
- absolute
- sealed gauge

4) State cable lengths and units

Integer values only, e.g. 1 m cable, 8 ft. Minimum length 1 m (3 ft) cable (only required with certain electrical connectors).

Maximum cable length 100 m (300 ft) for approval options not H0; 200 m (600 ft) for approval option H0.

5) Output options 5, 8 and 9

State voltage output at minimum and maximum pressure (e.g., output -1 to 9 V)

Typical order examples

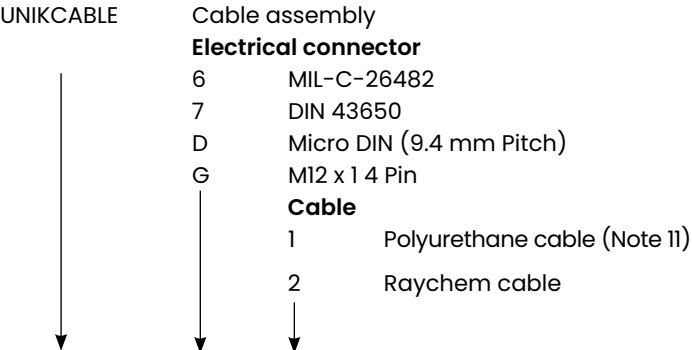
- PTX5012H-TB-A2-CA-H0-PA:** 0 to 10 bar, gauge, 3 m cable
- PMP5028H-TC-A3-CC-H0-PE:** -15 to 75 psi, gauge, 15 ft cable, output voltage -1 to 5 V
- PDCR5071H-TB-A1-CB-H0-PA:** 0 to 100 bar, sealed gauge
- Accessories (order as separate line items)**
- P/N 163-009: Mating connector for MIL-C-26482 (Electrical connector options 6, A, E, and F) (Note 10)

Cable assemblies (Note 11)

A made up electrical connector with a length of cable.

1) Select part number

Main product (Note 11)



2) State cable length and units (Integer value only)

- Minimum length 1 m (3 ft)
- Maximum length 200 m (600 ft)
- Example:** UNIKCABLE-6-2 5 m

- Note 11: Not considered suitable for use in hazardous areas.
- Note 12: This cable is the same as that used in the electrical connector cable gland (Option 1 in the main product).

# Mechanical drawings

