

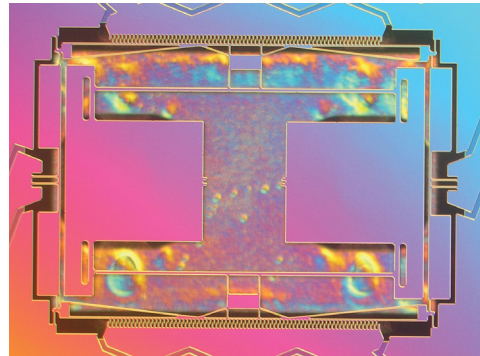
# RPS 8000

## High Accuracy Resonant Pressure Sensor

For over 35 years, Druck has manufactured precision pressure sensors with a capability to meet critical applications in industrial, aerospace, oil and gas, and research environments. Today, Druck is part of GE Measurement & Control Solutions and has continually worked to develop and improve on the performance of our pressure sensors to meet customer's requirements.

The RPS 8000 is the first product to incorporate the exciting new TERPS technology. TERPS is a resonant silicon pressure sensor technology platform that provides an order of magnitude greater accuracy and stability than current pressure measurement technologies available. The new TERPS technology also extends the pressure range capability to high pressures and by incorporating true pressure media isolation greatly improves its suitability for use in harsh environments. (For more information on our TERPS technology, please refer to our TERPS technology capability brochure.)

In addition to providing the performance and packaging improvements available with TERPS, the RPS 8000 product line takes advantage of best practices to offer a wide range of pressure and electrical connections to enable a level of customization for your specific requirements never before available in the performance class of this sensor.



The combination of the power of the TERPS technology and the quality, reliability and flexibility of the RPS 8000 Series offer a truly unique solution for high accuracy and high stability pressure measurement requirements.

### Features:

- High Accuracy,  $\pm 0.01\%$  FS over compensated temperature range
- High Stability,  $\pm 100$  ppm FS/year
- Pressure ranges for 1.5 bar (22 psi) up to 70 bar (1,000 psi) absolute
- Wide temperature range,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  ( $-40^{\circ}$  to  $185^{\circ}\text{F}$ )
- Media isolated construction, suitable for use in harsh environments
- Multiple Output configurations, RS-232, RS-485, Frequency & Diode (TTL)
- Wide selection of pressure & electrical connections to suit specific requirements



# Specifications

## Measurement

### Pressure Ranges

Any pressure range between:

- 0-1.5 bar (0-22 psi) absolute and
- 0-70 bar (0-1,000 psi) absolute
- Barometric Ranges (e.g. 600 to 1100 mbar, 8 to 15 psi)

### Overpressure

1.5X FS

### Sensor Failure Pressure

2.0X FS

### Pressure Containment

- Ranges 1.5 bar (22 psi) to  $\leq$  7 bar (100 psi) abs: containment to 70 bar (1,000 psi)
- Ranges  $>$  7 bar (100 psi) to  $\leq$  70 bar (1,000 psi) abs: containment to 200 bar (3,000 psi)

## Supply and Output

Electronics Option	Supply Voltage (V)	Output	Current Consumption*** (mA)
0	5 to 28	Frequency <sup>^</sup> & Diode <sup>^^</sup> (Low Power)*	3.5
1	5 to 28	Frequency <sup>^</sup> & Diode <sup>^^</sup> (Low Noise)**	10
A	5 to 28	RS485	16.5 quiescent, 32 max
B	5 to 28	RS232	16.5 quiescent, 32 max

\* Low Power has Jitter of  $<$ 120 ns

\*\* Low Noise has Jitter of  $<$ 75 ns

\*\*\* At 6V at 25°C (77°F)

<sup>^</sup> Square wave pressure signal, 25 kHz nominal, 6-10 kHz span

<sup>^^</sup> Forward voltage diode, 0.5 to 0.7 V @ 25°C (77°F), typically  $-2$  mV/°C nominal

### Response Time

$<$  300 msec for pressure change from 10% to 90% FS

### Supply Response

Frequency & Diode: Accurate to 100 ppm within 500 ms of supply switch on, over all operating temperatures

RS 232/485: First stable reading within 20 sec of supply switch on

### Electrical Protection

Connecting  $V_{\text{supply}}$  and GND between any combinations of pins on the connector will not damage the unit

## Performance

There are two levels of performance specification: standard and Improved

### Accuracy

Accuracy specifications include combined effects of non-linearity, hysteresis, repeatability and temperature errors over the compensated temperature range.

Standard:  $\pm 0.02\%$  FS

Improved:  $\pm 0.01\%$  FS

For Frequency & Diode output the above accuracies are achievable by using a polynomial curve fit algorithm and coefficient data supplied with sensor

For ranges  $<$  2 bar: errors increase pro-rata

### Compensated Temperature Ranges:

There are two compensated temperature ranges available:

-10 to +50°C

-40 to +85°C

### Temperature Effects

All temperature effects are included in accuracy statement. The accuracy stated applies to either compensation temperature range selected, e.g.

Standard:  $\pm 0.02\%$  FS over -10 to +50°C (+14 to +122°F) or over -40 to +85°C (-40 to +185°F)

Improved:  $\pm 0.01\%$  FS over -10 to +50°C (+14 to +122°F) or over -40 to +85°C (-40 to +185°F)

### Long Term Stability

Standard:  $\pm 0.02\%$  FS/annum

Improved:  $\pm 0.01\%$  FS/annum

*Note: Unless otherwise specified, specifications are at reference conditions: 25°C (77°F)  $\pm 5^\circ\text{C}$  ( $\pm 9^\circ\text{F}$ ).*

## Physical Specifications

### Storage Temperature Range

-54 to +125°C (-67 to +257°F)

### Operating Temperature Range

-54 to +125°C (-67 to +257°F)

Operation outside characterized temperature range may cause output shifts.

Operating temperature range may be restricted by electrical connection option.

Digital output versions are limited to -54 to +85°C (-67 to +185°F)

### Pressure Media

Media compatible with 316L Stainless Steel and Hastelloy C276

### Ingress Protection

See Electrical Connector Section

### Vibration

DO-160E Curve W Sine sweeps 5 Hz to 2 kHz, levels to 20g<sub>n</sub>

<0.2 mbar/g<sub>n</sub> (<0.003 psi/g<sub>n</sub>) output change

### Shock

DO-160E 9 (Figure 7.2) 20 g<sub>n</sub> 11 ms terminal saw-tooth profile

Negligible calibration change

### Humidity

MIL-STD-810D Method 507.2 Procedure III (Aggravated humidity environment, 65°C, 95% RH)

### Pressure Connector

Available Options are

- G1/4 Female
- G1/4 Male Flat
- G1/4 Male 60 degree Cone
- G1/8 Male 60 degree Cone
- 1/4 NPT Female
- 1/4 NPT Male
- 1/8 NPT Male
- M20 x 1.5
- M14 x 1.5 60 degree Internal Cone
- M12 x 1 Internal Cone
- 7/16 UNF Male
- G1/2 Male
- G1/4 Quick Connect
- 1/2 NPT Male
- G1/4 Male Flat Long
- 7/16-20 UNF Female
- Depth Cone (G1/4 Female)
- 7/16-20 UNF Male Short Flat
- Other pressure connectors may be available. Contact GE to discuss your requirement.

## Electrical Connector

Code Number	Description	Max Operating temp range		IP rating
		°C	°F	
0	No Connector	-55 to +125	-67 to +257	-
1	Cable Gland	-40 to +80	-40 to +176	65
2	Raychem Cable	-55 to +125	-67 to +257	65
3	Polyurethane Depth	-40 to +80	-40 to +176	68
4	Hytrell Depth	-40 to +80	-40 to +176	68
6	Bayonet MIL-C-26482	-55 to +125	-67 to +257	67
C	1/2 NPT Conduit	-40 to +80	-40 to +176	67
G	M12 X 1 5-pin	-55 to +125	-67 to +267	65
H	PTFE Cable (Orange)	-55 to +125	-67 to +267	54

## Connection Details

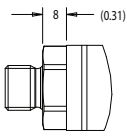
OPTION	CODE	CONNECTION	FUNCTION		
			FREQUENCY & DIODE	DIGITAL - RS485	DIGITAL - RS485 / RS232
FLYING LEADS	0	RED	SUPPLY	SUPPLY	SUPPLY
		YELLOW	FREQ	RS485 B	RS485 B
		GREEN	+VE TEMP	RS485 A	RS485 A
		BLUE	GROUND	GROUND	GROUND / RS232 SIG GND
		ORANGE	-VE TEMP		Tx
		BLACK	-		Rx
CABLE	1, 3, 4, C	RED	SUPPLY	SUPPLY	SUPPLY
		YELLOW	FREQ	RS485 B	RS485 B
		BLUE	+VE TEMP	GROUND	GROUND / RS232 SIG GND
		WHITE	GROUND		Tx
		ORANGE	-VE TEMP	RS485 A	RS485 A
		BLACK	-		Rx
		SCREEN	CASE		
		RAYCHEM	2	RED	SUPPLY
		WHITE	FREQ	RS485 B	
		GREEN	+VE TEMP	RS485 A	
		BLUE	GROUND	GROUND	
		BLACK	-VE TEMP		
		-	-		
		SCREEN	CASE		
MIL-C	6	A	SUPPLY	SUPPLY	SUPPLY
		B	FREQ		Rx
		C	+VE TEMP		Tx
		D	GROUND	GROUND	GROUND / RS232 SIG GND
		E	-VE TEMP	RS485 A	RS485 A
		F	-	RS485 B	RS485 B
M12	G	1	SUPPLY	SUPPLY	N/A
		2	FREQ	RS485 B	
		3	+VE TEMP	RS485 A	
		4	GROUND	GROUND	
		5	-VE TEMP		
PTFE	H	RED	SUPPLY	SUPPLY	SUPPLY
		YELLOW	FREQ	RS485 B	RS485 B
		GREEN	+VE TEMP	RS485 A	RS485 A
		BLUE	GROUND	GROUND	GROUND / RS232 SIG GND
		BLACK	-VE TEMP		Rx
		WHITE	-		Tx
		SCREEN	CASE		

## Certification

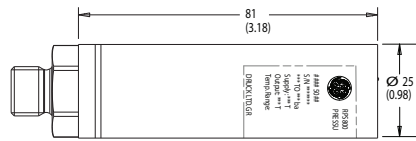
- CE Marked
- RoHS
- EMC Standards

BS EN 61000-6-1: 2007 Susceptibility - Light Industrial  
 BS EN 61000-6-2: 2005 Susceptibility - Heavy Industrial (except mV versions)  
 BS EN 61000-6-3: 2007 Emissions - Light Industrial  
 BS EN 61000-6-4: 2007 Emissions - Heavy Industrial  
 BS EN 61326-1: 2006 Electrical Equipment for Measurement, Control and Laboratory Use - EMC requirements  
 BS EN 61326-2-3:2006 Requirements for pressure transducers

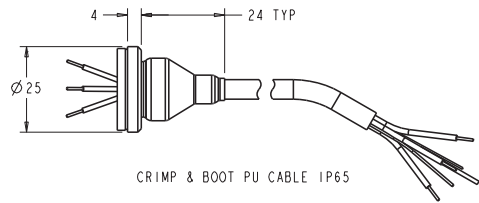
# Mechanical Drawings



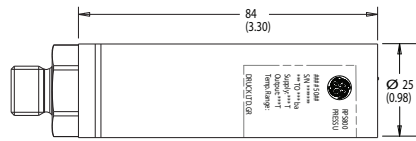
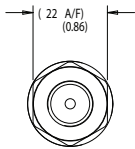
MALE PRESSURE CONNECTION



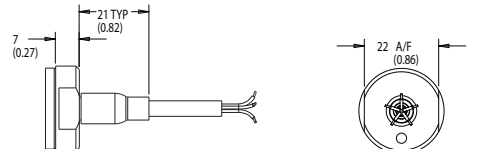
MEDIUM PRESSURE CONSTRUCTION



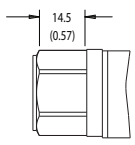
CRIMP & BOOT PU CABLE IP65



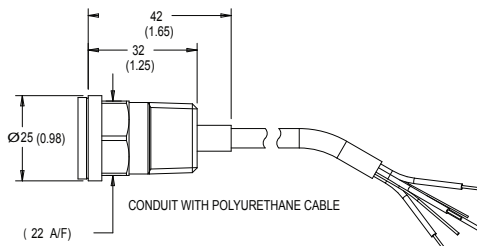
LOW PRESSURE CONSTRUCTION



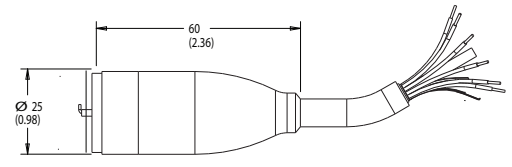
RAYCHEM CABLE



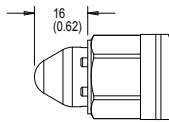
FEMALE PRESSURE CONNECTION



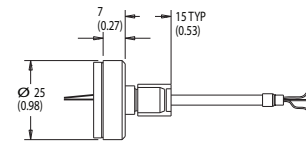
CONDUIT WITH POLYURETHANE CABLE



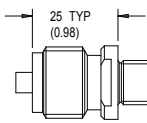
DEPTH CABLE



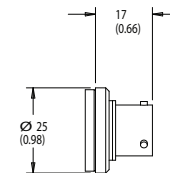
DEPTH CONE PRESSURE ADAPTOR



24 AWG 7/0.2 PTFE CABLE



OPTIONAL WELDED PRESSURE ADAPTOR



BAYONET MIL-C-26482

## Notes:

1. All dimensions are proposed nominal lengths and are subject to change.
2. All dimensions are in millimeters (inches).
3. Other pressure and electrical connectors may be available, please contact GE.
4. Low Pressure  $\leq 7$  bar (100 psi)
5. Medium Pressure  $> 7$  bar (100 psi) and  $\leq 70$  bar (1,000 psi)

# Ordering Information

## (1) Select model number

### Main Product Variant

- R RPS - Frequency Output
- E DPS - Digital Output

### Product Series

8 RPS/DPS 8000 Series

### Diameter, Material and Isolation

0 25mm Stainless Steel Oil isolated

### Electrical Connector

- 0 No Electrical Connector (Flying leads)
- 1 Polyurethane Cable IP65
- 2 Raychem Cable
- 3 Polyurethane Cable (Depth) IP68
- 4 Hytrel Cable (Depth) IP68
- 6 MIL-C-26482 (6-pin Shell Size 10)
- C 1/2" NPT Conduit with Polyurethane Cable (Non-Exd Only)
- G M12x1 5-Pin
- H Orange PTFE Cable

### Output Option

- 0 Frequency & Diode (Low Power <3.5 mA)
- 1 Frequency & Diode (Low Jitter aprox 75 ns)
- A RS485
- B RS232

### Compensated Temperature Range

- TA -10 to +50 °C
- TB -40 to +85 °C

### Accuracy

- A1 0.02%
- A2 0.01%

### Calibration

CC Full Thermal Calibration

### Hazardous Area Approval

H0 None

### Pressure Connector

- PA G1/4 Female
- PB G1/4 Male Flat
- PC G1/4 Male 60 degree ICone
- PD G1/8 Male 60 degree Cone
- PE 1/4 NPT Female
- PF 1/4 NPT Male
- PG 1/8 NPT Male
- PH M20x1.5
- PJ M14x1.5 60° Internal Cone
- PK M12x1 Internal Cone
- PL 7/16 UNF Male
- PN G1/2 Male
- PQ G1/4 Quick Connect
- PR 1/2 NPT Male
- PT G1/4 Male Flat Long
- PV 7/16-20 UNF Female)
- PW Depth Cone (G1/4 Female)
- PX 7/16-20 UNF Male Flat

R 8 0 4 1 - TA - A2 - CC - H0 - PA Typical Model Number

**2) State pressure range and units:** e.g. 0 to 20 bar,, 0 to 100 psi

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 cable lengths and units:** e.g. 1 m cable, 8 ft cable (only required on certain electrical connectors)

**Typical order examples:**

RPS 8010-TA-A1-CC-H0-PA, 0-7 bara, 5 m cable

DPS 806A-TB-A2-CC-H0-PL, 0-1,000 psia



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920-519A