

# RPS/DPS 8100

## 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 and has continually worked to develop and improve on the performance of our pressure sensors to meet customer's requirements.

The RPS/DPS 8100 incorporates 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.

In addition to providing the performance and packaging improvements available with TERPS, the RPS/DPS 8100 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 8100 Series offer a truly unique solution for high accuracy and high stability pressure measurement requirements.

### Features:

- High Precision,  $\pm 0.01\%$  FS over compensated temperature range
- High Stability,  $\pm 100$  ppm FS/year
- Wide temperature range,  $-40$  to  $+85^{\circ}\text{C}$  ( $-40$  to  $185^{\circ}\text{F}$ )
- Multiple Output configurations, RS-232, RS-485, Frequency & Diode (TTL)
- Wide selection of pressure & electrical connections to suit specific requirements
- Low acceleration effects



# Specifications

## Measurement

### Base Pressure Ranges

- 0 to 2 bar (0 to 30 psi) absolute
- 0 to 3.5 bar (0 to 50 psi) absolute

### Calibrated Ranges

- 35 to 3500 mbar (0.5 to 50 psi) absolute
  - 35 to 2000 mbar (0.5 to 30 psi) absolute
  - 750 to 1150 mbar (11 to 17 psi) barometric
- (Values in psi are approximate.)

Alternative barometric ranges are available on request.  
Higher pressure ranges are available in the RPS/DPS 8000 series.

### Overpressure

2X FS

### Pressure Containment

- 7 bar, (100 psi)

## Supply and Output

Electronics Option	Supply Voltage (V)	Output	Current Consumption*** (mA)
0	6 to 28	Frequency <sup>^</sup> & Diode <sup>^^</sup> (Low Power)*	3.5
1	6 to 28	Frequency <sup>^</sup> & Diode <sup>^^</sup> (Low Noise)**	10
A	11 to 28	RS485	16.5 quiescent, 32 max
B	11 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, 4-10 kHz span

<sup>^^</sup> Forward voltage diode, 0.4 to 0.8 V @ 25 °C (77 °F), typically -2 mV/°C nominal

### Response Time

Frequency Output

<25 ms for pressure change from 10% to 90% FS

RS232/485 Output

Dependent on the output update rate which is set by the user with a minimum of 100 ms (see manual K0473 for details)

### Supply Response

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

RS 232/485: Accurate to specification within 20 s of supply switch on

## Electrical Protection

Connecting V<sub>supply</sub> and GND between any combinations of pins on the connector will not damage the unit

## Insulation

500 V dc

## Performance

There are two levels of performance specification: Standard and Improved

Specifications include combined effects of non-linearity, hysteresis, repeatability and temperature errors over the compensated temperature range and calibrated pressure range.

Accuracy Code	Precision	Accuracy
A1- Standard	0.02% FS	0.0225% FS
A2- Improved	0.01% FS	0.0144% FS

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

## 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 the accuracy statement.

## Long Term Stability

Standard: ±0.02% FS/annum

Improved: ±0.01% FS/annum

*Note: Unless otherwise stated, specifications are at reference conditions: 25 °C (77 °F) ±5 °C (±9 °F).*

## Orientation (g) Sensitivity

Less than 0.05 mbar/g

## Physical Specifications

### Storage Temperature Range

As compensated temperature range.

### Operating Temperature Range

-40 to +85 °C (-40 to +185 °F)

Restricted by some electrical connector options.

### Pressure Media

Non-condensing dry gases compatible with 316L Stainless Steel, silicon, silicon dioxide, RTV adhesive and glass

### 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). It is recommended that in all non-dry environment applications, that sealed electrical connectors are selected (options 3, 4, 6 or G)

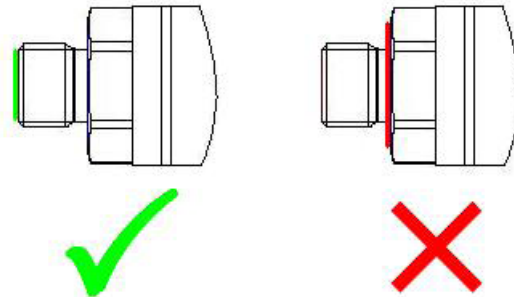
### Pressure Connector

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.

Please ensure that only the intended sealing face is used when mounting the sensor. Failure to comply with this requirement may affect performance or calibration accuracy.

Male threaded pressure connectors must not be sealed or constrained against the face at the base of the thread. The forward cone or flat face should always be used, as indicated below.



## Electrical Connector

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

*Note: Hermetically sealed connectors with a maximum leak rate of  $1 \times 10^{-6}$  cc/s at 1 Atmosphere. High IP rated mating connectors are available.*

## Connection Details

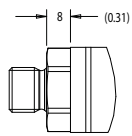
Option	Code	Connection	Function		
			Frequency & Diode	Digital- RS485	Digital - RS232
Flying Leads	0	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		YELLOW	FREQ	RS485 B	Rx
		GREEN	+VE TEMP	RS485 A	Tx
		BLUE	GROUND	GROUND	GROUND
		BLACK	-VE TEMP	-	-
		ORANGE	-	-	-
CABLE	1, 3, 4, C	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		YELLOW	FREQ	RS485 B	Rx
		BLUE	+VE TEMP	RS485 A	Tx
		WHITE	GROUND	GROUND	GROUND
		BLACK	-VE TEMP	-	-
		ORANGE	-	-	-
RAYCHEM	2	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		WHITE	FREQ	RS485 B	Rx
		GREEN	+VE TEMP	RS485 A	Tx
		BLUE	GROUND	GROUND	GROUND
		BLACK	-	-	-
		SCREEN	-	-	-
MIL-C	6	A	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		B	FREQ	RS485 B	Rx
		C	+VE TEMP	RS485 A	Tx
		D	GROUND	GROUND	GROUND
		E	-	-	-
		F	-VE TEMP	-	-
M12	G	1	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		2	FREQ	RS485 B	Rx
		3	GROUND	GROUND	GROUND
		4	+VE TEMP	RS485 A	Tx
		5	-	-	-
PTFE	H	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		YELLOW	FREQ	RS485 B	Rx
		GREEN	+VE TEMP	RS485 A	Tx
		BLUE	GROUND	GROUND	GROUND
		BLACK	-	-	-
		WHITE	-VE TEMP	-	-
		SCREEN	-	-	-

## Certification

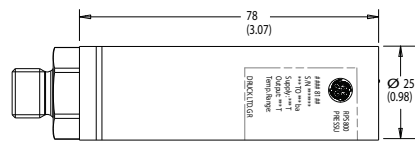
- CE Marked
- RoHS
- EMC Standards

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

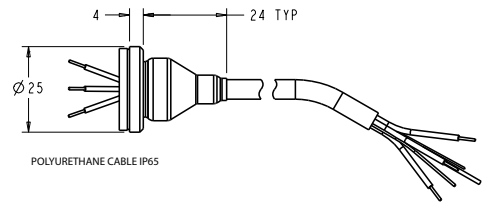
# Mechanical Drawings



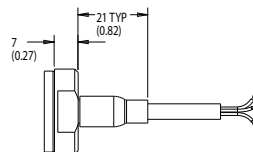
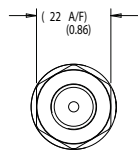
MALE PRESSURE CONNECTION



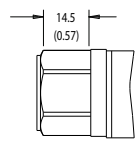
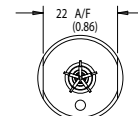
MEDIUM PRESSURE CONSTRUCTION



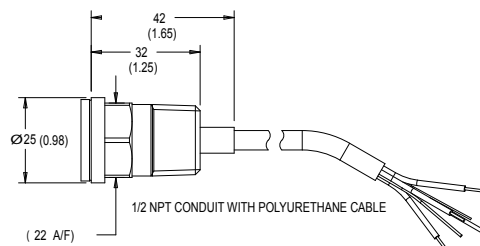
POLYURETHANE CABLE IP65



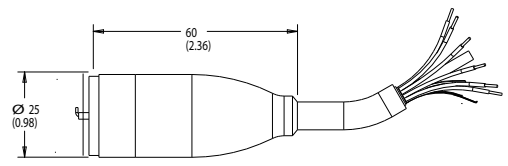
RAYCHEM CABLE



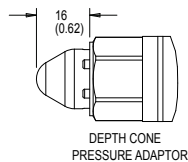
FEMALE PRESSURE CONNECTION



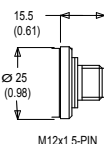
1/2 NPT CONDUIT WITH POLYURETHANE CABLE



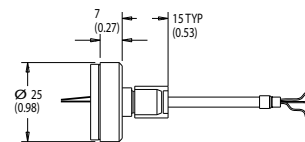
POLYURETHANE CABLE (DEPTH)  
HYTREL CABLE (DEPTH)



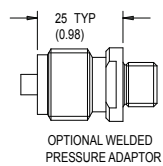
DEPTH CONE PRESSURE ADAPTOR



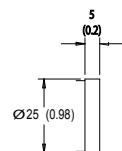
M12x1 5-PIN



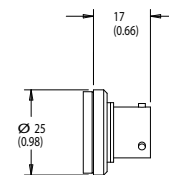
PTFE CABLE (ORANGE)



OPTIONAL WELDED PRESSURE ADAPTOR



NO ELECTRICAL CONNECTOR (FLYING LEADS)



MIL-C-26482 (6 PIN SHELL SIZE 10)

OTHER PRESSURE CONNECTOR DETAILS AVAILABLE ON REQUEST

## Notes:

1. All dimensions are 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.

(1) Select model number

Main Product Variant

RPS Resonant Pressure Sensor - Frequency & Diode Output (Note 1)

DPS Digital Pressure Sensor - Digital Output (Note 1)

Product Series

8 RPS/DPS 8000 Series

Diameter, Material and Isolation

1 25mm Stainless Steel Silicon Exposed

Electrical Connector

0 No Electrical Connector (Flying leads)

1 Polyurethane Cable

2 Raychem Cable

3 Polyurethane Cable (Depth)

4 Hytrel Cable (Depth)

6 MIL-C-26482 (6-pin Shell Size 10)

C 1/2" NPT Conduit with Polyurethane Cable

G M12x1 5-Pin

H PTFE Cable (Orange)

Output Option

0 Frequency & Diode (Low Power <3.5 mA)

1 Frequency & Diode (Low Jitter approx 75 ns)

A RS485

B RS232

Compensated Temperature Range

TA -10 to +50 °C

TB -40 to +85 °C

Accuracy

A1 - Standard 0.02%

A2 - Improved 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 internal Cone

PD G1/8 Male 60 degree internal 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 7/16-20 UNJF Male 74 degree external cone

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

Note 1: RPS variants require Output Option Code '0' or '1'. DPS variants require Output Option Code 'A' or 'B'.

**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



[www.ge-mcs.com](http://www.ge-mcs.com)

920-565A