

GE

Measurement & Control

RPS/DPS 8000

High Accuracy Resonant Pressure Sensor

For over 40 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 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.

In addition to providing the performance and packaging improvements available with TERPS, the RPS/DPS 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/DPS 8000 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, ± 100 ppm FS/year
- Wide temperature range, -40°C to $+85^{\circ}\text{C}$ (-40° to 185°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



GE imagination at work

Specifications

Measurement

Base Pressure Ranges

- 0 to 2 bar (0 to 30 psi) absolute
 - 0 to 7 bar (0 to 100 psi) absolute
 - 0 to 14 bar (0 to 200 psi) absolute
 - 0 to 20 bar (0 to 300 psi) absolute
 - 0 to 35 bar (0 to 500 psi) absolute
 - 0 to 70 bar (0 to 1000 psi) absolute
- (Values in psi are approximate.)

Calibration Ranges

- Any zero-based range between 1 and 70 bar (14.5 to 1000 psi) can be specified. (Performance will be of the full scale of the base pressure range selected.)
- Barometric ranges are available in the RPS/DPS 8100 series. The lowest calibrated pressure is 35 mbar absolute.

Overpressure

1.5X FS

Sensor Failure Pressure

2.0X FS

Pressure Containment

- Ranges to 7 bar, (100 psi), 70 bar (1,000 psi)
- Ranges to 70 bar (1,000 psi), 200 bar (3,000 psi)

Supply and Output

Electronics Option	Supply Voltage (V)	Output	Current Consumption*** (mA)
0	6 to 28	Frequency [^] & Diode ^{^^} (Low Power)*	3.5
1	6 to 28	Frequency [^] & Diode ^{^^} (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 25°C (77°F)

[^] Square wave pressure signal, 25 kHz nominal, 4-10 kHz span

^{^^} 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 specification 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_{supply} 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 over the pressure range 35 mbar to the full scale pressure.

Accuracy Code	Precision
A1- Standard	0.02% FS
A2- Improved	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.

Sensors are calibrated against standards traceable to UKAS operating to better than 100 ppm.

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: $\pm 0.02\%$ FS/annum

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

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

Orientation (g) Sensitivity

Less than 0.2 mbar/g

Physical Specifications

Storage Temperature Range

As compensated temperature range.

Operating Temperature Range

As compensated temperature range

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 $20g_n$
<0.2 mbar/ g_n (<0.003 psi/ g_n) output change

Shock

DO-160E 9 (Figure 7.2) $20g_n$ 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)

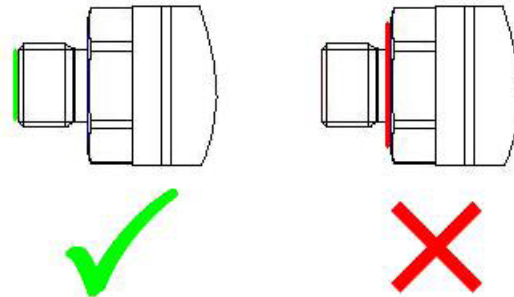
Pressure Connector

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.

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	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	Hytrek 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

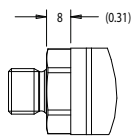
Option	Code	Connection	Function		
			Frequency & Diode	Digital- RS485	Digital - RS232
Flying Leads	0	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		YELLOW	FREQ	RS485 B	Rx
		GREEN	+VE TEMP	RS485 A	Tx
		BLUE	GROUND	GROUND	GROUND
		ORANGE	EEPROM	-	-
		BLACK	-VE TEMP	-	-
CABLE	1, 3, 4, C	RED	SUPPLY +VE	SUPPLY +VE	SUPPLY +VE
		YELLOW	FREQ	RS485 B	Rx
		BLUE	+VE TEMP	RS485 A	Tx
		WHITE	GROUND	GROUND	GROUND
		ORANGE	EEPROM	-	-
		BLACK	-VE TEMP	-	-
		SCREEN	-	-	-
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	EEPROM	-	-
		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	EEPROM	-	-
		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	EEPROM	-	-
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	EEPROM	-	-
		WHITE	-VE TEMP	-	-
SCREEN	-	-	-		

Certification

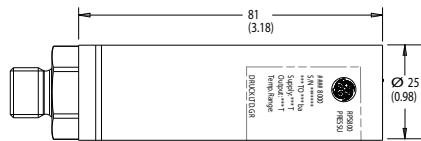
- CE Marked
- RoHS
- EMC Standards

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

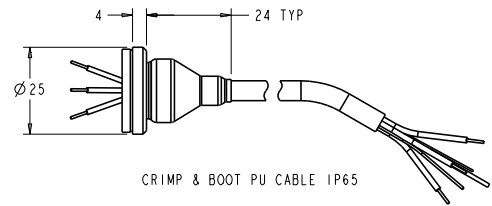
Mechanical Drawings



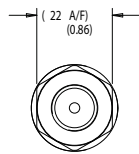
MALE PRESSURE CONNECTION



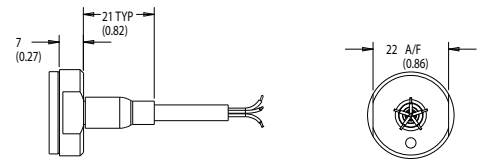
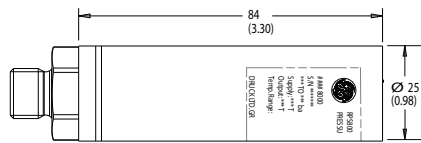
MEDIUM PRESSURE CONSTRUCTION



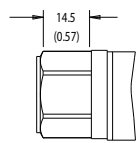
CRIMP & BOOT PU CABLE IP65



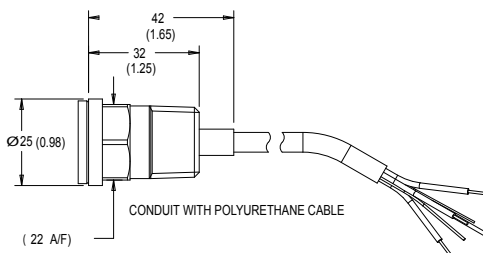
LOW PRESSURE CONSTRUCTION



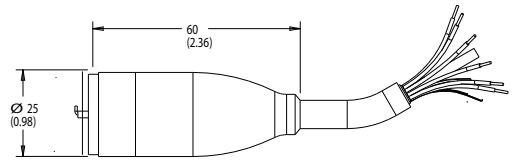
RAYCHEM CABLE



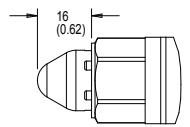
FEMALE PRESSURE CONNECTION



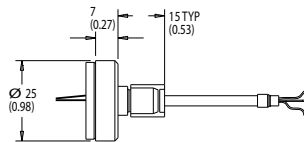
CONDUIT WITH POLYURETHANE CABLE



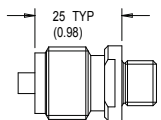
DEPTH CABLE



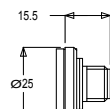
DEPTH CONE PRESSURE ADAPTOR



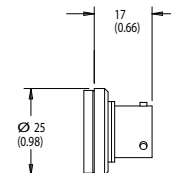
24 AWG 7/0.2 PTFE CABLE



OPTIONAL WELDED PRESSURE ADAPTOR



M12x1 5-PIN



BAYONET MIL-C-26482

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.
4. Low Pressure ≤ 7 bar (100 psi)
5. Medium Pressure >7 bar (100 psi) and ≤ 70 bar (1,000 psi)

(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

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 approx 75 ns)
- A** RS485
- B** RS232

Compensated Temperature Range

- TA** -10 to +50 °C
- TB** -40 to +85 °C **(Note 2)**

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'.

Note 2: Pressure ranges 2 and 7 bar (30 and 100 psi) are not available at this temperature range.

2) State pressure range (2, 7, 14, 20, 35 or 70 bar or equivalents) 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 ₂ O	mm water
cmH ₂ O	cm water
mH ₂ O	metres water
inH ₂ O	inches water
ftH ₂ O	feet water
mmHg	mm mercury
inHg	inches mercury
kgf/cm ²	kg force/sq. cm
atm	atmosphere
Torr	torr

3) State cable lengths and units: e.g. 1 m cable, 3 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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920-519E