

GE

Measurement & Control

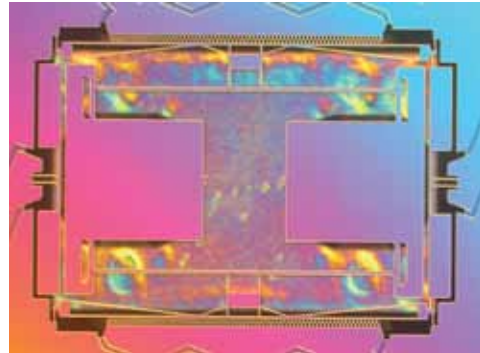
RPS/DPS 8000

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 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



Specifications

Measurement

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.)

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 6V 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 | 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 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: $\pm 0.02\%$ 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) 20 g_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)

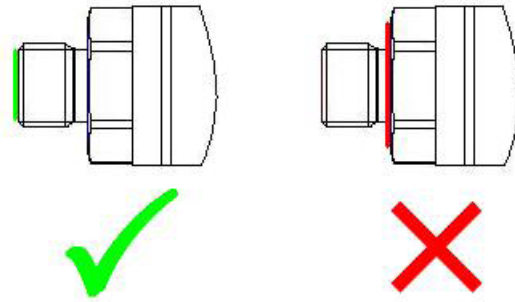
Pressure Connector

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 | 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

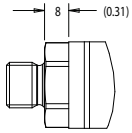
| Option | Code | Connection | Function | | |
|--------------|------------|------------|-------------------|----------------|-----------------|
| | | | Frequency & Diode | Digital- RS485 | Digital - RS232 |
| Flying Leads | 0 | RED | SUPPLY +VE | SUPPLY +VE | SUPPLY +VE |
| | | YELLOW | FREQ | RS485 B | Rx |
| | | GREEN | +VE TEMP | RS485 A | Tx |
| | | BLUE | GROUND | GROUND | GROUND |
| | | ORANGE | - | - | - |
| | | 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 | - | - | - |
| | | 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 | - | - | - |
| | | 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

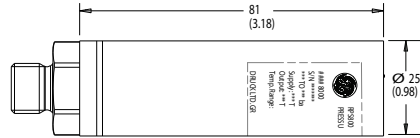
- CE Marked
- RoHS
- EMC Standards

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

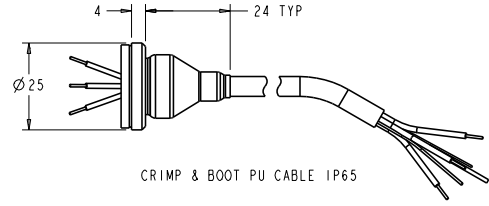
Mechanical Drawings



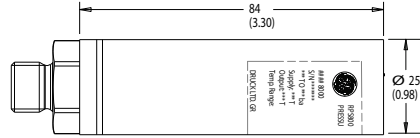
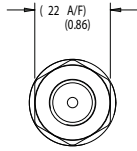
MALE PRESSURE CONNECTION



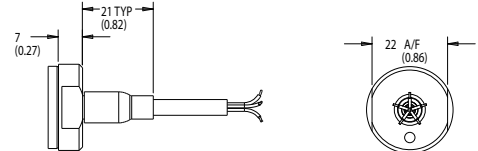
MEDIUM PRESSURE CONSTRUCTION



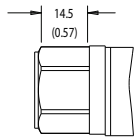
CRIMP & BOOT PU CABLE IP65



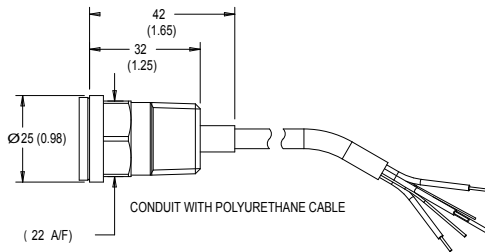
LOW PRESSURE CONSTRUCTION



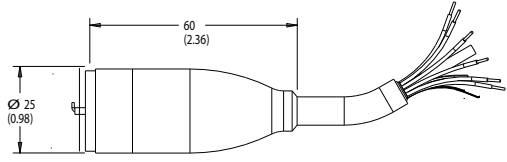
RAYCHEM CABLE



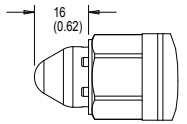
FEMALE PRESSURE CONNECTION



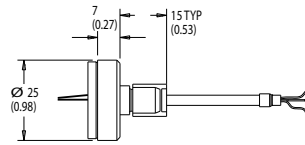
CONDUIT WITH POLYURETHANE CABLE



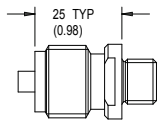
DEPTH CABLE



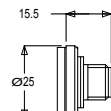
DEPTH CONE PRESSURE ADAPTOR



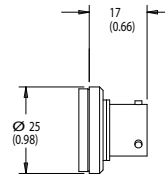
24 AWG 7/0.2 PTFE CABLE



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: or 70

| 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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920-519D