

High Performance Smart Differential Pressure Transmitter RP1001



High Stability Silicon Sensor



Reference Accuracy up to 0.035%



Reverse Polarity & Surge Protection



HART7 & ATEX, CE, SIL Certified

**Product
Datasheet**

ROCKSENSOR AT A GLANCE (ABOUT US)

Rocksensor is one of the global leaders specializing in Process Instrumentation, Research and Development and Designing of Industrial Automation Equipment. We provide highly precise pressure sensors and transmitters, flow metres, level transmitters and temperature transmitters with a prime focus to help our clients efficiently, safely and economically run complex industrial processes.

Rocksensor, headquartered in Switzerland, has its footprint in various geographical regions such as the US, Russia, South Korea, Italy, Germany, Singapore, Malaysia, Morocco, China, Taiwan, Australia, UAE, Brazil and India. Our clients come from some of the major industries such as Oil and Gas, Petrochemicals, Pharmaceuticals, FMCG, Automobiles, Water, Cement, Metal & Mining, and mainly from the Power Industry like Nuclear, Thermal, Hydro, and Solar.

Rocksensor deals in a wide range of highly accurate industrial automation instruments ensuring that even the complex industrial processes happen efficiently.

To fulfill the needs of our clients we make sure that our instruments work in even the harsh environmental conditions offering accurate recordings and communication.

We, at Rocksensor, believe in creating bonds that last a lifetime and create a success story for each and every client. Rocksensor aims to achieve a perfect fit in the global market landscape and establish our footprints across the globe.



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KEY APPLICATION INDUSTRIES

- Oil and Gas sector
- Cement
- Metal
- Pulp and Paper
- Agriculture
- Textiles
- Chemicals
- Power
- Water
- Pharmaceutical
- Fertilizer
- Plastics and HVAC

1. Salient Features

- High Stability Silicon Sensor with accuracy up to 0.035%
- Overload Pressure up to 60 MPa
- Packaged Temperature Sensor inside
- Static Pressure error up to 0.05%/10 MPa
- Inbuilt Reverse Polarity Protection
- Inbuilt Surge Protection
- Available with square root output function
- IP67 Grade Protection
- Integrated Push-button
- HART®, Foundation Fieldbus & Profibus Communication
- ATEX, CE, SIL Certified

2. Technical Specifications

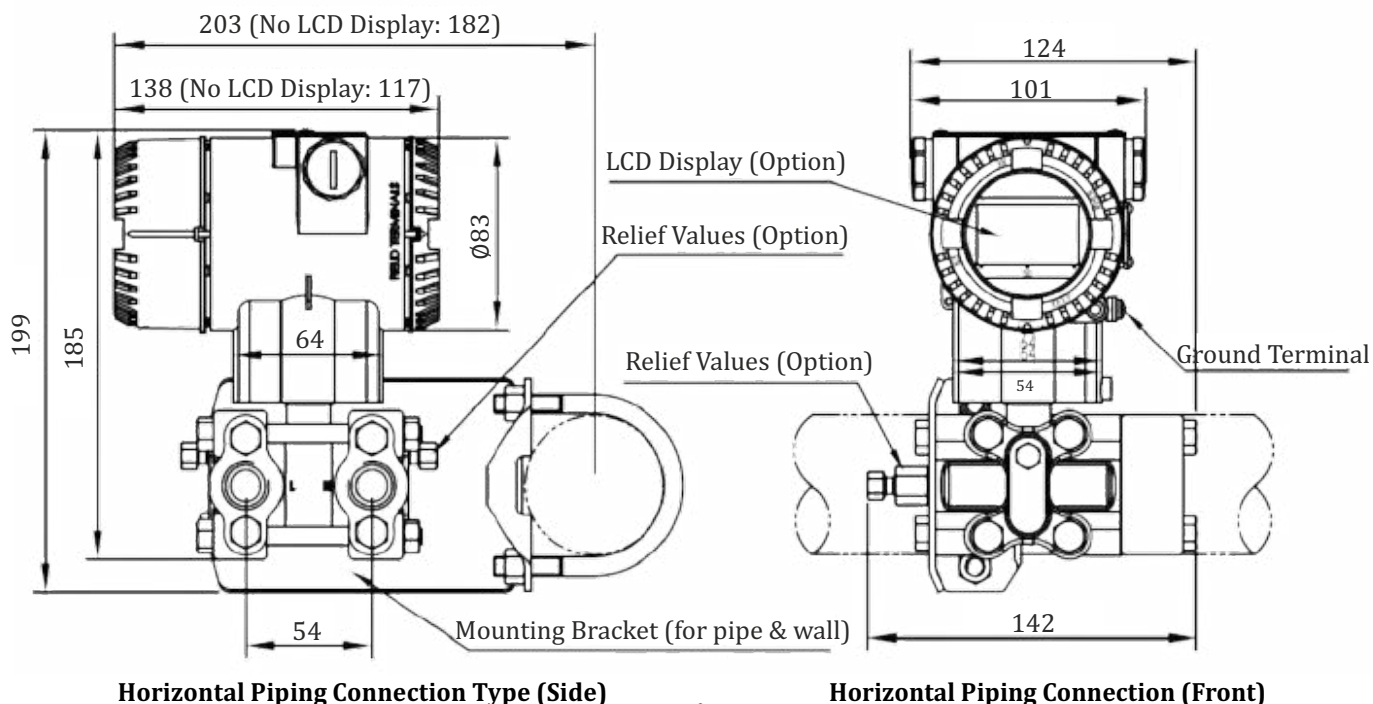
| Parameter | Details |
|--|--|
| Medium | Gas, Steam, Liquid |
| Measurement Range | 0 - 100 Pa ~ 4 MPa |
| Reference Accuracy | ±0.035%/ ±0.06%/ ±0.1% |
| Square Root Output Accuracy | 1.5 x Linear Output Accuracy |
| Ambient Temp. Effects | (-)25 ~ 65°C: ±(0.075%*TD + 0.025%)% x Span |
| Over Range Effects | ±0.05% x Span |
| Static Pressure Effects | ±(0.025%URL + 0.05%Span)/ 10 MPa |
| Over Pressure Effects | ±0.05%URL/ 10 MPa |
| Stability | ±0.15% / 10 years |
| Power Supply Effects | ±0.001%/ 10 V (12-36 VDC) |
| Zero Setting | Zero Point can be adjusted to any value within measuring range |
| Span & Range | Randomly adjusted between Upper Range and Lower Range |
| Mounting Position Effects | Tilting up to 90°, Zero shift <0.15 kPa (This can be adjusted) |
| Output Options | 2 Wire, 4-20 mA HART 7/ Profibus PA/ Foundation Fieldbus |
| Output Signal Limit | $I_{min} = 3.9 \text{ mA}$, $I_{max} = 21 \text{ mA}$ |
| Failure Alarm | NAMUR NE43 Compliant/ Low Mode: 3.6 mA/ High Mode: 21 mA |
| Response Time | Up to 100 ms; depends upon range & TD Ratio |
| Turn ON time | <5s |
| T _{Ambient} | (-)40°C ~ 85°C/ (-)20°C ~ 65°C (With LCD, Fluorine O-ring) |
| T _{Process} | (-)30°C ~ 120°C; Up to 600°C available as an option |
| T _{Storage/Transportation} | (-)50°C ~ 85°C/ (-)25°C ~ 85°C (With LCD, Fluorine O-ring) |
| Static Pressure Limit | 3.5 kPa abs to Max. Working Pressure |
| Working Pressure | 16 MPa/ 25 MPa/ 40 MPa |
| Burst Pressure | 1.5 x Working Pressure |
| One-way Overload Limit | Maximum Working Pressure Limit |
| Turn Down Ratio | Min. 10:1, Max. 100:1 |
| EMC | Compliant to IEC61326-1 |
| Explosion Proof | ATEX/ IECEx/ Intrinsic Safety/ Flameproof Certified |
| Power Supply | 24 VDC (9-36 VDC) |
| Load | $R \leq (U_s - 12V)/I_{max} \text{ k}\Omega$, $I_{max} = 23\text{mA}$ |
| Overload Range for Digital Communication | 230 ~ 600Ω |

| | |
|-------------------------------------|--|
| Electrical Connection | M20x1.5, suitable for wire cross-section up to 2.5 sq. mm |
| Process Connection | Standard 1/2" NPT Female Thread; Other options available |
| Isolating Diaphragm MOC | 316L Stainless Steel/ Hastelloy C/ Gold plated on 316L/ FEP plated on 316L/ Tantalum |
| Process Connection & MOC | Flange with thread 7/16 UNF . NPT Female Thread on both sides/ SS316L |
| Filling Fluid | Silicone Oil/ Fluorine Oil |
| Housing | Die Cast Aluminium with Epoxy Resin Coat |
| | Stainless Steel Housing available as an option |
| Housing Gasket | Perbunan (NBR)/ FKM/ PTFE |
| Nameplate MOC | SS304 |
| Nut & Bolt MOC | SS316 |
| Ingress Protection | IP67 |
| Mounting Bracket | Stainless Steel/ Galvanized Carbon Steel |
| Surge Protection | Available |
| Display | 5½ Digit LCD/ Backlit Display/ OLED |
| Sensor | Piezoresistive |
| Reverse Polarity Protection | Available |
| Configuration | Through in-built Push-button/ Handheld HART Communicator/ Rocksensor Software |
| Safety Integrity | SIL2 Certified |
| Certification | CE certified |
| Weight | ~3.3kg (excluding accessories such as mounting bracket, etc.) |

Span & Range

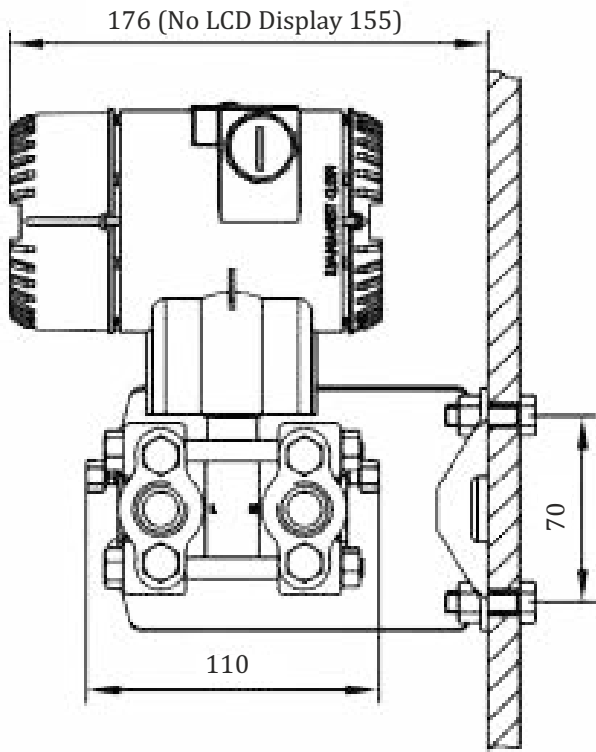
| Span/Range | | kPa | inH ₂ O | mbar | mmH ₂ O |
|------------|-------|---------------|--------------------|----------------|------------------------------|
| B | Span | 0.2 ~ 6 | 0.8 ~ 24 | 2 ~ 60 | 20 ~ 600 |
| | Range | (-)6 ~ 6 | (-)24 ~ 24 | (-)60 ~ 60 | (-)600 ~ 600 |
| C | Span | 0.4 ~ 40 | 1.6~ 160 | 4 ~ 400 | 40 ~ 4000 |
| | Range | (-)40 ~ 40 | (-)160 ~ 160 | (-)400 ~ 400 | (-)4000 ~ 4000 |
| D | Span | 2.5 ~ 250 | 10 ~ 1000 | 25~ 2500 | 0.25 ~ 25mH ₂ O |
| | Range | (-)250 ~ 250 | (-)1000 ~ 1000 | (-)2500 ~ 2500 | (-)25 ~ 25mH ₂ O |
| F | Span | 30 ~ 3000 | 120 ~ 12000 | 0.3~ 30 bar | 3 ~ 300mH ₂ O |
| | Range | (-)500 ~ 3000 | (-)2000 ~ 12000 | (-)50 ~ 30bar | (-)50 ~ 300mH ₂ O |

3. Dimensions (mm) & Installations

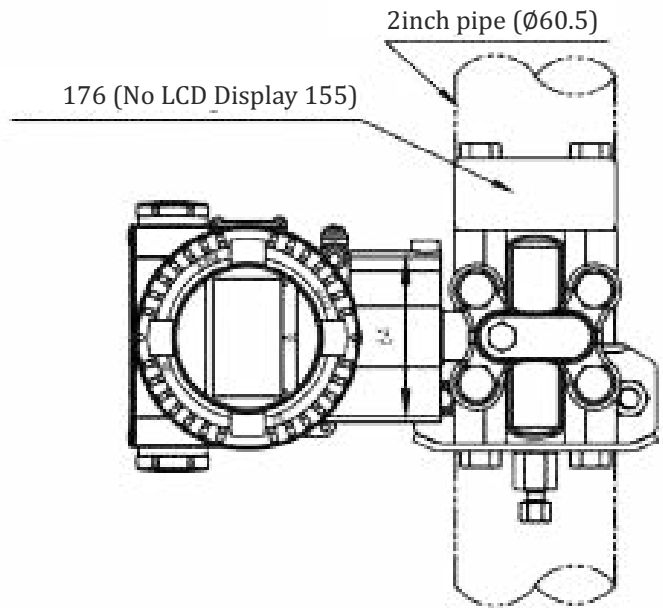


Horizontal Piping Connection Type (Side)

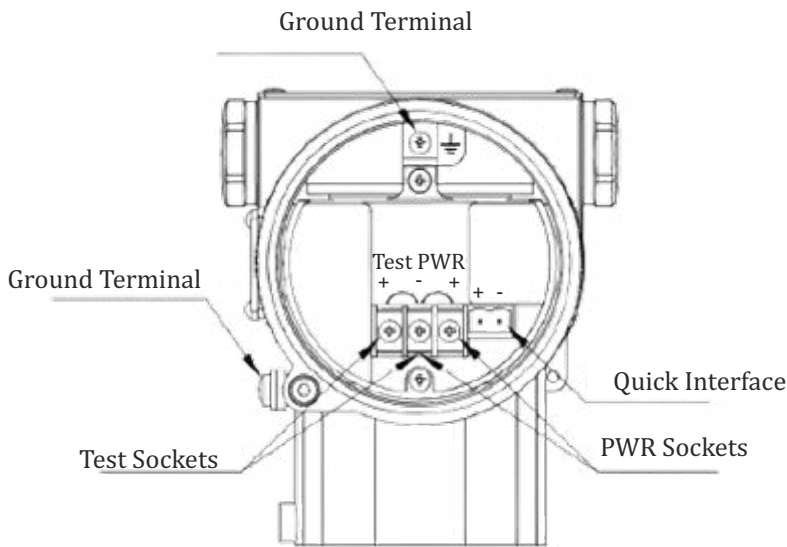
Horizontal Piping Connection (Front)



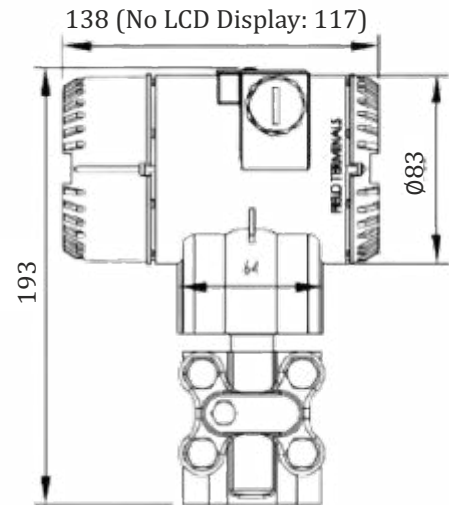
Wall Mounting Connection Type



Vertical Piping Connection Type



Terminal Configuration



Vertical Mounting Flange (Code V)

4. Process Connection Description

| Process Connections | |
|---|---|
| <p>Oval-shaped flange with 1/4-18 NPT female thread (code1)</p> | <ol style="list-style-type: none"> 1 Flange 2 O Ring 3 Oval-shaped Flange 4 Bolt |
| <p>D-shaped connector with M20x1.5 male thread</p> | <ol style="list-style-type: none"> 1 Flange 2 D- shaped connector 3 Bolt 4 O ring 5 M20x1.5 Nut 6 Joinig Pipe |

5. Model Selection Table

| RP1001 Differential Pressure Transmitter | |
|---|---|
| Code | 1 2 3 4 5 6 7 8 9 10 11 12 ... 18 |
| Accuracy | |
| ±0.035% of span | A |
| ±0.06% of span | B |
| ±0.1% of span | C |
| Sensor Type | |
| Piezo-resistive Silicon Sensor | 1 |
| Output | |
| 4-20mA with HART7 | B |
| Profibus-PA | C |
| Foundation Fieldbus | D |
| Static Pressure Sensor | |
| None | 0 |
| 40 MPa (suitable for 0.05% & span A) | 1 |
| Span | |
| 0-100Pa ~ 1kPa (0-10 ~ 100mmH ₂ O/ (0-1 ~ 10mbar) Accuracy 0.1% | A |
| 0-200Pa ~ 6kPa (0-20 ~ 600mmH ₂ O/ (0-2 ~ 60mbar) | B |
| 0-400Pa~40kPa (0-40~4000mmH ₂ O/ (0-20~400mbar) | C |
| 0-2.5kPa~250kPa (0-0.25~25mmH ₂ O/ (0-25~2500mbar) | D |
| 0-30kPa~3Mpa (0-3~300 mH ₂ O/ (0-0.3~30bar) | F |
| 0-40kPa~4Mpa (0-4~400 mH ₂ O/ (0-0.4~40bar) | G |
| Diaphragm & Filling Fluid | |
| 316L Stainless Steel | S |
| Hastelloy C | H |
| Gold plated on SS316L | G |
| FEP plated on SS316L | F |
| Tantalum | T |
| Filling Fluid | |
| Silicone oil | S |
| Fluorine oil/Inert Oil | F |
| Mounting Bracket | |
| N | None |
| 1 | SS304/ SS316 stainless steel |
| 2 | Carbon steel galvanized |
| Special Function | |
| N | None |
| F | Square root output |
| O | Degrease cleansing treatment (Oxygen measurement must be with fluorinated oil filled capsule, Viton (FKM) gasket, <6MPa ,<60°C) |
| P | Anti-lightning Function |
| Gaskets (Sealing Material) | |
| N | Perbunan (NBR) |
| F | Viton (FKM) |
| P | Teflon (PTFE) |
| Process Connections | |
| N | 7/16-20 UNF and 1/4-18 NPT female thread, No relief valve |
| B | 7/16-20 UNF and 1/4-18 NPT female thread, Relief valves at end of flanges |
| U | 7/16-20 UNF and 1/4-18 NPT female thread, Relief valves at the upper part of the flange side |
| D | 7/16-20 UNF and 1/4-18 NPT female thread, Relief valve at the lower part of the flange side |
| V | Vertical mounting flange, 7/16-20 UNF and 1/4-18 NPT female thread, Relief valves at the upper part of the flange side |
| L | Level |
| R | Remote Seal |
| Working Pressure | |
| 0 | 0.2MPa (only for Span-A) |
| 7 | 7MPa (only for Span-A & static pressure sensor 7MPa) |
| 1 | 16MPa |
| 2 | 25MPa |
| 3 | 40MPa |

High performance Smart Differential Pressure Transmitter RP1001

| RP1001 | Differential Pressure Transmitter | | | | | | | |
|--------|-----------------------------------|-----|----|----|----|----|----|----|
| Code | 1 | ... | 13 | 14 | 15 | 16 | 17 | 18 |

| Process Connector Accessory | |
|---|---|
| None | N |
| Stainless steel oval-shaped flange with 1/2 NPT female thread | 1 |
| Stainless steel D-shaped connector with M20x1.5 male thread | 2 |

| Integral Indicator | |
|---------------------|---|
| LCD Backlit Display | 2 |
| OLED Display | 3 |

| Explosion-Proof Option | |
|---|----|
| None | N |
| Intrinsic Safety (Exia) | I1 |
| Intrinsic Safety (Exia)- ATEX/ IECEx | I2 |
| Isolated Explosion/ Flameproof(Exd) | D1 |
| Isolated Explosion/ Flameproof(Exd)-ATEX/ IECEx | D2 |
| Intrinsically Safe & Flameproof- ATEX/ IECEx | E1 |

| Additional Options | |
|--------------------|--|
| N | None |
| A | Exd Cable Entry (Ex-Proof Cable Gland) |
| D | Double Compression Gland |
| E | Hanging Stainless Steel Tag Plate |

| Enclosure Material | |
|--------------------|---------------------|
| A1 | Die Cast Aluminum |
| S2 | Stainless Steel 316 |

| Electrical Connection | |
|-----------------------|----------|
| M | M20*1.5 |
| N | 1/2" NPT |

Example: RP1001-A1B0CSS1NNN1N2E1MA1A

RP1001 – Differential Pressure Transmitter

A - Reference Accuracy 0.035%

1 – Piezoresistive Silicon Sensor

B – 4-20 mA DC HART7 Output

0 – Static Pressure Sensor None

C – Span 0 – 400 mbar

S – SS316L Diaphragm Material

S – Filling Fluid Silicon Oil

1 – Working Pressure 16 MPa

N – 7/16-20 UNF and 1/4-18 NPT female threads, No relief valve

N – Gasket NBR (Perbunan)

N – Special Function None

1 – SS304 Mounting Bracket

N – Process Connector Accessory None

2 – Backlit LCD Display (-20 deg C)

E1 – Intrinsically safe and flameproof enclosure with ATEX Certificate

M - M20*1.5 Electrical Connection

A1 – Die Cast Aluminium Housing

A – Exd cable entry (Explosion proof cable glands)

6. Electromagnetic Compatibility (EMC)

| No. | Test Items | Basic Standard | Test Conditions | Performance Level |
|-----|---|-----------------------------|---|-------------------|
| 1 | Radiated Interference (Housing) | IEC61000-4-20, EN61326-1 | 30MHz ~ 1000MHz | Qualified |
| 2 | Conducted Interference (DC power port) | CISPR:11:2009+A1, EN61326-1 | 0.15MHz ~ 30MHz | Qualified |
| 3 | Electrostatic Discharge (ESD) Immunity | IEC61000-4-2, EN61326-1 | 4kV(Line), 8kV(Air) | B |
| 4 | RF Electromagnetic Field Immunity | IEC61000-4-3, EN61326-1 | 10V/m (80MHz ~ 1GHz) | A |
| 5 | Frequency Magnetic Field Immunity | IEC61000-4-8, EN61326-1 | 30A/m | A |
| 6 | Electrical Fast Transient Burst Immunity | IEC61000-4-4, EN61326-1 | 2kV (5/50ns, 5kHz) | B |
| 7 | Surge Immunity | IEC61000-4-5, EN61326-1 | 500V (line to line 1kV (line to ground, 1.2us/50us) | B |
| 8 | Conducted Interference Immunity induced by RF field | IEC61000-4-20, EN61326-1 | 3V (150KHz ~ 80MHz) | A |

Note:

A: No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer (or what the user may reasonably expect) when the equipment is used as intended.

B: No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer (or what the user may reasonably expect) when the equipment is used as intended.

7. Pressure Conversion Table

| | psi | atms | "H ₂ O | mm H ₂ O | cm H ₂ O | oz/in ² | Kg/cm ² | "Hg | mmHg (Torr) | cmHg | mbar | bar | Pa (N/m ²) | kPa | MPa |
|---------------------|----------|----------|-------------------|---------------------|---------------------|--------------------|--------------------|----------|-------------|---------|--------|----------|------------------------|--------|----------|
| psi | 1 | 0.0681 | 27.71 | 703.8 | 70.38 | 16 | 0.0704 | 2.036 | 51.715 | 5.17 | 68.95 | 0.0689 | 6,895 | 6.895 | 0.0069 |
| atms | 14.7 | 1 | 407.2 | 10,343 | 1,034.3 | 235.1 | 1.033 | 29.92 | 760 | 76 | 1013 | 1.013 | 101,325 | 101.3 | 0.1013 |
| "H ₂ O | 0.0361 | 0.00246 | 1 | 25.4 | 2.54 | 0.5775 | 0.00254 | 0.0735 | 1.866 | 0.187 | 2.488 | 0.00249 | 248.8 | 0.249 | 0.00025 |
| mm H ₂ O | 0.001421 | 0.000097 | 0.0394 | 1 | 0.1 | 0.0227 | 0.0001 | 0.00289 | 0.0735 | 0.00735 | 0.098 | 0.000098 | 9.8 | 0.0098 | 0.00001 |
| cm H ₂ O | 0.01421 | 0.000967 | 0.3937 | 10 | 1 | 0.227 | 0.001 | 0.0289 | 0.735 | 0.0735 | 0.98 | 0.00098 | 98 | 0.098 | 0.0001 |
| oz/in ² | 0.0625 | 0.00425 | 1.732 | 43.986 | 4.40 | 1 | 0.0044 | 0.1273 | 3.232 | 0.3232 | 4.31 | 0.00431 | 431 | 0.431 | 0.00043 |
| Kg/cm ² | 14.22 | 0.968 | 394.1 | 100,010 | 1,001 | 227.6 | 1 | 28.96 | 735.6 | 73.56 | 980.7 | 0.981 | 98,067 | 98.07 | 0.0981 |
| "Hg | 0.4912 | 0.03342 | 13.61 | 345.7 | 34.57 | 7.858 | 0.0345 | 1 | 25.4 | 2.54 | 33.86 | 0.0339 | 3,386 | 3.386 | 0.00339 |
| mmHg | 0.01934 | 0.001316 | 0.536 | 13.61 | 1.361 | 0.310 | 0.00136 | 0.0394 | 1 | 0.1 | 1.333 | 0.001333 | 133.3 | 0.1333 | 0.000133 |
| cmHg | 0.1934 | 0.01316 | 5.358 | 136.1 | 13.61 | 3.10 | 0.0136 | 0.394 | 10 | 1 | 13.33 | 0.01333 | 1,333 | 1.333 | 0.00133 |
| mbar | 0.0145 | 0.000987 | 0.4012 | 10.21 | 1.021 | 0.2321 | 0.00102 | 0.0295 | 0.75 | 0.075 | 1 | 0.001 | 100 | 0.1 | 0.0001 |
| bar | 14.504 | 0.987 | 401.9 | 10,210 | 1021 | 232.1 | 1.02 | 29.53 | 750 | 75 | 1,000 | 1 | 100,000 | 100 | 0.1 |
| Pa | 0.000145 | 0.00001 | 0.00402 | 0.102 | 0.0102 | 0.00232 | 0.00001 | 0.000295 | 0.0075 | 0.00075 | 0.01 | 0.00001 | 1 | 0.001 | 0.000001 |
| kPa | 0.14504 | 0.00987 | 4.019 | 102.07 | 10.207 | 2.321 | 0.0102 | 0.295 | 7.5 | 0.75 | 10 | 0.01 | 1,000 | 1 | 0.001 |
| MPa | 145.04 | 9.869 | 4019 | 102,074 | 10,207 | 2321 | 10.2 | 295.3 | 7500 | 750 | 10,000 | 10 | 1,000,000 | 1,000 | 1 |