# Cecomp® Intrinsically Safe Digital Pressure Gauges, with Min/Max Options — DPG2000B D4, M0, M1 Series

## Agency Approval
Factory Mutual Approved Intrinsically Safe for Hazardous Locations USA & Canada
IS Class I, Division 1, Groups A, B, C, D
T3C Ta = –40°C to 82°C; T4 Ta = –40°C to 66°C
CL I Zone 0 AEx/Ex ia IIC
T3 Ta = –40°C to 82°C; T4 Ta = –40°C to 66°C

## Ranges and Resolution
See table below. Select range and default engineering unit.
Units may be changed to any listed under the same sensor range.
Resolution is fixed and limited to available display digits.

## Display
3 readings per second nominal display update rate
4 digit LCD, 0.5" H and 5 character 0.25" H alphanumeric
**BL**: Red LED backlight. Default: Keypress activates backlighting for 1 minute if enabled and ambient light is insufficient.

## Accuracy
Accuracy includes linearity, hysteresis, repeatability
Standard accuracy: ±0.25% of full scale ±1 least significant digit
**HA** accuracy option: ±0.1% FS ±1 LSD
Sensor hysteresis: ±0.015% FS, included in accuracy
Sensor repeatability: ±0.01% FS, included in accuracy

## Auto Shutoff
5, 10 , 30 minutes, or on/off. User selectable 1 minute to 8 hrs

## Memory Options
Min/max can be user configured to be individually enabled or disabled, readings saved or cleared at power off
Std: Min/max enabled
**M0**: Min/max turned off in user setup
**M1**: Peak reading only gauge for tire pressure

## Calibration
Non-interactive zero, span, and linearity, ±10% of range Internal setup/calibration buttons, internal lockout switch.

## Controls and Functions
Front button turns gauge on or off, zeros gauge reference gauges, and cycles through min/max functions (if enabled)
Internal buttons for engineering unit selection, auto shutoff time, min/max setup, calibration
Internal lockout switch to disable setup and calibration

## Batteries
Two 1.5 V AAA Panasonic LR03 alkaline cells
**B**: Approx. 1000 hours
**BL**: Approx. 150 to 1000 hours depending on backlight usage
Low battery symbol on display when batteries need replacement

## Weight
9 ounces (approx.), shipping wt. 1 pound (approx.)

## Housing Materials and Circuit Board Protection
NEMA 2 epoxy powder coated aluminum case, rear cover, and bezel.
Front and rear rubber gaskets, polycarbonate label.
Stainless steel stiffener plate to reinforce sensor area.
Conformal coating on circuit boards for moisture resistance.

## Connection and Material
1/4" NPT male fitting. All wetted parts are 316L stainless steel.

## Overpressure, Burst, Vacuum
2 X pressure range for 3 psi to 2000 psi sensors
5000 psig for ranges using 3000 psig sensor
7500 psig for ranges using 5000 psig sensor
Over-range display 112.5% FS: *I – – –* or *I –.–.–.–*
Under-range display (non-vacuum sensors): *–Err*
Vacuum service: 15 psia, ±15 psig, 15 psig, 30 psia, 100 psig, 100 psia, 200 psig sensors
Burst: 4 X sensor pressure rating or 10,000 psi, whichever is less

## Environmental Temperatures
Storage temperature: –40 to 203°F (–40 to 95°C)
Operating temperature: –4 to 185°F (–20 to 85°C)
Sensor compensated range: 32 to 158°F (0 to 70°C)

- *±0.25% Test Gauge Accuracy, ±0.1% Optional*
- *316L Stainless Steel Sensor*
- *All Metal Housing*


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**Quick Link cecomp.com/is**

| How to Specify | Display | Memory |
|---|---|---|
| **DPG2000B** *range* **-D4**-*time-options* | - | Min/max |
| **DPG2000BBL** *range* **-D4**-*time options* | backlit | Min/max |
| **DPG2000B** *range* **-D4-M0**-*time-options* | - | Min/max off |
| **DPG2000BBL** *range* **-D4-M0**-*time-options* | backlit | Min/max off |
| **DPG2000B** *range* **-D4-M1**-*time-options* | - | Peak read |
| **DPG2000BBL** *range* **-D4-M1**-*time-options* | backlit | Peak read |

**Range**—See table at left. Select a range code for default unit.

| | | |
|---|---|---|
| psi = PSI | mmHg = MMHG | MPa = MPA |
| inHg = INHG | torr = TORR | mbar = MBAR |
| inHg/PSIG = CPD | $mmH_2O$ = MMH2O | bar = BAR |
| $oz/in^2$ = ZIN | $kg/cm^2$ = KGCM | $cmH_2O$ = CMH2O |
| $inH_2O$ = INH2O | $g/cm^2$ = GCM | atm = ATM |
| $ftH_2O$ = FTH2O | kPa = KPA | |

G = gauge reference pressure
A = absolute reference; zero at full vacuum
VAC = gauge reference vacuum
CPD = compound; inHg vacuum, psi pressure

| **Time**—auto shutoff time (user configurable) | |
|---|---|
| **-5** | 5 minutes. Default if not specified. |
| **-10** | 10 minutes |
| **-30** | 30 minutes |
| **-ON** | No auto shutoff. On/off via front button. |

| **Options**—add to end of model number. Factory installed only. See cecomp.com/accessories for details. | |
|---|---|
| **-TP** | Top port, gauge port on top of case |
| **-HA** | High accuracy, ±0.1% FS ±1 LSD |
| **-PM** | Panel mount, 4.1" x 4.1" |
| **Calibration Cert. Option**—add to end of model number | |
| **-NC** | NIST traceability documentation, 5 points and date |

**TP**
Top gauge port. Used for aircraft hydraulics.

**Accessories**—order separately

**RB**
High visibility orange rubber boot protects gauge for portable applications.

**SCR14SS**
Filter screen fitting keeps debris out of gauge sensor. For food vacuum packaging applications. 303SS body, 100 micron 304SS screen.

**CON14SS**
Quick connector to install or remove gauge without tools. 304 stainless steel, urethane seal.

## Ranges and Engineering Units — Range codes are rounded off. CPD = inHg/PSIG, -15V = same units for vacuum & pressure

| 3 psig | Res | 15 psig vac | Res | 30 psia | Res | –15V100psig | Res | 300 psig | Res |
|---|---|---|---|---|---|---|---|---|---|
| 3PSIG | .001 | 100KPAVAC | .1 | 2KGCMA | .001 | 100PSIVAC | .1 | 300PSIG | .1 |
| 6INHGG | .001 | 0.1MPAVAC | .0001 | 2ATMA | .001 | 100PSICPD | .1 | 610INHGG | .1 |
| 85INH2OG | .1 | 1BARVAC | .001 | **30 psig** | **Res** | 200INHGVAC | .1 | 4800ZING | 1 |
| 50ZING | .01 | 1KGCMVAC | .001 | 30PSIG | .01 | 2770INH2OVAC | 1 | 700FTH2O | .1 |
| 210GCMG | .1 | 1ATMVAC | .001 | 60INHGG | .01 | 1600ZINVAC | 1 | 2000KPAG | 1 |
| 150MMHGG | .1 | **15 psig** | **Res** | 850INH2OG | 1 | 5200MMHGVAC | 1 | 2MPAG | .001 |
| 150TORRG | .1 | 15PSIG | .01 | 480ZING | .1 | 5200TORRVAC | 1 | 20BARG | .01 |
| 200MBARG | .1 | 30INHGG | .01 | 2100GCMG | 1 | 700KPAVAC | 1 | 20KGCMG | .01 |
| 200CMH2OG | .1 | 400INH2OG | .1 | 1600MMHGG | 1 | 0.7MPAVAC | .001 | 20ATMG | .01 |
| 2000MMH2OG | 1 | 240ZING | .1 | 1600TORRG | 1 | 7BARVAC | .01 | **500 psig** | **Res** |
| 7FTH2O | .001 | 1000GCMG | 1 | 2000MBARG | 1 | 7KGCMVAC | .01 | 500PSIG | .1 |
| 20KPAG | .01 | 760MMHGG | .1 | 2100CMH2OG | 1 | 7ATMVAC | .01 | 1020INHGG | 1 |
| **5 psig** | **Res** | 760TORRG | .1 | 70FTH2O | .01 | **100 psig** | **Res** | 1150FTH2O | 1 |
| 5PSIG | .001 | 1000MBARG | 1 | 200KPAG | .1 | 100PSIG | .1 | 3500KPAG | 1 |
| 10INHGG | .01 | 1000CMH2OG | 1 | 0.2MPAG | .0001 | 200INHGG | .1 | 3.5MPAG | .001 |
| 140INH2OG | .1 | 35FTH2O | .01 | 2BARG | .001 | 2770INH2OG | 1 | 35BARG | .01 |
| 80ZING | .1 | 100KPAG | .1 | 2KGCMG | .001 | 1600ZING | 1 | 35KGCMG | .01 |
| 350GCMG | .1 | 0.1MPAG | .0001 | 2ATMG | .001 | 7000GCMG | 1 | 35ATMG | .01 |
| 260MMHGG | .1 | 1BARG | .001 | **60 psig** | **Res** | 5200MMHGG | 1 | **1000 psig** | **Res** |
| 260TORRG | .1 | 1KGCMG | .001 | 60PSIG | .01 | 5200TORRG | 1 | 1000PSIG | 1 |
| 350MBARG | .1 | 1ATMG | .001 | 120INHGG | .1 | 7000MBARG | 1 | 2040INHGG | 1 |
| 350CMH2OG | .1 | **±15 psig** | **Res** | 1660INH2OG | 1 | 7000CMH2OG | 1 | 2300FTH2O | 1 |
| 3500MMH2OG | 1 | ±15PSIVAC | .01 | 960ZING | 1 | 230FTH2O | .1 | 7000KPAG | 1 |
| 12FTH2O | .01 | 15PSICPD | .01 | 4200GCMG | 1 | 700KPAG | .1 | 7MPAG | .001 |
| 35KPAG | .01 | ±30INHGVAC | .01 | 3100MMHGG | 1 | 0.7MPAG | .0001 | 70BARG | .01 |
| **15 psia** | **Res** | ±400INH2OVAC | 1 | 3100TORRG | 1 | 7BARG | .001 | 70KGCMG | .01 |
| 15PSIA | .01 | ±240ZINVAC | .1 | 4100MBARG | 1 | 7KGCMG | .001 | 70ATMG | .01 |
| 30INHGA | .01 | ±1000GCMVAC | 1 | 4200CMH2OG | 1 | 7ATMG | .001 | **2000 psig** | **Res** |
| 400INH2OA | .1 | ±760MMHGVAC | 1 | 140FTH2O | .1 | **–15V200 psig** | **Res** | 2000PSIG | 1 |
| 240ZINA | .1 | ±760TORRVAC | 1 | 400KPAG | .1 | 200PSIVAC | .1 | 4070INHGG | 1 |
| 1000GCMA | 1 | ±1000MBARVAC | 1 | 0.4MPAG | .0001 | 200PSICPD | .1 | 4600FTH2O | 1 |
| 760MMHGA | .1 | ±1000CMH2OVAC | 1 | 4BARG | .001 | 400INHGVAC | .1 | 14MPAG | .01 |
| 760TORRA | .1 | ±100KPAVAC | .1 | 4KGCMG | .001 | 5500INH2OVAC | 1 | 140BARG | .1 |
| 1000MBARA | 1 | ±0.1MPAVAC | .0001 | 4ATMG | .001 | 3200ZINVAC | 1 | 140KGCMG | .1 |
| 1000CMH2OA | 1 | ±1BARVAC | .001 | **100 psia** | **Res** | 1400KPAVAC | 1 | 140ATMG | .1 |
| 100KPAA | .1 | ±1KGCMVAC | .001 | 100PSIA | .1 | 1.4MPAVAC | .001 | **3000 psig** | **Res** |
| 0.1MPAA | .0001 | ±1ATMVAC | .001 | 200INHGA | .1 | 14BARVAC | .01 | 3000PSIG | 1 |
| 1BARA | .001 | **30 psia** | **Res** | 2770INH2OA | 1 | 14KGCMVAC | .01 | 6100INHGG | 1 |
| 1KGCMA | .001 | 30PSIA | .01 | 1600ZINA | 1 | 14ATMVAC | .01 | 6900FTH2O | 1 |
| 1ATMA | .001 | 60INHGA | .01 | 7000GCMA | 1 | **200 psig** | **Res** | 20MPAG | .01 |
| **15 psig vac** | **Res** | 850INH2OA | 1 | 5200MMHGA | 1 | 200PSIG | .1 | 200BARG | .1 |
| 15PSIVAC | .01 | 480ZINA | .1 | 5200TORRA | 1 | 400INHGG | .1 | 200KGCMG | .1 |
| 30INHGVAC | .01 | 2100GCMA | 1 | 7000MBARA | 1 | 5500INH2OG | 1 | 200ATMG | .1 |
| 400INH2OVAC | .1 | 1600MMHGA | 1 | 7000CMH2OA | 1 | 3200ZING | 1 | **5000 psig** | **Res** |
| 240ZINVAC | .1 | 1600TORRA | 1 | 700KPAA | .1 | 480FTH2O | .1 | 5000PSIG | 1 |
| 1000GCMVAC | 1 | 2000MBARA | 1 | 0.7MPAA | .0001 | 1400KPAG | 1 | 35MPAG | .01 |
| 760MMHGVAC | .1 | 2100CMH2OA | 1 | 7BARA | .001 | 1.4MPAG | .001 | 350BARG | .1 |
| 760TORRVAC | .1 | 200KPAA | .1 | 7KGCMA | .001 | 14BARG | .01 | 350KGCMG | .1 |
| 1000MBARVAC | 1 | 0.2MPAA | .0001 | 7ATMA | .001 | 14KGCMG | .01 | 340ATMG | .1 |
| 1000CMH2OVAC | 1 | 2BARA | .001 | | | 14ATMG | .01 | | |

## Precautions

### Approved Locations

The DPG2000B series is approved for use in the following Hazardous Locations.

IS Class I Div 1 Gp ABCD
T3C Ta = –40ºC to 82ºC; T4 Ta = –40ºC to 66ºC.

CL I Zone 0 AEx/Ex ia IIC
T3 Ta = –40ºC to 82ºC; T4 Ta = –40ºC to 66ºC

### Installation

- ✔ Read these instructions before installing the gauge. Configuration may be easier before the gauge is installed. Contact the factory for assistance.
- ✔ Installation instructions must be strictly followed in compliance with Intrinsic Safety National Standard NEC 504 or ANSI/ISA RP 12.6 and the National Electrical Code.
- ✔ Outdoor or wash down applications require a NEMA 4X gauge or installation in a NEMA 4X housing.
- ✔ Use fittings appropriate for the pressure range of the gauge.
- ✔ Due to the hardness of stainless steel, it is recommended that a thread sealant be used to ensure leak-free operation.
- ✔ For contaminated media use an appropriate screen or filter to keep debris out of gauge port.
- ✔ Avoid permanent sensor damage! NEVER insert objects into gauge port or blow out with compressed air.
- ✔ Remove system pressures before removing or installing gauge.
- ✔ Install or remove gauge using a wrench on the hex fitting only. Do not attempt to turn by forcing the housing.

### Operation

- ✔ Use within the pressure range indicated on gauge label.
- ✔ Avoid permanent sensor damage! Do not apply vacuum to gauges not designated for vacuum operation.
- ✔ Use only with media compatible with 316L stainless steel.

  Gauges are not for oxygen service. Accidental rupture of sensor diaphragm may cause silicone oil inside sensor to react with oxygen.
- ✔ The DPG2000B series gauges must only be operated in specified ambient temperature ranges.

### Maintenance

- ✔ The non-metallic cover of the pressure gauge is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
- ✔ Batteries must be replaced when the low battery indication comes on to prevent unreliable readings.
- ✔ WARNING: Replace batteries with approved type in non-hazardous locations only.
- ✔ Approved batteries are two Panasonic LR03 1.5 V AAA alkaline cells. Replace both batteries at the same time.
- ☒ WARNING: Substitution of batteries may impair intrinsic safety. Improper voltages will damage the gauge.
- ✔ WARNING: Substitution of components may impair intrinsic safety. Do not modify the gauge.
- ✔ These products do not contain user-serviceable parts except for batteries. Contact factory for repairs, service, or refurbishment.

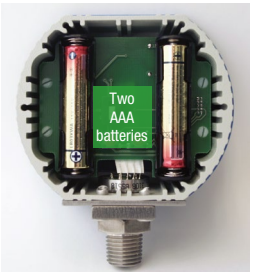
## Battery Replacement

A low battery indication (either LOBAT or a ⊘ symbol depending on the model) will be shown in the upper left-hand corner of the display when the battery voltage falls sufficiently. The batteries should be replaced when the indicator comes on or unreliable readings may result.

WARNING: Replace batteries with approved type in non-hazardous locations only. Replace batteries with two Panasonic LR03 1.5 V AAA alkaline cells.

Replace both batteries with new ones at the same time. Do not mix different types of batteries. Substitution of components may impair intrinsic safety.

1. Remove the 6 Phillips screws on the back of the unit.
2. Remove batteries by lifting up the positive end of the battery (opposite the spring) taking care not to bend the spring.
3. Discard old batteries properly, do not discard into fire, sources of extreme heat, or in any hazardous manner.
4. Install batteries with correct orientation. The negative (flat) end of each battery should be inserted first facing the battery holder spring.
5. Replace the back cover, including the rubber gasket.




DS-DPG2000B rev. 12-12

## Types of Gauges

Gauge reference sensors always read zero with an open gauge port. Ranges 1000 psi and higher use a 14.7 psi sealed reference sensor. They are functionally similar to gauge reference sensors.

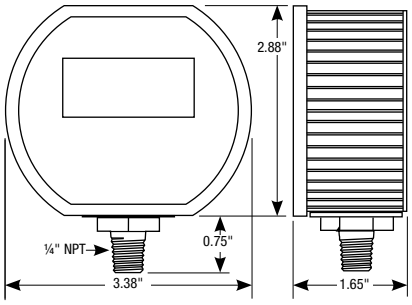
Bipolar sensors read positive pressure and vacuum in the same units, and zero with the gauge port open.

Compound ranges read inHg for vacuum and psig for pressure.

Absolute reference gauges read zero at full vacuum. With an open gauge port, their readings will vary due to continuously changing barometric pressure.

| psi | Compound | inHg | torr | mmHg | $inH_2O$ | $ftH_2O$ | $oz/in^2$ | $mmH_2O$ | $cmH_2O$ | $g/cm^2$ | $kg/cm^2$ | atm | mbar | bar | kPa | MPa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 to 14.70 psig vac | n/a | 29.92 vac | 760.0 vac | 760.0 vac | 406.8 vac | 33.90 vac | 235.1 vac | n/a | 1033 vac | 1033 vac | 1.033 vac | 1.000 vac | 1013 vac | 1.013 vac | 101.3 vac | .1013 vac |
| –14.70 to 15.00 psig | –29.92 inHg to 15.00 psi | –29.92 to 30.54 | –760.0 to 775.7 | –760.0 to 775.7 | –406.8 to 415.2 | –33.90 to 34.61 | –235.1 to 240.0 | n/a | –1033 to 1055 | –1033 to 1055 | –1.033 to 1.055 | –1.000 to 1.021 | –1013 to 1034 | –1.013 to 1.034 | –101.3 to 103.4 | –.1013 to .1034 |
| –14.7 to 100.0 psig | –29.9 inHg to 100.0 psi | –29.9 to 203.6 | –760 to 5171 | –760 to 5171 | –407 to 2768 | –33.9 to 230.7 | –235 to 1600 | n/a | –1033 to 7031 | –1033 to 7031 | –1.033 to 7.031 | –1.000 to 6.805 | –1013 to 6895 | –1.013 to 6.895 | –101.3 to 689.5 | –.1013 to .6895 |
| –14.7 to 200.0 psig | –29.9 inHg to 200.0 psi | –29.9 to 407.2 | n/a | n/a | –407 to 5536 | –33.9 to 461.4 | –235 to 3200 | n/a | n/a | n/a | –1.03 to 14.06 | –1.00 to 13.61 | n/a | –1.01 to 13.79 | –101 to 1379 | –.101 to 1.379 |
| 0 to 3.000 psig | n/a | 6.108 | 155.1 | 155.1 | 83.0 | 6.921 | 48.00 | 2109 | 210.9 | 210.9 | .2109 | .2041 | 206.8 | .2068 | 20.68 | n/a |
| 0 to 5.000 psig | n/a | 10.18 | 258.6 | 258.6 | 138.4 | 11.54 | 80.0 | 3515 | 351.5 | 351.5 | .3515 | .3402 | 344.7 | .3447 | 34.47 | n/a |
| 0 to 15.00 psig | n/a | 30.54 | 775.7 | 775.7 | 415.2 | 34.61 | 240.0 | n/a | 1055 | 1055 | 1.055 | 1.021 | 1034 | 1.034 | 103.4 | .1034 |
| 0 to 30.00 psig | n/a | 61.08 | 1552 | 1552 | 830 | 69.21 | 480.0 | n/a | 2109 | 2109 | 2.109 | 2.041 | 2068 | 2.068 | 206.8 | .2068 |
| 0 to 60.00 psig | n/a | 122.2 | 3103 | 3103 | 1661 | 138.4 | 960 | n/a | 4218 | 4218 | 4.218 | 4.083 | 4137 | 4.137 | 413.7 | .4137 |
| 0 to 100.0 psig | n/a | 203.6 | 5171 | 5171 | 2768 | 230.7 | 1600 | n/a | 7031 | 7031 | 7.031 | 6.805 | 6895 | 6.895 | 689.5 | .6895 |
| 0 to 200.0 psig | n/a | 407.2 | n/a | n/a | 5536 | 461.3 | 3200 | n/a | n/a | n/a | 14.06 | 13.61 | n/a | 13.79 | 1379 | 1.379 |
| 0 to 300.0 psig | n/a | 610.8 | n/a | n/a | n/a | 692.0 | 4800 | n/a | n/a | n/a | 21.09 | 20.41 | n/a | 20.68 | 2068 | 2.068 |
| 0 to 500.0 psig | n/a | 1018 | n/a | n/a | n/a | 1153 | n/a | n/a | n/a | n/a | 35.15 | 34.02 | n/a | 34.47 | 3447 | 3.447 |
| 0 to 1000 psig | n/a | 2036 | n/a | n/a | n/a | 2307 | n/a | n/a | n/a | n/a | 70.31 | 68.05 | n/a | 68.95 | 6895 | 6.895 |
| 0 to 2000 psig | n/a | 4072 | n/a | n/a | n/a | 4614 | n/a | n/a | n/a | n/a | 140.6 | 136.1 | n/a | 137.9 | n/a | 13.79 |
| 0 to 3000 psig | n/a | 6108 | n/a | n/a | n/a | 6921 | n/a | n/a | n/a | n/a | 210.9 | 204.1 | n/a | 206.8 | n/a | 20.68 |
| 0 to 5000 psig | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 351.5 | 340.2 | n/a | 344.7 | n/a | 34.47 |
| 15.00 to 0 psi abs | n/a | 30.54 abs | 775.7 abs | 775.7 abs | 415.1 abs | 34.61 abs | 240.0 abs | n/a | 1055 abs | 1055 abs | 1.055 abs | 1.021 abs | 1034 abs | 1.034 abs | 103.4 abs | .1034 abs |
| 30.00 to 0 psi abs | n/a | 61.08 abs | 1552 abs | 1552 abs | 830 abs | 69.21 abs | 480.0 abs | n/a | 2109 abs | 2109 abs | 2.109 abs | 2.041 abs | 2068 abs | 2.068 abs | 206.8 abs | .2068 abs |
| 100.0 to 0 psi abs | n/a | 203.6 abs | 5172 abs | 5172 abs | 2767 abs | 230.7 abs | 1600 abs | n/a | 7031 abs | 7031 abs | 7.031 abs | 6.805 abs | 6895 abs | 6.895 abs | 689.5 abs | .6895 abs |

## Dimensions




Cecomp maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. See cecomp.com for latest product information. Consult factory for your specific requirements.

## Power Up

Press and hold the front button for approximately 1 second.

The display is tested, the full-scale range is indicated, the display test is briefly shown again, then the actual pressure and units are displayed. The gauge is ready for use.

## Power Up with Zero

This applies to gauge reference models only. Absolute reference gauges do not use the zero feature since they read atmospheric pressure under normal conditions.

Be sure the gauge port is exposed to normal atmospheric pressure. The zeroing function is only stored at power-up and the zero correction is erased when the gauge is shut off.

Press and hold the front button until ▫▫▫▫ is displayed.

Release the button. The gauge in now zeroed. The full-scale range is indicated and the display test is briefly shown again, then the actual pressure and units are displayed. The gauge is ready for use.

Attempting to zero the gauge with pressure greater than about 3% of full-scale pressure or vacuum applied will result in an error condition, and the display will alternately indicate Err 0 and the actual pressure. The gauge must be powered down to reset the error condition.

### Normal Operation

Following the start-up initialization, the display indicates the pressure reading updated approximately 3 times per second. The auto shutoff timer starts when the gauge is powered up or whenever the button is pushed, unless the gauge shutoff time was set to zero for on/off operation.

If excessive vacuum is applied to a pressure-only gauge, the display will indicate *-Err* until the vacuum is released.

Applying vacuum to a gauge designed for pressure may damage the pressure sensor. If excessive pressure is applied (112.5% over range), an out-of-range indication of *I – – –* or *I.–.–.–* will be displayed depending on model.

### Shut-Down

To shut off the gauge manually at any time, press and hold the button until the display indicates *OFF* (about 5 seconds) and then release.

When an auto shutoff timer is used, the display indicates *OFF* five seconds prior to auto shutoff. Press the button to keep the gauge on. The auto shutoff and backlight (if equipped) timers are reset whenever the button is pressed.

If the gauge is set up without auto shutoff (on/off operation) it will stay on until manually shut off or until the batteries are depleted. Turn gauge off when not in use to conserve battery life.

### Display Backlighting (BL Option Only)

Display backlighting will operate for one minute when the button is pressed provided the front light sensor detects low ambient light levels.

Backlighting may not be apparent under some lighting conditions. Backlighting may also be configured to be on at all times (which will shorten battery life), or be turned off at all times.

### M0 Versions

M0 models are configured with minimum and maximum functions disabled. One or both can be enabled or disabled in the User Configuration mode.

### Minimum/Maximum Memory

If enabled, minimum and maximum readings are stored continuously whenever the gauge is on. The stored readings can be manually cleared if desired. The MIN and MAX memory can be configured to save or clear the reading whenever the gauge is off.

Press and hold the button for about 1 second until *MAX* is displayed alternating with the units. The maximum reading will be continuously updated. The gauge may be left in this mode.

After *MAX* is displayed, press and hold the button for about 1 second until *MIN* is displayed alternating with the units. The minimum reading will be continuously updated. The gauge may be left in this mode. If excessive vacuum is applied to a pressure-only gauge while in this mode, the display will indicate *-Err* until the MAX/MIN readings are cleared.

After *MIN* is displayed, press and hold the button again for about 1 second until * * * * * is displayed. The MAX and MIN memory is not erased and the gauge returns to normal operation with the display indicating the current reading.

Press and continue to hold the button until the display indicates *clr MX/MN* (about 3 seconds total) and then release the button. Both maximum and minimum values are cleared and the gauge returns to the normal operating mode.

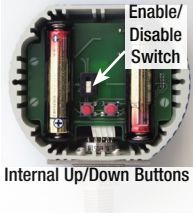
### M1 Versions: Peak Reading

M1 models are peak reading gauges that only display and capture maximum readings. The maximum reading will be continuously updated. The MAX memory can be configured to save or clear the reading whenever the gauge is off.

### User Configuration

Configuration must only be done in a non-hazardous area.

Configuration is done via an internal switch and buttons to help prevent accidental or unauthorized changes.



Internal Up/Down Buttons

Remove the 6 Phillips screws on the back of the unit.

Remove the rear cover.

Move the switch on the circuit board to the ENABLE position.

Locate the UP and DOWN buttons on the circuit board.

### Units Selection

The selected engineering unit is stored in non-volatile memory and will be retained even with the gauge off or batteries removed. The available engineering units depend on the sensor range and display resolution.

Compound (inHg/PSIG) gauges must be changed to display single-unit vacuum/pressure readings in the Advanced Configuration mode before different engineering units can be selected.

The default engineering units are mathematically converted to the newly selected engineering unit. When the gauge is powered up, the originally configured range is displayed and then the conversion with the selected engineering unit is displayed.

With the gauge powered up, press and hold the UP button. Release the button when the engineering units begin to flash.

Use the UP and DOWN buttons to scroll through the list of engineering units available for the pressure range of the sensor.

When the desired units are displayed, press and release the front button to save the selection and return to normal operation.

Note: The gauge will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

If done, replace the rear cover, or proceed to the next step.

### Auto Shutoff Time Selection

The selected shut off time is stored in non-volatile memory and will be retained even with the battery off or batteries removed.

With the gauge powered up, press and hold the DOWN button. Release the button when the auto shutoff time is displayed on the upper section.

The lower display will indicate *AST M* if the time displayed is in minutes, and *AST H* if it in hours.

An auto shutoff time of 0 signifies that the auto shutoff feature is disabled and the front button turns the gauge on and off.

Use the UP and DOWN buttons to select 0, 1, 2, 5, 10, 15, 20 or 30 minutes, or 1, 2, 4, or 8 hours.

When the desired time is displayed, press and release the front button to save the selection and return to normal operation.

Note: The gauge will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

Move the switch on the circuit board to the DISABLE position and replace the rear cover including the rubber gasket.

### Advanced User Configuration

This allows more features to be configured.

Configuration must only be done in a non-hazardous area.

Configuration is done via an internal switch and buttons to help prevent accidental or unauthorized changes.

Remove the 6 Phillips screws on the back of the unit and remove the rear cover.

Move the switch on the circuit board to the ENABLE position.

Locate the UP and DOWN buttons on the circuit board.

### User Configuration Access

With the gauge off, press and hold the UP button. Then press the front button. Release all buttons when the display indicates *CFG* and the program version. Then the full-scale range is indicated and the display is tested.

The display then indicates _ _ _ _ with the first underscore blinking, with *CFGPC* (configuration passcode) on the lower display.

Note: The gauge will automatically revert to normal operation if no buttons are pressed for approximately 15 seconds. To cancel and return to normal operation, press and release the front button without entering any passcode characters.

### User Configuration Passcode Entry

The factory default is 3510, but this may be changed by the user under the Passcode Configuration section. If an incorrect passcode is entered, the gauge will return to the start of the passcode entry sequence.

1. Use the UP or DOWN buttons to set the first digit to 3.
2. Press and release the front button to move to the next position. The 3 will remain, and the second position will be blinking.
3. Use the UP or DOWN buttons to select 5.
4. Press and release the front button to index to the next position. 35 will remain, and the third position will be blinking.
5. Use the UP or DOWN buttons to select 1.
6. Press and release the front button to index to the next position. 351 will remain, and the fourth position will be blinking.
7. Use the UP or DOWN buttons to select 0.
8. Press and release the front center button to proceed.

### Factory/User Configuration

This gives the choice of resetting the gauge features to the factory settings or continuing with user configuration.

The upper display section will be blank, and the lower section will display either *USER_* or *FCTRY*.

If *FCTRY* is selected, the existing user configuration will be replaced by the original factory configuration.

To select *FCTRY*, press and release the UP button.

With *FCTRY* displayed press and release the front button to restore the factory configuration and restart the gauge.

If *USER_* is selected, the user configuration can be modified as described in the following steps.

To select *USER_*, press and release the DOWN button.

With *USER_* displayed press and release the front center button to continue.

The configuration parameters vary depending on the model. Go to the appropriate section for your gauge.

### D4-M1 Peak Reading Gauge

You can select whether to retain maximum captured values at power off.

The upper display section will indicate *c l r*.

Use the UP and DOWN buttons to select from the following:

*AUTO* Automatically clear the maximum stored value when the gauge is powered off

*MAN* Save the maximum stored value when the gauge is powered off. It must be cleared manually.

Press and release the front button to move to the next parameter.

### D4 and D4-M0 Max/Min Configuration

Use the UP and DOWN buttons to select from the following:

*MX/MN* Both highest and lowest values will be captured

*MX/--* Only highest value will be captured

*--/MN* Only lowest value will be captured

*--/--* Capture feature is disabled (default with M0 version)

Press and release the front button to move to the next parameter.

### D4 and D4-M0 Max/Min Memory

The upper display section will indicate *c l r*.

Use the UP and DOWN buttons to select from the following:

*AUTO* Automatically clear max. and min. values when the gauge is powered off

*MAN* Manually clear max. and min. values

Press and release the front button to move to the next parameter.

### Gauge Type Configuration (all versions)

This will only appear with 15, 100, or 200 psig ranges that were originally ordered as compound gauges.

Use the UP and DOWN buttons to select from the following:

*-/+EU* Vacuum is indicated as negative pressure in the selected engineering units

*CMPND* Vacuum is negative INHG, pressure is PSIG. This setting will disable engineering unit selection.

### Backlight Time Selection (BL Option Only)

The upper display will indicate *bL* to indicate backlight setup.

Use the and UP and DOWN buttons to select from the following:

*AUTO* Display backlight enabled for 1 minute with any keypress

*ON* Display backlight on whenever the gauge is on

*OFF* Display backlight is disabled

### Completing Configuration (all versions)

Press and release the front button to save the user configuration and restart the gauge.

This completes the configuration for this model.

Move the switch on the circuit board to the DISABLE position and replace the rear cover including the rubber gasket.

Replace the rear cover taking care not to pinch the power wires between the cover and the case. Your gauge is ready for use with your new configuration.

### Calibration Preparation

Calibration must only be done in a non-hazardous area. See Installation and Precautions.

Gauges are factory calibrated at approximately 23°C using NIST traceable calibration equipment. Calibration is not required before using the gauge. Calibration intervals depend on your quality standards, but annual re-calibration is customary. Calibration should only be performed by qualified individuals using appropriate calibration standards and procedures.

The calibration equipment should be at least four times more accurate than the gauge being calibrated.

The calibration system must be able to generate and measure pressure and/or vacuum over the full range of the gauge.

A vacuum pump able to produce a vacuum of 100 microns (0.1 torr or 100 millitorr) or lower is required for vacuum and absolute gauges.

Warning: Never apply vacuum to gauge not designated for vacuum service. Permanent sensor damage may result.

It is good practice to install fresh batteries before calibration.

Allow the gauge to equalize to normal room temperature (about 20 minutes minimum) before calibration.

### Calibration

Internal Up/Down Buttons

See Calibration Preparation section. See rear label of gauge for model identification and range.

Remove the 6 Phillips screws on the back of the unit and remove the rear cover.

Move the switch on the circuit board to the ENABLE position.

Locate the internal UP and DOWN buttons on the circuit board.

### Entering Calibration Mode

With the gauge off, press and hold the DOWN button, then press the front button.

Release all buttons when the display indicates *CAL*.

The display begins by indicating the full-scale positive pressure rating of the gauge in the engineering units as configured by the factory, and then shows all display segments.

Before the gauge enters the calibration mode, the display initially indicates _ _ _ _ with the first underscore blinking, with *CALPC* (calibration passcode) on the lower display.

Note: The gauge will automatically revert to normal operation if no buttons are operated for approximately 15 seconds. To cancel and return to normal operation, press and release the front without entering any passcode characters.

Enter the passcode as described in the User Configuration Passcode Entry section. The default is 3510, but this is user changeable.

### Calibration Mode

The gauge remains in the calibration mode until restarted manually or power is removed. Features not related to calibration are disabled.

The calibration controls are non-interactive. It is possible to perform a zero calibration only and then save to exit the calibration mode.

The calibration may be performed in any of the available engineering units as well as percent (PCT). Compound range models are set for the same engineering units for pressure and for vacuum.

For greatest calibration accuracy, use the UP and DOWN buttons to select engineering units with highest number of display counts.

Press and release the front button when the desired engineering units are displayed.

### Calibration—continued

| Sensor | Suggested units for calibration |
|---|---|
| 3 PSI | 3.000 PSI |
| 5 PSI | 5.000 PSI |
| 15 PSI | 775.7 MMHG (TORR) |
| 30 PSI | 69.20 FTH2O |
| 60 PSI | 60.00 PSI |
| 100 PSI | 7.031 KG/CM2 |
| 200 PSI | 407.2 INHG |
| 300 PSI | 610.8 INHG |
| 500 PSI | 500.0 PSI |
| 1000 PSI | 70.31 KG/CM2 |
| 3000 PSI | 6108 INHG |
| 5000 PSI | 5000 PSI |
| Any | 100.00 PCT (percent) |

The display will then indicate the currently applied pressure in the engineering units selected for calibration.

### UP and DOWN Button Operation

Each time one of the UP or DOWN buttons is pressed and released quickly, a small change is made to the digitized pressure signal. It may take more than one of these small changes to result in a single digit change on the display.

To make larger changes, press and hold the appropriate UP or DOWN button. After about one second, the display will begin to change continuously. Release the button to stop. Then make fine adjustments by pressing and quickly releasing the appropriate button.

### Gauge Reference Pressure Gauges

Apply zero pressure by venting the gauge port to atmosphere. The character display will alternate between *ZERO* and *CAL*.

Press the UP and DOWN buttons to obtain a zero indication on the gauge display.

Apply full-scale pressure. The character display will alternate between *+SPAN* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the full-scale pressure reading on the calibrator.

Apply 50% full-scale pressure. The character display will alternate between *+MID* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the 50% of full-scale pressure on the calibrator.

### Gauge Reference Vacuum Gauges

Apply zero pressure by venting the gauge port to atmosphere. The character display will alternate between *ZERO* and *CAL*.

Press the UP and DOWN buttons to obtain a zero indication on the gauge display.

Apply full-scale vacuum. The character display will alternate between *+SPAN* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the full-scale vacuum indication on the calibrator.

Apply 50% full-scale vacuum. The character display will alternate between *+MID* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the 50% of full-scale vacuum indication on the calibrator.

### Absolute Reference Gauges

Apply full vacuum. The character display will alternate between *ZERO* and *CAL*.

Press the UP and DOWN buttons until the display indicates zero.

Apply full-scale pressure. The character display will alternate between *+SPAN* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the full-scale pressure reading on the calibrator.

Apply 50% of full-scale pressure. The lower display will alternate between *+MID* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the 50% of full-scale reading on the calibrator.

### Compound and Bipolar Gauges

In addition to the steps described above for pressure gauges, apply full-scale vacuum. The character display will alternate between *-SPAN* and *CAL*.

### Calibration—continued

Press the UP and DOWN buttons to match the gauge display to the full-scale vacuum reading on the calibrator.

For bipolar (±) and –30.00inHg/+15.00psig compound range models only, apply 50% full-scale vacuum. The character display will alternate between *-MID* and *CAL*.

Press the UP and DOWN buttons to match the gauge display to the 50% of full-scale vacuum on the calibrator.

### Save Calibration

Once the adjustments are complete, press and hold the front button until the display indicates - - - - then release the button to store the calibration parameters in non-volatile memory and restart the gauge.

Verify the pressure indications at 0%, 25%, 50%, 75% and 100% of full scale.

Move the switch on the circuit board to the DISABLE position.

Replace the back cover, including the rubber gasket.

### User Passcode

User-defined passcode configuration allows changing of the factory 3510 passcode to new value for configuration and calibration.

Configuration must only be done in a non-hazardous area.

Remove the rear 6 Phillips screws and remove the rear cover.

Move the switch on the circuit board to the ENABLE position.

Located the internal UP and DOWN buttons on the circuit board.

### View Or Change User Configuration Passcode

With the unit off, press and hold the UP button, then press the front button. Release all buttons when the display indicates *CFG*.

### View Or Change User Calibration Passcode

With the unit off, press and hold the DOWN button, then press the front button. Release all buttons when *CAL* is shown.

### Enter Access Code 1220

Before the unit enters the view or change passcode mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with *CFGPC* or *CALPC* on the lower display.

Note: The gauge will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

To cancel and return to normal operation, press and release the front button without entering any passcode characters.

Use the UP, DOWN, and front buttons to enter the 1220 passcode.

Press and release the front button to proceed.

Note: If an incorrect access code was entered, the gauge will return to the start of the access code entry sequence.

Once the access code has been entered correctly, the display will indicate the existing user-defined passcode with either *CFGPC* or *CALPC* on the character display.

1. Press the UP or DOWN button to select the first character of the new passcode.
2. When the desired first character is displayed, press and release the front button to move to the next character.
3. Repeat above until the entire passcode is complete.
4. To exit, press and hold the front button. Release the button when the display indicates - - - - to restart the gauge.
5. Move the switch on the circuit board to the DISABLE position.
6. Replace the back cover, including the rubber gasket.