## Cemop Intrinsically Safe Digital Pressure Gauges

### Controls & Functions
Front button gauge 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.
Keypad activates backlighting for 1 min. if low light detected.

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

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

### Housing Materials and Circuit Board Protection
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.

### Overpressure, Burst, Vacuum
2x Pressure range for 3 psi to 2000 psi sensors
5000 psi for ranges using 3000 psi sensor
7500 psi for ranges using 5000 psi sensor

### Vacuum
Service: 15 psi, 15 psig, 30 psi, 100 psig, 100 psig, 200 psig
Burst: 4x sensor pressure rating or 10,000 psi, whichever is less

### Environmental
Storage temperature: -40 to 232°F (-40 to 95°C)
Operational temperature: -4 to 182°F (-20 to 85°C)
Compensated temperature: 32 to 158°F (0 to 70°C)

### Memory Options
Min/max can be user configured to be individually enabled or disabled, saved or cleared at power off.

### Sensor Ranges and Engineering Units

<table>
<thead>
<tr>
<th>Sensor Ranges and Engineering Units</th>
<th>†</th>
<th>-HA option not available</th>
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<tbody>
<tr>
<td>3PSIG</td>
<td>0.001</td>
<td>0.1MPAVAC</td>
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<tr>
<td>6NHGG</td>
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<td>0.1MPAVAC</td>
</tr>
<tr>
<td>85NH2OG</td>
<td>0.1BARVAC</td>
<td>0.001</td>
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<td>50ZING</td>
<td>0.001</td>
<td>1KGCVMAC</td>
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<td>0.1NHG MAC</td>
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<tr>
<td>1500MNHG</td>
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<tr>
<td>1500NH2OG</td>
<td>0.15 psig</td>
<td>2500MNH2OG</td>
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<tr>
<td>2000NH2RG</td>
<td>0.15 psig</td>
<td>16000NH2RG</td>
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<tr>
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<tr>
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<td>0.1NHG MAC</td>
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</tr>
<tr>
<td>240ZINA</td>
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<td>0.1MPAVAC</td>
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### How to Specify

#### DPG2000B
range - **D4** - options

<table>
<thead>
<tr>
<th>Type</th>
<th>Min/max memory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DPG2000BB</strong> range - <strong>D4</strong> - options</td>
<td>Min/max memory, backlit display</td>
</tr>
<tr>
<td><strong>DPG2000BB</strong> range - <strong>M0</strong> options</td>
<td>No min/max, backlit display</td>
</tr>
</tbody>
</table>

#### Range—see table at left
psi = PSI
torr = TORR
inHg = INH
mmHg = MMHG
bar = BAR
oz/ft² = ZIN
kg/cm² = KCM
atm = ATM
Pa = PPA
mmHg = MPHG
MPa = MPa

#### Calibration

If vacuum gauge requires a minus sign, please specify.
The range code indicates the gauge’s default range. Engineering units may be changed to any of those listed under the same sensor range. The listed ranges are rounded off.

### Options—add to end of model number

| HA | High accuracy, ±0.1% FS ± 1 LSD. Not available with 3 psi, bipolar, absolute, or vacuum sensors, and some 3.5 digit display ranges. See table at left for availability. |
| TP | Top gauge port |

### RB
Protective rubber boot

### CD
Calibration data, 5 test points and data

### NC
NST traceability documentation, 5 points and data

#### Example: DPG2000BBL3000PSIG-D4
Battery powered, backlit display, 0-3000 psig, min/max
Note: Model number on gauge may vary from part number ordered.
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 Intrinsically Safe 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.
The pressure gauge enclosure's metal base must be mounted as part of a bonded structure.
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.

Dimensions

Types of Gauges
Gauge reference reads zero with the gauge port open.
Bipolar ranges read positive pressure and vacuum in the same units, and zero with the gauge port open.
Compound ranges read positive pressure in psig and vacuum in inHg, and zero with the gauge port open.
Sealed reference reads zero with the gauge port open and is referenced to 14.7 psi. Used for 1000 psi and up.
Absolute reference reads atmospheric pressure with gauge port open and zero at full vacuum.

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 and no pressure is applied. The zeroing function is only activated at each power-up and the stored zero correction is erased when the gauge is shut off.
Press and hold the front button. The display is tested.
Continue to press the button until oooo is displayed.
Release the button. The gauge in now zeroed.
The full-scale range is indicated and the display segments are briefly shown again.
The actual pressure and units are displayed. Attempting to zero the gauge with pressure greater than approximately 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 measured 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.

Display Backlighting (BL Option Only)
Display backlighting will operate when a button is pressed or held provided the front light sensor detects low ambient light levels. Display backlighting will turn on for one minute and then shut off. Backlighting may not be apparent under some lighting conditions.

Operation—continued

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.

Minimum and Maximum Readings
Gauges are normally configured with minimum and maximum capture enabled. M0 versions are configured with minimum and maximum functions disabled. One or both can be enabled or disabled in the User Configuration mode.
Minimum and maximum readings are continuously stored and updated whenever the gauge is on. The stored readings can be manually cleared if desired. The MAX and MIN 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 MX 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 cIr 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 mode and displays the current pressure.

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. The button can be pressed to keep the gauge on. The auto shutoff and backlight (if equipped) timers are reset whenever the button is pressed and released.
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.
Engineering Unit Selection
Engineering unit selection is done via internal buttons to help prevent accidental or unauthorized changes. 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 on, the originally configured range is displayed and then the conversion with the selected engineering unit is displayed. With the gauge powered on, press and hold the UP button. 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.

Auto Shutoff Time Selection
Auto shutoff time selection is done via internal buttons to help prevent accidental or unauthorized changes. The selected shutoff time is stored in non-volatile memory and will be retained even with the battery off or batteries removed.

With the gauge powered on, press and hold the DOWN button. Release the button when the auto shutoff time is displayed on the upper section. The lower display segments will indicate AST M if the time displayed is in minutes, and AST H if it is 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.
Calibration Preparation

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

Gauges are calibrated at the factory using equipment traceable to NIST. There is no need to calibrate the gauge prior to use.

Calibration should only be performed by qualified individuals using appropriate calibration standards and procedures.

Contact factory if assistance is required. Gauges can be returned to factory for certified calibration and repairs. NIST traceability is available.

Calibration intervals depend on your quality control program requirements. Many customers use an annual calibration cycle.

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 use. A vacuum of 0.1 torr or 100 millitorr is required for vacuum and absolute gauges.

It is good practice to install fresh batteries before calibration.

WARNING: Never apply vacuum to gauge not designated for vacuum use. A vacuum of 0.1 torr or 100 millitorr is required for vacuum and absolute gauges.

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

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

For calibration preparation, follow these steps:

1. Remove the rear 6 Phillips screws and remove the rear cover.
2. Move the switch on the circuit board to the ENABLE position.
3. Enter the pass code as described in the User Configuration Pass Code Entry section. The default is 3510, but this is user changeable.
4. To exit, press and hold the center power button. Release all buttons when the display indicates 3510.

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/CMP
200 PSI 407.2 INHG
300 PSI 610.8 INHG
500 PSI 500.0 PSI
1000 PSI 70.31 KG/CMP
3000 PSI 6108 INHG
5000 PSI 5000 PSI

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 small 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.

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

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

Apply 0% pressure by venting the gauge port to atmosphere. The character display will alternate between -MID and CAL.

Gauge Reference Vacuum Gauges

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

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

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

Apply 0% vacuum by venting the gauge port to atmosphere. The character display will alternate between -MID and CAL.

Absolute Reference Gauges

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

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

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

Apply 0% vacuum by venting the gauge port to atmosphere. The character display will alternate between -MID and CAL.

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.

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

Apply 0% vacuum by venting the gauge port to atmosphere. The character display will alternate between -MID and CAL.

View Or Change User Configuration Pass Code

With the unit off, press and hold the UP button, then press the power button. Release all buttons when the display indicates CF6.

Enter Access Code 1220

Before the unit enters the view or change pass code mode, the display initially indicates — with the first underscore blinking, and with CFGPC or CRIPC on the character 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 POWER button without entering any pass code characters.

Use the UP and DOWN, and center buttons to enter the 1220 pass code.

Press and release the power 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 pass code with either CF6PC or CRIPC on the character display.

1. Press the UP or DOWN button to select the first character of the new pass code.
2. When the desired first character is displayed, press and release the center power button to move to the next character.
3. Repeat above until the entire pass code is complete.
4. To exit, press and hold the center power 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.

Calibration DPG2000B D4 and M0 Series

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 center power 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 Pass Code

User-defined pass code configuration allows changing of the factory 3510 pass code 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.

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

View Or Change User Calibration Pass Code

With the unit off, press and hold the DOWN button, then press the power button. Release all buttons when the display indicates CF6.

Enter Access Code 1220

Before the unit enters the view or change pass code mode, the display initially indicates — with the first underscore blinking, and with CFGPC or CRIPC on the character 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 POWER button without entering any pass code characters.

Use the UP and DOWN, and center buttons to enter the 1220 pass code.

Press and release the power 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 pass code with either CF6PC or CRIPC on the character display.

1. Press the UP or DOWN button to select the first character of the new pass code.
2. When the desired first character is displayed, press and release the center power button to move to the next character.
3. Repeat above until the entire pass code is complete.
4. To exit, press and hold the center power 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.

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

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

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