Cecomp Battery Powered Digital Pressure Gauges with Selectable Units & Multi-Memory

- ±0.25% Test Gauge Accuracy, ±0.1% Optional
- 316 Stainless Steel Wetted Parts
- Selectable Units
- Selectable Auto Shutoff Times
- Zero Function
- Store Readings in Memory

Specifications

Ranges and Resolution
See table below for popular ranges and units
See page 2 table for available ranges and engineering units
Resolution is fixed for each engineering unit

Accuracy
Includes linearity, hysteresis, repeatability
Standard: ±0.25% of full scale ± 1 least significant digit
-HA: ±0.1% FS ±1 LSD (see below for availability)

Display
3 digit readings per second nominal display update rate
4 digit LCD, 0.5” H and 5 character 0.25” H alphanumeric
BL models: red LED backlight

Batteries, Battery Life, Low Battery Indication
B: 2 AA alkaline, approx. 2000 hours
BL: 2 AA alkaline, approx. 1500 hours depending on backlight usage
Low battery symbol on display

Controls & Functions
Three front buttons turn gauge on or off, zeros gauge reference gauges, and cycles through functions
BL: Front button activates backlighting for 1 minute
Memory
-M4: 4 memory, user settable to MEM 1 through MEM 4 or 4-wheel designations: LF, RF, LR, RR
-M8: 8 memory, set as MEM 1 through MEM 8
Consult factory for other memory configurations and labels

Calibration
Pass code protected calibration
Non-interactive zero, span, and linearity, ±10% of range

Auto Shutoff
User selectable 1 minute to 8 hours or front button on/off
Factory default 5 minutes, unless other time is specified

Weight
Gauge: 9 ounces (approximately)
Shipping: 1 pound (approximately)

Material
F20B:
F20BN:
ABS/polycarbonate label
Optional -MC aluminum bezel

Connection, Media Compatibility
1/4" NPT male fitting, 316L stainless steel
All wetted parts are 316L stainless steel
Compatible with most liquids and gases

Overpressure
3000 psig range: 5000 psig
5000 psig range: 7500 psig
All others: 2 X pressure range
112.5% FS out-of-range display: I – – – or I –.–.–.–

Burst Pressure
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: -4 to 185°F (-20 to 85°C)
Compensated range: 32 to 158°F (0 to 70°C)

Model Features

How to Order

Step 1: Model
Select model with standard housing or NEMA 4X housing. Select standard display or display with backlighting

- F20B Standard housing
- F20BBL Standard housing, backlit display
- F20BN NEMA 4X housing
- F20BBL NEMA 4X housing, backlit display

Step 2: Range
Specify pressure range and units. See table on other side for complete listing of available ranges and engineering units

<table>
<thead>
<tr>
<th>Range Code</th>
<th>Default Range</th>
<th>Selectable Engineering Units. See table on next page for additional ranges.</th>
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</tbody>
</table>

Step 3: Memory
-M4: Four memory, user settable to MEM 1 through MEM 4 or 4-wheel designations: LF, RF, LR, RR
-M8: Eight memory, factory set to MEM 1 through MEM 8

Step 4: Options—add to end of model number
-MC: Metal front cover. Machined aluminum, epoxy powder coated. Synthetic oil resistant. Not available with NEMA 4X models.
-CS: Case stiffener strengthens case bottom for tire pressure applications.
-CC: Conformal coating on circuit board for moisture resistance. Recommended for outdoor applications.
-TP: Top port, gauge port on top of case. Used primarily for tire pressure applications. Not available with NEMA 4X models.
-PM: Panel mount, 4.1” x 4.1”. Not available with NEMA 4X models.
-SM: Surface mount plate. Battery gauges only. Not available with NEMA 4X models.

Step 5: Accessories—add to end of model number
-RB: Protective rubber boot. Not for NEMA 4X models. May be ordered separately.
-CD: Calibration data, 5 test points, test date.
-NC: NIST certificate with traceability documentation, 5 test points and date.

Example
Typical tire pressure gauge
F20BBL100PSIG-M4-CS-RB

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cecomp.com/bat

USA
Made in USA

cecomp.com/cecomp.com
Installation Precautions, Ranges and Engineering Units

**Precautions**
- Read these instructions before using the gauge. Configuration may be easier before installation. Contact the factory for assistance.
- These products are made of durable, serviceable parts. Contact us for repairs, service, or refurbishment.
- Gauges must be operated within specified ambient temperature ranges.
- Outdoor or wash down applications require a NEMA 4X gauge or installation in a NEMA 4X housing.
- Use a pressure or vacuum range appropriate for the application.

- Use fittings appropriate for the pressure range of the gauge.
- Due to the hardness of 316 stainless steel, it is recommended that a non-reactive fluid be used to prevent leak-free operation.
- For contaminated media use an appropriate screen or filter to keep debris out of gauge port.
- 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 gauge by forcing the housing.
- Good design practices that positve displacement liquid pumps include protection devices to prevent sensor damage from over-pressures, acceleration beyond design limits.
- Avoid permanent sensor damage! Do not apply vacuum to non-vacuum gauges or hydraulic vacuum to any gauges.
- Avoid permanent sensor damage! NEVER insert objects into gauge port or blow out with compressed air.
- Gauges are not for oxygen service. Accidental rupture of sensor diaphragm may cause silicone oil inside sensor to react with oxygen.

**Battery Replacement**
A low battery indication will be shown in the upper left-hand corner of the display when the battery voltage falls sufficiently. Batteries should be replaced soon after the indicator comes on or unreliable readings may result.

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

**Ranges and Units**

**Range Codes**
The range code is part of the gauge model number and indicates the default range when the gauge is ordered. Consult factory with special requirements or engineering units.

**Range Codes Selectable Units**
Engineering units may be changed to any of those listed in the same Selectable Units group as shown in the table below.

**Conversion**
Engineering unit conversions are calculated from the factory default unit to the newly selected units. The ranges listed as Selectable Units are approximate only.

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<th>Selectable Units</th>
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</table>
Instructions

Display and Keypad

Low Battery Symbol
Minus Sign
Up
Zero/Clear

Power

Power-Up and Normal Operation

Your gauge is shipped ready to use. It was factory calibrated just prior to shipment with batteries installed. Please read these instructions and the installation precautions on previous page.

Press and hold the Power button for approximately 1 second.

The display is tested.

The full-scale range is indicated.

The display test is briefly shown again.

The actual pressure and units are displayed. The gauge is ready for use.

Occasional flashing of the minus sign is normal and indicates the gauge is at zero pressure.

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 and resets whenever any button is pressed, unless the gauge shut off time was set to zero for on/off operation.

Display Backlighting (BL Models Only)

Display backlighting can be turned on by momentarily pressing the Power button whenever the gauge is on. The backlighting will turn on for one minute and then automatically shut off. This also restarts the auto shutoff timer. The display backlighting will not be apparent under bright lighting conditions.

Zero the Display

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 is in the normal operating mode. The gauge port must be exposed to normal atmospheric pressure with no pressure or vacuum applied.

Press and hold the Zero/Clear button.

Continue to press the Zero/Clear button until zero is displayed.

Release the button.

The gauge in now zeroed.

Occasional flashing of the minus sign with zero pressure/vacuum is normal.

The stored zero correction is erased when the gauge is shut off.

Shut Down

To shut off the gauge manually at any time, press and hold the Power 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 Power button to keep the gauge on.

If the gauge 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.

Error or Out-of-Range Indications

Attempting to zero the gauge with pressure greater than approximately 3% of full-scale pressure or vacuum applied will result in an error condition.

The display will alternately indicate Err 0 and the actual pressure.

The gauge must be powered down to reset the error condition.

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 1--- or 1--- will be displayed depending on model.

Enter Gauge Configuration Mode

The gauge is designed to use a 4 digit pass code to enter the configuration modes. This is to prevent unauthorized changing of settings.

With the gauge off, press and hold the button. Then press the Power button.

Release all buttons when the display indicates CFG. The gauge firmware version is also displayed.

The gauge then goes through the normal power up sequence.

The display prompts for entry of the configuration pass code (CFGPC), with the first underscore blinking.

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 Power button without entering any pass code characters.

Enter Configuration Pass Code

Enter the pass code. 3510 is the factory default, but it is user-modifiable.

Use the or buttons to set the left-most digit to 3.

Press and release the Power button to index to the next position. The 3 will remain, and the second position will be blinking.

Use the or buttons to select 5.

Press and release the Power button to index to the next position. 3 5 will remain, and the third position will be blinking.

Use the or buttons to select 1.

Press and release the Power button to index to the next position. 3 5 1 will remain, and the fourth position will be blinking.

Use the or buttons to select 0.

Press and release the Power button to proceed with configuration procedures.

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

Gauge Configuration—User or Factory

Upon successful pass code entry, the upper display will be blank, and the lower section will display USER.

With User selected, the gauge configuration can be modified as described in the following sections.

Press and release the button if User is not displayed. The lower display will indicate USER.

Press and release the Power button to continue with configuration.

If Factory (FCTRY) is selected, the user configuration will be replaced by the configuration as it left the factory.

To select Factory, press and release the button. The lower display will indicate FCTRY.

Press and release the Power button to restore the factory configuration and restart the gauge.

Engineering Unit Selection

With the gauge in the user configuration mode, the upper display will be blank with the engineering units in the lower display.

Use the or buttons to navigate through the list of engineering units. Available engineering units depend on the sensor range.

When the desired units are displayed, press and release the Power button to save your selection and move to the next parameter.

Auto Shutoff Time Selection

The auto shutoff time is displayed on the upper display. The lower display will indicate RST M if the time displayed is in minutes or RST H if it is in hours.

Use the or buttons to select 0 (manual shutoff), 1, 2, 5, 10, 15, 20 or 30 minutes, or 1, 2, 4, or 8 hours.

A setting of zero disables the auto shutoff timer. This requires using the Power button to shut the gauge off.

If the gauge was ordered with a custom shutoff time it will become unavailability if the time is changed. Reset the gauge to the original factory configuration as described previously to restore the custom time.

When the desired length of time is displayed, press and release the Power button to save your selection and move to the next parameter.

Memory Label Selection—M4 Versions

The M4 version allows recording pressure readings of up to four vehicle tires. While in the memory mode the peak reading is captured.

The number 1 is shown on the upper display. The lower display will indicate the label for memory 1.

Use the or buttons to select the desired label: MEM 1, LF (left rear), RR (right rear), RF (right front), or LF (left front).

Each of the memory locations may be renamed as desired in any sequence.

Care should be taken to avoid duplication or omission of a position.

When the desired label for memory 1 is displayed, press the Power button.

Repeat the steps for the other memory locations.

When the desired label for memory 4 is displayed, press and release the Power button to save the user configuration and restart the gauge.
Instructions

Memory—M8 Versions
The M8 version allows recording of up to eight pressure readings. While in the memory mode the peak reading is captured. The eight memory locations named MEM 1 through MEM 8, these are factory set.

Memory—Custom Versions
If a special memory configuration was ordered, the custom memory labels may be shown.
In some cases, it may be possible to rename the MEM locations to the custom labels. If this is the case, use the following example below.
After auto shutdown time selection, the number 1 is displayed on the upper display. The lower display will indicate the label for memory 1.
Use the \( \Delta \) and \( \nabla \) buttons to select MEM 1, or the programmed memory label.
When the desired label for memory 1 is displayed, press and release the Power button.
Repeat the steps for the other memory locations.
When the desired label for the last memory location is displayed, press and release the Power button to save the user configuration and restart the gauge.

Calibration

Setup and Preparation
Gauges are calibrated at the factory using equipment traceable to NIST. There is no need to calibrate the gauge before putting it into service. Calibration should only be performed by qualified individuals using appropriate calibration standards and procedures. Calibration intervals depend on your quality control program requirements, although most customers calibrate annually.
The calibration system must be able to generate and measure pressure/vacuum over the full range of the gauge and should be at least four times more accurate than the gauge being calibrated.
A vacuum pump able to produce a vacuum of 100 microin (0.1 torr or 100 mtorr) or lower is required for vacuum gauges.
Allow the gauge to acclimate to ambient temperature for 20 minutes.
Install fresh batteries.

Entering Calibration Mode
With the gauge off, press and hold the \( \nabla \) button. Then press the Power button. Release all buttons when the display indicates \( \text{CAL} \).
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 displays.
Before the gauge enters the Calibration Mode, the display initially indicates \( _{-}_0000 \) with the first underscore blinking, and with \( \text{CALP} \) (calibration pass code) on the lower display.
Enter the 3510 pass code as described in the Configuration Pass Code section.

Calibration Mode
The gauge enters and remains in the Calibration Mode until restarted manually or power is removed. Features not related to calibration are disabled and compound range models are set for the same engineering units for pressure and for vacuum.
The calibration may be performed in any of the available engineering units as well as percent (PCT).
For greatest accuracy, use the \( \Delta \) and \( \nabla \) buttons to select engineering units for calibration with highest resolution (highest number of display counts).
Press and release the Power button when the appropriate engineering units are displayed. Suggested units are listed below.

Sensor
Suggested units for calibration
5 PSI 5.000 PSI
15 PSI 775.7 MMHG or TORR
30 PSI 61.0 INHG
50 PSI 50.00 PSI
60 PSI 60.00 PSI
100 PSI 7.031 KG/CM2
200 PSI 407.2 INHG
300 PSI 610.8 INHG
500 PSI 3447 KPA
1000 PSI 6895 KPA
2000 PSI 4613 FTHG
3000 PSI 6920 FTHG
5000 PSI 5000 PSI
The display will then indicate the currently applied pressure in the engineering units selected for calibration.

\( \Delta \) and \( \nabla \) Button Operation
Each time one of the \( \Delta \) or \( \nabla \) 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 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 buttons as previously described.

Gauge Reference Pressure Gauges
Apply zero pressure by venting the gauge port to atmosphere. The character display will alternate between \( \text{ZERO} \) and \( \text{CAL} \) Adj. for a display indication equal to zero.
Apply full-scale pressure. The character display will alternate between \( \text{-SPAN} \) and \( \text{CAL} \) Adj. for a display indication equal to full-scale pressure using the \( \Delta \) and \( \nabla \) buttons.

Gauge Reference Vacuum Gauges
Apply zero pressure by venting the gauge port to atmosphere. The character display will alternate between \( \text{ZERO} \) and \( \text{CAL} \) Adj. for a display indication equal to zero.
Apply full-scale vacuum. The character display will alternate between \( \text{SPAN} \) and \( \text{CAL} \) Adj. for a display indication of full-scale vacuum using the \( \Delta \) and \( \nabla \) buttons.

Calibration—continued

Absolute Reference Gauges
Apply full vacuum to the gauge. The character display will alternate between \( \text{ZERO} \) and \( \text{CAL} \) Adj. Press the \( \Delta \) and \( \nabla \) buttons to obtain a display indication of zero.
Apply full-scale pressure. The character display will alternate between \( \text{SPAN} \) and \( \text{CAL} \) Adj. Press the \( \Delta \) and \( \nabla \) buttons to obtain a display indication equal to full-scale pressure.
Apply 50% of full-scale pressure. The lower display will alternate between \( \text{+MID} \) and \( \text{CAL} \) Adj. Press the \( \Delta \) and \( \nabla \) buttons to obtain an indication equal to 50% of full-scale pressure.

Compound and Bipolar Gauges
In addition to the steps described above for pressure gauges, apply full-scale vacuum. The character display will alternate between \( \text{-SPAN} \) and \( \text{CAL} \) Adj. for a display indication of actual applied vacuum using the \( \Delta \) and \( \nabla \) buttons.
For bipolar and –30.00inhg to 15.00psig compound range models only, apply 50% full-scale vacuum. The character display will alternate between \( \text{+MID} \) and \( \text{CAL} \) Adj. for a display indication equal to 50% of full-scale vacuum using the \( \Delta \) and \( \nabla \) buttons.

Save Calibration
Press and hold the Power button until the display indicates \(-_\_\_\_\_\) then release the button to store the calibration parameters in nonvolatile memory and restart the gauge.
Verify the pressure indications at 0%, 25%, 50%, 75% and 100% of full scale.

User-Defined Pass Code Configuration
The factory default pass code 3510 may be changed to a different value for configuration and/or calibration.

Configuration Pass Code
With the unit off, press and hold the \( \nabla \) button to view and/or change the user configuration pass code. Then press the Power button. Release all buttons when the display indicates \( \text{CFG} \).

Calibration Pass Code
With the unit off, press and hold the \( \nabla \) button to view and/or change the user calibration pass code. Then press the Power button. Release all buttons when the display indicates \( \text{CAL} \).

Change Pass Code Mode
Before the unit enters the view or change pass code mode, the display initially indicates \( _{-}_0000 \) with the first underscore blinking, and with \( \text{CFGPC} \) or \( \text{CALPC} \) on the character segments.
Note: The unit 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.
Enter access code 1220:
Use the \( \Delta \) and \( \nabla \) buttons to select the left-most digit to 1.
Press and release the Power button to index to the next position.
The 1 will remain, and the second position will be blinking.
Use the \( \Delta \) and \( \nabla \) buttons to select 2.
Press and release the Power button to index to the next position.
The 1 will remain, and the third position will be blinking.
Use the \( \Delta \) and \( \nabla \) buttons to select 2.
Press and release the Power button to index to the next position.
The 1 will remain, and the fourth position will be blinking.
Use the \( \Delta \) and \( \nabla \) buttons to select 0.
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.

Change Pass Code
Once the access code has been entered correctly, the display will indicate the existing user-defined pass code with \( \text{CFGPC} \) or \( \text{CALPC} \) on the character segments.
Press the \( \Delta \) or \( \nabla \) button to select the first character of the new pass code.
When the correct first character is being displayed, press and release the Power button to proceed to the next pass code character.
Repeat until all the pass code is complete.
To exit the User Defined Pass Code change mode, press and hold the Power button.
Release the button when the display indicates \(-_\_\_\_\_\) to restart the gauge.

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Gauge Reference Pressure Gauges
ments by pressing and quickly releasing the buttons as previously described.

Clear a Memory Location
Before clearing a memory location, make sure the gauge has no pressure applied.
Press and hold the Zero/Clear button.
Release the button when \( \text{CLR} \) is displayed.
The reading for the memory location indicated on the lower display will be cleared.
With a gauge reference models if no pressure is applied, the gauge will return to zero.
If pressure is applied the new pressure reading will be stored in memory.
With absolute reference models the current atmospheric pressure reading will be stored if the gauge port is open to atmosphere.
Press and release the Power button to exit the memory mode and return to live pressure readings.

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