Cecomp® Battery Powered Digital Pressure Gauges w. Memory Options & Selectable Units F20B, F22B

Ranges and Resolution
See table below for standard ranges and units
Resolution is fixed for each engineering unit

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, see ranges for availability
Sensor hysteresis: ±0.015% FS, included in accuracy
Sensor repeatability: ±0.01% FS, included in accuracy

Display
3 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
B: 2 AA alkaline, approx. 2000 hours
BL: 2 AA alkaline, approx. 150 to 1500 hours depending on backlight usage

Controls and Functions
Three button keypad: Zero/clear, on/off, memory
BL models: Backlight active for 1 minute (user configurable)

F20B Memory
-M4: 4 peak reading memory, settable to MEM 1 ~ MEM 4 or 4 wheel designations: LF, RF, LR, RR
-M8: 8 peak reading memory, MEM 1 ~ MEM 8

F22B Min/Max Memory
Minimum and/or maximum readings stored in memory, readings cleared or stored at shutoff. User configurable.

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

Calibration
Zero button for gauge reference ranges
Pass code protected calibration via keypad
Non-interactive zero, span, and linearity, ±10% of range

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

Materials
Standard: Extruded aluminum case, epoxy powder coated, ABS/polycarbonate bezel, front and rear gaskets, polycarbonate label.
Optional -MC aluminum bezel.
NEMA 4X: ABS/polycarbonate case, rear gasket, polycarb. label

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

Overpressure, Burst, Vacuum Service
3000 psig sensor: 5000 psig overpressure
5000 psig sensor: 7500 psig overpressure
All others: 2 X pressure range overpressure
Burst pressure: 4 X sensor pressure rating, or 10,000 psi, whichever is less
Vacuum service: 15 psig, ±15 psig, 100 psig, 200 psig, 15 psia, 30 psia, 100 psia

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)

Dimensions
See next page

Sensor Ranges and Engineering Units		‡ -HA option not available		Consult factory for special units					
3 psig ‡	**Res**	**15 psig vac ‡**	**Res**	**30 psia**	**Res**	**–15V100psig ‡**	**Res**	**300 psig**	**Res**
3PSIG	.001	100KPAVAC	.1	2KGCMA	.001	–15V100PSIG	.1	300PSIG	.1
6INHGG	.001	0.1MPAVAC	.0001	2ATMA	.001	–30INHG/100PSIG	.1	610INHGG	.1
85INH2OG	.1	1BARVAC	.001	**30 psig**	**Res**	–30V200INHGG	.1	4800ZING	1
50ZING	.01	1KGCMVAC	.01	30PSIG	.01	–400V2770INH2OG	1	700FTH2O	.1
210GCMG	.1	1ATMVAC	.001	60INHGG	.01	–240V1600ZING	1	2000KPAG	1
150MMHGG	.1	**15 psig**	**Res**	850INH2OG	1	–760V5200MMHGG	1	2MPAG	.001
150TORRG	.1	15PSIG	.01	480ZING	.1	–760V5200TORRG	1	20BARG	.01
200MBARG	.1	30INHGG	.01	2100GCMG	1	–100V700KPAG	1	20KGCMG	.01
200CMH2OG	.1	400INH2OG	.1	1600MMHGG	1	–0.1V0.7MPAG	.001	20ATMG	.01
2000MMH2OG	1	240ZING	.1	1600TORRG	1	–1V7BARG	.01	**500 psig**	**Res**
7FTH2O	.001	1000GCMG	1	2000MBARG	1	–1V7KGCMG	.01	500PSIG	.1
20KPAG	.01	760MMHGG	.1	2100CMH2OG	1	–1V7ATMG	.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	1	**60 psig**	**Res**	5200MMHGG	1	**1000 psig**	**Res**
260TORRG	.1	1KGCMG	1	60PSIG	.01	5200TORRG	1	1000PSIG	1
350MBARG	.1	1ATMG	1	120INHGG	.1	7000MBARG	1	2040INHGG	1
350CMH2OG	.1	**±15 psig ‡**	**Res**	1660INH2OG	1	7000CMH2OG	1	2300FTH2O	1
3500MMH2OG	1	±15PSIG	.01	960ZING	1	230FTH2O	.1	7000KPAG	1
12FTH2O	.01	–30INHG/15PSIG	.01	4200GCMG	1	700KPAG	.1	7MPAG	.0001
35KPAG	.01	±30INHGG	.01	3100MMHGG	1	0.7MPAG	.0001	70BARG	.01
15 psia	**Res**	±400INH2OG	1	3100TORRG	1	7BARG	.001	70KGCMG	.01
15PSIA	.01	±240ZING	.1	4100MBARG	1	7KGCMG	.001	70ATMG	.01
30INHGA	.01	±1000GCMG	1	4200CMH2OG	1	7ATMG	.001	**2000 psig**	**Res**
400INH2OA	.1	±760MMHGG	1	140FTH2O	.1	**–15V200 psig ‡**	**Res**	2000PSIG	1
240ZINA	.1	±760TORRG	1	400KPAG	.1	–15V200PSIG	.1	4070INHGG	1
1000GCMA	1	±1000MBAR	1	0.4MPAG	.0001	–30INHG/200PSIG	.1	4600FTH2O	1
760MMHGA	.1	±1000CMH2OG	1	4BARG	.001	–30V400INHGG	.1	14MPAG	.01
760TORRA	.1	±100KPAG	.1	4KGCMG	.001	–400V5500INH2OG	1	140BARG	.1
1000MBARA	1	±0.1MPAG	.0001	4ATMG	.001	–240V3200ZING	1	140KGCMG	.1
1000CMH2OA	1	±1BARG	.001	**100 psia**	**Res**	–100V1400KPAG	1	140ATMG	.1
100KPAA	.1	±1KGCMG	.001	100PSIA	.1	–0.1V1.4MPAG	.001	**3000 psig**	**Res**
0.1MPAA	.0001	±1ATMG	.001	200INHGA	.1	–1V14BARG	.01	3000PSIG	1
1BARA	.001	**30 psia**	**Res**	2770INH2OA	1	–1V14KGCMG	.01	6100INHGG	1
1KGCMA	.001	30PSIA	.01	1600ZINA	1	–1V 14ATMG	.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		

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

MADE IN USA

F20B, F22B

F20BN, F22BN
NEMA 4X

Quick Link: cecomp.com/bat

How to Specify	Housing	Backlit	Memory
F20B *range* - **M4** - *options*	Standard	no	4 max reading
F20BBL *range* - **M4** - *options*		Yes	
F20BN *range* - **M4** - *options*	NEMA 4X	no	
F20BNBL *range* - **M4** - *options*		Yes	
F20B *range* - **M8** - *options*	Standard	no	8 max reading
F20BBL *range* - **M8** - *options*		Yes	
F20BN *range* - **M8** - *options*	NEMA 4X	no	
F20BNBL *range* - **M8** - *options*		Yes	
F22B *range* - *options*	Standard	no	Min/max
F22BBL *range* - *options*		Yes	
F22BN *range* - *options*	NEMA 4X	no	
F22BNBL *range* - *options*		Yes	

Range—See table at left. Select a range code for default units. Please specify if vacuum gauge requires a minus sign.

psi = PSI, torr = TORR, mbar = MBAR
inHg = INHG, 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
mmHg = MMHG, MPa = MPA

G gauge reference pressure A absolute reference
VAC gauge reference vacuum

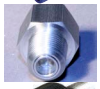
Options—add to end of model number. See price list for details.	
HA	High accuracy, ±0.1% FS ±1 LSD. See range table.
PM	Panel mount, 4.1" x 4.1", n/a NEMA 4X
FP	Sealed housing and CC for high humidity food processing applications. F16BN in absolute ref. ranges only.
MC	Metal front cover instead of plastic, n/a NEMA 4X
CS	Case bottom stiffener plate, n/a NEMA 4X
CC	Moisture resistant circuit board conformal coating
TP	Top port, gauge port on top of case, n/a NEMA 4X
SM	Surface mount plate, n/a NEMA 4X
CD	Calibration data; 5 test points and date
NC	NIST traceability documentation, 5 points and date

TP Top gauge port. Primarily used with tire pressure applications. Shown with optional rubber boot. n/a NEMA 4X.

Accessories—order separately

RB High visibility orange rubber boot protects gauge for portable applications. n/a with NEMA 4X.

GP Zippered nylon gauge pouch with carabiner belt clip. Fits any battery powered gauge including gauge with rubber boot.



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.

Installation Precautions, Ranges and Engineering Units

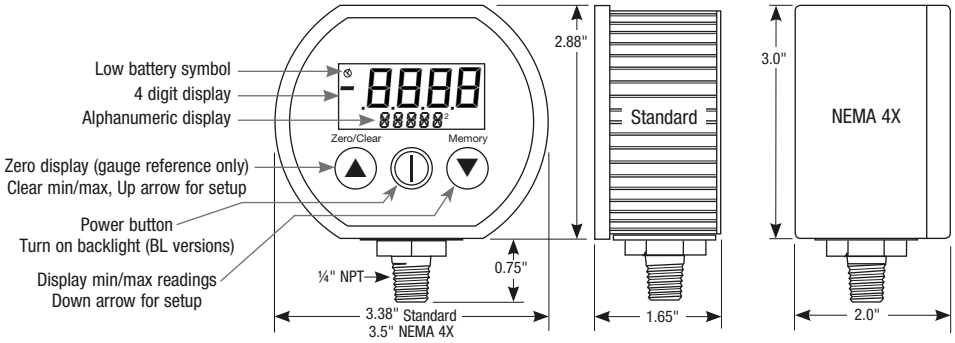
Ranges and Selectable Units

Range Codes
The gauge model range code indicates the default range. Alternate default engineering units may be ordered.

Selectable Ranges
Engineering units may be changed to any of those listed in the same row as shown in the table below.

Conversion
Engineering unit conversions are calculated from the factory default unit to the newly selected units.

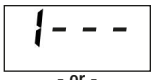
Sensor Range and Units	psi	kPa	MPa	mbar	bar	atm	kg/cm²	g/cm²	mmH₂O	cmH₂O	oz/in²	ftH₂O	inH₂O	mmHg	torr	inHg
–14.7 to 15.0 psig	–14.7 to 15.0	–101.3 to 103.4	–.1013 to .1034	–1013 to 1034	–1.013 to 1.034	–1.000 to 1.021	–1.033 to 1.055	–1033 to 1055		–1033 to 1055	–235.1 to 240.0	–33.90 to 34.61	–407 to 415	–760 to 7767	–760 to 776	–29.92 to 30.54
–29.9 inHg to 15.0 psig	–14.7 to 15.0	–101.3 to 103.4	–.1013 to .1034	–1013 to 1034	–1.013 to 1.034	–1.000 to 1.021	–1.033 to 1.055	–1033 to 1055		–1033 to 1055	–235.1 to 240.0	–33.90 to 34.61	–407 to 415	–760 to 776	–760 to 776	–29.92 to 30.54
–29.9 inHg to 100.0 psig	–14.7 to 100.0	–101 to 690	–.101 to .690		–1.01 to 6.90	–1.00 to 6.81	–1.03 to 7.03				–235 to 1600	–33.9 to 230.7	–407 to 2767	–760 to 5171	–760 to 5171	–29.9 to 203.6
–29.9 inHg to 200.0 psig	–14.7 to 200.0	–101 to 1379	–.101 to 1.379		–1.01 to 13.79	–1.00 to 13.61	–1.03 to 14.06				–235 to 3200	–33.9 to 461.4	–407 to 5534			–29.9 to 407.2
0 to 3.000 psig	3.000	20.68		206.8	.2068	.2041	.2109	210.9	2109	210.9	48.00	6.921	83.0	155.1	155.1	6.108
0 to 5.000 psig	5.000	34.47		344.7	.3447	.3402	.3515	351.5	3515	351.5	80.0	11.54	138.4	258.6	258.6	10.18
15.00 to 0 psi abs	15.00 abs	103.4 abs	.1034 abs	1034 abs	1.034 abs	1.021 abs	1.055 abs	1055 abs		1055 abs	240.0 abs	34.61 abs	415.1 abs	775.7 abs	775.7 abs	30.54 abs
0 to 14.70 psig vac	14.70 vac	101.3 vac	.1013 vac	1013 vac	1.013 vac	1.000 vac	1.033 vac	1033 vac		1033 vac	235.1 vac	33.90 vac	406.8 vac	760 vac	760 vac	29.92 vac
0 to 15.00 psig	15.00	103.4	.1034	1034	1.034	1.021	1.055	1055		1055	240.0	34.61	415.1	775.7	775.7	30.54
30.00 to 0 psi abs	30.00 abs	206.8 abs	.2068 abs	2068 abs	2.068 abs	2.041 abs	2.109 abs	2109 abs		2109 abs	480.0 abs	69.21 abs	830 abs	1551 abs	1551 abs	61.08 abs
0 to 30.00 psig	30.00	206.8	.2068	2068	2.068	2.041	2.109	2109		2109	480.0	69.21	830	1551	1551	61.08
0 to 60.00 psig	60.00	413.7	.4137	4137	4.137	4.083	4.218	4218		4218	960	138.4	1660	3103	3103	122.2
100.0 to 0 psi abs	100.0 abs	689.5 abs	.6895 abs	6895 abs	6.895 abs	6.805 abs	7.031 abs	7031 abs		7031 abs	1600 abs	230.7 abs	2767 abs	5171 abs	5171 abs	203.6 abs
0 to 100.0 psig	100.0	689.5	.6895	6895	6.895	6.805	7.031	7031		7031	1600	230.7	2767	5171	5171	203.6
0 to 200.0 psig	200.0	1379	1.379		13.79	13.61	14.06				3200	461.4	5534			407.2
0 to 300.0 psig	300.0	2068	2.068		20.68	20.41	21.09				4800	692.1				610.8
0 to 500.0 psig	500.0	3447	3.447		34.47	34.02	35.15					1154				1018
0 to 1000 psig	1000	6895	6.895		68.95	68.05	70.31					2307				2036
0 to 3000 psig	3000		20.68		206.8	204.1	210.9					6921				6108
0 to 5000 psig	5000		34.47		344.7	340.2	351.5									



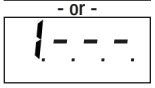
Error or Out-of-Range Indications

Attempting to zero the gauge with pressure greater than approximately 3% of full-scale pressure or vacuum 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 pressure-only gauge can damage the pressure sensor.



- or -



If 112.5% over range pressure is applied , an out-of-range indication of 1 – – – or 1.–.–.– will be displayed depending on model.

Installation Precautions

- ✔ Read these instructions before using the gauge. Configuration may be easier before installation. Contact the factory for assistance.
- ✔ These products do not contain user-serviceable parts, except batteries. 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 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.
- ✔ 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 practice dictates that positive displacement liquid pumps include protection devices to prevent sensor damage from pressure spikes, acceleration head, and vacuum extremes.
- ☒ 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.

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

Power-Up and Normal Operation

Your gauge is ready to use. It was factory calibrated just prior to shipment with batteries installed.

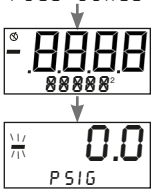
Press and hold the center power button for approximately 1 second. The display is tested.

The full-scale range in the factory default units is indicated. If the units were changed by the user, then the full scale range in the selected engineering units is displayed.

The display test is briefly shown again.

The actual pressure and units are displayed. The gauge is ready for use and readings are updated approximately 3 times per second

For gauge reference models occasional flashing of the minus sign is normal and indicates the gauge is at zero pressure. Absolute gauges only display zero at full vacuum.



Display Backlighting (BL Models Only)

Display backlighting can be turned on by momentarily pressing the power button whenever the gauge is on. This also restarts the auto shutoff timer.

F20B: The backlighting will turn on for 1 minute and then automatically shut off.

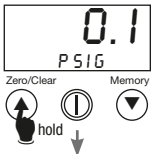
F22B: The factory default on-time is 1 minute, but the setup procedure allows setting it to 1 to 255 minutes, or to 0 to disable display backlighting.

The red LED display backlighting will not be apparent under bright lighting conditions.

Zero the Display

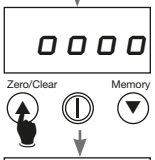
This applies to gauge reference models only. Absolute reference gauges do not use the zero feature since they read atmospheric pressure under normal conditions.

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.

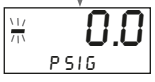
Continue to press the Zero/Clear button until *0000* is displayed then release the button.



The gauge in now zeroed.

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

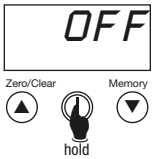
The stored zero correction is erased when the gauge is shut off.



Shutoff

The auto shutoff timer starts at power up and resets whenever any button is pressed. The default time is 5 minutes, but can be set for a variety of times. If on/off operation is selected, the gauge will stay on until manually shut off or the batteries are depleted. Turn gauge off when not in use to conserve battery life.

When an auto shutoff time is used, the display indicates *OFF* five seconds prior to shutoff. Press the power button to keep the gauge on.



To shut the gauge off manually, press and hold (about 5 seconds) the center power button until *OFF* is displayed.

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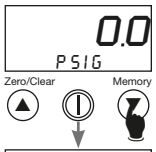
Division of ABSOLUTE PROCESS INSTRUMENTS, Inc.
1220 American Way Libertyville, IL 60048
Phone: 800-942-0315 Fax: 800-949-7502
cecomp.com

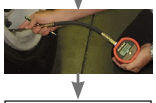
F20B Memory

With the gauge powered up and in the normal operating mode, press and release the Memory button to sequence through the memory locations.



When the Memory button is pressed the gauge is in the peak hold mode. A new higher reading will replace an existing reading, but a pressure reading lower then the one displayed will not be saved.

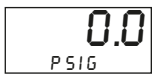
When desired memory location is displayed, take the pressure reading. The peak reading will be captured.



Remove the gauge from the pressure source and press the memory button for the next location.

Repeat until all readings are taken.

The readings will be saved even if the gauge is shut off.



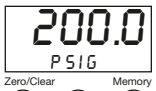
Press and release the Power button to exit the memory mode and return to live pressure readings.

F22B Min/Max Memory

The Min/Max setup procedure in the **Gauge Configuration** > **F22B Min/Max Setup** section may be used to configure the gauge to capture both maximum and minimum values, the maximum value only, or the minimum value only. Only the configured values will be displayed when the memory button is pressed. The gauge also may be configured to erase or save the readings when the gauge powers down.

The Min/Max readings are captured at the rate of 3 times per second. Note that if a brief pressure deviation occurs, it may not be captured. The readings are captured any time the gauge is on and not in the configuration or calibration mode.

Press and release the Memory button to view the maximum stored value.



The center power button may be pressed at any time to return to the normal display mode.

The gauge may be left in the maximum display mode if desired. The maximum reading will be continuously displayed, stored and updated.

Press and release the Memory button to view the minimum stored value.

For many applications it may be best to bring the system up to normal pressure and then clear the minimum value.

The gauge may be left in the minimum display mode if desired. The minimum reading will be continuously displayed, stored and updated.

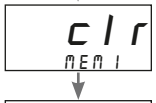
Press and release the center power button to return to the normal display mode.

Clear a Memory Location

Press and release the Memory button until the value to be cleared is displayed.

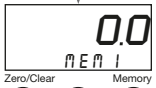
Press and hold the Zero/Clear button.

Release the button when *clr* is displayed. The reading for the indicated memory location will be cleared.



With a gauge reference models if no pressure is applied, the value will return to zero.

If pressure is applied the new pressure reading will be stored in memory.



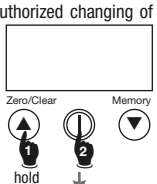
Absolute reference models will store the current atmospheric pressure reading if the gauge port is open to atmosphere.

Press and release the Power button to exit the memory mode and return to live pressure readings.

Gauge Configuration

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.

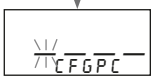


Release all buttons when the display indicates *CFG*. The gauge firmware version is also displayed.

The gauge then goes through the normal power up sequence.

power up sequence

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

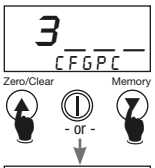


Note: The gauge will automatically revert to normal operation if no buttons are pressed for approximately 15 seconds. To cancel and return to normal operation, press and release the Power button without entering any pass code characters.

Enter Configuration Pass Code

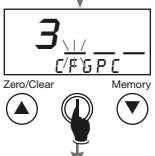
Enter the pass code. 3510 is the factory default, but it is user-modifiable.

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.

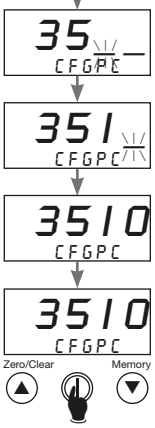
Use the ▲ or ▼ buttons to select 1.

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.

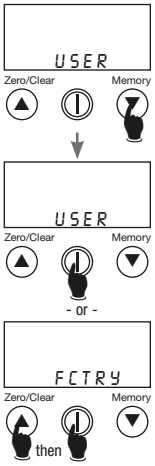
Press and release the Power button to proceed with configuration procedures.

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*. If User is not displayed press and release the ▼ button to change the lower display to *USER*. With User selected, the gauge configuration can be modified as described in the following sections.



Press and release the Power button to continue with configuration.

F20B: Go to **Engineering Unit Selection** to continue user configuration.

F22B: Go to the **F22B Min/Max Setup** section to continue user 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.

F22B Min/Max Setup

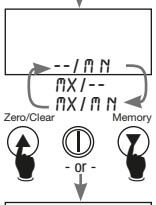
After the center power button is pressed when in user configuration mode, the display indicates *MX/MN*.

Use the ▲ or ▼ buttons to select the desired configuration.

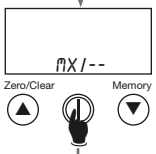
MX/MN to capture both maximum and minimum readings.

--/MN to capture minimum readings only.

MX/-- to capture maximum readings only.



Press and release the power button to save the user configuration and move to the next setup parameter.



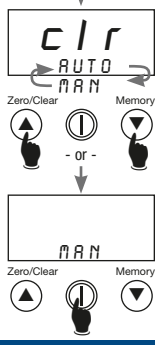
After the center power button is pressed when in user *MX/MN* configuration mode, the upper display indicates *clr*.

Use the ▲ button to select *AUTO* and the or ▼ button to select *MAN*.

When the lower display indicates *AUTO*, the maximum and/or minimum readings will be automatically cleared when the gauge is powered off.

When the lower display indicates *MAN*, the maximum and/or minimum readings will be retained in memory after the gauge is powered off. The readings can be cleared manually.

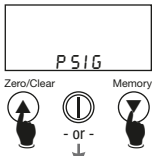
Press and release the power button to save the user configuration and move to the next setup parameter.



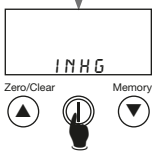
Engineering Unit Selection

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

Use the ▲ and ▼ 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.



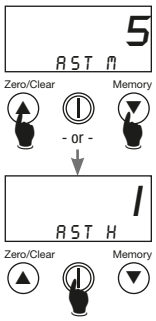
Auto Shutoff Time Selection

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

Use the ▲ and ▼ 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.

When the desired time is displayed, press and release the Power button to save your selection.

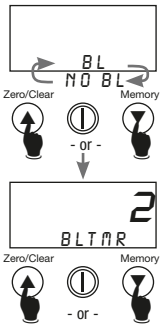


If the gauge was ordered with a custom shutoff time it will be unavailable if the time is changed. Reset the gauge to the original factory defaults as described previously to restore the custom time.

F20B: Go to the appropriate **F20B Memory** section on the next page to continue user configuration.

F22B: Go to the **F22B Backlight Shutoff Time** section on the next page to continue user configuration.

F22B Backlight Time Selection



The lower display will indicate *BL* if the display backlight is enabled or *NO BL* if display backlight is disabled.

Use the ▲ button to enable backlighting and the ▼ button to disable backlighting.

Press the power button to save the setting.

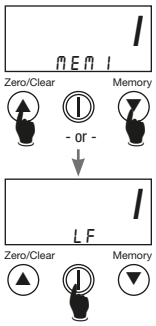
If *NO BL* was selected the user setup is complete and the gauge will restart and be ready for use with the new configuration.

If *BL* was selected the current backlight auto shutoff time is displayed in minutes. 1 minute is the factory default.

Use the ▲ and ▼ buttons to select the minutes for backlight shutoff time.

A setting of zero disables the auto shutoff timer and the backlight will be on whenever the gauge is on. The maximum setting is 255 minutes. The gauge auto shutoff time will override the backlight time. When the desired time is displayed, press and release the power button to save your selection and restart the gauge.

F20B Memory—M4 Versions



The M4 version allows recording pressure readings of up to four 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 ▲ and ▼ buttons to select the desired label: *MEM 1*, *LR* (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.

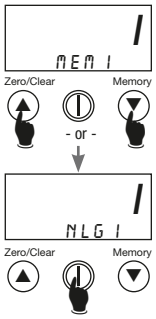
Repeat the steps for the other memory locations. When the desired label for memory 4 is displayed, press and release the Power button to save the user configuration and restart the gauge.

F20B 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 MEM 1 through MEM 8 labels are factory set.

F20B 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 shutoff time selection, the number 1 is on the upper display. The lower display will indicate the label for memory 1.

Use the ▲ and ▼ 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.

Battery Replacement

A low battery indication will be shown in the upper left-hand corner of the display when the battery voltage falls sufficiently. The 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 retainer. 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.
5. Install batteries with correct orientation. Incorrect polarity will damage the gauge. The negative (flat) end of each battery should be inserted first facing the battery holder spring.
6. Replace battery retainer and back cover, including the rubber gasket and reinstall the six screws.

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 many 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 microns (0.1 torr or 100 millitorr) 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 ▼ button. Then press the Power 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.

Before the gauge enters the Calibration Mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with *CALPC* (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 ▲ and ▼ 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	61.08 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 FTH2O
3000 PSI	6920 FTH2O
5000 PSI	5000 PSI

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

▲ and ▼ Button Operation

Each time one of the ▲ or ▼ 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 *ZERO* and *CAL*. Adjust for a display indication of zero using the ▲ and ▼ buttons.

Apply full-scale pressure. The character display will alternate between *+SPAN* and *CAL*. Adjust for a display indication of full-scale pressure using the ▲ and ▼ buttons.

Apply 50% full-scale pressure. The character display will alternate between *+MID* and *CAL*. Adjust for a display indication equal to 50% of full-scale pressure using the ▲ and ▼ buttons.

Gauge Reference Vacuum Gauges

Apply zero pressure by venting the gauge port to atmosphere. The character display will alternate between *ZERO* and *CAL*. Adjust for a display indication of zero using the ▲ and ▼ buttons.

Apply full-scale vacuum. The character display will alternate between *+SPAN* and *CAL*. Adjust for a display indication of full-scale vacuum using the ▲ and ▼ buttons.

Calibration—continued

Apply 50% full-scale vacuum. The character display will alternate between *+MID* and *CAL*. Adjust for a display indication equal to 50% of full-scale vacuum using the ▲ and ▼ buttons.

Absolute Reference Gauges

Apply full vacuum to the gauge. The character display will alternate between *ZERO* and *CAL*. Press the ▲ and ▼ buttons to obtain a display indication of zero.

Apply full-scale pressure. The character display will alternate between *+SPAN* and *CAL*. Press the ▲ and ▼ buttons to obtain a display indication equal to full-scale pressure.

Apply 50% of full-scale pressure. The lower display will alternate between *+MID* and *CAL*. Press the ▲ and ▼ 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 *-SPAN* and *CAL*. Adjust for a display indication of actual applied vacuum using the ▲ and ▼ buttons.

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*. Adjust for a display indication equal to 50% of full-scale vacuum using the ▲ and ▼ buttons.

Save Calibration

Press and hold the 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.

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 ▲ button to view and/or change the user configuration pass code. Then press the Power button. Release all buttons when the display indicates *CFG*.

Calibration Pass Code

With the unit off, press and hold the ▼ button to view and/or change the user calibration pass code. Then press the Power button. Release all buttons when the display indicates *CAL*.

Change Pass Code Mode

Before the unit enters the view or change pass code mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with *CFGPC* or *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 ▲ and ▼ buttons to set 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 ▲ and ▼ buttons to select 2.

Press and release the Power button to index to the next position. 1 2 will remain, and the third position will be blinking.

Use the ▲ and ▼ buttons to select 2.

Press and release the Power button to index to the next position. 1 2 2 will remain, and the fourth position will be blinking.

Use the ▲ and ▼ 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 *CFGPC* or *CALPC* on the character segments.

Press the ▲ or ▼ 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 above until the entire 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.