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: LED display 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 Peak Reading Memory
-M4: MEM 1 ~ MEM 4 or 4 tire designations: LF, RF, LR, RR
-M8: MEM 1 ~ MEM 8 or 4 tires plus 4 inner liner designations: LF, LF IN, RF, RF IN, LR, LR IN, RR, RR IN

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
Passcode 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. NEMA 4X: UV stabilized ABS/polycarbonate case, polycarbonate display window, polycarbonate front label, rear gasket, six stainless steel cover screws. Not intended for permanent outdoor installations.

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 psia, 15 psig, ±15 psig, 30 psia, 100 psia, 100 psig, 200 psig

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)

Dimensions
See next page

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

F20B F22B

MADE IN USA

Quick Link: cecomp.com/bat

F20BN NEMA 4X F22BN NEMA 4X

Sensor Ranges and Engineering Units ‡ -HA option not available								Range codes are rounded off	
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	.001	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	.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	±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	±1000MBARG	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		

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.

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, CC for high-humidity food processing applications. Absolute reference NEMA 4X models 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
NC	NIST traceability documentation, 5 points and date

TP
Top gauge port. Primarily used with tire pressure applications. Not available with NEMA 4X models.

Accessories—order separately

RB
High visibility orange rubber boot protects gauge for portable applications. Not available with NEMA 4X models.

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.

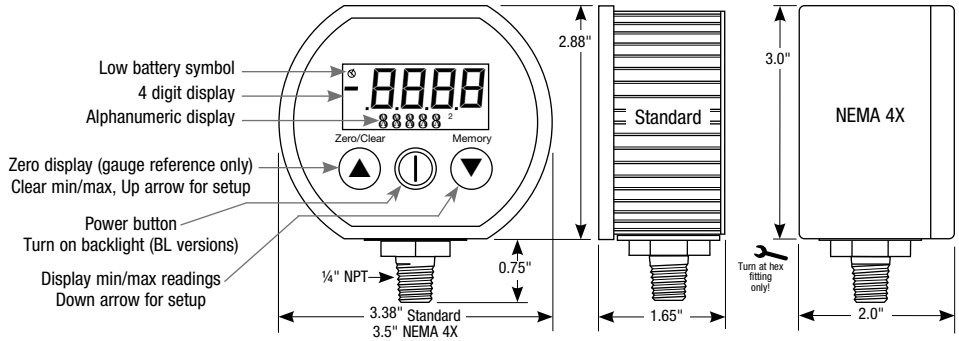
Types of Gauges

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

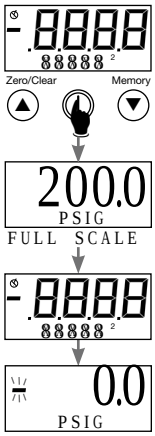


Precautions

- ✔ Read and understand all instruction sheet information. Contact us for help, instructions, or repairs.
- ✔ Batteries should be replaced when the low battery indicator comes to prevent unreliable readings. If gauge is used infrequently, remove batteries to prevent damage from leaky batteries. Inspect batteries at least annually.
- ✔ Gauges are not intended for permanent outdoor use. Protect from weather and excessive humidity. NEMA 4X models are available for temporary outdoor use and wash down areas.
- ✔ Install gauge so it is protected from impact damage.
- ✔ Media temperature and gauge ambient temperature must be within specified ranges.
- ✔ Use a screen or filter to avoid clogging gauge port when measuring contaminated media.
- ✔ Use thread sealant to ensure leak-free operation.
- ✔ Media being measured must be compatible with 316L SS.
- ✔ Avoid sensor damage! Sensor diaphragm is thin 316L SS foil. Never insert objects into the gauge port or blow out with compressed air.
- ✔ Avoid sensor damage! Hydraulic or liquid pumping systems must include a shock suppressor to protect gauge sensor from damaging pressure spikes or water hammer.
- ✔ Avoid sensor damage! Do not apply vacuum to non-vacuum gauges or hydraulic vacuum to any gauge.
- ⚠ Do not exceed pressure range indicated on gauge label.
- ⚠ Remove system pressure before removing or installing gauge.
- ⚠ Use fittings appropriate for the pressure range of the gauge.
- ⚠ Gauges are not for oxygen service. Accidental rupture of sensor diaphragm may cause silicone oil inside sensor to react with oxygen.
- ⚠ Only gauges marked as Intrinsically Safe can be used in hazardous locations or in the presence of flammable or explosive substances, or atmospheres.

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 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 shown first. If the units were changed by the user, then the full scale range in the selected engineering units is displayed next.

The display test is briefly shown again.

The actual pressure and units are displayed. The gauge is ready for use with readings updated approx. 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 a button whenever the gauge is on. This also restarts the auto shutoff timer.

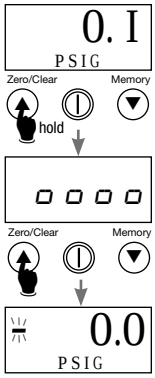
F20BBL: The backlighting will turn on for 1 minute and then automatically shut off.

F22BBL: The factory default on-time is 1 minute, but setup allows setting it to 1 to 255 minutes, or to 0 to disable backlighting.

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

Zero the Display (Gauge Reference 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.

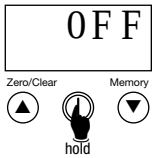
The gauge in now zeroed.

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

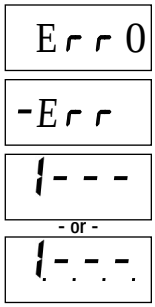
The auto shutoff timer starts at power up and resets whenever any button is pressed. The default time is 5 minutes, but can be set for a variety of times. If on/off operation is selected, the gauge will stay on until manually shut off or the batteries are depleted. Turn gauge off when not in use to conserve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

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.

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

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.

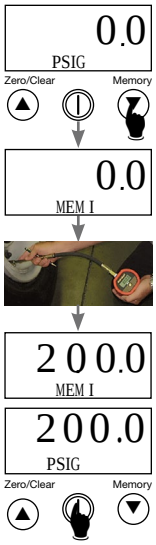
When desired memory location is displayed, take the pressure reading. The peak reading will be captured.

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.

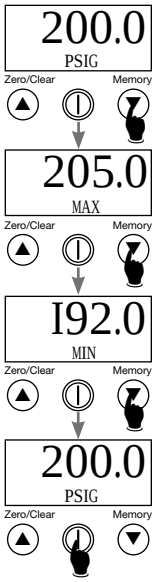
The gauge may be left in the maximum display mode if desired. The maximum reading will be continuously displayed, stored and updated.

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.

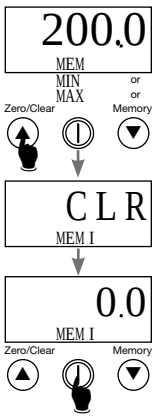
Release the button when CLR is displayed. The reading for the indicated memory location will be cleared.

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 uses a 4 digit passcode to enter the configuration modes. This is to prevent unauthorized changing of settings.

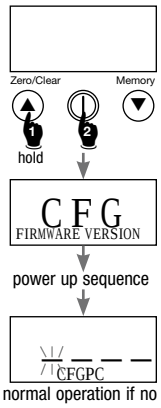
With the gauge off, press and hold the ▲ button. Then press the Power button.

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 passcode (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 passcode characters.



Enter Configuration Passcode

Enter the passcode. 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.

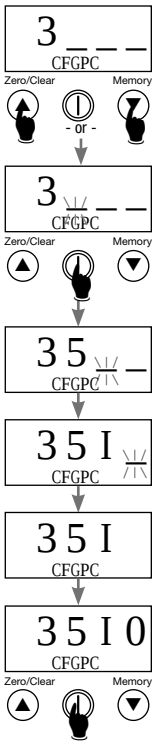
Use the ▲ or ▼ buttons to select 1.

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 passcode is entered, the gauge will return to the start of the passcode entry sequence.



Gauge Configuration—User or Factory

Upon successful passcode 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.

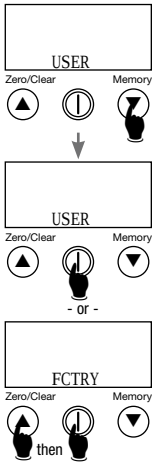
Press and release the Power button to continue with configuration.

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 or the previous configuration.

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.

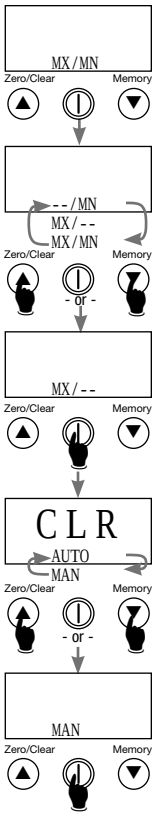
After the center power button is pressed when in user MX/MN configuration mode, the upper display indicates CLR.

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.



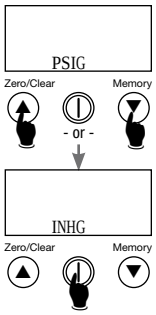
Engineering Unit Selection

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.

For compound gauges the choice of CMPND (inHg/psig) or -/+EU (±Engineering Units) will appear. The gauge must be changed to -/+EU first before alternate engineering units may be selected. Use the ▲ and ▼ buttons to navigate through the list of engineering units.

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.

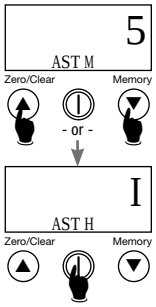
A setting of zero disables the auto shutoff timer. This requires using the Power button to shut the gauge off.

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 to restore the custom time.

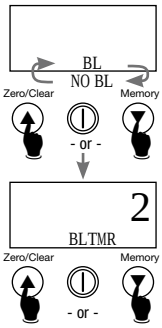
F20B: Go to the appropriate **F20B Memory** section on the next page to continue user configuration.

F22BBL: Go to the **F22BBL Backlight Shutoff Time** section on the next page to continue user configuration.



F22BBL 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.

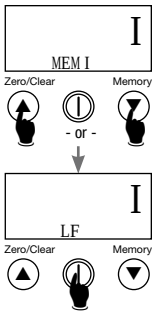
If BL was selected the current backlight auto shutoff time is displayed in minutes. 1 minute is the factory default.

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.

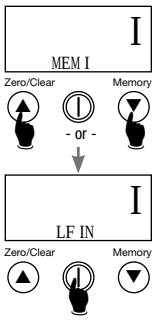
Use the ▲ and ▼ buttons to select MEM 1, or LF, RF, RR, or LR. The labels can be set up in any order.

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 memory labels can be set for MEM 1 through MEM 8, or for 4 tires and 4 tire inner liners used for auto racing.

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 one of the 8 memory labels: LF, LF IN, RF, RF IN, RR, RR IN, LR, LR IN. The labels can be set up in any order.

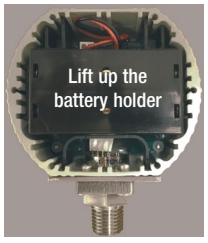
When the desired label for memory 1 is displayed, press and release the Power button.

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 when the indicator comes on or unreliable readings may result.

1. Remove the 6 Phillips screws on the back of the unit.
2. Lift up the battery holder.
3. Remove batteries by lifting up the positive end of the battery (opposite the spring) taking care not to bend the battery holder spring.
4. Discard old batteries properly, do not discard into fire, sources of extreme heat, or in any hazardous manner.
5. Always replace both batteries at the same time with high quality alkaline batteries.
6. 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.
7. Replace battery holder face down being careful not to pinch the wires.
8. Replace the back cover, including the rubber gasket and reinstall the six screws.



Calibration Preparation

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 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.

Install fresh batteries and allow the gauge to acclimate to ambient temperature for 20 minutes.

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 passcode) on the lower display.

Enter the 3510 passcode as described in the Configuration Passcode 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
3 PSI	6.920 FTH2O
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. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

Apply 50% full-scale pressure. The character display will alternate between +MID and CAL. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

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. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

Apply 50% full-scale vacuum. The character display will alternate between +MID and CAL. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

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. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

Apply 50% of full-scale pressure. The lower display will alternate between +MID and CAL. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

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. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

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. Use the ▲ and ▼ buttons to adjust the display to match the calibrator reading.

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.

Note: it is possible to do a zero calibration without affecting other calibration points. After Zero calibration, press and hold the Power button until the display indicates - - - - then release the button to store the new zero point calibration and restart the gauge.

User-Defined Passcode Configuration

The factory default passcode 3510 may be changed to a different value for configuration and/or calibration.

Configuration Passcode

With the unit off, press and hold the ▲ button to view and/or change the user configuration passcode. Then press the Power button. Release all buttons when the display indicates CFG.

Calibration Passcode

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

Change Passcode Mode

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 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 passcode 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 Passcode

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

Press the ▲ or ▼ button to select the first character of the new passcode.

When the correct first character is being displayed, press and release the Power button to proceed to the next passcode character.

Repeat above until the entire passcode is complete.

To exit the User Defined Passcode change mode, press and hold the Power button.

Release the button when the display indicates - - - - to restart the gauge.