MPG2000BBL D4-M2 Min/Max Intrinsically Safe Battery-Powered Digital Pressure Gauges

meriam® Meriam.com

- ▲ Selectable Units, Min/Max, Shutoff Time
- ▲ Easy Keypad Setup and Zero
- ▲ ±0.25% Test Gauge Accuracy
- ▲ 316L Stainless Steel Sensor
- ▲ All Metal Housing

Meriam MPG2000BBL series digital pressure gauges successfully address the modern demands of process pressure measurement in hazardous locations.

Standard features include min/max capture, zeroing on gauge reference ranges, selectable engineering units, pass code protection, adjustable display shutoff time, field recalibration and a ruggedized all-metal housing.

Typical applications are instrumentation and control in the process industries, hydraulics, pneumatics, industrial gases, and OEM applications.

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

Ranges and Resolution
See table below. Units may be changed to any listed with same sensor range. Fixed resolution.

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

Display
3 readings per second nominal display update rate
4 digit LCD, 0.5" H and 5 character 0.25" H alphanumeric
Red LED backlight

Batteries
Two 1.5 V AAA Panasonic LR03 alkaline cells
Approx. 150 to 1000 hours depending on backlight usage
Low battery symbol on display

Controls and Functions
Center button turns gauge on or off, hold to zero gauge reference models, activate backlighting for 1 min. if low light detected, cycle through min/max functions.
▲ (Units) increase settings, engineering unit selection
▼ (Time) decrease settings, auto shutoff time selection
Internal lockout switch: disable setup and calibration.

Auto Shutoff
Default 5 minutes. Selectable 1 minute to 8 hrs or on/off.

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

Pass Code Protected Calibration
Non-interactive zero, span, and linearity, ±10% of range

FM C US APPROVED

MADE IN USA

Overpressure, Burst, Vacuum
2 X pressure range for 3 psi to 2000 psi sensors
5000 psig for ranges using 3000 psig sensor
7500 psig for ranges using 5000 psig sensor
Over-range and under-range display warnings
Vacuum service: 15 psig, 15 psia, 30 psia, 100 psig, 100 psia, 200 psig
Burst: 4 X pressure rating or 10,000 psi, whichever is less

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

Housing Materials and Circuit Board Protection
Epoxy powder coated aluminum case, rear cover, and bezel. Rubber gaskets, polycarbonate label. Reinforced sensor area. Moisture resistant circuit board coating.

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

Temperature Ranges

Compensated:	32 to 158°F (0 to 70°C)
Storage:	–40 to 203°F (–40 to 95°C)
Operating:	–40 to 180°F (–40 to 82°C)

Sensor Ranges and Engineering Units * -HA option not available

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

How to Specify

MPG2000BBL range **-D4-M2 -** options

Range—see table at left

psi = PSI	kg/cm² = KGCM
inHg = INHG	g/cm² = GCM
oz/in² = ZIN	kPa = KPA
inH₂O = INH2O	MPa = MPA
ftH₂O = FTH2O	mbar = MBAR
mmHg = MMHG	bar = BAR
torr = TORR	cmH₂O = CMH2O
mmH₂O = MMH2O	atm = ATM

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

Any range may be ordered as the default engineering unit. If vacuum gauge requires a minus sign, please specify. The listed ranges are rounded off.

Optional—add to end of model number	
HA	High accuracy, ±0.1% FS ±1 LSD. Not available with 3 psi, 5 psi, bipolar, or vacuum sensors. See table at left for availability.
Accessories	
NC	5 point NIST traceability certificate, test data and date
RRB	Protective rubber boot

Example: **MPG2000BBL300PSIG-D4-M2-HA**
Battery powered, backlit display, 0-300.0 psig, 4 digit display, min/max memory, high accuracy
Gauge model number may vary from part number ordered.

MPG2000BBL D4-M2 Operating Instructions

Precautions

Approved Locations

The MPG2000BBL series is approved for use in the following Hazardous Locations.

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

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

Installation

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

Operation

- ✔ Use within the pressure range indicated on gauge label.
- ✔ Avoid permanent sensor damage! Do not apply vacuum to gauges not designated for vacuum operation.
- ✔ Use only with media compatible with 316L stainless steel.
- ⚠ Gauges are not for oxygen service. Accidental rupture of sensor diaphragm may cause silicone oil inside sensor to react with oxygen.
- ✔ The MPG2000BBL series gauges must only be operated in specified ambient temperature ranges.

Maintenance

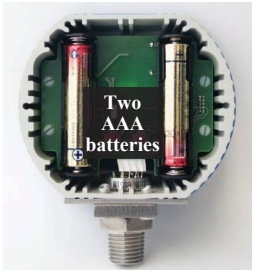
- ✔ The non-metallic cover of the pressure gauge is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
- ✔ Batteries must be replaced when the low battery indication comes on to prevent unreliable readings.
- ✔ WARNING: Replace batteries with approved type in non-hazardous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

Battery Replacement

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

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

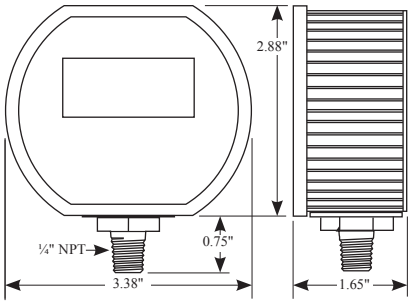
Replace both batteries with new ones at the same time. Do not mix different types of batteries. Substitution of components may impair intrinsic safety.



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

DS-MPG2000BBL rev. 01-15

Dimensions



Types of Gauges

Gauge reference reads zero with the gauge port open.

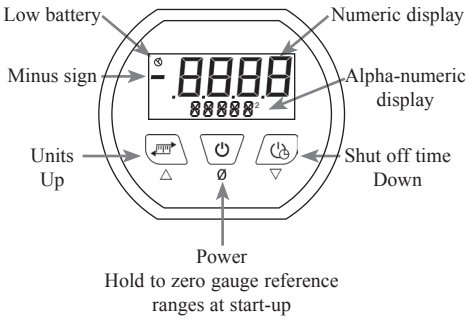
Bipolar ranges read positive pressure and vacuum in the same units, and zero with the gauge port open.

Compound ranges read positive pressure in psig and vacuum in inHg, and zero with the gauge port open.

Sealed reference reads zero with the gauge port open and is referenced to 14.7 psi. Used for 1000 psi and up.

Absolute reference reads atmospheric pressure with gauge port open and zero at full vacuum.

Display and Keypad



Operation

Power-Up

Press and hold the front button for approximately 1 second.

The display is tested, the full-scale range is indicated, the display segments are briefly shown again, then the actual pressure and units are displayed.

Power Up with Zero

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

Be sure the gauge port is exposed to normal atmospheric pressure and no pressure is applied. The zeroing function is only activated at each power-up and the stored zero correction is erased when the gauge is shut off.

Press and hold the front button. The display is tested.

Continue to press the button until *0000* is displayed.

Release the button. The gauge in now zeroed.

The display is tested, the full-scale range is indicated, the display segments are briefly shown again, then the actual pressure and units are displayed.

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

Normal Operation

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

If excessive vacuum is applied to a pressure-only gauge, the display will indicate *-Err* until the vacuum is released. Applying vacuum to a gauge designed for pressure may damage the pressure sensor.

If excessive pressure is applied (112.5% over range), an out-of-range indication of *I – – –* or *I.–.–.–* will be displayed depending on model.

Display Backlighting

Display backlighting will operate for one minute when a button is pressed provided the front light sensor detects low ambient light levels. The red LED backlighting may not be apparent under some lighting conditions.

Operation—continued

Minimum and Maximum Readings

Gauges are configured with minimum and maximum capture enabled. One or both can be enabled or disabled in the User Configuration mode.

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

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

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

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

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

Shut-Down

To shut off the gauge manually at any time, press and hold the center 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. A button can be pressed to keep the gauge on. The auto shutoff and backlight (if equipped) timers are reset whenever a button is pressed and released.

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

MPG2000BBL D4-M2 Configuration Instructions

Engineering Unit Selection

The selected engineering unit is stored in non-volatile memory and will be retained even with the gauge off or batteries removed. The available engineering units depend on the sensor range and is limited to prevent unwanted reading instability.

With the gauge in the normal operating mode, press and hold the left button until the lower units display starts blinking.

Use the ▲ and ▼ buttons to navigate through the list of engineering units. When the desired units are displayed, press and release the center button to save your selection and return to normal operation.

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

Compound (inHg/psig) gauges can be changed to display single-unit vacuum/pressure readings (±psig) when in the user configuration mode.

If no buttons are pressed the gauge will return to normal operating mode in approximately 15 seconds.

Auto Shutoff Time Selection

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

With the gauge in the normal operating mode, press and hold the right button.

Release the button when the auto shutoff time is displayed.

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

An auto shutoff time of zero disables the auto shutoff feature. Use the center button to shut the gauge off.

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

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

User Configuration Access

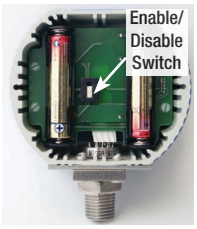
User configuration allows access to several functions.

- ❍ Revert back to the factory configuration
- ❍ Change min/max operation
- ❍ Convert a compound gauge to a bipolar gauge
- ❍ Calibrate the gauge

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

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

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



User Configuration Access

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

Then press the center power button.

Release all buttons when the display indicates *CFG* and the program version.

The full-scale range is indicated and the display is tested.

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

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

Proceed to the User Configuration Pass Code Entry section.

User Configuration: Pass Code Entry

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

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

User Configuration: Factory or User

This gives the choice of resetting the gauge features to the factory settings or continuing with user configuration. The upper display will be blank, and the lower display will indicate either *USER_* or *FCTRY*.

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

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

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

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

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

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

The configuration parameters may vary depending on the model.

User Configuration: Min/Max

Max/Min Configuration

Use the ▲ and ▼ buttons to select from the following.

MX/MN	Both highest and lowest values will be captured
MX/--	Only highest value will be captured
--/MN	Only lowest value will be captured
--/--	Capture feature is disabled

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

Max/Min Memory

The upper display will indicate *clr*.

Use the ▲ and ▼ buttons to select from the following.

AUTO	Automatically clear maximum and minimum values when the gauge is powered off.
MAN	Manually clear maximum and minimum values.

For compound range models, press and release the center button to move to the next parameter.

For all other models press and release the center button to save the user configuration and restart the gauge. Move the switch on the circuit board to the DISABLE position and replace the rear cover including the rubber gasket.

User Configuration: Compound/Bipolar Models

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

Use the ▲ and ▼ buttons to select from the following.

-/+EU	Vacuum is indicated as negative pressure in the selected engineering units
CMPND	Vacuum is negative INHG, pressure is PSIG. This setting disables engineering unit selection.

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

This completes the configuration for this model. Move the switch on the circuit board to the DISABLE position and replace the rear cover including the rubber gasket.

Changing the Pass Code

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

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

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

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

View Or Change User Configuration Pass Code

With the unit off, press and hold the ▲ button, then press the center button.

Release all buttons when the display indicates *CFG*.

View Or Change User Calibration Pass Code

With the unit off, press and hold the ▼ button, then press the center button.

Release all buttons when *CAL* is shown.

Enter Access Code 1220

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

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

To cancel and return to normal operation, press and release the center button without entering any pass code characters.

Use the ▲ and ▼ and center buttons to enter the 1220 pass code.

Press and release the center button to proceed.

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

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

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

MPG2000BBL D4-M2 Calibration Instructions

Calibration Preparation

Calibration must only be done in a non-hazardous area. See the Precautions section.

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

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

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

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

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

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

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

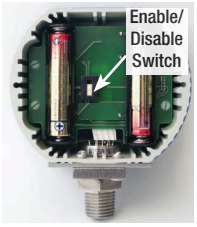
Warning: Never apply vacuum to gauge not designated for vacuum service. Permanent sensor damage may result.

It is good practice to install fresh batteries before calibration.

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

Calibration

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



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

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

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

Entering Calibration Mode

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

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

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

Enter the pass code as described in the User Configuration Pass Code Entry section. The default is 3510, but this is user changeable.

Continue to the Calibration Mode section.

Calibration—continued

Calibration Mode

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

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

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

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

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

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

▲ 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 ▲ or ▼ button. After about one second, the display will begin to change continuously.

Release the button to stop.

Then make fine adjustments by pressing and quickly releasing the appropriate button.

Gauge Reference Pressure Gauges

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

Press the ▲ and ▼ buttons to obtain a zero indication on the gauge display.

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

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

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

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

Calibration—continued

Gauge Reference Vacuum Gauges

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

Press the ▲ and ▼ buttons to obtain a zero indication on the gauge display.

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

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

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

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

Absolute Reference Gauges

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

Press the ▲ and ▼ buttons until the display indicates zero.

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

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

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

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

Compound and Bipolar Gauges

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

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

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

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

Save Calibration

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

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

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

Replace the back cover, including the rubber gasket.

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