

Product Manual



PG5

DIGITAL PRESSURE GAUGE

Table of Contents

WARRANTY	1
PROGRAMMING THE PG5	2-18
Full Access Menu	3
Accessing the Mode Setting	4
Mode Definitions	4
Accessing/Exiting the Setup Menu	5
Maximum/Minimum Reset (MAXMIN)	6
Units of Measure (UNITS)	7
Using Custom Units (CUSTOM)	8
Peak-Hold (P HOLd)	9
Advanced Settings (AdvSET)	10
Auto-Off (AUTO)	10
Decimal Place (dEC PL)	11
Sample Rate (SAMPLE)	12
Bar Graph Settings	13
Full-Scale Range Adjust (RANGE)	14
Analog Setpoints	15
Analog Calibration	16
Tare (TARE)	17
Default (dEFAULT)	18
WIRING THE PG5	19-21
Standard 9V Battery	19
4-20 mA Option (loop powered)	19
Battery Powered with 0-2 VDC Output	20
Externally Powered with 0-5 VDC Analog Output	21
Externally Powered, No Output	21
SPECIFICATIONS	22-23

WARRANTY

This product is covered by APG's warranty to be free from defects in material and workmanship under normal use and service of the product for 24 months. For a full explanation of our Warranty, please visit <https://www.apgsensors.com/resources/warranty-certifications/warranty-returns/>. Contact Technical Support to receive a Return Material Authorization before shipping your product back.

PROGRAMMING THE PG5



Each of the three buttons on the PG5 performs multiple functions. The primary function applies when in standard operating mode. The secondary functions are used for programming operations and when special features, such as Peak-Hold, are enabled.

On/Off Button

Primary Function: Press and hold for 1 second to turn the gauge on/off.

Secondary Function: Press once to access the main setup menu.

Zero Button (Z)

Primary Function: Press to “zero” the gauge reading (the reading must be less than 5% of full-scale in order to zero the gauge).

Secondary Function: Cycles through the options in the setup menus.

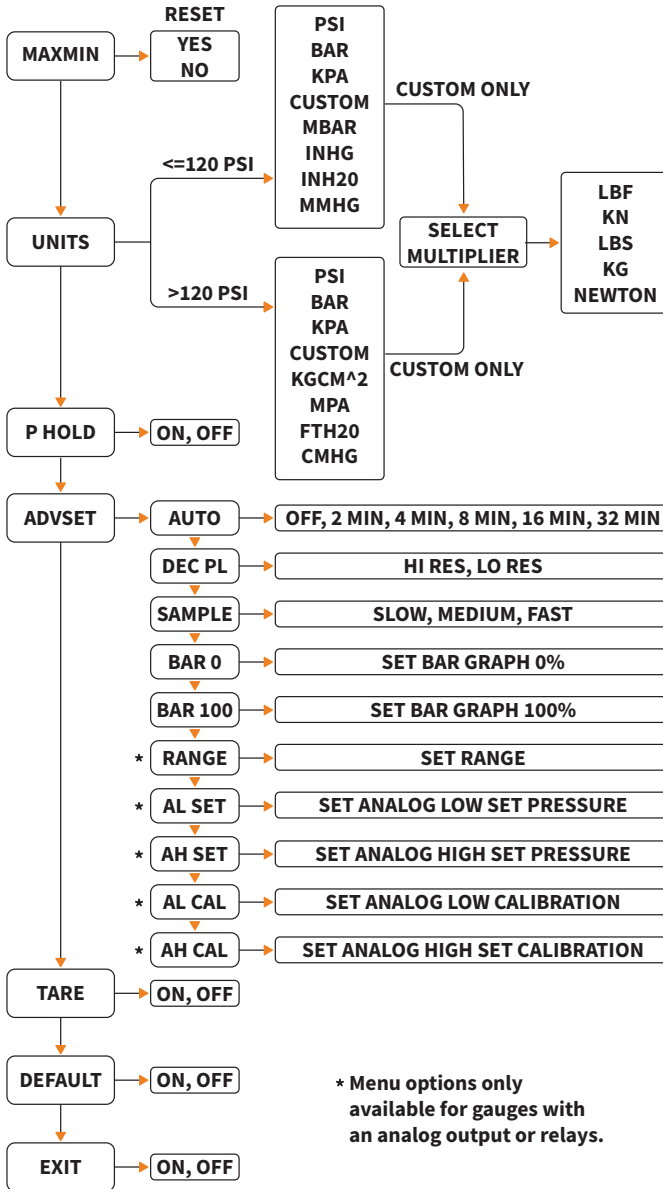
Select Button (S)

Primary Function: Cycles between the current, maximum, and minimum pressure readings.

Secondary Function: Used to accept the displayed option while in the setup menus.

Secondary Function: Resets the peak-hold reading when the peak-hold feature is enabled.

Full Access Menu



Accessing the Mode Setting:

- Step 1:** Simultaneously press and hold the **On/Off** button and the **(S)** button for approximately 3 seconds. This will bring up the 3 digit mode number.
- Step 2:** Enter the desired mode number (see mode definitions below) by using **(Z)** to change the value of the flashing digit, and **(S)** to advance to the next digit.

Mode Definitions:

Mode 000: Full Access

Provides access to all menu settings.

NOTE: *If no buttons are pushed for 1 minute, the gauge will revert back to Mode 003 (factory default).*

Mode 002: Limited Access

Menu is locked

(Z) button zeros the reading

(S) cycles between the Max and Min readings

On/Off functions only on battery powered gauges

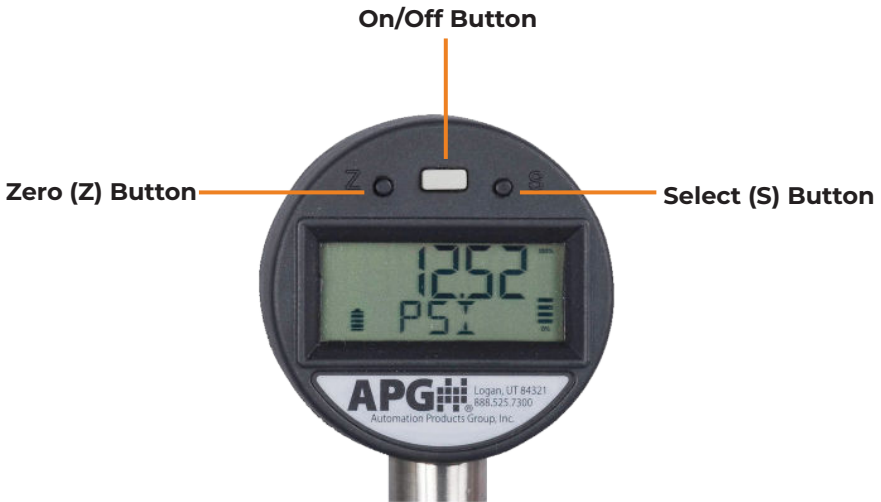
Mode 003: Factory Default

Full access **except** Full Scale Calibration is locked

Mode 005: Locked Access

All buttons locked **except** the on/off button on battery powered gauges.

Accessing/Exiting the Setup Menu:



Accessing the Main Setup Menu:

- Step 1:** With the gauge powered on, press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to scroll through menu choices; max/min, units, peakhold, advanced settings, tare, default, and exit.

Exiting the Setup Menu:

- Step 1:** While in the main setup menu, press **(Z)** until **EXIT** is displayed.
- Step 2:** Press **(S)** to access the Exit options.
- Step 3:** Press **(Z)** until **YES** is displayed.
- Step 4:** Press **(S)** to Exit the main setup menu and return to the standard operating mode.

Maximum/Minimum Reset (MAXMIN):

Pressing the **(S)** button while in standard operating mode will cycle between displaying the current pressure reading, the Maximum pressure reading and the Minimum pressure reading. The maximum and minimum readings will be stored until the gauge is powered down or the max/min readings are reset.

Resetting the Max/Min readings:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through options until **MAXMIN** is displayed.
- Step 3:** Press **(S)** to access the Max/Min reset options.
- Step 4:** Press **(Z)** to toggle between **YES** and **NO** until **YES** is displayed.
- Step 5:** Press **(S)** to reset the Max/Min readings and return to the main setup menu.

Units of Measure (UNITS):

Allows the user to select the unit of measure to be displayed as the pressure reading.

For gauges over 120 psi:

PSI	(pounds per square inch)
bAR	(bar)
KPA	(kilopascals)
*CUSTOM	(see "Using Custom Units" on next page)
KGCM [^] 2	(kilograms per cubic centimeter)
MPA	(megapascals)
FTH20	(feet of water @ 60 °F)
cmHG	(centimeters of mercury)

For gauges less than 120 psi:

PSI	(pounds per square inch)
bAR	(bar)
KPA	(kilopascals)
*CUSTOM	(see "Using Custom Units" on next page)
mbAR	(millibar)
INHG	(inches of mercury)
INH20	(inches of water @ 60 °F)
mmHG	(millimeters of mercury)

Setting the Unit of Measure:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **UNITS** is displayed.
- Step 3:** Press **(S)** to access the Units options.
- Step 4:** Press **(Z)** to cycle through setting options until the desired unit of measure is displayed.
- Step 5:** Press **(S)** to apply the setting and return to the main setup menu.

Using Custom Units (CUSTOM):

The Custom Units setting allows the user to display a volumetric weight by applying a conversion factor to the pressure reading.

NOTE: *The conversion factor must be calculated using Pound per Square Inch (psi) as the base unit of measure.*

Setting the Custom Units feature:

- Step 1:** Calculate the conversion factor from psi to the desired unit of measure.
- Step 2:** Press the **On/Off** button once to enter the main setup menu.
- Step 3:** Press **(Z)** to cycle through the options until **UNITS** is displayed.
- Step 4:** Press **(S)** to access the Units setting options.
- Step 5:** Press **(Z)** to cycle through the Units options until **CUSTOM** is displayed.
- Step 6:** Press **(S)** to access the Custom Units setting. A 5-digit conversion factor will appear with the first digit flashing.
- Step 7:** Press **(Z)** to change the value of the flashing digit (options: 0-9).
- Step 8:** Press **(S)** to accept the flashing digit and advance to the next digit. Repeat steps 7 and 8 as necessary.
- Step 9:** After the last digit is accepted by pressing **(S)**, use **(Z)** to scroll through the custom units of measure: **LBF, KN, LBS, KG, NEWTON.**
- Step 10:** Press **(S)** to accept the custom unit and return to the main setup menu.

Peak-Hold (P HOLD):

When the Peak-Hold is enabled, the gauge will display the “peak” or maximum pressure reading since the gauge was powered on or the Max/Min value was reset.



NOTE 1: When the Peak-Hold feature is enabled, a small box containing the words PEAK HOLD will be displayed in the upper left corner of the display.

Options: Off or On

Enabling the Peak-Hold feature:

- Step 1:** Press the **On/Off** button to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **P HOLD** is displayed.
- Step 3:** Press **(S)** to access the Peak-Hold setting options.
- Step 4:** Press **(Z)** to toggle between **OFF** and **ON**.
- Step 5:** Press **(S)** to apply the displayed setting and return to main setup menu.

NOTE 2: The peak value can be reset by pressing (S) with the Peak-Hold function enabled.

Advanced Settings (AdVSET):

The Advanced Settings menu is used to customize the LCD display and to setup any optional features, such as an analog output.

Auto-Off (AUTO):

This function is applicable to battery powered units only. The Auto-Off feature allows the user to designate the time of inactivity (no buttons pushed) until the gauge automatically powers down.

Options: 2 MIN, 4 MIN, 8 MIN, 16 MIN, 32 MIN, and OFF

NOTE: Selecting OFF disables the Auto-Off feature; the gauge will then remain powered indefinitely as long as there is sufficient voltage being supplied (~3.3V).

Setting the Auto-Off feature:

- Step 1:** Press the **On/Off** button to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the menu options until **AdVSET** is displayed.
- Step 3:** Press **(S)** to enter the Advanced Settings menu.
- Step 4:** Press **(Z)** to cycle through the menu options until **AUTO** is displayed.
- Step 5:** Press **(S)** to access the Auto-Off setting options.
- Step 6:** Press **(Z)** to cycle through setting options until the desired setting is displayed.
- Step 7:** Press **(S)** to apply the setting and return to advanced setup menu.

Decimal Place (dEC PL):

The reading can be set to display in High Resolution (**HI RES**) or Low Resolution (**LO RES**) mode. Switching between resolutions will shift the displayed reading by one decimal place position.

NOTE: *When Low Resolution mode is enabled on a gauge with 0 decimal place positions, the display will increment in factors of 10.*

Options: High Resolution (**HI RES**) or Low Resolution (**LO RES**)

Setting the Decimal Place feature:

- Step 1:** Press the **On/Off** button to enter the main setup menu.
- Step 2:** Press (**Z**) to cycle through the options until **AdvSET** is displayed.
- Step 3:** Press (**S**) to enter the Advanced Settings menu.
- Step 4:** Press (**Z**) to cycle through the options until **dEC PL** is displayed.
- Step 5:** Press (**S**) to access the Decimal Place setting options.
- Step 6:** Press (**Z**) to cycle through the resolution settings.
- Step 7:** Press (**S**) to apply the displayed setting and return to advanced setup menu.

Sample Rate (SAMPLE):

Adjusts the rate at which the gauge takes sample readings.

NOTE: *Setting the Sample Rate to “SLOW” will help preserve battery life (when applicable) and will also help to smooth rapidly fluctuating readings.*

Options: **SLOW** (4x/second), **MEDIUM** (8x/second), **FAST** (16x/second)

Setting the Sample Rate feature:

- Step 1:** Press the **On/Off** button to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **AdvSET** is displayed.
- Step 3:** Press **(S)** to access the Advanced Settings menu.
- Step 4:** Press **(Z)** to cycle through the options until **SAMPLE** is displayed.
- Step 5:** Press **(S)** to access the Sample Rate setting options.
- Step 6:** Press **(Z)** to cycle through the setting options until the desired setting is displayed.
- Step 7:** Press **(S)** to apply the displayed setting and return to advanced setup menu.

Bar Graph 0% (bAR 0) & Bar Graph 100% (bAR100) Settings:

Allows the user to define the reading values associated with 0% and 100% on the display bar graph. Bars will appear/disappear in 10% increments of the total span between the two values.



NOTE: The 0% reference does not have to be the lower pressure setting; 0% can be set as the higher pressure setting, thereby causing the bar graph to increase as the pressure decreases. Negative pressure settings can also be used as either the 0% or 100% reference points.

Setting the Display Bar Graph:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **AdvSET** is displayed.
- Step 3:** Press **(S)** to access the Advanced Settings menu.
- Step 4:** Press **(Z)** to cycle through the options until **BAR 0** is displayed.
- Step 5:** Press **(S)** to access the Bar Graph 0% value. A 5-digit number will appear with the first digit flashing.
- Step 6:** Press **(Z)** to change the value of the first flashing digit (options: 0-9 or "-").
- Step 7:** Press **(S)** to accept the value of the flashing digit and advance to the next digit. Repeat steps 6 and 7 until the desired 0% reading is fully entered. After the last digit is accepted by pressing **(S)**, the display will return to the advanced setup menu.
- Step 8:** Press **(Z)** to cycle through the options until **BAR100** is displayed.
- Step 9:** Repeat Steps 5-7 to enter the Bar Graph 100% value.
- Step 10:** To exit the advanced setup menu, press **(Z)** until **EXIT** is displayed and press **(S)** to exit to the main setup menu.

Full-Scale Range Adjust (RANGE):

Allows the user to adjust the reading at full-scale pressure. The reading can be adjusted by +/-10% full-scale.

NOTE: *The pressure reading must be within 5% of the full-scale value in order to make Range adjustments. For example, a 1000 psi gauge would need to be reading between 950 psi and 1050 psi in order to adjust the Range feature. If the reading is not within 5% of full scale, **NOADJU** (No Adjustment) will be displayed when trying to adjust the Range.*

Adjusting the Full-Scale Range:

- Step 1:** Ensure that the pressure reading is within 5% of full-scale.
- Step 2:** Press the **On/Off** button to enter the main setup menu.
- Step 3:** Press **(Z)** to cycle through the options until **AdvSET** is displayed.
- Step 4:** Press **(S)** to access the Advanced Settings menu.
- Step 5:** Press **(Z)** to cycle through the options until **RANGE** is displayed.
- Step 6:** Press **(S)** to enter the Range adjust mode.
- Step 7:** Press **(Z)** to increase the reading, or press **(S)** to decrease the reading.
- Step 8:** Press the **On/Off** button to accept the adjusted reading and return to the advanced setup menu.
- Step 9:** To exit the advanced setup menu, press **(Z)** until **EXIT** is displayed and press **(S)** to exit to the main setup menu.

Analog Low (AL SET) & Analog High (AH SET) Setpoints:

Allows the user to define the reading values associated with the Low Analog signal (i.e. 4mA or 0V) and the High Analog signal (i.e. 20mA, 2V or 5V).

NOTE: *The analog signal can be spanned over any portion of the pressure range, and can also be inverted by setting the Analog Low Setpoint as the higher pressure value. Negative pressure values can also be used as either the Analog High or Analog Low Setpoints.*

Setting the Analog Signal Span:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the menu options until **AdvSET** is displayed.
- Step 3:** Press **(S)** to enter the Advanced Settings menu.
- Step 4:** Press **(Z)** to cycle through the options until **AL SET** is displayed.
- Step 5:** Press **(S)** to access the Analog Low setpoint value. A 5-digit number will appear with the first digit flashing.
- Step 6:** Press **(Z)** to change the value of the first flashing digit (options 0-9 or "-").
- Step 7:** Press **(S)** to accept the value of the flashing digit and advance to the next digit.
- Step 8:** Repeat steps 6 and 7 until the desired Analog Low reading is fully entered. After the last digit is accepted by pressing **(S)**, the display will return to the main options menu.
- Step 9:** Press **(S)** to reenter the Advanced Settings menu.
- Step 10:** Press **(Z)** to cycle through the options until **AH SET** is displayed.
- Step 11:** Repeat Steps 6-8 to enter the Analog High Setpoint value.

Analog Low (AL CAL) & Analog High (AH CAL) Calibration:

Allows the user to calibrate or “trim” the endpoints of the analog signal output (i.e. 4mA & 20mA or 0V & 2V/5V).

Calibrating the Analog Signal End-Points:

Step 1: Use a calibrated meter to monitor the analog output signal.

Step 2: Force a low analog output signal (i.e. 4mA or 0V) either by adjusting the applied pressure or by adjusting the Analog Setpoints (see “Analog Setpoints” on page 15 for details).

Step 3: Press the **On/Off** button to enter the main setup menu.

Step 4: Press **(Z)** to cycle through the options until **AdvSET** is displayed.

Step 5: Press **(S)** to access the Advanced Settings menu.

Step 6: Press **(Z)** to cycle through the setup options until **AL CAL** is displayed.

Step 7: Press **(S)** to access the Analog Low Calibration value. A 5-digit number will appear with the first digit flashing.

Step 8: Press **(Z)** to change the value of the flashing digit.

NOTE: *Increasing this 5-digit number will increase the output signal. Changing the digit farthest to the left will produce the coarsest adjustment, while each successive digit moving to the right will cause subsequently finer adjustments to the output signal.*

Step 9: Press **(S)** to accept the value of the flashing digit and advance to the next digit.

Step 10: Repeat steps 8 and 9 until the desired Analog Output Signal is displayed on the meter. After the last digit is accepted by pressing **(S)**, the display will return to the main setup menu.

Step 11: Press **(S)** to reenter the Advanced Settings menu.

Step 12: Press **(Z)** to cycle through the options until **AH CAL** is displayed.

Step 13: Repeat Steps 8-10 to enter the Analog High Calibration value.

Tare (TARE):

Enabling the Tare function will set the current pressure reading as the zero reference pressure in order to measure a net change in pressure as opposed to measuring the gross pressure.

Enabling the Tare feature:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **TARE** is displayed.
- Step 3:** Press **(S)** to access the Tare setting options.
- Step 4:** Press **(Z)** to toggle between **OFF** and **ON**.
- Step 5:** Press **(S)** button to apply the displayed option and return to main setup menu.



NOTE 1: When tare function is enabled, the T5 symbol will appear in the lower left corner of the display.

WARNING: Do NOT disconnect the gauge from the pressure fitting while the tare function is enabled. The gauge could still be under pressure even though the reading shows 0.

NOTE 2: If the maximum gross full-scale pressure value is reached while the Tare feature is enabled, the PG5 will automatically disable the Tare feature and return to reading the gross pressure in order to help prevent the user from accidentally overpressuring the gauge.

Default (dEFAULT):

Used to reset the gauge to the factory default settings.

Resetting the gauge to factory default settings:

- Step 1:** Press the **On/Off** button once to enter the main setup menu.
- Step 2:** Press **(Z)** to cycle through the options until **dEFAULT** is displayed.
- Step 3:** Press **(S)** to access the Default options.
- Step 4:** Press **(Z)** to cycle between **NO** and **YES**.
- Step 5:** Press **(S)** to apply the displayed setting and return to main setup menu.

WIRING THE PG5

Standard 9V Battery

Battery Replacement:

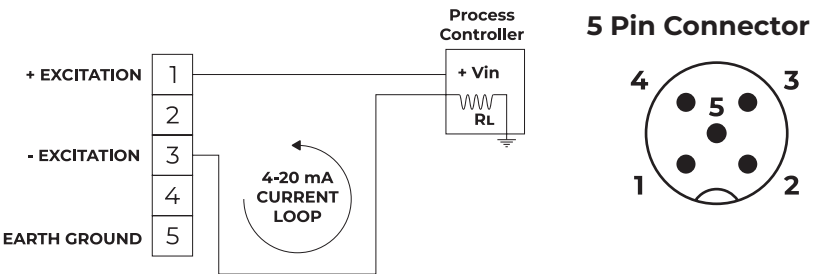
The battery is accessed by removing the single screw at the top of the battery cover on the back of the gauge.

NOTE: Do not overtighten the screw when securing the battery cover.

4-20 mA Option (loop powered):

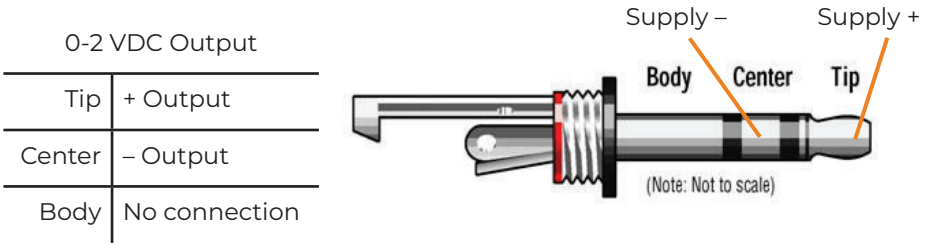
NOTE 1: The supply voltage must be sufficient to maintain a minimum of 9 VDC after “dropping” voltage across the load resistance with the output at 20mA. Example: If $R_L = 250$ ohm then the “drop” is $0.02 \text{ Amps} \times 250 \text{ ohm} = 5$ volts. Therefore power supply minimum is $5 \text{ V} + 9 \text{ V} = 14\text{V}$.

NOTE 2: Completion of the earth ground (Pin 5) is recommended for proper circuit protection.



Battery Powered with 0-2 VDC output option:

The 0-2 VDC signal is accessed through a 1/8 inch stereo jack connector (mate supplied) on the back of the gauge. The “Tip” connection is “+ Power” and the “Center” connection is “– Power”.

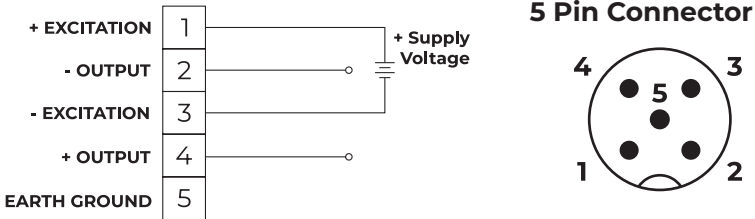


NOTE 1: Do not connect to the stereo jack’s case connection.

NOTE 2: To minimize the effect on the battery life, the output should not be loaded with less than 100k ohms.

WARNING: Always turn off the supply power before inserting or removing the stereo jack plug. Failure to do so can damage the gauge.

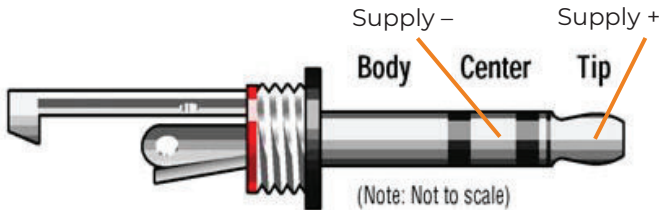
Externally Powered with 0-5 VDC Analog Output:



NOTE: Completion of the earth ground (Pin 5) is recommended for proper circuit protection.

Externally Powered, No Output:

Externally powered gauges without an analog output are powered using an 1/8 inch stereo jack connector (mate supplied) on the back of the gauge. The “Tip” connection is “+ Power” and the “Center” connection is “– Power”.



WARNING: Always turn off the supply power before inserting or removing the stereo jack plug. Failure to do so can damage the gauge.

NOTE: Do not connect to the stereo jack’s case connection.

SPECIFICATIONS:

Overpressure:

(Proof) 1.5x full scale

Burst Pressure:

3x full scale

Performance

Accuracy (linearity & hysteresis):

+/- 0.25% BFSL

+/- 0.1% BFSL (selected ranges)

Stability – One Year Zero Drift: $<\pm 1\%$ FS

Thermal Zero Shift: $\pm 0.04\%$ FS/ °F

Thermal Sensitivity Shift: $\pm 0.04\%$ FS/ °F

Life: 10 million cycles minimum

Adjustments: Auto zero, tare

Connectivity

Output Options:

4-20 mA, 0-2 VDC, 0-5 VDC

Environmental:

Compensated Temp: 20° to 130°F (-7° to 54°C)

Storage Temp: -40° to 160°F (-40° to 71°C)

Operating Temp: 0° to 160°F (-18° to 71°C)

Certification:

NIST certification on select ranges

CE

Electrical:

Battery Option:

(1) Standard 9V (typical life 700 hrs)

Auto-off: 2 - 32 minutes

Low battery detection with 25% increments

External Power Option: 9-28 VDC

5-Pin M-12 Connector

Programming

Features:

User selectable units of measure, Max/Min,

Reset & Reading, Peak-Hold, Tare, Sample Rate,

Range Adjustment, Adjustable Resolution, Auto-Off

Physical:

Size: 2.66" x 1.55" (67.6 x 39.4 mm)

Connection: 1.25" (31.8 mm)

Weight: 0.36 lb (163 grams)

Injected molded case (EMI-X® PDX-W-88341)

Wetted Materials:

316L SS: up to 5,000 psi

15-5 SS: 5,000 psi and above

Display: 5 digit LCD, 0.4 in. digits