



## Ranges and Resolution

abs: absolute reference (atmospheric pressure to zero at full vacuum)

vac: vacuum gauge, minus sign not used unless specified

Resolution is fixed as indicated in table below

Contact factory for engineering units not listed

Contact factory for other engineering units	199.9 inHg abs	1600 mmHg	70.0 bar	±1.000 kg/cm <sup>2</sup>
	199.9 inHg	760 torr abs	140.0 bar	1.000 kg/cm <sup>2</sup>
	50.0 oz/in <sup>2</sup>	1600 torr abs	199.9 bar	1.999 kg/cm <sup>2</sup> abs
3.00 psig	80.0 oz/in <sup>2</sup>	1999 mmH <sub>2</sub> O	350 bar	1.999 kg/cm <sup>2</sup>
5.00 psig	240 oz/in <sup>2</sup> abs	199.9 cmH <sub>2</sub> O	19.99 kPa	4.00 kg/cm <sup>2</sup>
15.00 psi abs	240 oz/in <sup>2</sup> vac	350 cmH <sub>2</sub> O	35.0 kPa	7.00 kg/cm <sup>2</sup> abs
15.00 psig vac	±240 oz/in <sup>2</sup>	1000 cmH <sub>2</sub> O	100.0 kPa abs	7.00 kg/cm <sup>2</sup>
±15.0 psig	240 oz/in <sup>2</sup>	1999 cmH <sub>2</sub> O	100.0 kPa vac	14.00 kg/cm <sup>2</sup>
15.00 psig	85.0 inH <sub>2</sub> O	199.9 mbar	±100.0 kPa	19.99 kg/cm <sup>2</sup>
30.0 psi abs	140.0 inH <sub>2</sub> O	350 mbar	100.0 kPa	35.0 kg/cm <sup>2</sup>
30.0 psig	400 inH <sub>2</sub> O abs	1000 mbar abs	199.9 kPa abs	70.0 kg/cm <sup>2</sup>
60.0 psig	400 inH <sub>2</sub> O vac	1000 mbar vac	199.9 kPa	140.0 kg/cm <sup>2</sup>
100.0 psi abs	±400 inH <sub>2</sub> O	±1000 mbar	400 kPa	199.9 kg/cm <sup>2</sup>
100.0 psig	400 inH <sub>2</sub> O	1000 mbar	700 kPa abs	350 kg/cm <sup>2</sup>
199.9 psig	850 inH <sub>2</sub> O	1999 mbar abs	700 kPa	1.000 atm abs
300 psig	7.00 ftH <sub>2</sub> O	1999 mbar	1500 kPa	±1.000 atm
500 psig	12.00 ftH <sub>2</sub> O	1.000 bar abs	1999 kPa	1.000 atm
1000 psig	35.0 ftH <sub>2</sub> O	1.000 bar vac	3.50 MPa	4.00 atm
1999 psig	70.0 ftH <sub>2</sub> O	±1.000 bar	7.00 MPa	7.00 atm
6.00 inHg	140.0 ftH <sub>2</sub> O	1.000 bar	14.00 MPa	14.00 atm
10.00 inHg	230 ftH <sub>2</sub> O	1.999 bar abs	19.99 MPa	19.99 atm
30.0 inHg abs	480 ftH <sub>2</sub> O	1.999 bar	35.0 MPa	35.0 atm
30.0 inHg vac	150.0 mmHg	4.00 bar	1000 g/cm <sup>2</sup> abs	70.0 atm
±30.0 inHg	260 mmHg	7.00 bar abs	1000 g/cm <sup>2</sup>	135.0 atm
30.0 inHg	760 mmHg abs	7.00 bar	1999 g/cm <sup>2</sup> abs	199.9 atm
60.0 inHg abs	760 mmHg vac	14.00 bar	1999 g/cm <sup>2</sup>	340 atm
60.0 inHg	760 mmHg	19.99 bar	1.000 kg/cm <sup>2</sup> abs	
120.0 inHg	1600 mmHg abs	35.0 bar	1.000 kg/cm <sup>2</sup> vac	

## Accuracy

Includes linearity, hysteresis, repeatability

Standard: ±0.25% of full scale ±1 least significant digit

Optional: **-HA** ±0.1% FS ±1LSD (most ranges)

**CD** Factory 5-point calibration data

**NC** NIST traceable test report and 5-point calibration data

## Display

3 readings per second nominal display update rate

**DR** in ranges up to 1999: 3 1/2 digit LCD, 1/2" digit height

**DRBL** ranges up to 1999: 3 1/2 digit LCD, 1/2" digit height, red LED backlight

## Controls

Non-interactive zero and span: ±10% range

Test calibration level: 0-100% range

Retransmission zero and span: internal potentiometers

## Retransmission Output

True analog output, 50 milliseconds typical response time.

**-I** model: Current output, 4-20 mA DC, output drive (compliance) determined by power source. See graph.

**-V** model: Voltage output, 0-2 VDC into 5 kΩ or greater

## Test Function

Front panel TEST button, when depressed sets display and retransmission output to "test calibration" level, independent of pressure input to allow testing of system operation.

Test level is set by top-accessible multiturn potentiometer to any value from 0 to 100% of full scale.

## Power

Gauge is on whenever power is applied. Designed for continuous operation.

Any AC source of 8 to 24 VAC 50/60 Hz or any DC source of 9 to 32 VDC

30 mA maximum, 40 mA for DRBL model with backlighting

3 ft long 4-conductor (power and output) 22 AWG shielded cable with stripped and tinned wire ends

Order optional **WMPK** 12 VDC wall mount power supply kit to operate on 115 VAC

## Environmental

Storage temperature: -40 to 203°F (-40 to 95°C)

Operating temperature: -4 to 185°F (-20 to 85°C)

Compensated temperature: 32 to 158°F (0 to 70°C)

- Low-Voltage AC/DC-Powered
- Powered 4-20 mA or 0-2 V Analog Output
- Output Test Function
- DRBL Includes Backlit Display

**F4DR2000PSIG-I**  
1999 psig Range  
NEMA 4X  
4-20 mA Output



## Size

3.5" W x 3.0" H x 2.0" D housing

Add approximately 0.75" to height for pressure fitting

Add approximately 1" to depth for strain relief and wire clearance

## Weight

Gauge: 9 ounces (approx.)

Shipping weight: 1 pound (approx.)

## Housing

NEMA 4X

UV stabilized polycarbonate/ABS case, light gray color

Clear polycarbonate window to protect display

Gasketed rear cover, six captive stainless steel screws

## Pressure/Vacuum Connection Size and Material

1/4 NPT male

All wetted parts are 316 stainless steel

## Overpressure

3000 psig range and metric equivalents: 5000 psig

5000 psig range and metric equivalents: 7500 psig

All others 2 times sensor pressure

## Burst Pressure

4 times sensor pressure rating, or 10,000 psi, whichever is less

## Models and Options

NEMA 4X

Backlit + NEMA 4X

Pressure/Vacuum Range → **F4DR range units ref - output**

Units → **F4DRBL range units ref - output**

**G**=Gauge, **A**=Absolute, **VAC**=Vacuum

Output Options →

**-I** 4-20 mA

**-V** 0-2 V

Example: **F4DRBL500PSIG-V**

F4DR with BL display backlighting, 500 psig, 0-2 Volt output

Unit Abbreviations			
psi = <b>PSI</b>	ftH <sub>2</sub> O = <b>FTH2O</b>	kg/cm <sup>2</sup> = <b>KGCM</b>	mbar = <b>MBAR</b>
inHg = <b>INHG</b>	mmHg = <b>MMHG</b>	g/cm <sup>2</sup> = <b>GCM</b>	bar = <b>BAR</b>
oz/in <sup>2</sup> = <b>ZIN</b>	torr = <b>TORR</b>	kPa = <b>KPA</b>	cmH <sub>2</sub> O = <b>CMH2O</b>
inH <sub>2</sub> O = <b>INH2O</b>	mmH <sub>2</sub> O = <b>MMH2O</b>	MPa = <b>MPA</b>	atm = <b>ATM</b>



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## INSTALLATION AND PRECAUTIONS

Install or remove the gauge using wrench on hex fitting only. Do not attempt to tighten by turning housing or any other part of the gauge. Use fittings appropriate for the pressure range of the gauge. Do not apply vacuum to gauges not designed for vacuum operation. Due to the hardness of 316 stainless steel, it is recommended that a thread sealant be used to ensure leak-free operation. **NEVER** insert objects into the gauge port or blow out with compressed air. Permanent damage not covered by warranty will result to the sensor. **NEVER** connect the gauge wires directly to 115 VAC or permanent damage not covered by warranty will result!

## ELECTRICAL CONNECTION

The F4DR series can be powered by any 9 to 32 VDC or 8 to 24 VAC 50/60 Hz power source. An inexpensive unregulated low voltage source can be used. The magnitude of the supply voltage has negligible effect on the gauge calibration as long as it is within the stated voltage ranges. Do not allow the gauge supply voltage fall below 9 VDC or 8 VAC RMS. Operation below these values may cause erratic or erroneous readings or output. Models with 4-20 mA output power the current loop. Use a power source with sufficient voltage to operate the current loop.

Connection is made with the 4-conductor cable at the gauge rear. This cable accommodates both the gauge power supply and retransmission output. If using a 9 to 32 VDC power source, connect the (+) supply to the RED lead and the (-) supply to the BLACK lead. If using a 8 to 24 VAC 50/60 Hz power source, connect to the RED and BLACK leads. When using low voltage AC power, there is of course, no polarity consideration.

The (+) retransmission output appears on the WHITE lead, and the (-) retransmission output appears on the GREEN lead. Use of the shield (drain) wire of the retransmission output is optional. It is not generally needed for 4-20 mA current loops unless very long cable lengths are used in electrically noisy environments.

Power -	BLACK
Power +	RED
Output -	GREEN
Output +	WHITE

The output is a continuous analog signal based on the transducer output rather than the display. This output is filtered to improve noise immunity and has a response time of about 50 milliseconds.

The power supply (-) lead is tied to the retransmission output ground. Therefore, if a DC supply is used, the power supply (-) lead should be considered common with regard to the retransmission output (-) connection.

## USING THE RETRANSMISSION OUTPUT

**NEVER** connect retransmission output wires together or to an external power source or permanent damage not covered by warranty will result.

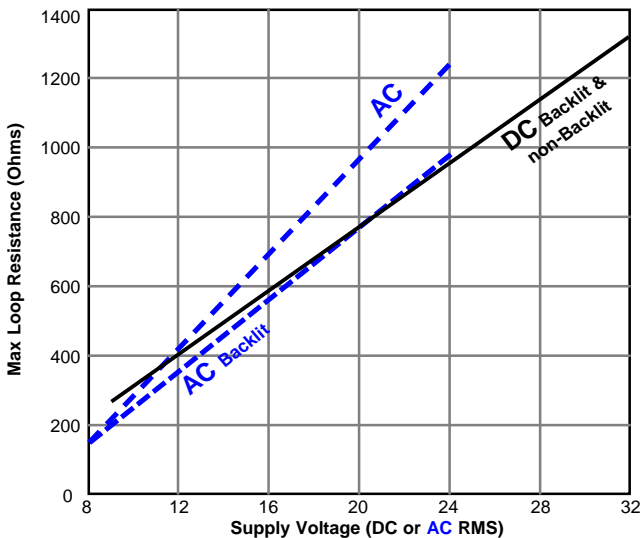
For 4-20 mA output models, be sure to observe the output compliance (voltage drive) capabilities of the gauge. The compliance, and therefore the maximum loop resistance the output can drive, is a function of the supply voltage to the gauge. Consult the graph shown below for maximum loop resistance vs. gauge supply voltage. Too large a loop resistance will cause the gauge output to "limit" or saturate before reaching its full 20 mA output.

When using the 0-2 volt retransmission output, do not allow the resistive load on the output to fall below 5K ohms. Avoid large capacitive loads (greater than 1000 pF) such as those caused by long runs of shielded cable. For long cable runs, use a 4-20 mA output model.

## OPERATION

The gauge is powered on whenever a supply voltage is applied. Warm-up time is negligible. In normal operation, the system pressure is displayed on the LCD and an output signal will be present. F4DRBL model display backlighting will be on whenever power is on. The display backlighting will not be apparent under bright lighting conditions.

Voltage Compliance for 4-20 mA Current Retransmission Output



## TEST BUTTON

When the front-panel TEST button is held depressed, the display and retransmission output are switched, independent of the system pressure, to a test level determined by the setting of the Test potentiometer. This test mode will allow setup and testing of the output and any external device(s) connected to it by switching to this test level whenever desired without having to alter the system pressure.

To set the test output level, see gauge label for location of Test potentiometer. Press and hold the front-panel TEST button and adjust the Test potentiometer to set the display and retransmitted output to the desired test level.

## CALIBRATION

The gauge is calibrated at the factory using equipment traceable to NIST. There is no need to calibrate the gauge before putting it in service. Complete calibration instructions can be downloaded from [www.cecomp.com](http://www.cecomp.com). Gauges may be returned to Cecomp Electronics for factory certified recalibration. NIST traceability is available.

Span calibration should only be attempted if the user has access to a pressure reference of known accuracy. The quality of the calibration is only as good as the accuracy of the calibration equipment and ideally should be at least four times the gauge accuracy.

Absolute reference gauges require vacuum generation and atmospheric pressure measurement equipment for accurate calibration and are more difficult to calibrate in the field.

The calibration system must be able to generate and measure pressure/vacuum over the full range of the gauge. A vacuum pump able to produce a vacuum of 10 microns (0.01 torr or 10 millitorr) or lower is required for vacuum and absolute gauges.

1. Low-voltage powered gauges must be connected to 8-24 VAC 50/60 Hz or 9-32 VDC during the calibration procedure. The supply voltage has negligible effects on the gauge calibration as long as it is within the stated voltage ranges.
2. Allow the gauge to equalize to normal room temperature before calibration.
3. Access the individual controls to adjust the zero and span of the display.
4. Zero calibration must be done before span calibration.
5. **Zero for gauge reference pressure or vacuum gauges:** Gauge reference units may be re-zeroed without affecting the span calibration. The gauge port must be open to the ambient with no pressure or vacuum applied. Adjust the Zero potentiometer for a display indication of zero with the minus (-) sign occasionally flashing.

**Zero for absolute reference gauges:** Apply full vacuum to the gauge. Adjust the Zero potentiometer for a display indication of zero with the minus (-) sign occasionally flashing.

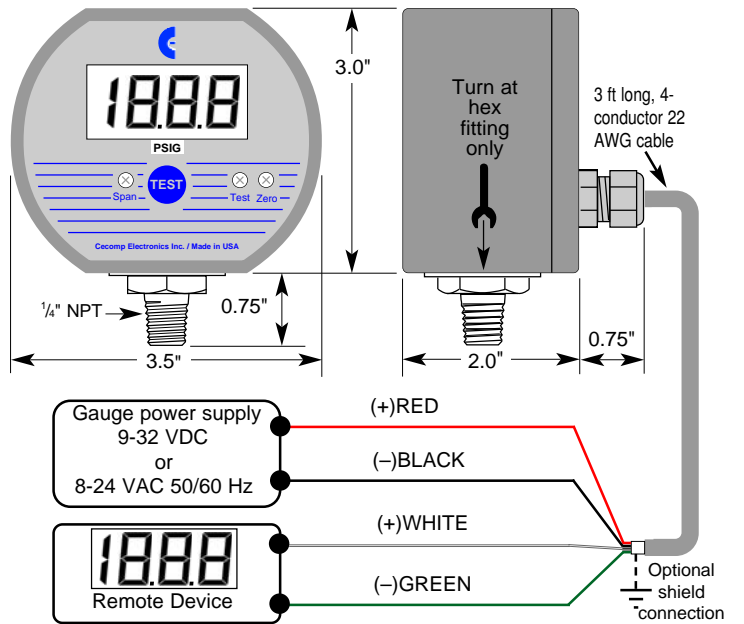
6. **Span for gauge reference pressure gauges and absolute reference gauges:** Apply full-scale pressure and adjust the Span potentiometer for a display indication equal to full-scale pressure.

**Span for gauge reference vacuum gauges:** Apply full vacuum to the gauge. Adjust the Span potentiometer for a display indication equal to full-scale vacuum.

7. Verify pressure indications at 0%, 25%, 50%, 75%, and 100% of full scale and repeat calibration as needed to achieve best accuracy over desired operating range.

Calibration of the retransmission output coordinates the retransmission output to the display indication, and normally does not need to be adjusted. It requires a direct physical measurement of the retransmission output. This calibration procedure can be downloaded from [www.cecomp.com](http://www.cecomp.com).

## DIMENSIONS AND WIRING EXAMPLE



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