### Ranges and Resolution
See table below. Consult factory for special engineering units. Resolution is fixed as indicated in table. For DPG100L and F4L series see www.cecomp.com/loop.

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#### Accuracy
Accuracy includes linearity, hysteresis, repeatability, and standard accuracy. ±0.25% of full scale ±1 least significant digit.

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<th>Option</th>
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<td>1BARVAC</td>
<td>0.75&quot; 1BARVAC</td>
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#### Controls and Functions
Test:
- When depressed sets loop current and display to user-set output test level, independent of input pressure, to allow testing of system operation.
- Up: set test, pass code, and calibration values
- Down: set test, pass code, and calibration values

#### Calibration

#### Loop Supply Voltage
Any DC supply/loop resistance that maintains 8-32 VDC at gauge terminals.

#### Output Characteristics
Current output, 4-20 mA DC. Passive transmitter, requires external loop power.

Output drive (compliance) determined by power source.

Updated approximately 16 times per second. 12,000 counts over sensor range.

#### Weight
9 ounces (approx.). Shipping wt. 1 pound (approx.).

#### How to Specify
**F16L range - options**
- **NEMA 4X Housing**
- **–Err**

#### How to Specify
**F16LN range - options**
- **Standard housing**

#### Range—see table at left
- psi = PSI
- bar = BAR
- mmH2O = 2500 GCMGG
- psig = PSIG
- mmH2O = 2500 GCMGG
- inHg = 2500 GCMGG
- kPa = MPAG
- INH2O = GCM
- mbar = MBAR
- kgs = KGCMGA
- G = gauge reference pressure
- MMH2OG = 2500 GCMGG
- VAC = gauge reference vacuum
- NSTRUMENTS

#### Options—add to end of model number
- **HA**
- **PM**
- **CC**
- **CD**
- **NC**
**Calibration—continued**

is held depressed for longer than 2 seconds, the display will change to indicate — — — — , and the gauge will exit the calibration mode. All settings will be released.

4 mA loop current
Press the TEST button and release it when the display indicates LCAL. The upper display segments will indicate the pre-configured pressure corresponding to a 4 mA loop current. The lower display segments will alternate between CAL and 4 MA. Use A or V to adjust the actual loop current to 4 mA.

20 mA loop current
Press the TEST button and release it when the display indicates HCAL. The upper display segments will indicate the pre-configured pressure corresponding to a 20 mA loop current. The lower display segments will alternate between CAL and 20 MA. Use A or V to adjust the actual loop current to 20 mA.

Pressure Calibration

The pressure calibration procedure simultaneously adjusts both the display indication and the loop current to correspond to the actual applied pressure.

Note: During any of the following calibration steps if the TEST button is held depressed for longer than 2 seconds, the display will change to indicate — — — — , and the gauge will exit the calibration mode when all buttons are released.

Zero calibration
Press the TEST button and release it when the display indicates CAL. Apply zero pressure. The lower display will alternate between CAL and ZERO. Use A or V to adjust the upper display to indicate zero.

Span calibration
Apply full-scale pressure.

The lower display will alternate between CAL and +SPAN. Use A or V to adjust the upper display to indicate the applied pressure.

Midpoint non-linearity calibration
Apply 50% full-scale positive pressure.

The lower display will alternate between CAL and +MID. Use A or V to adjust the upper display to indicate the applied pressure.

Negative span calibration (bipolar and compound ranges only)
Apply full-scale negative pressure.

The lower display will alternate between CAL and –SPAN. Use A or V to adjust the upper display to indicate the applied pressure.

Save and exit
To store the calibration parameters and exit calibration mode, press and hold the TEST button until the display indicates — — — — .

**Calibration Pass Code**

1. While pressing and holding the ∆ button, press the TEST button to enter the calibration mode. The upper section of the display will indicate CAL.

2. When all buttons are released, the upper section of the display will indicate 0 – MID, the left-most position blinking, and the lower section will indicate PASS. To exit and return to the normal operating mode, press and release the TEST button.

3. Enter the user-modifiable calibration pass code (5150 factory default) Use A or V to select the left-most digit to 3.

Press and release the TEST button to move to the next position. The 3 will remain, and the second position will be blinking. Use A or V to select 5.

Press and release TEST to move to the next position. 3 5 will remain, and the third position will be blinking. Use A or V to select 1.

Press and release the TEST to move to the next position. 3 5 1 will remain, and the fourth position will be blinking. Use A or V to select 0.

Press and release the TEST button to proceed with calibration.

If an incorrect pass code was entered, the gauge will exit to the normal operating mode.

**Calibration**

8 mA loop current
Press the TEST button and release it when the display indicates LC8. The upper display segments will indicate the pre-configured pressure corresponding to a 8 mA loop current. The lower display segments will alternate between CAL and 8 MA. Use A or V to adjust the actual loop current to 8 mA.

16 mA loop current
Press the TEST button and release it when the display indicates HC16. The upper display segments will indicate the pre-configured pressure corresponding to a 16 mA loop current. The lower display segments will alternate between CAL and 16 MA. Use A or V to adjust the actual loop current to 16 mA.

20 mA loop current
Press the TEST button and release it when the display indicates HC20. The upper display segments will indicate the pre-configured pressure corresponding to a 20 mA loop current. The lower display segments will alternate between CAL and 20 MA. Use A or V to adjust the actual loop current to 20 MA.

**Power (–)**

Use a stable DC power supply and an accurate mA meter for calibration. Gauges are calibrated at the factory using equipment traceable to NIST.

Gauges are calibrated at the factory in the full range of the gauge.

There is no need to calibrate the gauge before putting it into service. Gauges are calibrated at the factory using equipment traceable to NIST. NIST traceability is available.

**Display (–)**

Calibration intervals depend on your quality control program requirements and as-found data. Many customers calibrate their equipment annually.

**Calibration Preparation**

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 capable of producing a vacuum of 100 microns (0.1 torr or 100 millitorr) or lower is required for vacuum and absolute gauges. Use a stable DC power supply and an accurate mA meter for calibration of loop powered transmitters.

Allow the gauge to equalize to normal room temperature for at least 20 minutes before calibration.

**Operation**

The F16L series uses a user-modifiable calibration pass code to enter the calibration mode. In the calibration mode, the gauge automatically recognizes the calibration range corresponding to the applied pressure. There are 3, 4, or 5 calibration ranges depending upon the pressure range of the gauge. All gauges have Zero, –MIDpoint, and –SPAN ranges. Vacuum/pressure gauges will also have a –SPAN region, and a ±15 psig sensor will have a –MIDpoint region as well.

The loop configuration and all other information to perform the calibration is held in non-volatile memory.

**Entering the Calibration Mode**

1. While pressing and holding the ∆ button, press the TEST button to enter the calibration mode.

2. When all buttons are released, the upper section of the display will indicate CAL.

3. Enter factory pass code 1220, noting the left-most position blinking, and the lower section will indicate PASS. To exit and return to the normal operating mode, press and release the TEST button.

4. Press and release the TEST button to move to the next position. The 3 will remain, and the second position will be blinking. Use A or V to select 5.

Press and release TEST to move to the next position. 3 5 will remain, and the third position will be blinking. Use A or V to select 1.

Press and release the TEST to move to the next position. 3 5 1 will remain, and the fourth position will be blinking. Use A or V to select 0.

Press and release the TEST button to proceed with calibration.

If an incorrect pass code was entered, the gauge will exit to the normal operating mode.

**Calibration Preparation**

For correct operation and to avoid erratic or erroneous readings, the gauge terminal voltage must not fall below 8 VDC. Too large a loop resistance will cause the gauge output to “limit” or saturate before reaching its full 20 mA output. The minimum loop supply voltage may be calculated from the formula:

\[
V = 8 + (20 \text{mA} \times \text{Total loop resistance})
\]

**Operation**

The F16L is designed for continuous operation. Warm-up time is negligible. When power is first applied, the F16L will set the loop current to 0 mA to indicate that the gauge is ready to be used. The F16L can be used as a loop powered gauge. Reversing the connections will not harm the gauge as long as the polarity is correct.

All operating power is supplied by the 4-20 mA current loop using the 2-wire cable at the gauge rear. The F16L can be used as an indicator transmitter in any 4-20 mA current loop or as a DC powered gauge. Reverse polarity connections will not harm the gauge but will not operate with incorrect polarity.

Calibration Preparation

For correct operation and to avoid erratic or erroneous readings, the gauge terminal voltage must not fall below 8 VDC. Too large a loop resistance will cause the gauge output to “limit” or saturate before reaching its full 20 mA output. The minimum loop supply voltage may be calculated from the formula:

\[
V = 8 + (20 \text{mA} \times \text{Total loop resistance})
\]

**Electrical Connection**

The 3 will remain, and the second position will be blinking. Use A or V to select 5.

Apply 50% full-scale negative pressure.

Use A or V to adjust the upper display to indicate the applied pressure.

The upper display segments will indicate the pre-configured pressure corresponding to a 20 mA loop current. The lower display segments will alternate between CAL and 20 MA. Use A or V to adjust the actual loop current to 20 MA.

To store the calibration parameters and exit calibration mode, press and hold the TEST button until the display indicates — — — — .

Press and release the TEST button to index to the next position.

Use A or V to select 2.

Press and release the TEST button to index to the next position. The third position will be blinking. Press A or V to select 0.

Press and release the TEST button to index to the next position. The fourth position will be blinking. Press A or V to select 0.

Press and release the TEST button to index to the next position. The fourth position will be blinking. Press A or V to select 0.

Press and release the TEST button to index to the next position. The third position will be blinking. Press A or V to select 0.

Press and release the TEST button to index to the next position. The fourth position will be blinking. Press A or V to select 0.

Use A or V to adjust the upper display to indicate zero.

Use A or V to adjust the upper display to indicate the applied pressure.

Use A or V to adjust the upper display to indicate the applied pressure.

To exit and return to the normal operating mode, press and release the TEST button.

Use a stable DC power supply and an accurate mA meter for calibration. Gauges are calibrated at the factory using equipment traceable to NIST.

Gauges are calibrated at the factory in the full range of the gauge.

There is no need to calibrate the gauge before putting it into service. Gauges are calibrated at the factory using equipment traceable to NIST. NIST traceability is available.

**Calibration Intervals**

Calibration intervals depend on your quality control program requirements and as-found data. Many customers calibrate their equipment annually.

**Calibration Preparation**

For correct operation and to avoid erratic or erroneous readings, the gauge terminal voltage must not fall below 8 VDC. Too large a loop resistance will cause the gauge output to “limit” or saturate before reaching its full 20 mA output. The minimum loop supply voltage may be calculated from the formula:

\[
V = 8 + (20 \text{mA} \times \text{Total loop resistance})
\]

5. The upper display section will indicate the calibration pass code.

6. To change the calibration pass code, press and release the A or V button. The first character of the pass code will begin to blink. Use A or V to set the blinking character to the desired value, then press and release the TEST button to move to the next character. Repeat for each character position.

7. When the calibration pass code is held depressed, a buzzer sounds, and the display will change to indicate — — — — . The gauge will exit to the normal operating mode when all buttons are released.