Falcon NEMA 4X 2 Wire Loop-Powered Indicating Transmitters

DIGI PRO® 4 F4L

Electrical Specifications

Ranges and Resolution

Bold: standard ranges, price adder for all others
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 other engineering units	**120.0 inHg**	1600 mmHg	35.0 bar	1.000 kg/cm² abs
	199.9 inHg abs	760 torr abs	70.0 bar	1.000 kg/cm² vac
	199.9 inHg	1600 torr abs	140.0 bar	±1.000 kg/cm²
3.00 psig	50.0 oz/in²	2100 mmH_2O	199.9 bar	1.000 kg/cm²
5.00 psig	80.0 oz/in²	3500 mmH_2O	350 bar	1.999 kg/cm² abs
15.00 psi abs	240 oz/in² abs	199.9 cmH_2O	19.99 kPa	1.999 kg/cm²
15.00 psig vac	240 oz/in² vac	350 cmH_2O	35.0 kPa	4.00 kg/cm²
±15.00 psig	±240 oz/in²	1000 cmH_2O	100.0 kPa abs	7.00 kg/cm² abs
15.00 psig	240 oz/in²	2100 cmH_2O	100.0 kPa vac	7.00 kg/cm²
30.0 psi abs	85.0 inH_2O	199.9 mbar	±100.0 kPa	14.00 kg/cm²
30.0 psig	140.0 inH_2O	350 mbar	100.0 kPa	19.99 kg/cm²
60.0 psig	400 inH_2O abs	1000 mbar abs	199.9 kPa abs	35.0 kg/cm²
100.0 psi abs	400 inH_2O vac	1000 mbar vac	199.9 kPa	70.0 kg/cm²
100.0 psig	±400 inH_2O	±1000 mbar	400 kPa	140.0 kg/cm²
199.9 psig	400 inH_2O	1000 mbar	700 kPa abs	199.9 kg/cm²
300 psig	850 inH_2O	1999 mbar abs	700 kPa	350 kg/cm²
500 psig	7.00 ftH_2O	1999 mbar	1500 kPa	1.000 atm abs
1000 psig	12.00 ftH_2O	4000 mbar	1999 kPa	±1.000 atm
1999 psig	35.0 ftH_2O	1.000 bar abs	3500 kPa	1.000 atm
3000 psig	70.0 ftH_2O	1.000 bar vac	5000 kPa	4.00 atm
5000 psig	140.0 ftH_2O	±1.000 bar	3.50 MPa	7.00 atm
6.00 inHg	230 ftH_2O	1.000 bar	7.00 MPa	14.00 atm
10.00 inHg	480 ftH_2O	1.999 bar abs	14.00 MPa	19.99 atm
30.0 inHg abs	150.0 mmHg	1.999 bar	19.99 MPa	35.0 atm
30.0 inHg vac	260 mmHg	4.00 bar	35.0 MPa	70.0 atm
±30.0 inHg	760 mmHg abs	7.00 bar abs	1000 g/cm² abs	135.0 atm
30.0 inHg	760 mmHg vac	7.00 bar	1000 g/cm²	199.9 atm
60.0 inHg abs	760 mmHg	14.00 bar	2100 g/cm² abs	340 atm
60.0 inHg	1600 mmHg abs	19.99 bar	2100 g/cm²	

Accuracy (linearity, hysteresis, repeatability)

Standard: ±0.25% of full scale ±1 least significant digit
-HA option: ±0.1% FS ±1LSD (most ranges)
-4A option: ±0.4% FS ±1LSD
NC: NIST traceable test report and data

Display (update rate, type, size)

3 readings per second nominal display update rate
Ranges up to 1999: 3½ digit LCD, ½" digit height
3000 and 5000 psi ranges: 4 digit LCD, 0.4" digit height

Controls

Non-interactive zero and span, ±10% range
Test calibration level: 0-100% range
Retransmission zero and span: Internal potentiometers

Loop Supply Voltage

Any DC supply/loop resistance that maintains 8 to 32 VDC at gauge terminals.
Gauge is reverse polarity protected.
3 ft long, 2-conductor 22 AWG cable
Order optional **9046-24-008** loop power supply

Low Loop Indication (below approximately 7.8 VDC)

Ranges up to 1999: None
3000 and 5000 psi ranges: All decimal points flash

Output Characteristics

True analog output, 50 millisecond typical response time
If gauge terminal voltage falls below approx. 7.8 VDC erratic operation may occur

Test Function

Front panel TEST button, when depressed sets loop current and display to "test calibration" level, independent of pressure input, to allow testing of system operation.
Test Cal level is set by multiturn potentiometer to any value from 0 to 100% of FSO.

Environmental Specifications

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)

- ***±0.25% Test Gauge Accuracy***
- ***316 Stainless Steel Wetted Parts***
- ***4-20 mA Analog Output***
- ***Pressure, Vacuum, Absolute***
- ***Output Test Function***



F4L200PSIG with 199.9 psig range

Mechanical Specifications

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 (approximate)

Gauge: 9 ounces
Shipping weight: 1 pound

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 and Material

¼" NPT male, 316 stainless steel

Media Compatibility

All wetted parts are 316 SS
Compatible with most liquids and gases

Overpressure

3000 psig range and metric equivalents: 5000 psig
5000 psig range and metric equivalents: 7500 psig
All others 2x rated pressure minimum

Burst Pressure

4x rated pressure minimum or 10,000 psi, whichever is less

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MOD-TRONIC INSTRUMENTS LIMITED
1 Delta Park Blvd, #12 Brampton, ON L6T 5G1
Tel 905-457-6322 or 1-800-794-5883
Fax 905-457-4716 or 1-800-830-7122
sales@mod-tronic.com www.mod-tronic.com

F4L DiGi PRO®

Falcon NEMA 4X 2 Wire Loop-Powered Indicating Transmitter

Description

The ***Falcon Digi Pro***® series is a versatile family of industrial pressure and vacuum gauges featuring a rugged NEMA 4X case. This type of enclosure, when properly installed, is suitable for indoor or outdoor non-hazardous locations and provides a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, corrosion and ice formation.

The **F4L** is a two-wire 4-20 mA loop-powered pressure transmitter with indication. All operating power is supplied by the 4-20 mA current loop. The 2-wire connection allows the **F4L** to be used as a pressure transmitter in any 4-20 mA current loop application where local indication is desirable.

Installation and Precautions

Install or remove gauge using wrench on hex fitting only. Do not 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.

Electrical Connection

Connection to the **F4L** is made with the 2-wire cable at the gauge rear. Connect the loop positive (+) supply to the RED lead and the loop negative (–) supply to the BLACK lead. Reversing the connections will not harm the gauge but the **F4L** will not operate with incorrect polarity. **NEVER** connect the gauge wires to voltage greater than 32 VDC or damage not covered by warranty will result.

Loop Voltage

Select a loop power supply voltage and total loop resistance so that when the loop current is 20 mA, the gauge will have at least 8 VDC at its terminals. 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:

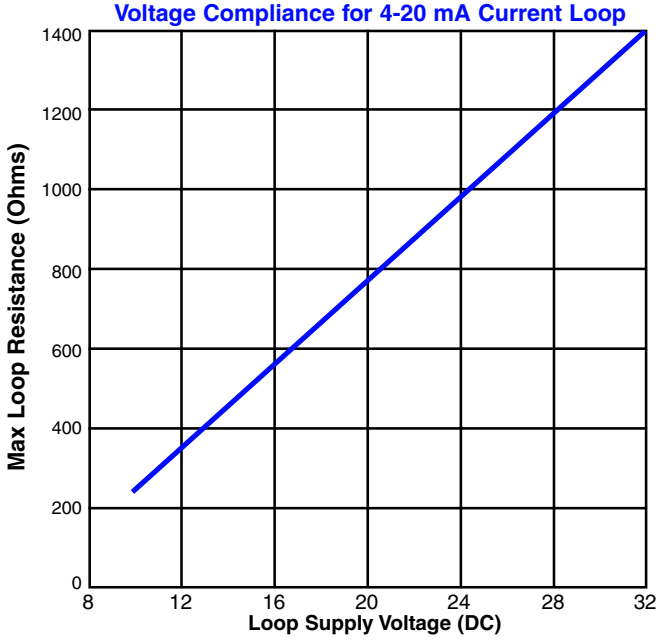
$$V_{min} = 8V + (20mA \times \text{Total loop resistance})$$

If the terminal voltage of the gauge falls below about 7.8 VDC erratic operation may occur. This is an indication that the loop supply/resistance may not allow adequate headroom for reliable operation. This should never occur in normal use. If it does, examine the loop supply/resistance.

Operation

The **F4L** is designed for continuous operation. Warm-up time is negligible. The display indication and the loop current will be proportional to the system pressure/vacuum; 4 mA = Zero or low end, 20 mA = Span, full-scale or high end. The output is a continuous analog signal based on the transducer output rather than the display. The output is filtered to improve noise immunity and has a response time of about 50 milliseconds.

Voltage Compliance for 4-20 mA Current Loop



TEST Button

The TEST pushbutton on the front of the gauge, when depressed, switches the display and output loop to a preset level determined by the setting of a Test potentiometer. This test mode will allow setup and testing of the current loop 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 loop current to the desired test level.

Calibration

See gauge label for location of individual controls to adjust the zero and span of the display.

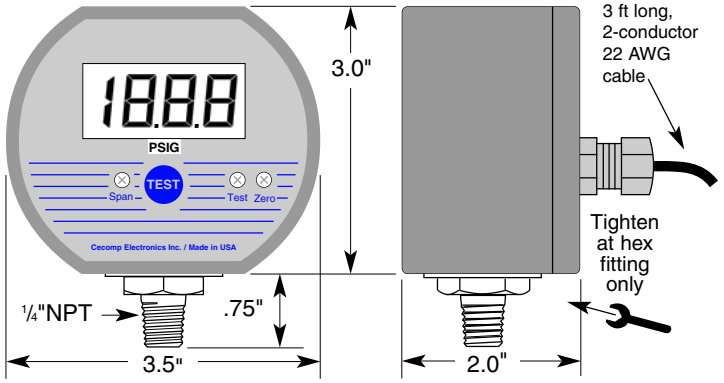
GAUGE reference units may be re-zeroed without affecting the span calibration. The gauge port must be open to the ambient with no pressure or vacuum applied. Adjust the Zero control until the gauge reads zero with the minus (–) sign occasionally flashing.

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. Zero calibration must be done before span calibration. Record readings at three to five points over the range of gauge and adjust span control to minimize error and meet specifications.

ABSOLUTE reference gauges require vacuum generation and atmospheric pressure measurement equipment for accurate calibration and thus are more difficult to calibrate in the field. Gauges may be returned to Cecomp Electronics for factory certified recalibration. NIST traceability is available.

The **F4L** has internal controls to adjust the agreement between the displayed value and the 4-20 mA loop current. These are set at the factory and should not normally be adjusted. If adjustment is necessary, consult factory. Accurate pressure generation and measurement and current measurement equipment are required to successfully complete this calibration.

Dimensions



Part Numbers

ModelRangeUnitsRef-Options

Model
F4L

Range
See table on other side

Units
See table at right

Reference
See table on other side for availability
G=Gauge, **A**=Absolute, **VAC**=Vacuum

Options
See price list for available options

Example: F4L30INHGVAC = Falcon NEMA 4X, Loop powered, inches Hg vacuum

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

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