

The Smith Meter™ **Model FA420** is a precision frequency to current or frequency to voltage transmitter. The signal is directly proportional to the frequency input to the unit from a turbine flow meter pickup or related device. The span of the unit is field adjustable to accommodate a wide range of flow rates. By using relatively high dc voltages and an independently sourced current, the transmitter is immune to voltage drops caused by long wire runs and electrical noise due to motors, relays, switches, transformers, and other industrial equipment. The Model FA420 excels in supplying signals for remote flow rate indication or as an input to data acquisition systems.

Features

- Jumper Selectable Voltage or Current Output
- Jumper Selectable Output Ranges
- Jumper Selectable Signal Ranges
- Output Signal Proportional to Flow
- Two or Three Wire Current Output

Specifications

Electrical Input

DC Power

11 to 28 Vdc (reverse polarity protected).
Supply current: 4.0 mA (2 wire), 5.0 mA (3 wire).
Input Protection: 50 Vac.

Input Signal

Low Level

Type: Sinusoidal wave.
Input Sensitivity: 50 mV peak-to-peak.

High Level

Type: Digital (square wave).
Voltage: 480 millivolts minimum.
Input Sensitivity: 50 mV peak-to-peak.

Maximum Full Scale Output

Frequency Range: Jumper selectable.
High Range: 1000 Hz to 12.8 KHz for full scale output.
or
Low Range: 125 Hz to 1250 Hz for full scale output.



Outputs

Voltage Mode

	0-5 Volt Range	0-10 Volt Range
V_{out} Minimum (Freq. input = zero Hz), at full scale frequency cal.maximum	5.1 mV	10.5 mV
V_{out} minimum at full scale minimum frequency cal.	21 mV	43 mV
V_{out} maximum at $V_{supply} = +12$ Vdc	6.8V	11.3V
V_{out} maximum at $V_{supply} = +24$ Vdc	6.8V	13.7V
Minimum Load Resistance	50 Ohm, 1/2W	100 Ohm, 1W

Current Mode

2 or 3 Wire Output Version	4-20 mA Range	10-50 mA Range
Minimum Output Current	0.07 mA	0.19 mA
Maximum Output Current (Full Scale Current with Calibration set to "zero" 4mA and 10mA respectively)	24.1 mA	61.2 mA
Load Resistance <(+V-6V) /Full Scale Output +V=12V	<300 Ohms	<120 Ohms
Output +V=24V	<900 Ohms	<360 Ohms

Zero/Span Adjustment Interaction

Less than 1%.

Environmental Ambient Operating Temperature

Standard -40°F to 158°F (-40°C to 70°C).

Output Settling Time

Full scale change to 95% of final Value in 1.8 sec.

Output Ripple and Noise

5 mV peak-to-peak, <2mV rms, .05% of Full Scale.

Temperature Coefficient

77°F to 104°F (25°C to 40°C), 0.13%/°C, 13 mV/°C on 10V range.

Enclosure

XP (Explosion-Proof - Optional)

UL/CUL - Class I Groups C and D; Class II Groups E,F, and G.

CENELEC - Approved to EEx d IIBT6

Ordering Information

To assure that the FA420 meets all requirements please specify the following information when ordering: Model and Enclosure Type.

FA420 - 1

Basic Model Designation

FA420

Enclosure Option

- 1 - None
- 2 - XP Explosion Proof, UL, CUL,
- 3 - XP CENELEC Approved Housing
- 4 - Upgrade Kit (no enclosure)

Dimensional Drawings

Inches (mm)

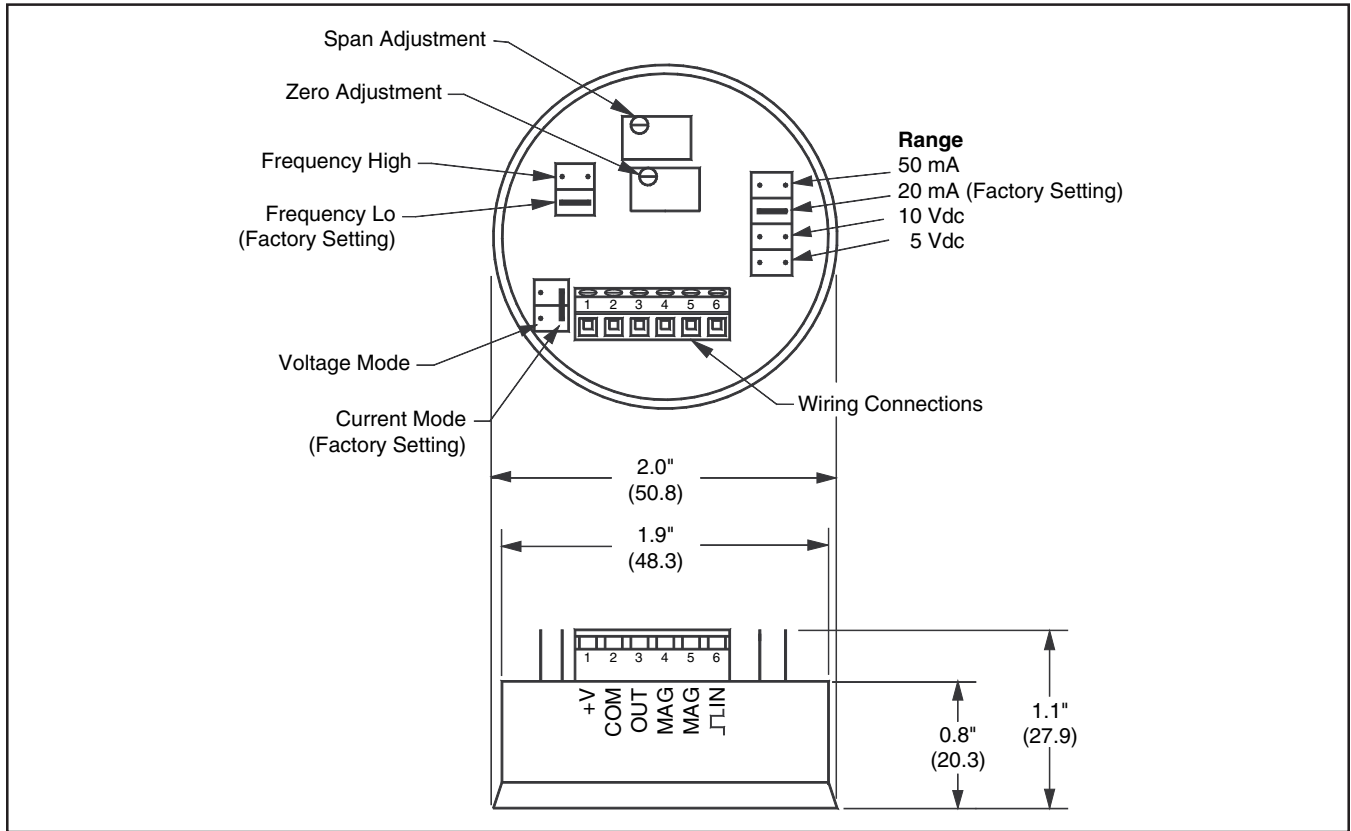


Figure 1 - FA420 Dimensions

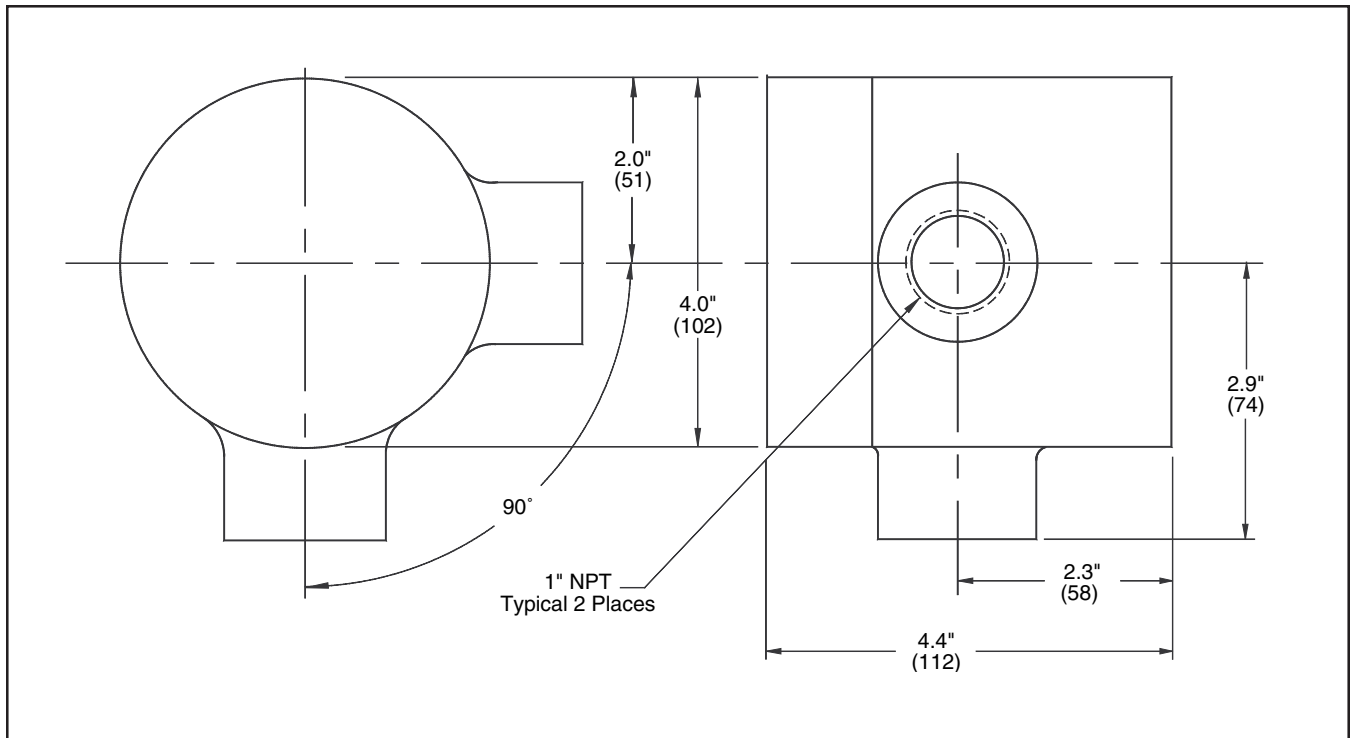


Figure 2 - FA420 Mounted in CUL and CENELEC Approved Enclosure

Note: Dimensions—Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

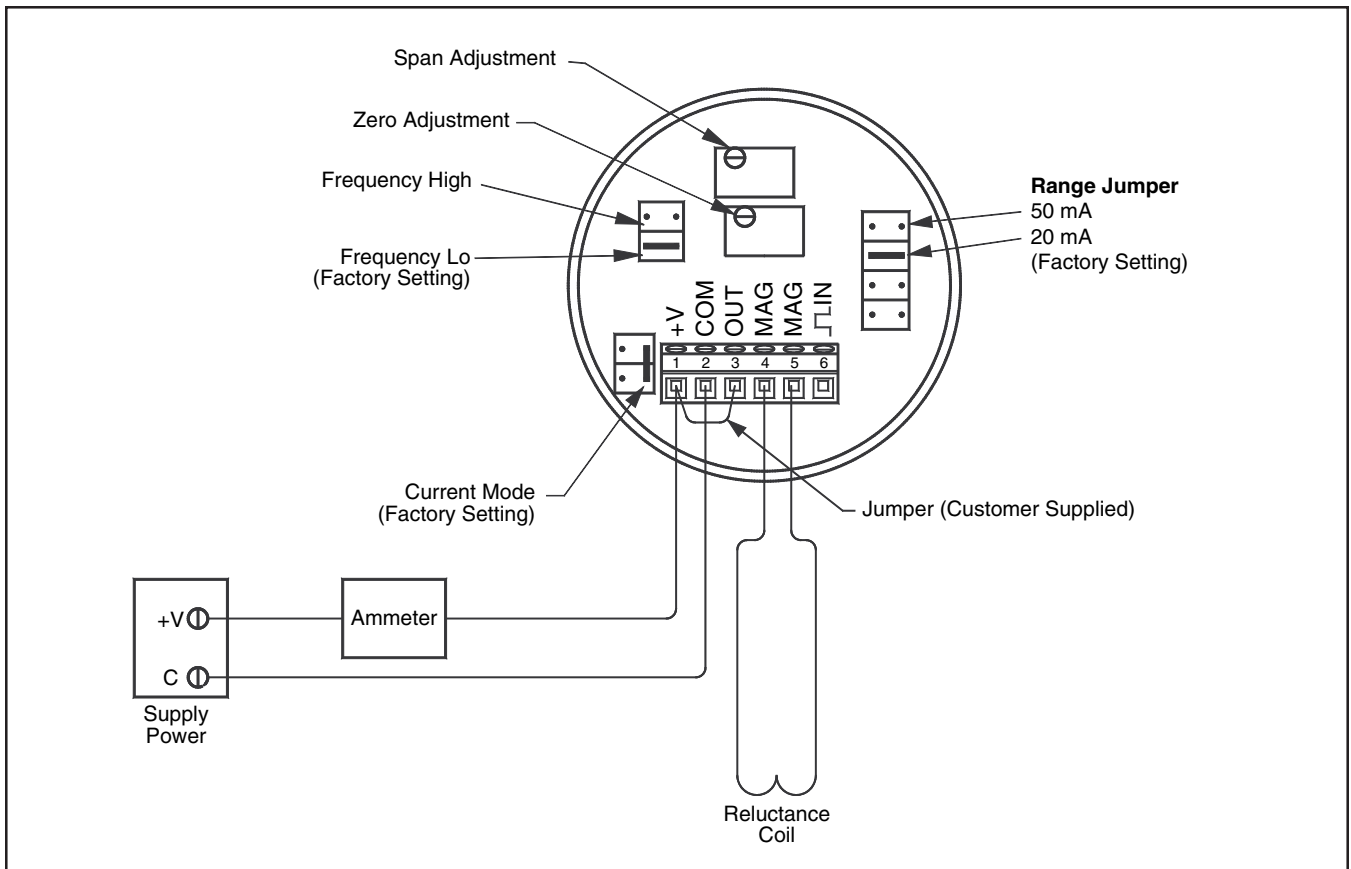


Figure 3 - Two Wire Current Output w/ Reluctance Coil

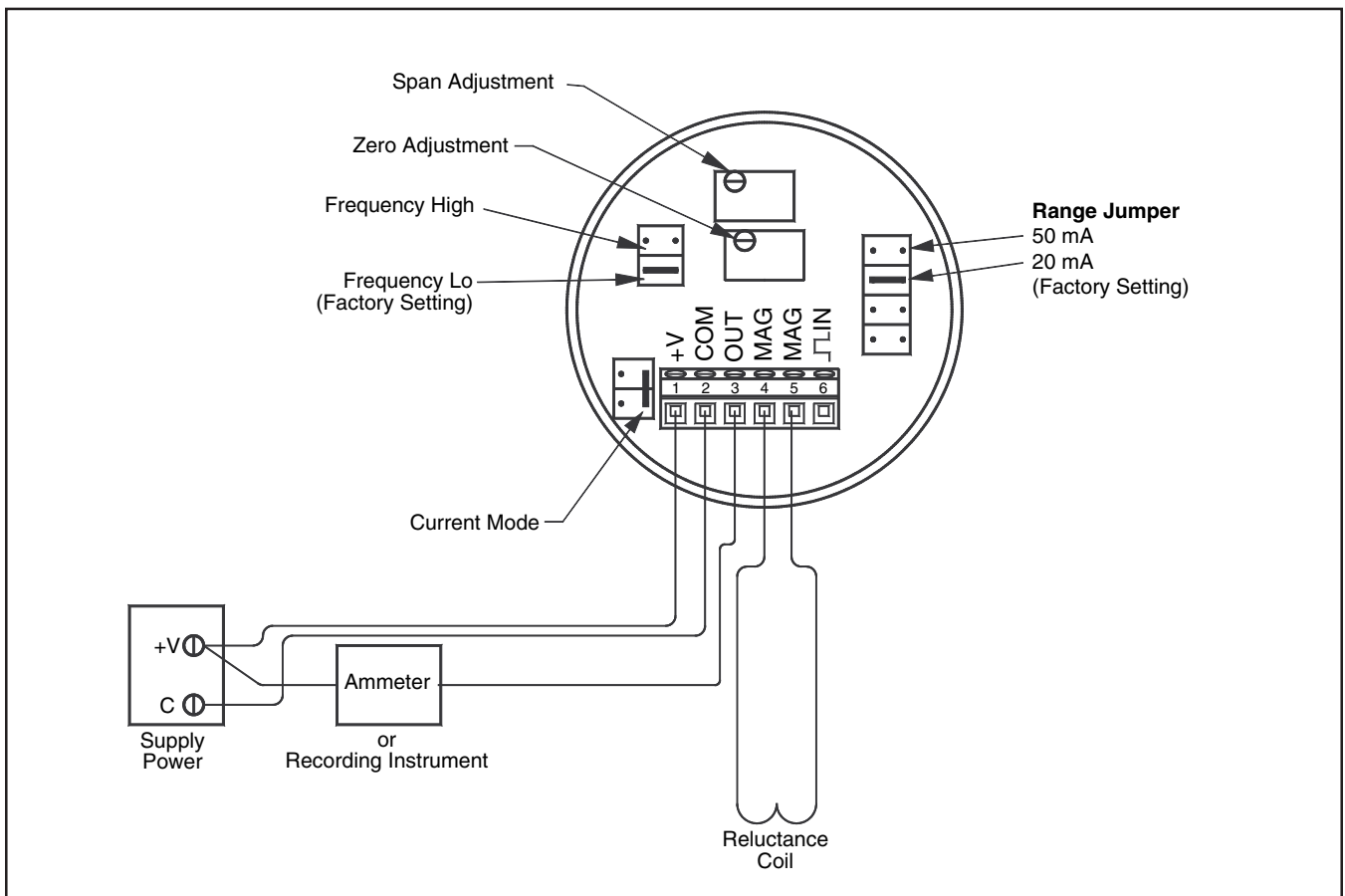


Figure 4 - Three Wire Current Output w/ Reluctance Coil

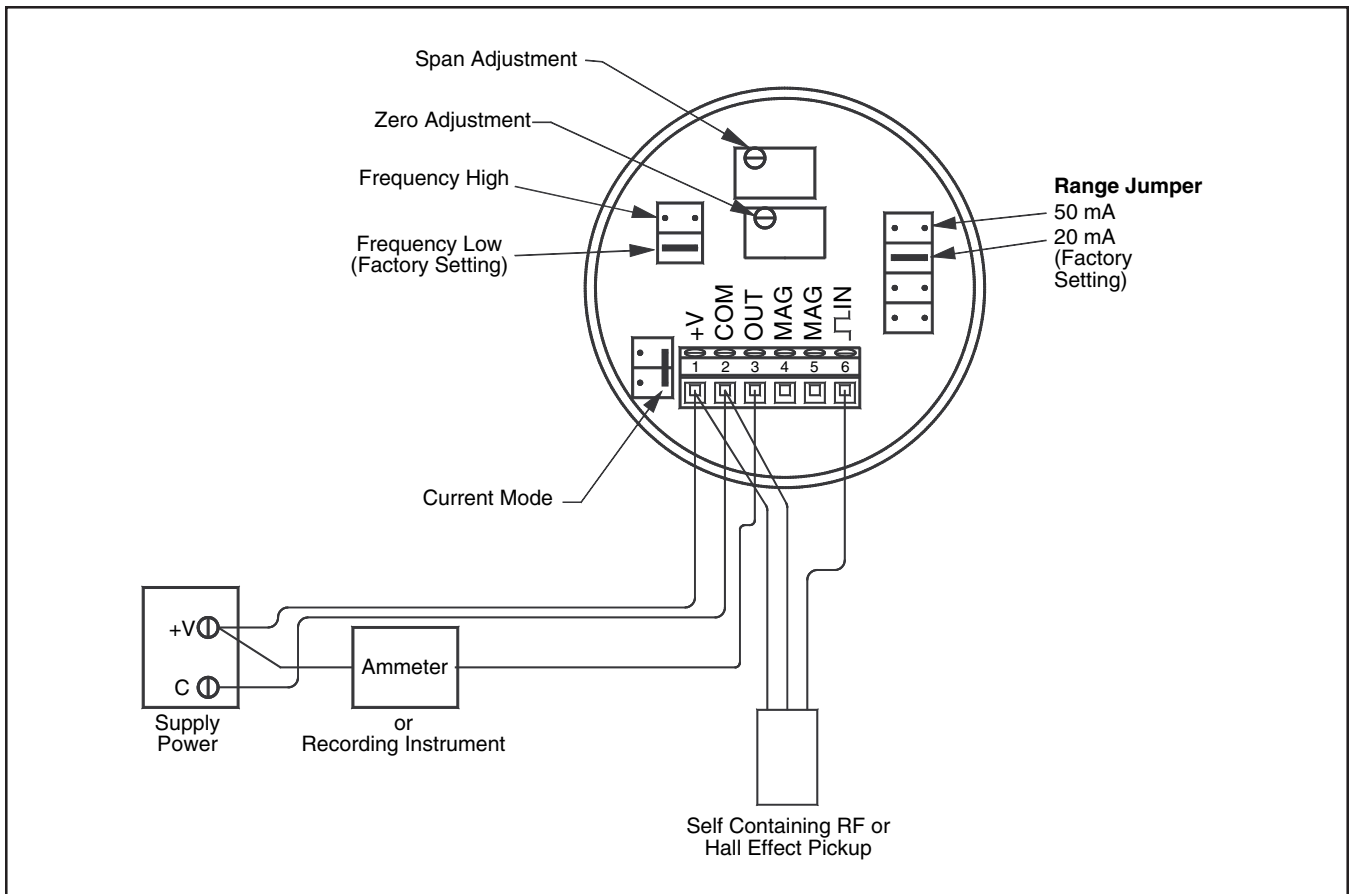


Figure 5 - Three Wire Current w/ RF or Hall Effect Pick-Up

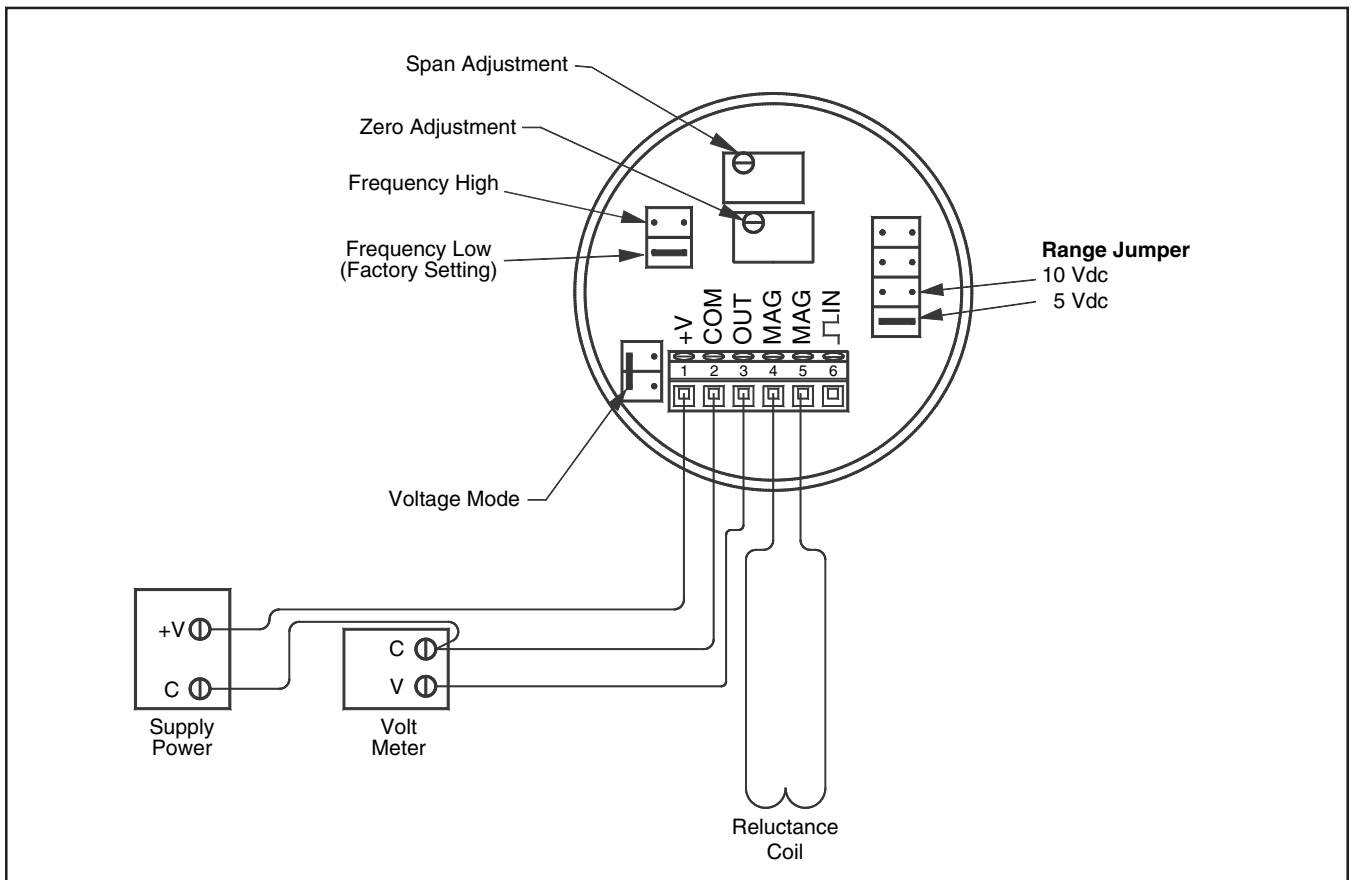


Figure 6 - Three wire Voltage w/ Reluctance Coil

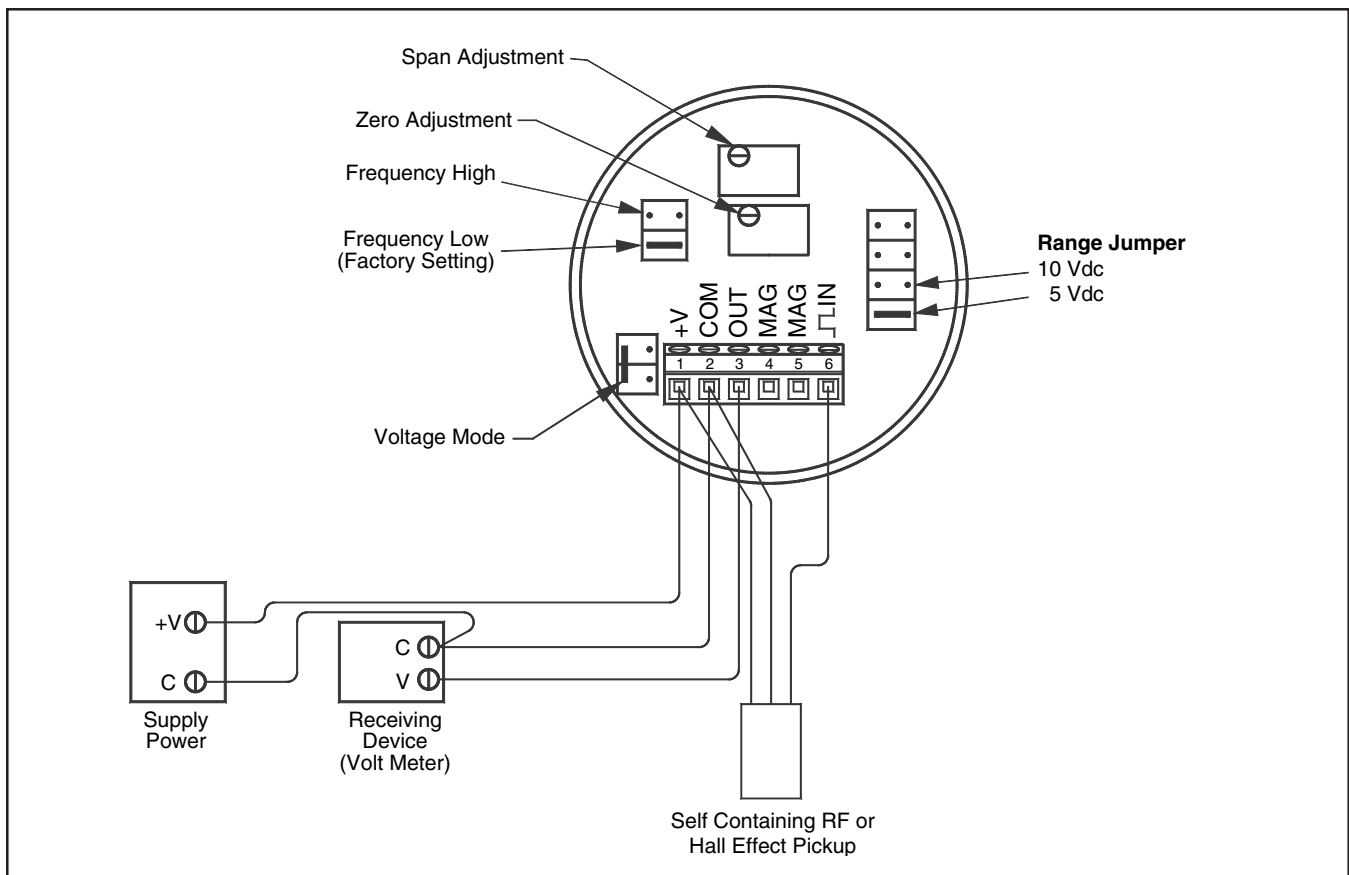


Figure 7 - Three Wire Voltage w/ RF or Hall Effect Pick-Up

Calibration Procedure

Current Equipment Required

- Function Generator (Wavetek Model 21 or equiv.).
- DC Power Supply (12V, 100mA)
- Digital Multimeter Meter DMM (Keithley 175 or equiv.).
- Resistor, 1/4W 1% 200 ohm, metal film.

Preliminary Setup (4-20 mA)

1. Connect DC power supply to FA420 as follows: POSITIVE to terminal 1, COM to terminal 2.
2. Set DMM for 200 mA range. Connect "negative" side of DMM to FA420 terminal 2 and "positive" side to 200 ohm (current limiting) resistor. Connect other side of 200 ohm resistor to FA420 terminal 3.
3. Connect Function Generator output to FA420 terminals 4 and 5.
4. Position Frequency Input Range jumper for desired full scale output: 12.8 KHz max. = HIGH range, 1200 Hz max. = LOW range.
5. Place RANGE jumper in the "20mA" position.
6. Place MODE jumper in the "C" position.

Procedure (4-20 mA)

1. Turn on 12V DC power supply.
2. Set the Function Generator for a 500mV P-P sine wave output. Set output frequency for 0hz. and adjust

ZERO pot on FA420 for a 4.00mA +/- .02mA output reading on the DMM.

3. Set Function Generator for the maximum flowrate frequency and adjust the SPAN pot on FA420 for a 20.00mA +/- .02mA output reading on the DMM.
4. Set output frequency for 0hz. and verify output reading of 4.00mA +/- .02mA. Readjust ZERO pot if necessary.
5. Set output frequency for the maximum flowrate frequency and verify output reading of 20.00mA +/- .02mA. Readjust SPAN pot if necessary.

Preliminary Setup (0-5V or 0-10V)

1. Connect DC power supply to FA420 as follows: POSITIVE to terminal 1, COM to terminal 2.
2. Set DMM for DC volts, 200V range. Connect "positive" side of DMM to FA420 terminal 3 and "negative" side to terminal 2.
3. Connect Function Generator output to FA420 terminals 4 and 5.
4. Position Frequency Input Range jumper for desired full scale output:
12.8KHz max. HIGH range.
1200Hz max. LOW range.
5. Place RANGE jumper in the "5 or 10 Volt" position.
6. Place MODE jumper in the "V" position.

Procedure (0-5V or 0-10V)

1. Turn on 12V DC power supply.
2. Set the Function Generator for a 500Mv P-P sine wave output. Set output frequency for 0Hz and adjust ZERO pot on FA420 for a 0.00 + .05, -0V output reading on the DMM.
3. Set Function Generator for the maximum flowrate frequency and adjust the SPAN pot on FA420 for a 5.00 or 10.00 ± .05V output reading on the DMM.
4. Set output frequency for 0Hz and verify output reading of 0.00, +.05, -0V. Readjust ZERO pot if necessary.
5. Set output frequency for the maximum flowrate frequency and verify output reading of 5.00 or 10.00 ± .05V. Readjust SPAN pot if necessary.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Headquarters:

1803 Gears Road, Houston, TX 77067 USA, Phone: 281/260-2190, Fax: 281/260-2191

Gas Measurement Products:

Houston, TX USA Phone 281/260-2190
Thetford, England Phone (44) 1842-82-2900
Kongsberg, Norway Phone (47) 32/286-700
Buenos Aires, Argentina Phone 54 (11) 4312-4736

Integrated Measurement Systems:

Corpus Christi, TX USA Phone 361/289-3400
Kongsberg, Norway Phone (47) 32/286-700
San Juan, Puerto Rico Phone 787/274-3760
United Arab Emirates, Dubai Phone 971 +4/331-3646

Liquid Measurement Products:

Erie, PA USA Phone 814/898-5000
Los Angeles, CA USA Phone 661/702-8660
Slough, England Phone (44) 1753-57-1515
Ellerbek, Germany Phone (49) 4101-3040
Barcelona, Spain Phone (34) 93/201-0989
Moscow, Russia Phone (7) 495/564-8705
Melbourne, Australia Phone (61) 3/9807-2818

Beijing, China Phone (86) 10/6500-2251
Singapore Phone (65) 6861-3011
Chennai, India Phone (91) 44/450-4400

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