red lion

Tel +1 (717) 767-6511
Fax +1 (717) 764-0839
www.redlion-controls.com

MODEL VFC - VOLTAGE TO FREQUENCY CONVERTER
MODEL CFC - CURRENT TO FREQUENCY CONVERTER

- *0 to 10 VDC OR 4 to 20 mA INPUT UNITS*
- *AC OR DC OPERATION*
- *ADJUSTABLE ZERO & SPAN FOR FREQUENCY FINE TUNE*
- *ADJUSTABLE LOW END CUT-OUT (Output Inhibit)*
- *3 NPN OPEN COLLECTOR OUTPUTS (10 KHz, 1 KHz, 100 Hz)*
- *LINEARITY 1% OF FULL SCALE*

DESCRIPTION

The Voltage/Current to Frequency Converter is a plug-in module which converts either 0 to 10 VDC or 4 to 20 mA analog input signals *(specify when ordering)* to a frequency output. In typical applications, a process is monitored by a transducer providing an analog output that is converted to a frequency by the module and then totalized by an electronic counter. The Models VFC and CFC provide this conversion process with linearity to within 1% of full scale output. Zero and Span potentiometers are accessible at the top of the module and provide fine tuning of the frequency outputs. A low end Output Inhibit adjustment is accessible at the top of the module to disable the output frequencies up to 10% of full scale, which prevents totalizing false counts during process start-up or other abnormal conditions. Three full scale frequencies are simultaneously available; 10 KHz, 1 KHz, and 100 Hz. These frequency outputs are NPN Open Collector transistors and easily interface to most counters and totalizers. The modules may be operated from either 115 or 230 VAC *(specify when ordering)* or from DC supplies from +9 to +16 VDC.

The VFC and CFC Models are packaged in a convenient 8-pin octal plug-in case that mates with a UL and CSA rated base mounted or DIN rail mounted socket. The socket *(ordered separately)* features clamp type screw terminals which accept stripped wires without lugs.

SPECIFICATIONS

1. **POWER:**
   AC: 115 or 230 VAC ±10%, 50/60 Hz, 2.0 VA (See Ordering Information).
   DC: +9 to +16 VDC @ 45 mA max.
2. **INPUT:**
   Model VFC: 0 to 10 VDC, Impedance greater than 600 KΩ.
   Model CFC: 4 to 20 mA, 30 Ω Impedance,
      burden less than 600 mV @ 20 mA
   Protection: 100% of full scale input
   Common Mode Rejection: 120 dB, 0-60 Hz
   Normal Mode Rejection: 35 dB @ 50/60 Hz
3. **ACCURACY:**
   Linearity: within 1% of full scale
   Zero Drift: 0.06% per °C of full scale
   Span Drift: 0.04% per °C of output frequency
   Linearity over power input of +9 to +16 VDC = within 2% of full scale.
4. **OUTPUTS:** All outputs NPN Open Collector transistor, I_{SNK} = 10 mA max.,
   V_{OH} = 30 VDC max., V_{SAT} = 1 V @ 10 mA.
   Terminal 3: 0-10 KHz, 50/50 duty cycle
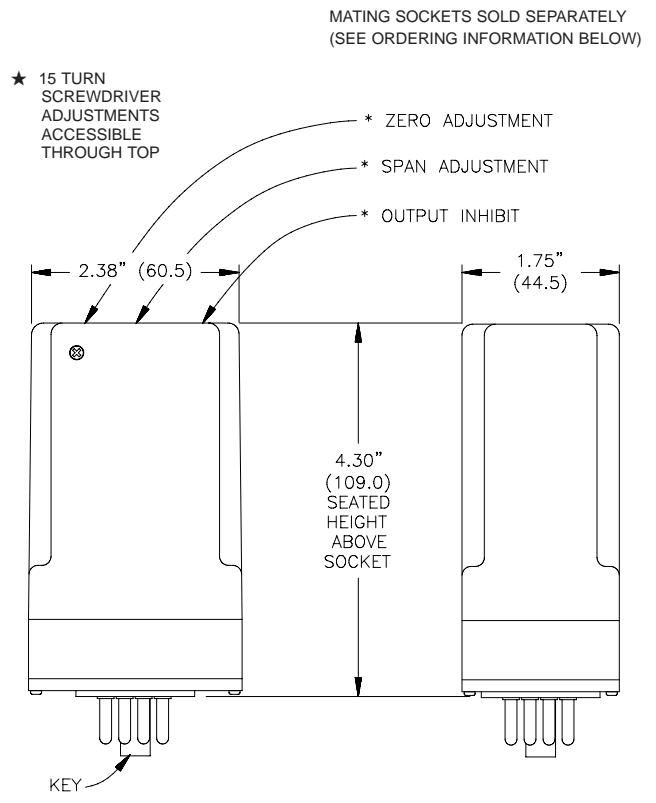   **Terminal 4**: 0-1 KHz, 80% high/20% low duty cycle
   Terminal 5: 0-100 Hz, 80% high/20% low duty cycle
5. **OPERATING TEMPERATURE:** 0°C to +60°C
6. **STORAGE TEMPERATURE:** -40°C to +80°C
7. **WEIGHT:** Module - 8.0 oz. (227 g)

DIMENSIONS In inches (mm)

MATING SOCKETS SOLD SEPARATELY
(SEE ORDERING INFORMATION BELOW)

★ 15 TURN SCREWDRIVER ADJUSTMENTS ACCESSIBLE THROUGH TOP

* ZERO ADJUSTMENT
* SPAN ADJUSTMENT
* OUTPUT INHIBIT

2.38" (60.5)

1.75" (44.5)

4.30" (109.0) SEATED HEIGHT ABOVE SOCKET

KEY

ORDERING INFORMATION

| MODEL NO.	DESCRIPTION	PART NUMBER
VFC	Voltage to Frequency Converter, 115 VAC	VFC10000
VFC	Voltage to Frequency Converter, 230 VAC	VFC20000
CFC	Current to Frequency Converter, 115 VAC	CFC10000
CFC	Current to Frequency Converter, 230 VAC	CFC20000
—	Base Mount, 8-Pin Octal Socket	SKT10000
—	Din Rail Mount, 8-Pin Octal Socket	SKTDIN00

RECOMMENDED CALIBRATION PROCEDURE

1. Apply VAC or VDC to the module as per the actual application.
2. Apply 100 mV for Model VFC or 4.16 mA for Model CFC to *"Signal Input" (Terminal 8)* and *"Common" (Terminal 2)*.
3. Adjust *"ZERO"* potentiometer to obtain 100 Hz at Terminal 3 *(a frequency counter and an appropriate pull-up resistor to DC are required, $V_{OH} = 30$ VDC, $I_{SNK} = 10$ mA maximum)*.
4. Apply 10.00 VDC for Model VFC or 20.00 mA for Model CFC to *"Signal Input" (Terminal 8)* and adjust the *"SPAN"* potentiometer to obtain 10,000 Hz at Terminal 3. Re-apply Model VFC voltages or Model CFC currents to Terminal 8 for additional *"ZERO"* and *"SPAN"* readjustments if required.
5. The *"OUTPUT INHIBIT"* potentiometer may be adjusted for up to 10% of full scale output during this procedure or adjusted in the actual application.

Note: Frequency outputs at Terminal 4 (1 KHz) and 5 (100 Hz) are divided down internally from the 10 KHz output.

Before commencing with calibration procedure, ensure Output Inhibit pot is rotated fully counter clockwise, otherwise the frequency output may be inhibited during zero calibration.

Although Models VFC and CFC are factory calibrated, periodic calibration is recommended as part of a regular maintenance program or whenever accuracy is questionable.
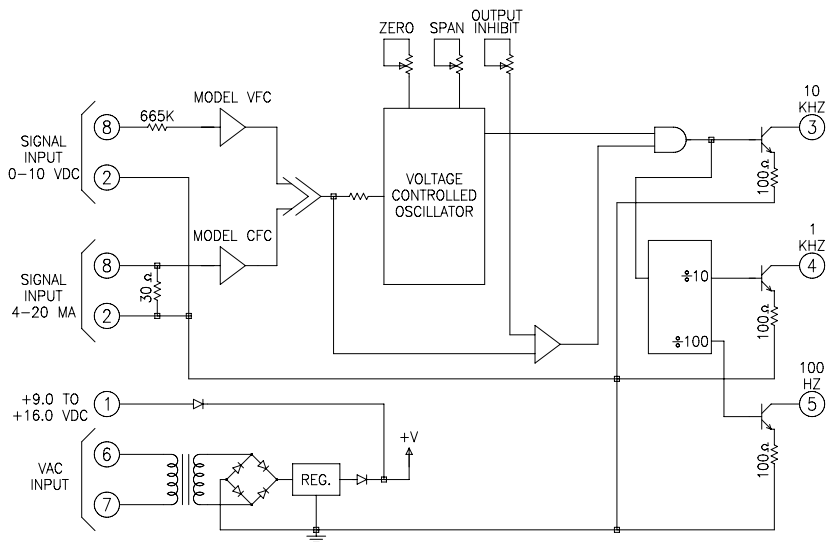
TOTALIZE THE NUMBER OF GALLONS FLOWING THROUGH A PIPELINE
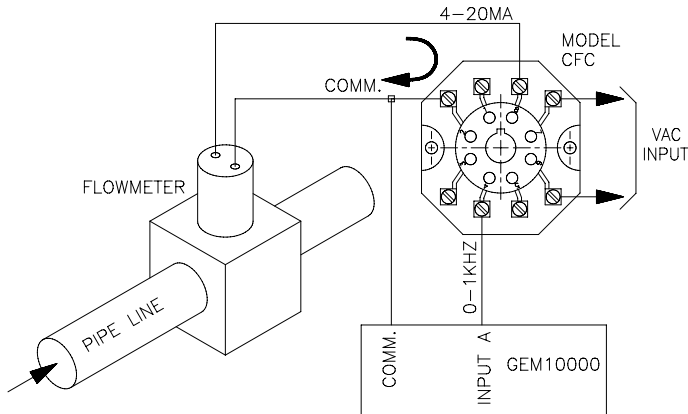
A pipeline is moving material at a known rate of 10 gallons per minute as detected by a flowmeter that generates a linearized 4 to 20 mA analog output. This signal is applied to a Model CFC Current to Frequency Converter Module that provides a 0 to 1000 Hz output on Terminal 4 proportional to the analog 4 to 20 mA input. A Gemini 1000 is then set up for totalization of gallons to 10ths accuracy.

A Gemini Scale Multiplier of 0.01 divides the 1 KHz CFC full scale output to 10 Hz, which corresponds to 10 gallons/minutes maximum rate. Therefore, 10 Hz x 60 seconds/minute = 600 counts/minute for 10 gallons/minute flow rate. The Gemini scale factor is calculated for a display in gallons as $10 \div 600 = 0.0167$. To read gallons to 10ths, the 10 gallons is multiplied by 10 for $100 \div 600 = 0.1667$ scale factor and the Gemini decimal point is set to the right of the second digit.

Note: A +0.02% accumulation error occurs due to the 4 decimal place scale factor limitation.