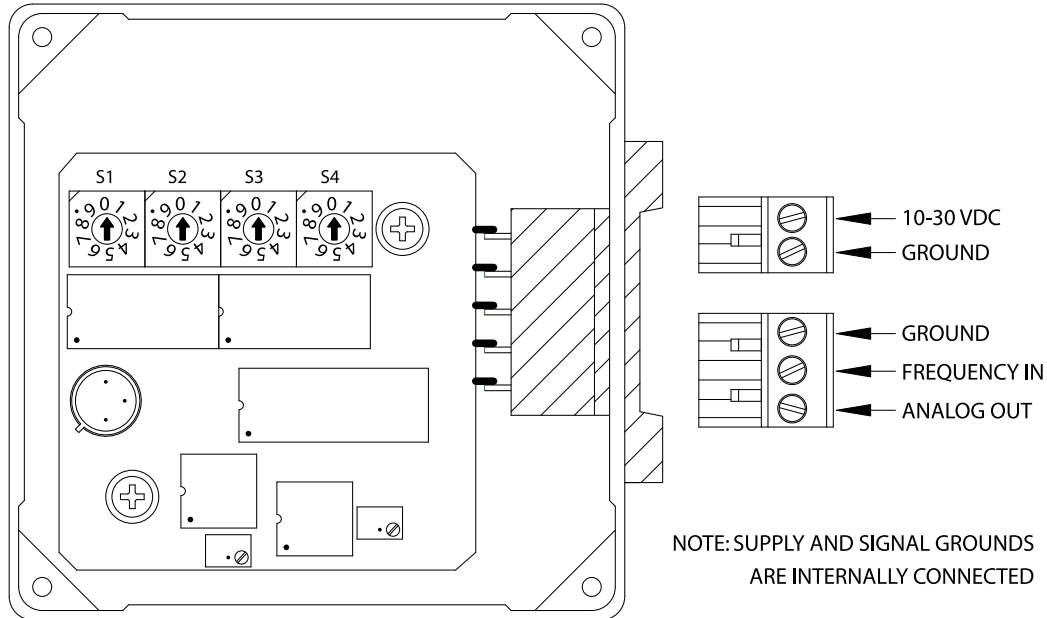# FI-V Frequency-to-Analog Modules

The FI -V Series are microprocessor based frequency to analog converters designed to convert input frequencies up to 5,000 Hz into an analog output. There are four output options in the voltage model (V Type) and two output options in the mAmp model (A Type). Output settings are factory set and must be specified upon ordering. The high flow rate is user set as a frequency setting via four BCD rotary switches, and the analog output signal is automatically scaled. Connections are made via 2 and 3 pin female Weidmuller connectors. A glowing LED indicates the unit is operating properly, and a blinking LED indicates a frequency is active.

10-30 VDC
GROUND

GROUND
FREQUENCY IN
ANALOG OUT

NOTE: SUPPLY AND SIGNAL GROUNDS
ARE INTERNALLY CONNECTED

Technical Specifications

|	
Supply Voltage (Vcc)	10 - 30 VDC @ 60 mA max
Available Outputs	0-20 mA, 4-20 mA 0-5V, 1-5V, 0-10V, 2-10V
Max. Load Impedance for current output	(Vcc/0.02) - 275 ohm
Min Load Impedance for voltage output	500 ohm
Driving Capacity of voltage output	10mA max.
Frequency Input	5 KHz max.
Input signal amplitude	1 Vp min.
Temperature Range	0 - 185°F
Response Time	= 1/f + 25 msec
Dimensions	3.25" x 3.25" x 1.25"
Diagnostics	A glowing LED indicates unit is working. The LED will blink to show an active frequency.

Ordering Information

FI __ V __ X

1 : 1 - 5 V
2 : 2 - 10 V
4 : 4 - 20 mA
5 : 0 - 5 V
10: 0 - 10 V
20: 0 - 20 mA

V: Voltage

A: mA
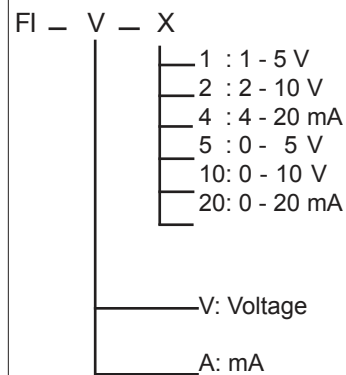
For scaling instructions see other side.

AW-LAKE
COMPANY

SCALING ANALOG OUTPUT

On the front panel there are four rotary switches which are adjustable with a small screwdriver. It is not necessary to power the unit down to change the settings. The switches are read from left to right in order of decreasing value as shown in the figure above.
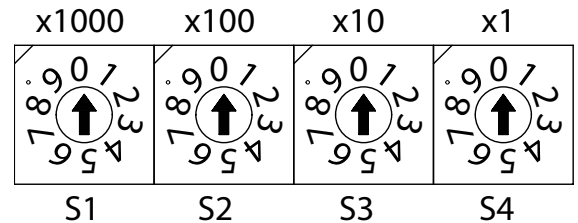
If the maximum frequency is known at which the resulting output should be 20mA, set the switches to this frequency. The output will automatically scale itself. If the maximum frequency is not known, the correct switch settings can be determined in 2 ways.

The following equation can be used to determine what the switch setting should be for any particular meter and flow rate.

$$SwitchSetting = \frac{K - Factor * Max.Flowrate}{60}$$

Where: K-Factor is the flow meter scaling factor in pulses/volume (found on calibration sheet).
Max. Flowrate is the flowrate at which the analog output should be at its max.
Note: K-Factor and Max. Flowrate <u>must</u> have same units, ie. Gallon/GPM, Liter/LPM.
60 is the scaling factor when Max. Flowrate is in volume/minute. Use 3600 for volume/hour.

Ex. K-Factor = 89,100 pulses/gallon (for a JVM-10KL), Max Flow rate = 0.2gpm

$$SwitchSettings = \frac{89,100 * 0.2}{60} = 297$$

If the numerical maximum flow rate is not known, the unit can be calibrated in systems with the following:

1. Adjust system flow to the rate at which analog output should read 20mA.
2. Set scaling switches to a value known to be above the maximum frequency (ex. 9, 49, 799, 2999). If unsure, use 4999.
3. If S1 is 0, go to step 4. Decrease S1 until output shows 20mA. Then increase its setting by one unless value is 4, in which case value should remain 4. If the switch value is 0 and the output is below 20mA, leave switch at 0 and go to next switch.
4. If S2 is 0, go to step 5. Decrease S2 until output shows 20mA. Then increase its setting by one unless value is 9, in which case value should remain 9. If the switch value is 0 and the output is below 20mA, leave switch at 0 and go to next switch.
5. If S3 is 0, go to step 6. Decrease S3 until output shows 20mA. Then increase its setting by one unless value is 9, in which case value should remain 9. If the switch value is 0 and the output is below 20mA, leave switch at 0 and go to next switch.
6. Decrease S4 until output shows 20mA and leave setting. <u>Do not</u> increase this setting by one. The switches are now set at the frequency which will result in a 20mA output.

When setting switches in step 1, try to use numbers ending in 9 for example: 9, 39, 299, and 2999. Any switch setting above 5000 Hz is read as 4999 Hz.

Example: Actual maximum input frequency is 538 Hz. Switches are set to 0999 Hz, a value known to be above actual maximum input frequency. The output shows 12.64 mA.

Starting with the switch of highest order, in this case S2 since S1 is 0, its value is decreased until the output shows 20mA **(S2 shows 4)**. The switch is then increased by 1 **(S2 is set to 5)**. S3 is then decreased until the output shows 20mA **(S3 shows 2)**. The switch is then increased by 1 **(S3 is set to 3)**. Finally, S4 is decreased until the output shows 20mA and left as such **(S4 set at 8)**. The switches are now set to 538 Hz, the frequency which will cause maximum output current/voltage.

Note: Wherever this procedure refers to 20mA you may substitute either 5V or 10V depending upon the output you have ordered.