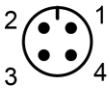
FIP Analog Output Sensor

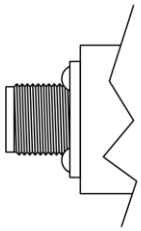
The FIP is a microprocessor based, meter mounted, analog output sensor. Each unit has a sensor, amplifier and converter module built into an aluminum junction box. The FIP is designed to handle frequencies up to 5,000 Hz. The operational frequency range is user defined via four BCD rotary switches, where the high flow rate in frequency is set to 20 mA, 5V or 10V, and the output signal is automatically scaled. Electrical connection options include ½" NPT for running conduit piping, 4-pin connector or 3-pin connector.

NOTE: This is a 3 wire hookup and is not suitable for a 2 wire installation.

4 PIN M12
"M" VERSION CONNECTOR



(1) +10-30 VDC
(2) COMMON
(3) SIGNAL OUT
(4) N/C

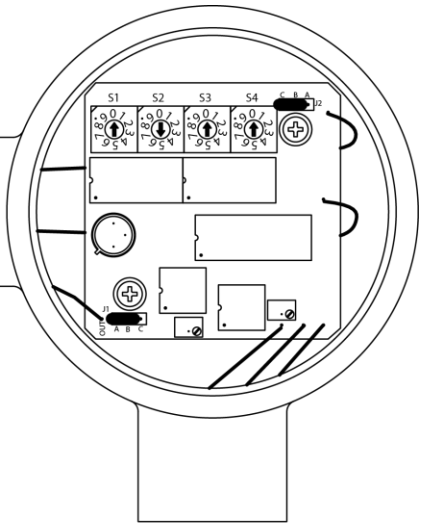


3 PIN
"S" VERSION CONNECTOR

(A) +10-30 VDC
(B) COMMON
(C) SIGNAL OUT

"E" VERSION
PIGTAIL LEADS

+10-30 VDC	RED
COMMON	BLACK
SIGNAL OUT	WHITE



Ordering Information

FIP X X X

- X: M: M12 Connector; S: 3-Pin Connector; E: Conduit Connection
- X: Meter Selection — H: JV, HPM, TRG Series; T: TR-1100 Series; IR: JVK Series
- X: Output — 1: 1-5 V; 2: 2-10V; 4: 4-20 mA; 5: 0-5V; 10: 0-10V; 20: 0-20 mA

Technical Specifications

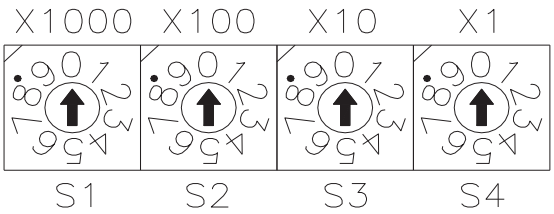
Supply Voltage:	10-30 VDC
Supply Current:	60 mA max
Signal Output:	0-20 mA, 4-20mA or 0-5V, 0-10V, 1-5V, 2-10V
Max Load Impedance	(Vcc/0.02) – 275 ohm (for mA out)
Min Load Impedance:	500 ohm (for Volt out)
Driving Capacity:	For Voltage output only 10 mA max
Temperature Range:	0-185° F

Jumper Settings

J1	AB: Analog Output
	BC: Frequency Output
J2	AB: Housing Ground
	CB: Signal ground
Response Time:	1/F + 25 msec
Frequency Input:	5 KHz max
Diagnostics:	A glowing LED indicates the unit is working. The LED will blink to show an active frequency.

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 to the right.



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.

$$\text{Switch Setting} = \frac{\text{K Factor} * \text{Max Flow Rate}}{60}$$

Where: K Factor is the flow meter scaling factor in pulses / volume (found on calibration sheet)
Max. Flow Rate is the flow rate at which the analog output should be at it's max.
Note: K-Factor and Max flow rate MUST have same units, ie: gallon/GPM, liter/LPM
60 is the scaling factor when max. flow rate is in volume/minute. Use 3600 for volume/hour

Ex: K Factor = 53,100 pulses/gallon (for a JVM-12KG), Max flow rate = 2 GPM

$$\text{Switch Setting} = \frac{53{,}100 * 2}{60} = 1770$$

If the numerical 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 20 mA.
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 20 mA. 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 20 mA, leave switch at 0 and go to next switch.
4) If S2 is 0, go to step 5. Decrease S2 until output shows 20 mA. 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 20 mA, leave switch at 0 and go to next switch.
5) If S3 is 0, go to step 6. Decrease S3 until output shows 20 mA. 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 20 mA, leave switch at 0 and go to next switch.
6) Decrease S4 until output shows 20 mA and leave setting. DO NOT increase this setting by one. The switches are now set at the frequency which will result in a 20 mA 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.

Starting with the switch of highest order, in this case S2 since S1 is 0, its value is decreased until the output shows 20 mA (**S2 shows 4**). The switch is then increased by 1 (**S2 is set to 5**). S3 is then decreased until the output shows 20 mA **(S3 shows 2**). The switch is then increased by 1 (**S3 is set to 3**). Finally, S4 is decreased until the output shows 20 mA 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 20 mA you may substitute either 5V or 10V depending upon the output you have ordered.