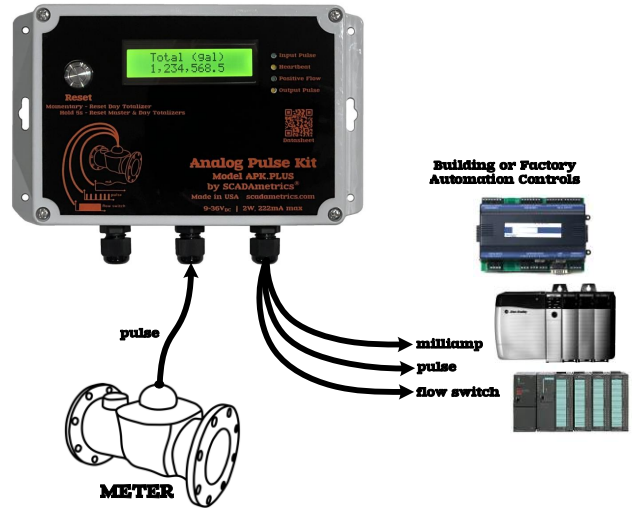


Analog Pulse Kit

Model APK.PLUS



Provides 4-20 Milliamp Flow Rate and Pulse-per-Volume Meter Signals to SCADA, Telemetry, and Building Automation Systems!

SCADAMetrics® is pleased to introduce a new member to its DINstrumentation™ series – **Analog Pulse Kit Plus!**

This new electronic signal generator for water meters provides a 4-20 milliamp (flow) output, a dry contact pulse (per volume) output, and a dry contact flow switch output!

Certain flow meters, such as the Sensus® OMNI™-Series, feature a digital pulse output signal. The SCADAMetrics **Analog Pulse Kit** was designed to expand upon this signal to provide an efficient flow meter interface to SCADA, Telemetry, and Building Automation Systems.

Furthermore, the **Analog Pulse Kit Plus** was designed using SCADAMetrics' signature approach of providing users with the capability to easily set the instrument's meter-specific behavior in-the-field, as opposed to only at the factory. All meter-specific customization is accomplished using 16 integrated DIP-switches, which are set according to our lookup table. The obvious benefits to our approach are accelerated project schedules and shortened lead-times.

The **Analog Pulse Kit** utilizes the digital pulse output from the water meter to generate a 4-20mA rate-of-flow signal and a secondary dry-contact pulse-per-volume signal. It also generates a dry-contact flow switch signal, which can be used, for example, to trigger ON/OFF a chemical disinfection pump.

For Sensus® OMNI™ and HET Propeller Meters, the **Analog Pulse Kit** provides the necessary 24VDC auxiliary power supply for these unique, 3-wire pulse-type meters.

For flow meters whose pulse output signal is too short-duration (milliseconds) or too high-frequency (Hz) to be detected by certain low-pulse-bandwidth BMS systems, the **Analog Pulse Kit** provides a **Pulse Extension** feature, which lengthens the duration of each pulse by a factor of 10; and the **Analog Pulse Kit** also provides a **Low-Speed Pulse Output** feature, which decreases the pulse output frequency (Hz) by a factor of 10.

Key Features -

- 4-20mA Flow-Proportional Output (3KV Isolation).
- Dry-Contact, Volume-Proportional Output (3.75KV Isolation).
- Dry-Contact Flow-Switch Output (3.75KV Isolation).
- Large, 2x16 Character Backlit Display: Master Total, Day Total, Rate
- Compatible with Most Late-Model, Pulse-Type Flow Meters.
- Works with All Popular Registration Units (Gallons, Cubic Feet, Cubic Meters, Acre Feet).
- No Computer Required! – Setup via DIP Switches Only!
- Removable Terminal Blocks, Simplified Wiring Procedures.
- NEMA-4X Wall-Mountable.
- 24VDC-Powered (1.5KV Isolation). Low 1.2W Power Consumption.
- Enclosure and Circuit Board: UL 94-VO recognized materials.
- Simulation-Mode Feature: Emits 12mA and 1 Hz Pulse.

Are you interested in how SCADAMetrics meter technology can help you more closely monitor the flow through your water meters? Give us a call! We'll be glad to discuss the details!

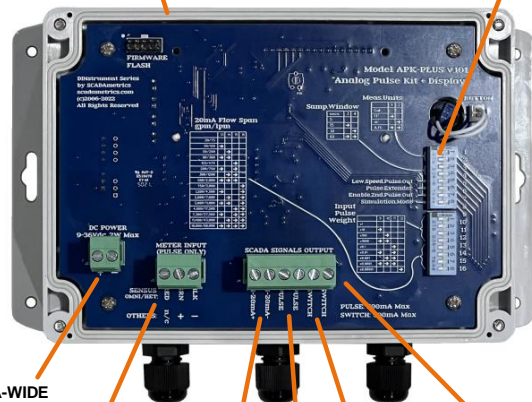
SCADAMetrics
scadаметrics.com
 Saint Louis, Missouri USA
 636.405.7101

NEMA-4X ENCLOSURE AND PUSHBUTTON

- STATUS LED'S
- POWER OK
 - INPUT PULSE
 - OUTPUT PULSE
 - FLOWING

SILICONE, O-RING GASKET

USER-FRIENDLY SETUP VIA DIP SWITCHES



1/4" NPT CABLE GLANDS

ULTRA-WIDE POWER SUPPLY INPUT
9-36V_{DC}
1.5KV Isolation

3-Wire or 2-Wire Pulse Input
3KV Isolation

4-20mA (per Flow Rate)
3KV Isolation

Pulse (per Volume)
3.75KV Isolation

Flow Switch (or 2nd Pulse)
3.75KV Isolation

ALL TERMINAL BLOCKS REMOVABLE

Engineering Specifications -

Dimensions: 4.5" x 5.0" x 1.275"
 Weight: 17.1 Ounces
 Supply Voltage: 9-36V_{DC}
 Supply Power: 1.25W
 Power Supply Isolation: 1500V_{RMS}

Solid-State Pulse Support: Yes
 Dry-Contact Pulse Support: Yes
 Sensus® OMNI™/HET Support: Yes

Supported Units: Gallon, Cubic Feet, Cubic Meters, Acre-Feet
 Supported Scalars: x1, x10, x100, x1,000 --- x0.1, x0.01, x0.001, x0.0001, x0.00001, x1/6, x10/6, x100/6
 Flow Calculation Window: 5s, 15s, 30s, 60s (User-Selectable)
 Programming Method: Integrated DIP Switches, 16-Poles
 Totalizer Max Unscaled Count: 999,999,999

4-20mA Flow Range (gpm): 20,30,50,80,125,200,300,500,750,1200,2000,3000,4600,7300,11400,18000
 4-20mA Flow Range (lpm): 75,120,200,300,475,750,1200,2000,3000,4500,7000,11000,17500,27500,43000,68000
 4-20mA Resolution: 16-Bit DAC
 4-20mA Isolation: 3000V_{RMS}
 4-20mA Max Series Resistance: 500 Ω
 4-20mA Signal Type: Active. Therefore, do not add an external loop supply, or else damage to the unit will result!

Physical Display: 2x16 Characters, Character Dimension: 0.114 x 0.203 inch
 Displayed Metering Data: Master Totalization, Day Totalization, Flow Rate
 Pulse Output Type: Solid-State Dry-Contact, 1 Output Pulse per Input Pulse
 Flow Switch Output Type: Solid-State Dry-Contact, Closes if Rate-of-Flow > 0
 Pulse Output Resolution: Normal-Speed Mode: Output Pulse Resolution = Input Pulse Resolution
 Low-Speed Mode: Output Pulse Resolution = Input Pulse Resolution / 10

De-Bounce Filter: 200ms, but De-Activated for 5-Second Flow Calculation Window
 Closed-Contact Resistance: 0.4 ohm, typical
 Closed-Contact Max Current: 500mA
 Open-Contact Max Voltage: 60V
 Pulse/Flow Switch Isolation: 3750V_{RMS}

Meter Cable Connection: 3-Position, Removable Screw-Down Terminal Block, 12-26 AWG
 SCADA Cable Connections: 6-Position, Removable Screw-Down Terminal Block, 12-26 AWG

Temperature: -40C to 85C (-40°F to 185°F)
 Relative Humidity: 5% to 95%, Non-Condensing
 Enclosure Rating: Built to NEMA-4X Specifications, Not Rated for Submersion
 Manufacturing Location: USA
 Environmental: ROHS-Compliant, Lead-Free
 Warranty: 2 Years (see www.scadametrics.com for details)

Engineering Dimensions (Inches) -



Meter Terminal Block Hookup (Table.1) -

Terminal	Function	Sensus® OMNI™ or Sensus® HET Prop	Dry-Contact Pulse Input or Transistor Pulse Input
1	Excitation Power (+24V _{DC})	Red	No Connection!
2	Pulse Input (+)	Green	Pulse (+)
3	Pulse Input (-)	Black	Pulse (-)

Wiring Notes:

- Terminal #1 is a 24V_{DC} Excitation Power Supply, which is provided as a convenience for Sensus® OMNI™ and HET Propeller Water Meters only.
- Non-Sensus® Water Meters should connect to Terminals #2 and #3 only.

Signal Terminal Block Hookup (Table.2) -

Terminal	Function	Notes
4	4-20mA +	Settable Range via DIP Switches
5	4-20mA -	
6	Pulse +	Solid-State Dry Contact (N-O) 500mA Max, 60V Max
7	Pulse -	
8	Flow Switch +	Solid-State Dry Contact (N-O) 500mA Max, 60V Max
9	Flow Switch -	

DIP Switch Setup (Figure.1) -

9-36Vdc
2W Max, 222mA Max

Yellow LED: Device Heartbeat (Blinking=OK)
Green LED: Input Pulse

1

ON(■) →
DIP Switch Settings

1	REGISTRATION
2	UNITS
3	SAMPLING
4	WINDOW
5	PULSE _{OUT} SPEED
6	PULSE _{OUT} EXTEND
7	DIGITAL _{OUT} CH.2
8	SIMULATION
9	INPUT PULSE WEIGHT
10	
11	
12	20mA FLOW RATE
13	
14	
15	
16	

Acre Ft, gpm
M³, lpm
Ft³, gpm
Gallons, gpm

1	■	■	■	■
2	■	■	■	■

3	■	■	■	■
4	■	■	■	■

LOW NORMAL YES
PULSE FLOW/SW

5	■	■	■	■
6	■	■	■	■
7	■	■	■	■
8	■	■	■	■

ON OFF
X100/6
X10/6
X1/6
X0.00001
X0.0001
X0.001
X0.01
X0.1
X1000
X100
X10
X1

9	■	■	■	■	■	■	■	■	■	■	■
10	■	■	■	■	■	■	■	■	■	■	■
11	■	■	■	■	■	■	■	■	■	■	■
12	■	■	■	■	■	■	■	■	■	■	■

e.g. x10: 1 pulse = 10 reg.units

18,000/68,000
11,400/43,000
7,300/27,500
4,600/17,500
3,000/11,000
2,000/7,000
1,200/4,500
750/3,000
500/2,000
300/1,200
200/750
125/475
80/300
50/200
30/120
20/75

gpm/lpm

13	■	■	■	■	■	■	■	■	■	■	■
14	■	■	■	■	■	■	■	■	■	■	■
15	■	■	■	■	■	■	■	■	■	■	■
16	■	■	■	■	■	■	■	■	■	■	■

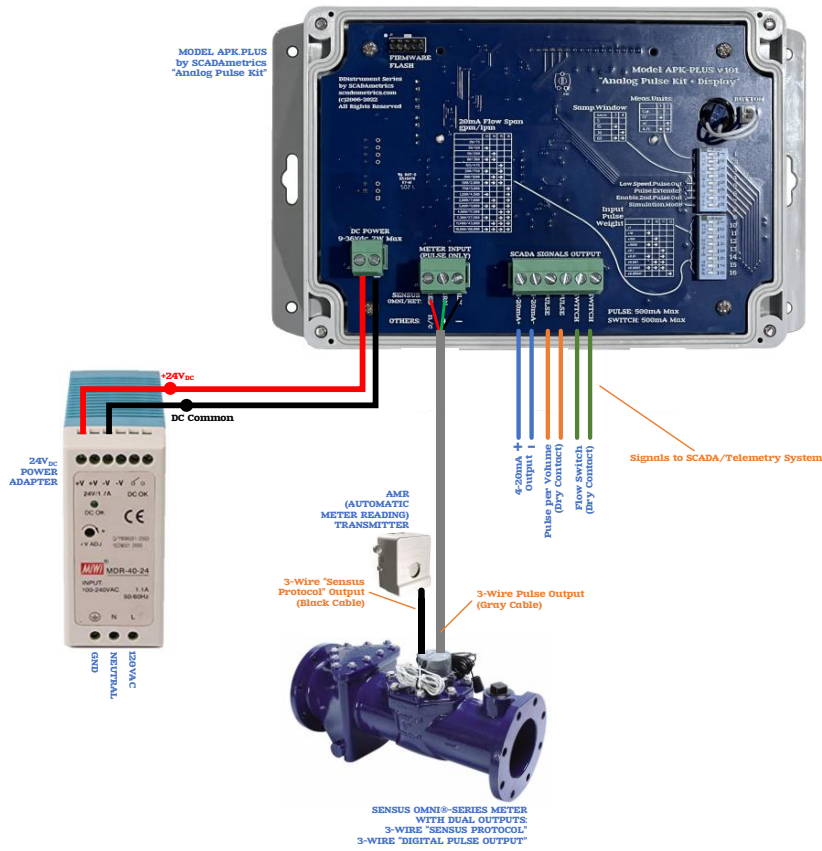
NORMAL SPEED PULSES:
OUTPUT PULSES=
INPUT PULSES

LOW SPEED PULSES:
OUTPUT PULSES=
INPUT PULSES / 10

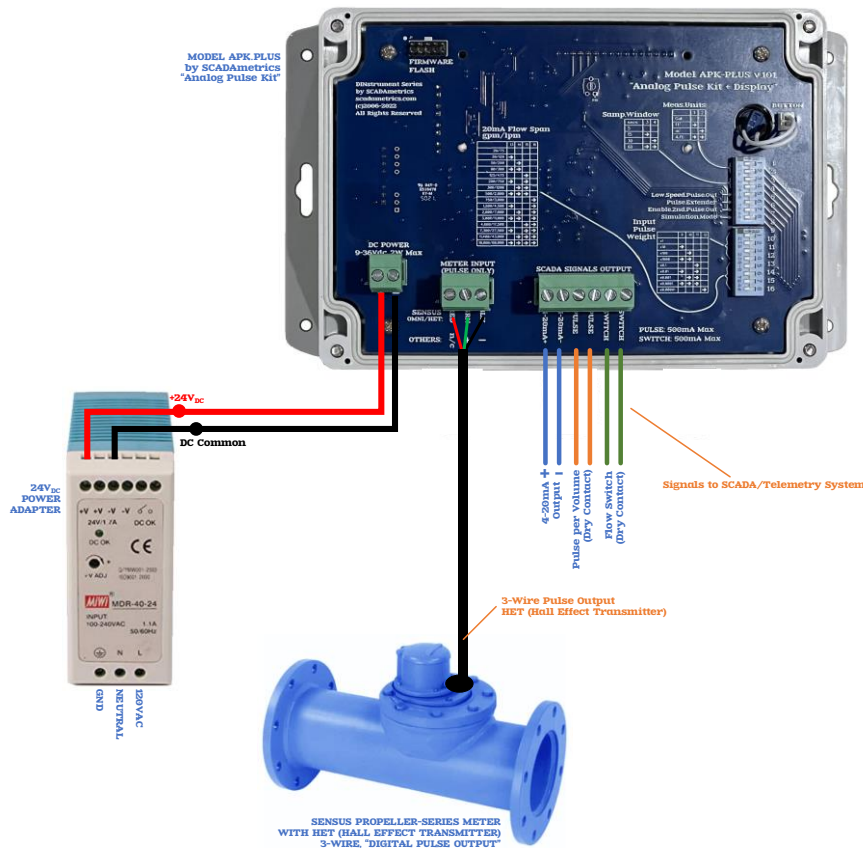
SIMULATION MODE:
PULSE OUTPUT: 1 Hz
FLOW SIGNAL OUTPUT: 12mA

16

QUICK-START GUIDE -



**SENSUS®
OMNI®
WIRING
Fig.2**



**SENSUS®
HET/
PROPELLER
WIRING
Fig.3**

Initial Setup:

- 1. Attach the water meter's two (2) pulse wires (or three (3) pulse wires for Sensus meters) Analog Pulse Kit terminals 1,2,3 (see above table for color-coding).**
- 2. (If Applicable) Connect the 4-20mA output signal to PLC/Controller: Terminals 7(+) and 8(-). Important Note! – The Analog Pulse Kit provides loop power. The user must not add an additional loop power supply, or else damage to the unit will result.**
- 3. (If Applicable) Connect the pulse output signal to the PLC/Controller: Terminals 9 and 10. Important Note! – The pulse output is a solid-state, dry-contact type. 500mA max, 60V max. Circuit must be current-limited by external means.**
- 4. (If Applicable) Connect the flow switch signal to the PLC/Controller: Important Note! – The flow switch output is a solid-state, dry-contact type. 500mA max, 60V max. Circuit must be current-limited by external means.**
- 5. Set the DIP Switches, per Figure.1, and per Following Instructions:**

DIP Switches	Function
1-2	Set Registration Units to Match Target Flow Meter: <ul style="list-style-type: none"> • Gallons • Cubic Feet • Cubic Meters • Acre Feet
3-4	Set Sampling Window, Per Typical Pulse Input Frequency: <ul style="list-style-type: none"> • 5s – When Pulse Input Freq > 4 Hz • 10s – When Pulse Input Freq: 2-4 Hz • 30s – When Pulse Input Freq: 1-2 Hz • 60s – When Pulse Input Freq < 0.5 Hz
5	Set Pulse Output Speed: <ul style="list-style-type: none"> • Normal (Output Pulse Speed = Input Pulse Speed) • Slow (Output Pulse Speed Hz = Input Pulse Speed Hz / 10) Recommendation: Use Slow Speed if SCADA, Telemetry, BMS Incapable of Processing Normal Speed Pulses.
6	Enable/Disable Pulse Output Extension Mode: <ul style="list-style-type: none"> • Disable (Output Pulse Width = Input Pulse Width) • Enable (Output Pulse Width = 10 x Input Pulse Width) Recommendation: Enable Pulse Extension Mode If Pulse Width Too Short for Detection by SCADA, Telemetry, BMS System. Note! – If Extended Pulse Width Mode Causes Output Pulses to Overlap, Then User May Also Set Pulse Output Speed to 'Slow'. Possible Examples: <ul style="list-style-type: none"> • Badger Meter HR Default Pulse Width: 50ms • Metron-Farnier Innov8 Default Pulse Width: 50ms

7	Configure Digital Output Channel 2: <ul style="list-style-type: none"> Flow Switch Output (Contact Closure When Flow Rate > 0) 2nd Pulse Output (Mirrors 1st Pulse Output) 																								
8	Enable / Disable Simulation Mode: <ul style="list-style-type: none"> Enable (For Debugging Control Panel): <ul style="list-style-type: none"> 4-20mA Output = 12mA (50%) Fixed Pulse Output = 1 Hz Fixed Flow Switch Output = ON / Closed Disable (Run Mode): <ul style="list-style-type: none"> 4-20mA, Pulse, & Flow Switch Operate in Normal Run Mode 																								
9,10,11,12	Set the Input Pulse Weight: <table border="1" style="margin-left: 20px;"> <tr><td>x1</td><td>1 pulse per 1 unit</td></tr> <tr><td>x10</td><td>1 pulse per 10 units</td></tr> <tr><td>x100</td><td>1 pulse per 100 units</td></tr> <tr><td>x1000</td><td>1 pulse per 1000 units</td></tr> <tr><td>x0.1</td><td>1 pulse per 0.1 unit</td></tr> <tr><td>x0.01</td><td>1 pulse per 0.01 unit</td></tr> <tr><td>x0.001</td><td>1 pulse per 0.001 unit</td></tr> <tr><td>x0.0001</td><td>1 pulse per 0.0001 unit</td></tr> <tr><td>x0.00001</td><td>1 pulse per 0.00001 unit</td></tr> <tr><td>x1/6</td><td>1 pulse per 1/6 unit</td></tr> <tr><td>x10/6</td><td>1 pulse per 10/6 unit</td></tr> <tr><td>x100/6</td><td>1 pulse per 100/6 unit</td></tr> </table> <p>...where unit = gal/ft³/m³/AF</p>	x1	1 pulse per 1 unit	x10	1 pulse per 10 units	x100	1 pulse per 100 units	x1000	1 pulse per 1000 units	x0.1	1 pulse per 0.1 unit	x0.01	1 pulse per 0.01 unit	x0.001	1 pulse per 0.001 unit	x0.0001	1 pulse per 0.0001 unit	x0.00001	1 pulse per 0.00001 unit	x1/6	1 pulse per 1/6 unit	x10/6	1 pulse per 10/6 unit	x100/6	1 pulse per 100/6 unit
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x1/6	1 pulse per 1/6 unit																								
x10/6	1 pulse per 10/6 unit																								
x100/6	1 pulse per 100/6 unit																								
13,14,15,16	Set the 20mA Flow Rate. (4mA Flow Rate Always Equals Zero Flow). If Meter Registration Units = gal, ft ³ , or AF Set 20mA Flow Rate in GPM (gallons per minute). If Meter Registration Units = m ³ Set 20mA Flow Rate in LPM (liters per minute).																								

6. Connect DC voltage source to the Analog Pulse Kit's V+ /V- terminals. Apply Power, and Observe...

- The #1 LED (Green) 'Pulse Input' should blink ON whenever an incoming pulse (contact closure) has been detected.
- The #2 LED (Yellow) 'Heartbeat' should signal with an OCCASIONAL BLINK OFF, signifying that the Analog Pulse Kit is working.
- The #3 LED (Green) 'Flow Detect' will light up SOLID GREEN during periods when Positive Flow is Detected.
- The #4 LED (Yellow) 'Pulse Output' will follow the Pulse Output (LED ON=Contact Closure).

7. RESET PushButton Operation:

- If the RESET PushButton is depressed for 1 second (or more), then the Day Totalizer will be reset to ZERO (0).
- If the RESET PushButton is depressed for 5 seconds (or more), then the Day Totalizer and the Master Totalizers will both be reset to ZERO (0).

SENSUS WATER METERS - PERSONALITY SETTINGS FOR OMNI-SERIES METERS.

Recommended **DIP Switches 1-12:**

Size	Gallons	Cubic Feet	Cubic Meters
1.5" Omni-R2/T2/F2 2" Omni-R2/T2/F2 3" Omni-T2/F2 Omni Meter Emits: 1 pulse per 1.0 gallon 1 pulse per 0.1 ft ³ 1 pulse per 0.01 m ³	DipSw.1= DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12= Normal Speed Pulse: 1 Pulse / 1 Gal Low Speed Pulse: 1 Pulse / 10 Gal	DipSw.1=ON DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12= Normal Speed Pulse: 1 Pulse / 0.1 FT ³ Low Speed Pulse: 1 Pulse / 1 FT ³	DipSw.1= DipSw.2=ON DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9=ON DipSw.10= DipSw.11=ON DipSw.12= Normal Speed Pulse: 1 Pulse / 0.01 M ³ Low Speed Pulse: 1 Pulse / 0.1 M ³
4" Omni-T2/F2 6" Omni-T2/F2 8" Omni-T2/F2 10" Omni-T2/F2 Omni Meter Emits: 1 pulse per 10 gallons 1 pulse per 1 ft ³ 1 pulse per 0.1 m ³	DipSw.1= DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9=ON DipSw.10= DipSw.11= DipSw.12= Normal Speed Pulse: 1 Pulse / 10 Gal Low Speed Pulse: 1 Pulse / 100 Gal	DipSw.1=ON DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12= Normal Speed Pulse: 1 Pulse / 1 FT ³ Low Speed Pulse: 1 Pulse / 10 FT ³	DipSw.1= DipSw.2=ON DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7= DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12= Normal Speed Pulse: 1 Pulse / 0.1 M ³ Low Speed Pulse: 1 Pulse / 1 M ³

SENSUS WATER METERS - PERSONALITY SETTINGS FOR OMNI AND PROP METERS.

Recommended **DIP Switches 13-16:**

The Following Are *Suggested* Flow Span Settings, and May Need to Be Adjusted Based on Anticipated Max Flow Conditions.

Size	Gallons , Cubic Feet , Cubic Meters	4-20mA Span Settings Are Based Solely on Meter Size and Maximum Expected Flow Rates.
1.5" Omni 200 gpm 750 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=	
2" Omni 300 gpm 1200 lpm	DipSw.13= DipSw.14=ON DipSw.15=ON DipSw.16=	
3" Omni 750 gpm 3000 lpm	DipSw.13= DipSw.14= DipSw.15= DipSw.16=ON	
4" Omni 2000 gpm 7000 lpm	DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=ON	
6" Omni 3000 gpm 11000 lpm	DipSw.13=ON DipSw.14=ON DipSw.15= DipSw.16=ON	
8" Omni 4600 gpm 17500 lpm	DipSw.13= DipSw.14= DipSw.15=ON DipSw.16=ON	
10" Omni 7300 gpm 27500 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=ON	