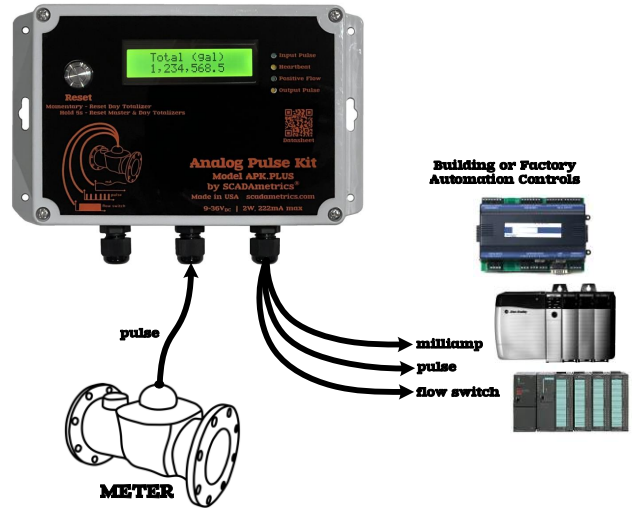




# Analog Pulse Kit

## 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® Cordonel®, OMNI™ and HydroVerse 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 pulse output meters that feature a dry-contact, open-collector, or open-drain output, the Analog Pulse Kit offers a standard 2-wire pulse input interface.

For Sensus® Cordonel®, OMNI™, HET Propeller, HydroVerse, and W-Series Turbo Meters, the **Analog Pulse Kit** provides the necessary 3<sup>rd</sup> wire (24V<sub>DC</sub> auxiliary power supply) for these unique 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 output pulse to at least 100 milliseconds; 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!

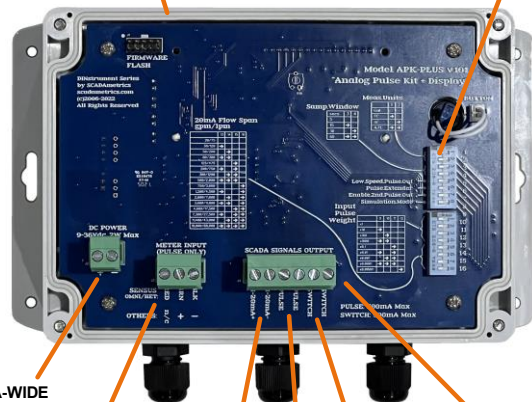
**SCADAMetrics**  
**scadаметrics.com**  
 Wildwood, Missouri USA  
 636.405.7101

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<sub>DC</sub>  
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 2<sup>nd</sup> Pulse)  
3.75KV Isolation

ALL TERMINAL  
BLOCKS REMOVABLE

## Engineering Specifications -

Dimensions: 8.063" x 5.750" x 2.250"  
 Weight: 18.1 Ounces  
 Supply Voltage: 9-36V<sub>DC</sub>  
 Supply Power: 1.25W  
 Power Supply Isolation: 1500V<sub>RMS</sub>

Solid-State Pulse Support: Yes  
 Dry-Contact Pulse Support: Yes  
 Sensus® Meter Support: Yes – Cordonel®, OMNI™, HydroVerse, Propeller/HET, Legacy W-Series Turbo

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, x1/60, 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  
 Input Pulse Frequency Range: 0 – 5000 Hz  
 Minimum Pulse Width: 100 microseconds

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<sub>RMS</sub>  
 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  
 Loss-of-Power Memory: Master and Day Totalizers Stored in Non-Volatile, Ferro-Electric RAM  
 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-Activates De-Bounce Filter)  
 De-Bounce Filter: 200ms – Activated Only For 15s, 30s, and 60s Flow Calculation Windows When Pulse Extension Mode is ON  
 100ms – Activated Only For 5s Flow Calculation Window When Pulse Extension Mode is ON

Closed-Contact Resistance: 0.4 ohm, typical  
 Closed-Contact Max Current: 500mA  
 Open-Contact Max Voltage: 60V  
 Pulse/Flow Switch Isolation: 3750V<sub>RMS</sub>

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.scadmetrics.com for details)

## Engineering Dimensions (Inches) -



## Meter Terminal Block Hookup (Table.1) -

Terminal	Function	Sensus® CordoneI®, OMNI™, HET, Prop, W-Series Turbo	Dry-Contact Pulse Input or Transistor Pulse Input or Sensus® HydroVerse
1	Excitation Power (+24V <sub>DC</sub> )	Red	<b>No Connection!</b>
2	Pulse Input (+)	Green	Pulse (+)
3	Pulse Input (-)	Black	Pulse (-)

### Wiring Notes:

- Terminal #1 is a 24V<sub>DC</sub> Excitation Power Supply, which is provided as a convenience for Sensus® CordoneI®, OMNI™, HET Propeller, and W-Series Turbo Water Meters only.
- Non-Sensus® Water Meters and the Sensus HydroVerse 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**

## DIP Switch Settings

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

ON(■) →

Acre Ft, gpm	
M <sup>3</sup> , lpm	
Ft <sup>3</sup> , gpm	
Gallons, gpm	

60s	
30s	
15s	
5s	

LOW	
NORMAL	

YES	
NO	

PULSE FLOW/SW

ON OFF

x100/6	
x10/6	
x1/6	
x1/60	
x0.00001	
x0.0001	
x0.001	
x0.01	
x0.1	
x100	
x1000	
x10	
x1	

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	

NORMAL SPEED PULSES:  
OUTPUT PULSES=  
INPUT PULSES

LOW SPEED PULSES:  
OUTPUT PULSES=  
INPUT PULSES / 10

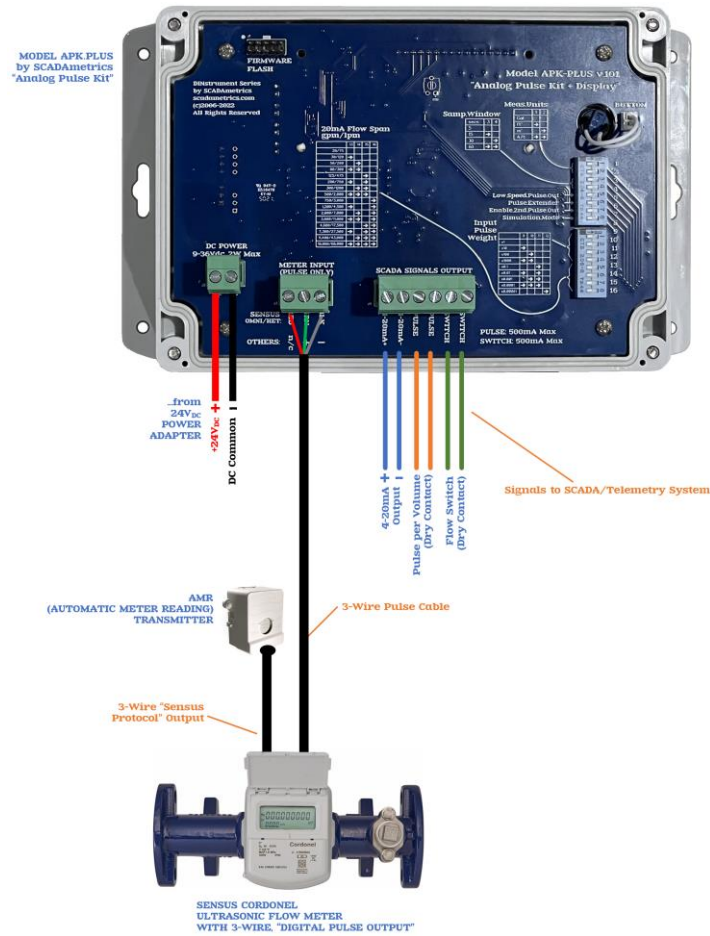
SIMULATION MODE:  
PULSE OUTPUT: 1 Hz  
FLOW SIGNAL OUTPUT: 12mA

**16**

DINstrumentation™ Series  
by SCADAmetrics® - Made in the USA

Yellow LED: Pulse Output (ON=Closed)  
Green LED: Flow Detect (ON=Flow>0)

# QUICK-START GUIDE -



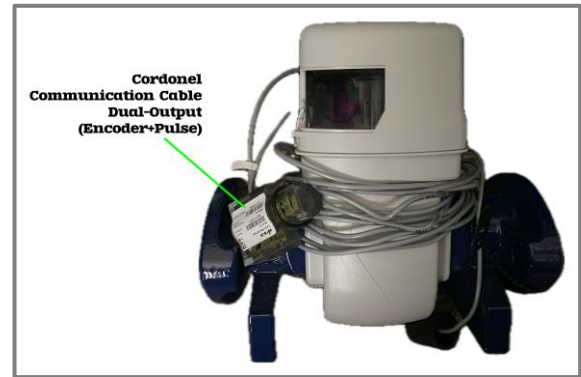
## SENSUS® CORDONEL ULTRASONIC METER WIRING

Fig.1

### Sensus CordoneL FieldLogic Configuration Tool (Android/Tablet):

1. Purchase/Acquire Compatible CordoneL Communication Cable Must be Dual-Output Type. Highlighted in Green Below.

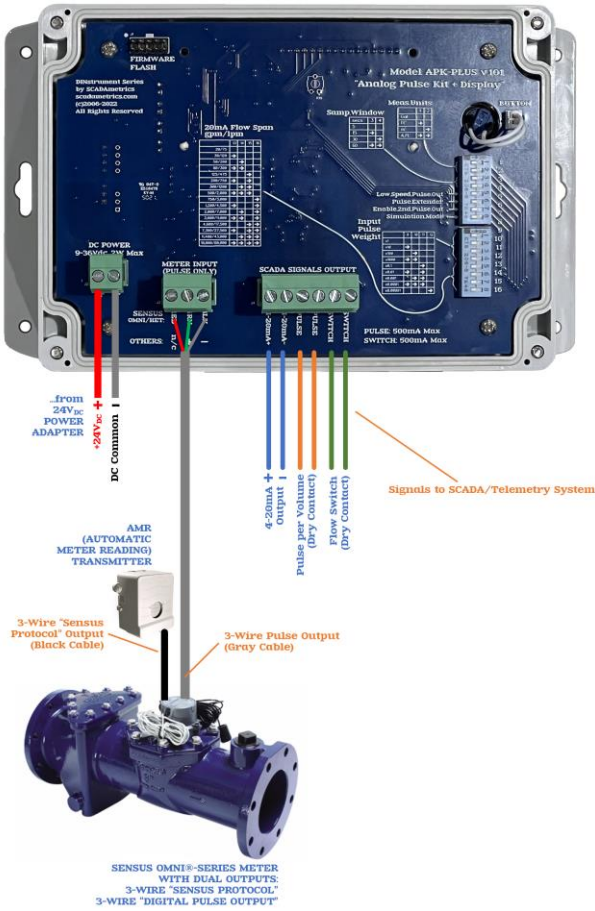
B	8	Communication Cables
	1	6' TR/PL cable (3-wire)
	2	20' TR/PL cable (3-wire)
	3	50' TR/PL cable (3-wire)
	4	100' TR/PL cable (3-wire)
	5	Itron connector with 5' cable
	6	Itron connector with 25' cable
	7	5' Nicor AMR cable (male connector)
	8	20' Nicor AMR cable (male connector)
	9	50' Nicor AMR cable (male connector)
x	A	6' TR/PL cable (3-wire) & 20' Pulse cable
x	B	20' TR/PL cable (3-wire) & 20' Pulse cable
x	C	50' TR/PL cable (3-wire) & 20' Pulse cable
x	D	100' TR/PL cable (3-wire) & 20' Pulse cable
x	E	Itron connector with 5' cable & 20' Pulse cable
x	F	Itron connector with 25' cable & 20' Pulse cable
	G	18" Nicor AMR cable (female connector) & 18" Nicor pulse cable (male connector)
x	H	5' Nicor AMR cable (male connector) & 20' Pulse cable
x	J	20' Nicor AMR cable (male connector) & 20' Pulse cable
x	K	50' Nicor AMR cable (male connector) & 20' Pulse cable



2. Insert/Attach Communication Cable to CordoneL
3. Enable Pulse Output using FieldLogic Tool
4. The Default Pulse Width of the CordoneL is 20ms. This is OK as-is.
5. Set Pulses per Unit Volume using FieldLogic Tool, According to the Following Table:

CordoneL Diameter	US Gal Pulse Weight	FT <sup>3</sup> Pulse Weight	M <sup>3</sup> Pulse Weight	AF Pulse Weight
1.5" – 2"	1 USG	0.1 FT <sup>3</sup>	0.001 M <sup>3</sup>	0.00001 AF not max resolution
3"	1 USG	0.1 FT <sup>3</sup> extended mode	0.01 M <sup>3</sup>	0.00001 AF not max resolution
4"	10 USG	0.1 FT <sup>3</sup> extended mode	0.01 M <sup>3</sup>	0.00001 AF not max resolution
6"	10 USG	1 FT <sup>3</sup>	0.01 M <sup>3</sup>	0.00001 AF not max resolution
8" – 12"	10 USG	1 FT <sup>3</sup>	0.01 M <sup>3</sup>	0.00001 AF

MODEL APK PLUS  
by SCADAMETRICS  
"Analog Pulse Kit"



# SENSUS® OMNI® WIRING

Fig 2

### Sensus FieldLogic Configuration Tool (Android/Tablet):

1. Omni-T2/C2/F2 register will always feature the necessary dual-output cables. Use 3-Wire Gray (Pulse) Cable.
2. For Omni-Plus register, Purchase/Acquire Compatible Dual-output Communication Cables. Use 3-Wire Gray (Pulse) Cable on Left Side.

### 3. ALWAYS USE SENSUS 3-WIRE PULSE CABLE!! ... DO NOT USE THE SENSUS 3-WIRE ENCODED CABLE!!

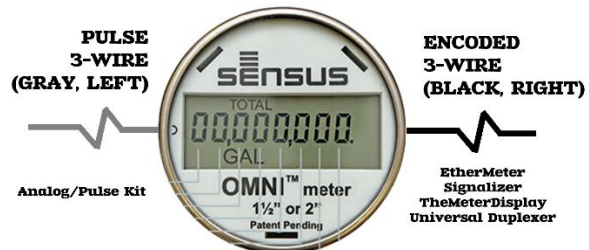
4. Sensus Omni or Omni-Plus register should be programmed using Sensus FieldLogic Tool, according to the following tables:

#### SCADAMETRICS Recommendations: Sensus Omni-Series Pulse Weight:

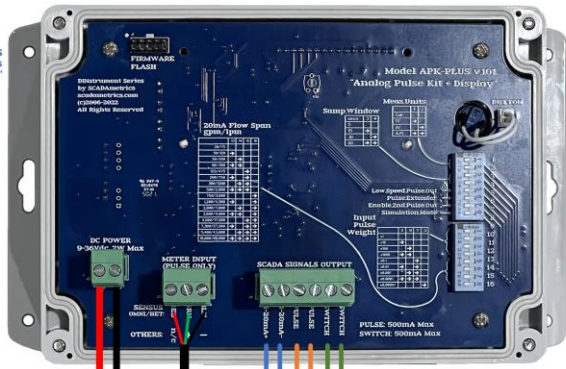
Omni Diameter	US Gal Pulse Weight	FT <sup>3</sup> Pulse Weight	M <sup>3</sup> Pulse Weight	AF Pulse Weight
1.5" – 3"	1 USG	0.1 FT <sup>3</sup>	0.001 M <sup>3</sup>	0.00001 AF
4" – 12"	10 USG	1 FT <sup>3</sup>	0.01 M <sup>3</sup>	0.0001 AF

#### SCADAMETRICS Recommendations: Sensus Omni-Plus Series Pulse Weight:

Omni Diameter	US Gal Pulse Weight	FT <sup>3</sup> Pulse Weight	M <sup>3</sup> Pulse Weight	AF Pulse Weight
1.5" – 4"	1 USG	0.1 FT <sup>3</sup>	0.001 M <sup>3</sup>	0.00001 AF
6" – 12"	10 USG	1 FT <sup>3</sup>	0.01 M <sup>3</sup>	0.0001 AF



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by SCADAmetrics  
'Analog Pulse Kit'



# SENSUS® HET/ PROPELLER WIRING

Fig3

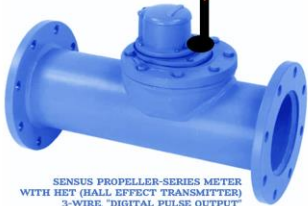
-from  
24VDC  
POWER  
ADAPTER  
+  
-24VDC  
DC Common

DC

4-20mA  
Output  
Pulse per Volume  
(Dry Contact)  
Flow Switch  
(Dry Contact)

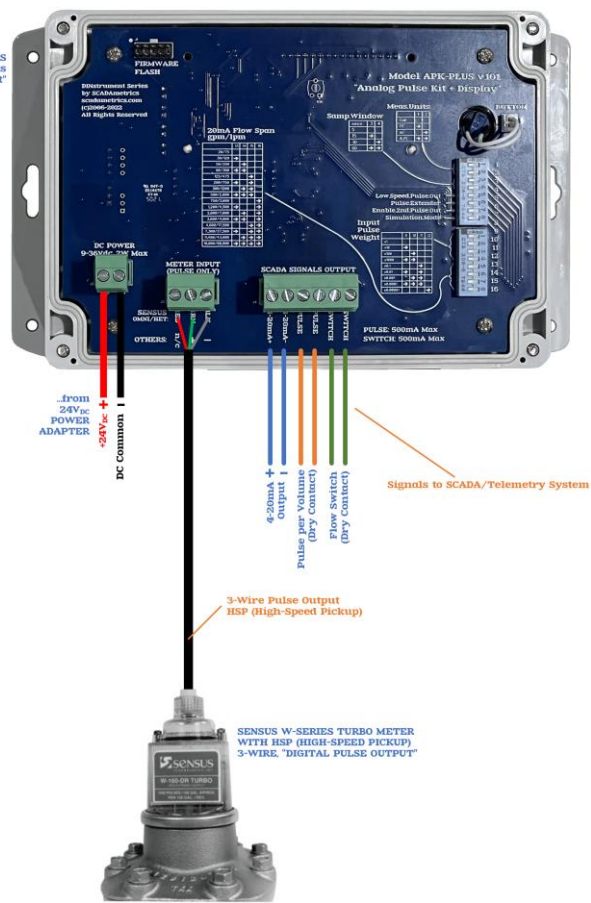
Signals to SCADA/Telemetry System

3-Wire Pulse Output  
HET (Hall Effect Transmitter)



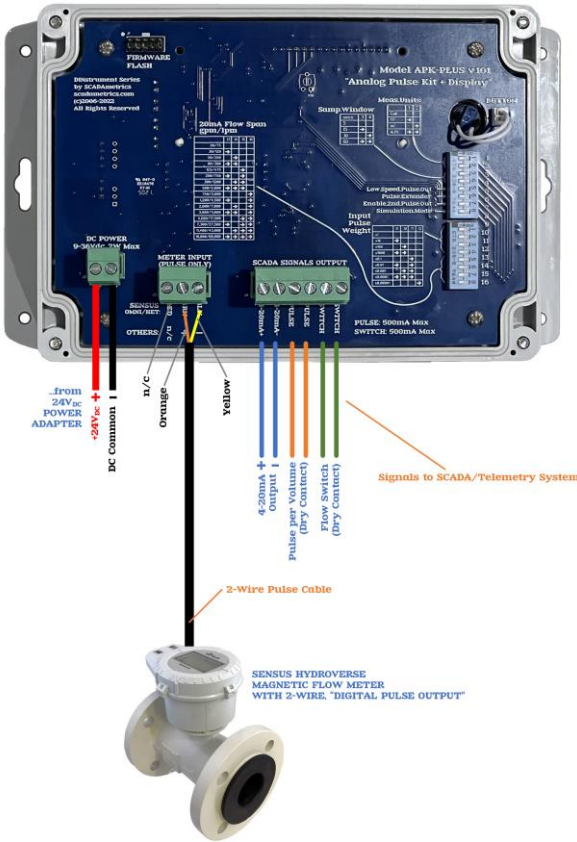
SENSUS PROPELLER-SERIES METER  
WITH HET (HALL EFFECT TRANSMITTER)  
3-WIRE "DIGITAL PULSE OUTPUT"

MODEL APK PLUS  
by SCADAmetrics  
"Analog Pulse Kit"



**SENSUS® HSP/  
W-SERIES TURBO  
WIRING  
Fig.4**

MODEL APK PLUS  
by SCADAMetrics  
'Analog Pulse Kit'



# SENSUS® HYDROVERSE MAGMETER WIRING

Fig.5

**Sensus FieldLogic Configuration Tool (Android/Tablet):**

1. Sensus HydroVerse register should be programmed using Sensus FieldLogic Tool, according to the following tables:

**SCADAMetrics Recommendations:  
Sensus HydroVerse Pulse Weight**

HydroVerse Diameter	US Gal Pulse Weight	FT <sup>3</sup> Pulse Weight	M <sup>3</sup> Pulse Weight	AF Pulse Weight
1.5" – 4"	1 USG	0.1 FT <sup>3</sup>	0.001 M <sup>3</sup>	0.00001 AF
6" – 8"	10 USG	1 FT <sup>3</sup>	0.01 M <sup>3</sup>	0.0001 AF
10" – 24"	100 USG	10 FT <sup>3</sup>	0.1 M <sup>3</sup>	0.001 AF

2. Set Pulse Width: 20ms (HydroVerse default is 2ms).

## **Initial Setup:**

- 1. Attach the water meter's two (2) pulse wires (or three (3) pulse wires for Sensus Cordonel/Omni/Prop/W-Turbo 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 4(+) and 5(-). 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 6 and 7. 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: Terminals 8 and 9. 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:**

<b>DIP Switches</b>	<b>Function</b>
1-2	Set Registration Units to Match Target Flow Meter: <ul style="list-style-type: none"> <li>• Gallons</li> <li>• Cubic Feet</li> <li>• Cubic Meters</li> <li>• Acre Feet</li> </ul>
3-4	Set Sampling Window, Per Typical Pulse Input Frequency: <ul style="list-style-type: none"> <li>• 5s – When Pulse Input Freq &gt; 0.4 Hz</li> <li>• 10s – When Pulse Input Freq: 0.2-0.4 Hz</li> <li>• 30s – When Pulse Input Freq: 0.1-0.2 Hz</li> <li>• 60s – When Pulse Input Freq &lt; 0.05 Hz</li> </ul>
5	Set Pulse Output Speed: <ul style="list-style-type: none"> <li>• Normal (Output Pulse Speed = Input Pulse Speed)</li> <li>• Slow (Output Pulse Speed Hz = Input Pulse Speed Hz / 10)</li> </ul> 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"> <li>• Disable (Output Pulse Width = Input Pulse Width)</li> <li>• Enable (Output Pulse Width = Max(Input Pulse Width , 100 or 200 ms) )</li> </ul> <p>(Enables 100ms De-Bounce Filter and Extension, if Sampling Window = 5s)  (Enables 200ms De-Bounce Filter and Extension, if Sampling Window = 15s, 30s, or 60s)</p> <p>Recommendation 1: Enable Pulse Extension Mode If Pulse Width Too Short for Detection by SCADA, Telemetry, BMS System.</p> <p>Recommendation 2: Enable Pulse Extension Mode for Low-Frequency, Mechanical Contact Closure Inputs In Order to Activate De-Bounce Function.</p> <p>Note! – If Extended Pulse Width Mode Causes Output Pulses to Overlap, Then User May Also Set Pulse Output Speed to 'Slow'.</p> <p>Possible Examples:</p> <ul style="list-style-type: none"> <li>• Badger Meter HR Default Pulse Width: 50ms</li> <li>• Metron-Farnier Innov8 Default Pulse Width: 50ms</li> </ul>

7	Configure Digital Output Channel 2: <ul style="list-style-type: none"> <li>Flow Switch Output (Contact Closure When Flow Rate &gt; 0)</li> <li>2<sup>nd</sup> Pulse Output (Mirrors 1<sup>st</sup> Pulse Output)</li> </ul>																										
8	Enable / Disable Simulation Mode: <ul style="list-style-type: none"> <li>Enable (For Debugging Control Panel):             <ul style="list-style-type: none"> <li>4-20mA Output = 12mA (50%) Fixed</li> <li>Pulse Output = 1 Hz Fixed</li> <li>Flow Switch Output = ON / Closed</li> </ul> </li> <li>Disable (Run Mode):             <ul style="list-style-type: none"> <li>4-20mA, Pulse, &amp; Flow Switch Operate in Normal Run Mode</li> </ul> </li> </ul>																										
9,10,11,12	Set the Input Pulse Weight: <table border="1"> <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>x1/60</td><td>1 pulse per 1/60 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> ...where unit = gal/ft <sup>3</sup> /m <sup>3</sup> /AF	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	x1/60	1 pulse per 1/60 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
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																										
x1/60	1 pulse per 1/60 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																										
13,14,15,16	Set the 20mA Flow Rate. (4mA Flow Rate Always Equals Zero Flow).  If Meter Registration Units = gal, ft <sup>3</sup> , or AF Set 20mA Flow Rate in GPM (gallons per minute).  If Meter Registration Units = m <sup>3</sup> Set 20mA Flow Rate in LPM (liters per minute).																										

## 6. Note the Following Behaviors of the Input Pulse De-Bounce Function and the Output Pulse-Extension Function:

Sample Period = 5 seconds...

	<b>Pulse Extension = ON (Enables De-Bounce)</b>	<b>Pulse Extension = OFF (Disables De-Bounce)</b>
<b>Pulse Speed = SLOW (Disables De-Bounce)</b>	Extension = 100ms De-Bounce = Disabled	Extension = Disabled De-Bounce = Disabled
<b>Pulse Speed = NORMAL</b>	Extension = 100ms De-Bounce = 100ms	Extension = Disabled De-Bounce = Disabled

Sample Period = 15, 30, 60 seconds...

	<b>Pulse Extension = ON (Enables De-Bounce)</b>	<b>Pulse Extension = OFF (Disables De-Bounce)</b>
<b>Pulse Speed = SLOW (Disables De-Bounce)</b>	Extension = 200ms De-Bounce = Disabled	Extension = Disabled De-Bounce = Disabled
<b>Pulse Speed = NORMAL</b>	Extension = 200ms De-Bounce = 200ms	Extension = Disabled De-Bounce = Disabled

## **7. 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).

## **8. 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 **CORDONEL-SERIES** METERS.

## Recommended **DIP Switches 1-12:**

Size	Gallons	Cubic Feet	Cubic Meters
<b>1.5" Cordonel</b> <b>2" Cordonel</b>  Cordonel Should be Programmed to Emit:  1 pulse per 1.0 gallon 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.001 m <sup>3</sup>	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9= DipSw.10=ON DipSw.11=ON DipSw.12=  Normal Speed Pulse: 1 Pulse / 0.001 M <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.01 M <sup>3</sup>
<b>3" Cordonel</b>  Cordonel Should be Programmed to Emit:  1 pulse per 1.0 gallon 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.01 m <sup>3</sup>  If Cordonel totalizer is FT <sup>3</sup> , then meter should be set up for "extended mode".	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.1 M <sup>3</sup>
<b>4" Cordonel</b>  Cordonel Should be Programmed to Emit:  1 pulse per 10 gallons 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.01 m <sup>3</sup>  If Cordonel totalizer is FT <sup>3</sup> , then meter should be set up for "extended mode".	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.1 M <sup>3</sup>
<b>6" Cordonel</b>  Cordonel Should be Programmed to Emit:  1 pulse per 10 gallons 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.01 m <sup>3</sup>	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.1 M <sup>3</sup>
<b>8" Cordonel</b> <b>10" Cordonel</b> <b>12" Cordonel</b>  Cordonel Should be Programmed to Emit:  1 pulse per 10 gallons 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.01 m <sup>3</sup>	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.1 M <sup>3</sup>



**Sensus Cordonel  
Ultrasonic Flow Meter**

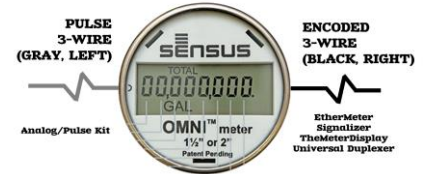
# SENSUS WATER METERS - PERSONALITY SETTINGS FOR **OMNI-SERIES** AND **HYDROVERSE** METERS.

## Recommended **DIP Switches 1-12:**

Size	Gallons	Cubic Feet	Cubic Meters
<b>1.5" Omni-C2/T2/F2</b> <b>2" Omni-C2/T2/F2</b> <b>3" Omni-C2/T2/F2</b>  Omni Meter Emits: 1 pulse per 1.0 gallon 1 pulse per 0.1 ft <sup>3</sup> 1 pulse per 0.01 m <sup>3</sup>	DipSw.1= DipSw.2=  DipSw.3=ON DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=  Normal Speed Pulse: 1 Pulse / 1 Gal  Low Speed Pulse: 1 Pulse / 10 Gal	DipSw.1=ON DipSw.2=  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 0.1 M <sup>3</sup>
<b>4" Omni-C2/T2/F2</b> <b>6" Omni-C2/T2/F2</b> <b>8" Omni-C2/T2/F2</b> <b>10" Omni-C2/T2/F2</b>  Omni Meter Emits: 1 pulse per 10 gallons 1 pulse per 1 ft <sup>3</sup> 1 pulse per 0.1 m <sup>3</sup>	DipSw.1= DipSw.2=  DipSw.3=ON 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=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 10 FT <sup>3</sup>	DipSw.1= DipSw.2=ON  DipSw.3=ON 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 <sup>3</sup>  Low Speed Pulse: 1 Pulse / 1 M <sup>3</sup>



**Sensus Omni-Series Flow Meter**



For Omni register, use gray (pulse) cable (left).




For Omni-Plus register, use Gray (pulse) cable (left).



**Sensus HydroVerse Magnetic Flow Meter**

# SENSUS WATER METERS - PERSONALITY SETTINGS FOR HET PROPELLER-SERIES METERS.

## Recommended DIP Switches 1-12:

Size	Gallons	Cubic Feet	
<b>3" HET</b>  Gallon Meter Emits: 600 Pulses per 100 Gallons (1 Pulse per 1/6 Gallon)  FT <sup>3</sup> Meter Emits: 600 Pulses per 10 FT <sup>3</sup> (1 Pulse per 1/60 FT <sup>3</sup> )	DipSw.1= DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9= DipSw.10=ON DipSw.11= DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (1/6) Gal  Low Speed Pulse: 1 Pulse / (10/6) Gal	DipSw.1=ON DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9=ON DipSw.10= DipSw.11= DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (1/60) FT <sup>3</sup>  Low Speed Pulse: 1 Pulse / (1/6) FT <sup>3</sup>	 <p><b>Sensus Propeller Meter With HET (Hall Effect Transmitter)</b></p>
<b>4" - 10" HET</b>  Gallon Meter Emits: 600 Pulses per 1000 Gallons (1 Pulse per 10/6 Gallon)  FT <sup>3</sup> Meter Emits: 600 Pulses per 100 FT <sup>3</sup> (1 Pulse per 1/6 FT <sup>3</sup> )	DipSw.1= DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9=ON DipSw.10=ON DipSw.11= DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (10/6) Gal  Low Speed Pulse: 1 Pulse / (100/6) Gal	DipSw.1=ON DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9= DipSw.10=ON DipSw.11= DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (1/6) FT <sup>3</sup>  Low Speed Pulse: 1 Pulse / (10/6) FT <sup>3</sup>	
<b>12" - 22" HET</b>  Gallon Meter Emits: 60 Pulses per 1000 Gallons (1 Pulse per 100/6 Gallon)  FT <sup>3</sup> Meter Emits: 60 Pulses per 100 FT <sup>3</sup> (1 Pulse per 10/6 FT <sup>3</sup> )	DipSw.1= DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (100/6) Gal  Low Speed Pulse: 1 Pulse / (1000/6) Gal	DipSw.1=ON DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=  DipSw.9=ON DipSw.10=ON DipSw.11= DipSw.12=ON  Normal Speed Pulse: 1 Pulse / (10/6) FT <sup>3</sup>  Low Speed Pulse: 1 Pulse / (100/6) FT <sup>3</sup>	

# SENSUS WATER METERS - PERSONALITY SETTINGS FOR **W-SERIES TURBO** METERS<sup>(1)</sup>.

## Recommended **DIP Switches 1-12:**

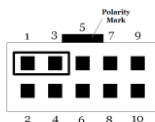
Size	Gallons	Cubic Feet	Cubic Meters
<b>W-Series - All Sizes</b>	DipSw.1= DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=	DipSw.1=ON DipSw.2=  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=	DipSw.1= DipSw.2=ON  DipSw.3= DipSw.4=  DipSw.5= DipSw.6= DipSw.7= DipSw.8=
<b>1.5" W-120</b>	DipSw.9= DipSw.10= DipSw.11= DipSw.12=  12.42 Pulses / Gal	DipSw.9= DipSw.10= DipSw.11= DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9= DipSw.10= DipSw.11= DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>2" W-160</b>	DipSw.9=ON DipSw.10= DipSw.11= DipSw.12=  12.42 Pulses / Gal	DipSw.9=ON DipSw.10= DipSw.11= DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9=ON DipSw.10= DipSw.11= DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>3" W-350</b>	DipSw.9= DipSw.10=ON DipSw.11= DipSw.12=  4.654 Pulses / Gal	DipSw.9= DipSw.10=ON DipSw.11= DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9= DipSw.10=ON DipSw.11= DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>4" W-1000</b>	DipSw.9=ON DipSw.10=ON DipSw.11= DipSw.12=  1.242 Pulses / Gal	DipSw.9=ON DipSw.10=ON DipSw.11= DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9=ON DipSw.10=ON DipSw.11= DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>6" W-2000</b>	DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=  0.501 Pulses / Gal	DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>8" W-3500</b>	DipSw.9=ON DipSw.10= DipSw.11=ON DipSw.12=  0.2617 Pulses / Gal	DipSw.9=ON DipSw.10= DipSw.11=ON DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9=ON DipSw.10= DipSw.11=ON DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>10" W-5500</b>	DipSw.9= DipSw.10=ON DipSw.11=ON DipSw.12=  0.1195 Pulses / Gal	DipSw.9= DipSw.10=ON DipSw.11=ON DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9= DipSw.10=ON DipSw.11=ON DipSw.12=  TBD Pulses / M <sup>3</sup>
<b>16" W-10,000</b>	DipSw.9=ON DipSw.10=ON DipSw.11=ON DipSw.12=  0.1157 Pulses / Gal	DipSw.9=ON DipSw.10=ON DipSw.11=ON DipSw.12=  TBD Pulses / FT <sup>3</sup>	DipSw.9=ON DipSw.10=ON DipSw.11=ON DipSw.12=  TBD Pulses / M <sup>3</sup>



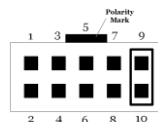
**Sensus W-Series  
Turbo Meter  
With  
High-Speed-Pickup**

\* All Pulse Weights are Approximate for W-Series Turbo Meters.

(1) Requires Setting of "W-Series Turbo Meter" Activation Jumper.  
User Must Open Device Case, and Set Shunt Jumper on Circuit Board Utility Header:



Activate Sensus W-Series Mode




De-Activate Sensus W-Series Mode

# SENSUS WATER METERS - PERSONALITY SETTINGS FOR CORDONEL, OMNI, HYDROVERSE, PROPELLER, & W-SERIES 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	
1.5" Cordonel, Omni, HydroVerse, Prop, W-120 Turbo  200 gpm 750 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">4-20mA Span Settings Are Based Solely on Meter Size and Maximum Expected Flow Rates.</p> 
2" Cordonel, Omni, HydroVerse, Prop, W-160 Turbo  300 gpm 1200 lpm	DipSw.13= DipSw.14=ON DipSw.15=ON DipSw.16=	
3" Cordonel, Omni, HydroVerse, Prop, W-350 Turbo  500 gpm 2000 lpm	DipSw.13=ON DipSw.14=ON DipSw.15=ON DipSw.16=	
4" Cordonel, Omni, HydroVerse, Prop, W-1000 Turbo  1200 gpm 4500 lpm	DipSw.13=ON DipSw.14= DipSw.15= DipSw.16=ON	
6" Cordonel, Omni, HydroVerse, Prop, W-2000 Turbo  3000 gpm 11000 lpm	DipSw.13=ON DipSw.14=ON DipSw.15= DipSw.16=ON	
8" Cordonel, Omni, HydroVerse, Prop, W-3500 Turbo  4600 gpm 17500 lpm	DipSw.13= DipSw.14= DipSw.15=ON DipSw.16=ON	
10" Cordonel, Omni, HydroVerse, Prop, W-5500 Turbo  7300 gpm 27500 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=ON	
16" Cordonel, Prop, HydroVerse, W-10,000 Turbo  11,400 gpm 43000 lpm	DipSw.13= DipSw.14=ON DipSw.15=ON DipSw.16=ON	