

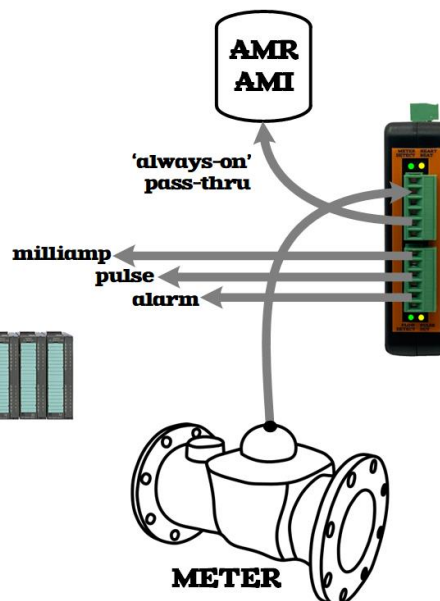


The Signalizer™

Model EMP_{v2} - US Patent No. 11,041,738



Building or Factory
Automation Controls



The Versatile 4-20 Milliamp and Pulse Signal Source for Honeywell evoQ4 Water Meters!

SCADAMetrics® is pleased to introduce the newest member of its DINstrumentation™ series – **The Signalizer™**!

This new electronic signal generator for water meters provides a 4-20 milliamp (flow) output and a dry contact pulse (per volume) output! – while still maintaining the meter's ability to be co-connected to an AMI/AMR endpoint!

Meter Owners have traditionally been required to make a weighted buying decision: encoder-type meter?... or milliamp/pulse-type meter? **The Signalizer** allows you to easily have both with the same meter!

The Signalizer utilizes the popular encoder signal from the water meter to generate both a 4-20mA rate-of-flow signal¹ and a dry-contact pulse-per-volume signal. ...And because **The Signalizer** is outfitted with an integral pass-thru port, it can co-exist with an AMI/AMR system². Even if power is removed, the pass-thru port is always functional – ensuring continuous connectivity to the AMR/AMI system!

The Signalizer is compatible with every late-model, encoder-type water meter in North America – including those from **Neptune, Sensus, Metron-Farnier, Mueller, Kamstrup, Badger, Master Meter, RG3, Zenner, Elster-AMCO, McCrometer**, and many others!

¹**Encoder Resolution** – a high-fidelity 4-20mA signal requires high-resolution encoder resolution (8+ digits). Therefore, for optimal 4-20mA SIGNALIZER performance, we recommend evoQ4 meter be outfitted with either the Sensus Protocol VFRAME or SHIFTED VFRAME module, which transmit eight (8) totalizer digits.

²**Permitting** – If the meter is owned by the water utility, we recommend that you first contact its engineering department for permission!

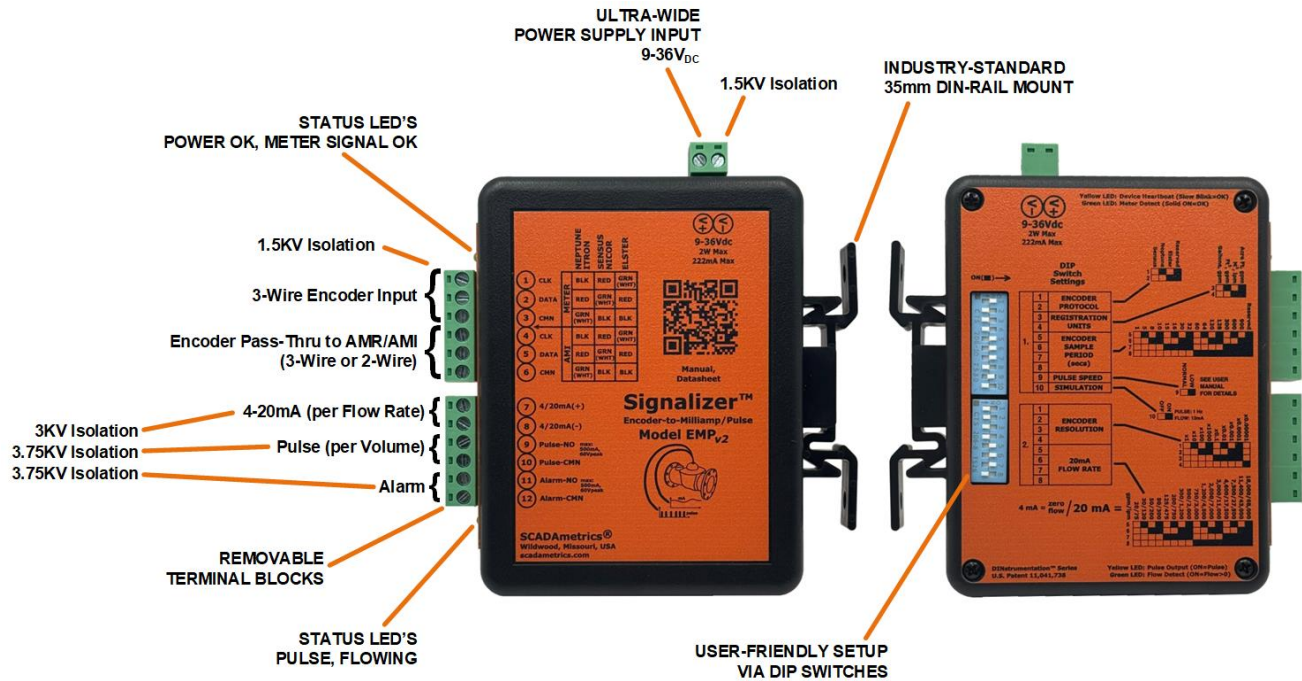
Key Features -

- 4-20mA Flow-Proportional Output (3KV Isolation).
- Dry-Contact, Volume-Proportional Output (3.75KV Isolation).
- Dry-Contact Alarm Output (3.75KV Isolation).
- Built-In Pass-Thru Port for Co-Connection to an AMI/AMR System – Works Even If Power Down!
- Compatible with All Late-Model, North American Encoder-Type Water Meters (Neptune 6,8,9-digit MACH-10/E-CODER/ProCoder/ProRead, Sensus 4,5,6,7,8,9-digit, Elster K-Frame Protocols).
- 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.
- Mounts on standard 35mm industrial DIN-rail.
- 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.
- Integral Common-Mode Rejection Choke

Caveat! – A high-resolution 4/20mA signal can only be produced by the Signalizer if the evoQ4 is field-retrofitted with an 8-Digit VFRAME encoder (Sensus protocol) communication module. Otherwise, the 4/20mA resolution will be coarse. Please contact your Honeywell/Elster and/or SCADAMetrics sales representative for details.

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
scadametrics.com
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Engineering Specifications -

Dimensions: 4.5" x 5.0" x 1.275"
 Weight: 6.5 Ounces
 Supply Voltage: 9-36V_{DC}
 Supply Power: 1.25W
 Power Supply Isolation: 1500V_{RMS}
 EMI Suppression: EN55032 Class B Chebyshev DC Power Filter, 3-Wire Common-Mode Rejection Choke for Encoder Signal

Neptune Protocol Support: Yes, 8,9-Digit "MACH-10/ProCoder/E-CODER", and 6-Digit "ProRead" Protocols
 Sensus Protocol Support: Yes, Both Fixed and Variable Digit Sensus Protocols (4-9 digits)
 Elster Protocol Support: Yes, Auto-Fills Units and Decimal Shift, Based on Embedded Info within Elster K-Frame
 AMI Pass-Thru Port Support: Universal – Works with All Major-Brand AMI/AMR Endpoints:
 Neptune, Sensus, Adara, Badger, Metron-Farnier, Itron, Master Meter, Hersey/Mueller, RG3, Zenner, Honeywell, Kamstrup, SCADAmetrics, Touchpads (All), Remote Displays (All)

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
 Encoder Sample Period (s): 1, 5, 8, 10, 15, 16, 30, 32, 60, 64, 120, 128, 300, 600, 900, Reserved (User-Selectable)
 Programming Method: Integrated DIP Switches, 18-Poles

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!

Pulse Output Type: Solid-State Dry-Contact, 1 Pulse-per-Encoder Resolution
 Contact Closure Duration: 50% Duty Cycle or 1000ms – whichever is less
 Alarm Output Type: Solid-State Dry-Contact, Closes if Meter or Signalizer Fault
 Pulse Resolution: Normal-Speed Mode (All Encoders): Pulse Resolution = Encoder Resolution
 Low-Speed Mode (8-Digit Encoders): Pulse Resolution = Encoder Resolution / 10
 Low-Speed Mode (9-Digit Encoders): Pulse Resolution = Encoder Resolution / 100
 Closed-Contact Resistance: 0.4 ohm, typical
 Closed-Contact Max Current: 500mA
 Open-Contact Max Voltage: 60V
 Pulse/Alarm Isolation: 3750V_{RMS}

Meter Cable Connection: 3-Position, Removable Screw-Down Terminal Block, 12-26 AWG
 Pass-Thru Cable Connection: 3-Position, Removable Screw-Down Terminal Block, 12-26 AWG
 Pass-Thru Port for AMR/AMI: Yes, Supports both 3-Wire and 2-Wire AMR Devices

Temperature: -40C to 85C (-40°F to 185°F)
 Relative Humidity: 5% to 95%, Non-Condensing
 Enclosure Rating: Built to IP40 Specifications, Not Rated for Submersion/Outdoor Use
 Manufacturing Location: USA
 Environmental: ROHS-Compliant, Lead-Free
 Meter Interface: AWWA C707-05
 Warranty: 2 Years (see www.scadametrix.com for details)

Engineering Dimensions (Inches) -



Meter Terminal Block Hookup -

Terminal	Function	Sensus Meter Color (Badger, Metron-Farnier, Master Meter, Kamstrup, Mueller, Zenner, RG3, Aclara, Nicor Cable)	Neptune & Itron ERT	Elster
1	Meter Clock	Red	Black	White Green
2	Meter Data	Green White	Red	Red
3	Meter Cmn	Black	Green White	Black
4	Utility AMI Clock	Red	Black	White Green
5	Utility AMI Data	Green White	Red	Red
6	Utility AMI Cmn	Black	Green White	Black

Wiring Notes:

- With the exceptions of Neptune Technology Group and Elster-AMCO (aka Honeywell, ABB, Kent), most meter manufacturers follow the Sensus wire color-coding scheme.
- Meter Terminal Block Hookup (Terminals 1,2,3): Apply the color-coding that pertains to the manufacturer of the Water Meter (or manufacturer of the Specialty Cable, such as Nicor or Itron).
- Utility AMI/AMR Terminal Block Hookup (Terminals 4,5,6): Apply the color-coding that pertains to the manufacturer of the AMI/AMR Endpoint (or manufacturer of the Specialty Cable, such as Nicor or Itron).
- Alternative color-coding: manufacturers occasionally substitute a WHITE wire for a GREEN wire.
- If the recommended wiring has been attempted, and the display still reports "meter not detected", then re-try using each of the six possible wire color-coding combinations on terminals 1,2,3.

Signal Terminal Block Hookup -

Terminal	Function	Notes
7	4-20mA +	Settable Range via DIP Switches
8	4-20mA -	
9	Pulse +	Solid-State Dry Contact (N-O) 500mA Max, 60V Max
10	Pulse -	
11	Alarm +	Solid-State Dry Contact (N-O) 500mA Max, 60V Max
12	Alarm -	

9-36Vdc

2W Max

222mA Max

Yellow LED: Device Heartbeat (Slow Blink=OK)

Green LED: Meter Detect (Solid ON=OK)

ON(■) → **DIP Switch Settings**

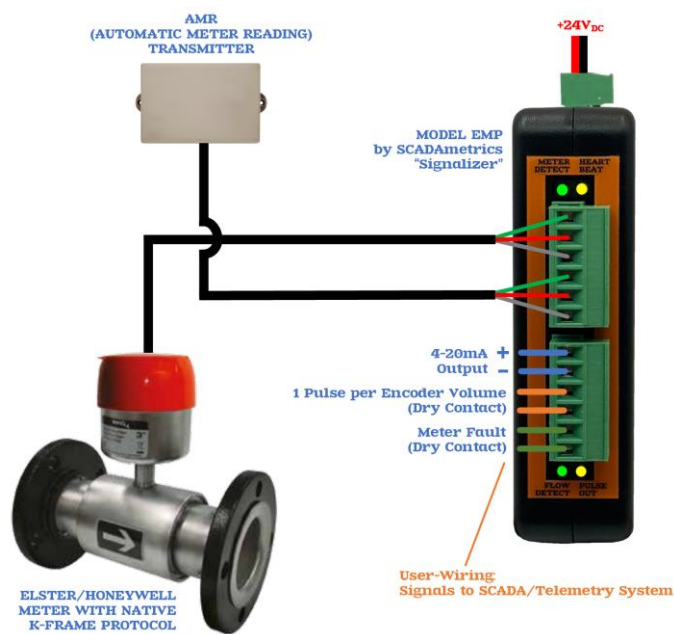
1.	1	ENCODER PROTOCOL
	2	
	3	REGISTRATION UNITS
	4	
	5	ENCODER SAMPLE PERIOD (secs)
	6	
	7	
	8	
	9	PULSE SPEED
	10	SIMULATION

2.	1	ENCODER RESOLUTION
	2	
	3	
	4	
	5	20mA FLOW RATE
	6	
	7	
	8	

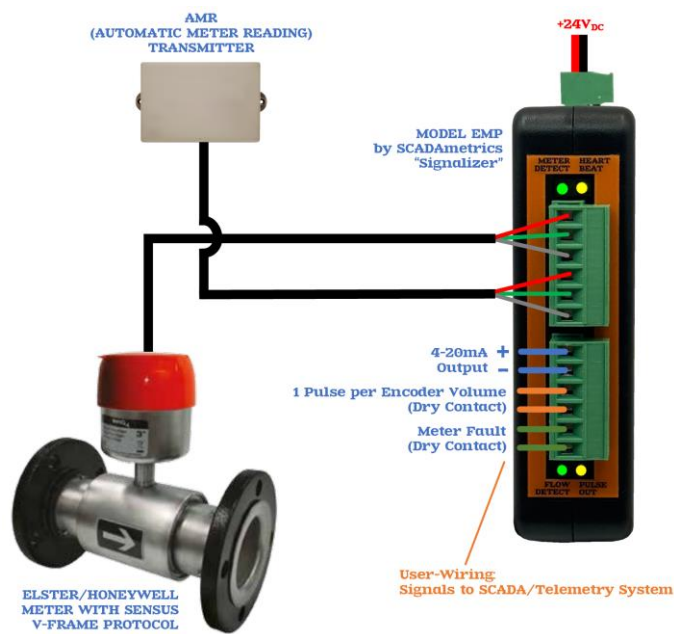
4 mA = zero flow / 20 mA =

Reserved		Acre Ft, gpm	
Elster		M ³ , lpm	
Neptune		Ft ³ , gpm	
Sensus		Gallons, gpm	
1		3	
2		4	
Reserved		Reserved	
1		900	
5		600	
8		300	
10		128	
15		120	
16		64	
30		32	
32		16	
60		8	
64		4	
120		2	
128		1	
300		0.5	
600		0.25	
900		0.125	
1200		0.0625	
1600		0.03125	
2000		0.015625	
2500		0.0078125	
3000		0.00390625	
3500		0.001953125	
4000		0.0009765625	
4500		0.00048828125	
5000		0.000244140625	
5500		0.0001220703125	
6000		0.00006103515625	
6500		0.000030517578125	
7000		0.0000152587890625	
7500		0.00000762939453125	
8000		0.000003814697265625	
8500		0.0000019073486328125	
9000		0.00000095367431640625	
9500		0.000000476837158203125	
10000		0.0000002384185791015625	
10500		0.00000011920928955078125	
11000		0.000000059604644775390625	
11500		0.0000000298023223876953125	
12000		0.00000001490116119384765625	
12500		0.000000007450580596923828125	
13000		0.0000000037252902984619140625	
13500		0.00000000186264514923095703125	
14000		0.0	

QUICK-START GUIDE -



WIRING FOR HONEYWELL (ELSTER)
EVOQ4 WATER METER WITH
ELSTER K-FRAME PROTOCOL
Fig1



WIRING FOR HONEYWELL (ELSTER)
EVOQ4 WATER METER WITH
SENSUS V-FRAME PROTOCOL
Fig2

Initial Setup:

- 1. Attach the water meter's three (3) encoder wires to Signalizer terminals 1,2,3 (see above table for color-coding).**
- 2. (If Applicable) Attach the AMR/AMI endpoint's three (3) encoder wires to Signalizer terminals 4,5,6 (see above table for color-coding).**
- 3. (If Applicable) Connect the 4-20mA output signal to PLC/Controller: Terminals 7(+) and 8(-). Important Note! – The Signalizer™ provides loop power. The user must not add an additional loop power supply, or else damage to the unit will result.**
- 4. (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.**
- 5. (If Applicable) Connect the alarm output signal to the PLC/Controller: Important Note! – The alarm output is a solid-state, dry-contact type. 500mA max, 60V max. Circuit must be current-limited by external means.**
- 6. Set the DIP Switches, per the Datasheet.**
- 7. Connect DC voltage source to the Signalizer's V+/V- terminals. An isolated 24V_{DC} power supply is recommended.**

Apply Power, and Observe...

- The upper yellow 'Heartbeat' LED should light up YELLOW with an OCCASIONAL BLINK, signifying that the Signalizer is working.
- During bootup, if the meter is detected, the upper green 'Meter OK' LED will blink ON for each detected encoded digit (from 4 to 9 blinks).
- After bootup, the upper green 'Meter OK' LED should light up SOLID GREEN, signifying that the meter has been successfully detected. A fast green blink means "Meter Not Detected".
- The Lower Yellow LED will follow the Pulse Output (LED ON=Contact Closure).
- The Lower Green LED will light up SOLID GREEN during periods when Positive Flow is Detected.

EVOQ4 WATER METERS with Elster K-Frame Protocol (Standard) -

Recommended **DIP Switches 1.1 thru 2.4** FOR **6-DIGIT ELSTER-PROTOCOL METERS:**

The Model EMP Signalizer is able to determine the Registration Units and the Encoder Resolution from information embedded within the Elster protocol, and therefore the DIP-Switch settings are simplified as follows:

Size	Gallon, Cubic Feet, Cubic Meters	
All Sizes evoQ4	DipSw.1.1= DipSw.1.2=ON DipSw.1.3= DipSw.1.4=	For NYC DEP Meter Applications, The Signalizer Sample Period Is Set To 600 Seconds (DIP Switches 5,6,7) In Order to Reduce Battery Wear Within the Water Meter.
	For NYC-DEP-Owned Meters: DipSw.1.5=ON DipSw.1.6= DipSw.1.7=ON DipSw.1.8=ON	
	For NYC Sub-Meters (*NOT* Owned by NYC-DEP): DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	
	DipSw.1.9= DipSw.1.10=	
	DipSw.2.1= DipSw.2.2= DipSw.2.3= DipSw.2.4=	
	For FT³ Meters:	
	Normal Speed Pulse: 1 Pulse / 100 FT ³	
	Low Speed Pulse: 1 Pulse / 1,000 FT ³	
	For Gallon Meters:	
	Normal Speed Pulse: 1 Pulse / 1,000 Gal	
	Low Speed Pulse: 1 Pulse / 10,000 Gal	
	For M³ Meters:	
	Normal Speed Pulse: 1 Pulse / 1 M ³ Low Speed Pulse: 1 Pulse / 10 M ³	

EVOQ4 WATER METERS with Sensus V-Frame Protocol (Non-Standard) -

The Model EMP Signalizer, when connected to an evoQ4 meter retrofitted with a Sensus-Protocol 'VFRAME' or 'SHIFTED VFRAME' module, should be configured as if connected to a Sensus-compatible water meter, as follows:

Recommended DIP Switches 11 thru 24 FOR 8-DIGIT 'VFRAME' METERS:

Size	Gallon	Cubic Feet	Cubic Meters	
All Sizes evoQ4	DipSw.1.1= DipSw.1.2= DipSw.1.3= DipSw.1.4=	DipSw.1.1= DipSw.1.2= DipSw.1.3=ON DipSw.1.4=	DipSw.1.1= DipSw.1.2= DipSw.1.3= DipSw.1.4=ON	For Sub-Meter Applications, The Signalizer Sample Period Is Set To 60 Seconds (DIP Switches 5,6,7) In Order to Provide Faster 4-20mA Updates to the BMS System.
	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	
	DipSw.1.9= DipSw.1.10=	DipSw.1.9= DipSw.1.10=	DipSw.1.9= DipSw.1.10=	
	DipSw.2.1=ON DipSw.2.2= DipSw.2.3= DipSw.2.4=	DipSw.2.1= DipSw.2.2= DipSw.2.3= DipSw.2.4=	DipSw.2.1= DipSw.2.2= DipSw.2.3=ON DipSw.2.4=	
	Normal Speed Pulse: 1 Pulse / 10 Gal	Normal Speed Pulse: 1 Pulse / 1 FT ³	Normal Speed Pulse: 1 Pulse / 0.1 M ³	
	Low Speed Pulse: 1 Pulse / 100 Gal	Low Speed Pulse: 1 Pulse / 10 FT ³	Low Speed Pulse: 1 Pulse / 1 M ³	

Recommended DIP Switches 11 thru 24 FOR 8-DIGIT 'SHIFTED VFRAME' METERS:

Size	Gallon	Cubic Feet	Cubic Meters	
All Sizes evoQ4	DipSw.1.1= DipSw.1.2= DipSw.1.3= DipSw.1.4=	DipSw.1.1= DipSw.1.2= DipSw.1.3=ON DipSw.1.4=	DipSw.1.1= DipSw.1.2= DipSw.1.3= DipSw.1.4=ON	For Sub-Meter Applications, The Signalizer Sample Period Is Set To 60 Seconds (DIP Switches 5,6,7) In Order to Provide Faster 4-20mA Updates to the BMS System.
	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	DipSw.1.5= DipSw.1.6= DipSw.1.7= DipSw.1.8=ON	
	DipSw.1.9= DipSw.1.10=	DipSw.1.9= DipSw.1.10=	DipSw.1.9= DipSw.1.10=	
	DipSw.2.1= DipSw.2.2= DipSw.2.3= DipSw.2.4=	DipSw.2.1= DipSw.2.2= DipSw.2.3=ON DipSw.2.4=	DipSw.2.1=ON DipSw.2.2= DipSw.2.3=ON DipSw.2.4=	
	Normal Speed Pulse: 1 Pulse / 1 Gal	Normal Speed Pulse: 1 Pulse / 0.1 FT ³	Normal Speed Pulse: 1 Pulse / 0.01 M ³	
	Low Speed Pulse: 1 Pulse / 10 Gal	Low Speed Pulse: 1 Pulse / 1 FT ³	Low Speed Pulse: 1 Pulse / 0.1 M ³	

EVOQ4 WATER METERS with Elster or Sensus Protocol -

Recommended **DIP Switches 2.5 thru 2.8:**

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

Size	Gallon , Cubic Feet , Cubic Meters	NOTE! - The 4-20mA Signal Derived from an evoQ4 Meter's 6-Digit Encoder Signal Will Be Inherently Coarse, Due to the Coarseness of the Meter's 6-Digit Resolution. 4-20mA Span Settings Are Based Solely on Meter Size and Maximum Expected Flow Rates.
5/8" evoQ4 20 gpm 75 lpm	DipSw.2.5= DipSw.2.6= DipSw.2.7= DipSw.2.8=	
3/4" evoQ4 30 gpm 120 lpm	DipSw.2.5=ON DipSw.2.6= DipSw.2.7= DipSw.2.8=	
1" evoQ4 50 gpm 200 lpm	DipSw.2.5= DipSw.2.6=ON DipSw.2.7= DipSw.2.8=	
1.5" EvoQ4 125 gpm 475 lpm	DipSw.2.5= DipSw.2.6= DipSw.2.7=ON DipSw.2.8=	
2" EvoQ4 200 gpm 750 lpm	DipSw.2.5=ON DipSw.2.6= DipSw.2.7=ON DipSw.2.8=	
3" EvoQ4 500 gpm 2000 lpm	DipSw.2.5=ON DipSw.2.6=ON DipSw.2.7=ON DipSw.2.8=	
4" EvoQ4 1200 gpm 4500 lpm	DipSw.2.5=ON DipSw.2.6= DipSw.2.7= DipSw.2.8=ON	
6" EvoQ4 3000 gpm 11000 lpm	DipSw.2.5=ON DipSw.2.6=ON DipSw.2.7= DipSw.2.8=ON	
8" EvoQ4 4600 gpm 17500 lpm	DipSw.2.5= DipSw.2.6= DipSw.2.7=ON DipSw.2.8=ON	
10" EvoQ4 7300 gpm 27500 lpm	DipSw.2.5=ON DipSw.2.6= DipSw.2.7=ON DipSw.2.8=ON	

ELSTER-AMCO WATER METERS -

ADDITIONAL NOTES FOR ELSTER-AMCO WATER METERS

(aka HONEYWELL, ABB, KENT).

Elster-AMCO (aka Honeywell, ABB, Kent) water meters generally are programmed to communicate using Elster's "K-Frame" protocol, which embeds units and decimal point shift information within the digital message. **TheSignalizer** takes full advantage of this information and automatically configures the units and multiplier settings based on that embedded information. Therefore, dip switches 1.3 and 1.4 and 2.1, 2.2, 2.3, and 2.4 may be left in their default positions (all OFF).

Caveat: Elster-AMCO (aka Honeywell, ABB, Kent) water meters can be purchased to include the "Sensus" protocol. If **TheSignalizer** fails to detect the meter, then retry setup while treating the meter as a "Sensus-compatible". In this case, that means you will need to follow Sensus wire color-coding, and follow the "Sensus-Compatible" setup of the dip switches.