The Signalizer™
Model EMP - US Patent No. 11,041,738

Building or Factory Automation Controls

MADE IN USA

RoHS Compliant

AWWA C707-05 COMPLIANT

2 YEAR WARRANTY

AMR, AMI

'always-on' pass-thru

milliamp
pulse
alarm
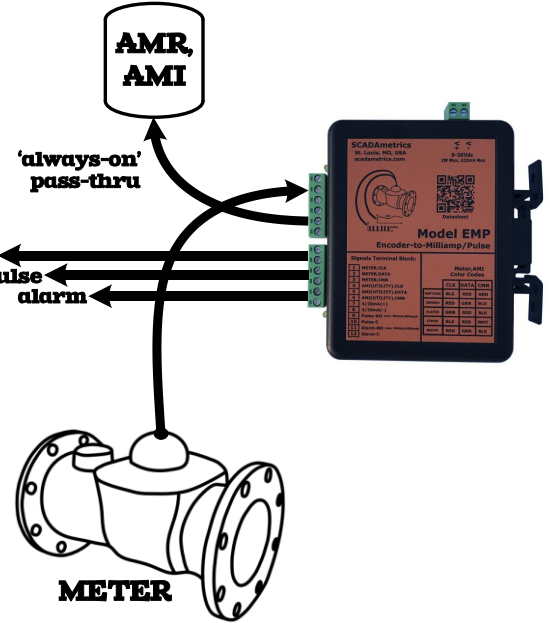
METER

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 evoQ4 water meters provides a dry contact pulse (per volume) output and a 4/20mA (flow) 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 signal[1] 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 system[2]. 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 the evoQ4 and other encoder-type Honeywell/Elster water meters.
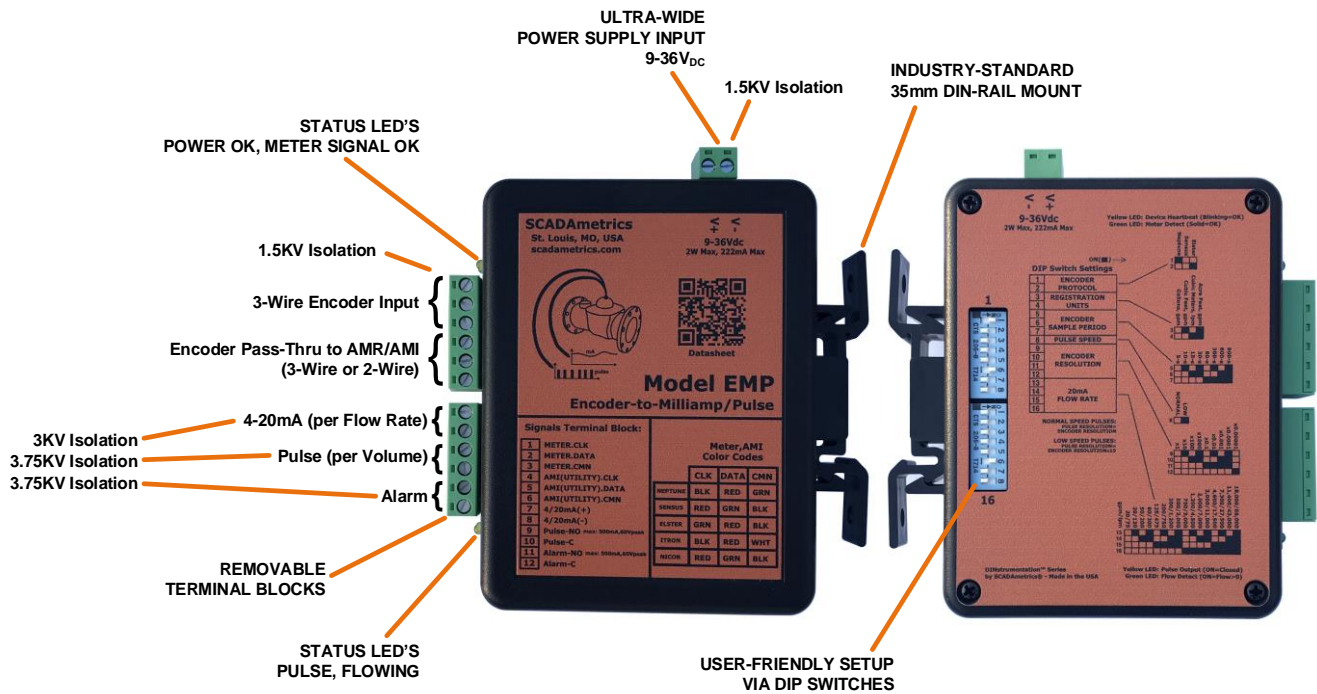
Key Features -

- 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 3-wire version Sensus registers.
- 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.

<u>Caveat!</u> – A high-resolution 4/20mA signal can only be produced by the Signalizer if the 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!

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[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!

SCADAmetrics
scadametrics.com
Wildwood, Missouri USA
636.405.7101

ULTRA-WIDE
POWER SUPPLY INPUT
9-36V$_{DC}$

1.5KV Isolation

INDUSTRY-STANDARD
35mm DIN-RAIL MOUNT

STATUS LED'S
POWER OK, METER SIGNAL OK

1.5KV Isolation

3-Wire Encoder Input

Encoder Pass-Thru to AMR/AMI
(3-Wire or 2-Wire)

3KV Isolation — 4-20mA (per Flow Rate)
3.75KV Isolation — Pulse (per Volume)
3.75KV Isolation — Alarm

REMOVABLE
TERMINAL BLOCKS

STATUS LED'S
PULSE, FLOWING

USER-FRIENDLY SETUP
VIA DIP SWITCHES

SCADAmetrics
St. Louis, MO, USA
scadametrics.com

Datasheet

Model EMP
Encoder-to-Milliamp/Pulse

Signals Terminal Block:

1	METER.CLK
2	METER.DATA
3	METER.CMN
4	AMI(UTILITY).CLK
5	AMI(UTILITY).DATA
6	AMI(UTILITY).CMN
7	4/20mA(+)
8	4/20mA(-)
9	Pulse-NO Max: 500mA,60Vpeak
10	Pulse-C
11	Alarm-NO Max: 500mA,60Vpeak
12	Alarm-C

Meter, AMI Color Codes

	CLK	DATA	CMN
NEPTUNE	BLK	RED	GRN
SENSUS	RED	GRN	BLK
ELSTER	GRN	RED	BLK
ITRON	BLK	RED	WHT
NICOR	RED	GRN	BLK

9-36Vdc
2W Max, 222mA Max

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$_{RMS}$

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, Aclara, 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 Scalors:	x1 , x10 , x100 , x1,000 --- x0.1 , x0.01 , x0.001 , x0.0001 , x0.00001
Encoder Sample Period (s):	5, 10, 15, 30, 60, 300, 600, 900 (User-Selectable)
Programming Method:	Integrated DIP Switches, 16-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:	Pulse Resolution = Encoder Resolution
	Low-Speed Mode:	Pulse Resolution = Encoder Resolution / 10
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.scadametrics.com for details)

Engineering Dimensions (Inches) -
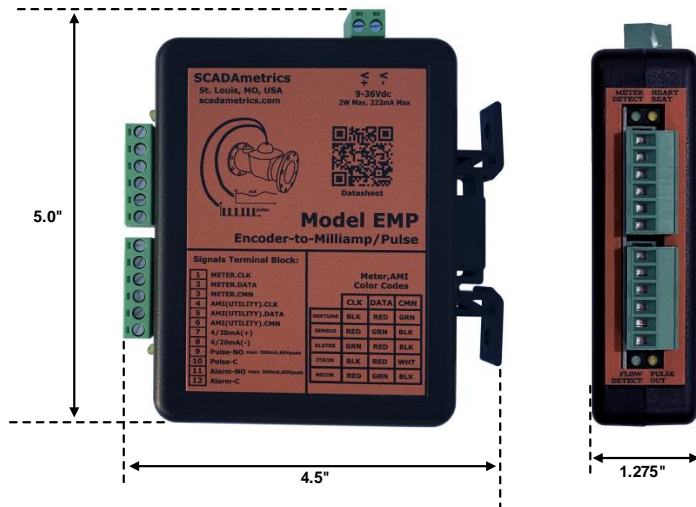
Meter Terminal Block Hookup -

Term.	Function	evoQ4 Meter with Standard Cable	evoQ4 Meter with Nicor Cable	evoQ4 Meter with Itron ERT Cable
1	Meter Clock	White|Green	Red	Black
2	Meter Data	Red	Green	Red
3	Meter Ground	Black	Black	White|Shield

AMR/AMI Terminal Block Hookup -

Term.	Function	Elster (evoQ4) Color	Neptune Color	Sensus (Metron-Farnier, Badger, Master Meter, Kamstrup, Mueller, Zenner, RG3, Nicor Cable)	Itron ERT Cable
4	Utility AMI Clock	White|Green	Black	Red	Black
5	Utility AMI Data	Red	Red	Green|White	Red
6	Utility AMI Ground	Black	Green	Black	White|Shield

Wiring Notes:

1. 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).

2. 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).

Signal Terminal Block Hookup -

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

DIP Switch Setup (Also Imprinted on Device Rear Cover) –

9-36Vdc
2W Max, 222mA Max

ON(■)→

DIP Switch Settings

#	Function
1, 2	ENCODER PROTOCOL
3, 4	REGISTRATION UNITS
5, 6, 7	ENCODER SAMPLE PERIOD
8	PULSE SPEED
9, 10, 11, 12	ENCODER RESOLUTION
13, 14, 15, 16	20mA FLOW RATE

Simulation Mode (switches 1, 2): Neptune, Sensus, Elster, Simulation Mode

Registration Units (switches 3, 4): Gallons, gpm; Ft³, gpm; M³, lpm; Acre Ft, gpm

Encoder Sample Period (switches 5, 6, 7): 5-s, 10-s, 15-s, 30-s, 60-s, 300-s, 600-s, 900-s

Pulse Speed (switch 8): NORMAL, LOW

Encoder Resolution (switches 9, 10, 11, 12): x1, x10, x100, x1000, x0.1, x0.01, x0.001, x0.0001, x0.00001

20mA Flow Rate (switches 13, 14, 15, 16), gpm/lpm: 20/75, 30/120, 50/200, 80/300, 125/475, 200/750, 300/1,200, 500/2,000, 750/3,000, 1,200/4,500, 2,000/7,000, 3,000/11,000, 4,600/17,500, 7,300/27,500, 11,400/43,000, 18,000/68,000

NORMAL SPEED PULSES:
PULSE RESOLUTION = ENCODER RESOLUTION

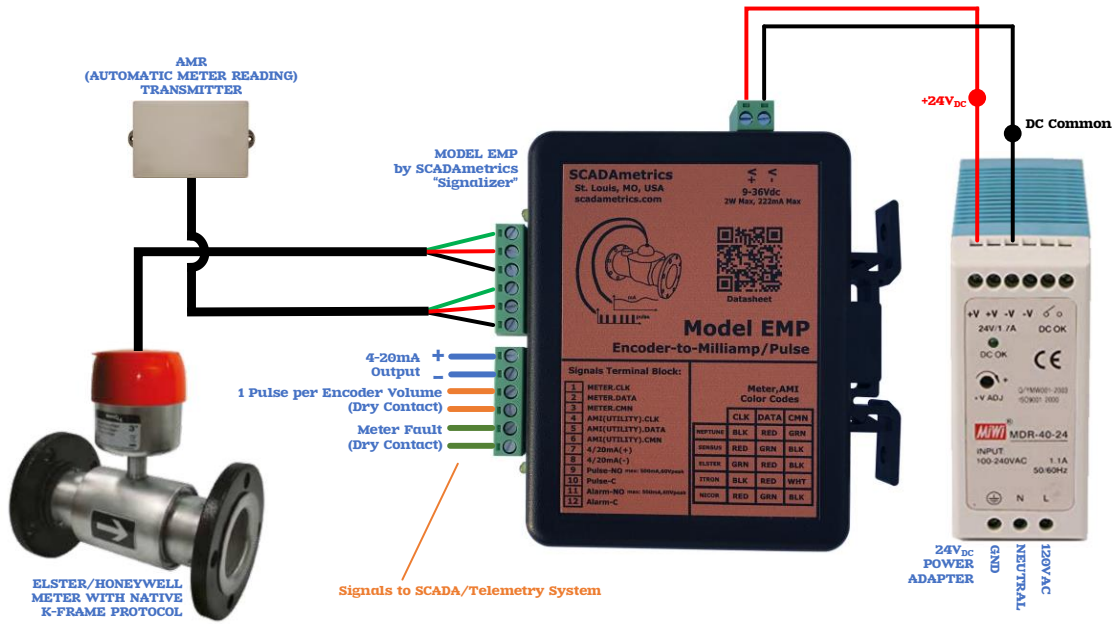**LOW SPEED PULSES:**
PULSE RESOLUTION = ENCODER RESOLUTION x10

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

QUICK-START GUIDE –

AMR
(AUTOMATIC METER READING)
TRANSMITTER

MODEL EMP
by SCADAmetrics
"Signalizer"

SCADAmetrics
St. Louis, MO, USA
scadametrics.com

9-36Vdc
2W Max, 222mA Max

Datasheet

Model EMP
Encoder-to-Milliamp/Pulse

+24V_DC

DC Common

24V/1.7A   DC OK

DC OK

+V ADJ

MDR-40-24

INPUT
100-240VAC   1.1A
50/60Hz

24V_DC
POWER
ADAPTER

GND

NEUTRAL

120VAC

4-20mA
Output

1 Pulse per Encoder Volume
(Dry Contact)

Meter Fault
(Dry Contact)

Signals Terminal Block:
1 METER.CLK
2 METER.DATA
3 METER.CMN
4 AMI(UTILITY).CLK
5 AMI(UTILITY).DATA
6 AMI(UTILITY).CMN
7 4/20mA(+)
8 4/20mA(-)
9 Pulse-NO Max: 500mA,60Vpeak
10 Pulse-C
11 Alarm-NO Max: 500mA,60Vpeak
12 Alarm-C

Meter,AMI
Color Codes

	CLK	DATA	CMN
NEPTUNE	BLK	RED	GRN
SENSUS	RED	GRN	BLK
ELSTER	GRN	RED	BLK
ITRON	BLK	RED	WHT
NICOR	RED	GRN	BLK

ELSTER/HONEYWELL
METER WITH NATIVE
K-FRAME PROTOCOL

Signals to SCADA/Telemetry System

WIRING FOR HONEYWELL (ELSTER)
EVOQ4 WATER METER WITH ELSTER-PROTOCOL
Fig.1

AMR
(AUTOMATIC METER READING)
TRANSMITTER

MODEL EMP
by SCADAmetrics
"Signalizer"

SCADAmetrics
St. Louis, MO, USA
scadametrics.com

9-36Vdc
2W Max, 222mA Max

Datasheet

Model EMP
Encoder-to-Milliamp/Pulse

+24V_DC

DC Common

24V/1.7A   DC OK

DC OK

+V ADJ

MDR-40-24

INPUT
100-240VAC   1.1A
50/60Hz

24V_DC
POWER
ADAPTER

GND

NEUTRAL

120VAC

4-20mA
Output

1 Pulse per Encoder Volume
(Dry Contact)

Meter Fault
(Dry Contact)

Signals Terminal Block:
1 METER.CLK
2 METER.DATA
3 METER.CMN
4 AMI(UTILITY).CLK
5 AMI(UTILITY).DATA
6 AMI(UTILITY).CMN
7 4/20mA(+)
8 4/20mA(-)
9 Pulse-NO Max: 500mA,60Vpeak
10 Pulse-C
11 Alarm-NO Max: 500mA,60Vpeak
12 Alarm-C

Meter,AMI
Color Codes

	CLK	DATA	CMN
NEPTUNE	BLK	RED	GRN
SENSUS	RED	GRN	BLK
ELSTER	GRN	RED	BLK
ITRON	BLK	RED	WHT
NICOR	RED	GRN	BLK

ELSTER/HONEYWELL
METER WITH
SENSUS PROTOCOL

Signals to SCADA/Telemetry System

WIRING FOR HONEYWELL (ELSTER)
EVOQ4 WATER METERS WITH SENSUS-PROTOCOL
Fig.2

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 <u>must not</u> 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...

- o The Upper Yellow 'Hearbeat' LED should light up YELLOW, with an OCCASIONAL BLINK, signifying that the Signalizer is working.

- o The Upper Green 'Meter OK' LED should light up SOLID GREEN, signifying that the meter has been successfully detected.

- o The Lower Yellow LED will follow the Pulse Output (LED ON=Contact Closure).

- o The Lower Green LED will light up SOLID GREEN during periods when Positive Flow is Detected.

EVOQ4 WATER METERS with Elster Protocol (Standard) –

Recommended <mark>DIP Switches 1-12</mark> FOR <mark>6-DIGIT ELSTER-PROTOCOL METERS</mark>:

The Model EMP Signalizer is able to determine the <u>Registration Units</u> and the <u>Encoder Resolution</u> 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= DipSw.2=ON DipSw.3= DipSw.4= <mark>**For NYC-DEP-Owned Meters:**</mark> <mark>**DipSw.5=**</mark> <mark>**DipSw.6=ON**</mark> <mark>**DipSw.7=ON**</mark> <mark>**DipSw.8=**</mark> <mark>**For NYC Sub-Meters (*NOT* Owned by NYC-DEP):**</mark> <mark>**DipSw.5=**</mark> <mark>**DipSw.6=**</mark> <mark>**DipSw.7=ON**</mark> <mark>**DipSw.8=**</mark> DipSw.9= DipSw.10= DipSw.11= DipSw.12= **For FT³ Meters:** Normal Speed Pulse: 1 Pulse / 100 FT³ Low Speed Pulse: 1 Pulse / 1,000 FT³ **For Gal 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 M³ Low Speed Pulse: 1 Pulse / 10 M³	<mark>**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.**</mark>

EVOQ4 WATER METERS with Sensus 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 1-12== FOR ==8-DIGIT 'VFRAME' METERS:==

Size	Gallon	Cubic Feet	Cubic Meters	
All Sizes evoQ4	DipSw.1= DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7=ON 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= DipSw.2= DipSw.3=ON DipSw.4= DipSw.5= DipSw.6= DipSw.7=ON 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= DipSw.3= DipSw.4=ON DipSw.5= DipSw.6= DipSw.7=ON 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**	==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.==

Recommended ==DIP Switches 1-12== FOR ==8-DIGIT 'SHIFTED VFRAME' METERS:==

Size	Gallon	Cubic Feet	Cubic Meters	
All Sizes evoQ4	DipSw.1= DipSw.2= DipSw.3= DipSw.4= DipSw.5= DipSw.6= DipSw.7=ON 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= DipSw.2= DipSw.3=ON DipSw.4= DipSw.5= DipSw.6= DipSw.7=ON 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= DipSw.3= DipSw.4=ON DipSw.5= DipSw.6= DipSw.7=ON 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**	==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.==

EVOQ4 WATER METERS with Elster or Sensus Protocol –

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	Gallon , Cubic Feet , Cubic Meters	
5/8" evoQ4 20 gpm 75 lpm	DipSw.13= DipSw.14= DipSw.15= DipSw.16=	
3/4" evoQ4 30 gpm 120 lpm	DipSw.13=ON DipSw.14= DipSw.15= DipSw.16=	
1" evoQ4 50 gpm 200 lpm	DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	
1.5" EvoQ4 125 gpm 475 lpm	DipSw.13= DipSw.14= DipSw.15=ON DipSw.16=	
2" EvoQ4 200 gpm 750 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=	
3" EvoQ4 200 gpm 750 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=	
4" EvoQ4 1200 gpm 4500 lpm	DipSw.13=ON DipSw.14= DipSw.15= DipSw.16=ON	
6" EvoQ4 3000 gpm 11000 lpm	DipSw.13=ON DipSw.14=ON DipSw.15= DipSw.16=ON	
8" EvoQ4 4600 gpm 17500 lpm	DipSw.13= DipSw.14= DipSw.15=ON DipSw.16=ON	
10" EvoQ4 7300 gpm 27500 lpm	DipSw.13=ON DipSw.14= DipSw.15=ON DipSw.16=ON	

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 Meters 6-Digit Resolution.

4-20mA Span Settings Are Based Solely on Meter Size and Maximum Expected Flow Rates.