

Connect a GWF Sonico Edge Ultrasonic Flow Meter to an AMI/AMR System Using the SCADAmetrics MBE Encodalizer™



Founded in 1899 as the Swiss branch of a measuring instruments company, [GWF Group \(Lucerne, Switzerland\)](#) has evolved into a globally leading provider of solutions for the water, gas, electricity, and heat industries.

The **Sonico Edge** (pictured left) is a mains-powered ultrasonic water meter manufactured by GWF. Ultrasonic flow meters are based upon the principle of measuring liquid flow as proportional to transit-time of sound waves traveling across water flowing through a closed pipe. [Read more here.](#)

Ultrasonic flow meters have no moving parts, and also have no protrusions into the flow tube – thereby lending themselves as suitable for both filtered and unfiltered water applications.

The Sonico Edge is available with optional SCADA connectivity modules, which include a pulse (totalizing) output, a 4-20mA (flow) output, Serial output, and the Modbus/RTU (RS.485) industrial protocol.

Today, the latest release of the **SCADAmetrics Model MBE Modbus Encodalizer** now adds UI.1203 (Sensus) protocol and Neptune ECODER.PLUS protocol to this important flow meter, so that it may now be easily integrated into modern potable water AMI/AMR systems.

The purpose of this Application Note is to provide technical assistance to the **Sonico Edge** User who wishes to connect his meter to an AMI system.

This Application Note assumes that the Sonico Edge is outfitted with the optional Modbus/RTU communication card installed into Transmitter one of the Two (2) Option Module slots.



*James Mimplitz, P.E. – “Slim”
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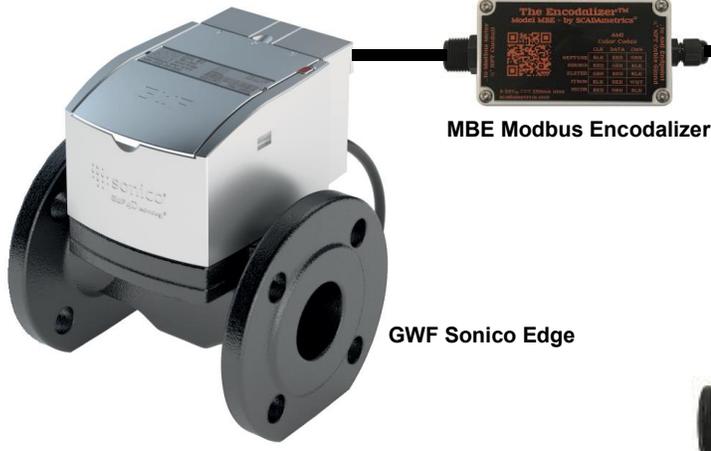
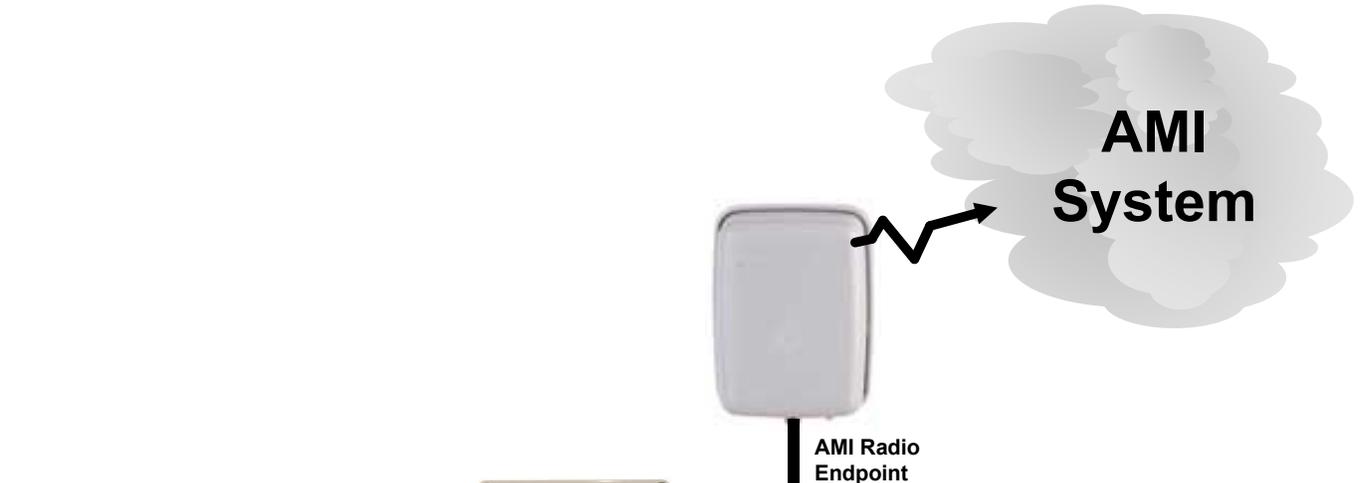


The operational convenience of the **MBE Encodalizer** is based upon the principle that the User sets the Meter Type (Make & Model) via Encodalizer DIP switches, connects the Encodalizer to the meter via Modbus/RTU (2-Wire RS.485), and the Encodalizer interacts with the target meter using the meter’s factory default Modbus/RTU settings.

Therefore, zero setup of the **Sonico Edge** is required. All Sonico Edge factory defaults are used, including baud (19,200), data bits (8), parity (none), stop bits (1), 32-Bit Word Ordering (Big-Endian), and Modbus Device ID (=1).

Important Note: As of the date of this Application Note, the **MAXIMUM MODBUS TOTALIZER VALUE** of the GWF Sonico Edge flow meter is 9,999,999.9 Gallons. When the meter exceeds this maximum, its Modbus totalizer rolls over, and the totalizer counter restarts from 0.0 Gallons. For comparative reference, a typical AWWA-style 6 Inch flow meter generally features a **MAXIMUM TOTALIZER** of 999,999,990.0 Gallons before rollover. The relatively low rollover value of the Sonico Edge may result in an excessive rollover frequency for your application.

Principle of Operation



MBE Modbus Encodalizer



Model MBE Modbus Encodalizer™
By SCADAmetrics

Encodalizer DIP Switch Settings:

1. Set DIP Switches 1-6 Per Desired Data Type:
 - “Sonico Edge Forward Total”:
(DIP Switches **2,4,6=ON**. DIP Switches 1,3,5=OFF)
 - “Sonico Edge Reverse Total”:
(DIP Switches **1,2,4,6=ON**. DIP Switches 3,5=OFF)
 - “Sonico Edge Net Total (Forward – Reverse)”:
(DIP Switches **3,4,6=ON**. DIP Switches 1,2,5=OFF)
2. Set DIP Switches 7,8 = OFF,OFF.
3. Set DIP Switches 9,10 = OFF,OFF.
4. Set DIP Switches 11,12 per the Desired Number of Encoded Digits. For example, if 8 encoded digits are desired, then set 11,12 = OFF,**ON**.
5. Set DIP Switches 13,14,15,16 according to the desired totalizer multiplier.

Example 1: The Sonico Edge Totalizer Screen Displays 925,402.4
Desired AMI Reading: 00925402
Set Multiplier DIP Switches to x1
(13,14,15,16 = OFF,OFF,OFF,OFF)

Example 2: The Sonico Edge Totalizer Screen Displays 925,402.4
Desired AMI Reading: 00092540
Set Multiplier DIP Switches to x10
(13,14,15,16 = **ON**,OFF,OFF,OFF)

Example 3: The Sonico Edge Totalizer Screen Displays 925,402.4
Desired AMI Reading: 09254024
Set Multiplier DIP Switches to x0.1
(13,14,15,16 = OFF,OFF,**ON**,OFF)

Sonico Edge and Encodalizer Wiring Instructions:

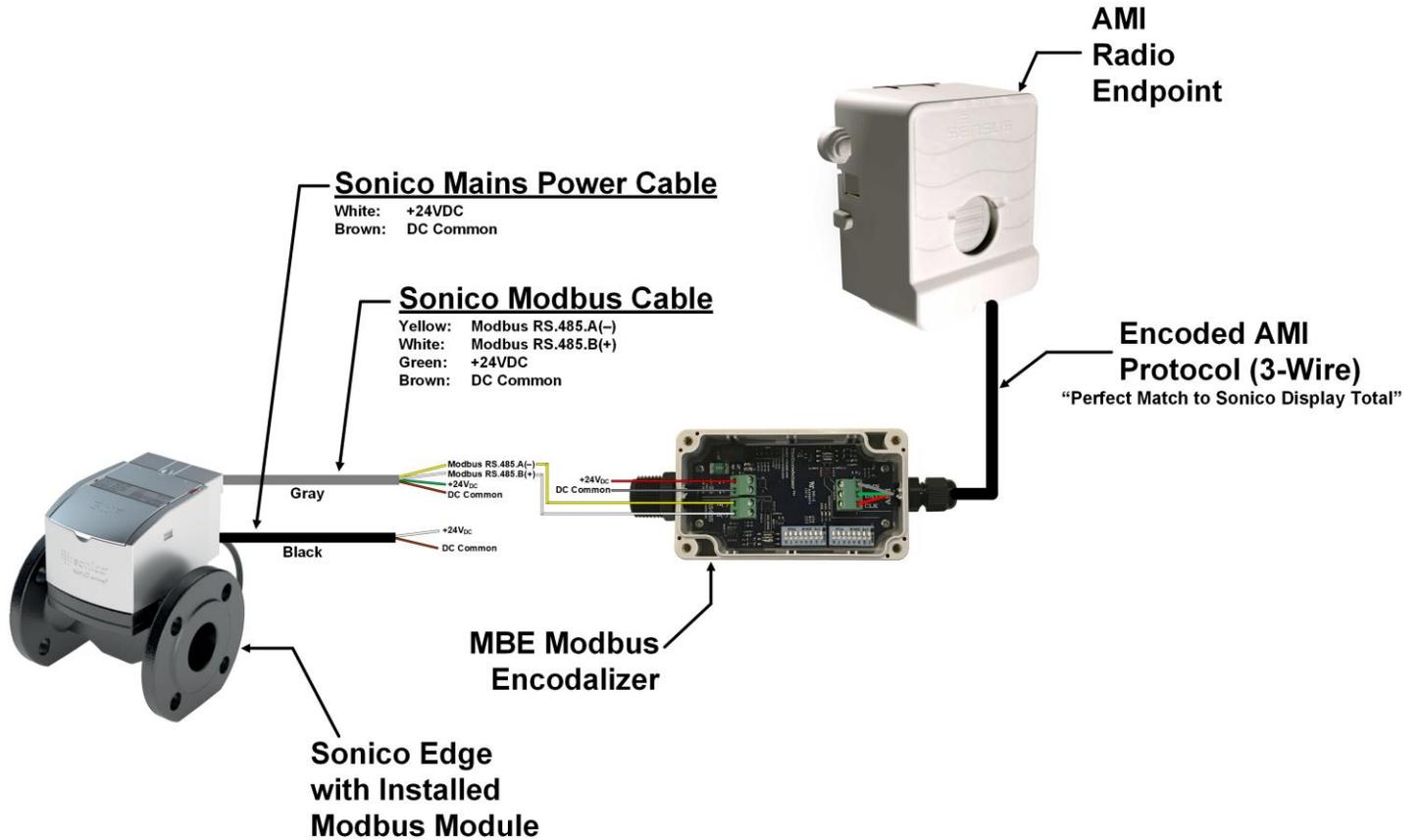
See the Wiring Detail, as illustrated on the following page.

1. Install Sonico Edge Flow Meter, per GWF Instruction Manual.
2. Connect Encodalizer Modbus Terminals to Sonico Edge Modbus/RTU Terminals.
 - MBE.A(-) to Sonico.Edge.Modbus.B
 - MBE.B(+) to Sonico.Edge.Modbus.A

***Note that the Sonico Edge Documentation is Incorrect Regarding Modbus Polarity!
The Sonico terminal marked as Modbus ‘A’ should be marked as ‘B’.
The Sonico terminal marked as Modbus ‘B’ should be marked as ‘A’.
Wiring should be performed exactly, as per the correct SCADAmetrics diagram on the following page.***

3. Connect Mains Power to the Sonico Edge Modbus Module.
4. Connect Mains Power to the Sonico Edge Flow Meter.
5. The Sonico Edge bootup process completes after a few seconds.
6. Connect DC Power to MBE Encodalizer (24V_{DC} or 12V_{DC}).
7. The Encodalizer LED should NOT blink RED. Red Blinks Denote a Configuration and/or Read Error.

Wiring Diagram:



Testing:



If you experience any problems, use of a SCADAmetrics model TMD TheMeterDisplay™ is highly recommended. When the TMD is operated in DEBUG mode (dip switch #10 = ON), the raw Sensus Protocol ASCII data can be observed on the LCD display.

Connections:

TMD.Terminal.1 to → Encodizer.Terminal.CLK
 TMD.Terminal.2 to → Encodizer.Terminal.DATA
 TMD.Terminal.3 to → Encodizer.Terminal.CMN

RECOMMENDED DIP SWITCHES 1 - 7

Forward Total	Reverse Total	Net (Fwd-Rev) Total
DipSw.1= DipSw.2=ON DipSw.3= DipSw.4=ON DipSw.5= DipSw.6=ON DipSw.7=	DipSw.1=ON DipSw.2=ON DipSw.3= DipSw.4=ON DipSw.5= DipSw.6=ON DipSw.7=	DipSw.1= DipSw.2= DipSw.3=ON DipSw.4=ON DipSw.5= DipSw.6=ON DipSw.7=

RECOMMENDED DIP SWITCHES 8 - 16

GALLONS - Sonico Edge Display = Gallons

AMI RESOLUTION	Sensus 6	Sensus 7	Sensus 8	Sensus 9	Neptune ECODER	Neptune PROREAD
USG x1	DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12= DipSw.13= DipSw.14= DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12= DipSw.13= DipSw.14= DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12=ON DipSw.13= DipSw.14= DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=ON DipSw.13= DipSw.14= DipSw.15= DipSw.16=	DipSw.8=ON DipSw.9= DipSw.10= DipSw.11= DipSw.12=ON DipSw.13= DipSw.14= DipSw.15= DipSw.16=	DipSw.8=ON DipSw.9= DipSw.10= DipSw.11= DipSw.12= DipSw.13=ON DipSw.14= DipSw.15= DipSw.16=
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USG x100	DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12= DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12= DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11= DipSw.12=ON DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	DipSw.8= DipSw.9= DipSw.10= DipSw.11=ON DipSw.12=ON DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	DipSw.8=ON DipSw.9= DipSw.10= DipSw.11= DipSw.12=ON DipSw.13= DipSw.14=ON DipSw.15= DipSw.16=	DipSw.8=ON DipSw.9= DipSw.10= DipSw.11= DipSw.12= DipSw.13=ON DipSw.14=ON DipSw.15= DipSw.16=
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