

Application Note Sensus.1
Version 001
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SCADA Signaling from Sensus Flow Meters



Sensus Flow Meters Include the Omni-Family, HydroVerse, Mainline Propeller, iPerl, SR-II, AccuStream, CordoneI, W-Series Turbo (legacy), and others.



Jim 'Slim' Mimitz, SCADAMetrics

[Sensus, a Xylem Brand \(Morrisville, NC\)](#) manufactures a broad line of flow meters and AMI/AMR systems, serving the municipal water utility industry. Here at [SCADAMetrics \(Wildwood, MO\)](#), we manufacture flow metering instrumentation in support of this industry, with the stated mission of helping users extend such meters for enhanced SCADA interoperability and functionality.

Sensus offers a pulse output on a subset of their flow meter offerings. However, like many manufacturers of AWWA-style flow meters, Sensus' signaling options are focused upon their 3-wire, encoded protocol for interfacing with AMI/AMR endpoints. Sensus' encoded protocol is capable of transmitting **8-digit, fine-resolution totalization** information — which SCADAMetrics instrumentation leverages to generate **additional** industrial signal and display options — thereby bridging the gap to solve the unique challenges facing the **SCADA, Telemetry, and Building Automation spheres**.

The purpose of this document is to provide a summary of several of the main SCADAMetrics devices and methods that we offer to extend the broad line of Sensus flow meters.

This article also highlights our new **models APK and APK.PLUS Analog/Pulse Kits**. These instruments are designed as improved, modern replacements to the legacy Sensus Act-Pak instrumentation.

Advantages of the models APK and APK.PLUS

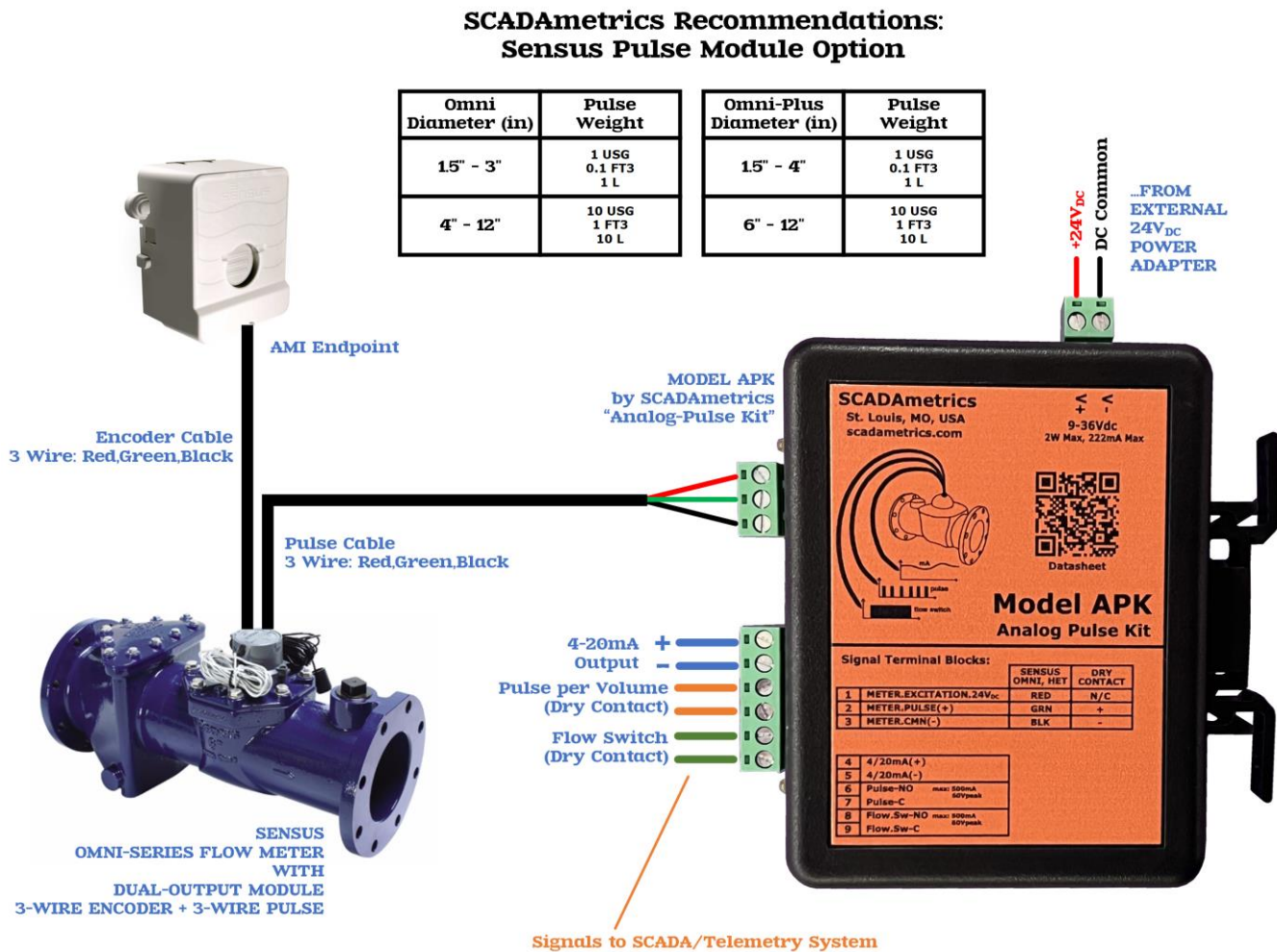
- Optically-Isolated Power and I/O Circuitry for Superior Lightning Protection.
- DC Low-Voltage Power Supply for Increased User Safety.
- Silicone-Gasketed NEMA-4X Enclosure for Wall-Mount APK.PLUS.
- Compact, DIN-Rail Footprint model APK, for Easier Integration inside the Control Panels.
- User-Settable DIP Switches Allow APK and APK.PLUS to be Used with Various Models and Sizes, Eliminating Need for Factory Programming.
- User-Selectable 4-20 Milliamp Span (Digitally Self-Calibrates).
- Auxiliary Flow-Switch Output.

Note 1: For brevity, most of the examples illustrated within this article feature the Sensus [Omni-T2 Series Water Meter](#), which features both a 3-wire encoded signal and a 3-wire pulse signal. However, SCADAmetrics generally offers solutions to Sensus' other flow meters, when paired with the appropriate SCADAmetrics instrument. Other Sensus/SCADAmetrics-compatible meters include the [HydroVerse](#), [Mainline Propeller](#), [Omni-R2](#), [Omni-C2](#), [Omni-F2](#), [iPerl](#), [SR-II](#), [AccuStream](#), [Cordonel](#), and [W-Series Turbo](#) (legacy).

Note 2: It is important to note that certain Sensus flow meters support an optional 2-wire (touch-coupled) reading method. SCADAmetrics *duplexer technology* fully supports 2-wire technology, but SCADAmetrics *reading technology* does not.

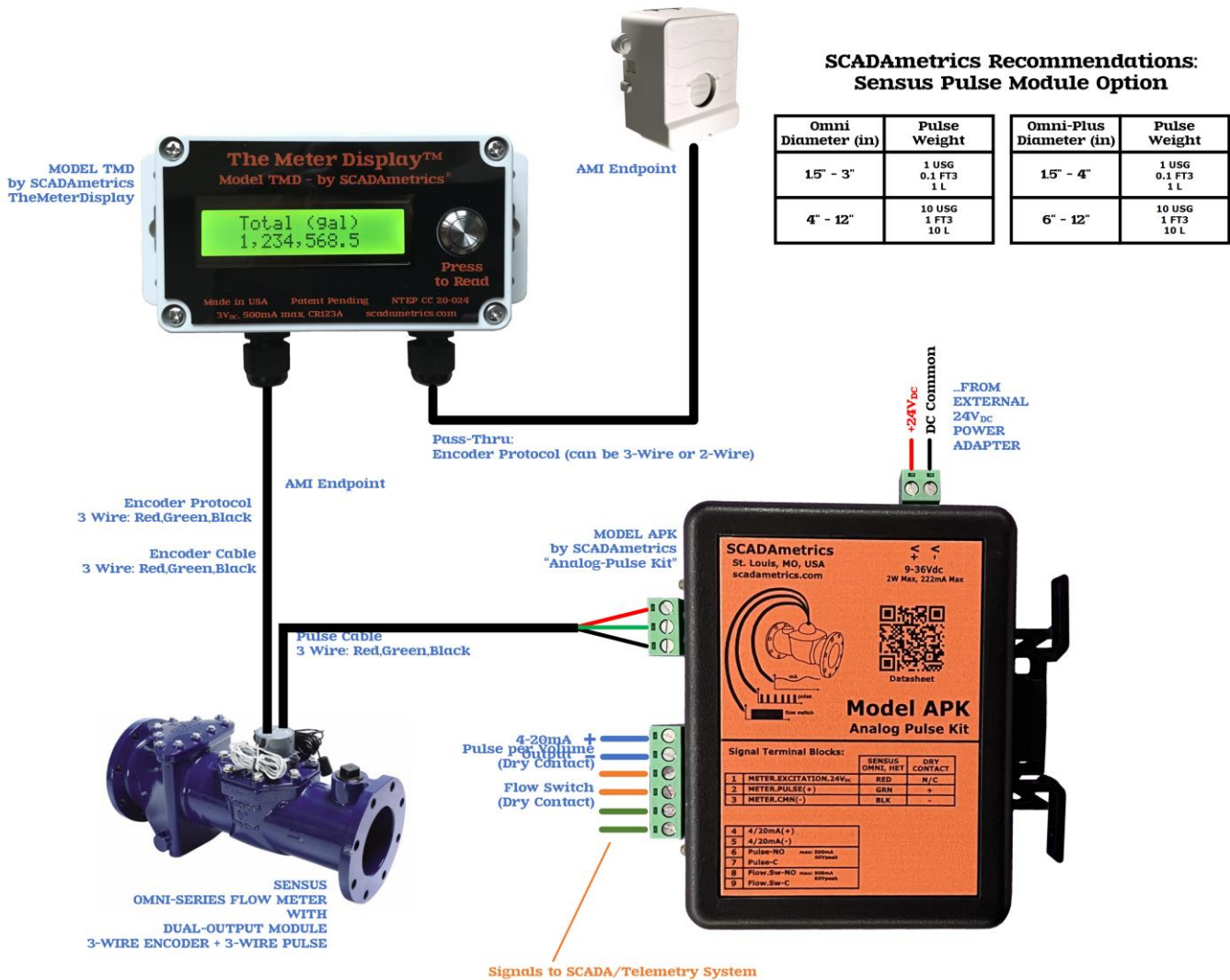
1. Concurrent Basic SCADA and AMI

The following illustrates how a Sensus Omni-series flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch), plus AMI signaling (3-wire encoder protocol). This solution leverages the dual-output capability of the Sensus Omni meter (Encoded + Pulse). Excellent for custody-transfer pump and metering stations. Also excellent for utility-owned water meters at commercial and industrial buildings, where the building owner desires a meter reading into its BMS system, without requiring the installation of a new water meter, or without interfering with the utility's AMI system. Design Basis: [Model APK Analog-Pulse Kit](#):



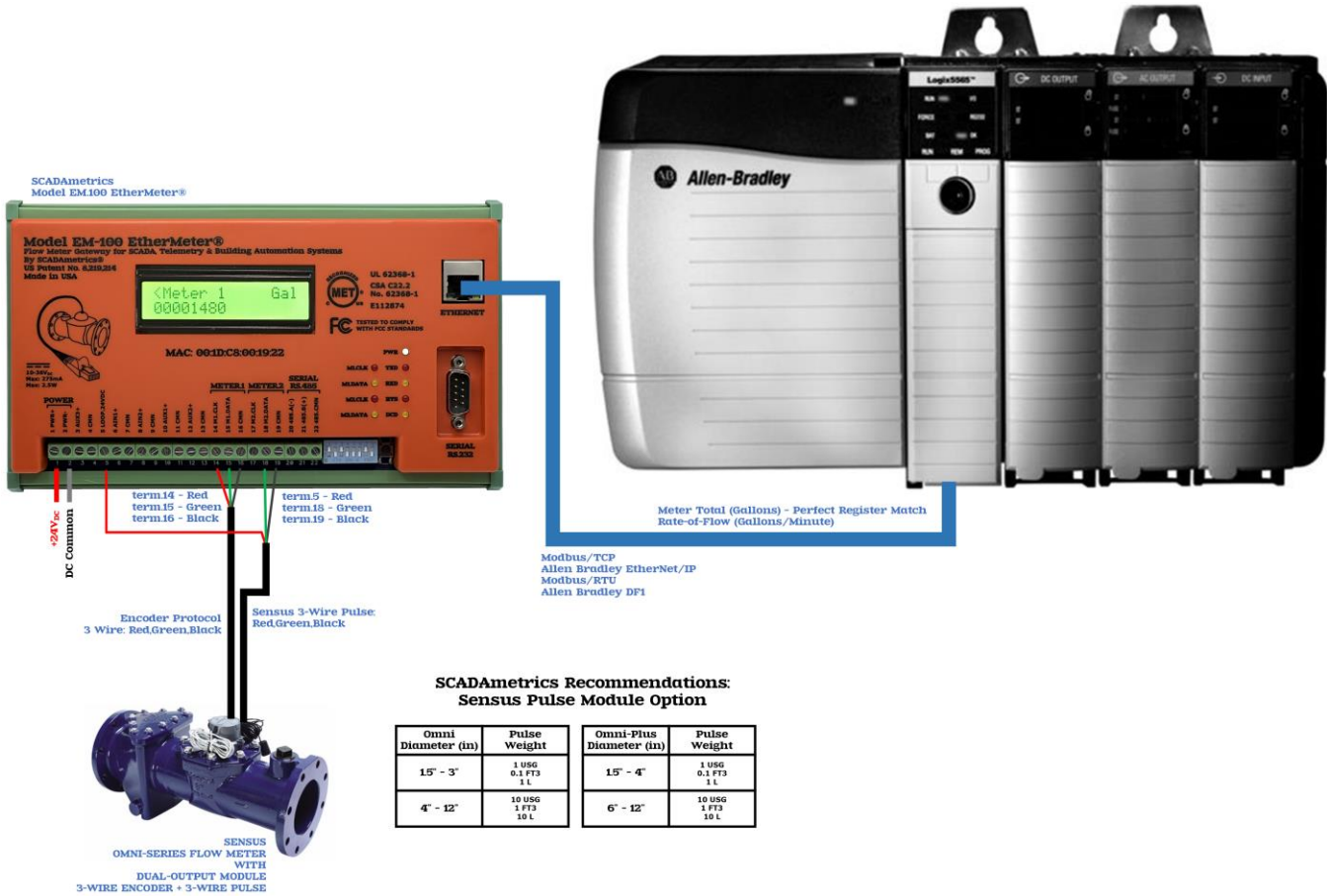
2. Concurrent Basic SCADA, AMI, and Remote Display

The following illustrates how a Sensus Omni-series flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch), AMI signaling (3-wire encoder protocol), and a Remote Wall Display. Excellent for custody-transfer stations and commercial buildings. Design Basis: [Model APK Analog-Pulse Kit](#) and [Model TMD TheMeterDisplay](#):



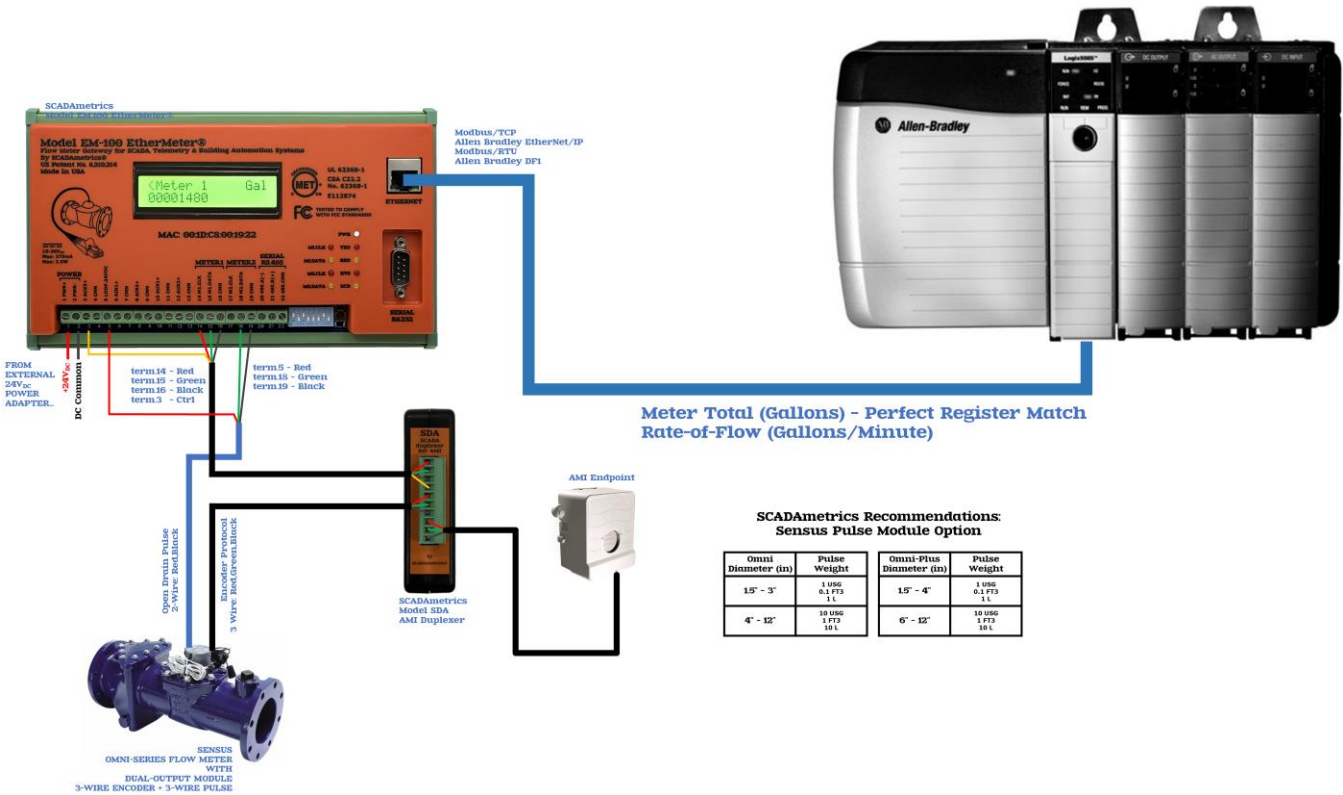
3. Advanced SCADA

The following illustrates how a Sensus Omni-series flow meter can provide advanced SCADA signaling (Modbus, Allen-Bradley EtherNet/IP). Excellent for custody-transfer pumping and valve stations where revenue-grade accuracy is of paramount importance. Also excellent for military bases and educational facilities. Design Basis: [Model EM.100 EtherMeter](#):



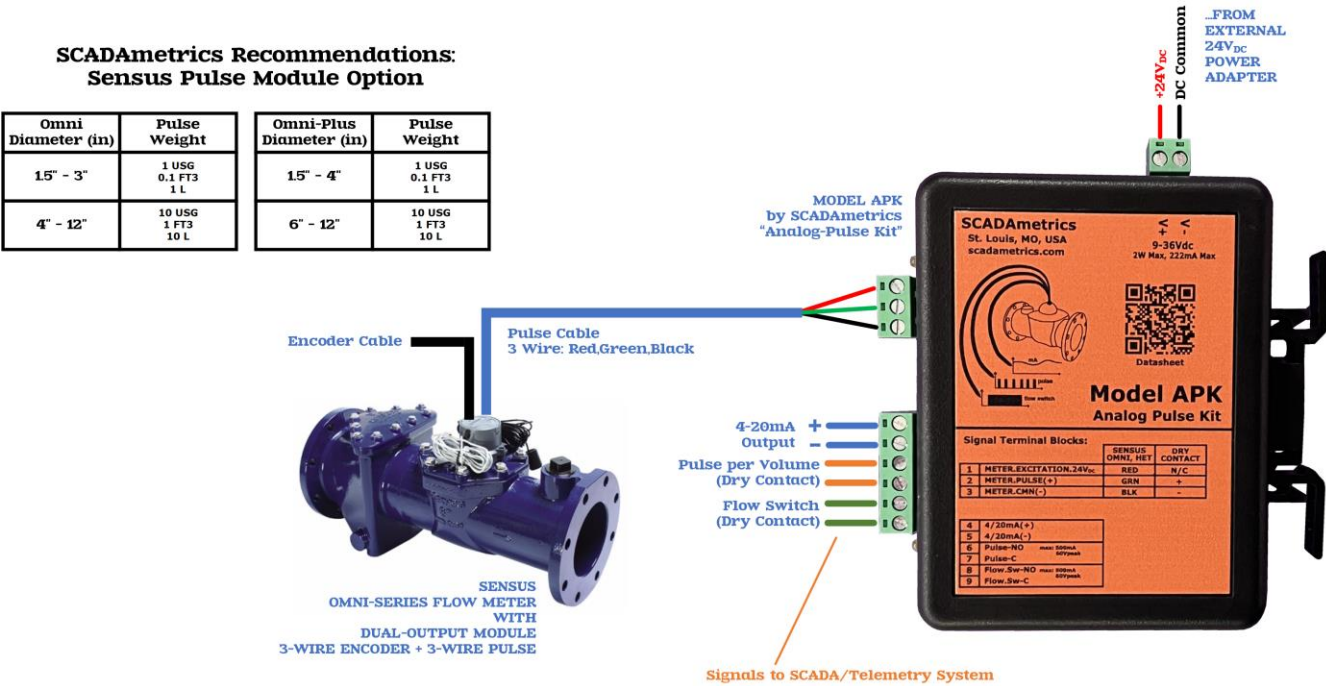
4. Concurrent Advanced SCADA and AMI

The following illustrates how a Sensus Omni-series flow meter can provide advanced SCADA signaling (Modbus, Allen-Bradley EtherNet/IP), while at the same time provide signaling to a connected AMI System. Excellent for custody-transfer metering, pumping, and valve stations where revenue-grade accuracy is of paramount importance for both the SCADA system and AMI system. Also excellent for commercial and industrial facilities who wish to internally track the utility-owned water meter. The inclusion of a model SDA or SDAW Duplexer (illustrated below) ensures concurrent AMI connectivity. Design Basis: [Model EM.100 EtherMeter](#) and [Model SDA SCADA Duplexer for AMI](#):



5. Basic SCADA

The following illustrates how a Sensus Omni-series flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch). Excellent for well and pumping stations, as well as commercial buildings. Design Basis: [Model APK Analog/Pulse Kit](#):



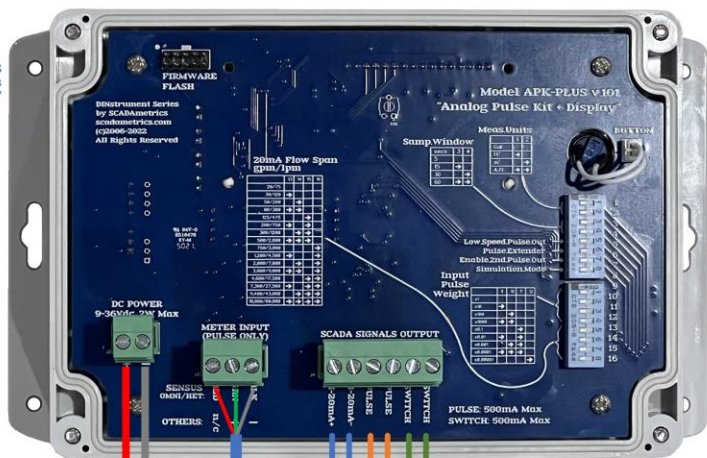
6. Visual Batching, Visual Rate-of-Flow, plus Basic SCADA Outputs

The following illustrates how a Sensus Omni-series flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch, meter fault alarm), along with an always-ON operator flow and batch display. Excellent for well and pumping stations. Design Basis: SCADAmetrics [Model APK.PLUS Analog-Pulse Kit, Plus](#):



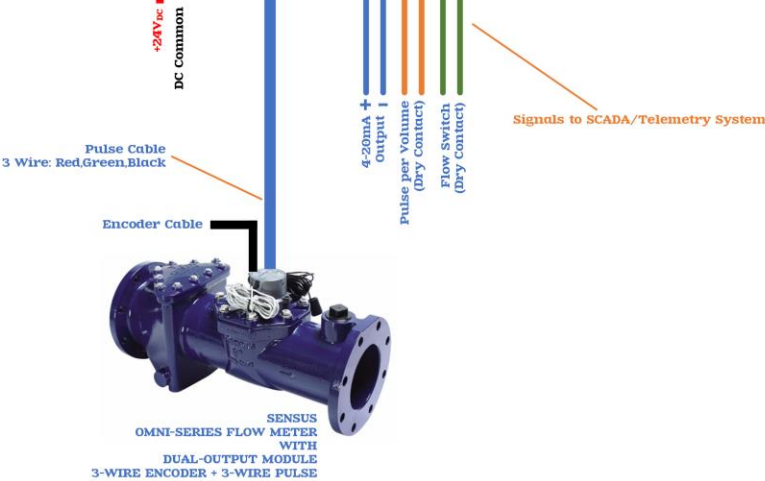
- Visual Flow
- Resettable Totalizers
- 4-20mA
- Pulse
- Flow Switch)

MODEL APK.PLUS by SCADAmetrics "Analog Pulse Kit"



SCADAmetrics Recommendations: Sensus Pulse Module Option

Omni Diameter (in)	Pulse Weight	Omni-Plus Diameter (in)	Pulse Weight
1.5" - 3"	1 USG 0.1 FT3 1 L	1.5" - 4"	1 USG 0.1 FT3 1 L
4" - 12"	10 USG 1 FT3 10 L	6" - 12"	10 USG 1 FT3 10 L



7. Dual-AMI Connectivity

The following illustrates how a Sensus Omni-series flow meter can provide AMI signaling to two separate systems. Excellent for custody-transfer stations, where both the water buyer and seller desire meter connectivity to their separate respective AMI systems. Design Basis: SCADAmetrics [Model UDA Universal Duplexer for AMI](#):



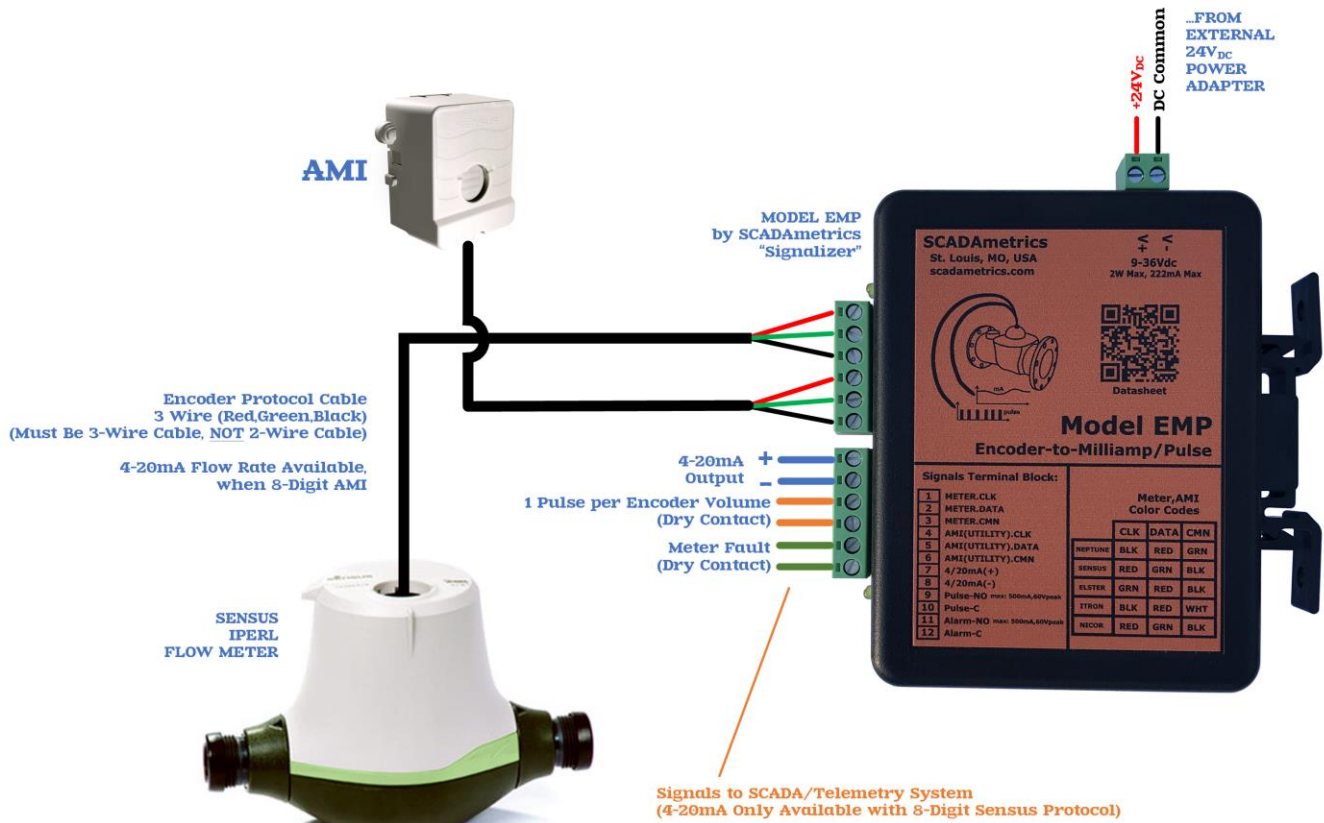
8. Concurrent AMI Connectivity and Remote Visual Display

The following illustrates how a model TMD display can work with a Sensus Omni-series flow meter to provide AMI signaling to the water utility, while concurrently providing a visual remote display whose reading is a perfect match to the Sensus register total. Furthermore, the TMD can also provide a rate-of-flow (gpm, lpm) display, as well. Excellent for utility-owned water meters at commercial and industrial buildings, where the building owner desires a meter reading without requiring entry to a vault or confined-space. Design Basis: SCADAmetrics [Model TMD TheMeterDisplay](#):



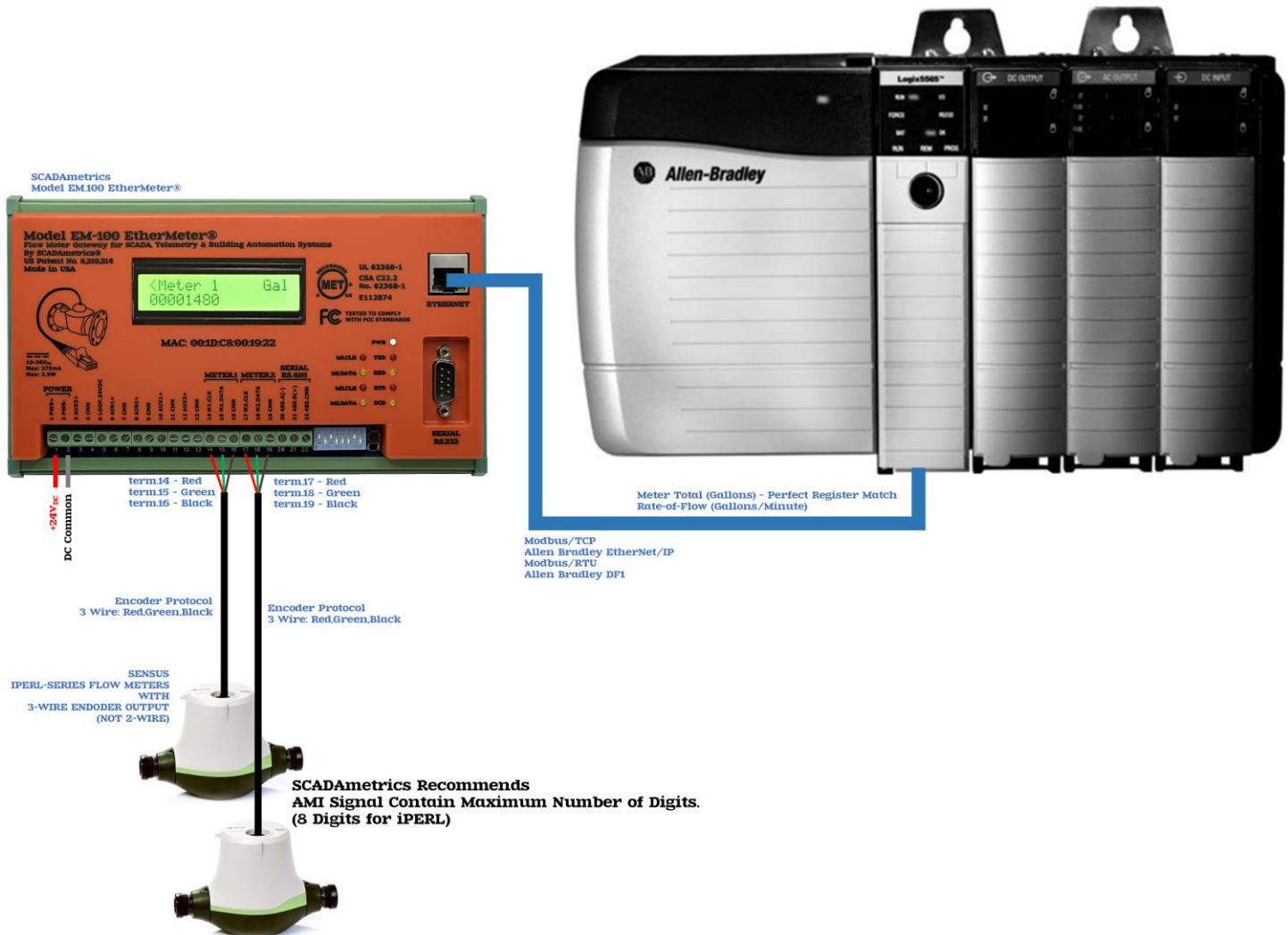
9. Basic SCADA Connectivity to AMI-Only Meter

The following illustrates how a model EMP Signalizer display can be applied to a Sensus iPerl-series, or Omni-R2-series, or Encoder-Only-Version-Omni+Plus, or AccuStream flow meter that is outfitted with a 3-wire encoded signal. This application provides basic SCADA signaling, while preserving the existing AMI signaling to the water utility. The SCADA signaling is in the form of a pulse-per-volume output. Furthermore, if the Omni register is programmed to transmit 8-digits resolution, then a 4-20 milliamp SCADA signal is also provided. Excellent for utility-owned water meters at commercial and industrial buildings, where the building owner desires a meter reading into its BMS system, without requiring the installation of a new water meter, or without interfering with the utility's AMI system. Design Basis: SCADAmetrics [Model EMP Signalizer](#):



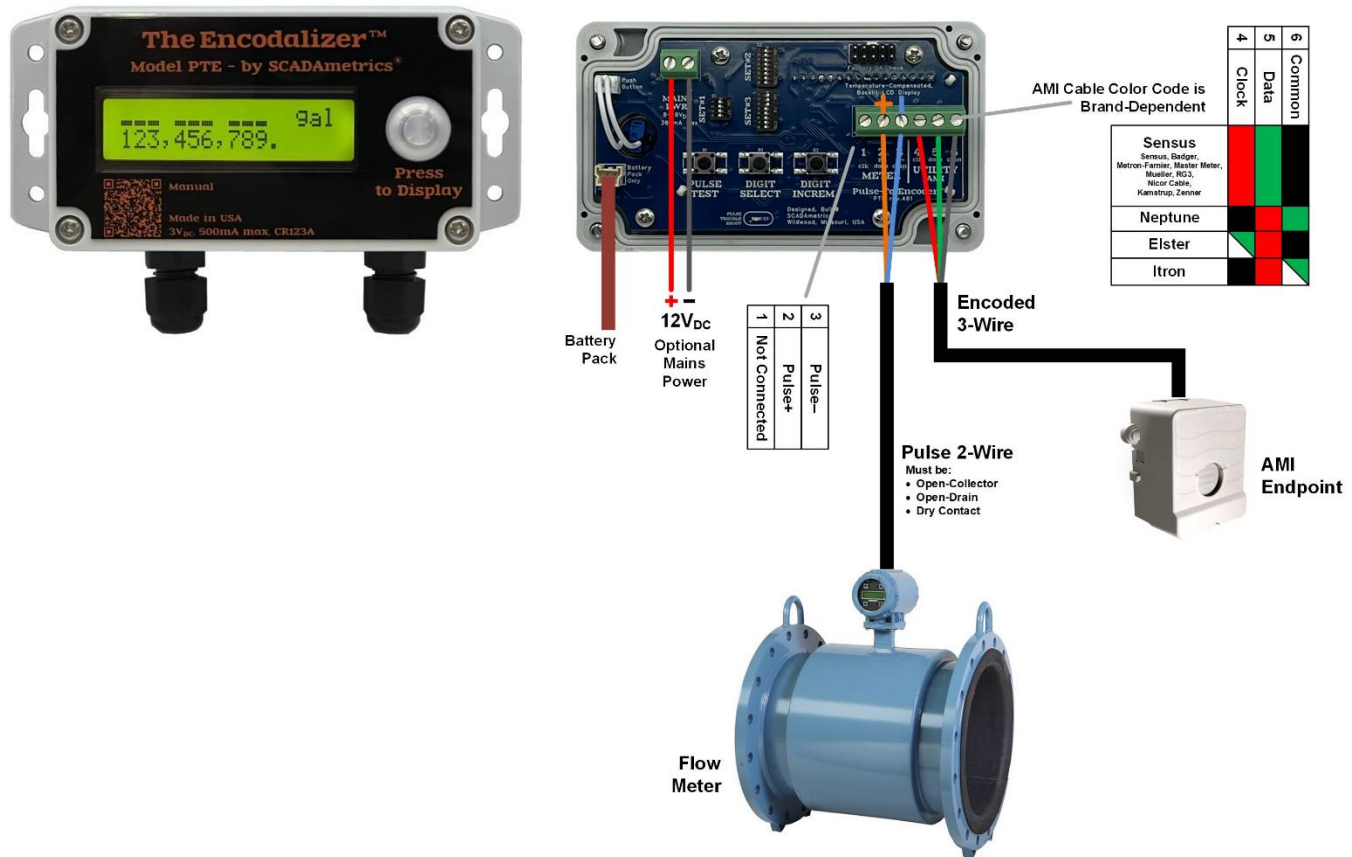
10. Advanced SCADA Connectivity to AMI-Only Meter

The following illustrates how a model EM.100 EtherMeter can be applied to a Sensus iPerl-series, or Omni-R2-series, or **Encoder-Only-Version-Omni+Plus**, or **AccuStream** flow meter that is outfitted with a 3-wire encoded signal. This application provides advanced SCADA signaling (Modbus, Allen-Bradley EtherNet/IP) to the water utility or other meter owner. Excellent for military bases, educational facilities, and commercial buildings, where revenue-grade accuracy is of paramount importance. Design Basis: [Model EM.100 EtherMeter](#):



11. AMI Connectivity to a Pulse-Output-Only Flow Meter

The following illustrates how a model **PTE Encodalyzer** can be applied to a pulse-only flow meter to generate a 3-wire encoded AMI signal. This allows a utility to connect non-traditional flow meters to its AMI system. Excellent for adding wastewater meters, natural gas meters, and magnetic flow meters to utility-owned automated meter infrastructure. Design Basis: SCADAmetrics [Model PTE Encodalyzer](#):



Want to Learn More?...

Are you interested in learning more about how SCADAmetrics flow instrumentation, when paired with Sensus/Xylem Meter flow meters, can provide a wealth of value-added SCADA and visual display options? Give us a call!... We'll be glad to discuss the details!