

SCADA Signaling from Master Meter Flow Meters



Master Meter Flow Meters Include the Octave Ultrasonic (pictured left), the MMT Turbine, and the BLMJ Bottom-Loaded Multi-Jet.



Jim 'Slim' Mimplitz, SCADAMetrics

[Master Meter Inc. \(Mansfield, TX\)](#) 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.

Like many manufacturers of AWWA-style flow meters, Master Meter's signaling options are focused upon their 3-wire, encoded protocol for interfacing with AMI/AMR endpoints. Master Meter's 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 Master Meter flow meters.

Note 1: The examples illustrated within this article feature Master Meter's ultrasonic Octave flow meter. However, all solutions are equally compatible with Master Meter's electromechanical flow meters when outfitted with Master Meter's **AccuLinx** or **eLinx** encoder registers.

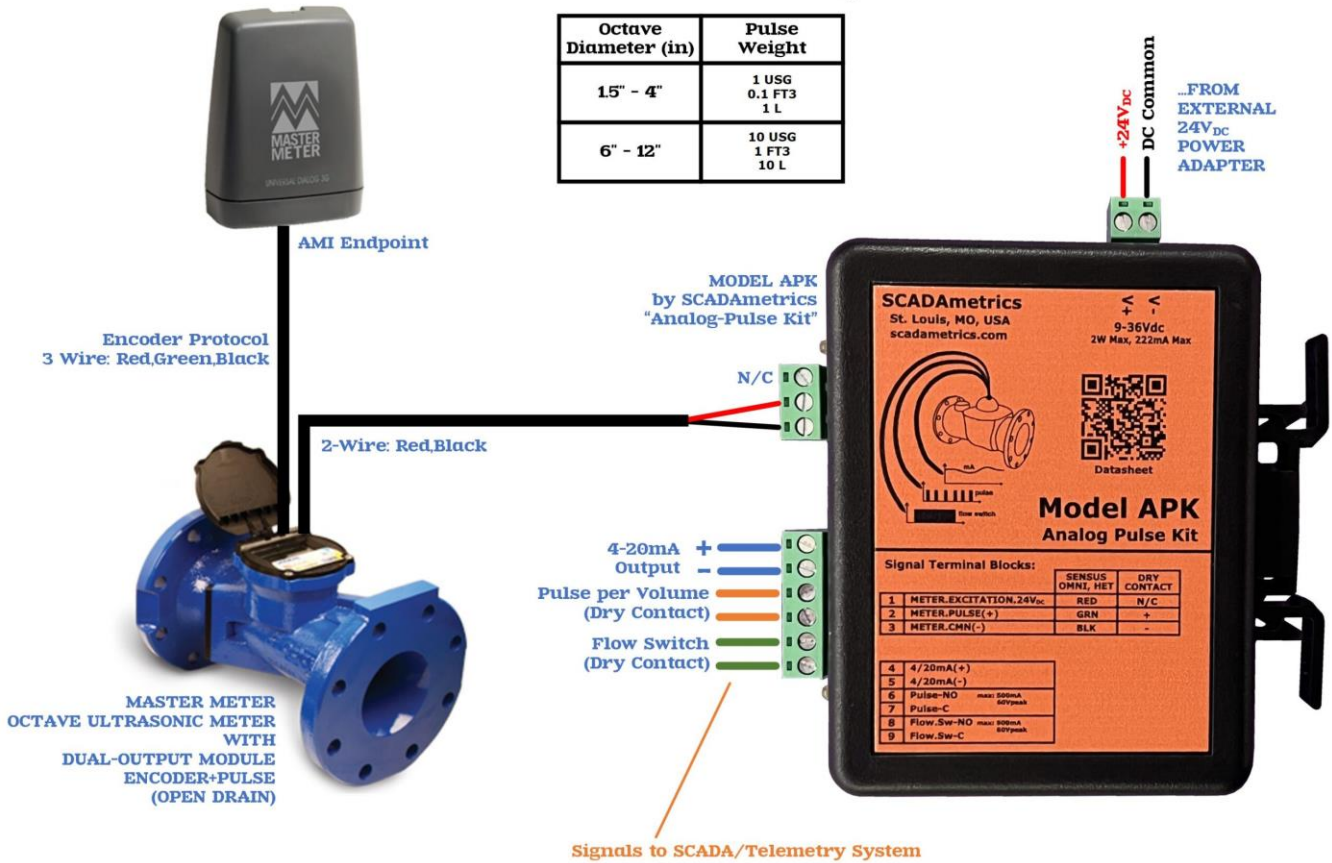
Note 2: It is important to note that standard, cabled versions of the Master Meter registers are utilized in all of the illustrated examples below, as the integrated radio registers do not provide the encoded signal cable required by SCADAMetrics instrumentation. However, all illustrated solutions are compatible with **Master Meter's XTR MIU**.

1. Concurrent Basic SCADA and AMI

The following illustrates how an Octave flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch), plus AMI signaling (3-wire encoder protocol). The Octave meter should be outfitted with dual-output communications option (Encoded + Open Drain 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](#):

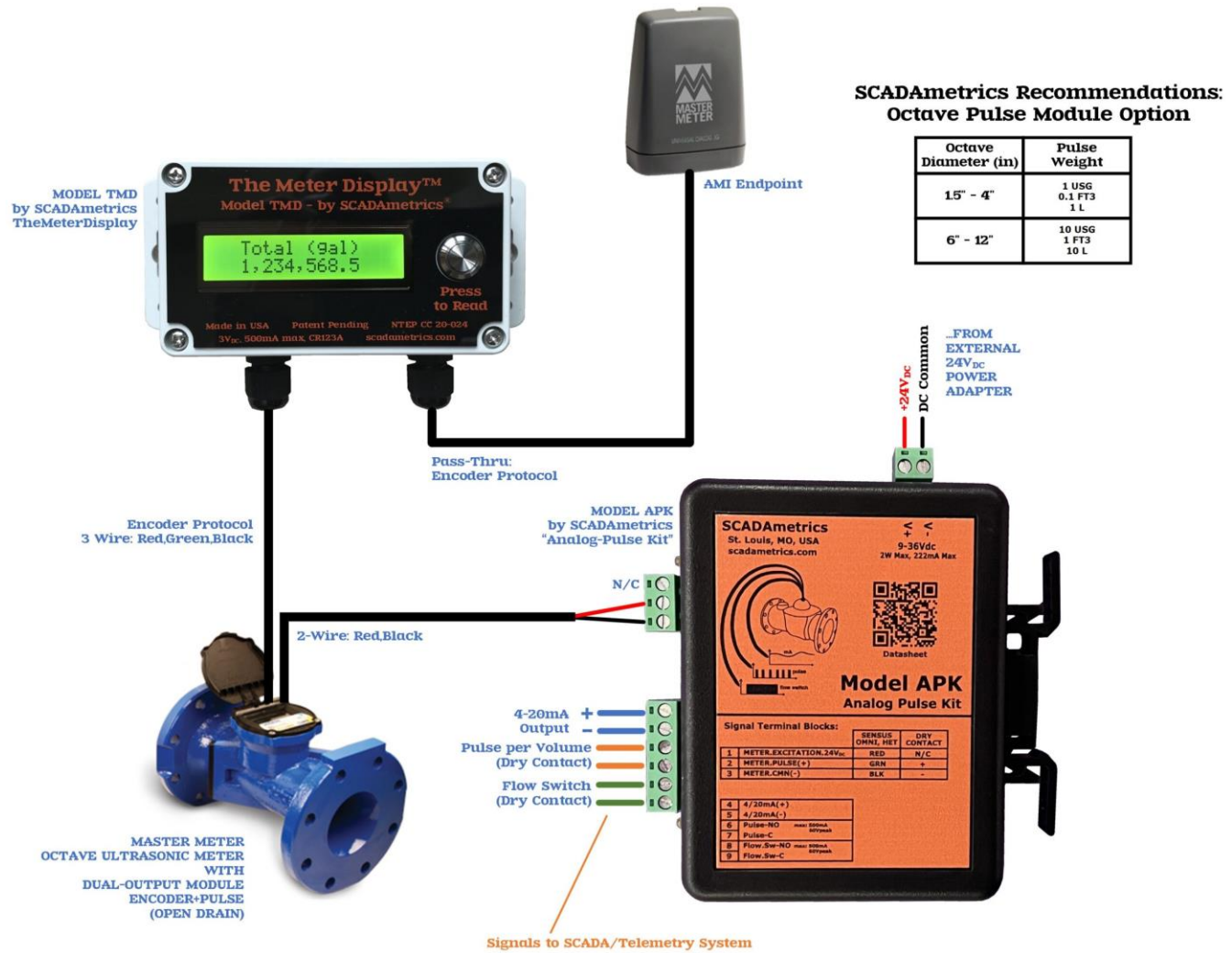
SCADAmetrics Recommendations: Octave Pulse Module Option

Octave Diameter (in)	Pulse Weight
1.5" - 4"	1 USG 0.1 FT ³ 1 L
6" - 12"	10 USG 1 FT ³ 10 L



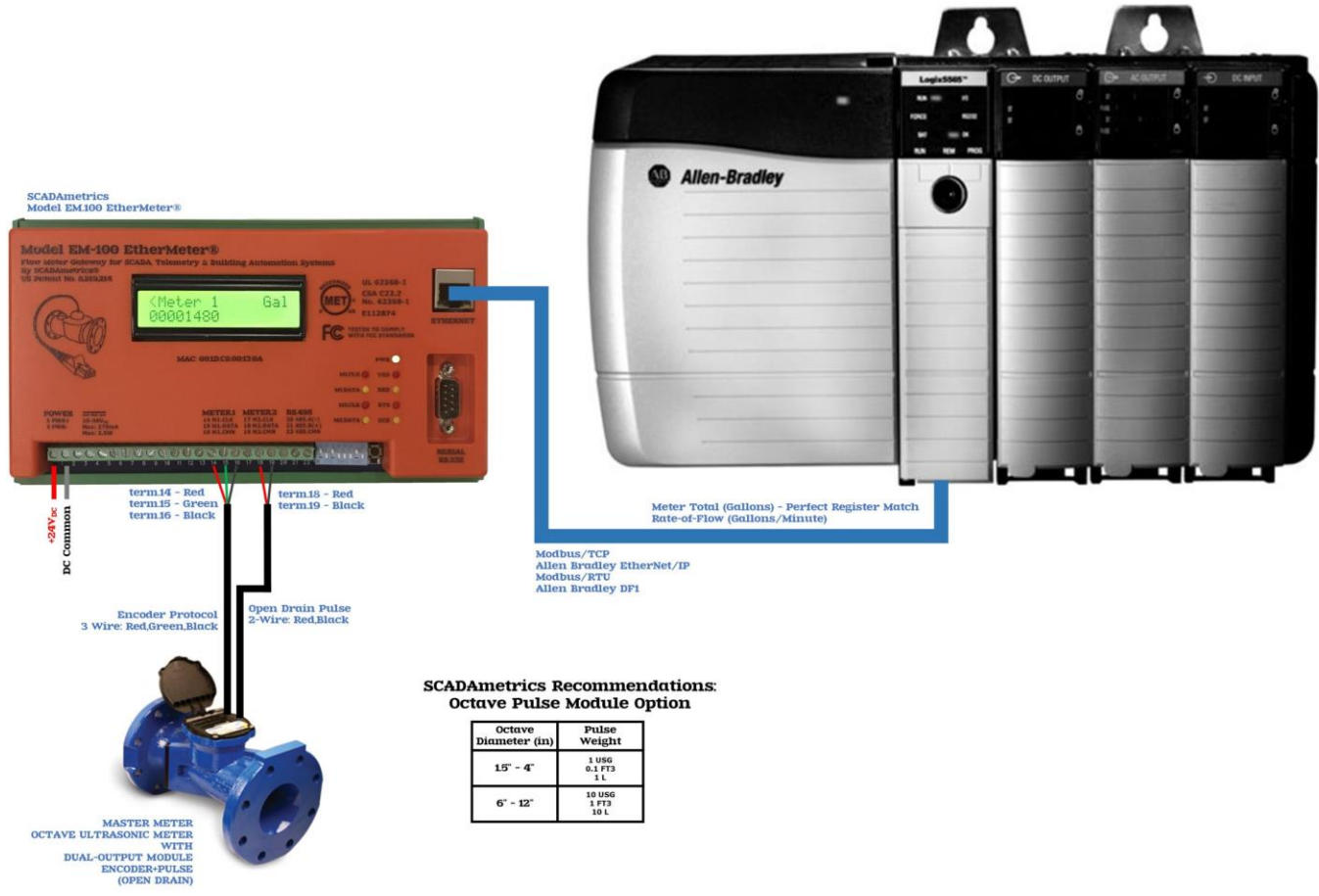
2. Concurrent Basic SCADA, AMI, and Remote Display

The following illustrates how an Octave 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](#):



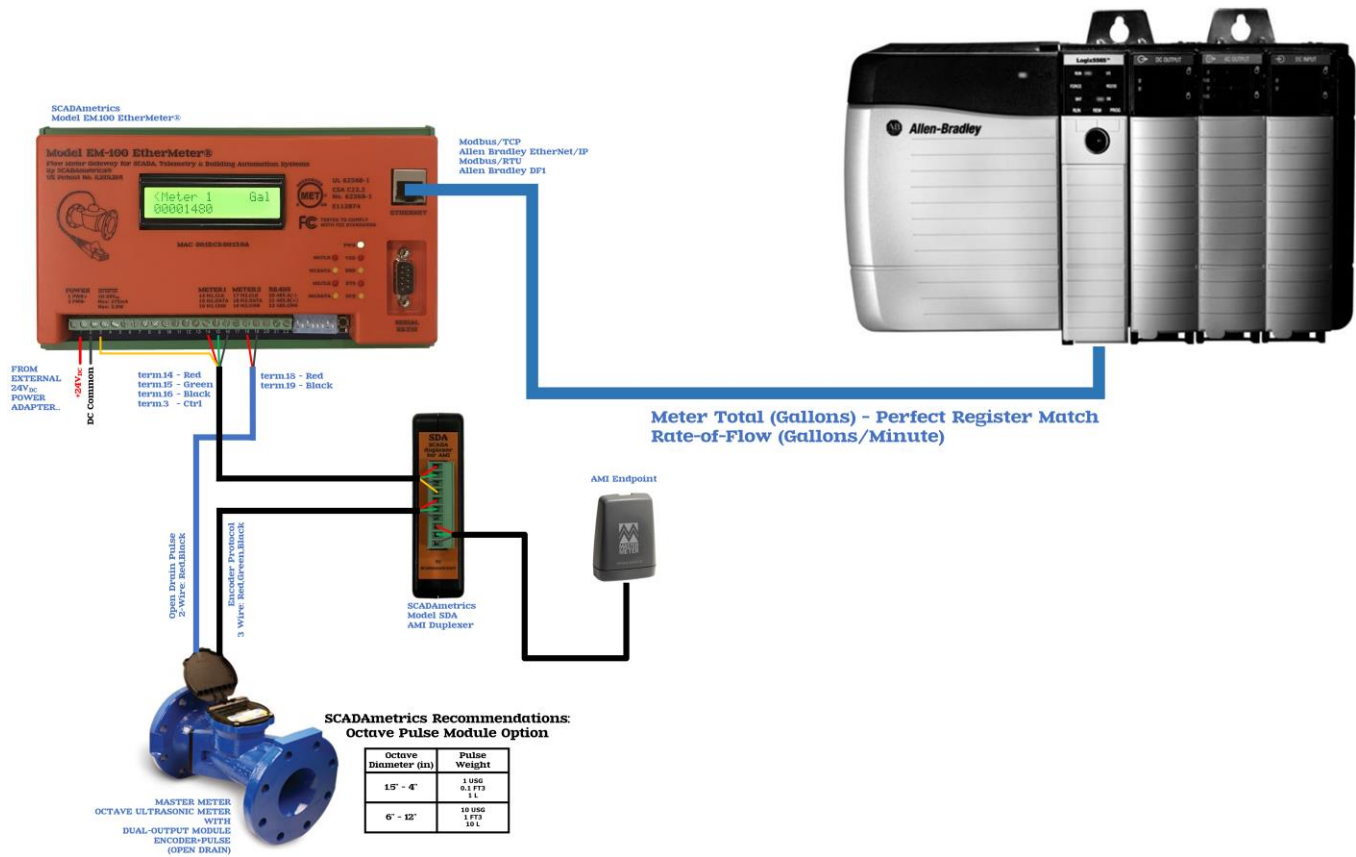
3. Advanced SCADA

The following illustrates how a Master Meter Octave 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. The addition of a model SDA or SDAW Duplexer (not shown) may be added if concurrent AMI connectivity is desired. Design Basis: [Model EM.100 EtherMeter](#):



4. Concurrent Advanced SCADA and AMI

The following illustrates how an Octave 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 Master Meter Octave 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](#):

SCADAmetrics Recommendations: Octave Pulse Module Option

Octave Diameter (in)	Pulse Weight
15" - 4"	1 USG 0.1 FT ³ 1 L
6" - 12"	10 USG 1 FT ³ 10 L

MASTER METER
OCTAVE ULTRASONIC METER
WITH PULSE OUTPUT MODULE
(OPEN DRAIN)
OR
DUAL-OUTPUT MODULE
ENCODER+PULSE
(OPEN DRAIN)



MODEL APK
by SCADAmetrics
"Analog-Pulse Kit"

2-WIRE (OPEN-DRAIN)
PULSE CABLE

N/C

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

Signals to SCADA/Telemetry System



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

The following illustrates how an Octave flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, flow switch), 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:](#)



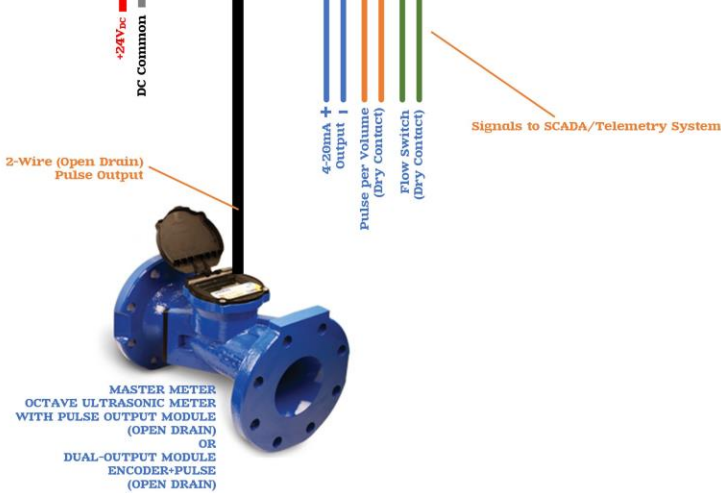
- Visual Flow
- Resettable Totalizers
- 4-20mA
- Pulse
- Flow Switch)

MODEL APK.PLUS by SCADAmetrics "Analog Pulse Kit"



SCADAmetrics Recommendations: Octave Pulse Module Option

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



7. Visual Batching, Visual Rate-of-Flow, Basic SCADA Outputs, and Concurrent AMI

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



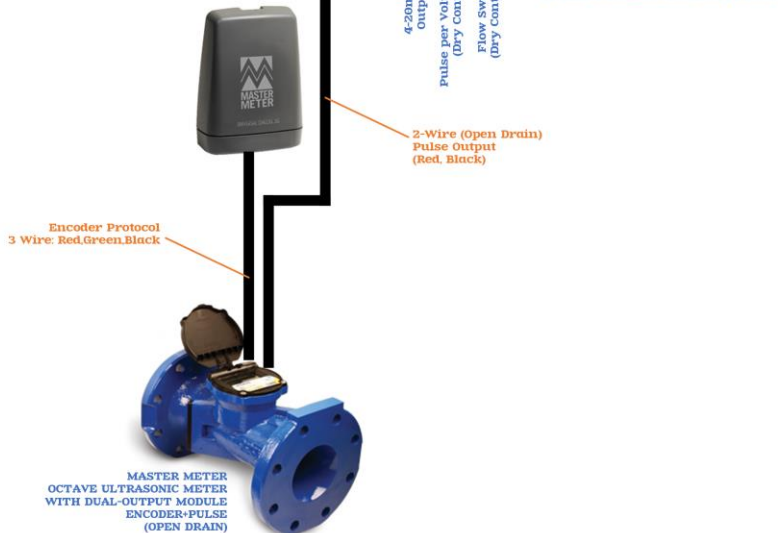
- Visual Flow
- Resettable Totalizers
- 4-20mA
- Pulse
- Flow Switch

MODEL APK PLUS
by SCADAmetrics
"Analog Pulse Kit"



SCADAmetrics Recommendations:
Octave Pulse Module Option

Octave Diameter (in)	Pulse Weight
1.5" - 4"	1 USG 0.1 FT ³ 1 L
6" - 12"	10 USG 1 FT ³ 10 L



8. Dual-AMI Connectivity

The following illustrates how an Octave 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](#):



9. Concurrent AMI Connectivity and Remote Visual Display

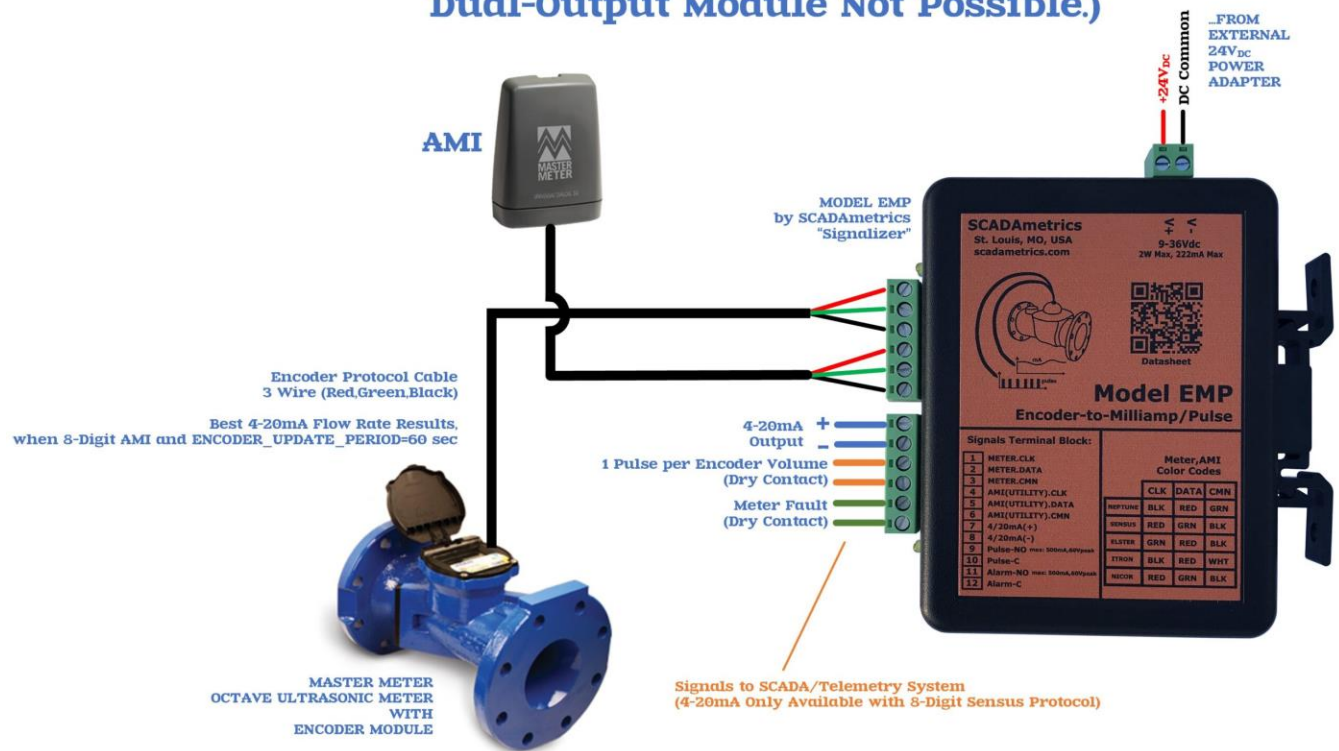
The following illustrates how a model TMD display can work with an Octave flow meter to provide AMI signaling to the water utility, while concurrently providing a visual remote display whose reading is a perfect match to the Octave register total. Furthermore, the TMD can also provide a rate-of-flow (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](#):



10. Retrofit Basic SCADA Connectivity to AMI-Connected Meter

The following illustrates how a model EMP Signalizer display can be applied to a Master Meter Octave flow meter that is outfitted with an encoded output module to provide 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 Octave register is programmed to transmit 8-digits resolution, then a 4-20 milliamp SCADA signal is also provided (requires Octave setting ENCODER_UPDATE_PERIOD = 60s). 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](#):

Retrofit SCADA Connectivity to AMI-Only Octave Flow Meter: Create 4-20mA and Pulse Signaling From AMI Encoded Signal, While Preserving AMI Connectivity. (For Situations Where Upgrading Octave to Dual-Output Module Not Possible.)



Want to Learn More?...

Are you interested in learning more about how SCADAmetrics flow instrumentation, when paired with Master 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!