

Application Note Neptune.1  
Version 001  
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## SCADA Signaling from Neptune Flow Meters



Neptune Flow Meters Include the Mach-10 Ultrasonic (pictured left), the T-10, High-Performance Turbine, and the Tru-Flo Compound.



*Jim 'Slim' Mimplitz, SCADAMetrics*

[Neptune Technology Group \(Tallassee, AL\)](#) 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, Neptune's signaling options are focused upon their 3-wire, encoded protocol for interfacing with AMI/AMR endpoints. Neptune's encoded protocol is unique in that it transmits **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 Neptune flow meters.

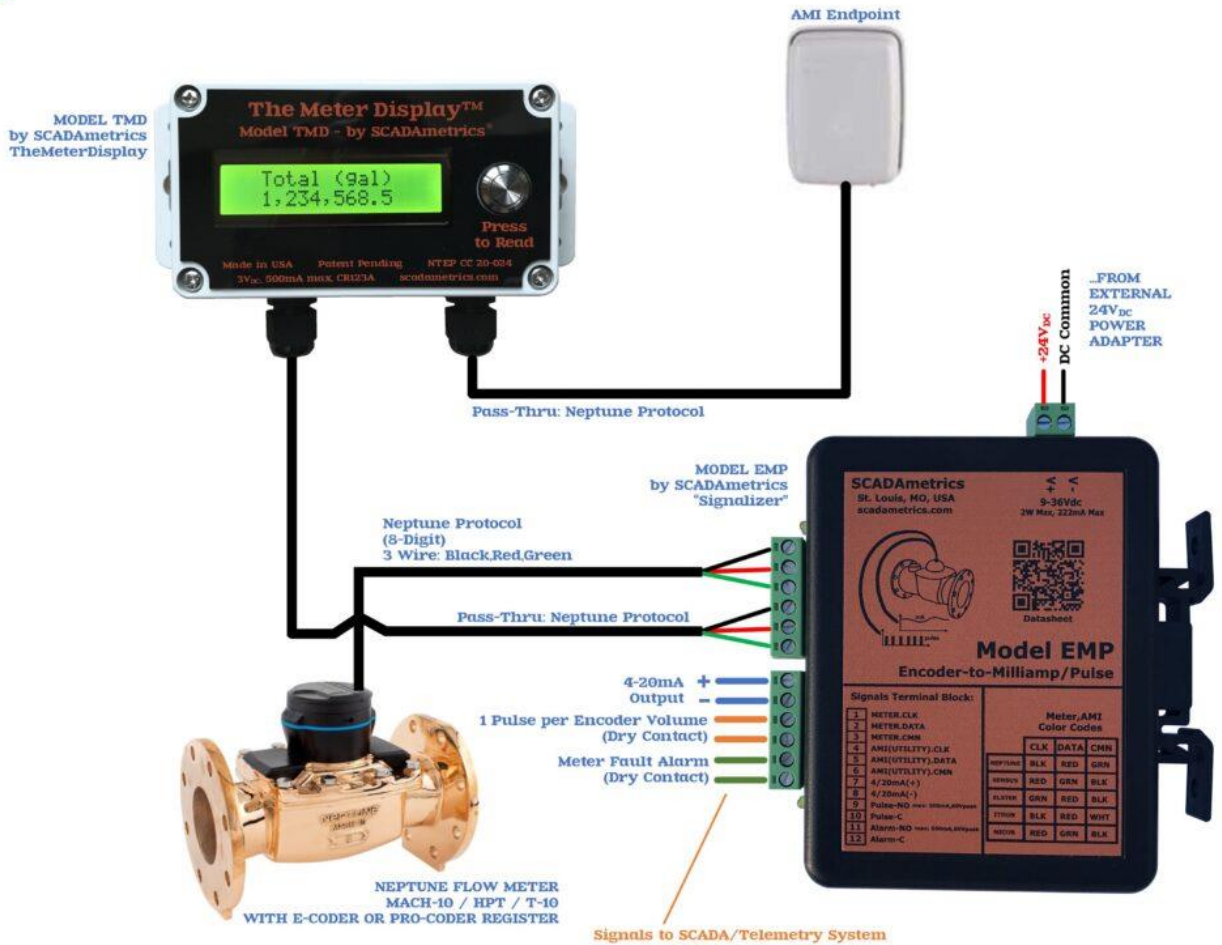
**Note:** It is important to note that standard, cabled versions of the Neptune registers are utilized in all of the illustrated examples below, as the integrated radio registers (R900i series) do not provide the encoded signal cable required by SCADAMetrics instrumentation. However, all illustrated solutions are compatible with [Neptune's standalone R900 MIU](#).

# Concurrent SCADA, AMI, and Remote Display

The following illustrates how a Neptune flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, meter fault alarm), AMI signaling (Neptune protocol), and a Remote Wall Display. Excellent for custody-transfer stations and commercial buildings. Design Basis: [Model EMP Signalizer](#) and [Model TMD TheMeterDisplay](#):

## Concurrent Connectivity to Neptune Flow Meter:

- SCADA (4-20mA, Pulse, Flow Switch)
- Remote Display (Pushbutton for Total and Rate)
- AMI



## Advanced SCADA

The following illustrates how a Neptune 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](#):

### Advanced SCADA Connectivity To Neptune Flow Meters:

- SCADA (Modbus, EtherNet/IP)
- Visual Display (Total and Rate)
- AMI (Possible with Duplexer)

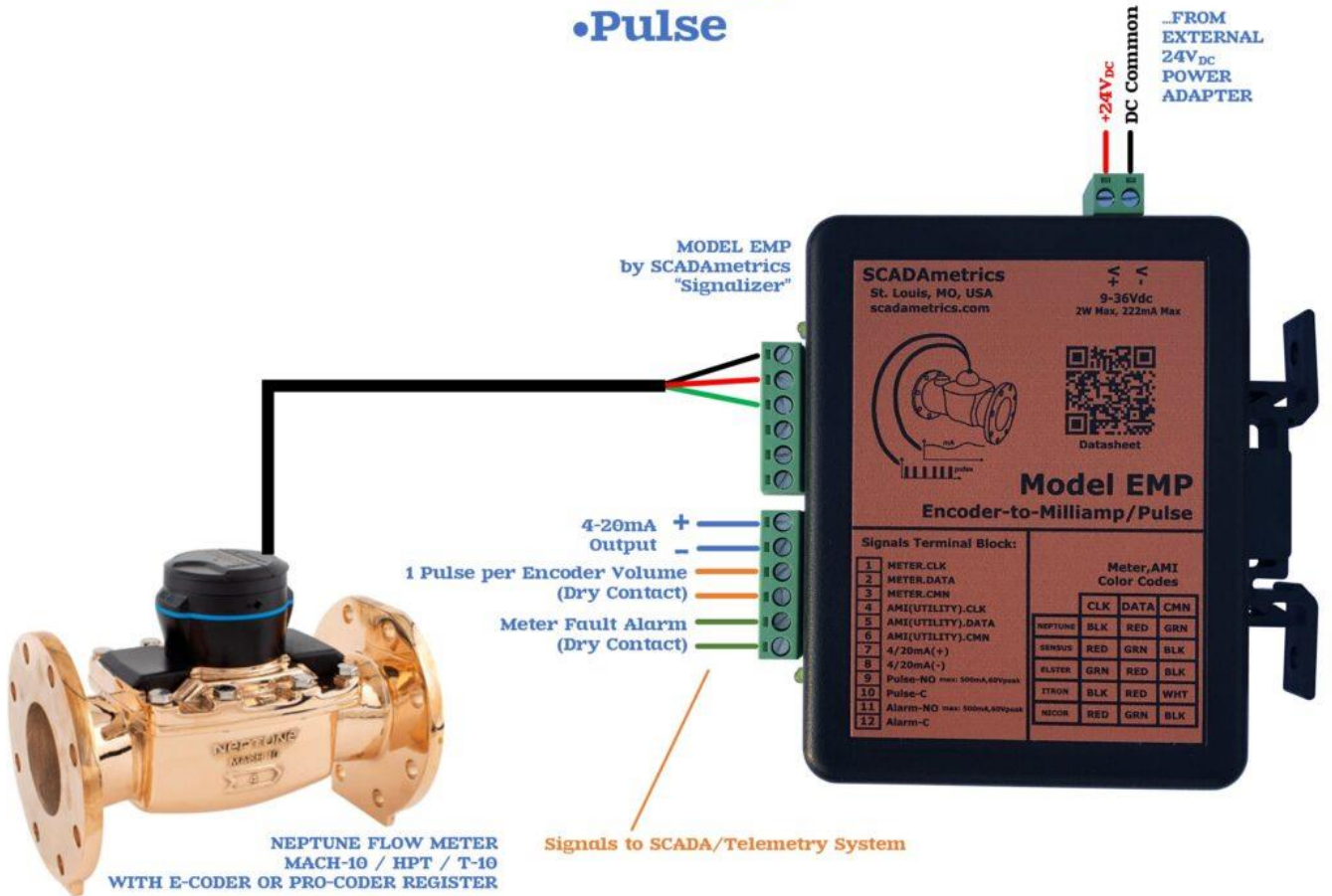


## Basic SCADA

The following illustrates how a Neptune flow meter can provide basic SCADA signaling (4-20 milliamp, pulse-per-volume, meter fault alarm). Excellent for well and pumping stations, as well as commercial buildings. Design Basis: [Model EMP Signalizer](#):

# Discrete SCADA Connectivity to a Neptune Flow Meter:

- 4-20mA
- Pulse



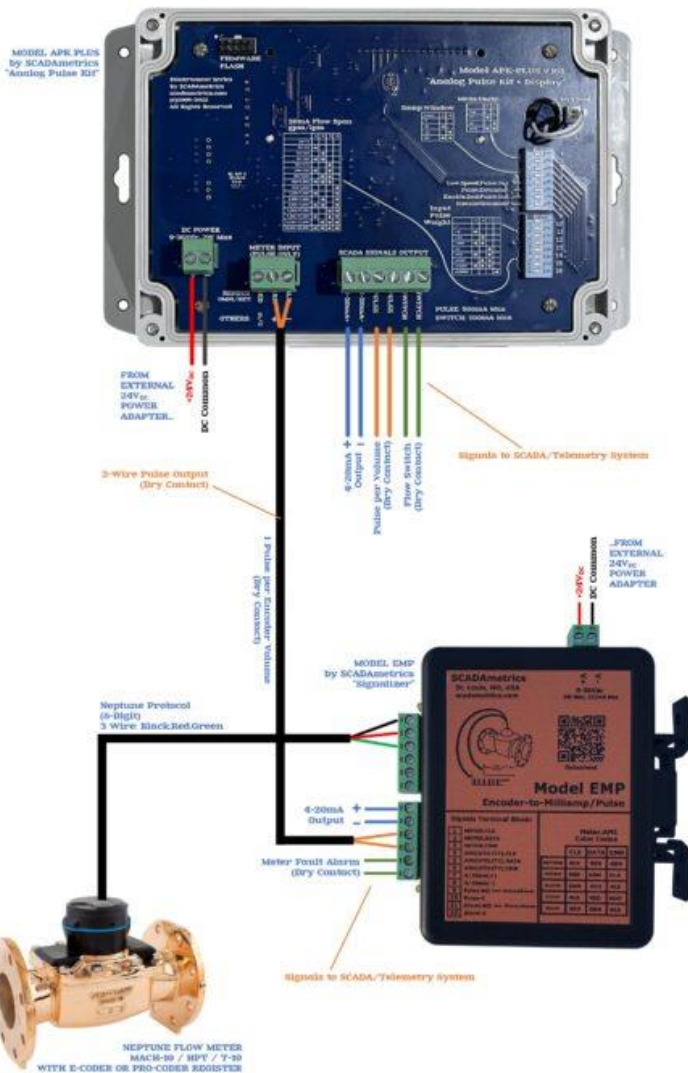
## Visual Batching, Visual Rate-of-Flow, plus SCADA Outputs

The following illustrates how a Neptune 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:](#) and [Model EMP Signalizer](#)

### Discrete SCADA Connectivity + "Always-ON" Visual Batching and Flow Display with Neptune Flow Meters:



- Visual Flow - Always ON
- Visual Totalizers - Always ON
- 2 Resettable Totalizers
- 4-20mA rate-of-flow
- Pulse per volume
- Flow Switch



## Dual-AMI Connectivity

The following illustrates how a Neptune 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](#):

# Dual-AMI Sharing of a Neptune Flow Meter: Custody-Transfer Metering Station



## Concurrent AMI Connectivity and Remote Visual Display

The following illustrates how a model TMD display can work with a Neptune 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 Neptune register total. Furthermore, if a Pro-Coder, E-Coder, or Mach-10 register is used, then the 8-digit resolution will enable the display of rate-of-flow (gpm,lpm), 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](#):

# Concurrent Connectivity to Neptune Flow Meter:

- Remote Display (Pushbutton for Total and Rate)
- AMI

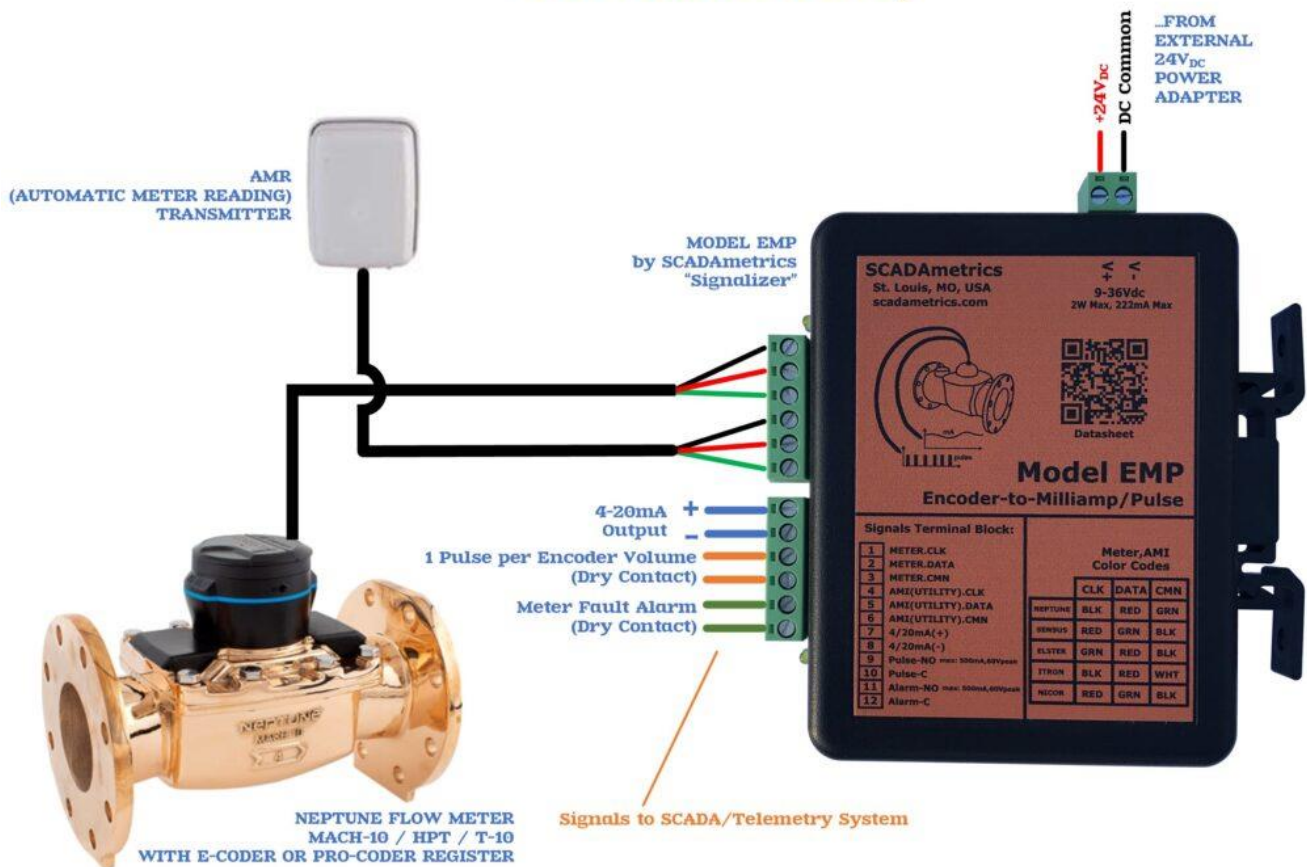


## Retrofit SCADA Connectivity to AMI-Connected Meter

The following illustrates how a model EMP Signalizer display can be applied to a Neptune 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 a Neptune 8-digit Pro-Coder, E-Coder, or Mach-10 register is used, 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](#):

# Retrofit SCADA Connectivity to an AMI-Connected Neptune Flow Meter:

## Create 4-20mA and Pulse Signaling From AMI Encoded Signal, While Preserving AMI Connectivity





## **Want to Learn More?...**

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