SCADAMETRICS®
APPLICATION NOTE

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Using an EtherMeter® that is Flashed with the Special Compound Flow Meter Analog Output Firmware.

This document describes the wiring procedures and EtherMeter settings that are required when using the **Special Compound Flow Meter Analog Output Firmware**.

In most cases, the user will collect flow rate data via the digital Ethernet and Serial communication channels of the EtherMeter. Digital communication protocols include MODBUS®/TCP/UDP/RTU/ASCII, DF1, and EtherNet/IP™.

However, in some instances, the user may wish to interface to 4-20mA analog signals that are proportional to flow. One especially common application includes the pacing of disinfectant chemical treatment pumps. To support this concept, SCADAmetrics has made available special firmware that enables the EtherMeter to translate its flow-rate signals to an ADAM-4024 multi-channel analog output module (manufactured by Advantech). The EtherMeter supports up to two flow meters, and the ADAM-4024 also supports two analog outputs (each corresponding to a flow meter).

However, in a subset of the aforementioned circumstance, the flow meter is a "Compound Meter", which basically consists of two flow meters within one housing: a high-flow meter and a low-flow meter. Examples include the Neptune and Badger Compound meters. In these cases, customers often desire for the flow signals to be added together and presented as a single 4-20mA flow-proportional signal. The EtherMeter **Special Compound Flow Meter Analog Output Firmware** was created to solve this specific problem.

It is important to note that this firmware should only be used if the compound meter is outfitted with high-resolution low-flow and high-flow registers. For Neptune, the registers should be either ProCoder or E-Coder type. For Badger, the registers should be HR/E type, programmed to 8- or 9-wheel resolution.

In **Figure 1**, a Neptune Compound Flow Meter is connected to the EtherMeter, and therefore Neptune meter color-coding is utilized. In case of a Badger Compound Flow Meter, "Sensus" meter color-coding would be utilized. In general, the meter wire color codes are according to the Meter Compatibility Matrix document.

In **Figure 1**, a parallel AMI/AMR hookup is assumed, and therefore two Model SDA "SCADA Duplexer for AMI/AMR" are included. If no parallel AMI/AMR connection is required, then the Compound Meter may be hooked up directly to the EtherMeter.

A detailed view of the ADAM-4024 module wiring is illustrated in **Figure 2**. Like the EtherMeter, the ADAM-4024 accepts a wide range of DC power supply voltages. In the demonstration panel, the EtherMeter and ADAM-4024 share a common +24VDC power supply.

Note that the ADAM-4024 provides two 4-20mA signals. Both signals represent the same rate-of-flow signal and can be used for distinct purposes – for example, to provide pace signals for two separate chemical pumps.

4-20mA signal #1 is obtained from IOUT0+ and IOUT0-, and 4-20mA signal #2 is obtained from IOUT1+ and IOUT1-. Please note that the maximum supported loop resistance is 500 ohms.

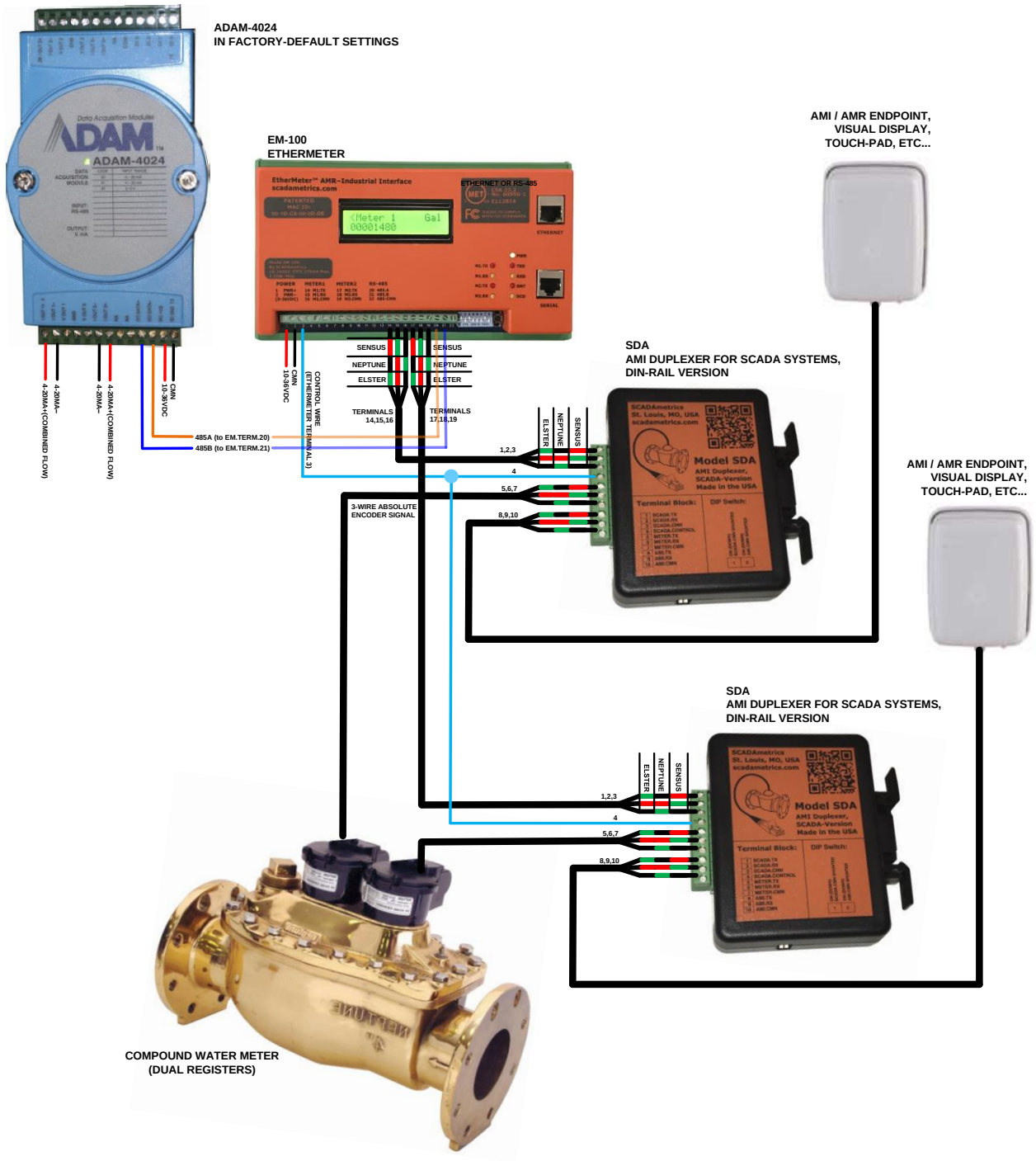

Figure 1. Hookup Diagram: EtherMeter, Neptune Compound Meter, ADAM-4024 Module, Power-Supply, Parallel AMI/AMR Hookup.

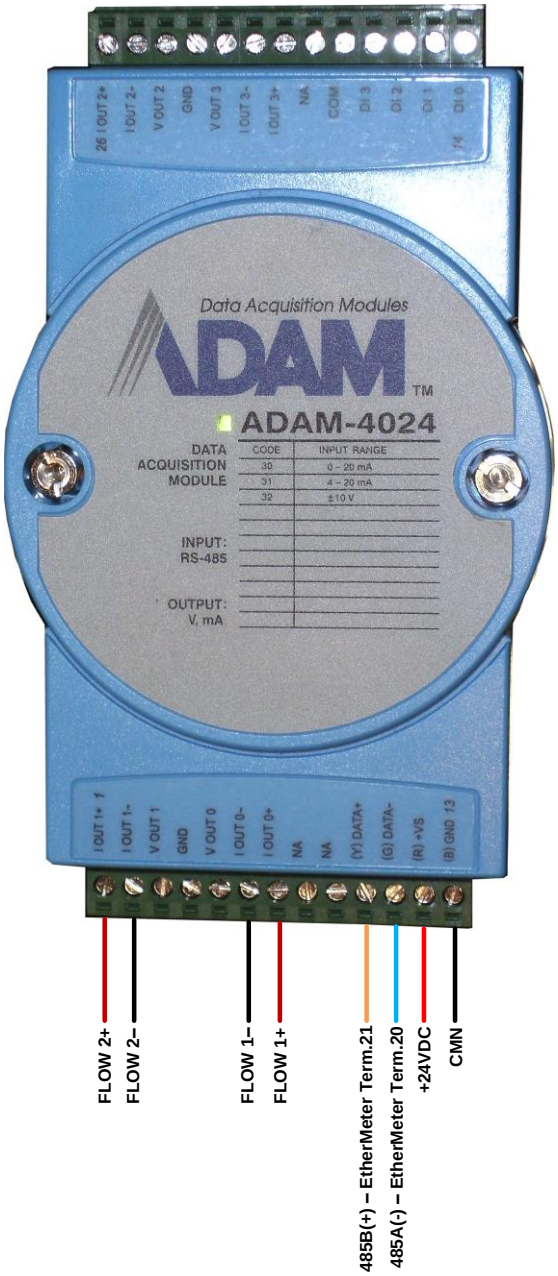

Figure 2. ADAM-4024 Hookup Detail.

ADAM-4024 Configuration:

The Mode Switch on the side of the ADAM-4024 module should be in the **"NORMAL MODE"** position (NOT "INIT MODE"). Otherwise, the ADAM-4024 should be in the factory-default condition (Active Protocol=ADAM, Device ID=1, Baud=9600). No further user setup modifications are necessary.

Switch on side of ADAM-4024 module should be set to **NORMAL MODE**!

Figure 3. ADAM-4024 Configuration.

Setting the EtherMeter DIP Switches:

The EtherMeter's DIP Switches must be set according to the following summary:

DIP SWITCH 1: DOWN (Run-Mode)
DIP SWITCH 2: DOWN (Serial Port=RS-485)
DIP SWITCH 3: UP (RS-485 Term. Resistor ON)
DIP SWITCH 4: UP or DOWN (UP: Display Backlight=ON, DOWN: Display Backlight=OFF)

Setting the EtherMeter DIP Switches:

The EtherMeter's DIP Switches must be set according to the following summary:

v257 EtherMeter…

DIP SWITCH 1: DOWN (Serial Port=RS-485)
DIP SWITCH 2: UP (Serial Port=RS-485)
DIP SWITCH 3: UP (RS-485 Term. Resistor ON)
DIP SWITCH 4: DOWN (Reserved)
DIP SWITCH 5: DOWN (Reserved)
DIP SWITCH 6: DOWN (Reserved)
DIP SWITCH 7: UP or DOWN (UP: Display Backlight=ON, DOWN: Display Backlight=OFF)
DIP SWITCH 8: DOWN (Run-Mode)

v256 EtherMeter and Earlier…

DIP SWITCH 1: DOWN (Run-Mode)
DIP SWITCH 2: DOWN (Serial Port=RS-485)
DIP SWITCH 3: UP (RS-485 Term. Resistor ON)
DIP SWITCH 4: UP or DOWN (UP: Display Backlight=ON, DOWN: Display Backlight=OFF)

Setting the Span(s) Of The 4-20mA Signals:

The combined flow-rate is defined as the summation of the flow-rates derived from the compound flow meter's low-flow and high-flow registers.

When the combined flow-rate is zero (or less than zero), then its corresponding analog signal will equal 4.00mA. However, the user must define the SPAN – the flow-rate that corresponds to 20.00mA.

The factory default flow-rate that corresponds to 20.00mA is 1000 flow units.
(Examples of flow units are: Gallons/Minute, Cubic-Feet/Minute, Liters/Minute, etc.).

The user can modify the SPAN with the following command within the **ETHERMETER SETUP MENU:**

SET CAL M, where M is the 20mA flow-rate.

Examples:

SET CAL 2000 ("20mA Corresponds To 2000 GPM." – or 2000 CFM, if registration units=FT^3)

…or…

SET CAL 3000 ("20mA Corresponds To 3000 GPM." – or 3000 CFM, if registration units=FT^3)