

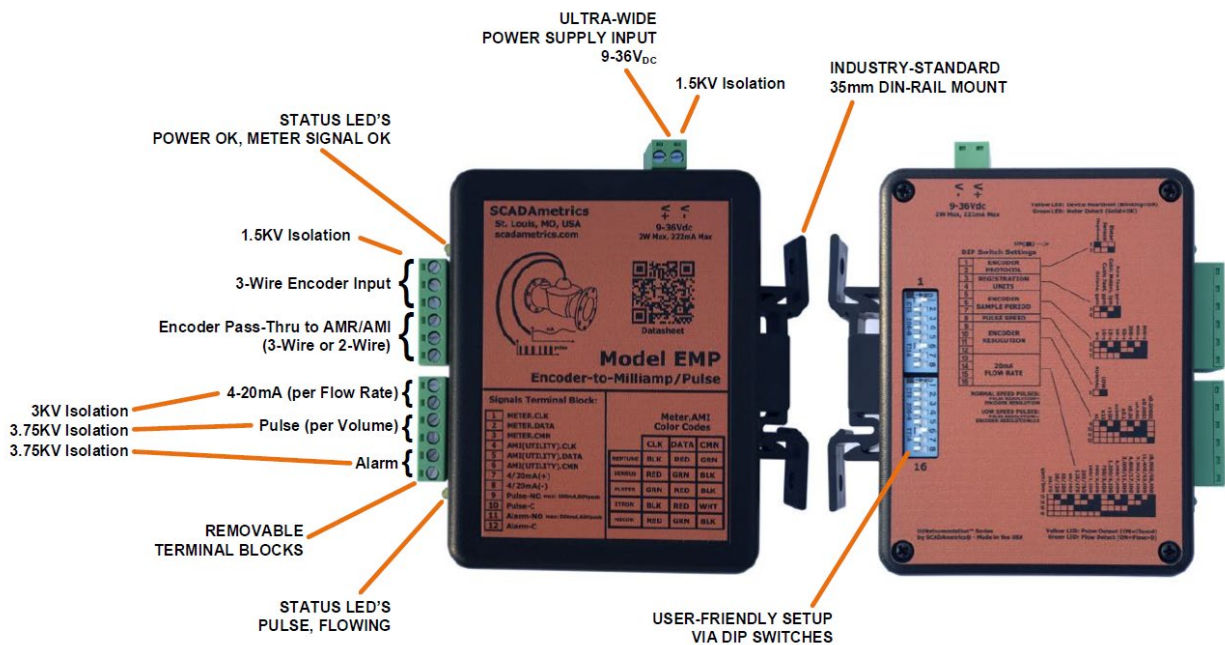


# How to Set Up a SCADAmetrics® Signalizer with the Neptune® C&I MACH 10®

The following document provides information related to the configuration and use of the SCADAmetrics Signalizer™ industrial output module (IOM) with Neptune’s C&I MACH 10 ultrasonic water meter. For further troubleshooting or additional information specific to The Signalizer™ product, contact SCADAmetrics at 636.405.7101, via email at [jim@scadmetrics.com](mailto:jim@scadmetrics.com), or online at [www.scadmetrics.com](http://www.scadmetrics.com).

## The Signalizer IOM Product Overview

The Signalizer from SCADAmetrics is an industrial output module that serves as an interface between water meters and building management systems for the purpose of control and automation. It simultaneously provides a 4-20mA rate-of-flow signal and digital pulse signals based on intercepted encoder signals from the meter.



Module Dimensions (inches): 5 x 4.5 x 1.275

Figure 1

## Quick Start Guide

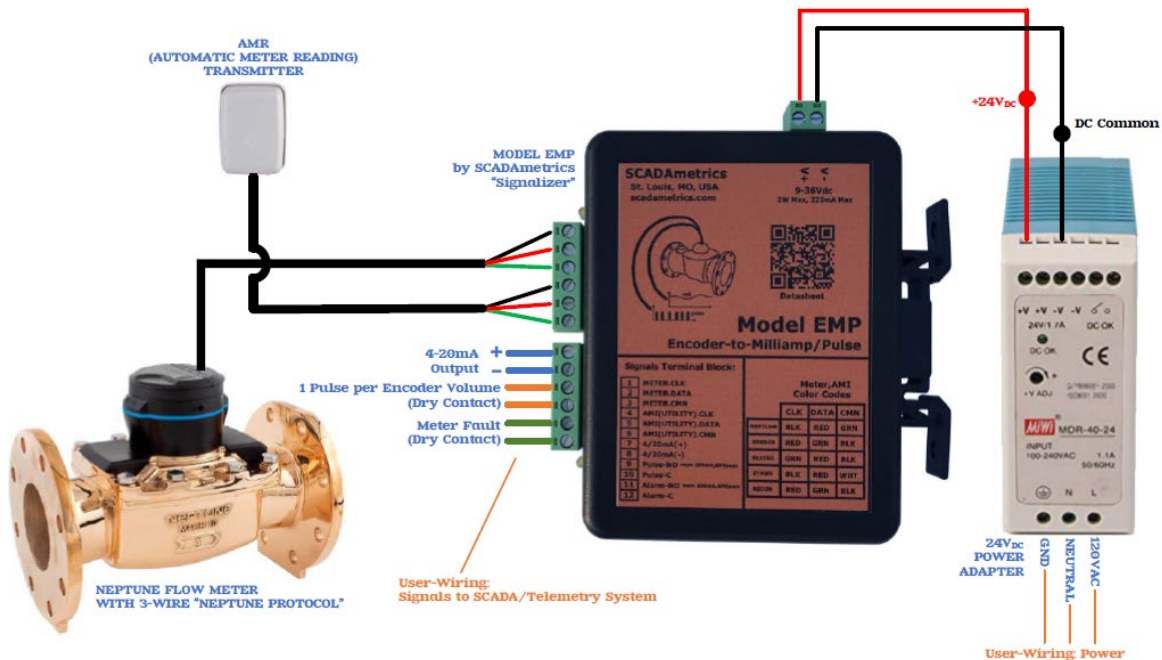


Figure 2

### Initial Set-Up

1. Attach the water meter's three (3) encoder wires to Signalizer terminals 1,2,3.
2. AMR/AMI (if applicable) - Attach the endpoint's three (3) encoder wires to Signalizer terminals 4,5,6.
3. 4-20mA (if applicable) - Connect the output signal to PLC/Controller: Terminals 7(+) and 8(-).
  - a. **Important:** The Signalizer™ provides loop power. The user must not add an additional loop excitation power supply, or else damage to the unit will result.
4. Pulse Output (if applicable) Connect the signal to the PLC/Controller: Terminals 9 and 10.
  - a. **Important:** The pulse output is a solid state, dry-contact type. 500mA max, 60V max. Circuit must be current limited by external means.
5. Alarm (if applicable) Connect the output signal to the PLC/Controller:
  - a. If Signalizer should lose communication with the meter (i.e. cut cable, Signalizer powered off), the alarm contact will close.
  - b. **Important:** The alarm output is a solid state, dry-contact type. 500mA max, 60V max. Circuit must be current limited by external means.
6. Set the DIP Switches per the C&I MACH 10 Recommended DIP Switch Settings on page 5.
7. Connect DC voltage source to the Signalizer's ultra-wide power supply input (V+/V- terminal block). A 24VDC power supply with galvanic isolation is recommended.

## Installation & Connectivity

### Install Location

Install the unit near a power source capable of providing 9-36VDC. When installing the module, please ensure that the total encoder cable length from the MACH 10 meter to the Signalizer, plus the length from the Signalizer to the endpoint does not exceed 500ft. If the total cable length is to be greater than 20ft or if the Signalizer is to be installed in proximity of motors or Variable Frequency Drives (VFD), then shielded/single point grounded extension cable is recommended. If an endpoint is connected to the Signalizer, it is recommended to use as short a length of wire as possible, 6 feet to 10 feet being preferred.

The Signalizer is not a water-proof design, therefore it will need to be installed in a dry location. If a water-proof installation is required, The Signalizer can be installed within a NEMA-6P, IP-68 enclosure (available separately from SCADAmetrics).

### Powering the Device

Connect DC voltage source to the Signalizer's ultra-wide power supply input (V+/V- terminal block; see Figure 2). A 24VDC power supply with galvanic isolation is recommended, but not required. An external AC/DC converter (Model MDR-20-24) is available separately from SCADAmetrics. It operates at 120vAC/24vDC, 20 W.

The Signalizer requires 9-36Vdc/1.5W external power. However, the module's 4-20mA output signal does not require an additional loop excitation DC power supply. The pass-thru function to AMR/AMI does not require DC power and will remain operational in the event DC power is lost or removed from the module.

### Meter Terminal Block Hookup

The following table provides the appropriate Neptune meter connections to the output module.

Terminal	Function	Neptune Color
1	Meter Clock	Black
2	Meter Data	Red
3	Meter Ground	Green

Table 1

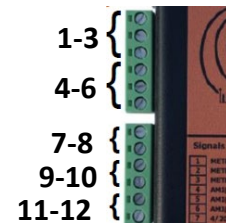


Figure 3

## AMR/AMI Terminal Block Hookup

The following table provides for compatible endpoint connections to the output module.

Terminal	Function	Neptune Endpoint w/Std Cable	Neptune (or other) Endpoint w/Nicor Cable	Neptune (or other) MIU w/Itron Cable	Sensus, Badger, Mueller, Zenner, Master-Meter, Metron-Farnier, RG3, Kamstrup Endpoints	Elster AMCO Endpoint
4	Utility AMI Clock	Black	Red	Black	Red	White   Green
5	Utility AMI Data	Red	Green   White	Red	Green   White	Red
6	Utility AMI Ground	Green	Black	White   Shield	Black	Black

**Table 2**

*\*Alternative color coding: Manufacturers occasionally substitute a WHITE wire for a GREEN wire.*

IMPORTANT: Utility AMI/AMR Terminal Block Hookup (Terminals 4-5-6): Apply color-coding that pertains to the manufacturer of the AMI/AMR endpoint (or manufacturer of the specialty cable, such as Nicor or Itron).

## Signal Terminal Block Hookup

The following table provides connections for respective signal options to destination system.

Terminal	Function	Notes
7*	4-20mA +	Settable Range via DIP
8*	4-20mA -	Switches
9	Pulse +	Solid State Dry Contact (N-O)
10	Pulse -	500mA Max, 60v Max
11	Alarm +	Solid State Dry Contact (N-O)
12	Alarm -	500mA Max, 60v Max

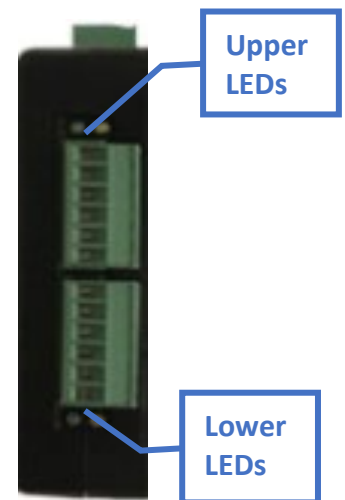
**Table 3**

*\*Important: The Signalizer output module provides loop power, therefore, there is no need to add an additional loop excitation power supply.*

## LED Indicator

After powering the module, the following LED indications may be observed:

- The Upper Yellow 'Heartbeat' LED should light up YELLOW with an OCCASIONAL BLINK, signifying that the Signalizer is working.
- The Upper Green 'Meter OK' LED should light up SOLID GREEN, signifying that the meter has been successfully detected; if the meter is not detected, then the 'Meter OK' LED will emit a fast (10Hz) blink.
- The Lower Yellow LED will follow the Pulse Output (LED ON = Contact Closure).
- The Lower Green LED will light up SOLID GREEN during periods when Positive Flow is Detected.



**Figure 4**

## Neptune C&I MACH 10 Recommended Settings

Neptune registers do not require any special pre-programmed factory settings. The following DIP Switch Settings (Table 4) should be configured for use with the C&I MACH 10 meter (sizes 3-12"). *Note: DIP Switches 9-16 are labeled 1-8 on The Signalizer as well, but positioned as the last 8 switches moving left-to-right.*



Figure 5

### C&I MACH 10 Recommended DIP Switch Settings

		C&I MACH 10					
Setting	DIP	3"	4"	6"	8"	10"	12"
Encoder Protocol	1	ON	ON	ON	ON	ON	ON
	2	OFF	OFF	OFF	OFF	OFF	OFF
Registration Units	3	OFF = Gallons, OFF = Cubic m; ON = Cubic ft, ON = Acre ft					
	4	OFF = Gallons, OFF = Cubic ft; ON = Cubic m, ON = Acre ft					
Encoder Sample Period	5	ON	ON	ON	ON	ON	ON
	6	OFF	OFF	OFF	OFF	OFF	OFF
	7	ON	ON	ON	ON	ON	ON
Pulse Speed	8	OFF = Normal (8th digit), ON = Low (7th digit)					
Encoder Resolution (US Gallons)	9	OFF	OFF	ON	ON	ON	ON
	10	OFF	OFF	OFF	OFF	OFF	OFF
	11	OFF	OFF	OFF	OFF	OFF	OFF
	12	OFF	OFF	OFF	OFF	OFF	OFF
20mA Flow Rate	13	ON	ON	OFF	OFF	OFF	OFF
	14	ON	OFF	ON	ON	OFF	ON
	15	ON	OFF	OFF	OFF	ON	OFF
	16	OFF	ON	ON	ON	ON	OFF

Table 4

### Encoder Protocol

Set DIP Switch (1) to ON and (2) to OFF to operate with Neptune protocol.

### Registration Units

The Signalizer can be set to Gallons, Cubic Meters, Cubic Feet, and Acre Feet. See Table 4 above and set according to preference.

### Encoder Sample Period

The recommended sampling period for The Signalizer and C&I MACH 10 is 300 seconds. The Signalizer's sampling period can be adjusted via DIP Switch (5-7), however it is important to familiarize yourself with how the sample period will affect the battery life expectancy of the C&I MACH 10 (see Sampling Period vs. Battery Life Expectancy section for more detail).

**IMPORTANT:** Using a sample period less than 300s will reduce the C&I MACH 10's expected 10-year battery life and impact the battery warranty.

## Pulse Speed

The Signalizer's pulse speed can be set to accommodate preferred SCADA or BMS system settings. Set DIP switch (8) to OFF for Normal Speed (8<sup>th</sup> digit) and ON for Low Speed (7<sup>th</sup> digit). Each time the respective register digit changes, a pulse is generated.

## Encoder Resolution

The Signalizer can be set to accommodate the appropriate encoder resolution for the respective C&I MACH 10 meter size. The following settings are recommended for an 8-digit resolution on a C&I MACH 10:

### U.S Gallons

- For sizes 3" and 4", set DIP Switches (9-12) all to OFF for a register resolution of (x1).
- For sizes 6" to 12", set DIP Switch (9) to ON and (10-12) to OFF for a register resolution of (x10).

### Cubic Feet

- For sizes 3" and 4", set DIP Switches (11) to ON and (9-10, 12) to OFF for a register resolution of (x0.1) in Cubic Feet.
- For sizes 6" to 12", set DIP Switches (9-12) all to OFF for a register resolution of (x1) in Cubic Feet.

### Cubic Metres

- For sizes 3" and 4", set DIP Switches (9,11) to ON and (10,12) to OFF for a register resolution of (x0.01) in Cubic Metres.
- For sizes 6" to 12", set DIP Switches (11) to ON and (9-10, 12) to OFF for a register resolution of (x0.1) in Cubic Metres.

## 20mA Flow Rate

The Signalizer can be set to match or closely match the maximum operating flow of each size meter. The Signalizer's maximum flow options range from 20 gpm to 18,000 gpm. Refer to the DIP Settings reference at end of this document or on the product label to see maximum flow rate options. See the 20mA Flow Rate Row in Table 4 above to select the option that best suits your application based on the C&I MACH 10's size and respective maximum flow rate.

## Sampling Period vs. Battery Life Expectancy

The C&I MACH 10's expected battery life of 10 years is based on the meter's typical operational parameters as well as providing AMR/AMI readings every 15 minutes.

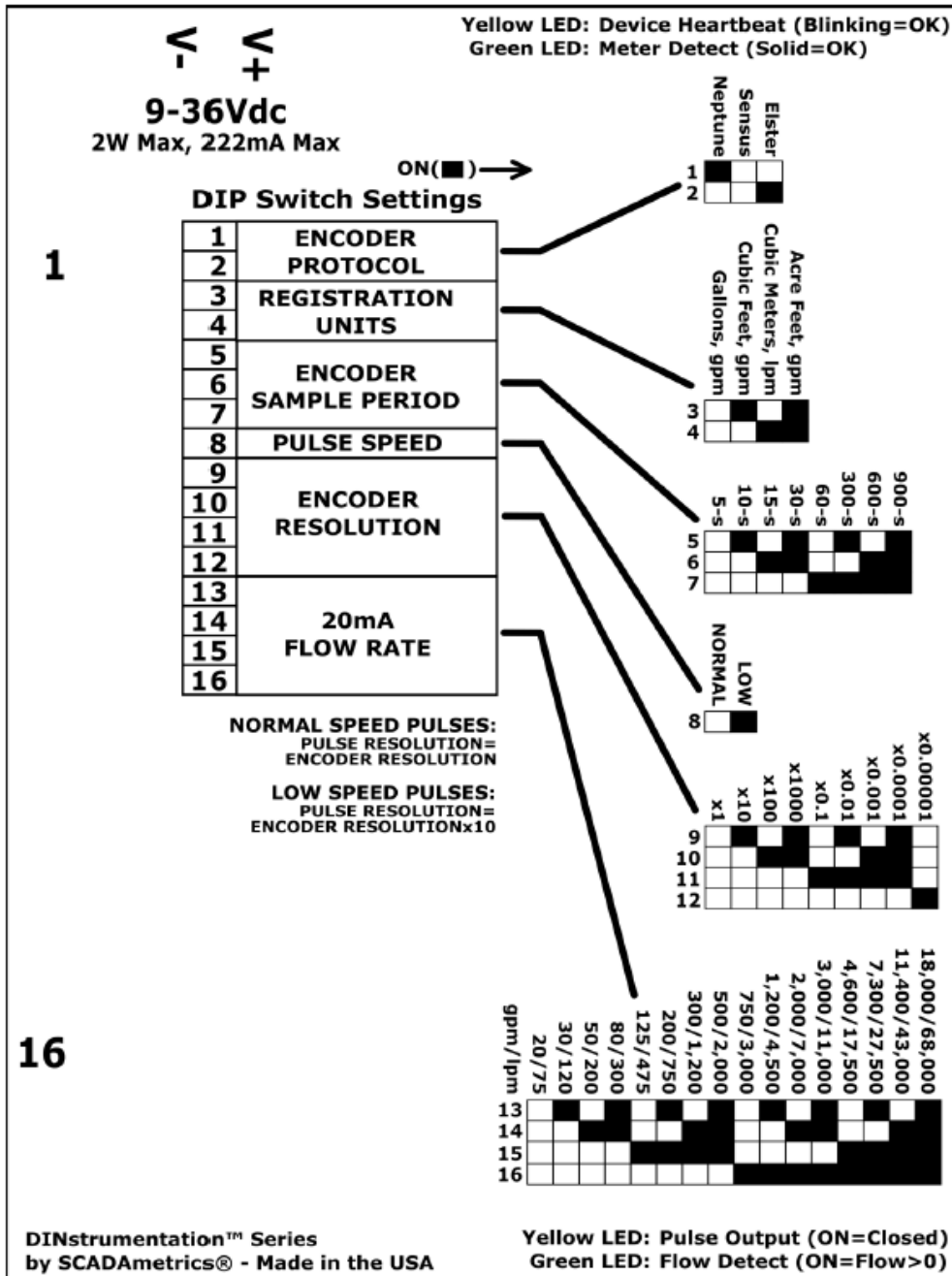
When operating in conjunction with The Signalizer, setting the output module's sampling period at too frequent of a rate can result in a less-than-expected battery life. Therefore it is highly recommended to set the Signalizer sampling period between 300 seconds and 900 seconds when connecting The Signalizer to a C&I MACH 10 meter.

Sampling Period	C&I MACH 10 Estimated Battery Life
5 secs	2 years
10 secs	3 years
15 secs	4 years
30 secs	7 years
60 secs	9 years
300 secs	10 years
600 secs	10 years
900 secs	10 years

Sampling periods below 300 seconds will result in the C&I MACH 10 battery having a life expectancy less than 10 years and will impact the meter's battery warranty. **Note:** Applying power to the Signalizer output module does not provide additional power to the meter or prevent battery degradation.

## DIP Switch Settings Reference

The following DIP Switch settings (Figure 6) can also be found on the module's rear cover. These are general setting options and are not specific to the C&I MACH 10. Refer to Table 4 in the Neptune C&I MACH 10 Recommended Settings section for specific configuration of a C&I MACH 10.



**16**

**NORMAL SPEED PULSES:**  
PULSE RESOLUTION=  
ENCODER RESOLUTION

**LOW SPEED PULSES:**  
PULSE RESOLUTION=  
ENCODER RESOLUTIONx10

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Yellow LED: Pulse Output (ON=Closed)  
Green LED: Flow Detect (ON=Flow>0)

Figure 6