SCADAMETRICS®
APPLICATION NOTE

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Migration from Neptune Tricon/S to the Signalizer™

Prologue

The purpose of this document is to provide assistance to the Control System Integrator who wishes to derive pulse-per-volume signaling from the broad line of electromechanical flow meters manufactured by **Neptune Technology Group** (Tallassee, AL, USA), including the Models **T-10**, **High-Performance Turbine**, **Trident Turbine**, and **Tru-Flo Compound**.

Pulse signaling was previously available through the provision of a **Neptune Tricon/S register** attached to the aforementioned flow meters. However, with the recently-announced discontinuance of the Tricon/S, the use of a SCADAmetrics Model EMP Signalizer™ provides a migration path to achieve equivalent functionality.

Legacy Tricon/S Solution…

In certain industrial water meter applications, a pulse-per-volume output is required to provide signaling to a connected batching or telemetry system.

When using a member of the electro-mechanical flow meter family from Neptune Technology Group, the traditional solution was to outfit the meter with Neptune's **Tricon/S register**.

The Tricon/S provided a visual index, plus a mechanical pulse output whose dry-contact would close and open per each specific volume of water passing through the meter. (Example: 1 pulse per 100 gallon). The dry-contact wire pair would generally be connected as the input to a batch controller, RTU, or PLC.

In my previous work as a control system integration engineer, I had utilized the Tricon/S in a number of pumping station applications to collect totalization and flow-rate data from **Neptune High-Performance Turbine flow meters**.

Neptune T-10 Water Meter with Tricon/S Register.

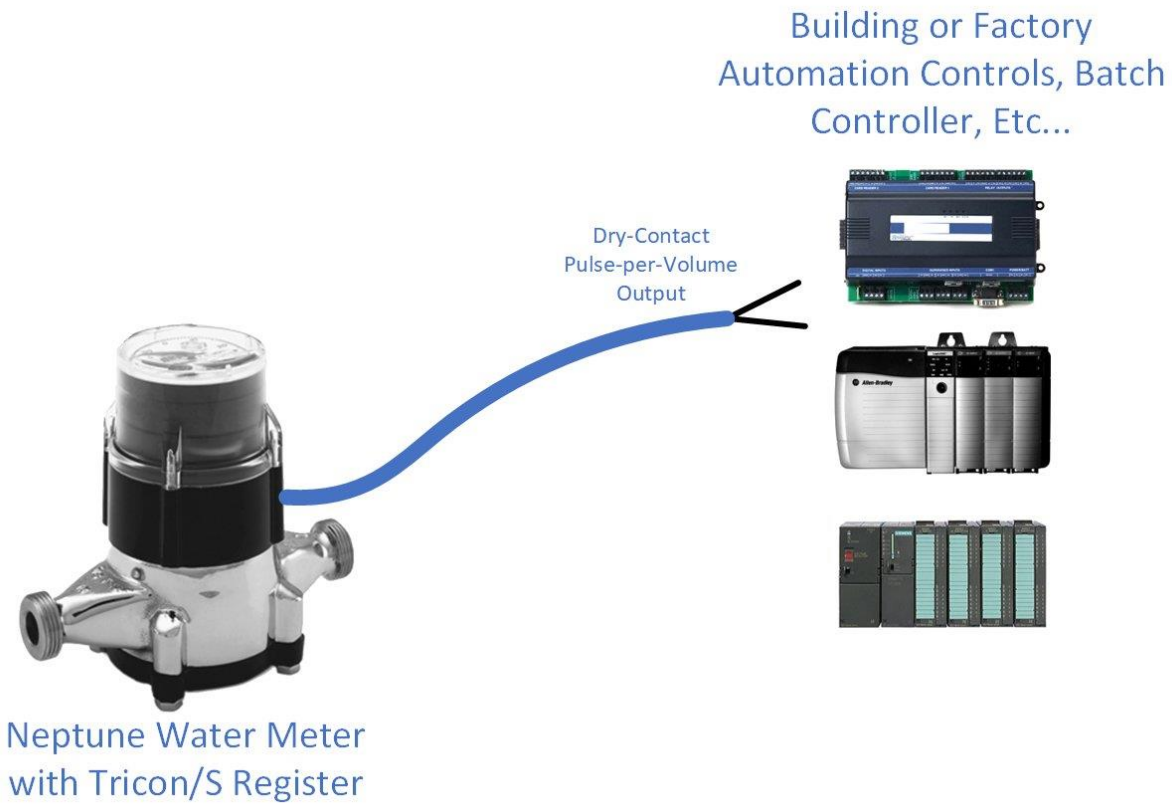
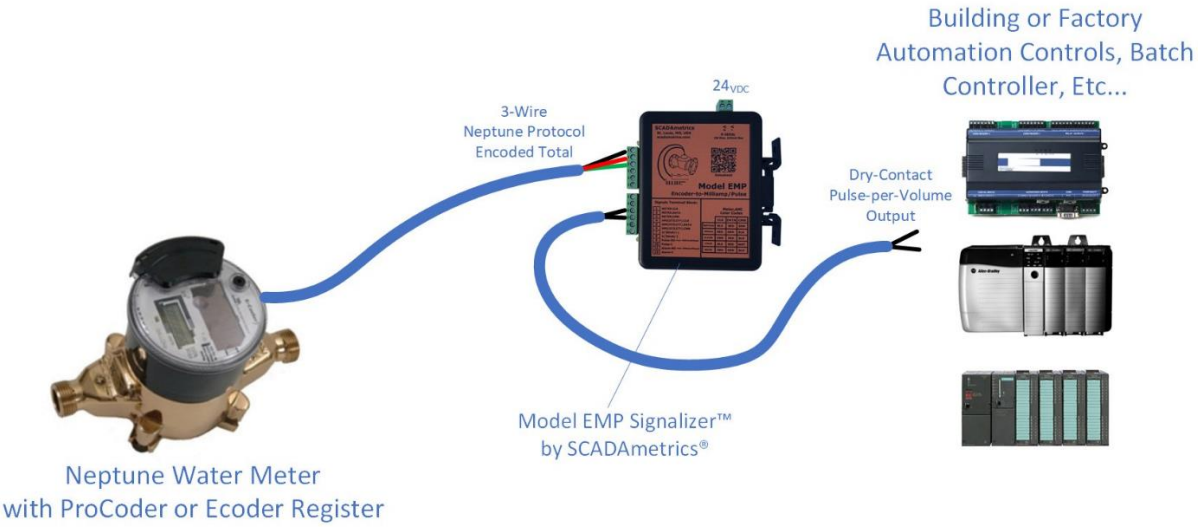


Illustration of Tricon/S Application.

SCADAmetrics Signalizer Solution…

Today, with the recently announced sunsetting of the Tricon/S register, SCADAmetrics is pleased to offer an instrument that has been successfully applied to Neptune's flow meters to achieve compatible results: the **Model EMP Signalizer™.**



Neptune Water Meter with Signalizer.

The Signalizer leverages the high-resolution, 3-wire encoder signal that is available from Neptune's **ProCoder** or **E-Coder** register to generate three (3) telemetry output signals that may be connected to the Automation System:

1. Dry-Contact Pulse (per volume)
2. 4-20 Milliamp Analog (per flow-rate)
3. Alarm Dry-Contact (cut cable/meter fault)

The "normal-speed" weight (upper number) and "low-speed" weight (lower number) of the Signalizer's dry-contact pulse output is based on meter diameter, as follows:

Neptune Meter Diameter	Gallon	FT^3	M^3
5/8″	1 pulse / 0.1 gallon 1 pulse / 1 gallon	1 pulse / 0.01 ft^3 1 pulse / 0.1 ft^3	1 pulse / 0.001 m^3 1 pulse / 0.01 m^3
3/4″	1 pulse / 0.1 gallon 1 pulse / 1 gallon	1 pulse / 0.01 ft^3 1 pulse / 0.1 ft^3	1 pulse / 0.001 m^3 1 pulse / 0.01 m^3
1″	1 pulse / 0.1 gallon 1 pulse / 1 gallon	1 pulse / 0.01 ft^3 1 pulse / 0.1 ft^3	1 pulse / 0.001 m^3 1 pulse / 0.01 m^3
1.5″	1 pulse / 1 gallon 1 pulse / 10 gallon	1 pulse / 0.1 ft^3 1 pulse / 1 ft^3	1 pulse / 0.01 m^3 1 pulse / 0.1 m^3
2″	1 pulse / 1 gallon 1 pulse / 10 gallon	1 pulse / 0.1 ft^3 1 pulse / 1 ft^3	1 pulse / 0.01 m^3 1 pulse / 0.1 m^3
3″	1 pulse / 1 gallon 1 pulse / 10 gallon	1 pulse / 0.1 ft^3 1 pulse / 1 ft^3	1 pulse / 0.01 m^3 1 pulse / 0.1 m^3
4″	1 pulse / 1 gallon 1 pulse / 10 gallon	1 pulse / 0.1 ft^3 1 pulse / 1 ft^3	1 pulse / 0.01 m^3 1 pulse / 0.1 m^3
6″-12″	1 pulse / 10 gallons 1 pulse / 100 gallons	1 pulse / 1 ft^3 1 pulse / 10 ft^3	1 pulse / 0.1 m^3 1 pulse / 1 m^3
16″ , 20″	1 pulse / 100 gallons 1 pulse / 1000 gallons	1 pulse / 10 ft^3 1 pulse / 100 ft^3	1 pulse / 1 m^3 1 pulse / 10 m^3

Normal-Speed and Low-Speed Pulse Output from Signalizer.

As illustrated in the table above, the Signalizer is capable of providing finer pulse weights than the Tricon/S solution. However, most telemetry and batch controllers are capable of deftly handling most provided pulse weights. In those rare cases where the controller lacks such flexibility, the Signalizer can actually provide two (2) additional, coarser pulse weight options.

By design, the Signalizer reads the ProCoder and E-Coder registers in high-resolution (Neptune) reading mode. However, by switching (via dip switch) the Signalizer into low-resolution (Sensus) reading mode, the additional two (2) coarser pulse weight options are thereby provided, as enumerated in the table below:

Neptune Meter Diameter	Gallon	FT^3	M^3
5/8″	1 pulse / 10 gallon 1 pulse / 100 gallon	1 pulse / 1 ft^3 1 pulse / 10 ft^3	1 pulse / 0.1 m^3 1 pulse / 1 m^3
3/4″	1 pulse / 10 gallon 1 pulse / 100 gallon	1 pulse / 1 ft^3 1 pulse / 10 ft^3	1 pulse / 0.1 m^3 1 pulse / 1 m^3
1″	1 pulse / 10 gallon 1 pulse / 100 gallon	1 pulse / 1 ft^3 1 pulse / 10 ft^3	1 pulse / 0.1 m^3 1 pulse / 1 m
1.5″	1 pulse / 100 gallon 1 pulse / 1,000 gallon	1 pulse / 10 ft^3 1 pulse / 100 ft^3	1 pulse / 1 m^3 1 pulse / 10 m
2″	1 pulse / 100 gallon 1 pulse / 1,000 gallon	1 pulse / 10 ft^3 1 pulse / 100 ft^3	1 pulse / 1 m^3 1 pulse / 10 m^3
3″	1 pulse / 100 gallon 1 pulse / 1,000 gallon	1 pulse / 10 ft^3 1 pulse / 100 ft^3	1 pulse / 1 m^3 1 pulse / 10 m^3
4″	1 pulse / 100 gallon 1 pulse / 1,000 gallon	1 pulse / 10 ft^3 1 pulse / 100 ft^3	1 pulse / 1 m^3 1 pulse / 10 m^3
6″-12″	1 pulse / 1,000 gallons 1 pulse / 10,000 gallons	1 pulse / 100 ft^3 1 pulse / 1,000 ft^3	1 pulse / 10 m 1 pulse / 100 m
16″ , 20″	1 pulse / 10,000 gallons 1 pulse / 100,000 gallons	1 pulse / 1,000 ft^3 1 pulse / 10,000 ft^3	1 pulse / 100 m^3 1 pulse / 1,000 m^3

Extra-Low-Speed Pulse Output from Signalizer

The encoder signal cable from the water meter can be extended up to 100 feet (and possibly more if shielded/grounded cable is used). Therefore, in most instances, the Signalizer should be installed within the control panel in proximity to the equipment that is to receive the pulse signal. The Signalizer requires an external DC voltage power source (9-36V_{DC}, 1.5W); and it can often be powered by the same supply as the control instrumentation.

How does the Signalizer solution differ from the Tricon/S?...

First, the user should thoroughly study the specifications of the Signalizer for comparison against the specifications of the Tricon/S.

As one comparison example, the dry-contact of the Tricon/S is ***mechanical***, whereas the dry-contact of the Signalizer is ***solid-state***. Solid-state relays do not exhibit "bounce" behavior, and thus do not need to be **de-bounced**.

The maximum switch voltage of the Tricon/S is 200V, whereas the maximum switch voltage of the Signalizer is 60V. Therefore, if a >60V switch is required, then an intermediary relay should be installed. Both the Tricon/S and Signalizer switches are rated for 0.5 amps.

The Tricon/S does not require external voltage, whereas the Signalizer does require a DC power supply. However, in almost all applications, the connected telemetry or batch controller will require DC power, and the Signalizer may often be powered using the same supply.

The Signalizer also provides additional benefits to the user that previously were not available. For example, the Signalizer also provides a user-scalable 4-20 milliamp flow output signal plus a cut-cable/meter-fault alarm.

Furthermore, the Signalizer utilizes the 3-wire encoder signal from a ProCoder or E-Coder register, but it still makes the encoder signal available to other devices via its pass-through port. Therefore, several interesting additions are made possible:

Co-connection to an AMI/AMR System (requires an external AMI/AMR endpoint).
Connection to a remote water meter display, such as the **SCADAmetrics Model TMD TheMeterDisplay™.**
Connection to both an AMI/AMR System and a remote display.

Setting Up a New Application…

When planning a new Neptune electro-mechanical water meter pulse monitoring project, the following should be on your purchase list:

1. Neptune Flow Meter (**T-10**, **HP Turbine**, Trident Turbine, or **Tru-Flo Compound**)
2. Neptune Register Selection: **ProCoder** or **E-CODER** (but NOT the R900i, integrated radio version)
3. SCADAmetrics **Model EMP Signalizer**
4. Optional: SCADAmetrics **DC Power Adapter** (not necessary if control panel already has compatible DC power)
5. Optional: Neptune **R900** or **R450** endpoint
6. Optional: SCADAmetrics **Model TMD Remote Display** (if remote visual display is desired)

Setting Up a Retrofit Application…

If you already have a Neptune flow meter that is equipped with a Tricon/S register, and you would like to replace it with the Signalizer-based solution, then the following should be on your purchase list:

1. Neptune Replacement Register: **ProCoder** or **E-CODER** (but NOT the R900i, integrated radio version)
2. SCADAmetrics **Model EMP Signalizer**
3. Optional: SCADAmetrics **DC Power Adapter** (not necessary if control panel already has compatible DC power)
4. Optional: Neptune **R900** or **R450** endpoint
5. Optional: SCADAmetrics **Model TMD Remote Display** (if remote visual display is desired)

Visual Batch and Flow Monitoring Accessory…

If an additional industrial flow monitor is need, SCADAmetrics is pleased to offer our new **Model APK.PLUS "Analog/Pulse Kit-Plus"**. With some similarity to the recently-sunsetted Neptune SmartTrol instrument, the APK.PLUS enhances the Signalizer with value-added features:

1. A Visual Master Totalizer (totalizes from the Signalizer pulse – user resettable).
2. A Visual "Day" or "Batch" Totalizer (totalizes from the Signalizer pulse – user resettable)
3. An additional 4-20 milliamp output (user-scalable).
4. An additional dry-contact pulse-output (mirrors the Signalizer pulse)
5. A dry-contact flow-switch output (closes whenever flow > 0 gpm/lpm)

Although the APK.PLUS does not offer a relay-driven batch control feature, this functionality can generally be achieved using most modern PLC's or dedicated-purpose, third-party batch controllers.

Want to Learn More?…

Are you interested in learning more about how the Signalizer, when paired with a Neptune flow meter, can provide a Tricon/S-style, dry-contact pulse output? …and more? Give us a call!… We'll be glad to discuss the details!

About **Jim 'Slim' Mimlitz, P.E.** …

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Specialties: Connecting Flow Meters with SCADA, Telemetry, and Building Automation Systems. Electronic Circuit Design, Software Development.

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