

Application Note 020
Version 002
12 Jan 2015

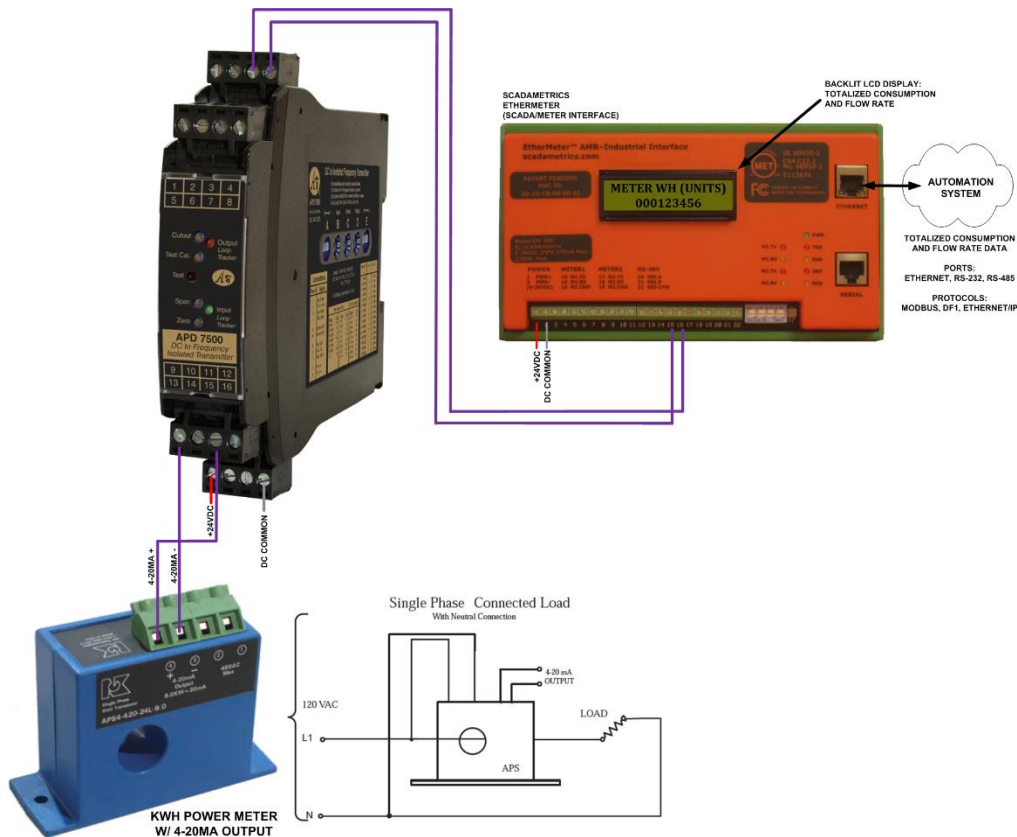
Totalizing a 4-20mA Flow Meter Signal Using the EtherMeter® and the APD-7500-SS-D.

When totalizing the total accumulated flow through a non-absolute-encoder flow meter, it is preferable to interface with a pulse-per-volume signal (eg. 1 pulse per gallon). However, certain flow meters only offer a 4-20mA signal that is proportional to rate-of-flow. Examples include certain WH Power Meters, Parshall Flume-Type Wastewater Flow Meters, Differential-Pressure Flow Meters, and many others. While it is certainly possible to program a computer or PLC to perform a running time integral of the rate-of-flow signal, this technique is difficult, time-consuming, and fraught with pitfalls.

A straightforward and elegant hardware-based solution is to convert the 4-20mA signal to a pulse, and utilize the EtherMeter's sophisticated pulse-processing capabilities to provide both totalization and rate-of-flow.

The Milliamp-to-Pulse Converter used in this Application Note is the APD-7500-SS-D, which is manufactured by Absolute Process Instruments (Libertyville, IL). This instrument is very flexible in that it accepts not only a 4-20mA signal, but also a variety of other analog signal inputs. The pulse output signal is also configurable, with ranges from 0-1 Hz up to 0-15 Hz. The setup of the APD-7500-SS-D is through a bank of dip and rotary switches.

In the following example, we will consider a WH power meter with a 4-20mA output signal. The 4 mA signal corresponds to 0 W, and the 20 mA signal corresponds to 2000 W. We wish to provide the total energy (Watt-Hours) as well as instantaneous power (Watt) information.



The APD-7500-SS-D was configured with the following DIP and ROTARY switch settings:

- A: I (Current Input)
- B: 5 (4-20mA)
- C: 9 (4-20mA)
- D: 5 (5 Hz = 20mA)
- E: L (Low Frequency Range, 1-15 Hz)



The 4-20mA(+) signal is connected to APD Terminal.11
 The 4-20mA(-) signal is connected to APD Terminal.9

The +24VDC Power is connected to APD Terminal.13
 The DC Common is connected to APD Terminal.16

The Pulse(+) signal is APD Terminal.4; and it is connected to EtherMeter Terminal.15
 The Pulse(-) signal is APD Terminal.3; and it is connected to EtherMeter Terminal.16

The EtherMeter requires pulse scale settings that match the output of the APD-7500-SS-D:

Since 2000 W corresponds to 5 Hz, 2000 WH corresponds to 5 pulses/sec x 3600 sec/hr = 18,000.
 So 18,000 pulses = 2000 WH, or 9 pulses = 1 WH.

```
SET UNIT1 UNITS (Generic "UNITS", since the EtherMeter does not display WH.)
SET TB1 HR
SET SAMP1 20
SET PWR1 0
SET PS1 1
SET PD1 9 (9 PULSES PER WH)
SET DESCR1 WH
```

The EtherMeter will then provide the readings via the Ethernet and/or Serial Ports (eg Modbus or EtherNet/IP). The TOTAL is provided in Watt-Hours (WH), and the instantaneous RATE in Watts (W). Both readings are also displayed on the LCD.

EtherMeter Setup Screens (Telnet):

```
Telnet 192.168.1.172
1/8-Meters                                     <TAB>=Next Pg
-----
FW: 3.140731.1200

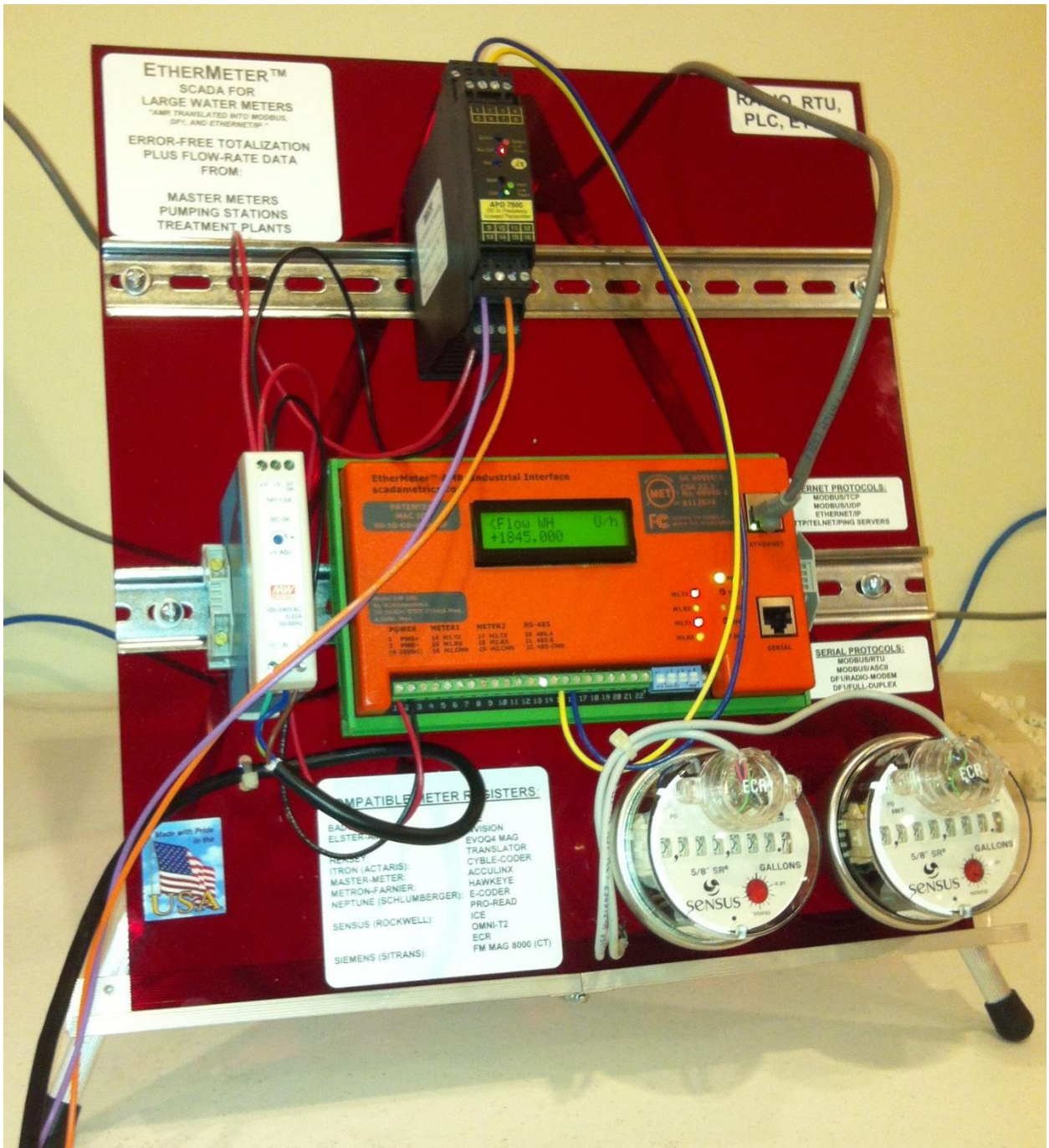
Meter1:                                         Meter2:
-----                                         -----
Unit1:          UNITS                          Unit2:          UNITS
Tb1:            HR                             Tb2:            HR
Exp1:           +0                             Exp2:           +0
Roll1:          +0                             Roll2:          +0
Fcalc1:         DTIME                          Fcalc2:         DTIME
Samp1:          20                             Samp2:          20
To1:            300                            To2:            300
Pwr1:           0                              Pwr2:           0

Db1:            0                              Db2:            0
PS1:            1                              PS2:            1
PD1:            9                              PD2:            9
Cnt1:           000021727                      Cnt2:           000000000

CMD>
```

```
Telnet 192.168.1.172
Pg 5/8-Interface                               <TAB>=Next Pg
-----
LCD Screens:                                   Meter Descriptions:
-----                                   -----
LCD01          ON          Meter1          DESCR1:  WH
LCD02          OFF         Meter2          DESCR2:  2
LCD03          ON          Flow1          BANNER:
LCD04          OFF         Flow2
LCD05          OFF         Vcc
LCD06          OFF         AIN1
LCD07          OFF         AIN2
LCD08          OFF         Aux1
LCD09          OFF         Aux2
LCD10          OFF         Aux3
LCD11          OFF         Uptime
LCD12          OFF         Protocol
LCD13          OFF         Addr
LCD14          OFF         Vers
LCD15          AUTO        Banner

CMD>
```



The APD-7500-SS-D Combined with the EtherMeter: The EtherMeter Reports Pulse Totalization and Pulse-Rate via Modbus and/or Rockwell Automation Protocols.