NWEMS

Totalization

Aug 22nd, 2017 | NW Meter School | Track D | Will Elliott, Aclara Technologies

Why Totalize?

- Multiple feeders into a facility
- Combines energy summations per interval
- Combines demand calculations per interval

No Totalization

Interval	Feeder 1 (kWh)	Feeder 2 (kWh)	Feeder 3 (kWh)
0:15	70	40	60
0:30	80	30	80
0:45	60	40	70
1:00	90	20	50
1:15	70	50	30
1:30	60	30	70

Peak kW Demand	(kWh / 0.25h)			
	360	**+ 200**	**+ 320**	**= 880**

Simply billing per the sum of the feeder peak demands at various times does not represent the true thermal impact of a combined load, arguably unfair.

Totalized Demand

Interval	Feeder 1 (kWh)	Feeder 2 (kWh)	Feeder 3 (kWh)	Totalized (kWh)
0:15	70	40	60	170
0:30	80	30	80	190
0:45	60	40	70	170
1:00	90	20	50	160
1:15	70	50	30	150
1:30	60	30	70	160

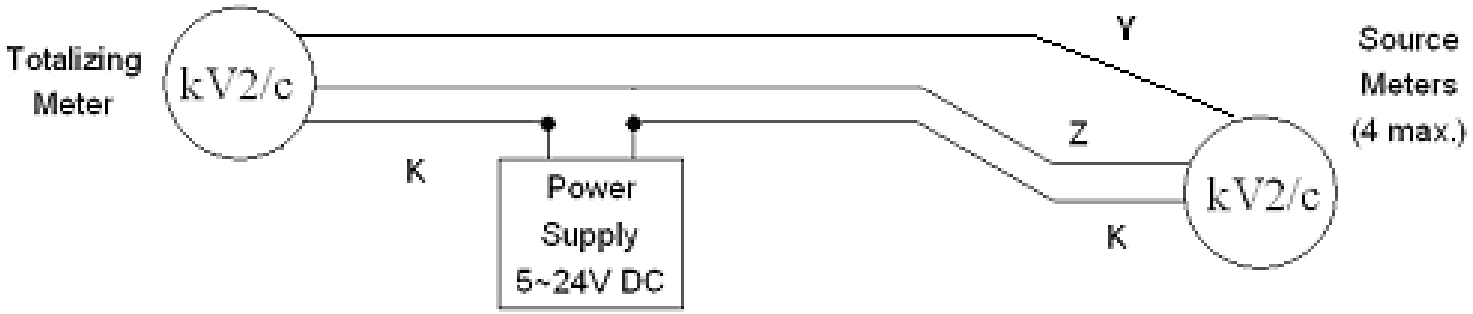
Peak kW	(kWh / 0.25h)
Demand	**760**

The totalized feeder peak demand represents the true thermal impact of the combined load, and serves as a fair metric for billing.

Totalizing with Hardware

Totalized meter feed #2

Source Meter feed #1



Z Soft Switch

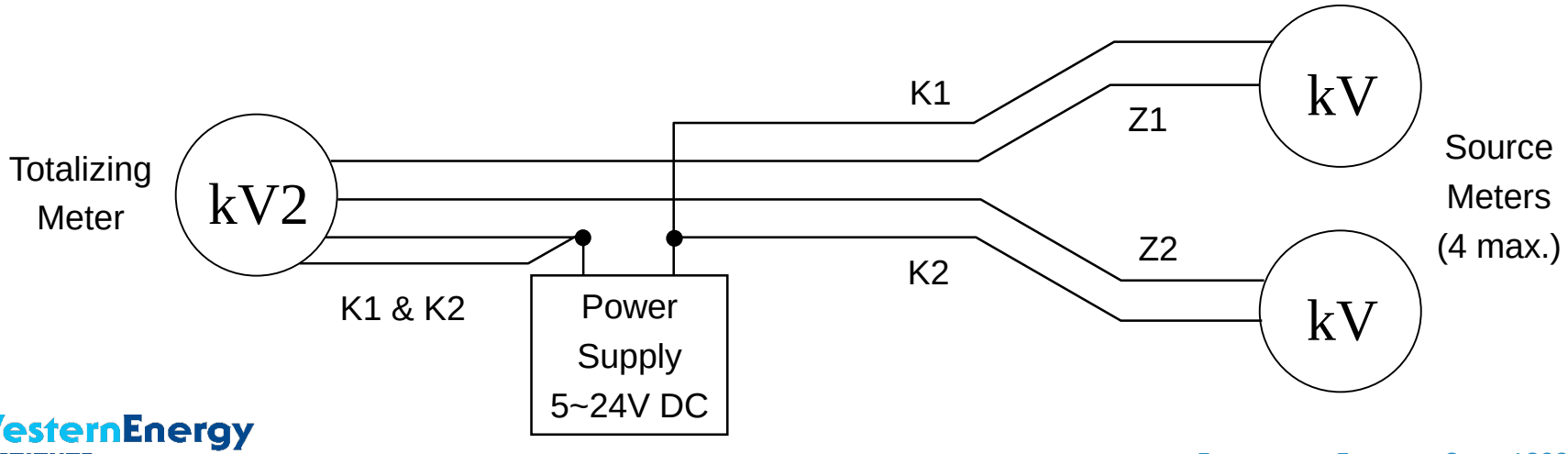
- **Totalization and External Pulse Input Scaling**
  - Enables combining data from up to 5 meters
    - 4 external meter inputs plus the kV2c metered data
    - External inputs require use of the Multiple I/O option board
  - Up to 8 data combinations allowed -- “totalization maps”
    - Add or subtract inputs with the same engineering units
    - May use one totalization channel as input to a second totalization channel
  - Enables data scaling of external pulse inputs
    - External inputs may be recorded and displayed as unscaled raw pulse counts without the Z soft switch installed

Multiple I/O Option Board

- **Expanded Functionality**
  - 2 Three-Wire Outputs
  - 6 Two-Wire Outputs
  - **4 Pulse Inputs (Three-Wire or Two-Wire)**
  - 1 RTP Input
- **All outputs configurable for:**
  - Pulse Initiator functions
  - Alerts, Diagnostics, & Cautions
  - Load Control Operation
- **Solid State relays**
  - Max. ratings: 120 V_{AC}, 0.1 A_{AC}; 170 V_{DC}, 0.1 A_{DC}
- **RTP and pulse inputs require 5~24 V_{DC}, 8 mA_{DC} minimum**
- **Not compatible with the kV meter**

Wiring the external inputs

- An external DC power supply must be connected in series with the “K” lines between between the kV2c inputs and the pulse initiator outputs
- If only two-wire inputs are used, use the kV2c “K” and “Z” input leads
- Shield signal lines and surge protect the power supply as needed
- The kV2c inputs must see 5 V_{DC} minimum to be recognized
- Maximum input pulse rate = 30 pulses/second
- Minimum input pulse duration = 33 milliseconds/pulse
  - Inputs are sampled 60 times per second
- Every input state change is counted as a pulse



Minimum Output Pulse Value

- Pulse Value given as Wh / pulse
- Small enough for high resolution, great enough to not overdrive output relays.
- Phase Volt x 3 x Max Amp x PF / (max pulse per sec) / 3600

  OR

- Line Volt x $\sqrt{3}$ x Max Amp x PF / (max pulse per sec) / 3600
- Meter-specific divisors may need to be applied in order to avoid truncation errors.

Input Pulse Scaling

Multiply and Divide:

- Multiply the source meter output pulse value by the TF of the source meter, which produces the primary output pulse value.
- Divide this number by the TF of the totalizing meter.
- Enter the result as the scaled input pulse value.

Example:

- A source meter is programmed for a pulse output of 0.15 wh/pulse with a CTR=600:5, TF=120.
- The totalizing meter has a CTR=400:5, TF=80.
- Determine the scaled input pulse value to correctly totalize the pulse input from the source meter with the measured energy of the totalizing meter.

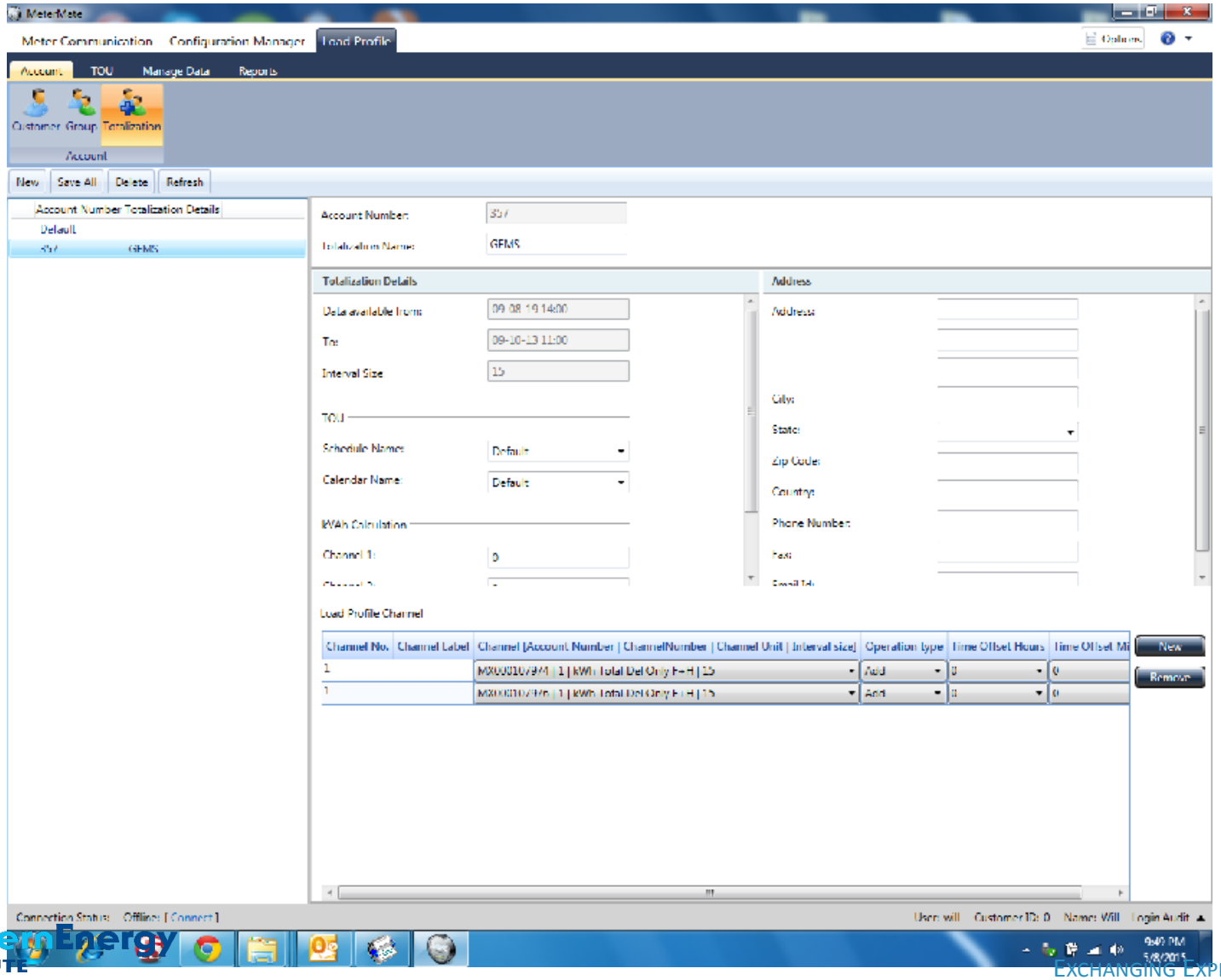
Solution:

- 0.15 wh/pulse * 120 = 18 wh/pulse
- 18 wh/pulse / 80 = 0.225 wh/pulse

Other Programming Considerations

- Combine inputs of the same units (Wh + Wh, VArh + VArh, etc.)
- Make sure the measurement Profile contains at least one Totalization entry and one External Pulse Input (scaled)
- Make sure the Totalization option is enabled for the MeterMate Program file
- Define the I/O and Alerts support table first
- Define the Totalization support table second
- Before programming the kV2c meter, make sure the Z soft switch is enabled and the Multiple I/O option board is installed
- If you wish to record the pulse inputs and/or totalized result, make sure either the R or X soft switch is enabled and the Recorder support table is configured appropriately

Totalizing with Software



MeterMate Load Profile - Overview

- **Version 2.00 provides data translation software for kV/kV2c Meters**
- **Allows creation and maintenance of:**
  - Customer Accounts: for individual meters
  - Group Accounts: to simplify data processing
  - Totalization Accounts: to combine data from multiple meters, or separate out selected channels from a Customer Account
- **Maintains a database of recorded data for each Customer Account**
  - Number of days of active data is specified in the Customer Account
  - As new data is added to the MMLP database, old data is deleted
- **Provides for data scaling to Primary values**
  - Multiplies data by user defined CT and VT ratios

MeterMate Load Profile - Overview

- **Enables editing of interval data**
  - Correct erroneous data
  - Fill in missing data
  - Delete a specified range of data
- **Enables reporting of:**
  - Interval Data: Numerically or Graphically
  - Summary Data: Totals and Peak Demands
    - TOU analysis also available - for both energy & demand
  - Coincident Demands
  - Status Summary
  - “Not Read” status
  - Error Log
  - Account Maintenance
- **Load Profile data may be exported to a “.prn” (text) file for processing in a spreadsheet program or billing system.**