



PRIMMER PIPER
EGGLESTON &
CRAMER PC

30 Main Street, Suite 500 | P.O. Box 1489 | Burlington, VT 05402-1489

MEMORANDUM

DATE: May 22, 2025
TO: Department of Public Service
FROM: Eli Emerson
RE: Town of Hardwick Electric Department Net Metering Calculation

The Department of Public Service (the “Department”) requested the Town of Hardwick Electric Department (“HED”) provide a written explanation as to how it performs the calculation of net metering credits for net metering systems that are located behind a customer’s billing meter (i.e., not directly interconnected to HED’s distribution system) and are not group net metering systems. This Memorandum provides that explanation. Moreover, HED believes that its method is consistent with the net metering statute and regulations. The Department also requested that HED provide a description of the metering set-up for the customer that filed the complaint and what the channels on the meters represent. This Memorandum first addresses the description of the meters.

Meter Description

Meter [REDACTED] is the production meter (R3). The customer’s solar array kwh goes through the inverter to convert from DC to AC power and some kwh is lost during this conversion. Channel 1 on the meter captures this kwh daily and HED gets the reading for billing once per month.

Meter [REDACTED] is the billing meter. Channel R1 is kwh delivered to the customer from HED’s distribution system (import channel). Channel R2 is the excess generation received back onto HED’s distribution system (export channel). This information is collected by the meter daily and HED gets the reading for billing once per month. This meter is set up as time of use (TOU) meter and is configured to net the production and consumption instantly.

The way the solar electrician has configured the wiring is in accordance with HED tariffs and specification sheets, which are in alignment with Vermont Utility Standards. When a customer has solar behind the billing meter, the kwh produced (R3 production meter) flows through to the house and the customer uses what is needed at the time of use; what is not needed then flows through channel R2 and back onto HED’s distribution system. When the customer needs

additional kwh above what the array is producing or while it is not producing, it flows through channel R1 directly from HED's distribution system.

With the once-a-month readings, HED monetizes according to its net metering tariff as the kwh was already netted at the meter during the month. Please see the attachment for the meter specifications.

Legal Standards

Rule 5.103

“Billing Meter” means an electric meter that measures either the consumption of electricity by a customer or the net of electric consumption by the customer and production by the net metering system.

“Excess Generation” means the following: for customers who elect to wire net-metering systems such that they offset consumption on the billing meter, excess generation is the number of kWh by which production exceeds consumption.¹

5.126(A)(2)

Individual Net-Metering System Billing: For customers who elect to wire net-metering systems such that they offset consumption on the billing meter, the billing meter establishes billing determinants for the customer's bill based on the rate schedule for the customer.

(a) At the end of the billing period, the electric company must net electricity produced with electricity consumed.²

(i) If electricity consumed by the customer exceeds the electricity produced by the net-metering system, the customer must be billed the difference, net of any credit accumulated in the preceding 12 months. Credits may not be applied to non-bypassable charges as identified in a utility's tariff.

(ii) If the electricity produced by the net-metering system exceeds the electricity consumed, the excess generation must be monetized at the applicable blended residential rate. The monetized credit applies to all charges on the bill not identified as non-bypassable charges in a utility's tariff.

¹ No definition for “production” or “consumption” or to which meter/channel those terms are related.

² Rule does not indicate in what unit the netting should happen at the end of the month (i.e., kilowatt/hours v. dollars).

Explanation of HED Practice

An important fact of this discussion is that HED uses bi-directional meters. Rule 5.100 does not easily account for bi-directional meters. As mentioned in Docket 21-1816, Order of 2/23/22 at 5, the rules were predicated on a mechanical meter.³

As Rule 5.126(A)(2) dictates, the billing meter establishes billing determinants for the customer's bill based on the rate schedule for the customer. As noted above, HED uses bi-directional meters. HED has two channels on its billing meter – an import (consumption) channel and an export (production⁴) channel. Based on the design of the meter, the import and export are netted immediately (or instantaneously). As there is an instantaneous netting of the consumption and production, the applicable rate can then be assigned to that result. In that moment, either there is net consumption (and the applicable billing rate is applied) or there is excess generation (and the blended rate is applied). At the end of the billing period, there are usually two values – net consumption and excess generation as expressed in dollars. Those values can be applied to the customer's bill at the end of the billing period. Thus, HED's method is consistent with Rule 5.126(A)(2)(a)(i) because it is billing the net consumption at the customer's billing rate. It is also consistent with Rule 5.126(A)(2)(a)(ii) because the excess generation is being monetized at the blended rate.

At the end of the billing period, HED nets the difference between consumption and production as expressed in dollars (as opposed to kilowatts/hours). This is consistent with Rule 5.126(A)(2)(a) because that subsection does not express in what form the netting must occur. HED's practice is to perform the netting in dollars as that is the best use of the meter technology that it is currently using.

HED's method is also consistent with the definition of "excess generation" because it is measuring how much kilowatt/hours of production exceeds consumption at that moment.

³ However, note that the order in Docket 21-1816 is not dispositive because it applies to group net metering situations. Also, the order did not indicate whether WEC used bi-directional billing meters, which is a critical issue in HED's implementation of the rules.

⁴ In this instance, "production" is used to mean the component of determining "excess generation" (from the definition of "excess generation"), not the electricity measured by the "production meter."



METER CARD NO.

Attachment HED.2-5 Part b

SERIAL NO. 82001040 VOLTS 240 AMPERES 30 TYPE C157
 CO. NO. [REDACTED] CYCLES 60 PHASES Single CONSTANT
 MAKE Eaton WATT HOURS PER REVOLUTION OF DISK 1.0 KH

[REDACTED]	INSTALLED		REMOVED	
	DATE	READING	DATE	READING
[REDACTED]	<u>7/8/22</u>	<u>00000</u>		

DATE	FOUND				CORRECTED				TESTED BY	REMARKS
	FULL LOAD		LIGHT LOAD		FULL LOAD		LIGHT LOAD			
	F%	S%	F%	S%	F%	S%	F%	S%		
										<u>Solar Production</u>
										<u>Acct # 801221-002</u> <u>Loc # 1020007581</u>

METER CARD NO.

SERIAL NO. 58497854 VOLTS 240 AMPERES 30 TYPE C157
 CO. NO. [REDACTED] CYCLES 60 PHASES Single CONSTANT 1.0
 MAKE Centron WATT HOURS PER REVOLUTION OF DISK

[REDACTED]	INSTALLED		REMOVED	
	DATE	READING	DATE	READING
[REDACTED]	<u>2/20/20</u>	<u>00000</u>		

DATE	FOUND				CORRECTED				TESTED BY	REMARKS
	FULL LOAD		LIGHT LOAD		FULL LOAD		LIGHT LOAD			
	F%	S%	F%	S%	F%	S%	F%	S%		
										<u>Replaces # 9495</u> <u>R. 78227</u>



CENTRON[®] C12.19, C1SD, C1ST, C1SL

The CENTRON meter is a solid-state, single-phase residential electricity meter that provides utilities with unparalleled digital accuracy, reliability, serviceability and cost-effectiveness. The CENTRON meter is one of the most adaptable meters on the residential market, providing an array of communications and application options to meet current and future business needs.

With this solid-state meter, Itron presents a platform for residential metering with the flexibility to adapt as your needs expand and change.

This residential meter is available with interchangeable personality modules that snap into the standard CENTRON metrology base. The three multifunction modules available utilize the ANSI Tables protocol in a demand module (C1SD), a time-of-use (TOU) module with demand (C1ST), and a load profile modules with TOU and demand (C1SL).

FEATURES

All programming, register, demand, TOU, and load profile data are stored in electrically erasable programmable read-only memory (EEPROM) during a power outage. A battery maintains only the clock circuitry during a power outage.

Time of Use

This meter with optional I/O capability can be used in TOU residential applications where dual heating systems, such as electricity and a furnace, are present. When temperatures or peak load fall below a given threshold, the heating will automatically switch from an electric to a combustible or a water-heating source.

Typically, utilities offer different electricity rates for energy consumption based on the exterior temperature or peak load in the hopes of decreasing energy demand during cold peak periods. The rate switch in the meter is triggered by an external pulse input.

Non-Volatile Memory

All programming, register, TOU and load profile data are stored in the EEPROM

during a power outage. A battery maintains only the clock circuitry during a power outage (except C1SD).

Optical Port Communication

Each module can be programmed to communicate at 28800, 19200, 14400 or 9600 baud through the optical tower.

Energy RF Transmission

- » Optional R300 RF module available with 2 ERT or 3 ERT
- » Each RF transmission contains the unit ID number, unit type, energy usage and tamper status, as well as the cyclic redundancy check (CRC) to ensure message integrity
- » Transmit frequency: spread spectrum 910-920 Mhz
- » Compatible with all Itron 900 MHz handheld, mobile and fixed network

data collection solutions, including ChoiceConnect™, Itron's premier automated meter reading (AMR) data collection suite

- » Offers up to +20 dBm of output power

Self-Read Capability

- » All meters are equipped with two self-read registers
- » The C1ST and C1SL modules can be programmed to automatically store up to 12 additional self-read registers. Billing data can be stored automatically, at programmable times, to be read later

Load Profile

The C1SL module provides 144K RAM for up to eight channels of load profile data.

Bidirectional Metering

All three multifunction modules are capable of measuring and displaying delivered, received, net and unidirectional energy (kWh).

Expansion Capability

An expansion port is available for future I/O or communication functions.

Real Time Pricing Capability for C1STI/C1SLI

The TOU rate changes from its configured (default) rate to a new configured rate when the pulse state signal is active on the I/O board. When the pulse state signal becomes inactive, the rate will switch back to the default TOU configured rate

- » Rate changes are configurable through PC-PRO+® Advanced software version 9.6 or later. No time synchronization is attempted using the pulse state rate change
- » The rate change caused by the transition of the pulse state input is logged as a TOU rate change event in the event log. The number of transitions will be limited to not overflow the event log

Standard Features

- » Electronic LCD Display
- » Polycarbonate cover
- » Demand reset
- » Optical tower
- » Test Mode push button
- » Test LED

Features for C1STI/C1SLI

- » >> 24V Pulse Input Board

Product Availability Technical Data

Meets applicable standards:

- » ANSI C12.1 – 2008
- » ANSI C12.10 – 2004
- » ANSI C12.20 (Class 0.5) – 2010
- » ANSI C12.1 – 2008
- » ANSI C12.18 – 2006
- » ANSI C12.19 – 2008
- » IEC 61000-4-4 (2004)
- » IEC 61000-4-2 (2001)
- » FCC Part 15 Class B

Product Approval

- » Measurement Canada Approval: AE-0920

Reference Information

- » CENTRON Technical Reference Guide
- » CENTRON C1S Specification Sheet
- » Hardware Specification Form

Product Availability

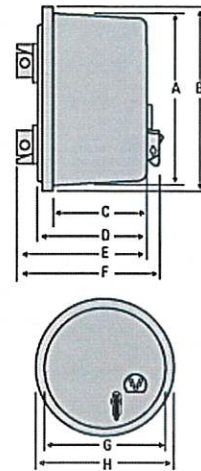
Meter Version	Class	Volts	Wire	Form	
C1SD	100	120	2	1S	G980850
C1SD	200	240	3	2S	G980852
C1SD	320	240	3	2S	G980854
C1SD	20	120	2	3S	G980855
C1SD	20	240	2	3S	G980856
C1SD	20	240	3	4S	G980860
CN1SD	200	120	3	12S	G980860
C1ST	100	120	2	1S	G980385
C1ST	200	240	3	2S	G980204
C1ST	320	240	3	2S	G980389
C1ST	20	120	2	3S	G980390
C1ST	20	240	2	3S	G980391
C1ST	20	240	3	4S	G980394
CN1ST	200	120	3	12S	G980394
C1SL	100	120	2	1S	G980397
C1SL	200	240	3	2S	G980182
C1SL	320	240	3	2S	G980400
C1SL	20	120	2	3S	G980404
C1SL	20	240	2	3S	G980405
C1SL	20	240	3	4S	G980407
CN1SL	200	120	3	12S	G980408
C1STI	200	240	3	2S	
C1SLI	200	240	3	2S	

SPECIFICATIONS**Dimensions – Polycarbonate**

A	B	C	D	E	F	G	H
6.29"	6.95"	2.7"	3.16"	4.53"	4.98"	6.29"	6.95"
16 cm	17.7 cm	6.9 cm	8 cm	11.5 cm	12.7 cm	16 cm	17.7 cm

Specifications

Power Requirements	Voltage rating: 120 V, 240 V Frequency: 60Hz (50Hz) Cell Relay Battery Voltage: 3.6V nominal Carryover: 10-12 year continuous usage or 15 year shelf-life Operating voltage: $\pm 20\%$ (60 Hz); $\pm 10\%$ (50 Hz) Operating range: ± 3 Hz Register Battery Operating Range: 3.4 V – 3.8 V External input signal: 24 VAC or ± 12 VDC
Operating Environment	Temperature: -40°C to +85°C Humidity: 0% to 95% non-condensing
Transient / Surge Suppression	IEC 61000-4-4 ANSI C62.45-1992
Accuracy	ANSI C12.20 0.5 Accuracy Class
General	Demand interval lengths: Programmable from 1 to 60 minutes Demand calculation: Present, previous, cumulative, continuous cumulative, projected, 5 highest, peak demand
Time	Line sync: Power line frequency Crystal sync: $\pm 0.01\%$ @ 25° C; $\pm 0.025\%$ over full temperature range Battery: $\pm 0.003\%$ @ 25° C; $\pm 0.02\%$ over full temperature range Display: Nine-digit liquid crystal display Six-digit data height: 0.4" Three-digit code number height: 0.24" Annunciator height: 0.088" Display duration: 1-15 seconds Three-segment electronic load indicator
Characteristic Data	Starting watts: 5 watts
Burden Data	Voltage circuit: 1.35 W (Form 1S, 2S) 1.55 W (Form 3S, 4S, 12S, 25S, 2S CL320)
Current Coil	<0.5 VA (all forms)

**Dimensions****Shipping Weights – Polycarbonate**

Meter Per Carton	Box Weight (Approx.)
4	10 lbs / 4.54 kg
Meter Per Pallet	Pallet Weight (Approx.)
20	291 lbs / 132 kg



At Itron, we're dedicated to delivering end-to-end smart grid and smart distribution solutions to electric, gas and water utilities around the globe. Our company is the world's leading provider of smart metering, data collection and utility software systems, with over 8,000 utilities worldwide relying on our technology to optimize the delivery and use of energy and water.

To realize your smarter energy and water future, start here: www.itron.com

CORPORATE HEADQUARTERS

2111 N Molter Road
Liberty Lake, WA 99019
USA

Phone: 1.800.635.5461

Fax: 1.509.891.3355