

# WATTNODE® PULSE

Standard and Revenue-Grade



## Measures kWh, Many Pulse Output Options

The WattNode Pulse meter is an accurate, low cost, watt-hour transducer that measures both energy consumed and energy produced (bi-directional). The basic model has two pulse outputs, one for energy consumed and the other for energy produced. Each pulse represents a certain quantity of energy (watt-hours). Many other pulse output configuration are available as options.

For a simple kWh metering system, a WattNode Pulse meter can be configured to output exactly one pulse per kilowatt-hour (kWh) of energy used. The pulse output from the meter is connected to our Pulse Totalizer Display model LCDB-E. This display register counts up the pulses and shows the total number of kWh used.

The output pulses from the WattNode meter can also be recorded using a data logger or other data acquisition device such as a building automation system. These systems can calculate the average kW demand during a sample interval and can also provide TOU (time of use) data.

The pulse outputs of WattNode meters are optically isolated to provide 5000 volts protection from the AC power lines. An optocoupler functions like mechanical on/off switch. The pulse recording device connected to the meter applies a small DC voltage to the optocoupler switch to determine if it is open or closed. Each opening and closing of the switch represents one pulse.

WattNode Pulse meters are available with a variety of pulse output options. The basic meter is suitable for conventional energy measurement applications as well as for PV net metering, and other renewable energy applications. Pulse meters are used for tenant sub-metering, branch circuit lighting, HVAC and equipment monitoring, and demand response applications.

The WattNode Pulse is available in standard and revenue-grade accuracy versions and can be used with any low voltage CT (0.333 Vac output). Revenue-grade system accuracy requires current transformers with Class 0.6 or better accuracy. The ACTL series of current transformers is available with Class 0.6 or Class 0.3 accuracy; these CTs are ideal for revenue-grade billing purposes, SREC and state revenue-grade requirements. Certificates of calibration are available for WattNode Revenue meters and the ACTL revenue-grade current transformers.

The complete line of WattNode energy meters measure 1, 2, or 3 phases in 2, 3, or 4 wire configurations, with nominal voltages from 120 to 600 Vac 50/60 Hz. CCS offers a complete line of low-voltage, split-core and solid core current transformers with rated currents from for 5 to 6000 amps.

## Features

- Low cost, bidirectional watt-hour transducer
- Safe, low voltage (0.333 Vac) current transformers
- Line powered
- Single or three phase, wye or delta configurations
- UL, cUL, CE, RoHS compliant
- 5 year warranty

## Models

Model Number	Model Number	VAC Line to Neutral	VAC Line to Line	Phases	Wires
WNB-3Y-208-P	RWNB-3Y-208-P	120	208-240	3	4
WNB-3Y-400-P	RWNB-3Y-400-P	230	400	3	4
WNB-3Y-480-P	RWNB-3Y-480-P	277	480	3	4
WNB-3Y-600-P	RWNB-3Y-600-P	347	600	3	4
WNB-3D-240-P	RWNB-3D-240-P	120	208-240	3	3-4
WNB-3D-400-P	RWNB-3D-400-P	230	400	3	3-4
WNB-3D-480-P	RWNB-3D-480-P	277	480	3	3-4

\*R" Designates revenue-grade



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WNP-11.1.17: Specifications are subject to change

## Quantities Measured

- Energy (kilowatt-hours), sum and per phase (optional)

## Accuracy

- 0.5% nominal (see manual for details)

## Electrical

- Line powered, 50 or 60 Hz
- Operating Voltage Range: +15% to -20% of nominal

## Environmental

- Oper. Temperature: -30°C to +55°C (-22°F to 131°F)
- Oper. Humidity: 5 to 90% RH up to 40°C, decreasing linearly to 50% RH at 55°C

## Mechanical

- Enclosure: high impact, UL rated, ABS plastic
- Size: 6.1 x 3.35 x 1.5 in. (155 x 85 x 38 mm)
- Connectors: UL, CSA recognized, detachable screw terminals

## Pulse Output

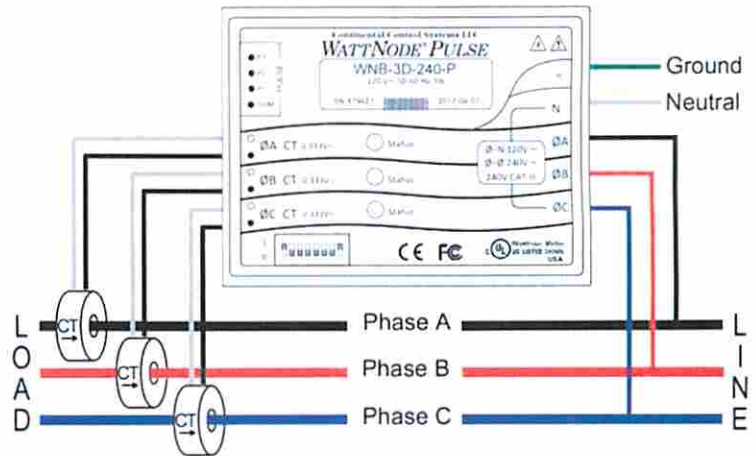
Opto-isolated, solid state relay closure up to 60 Vdc @ 5mA scaling:

- Full-scale frequency - 4 Hz (standard), or 0.01 Hz to 600 Hz (factory option)
- Specified watt-hours per pulse (factory option)

## Regulatory

- FCC Class B, EN 55022 Class B
- UL and cUL Listed (UL 61010-1)
- CE Mark and RoHS compliant
- Immunity: EN 61326, (industrial locations)

## WattNode Wiring Diagram, Three Phase Example



## LCDB-E, Pulse Totalizer Display

- LCD 8 digits high contrast display
- Works out of the box, – no configuration required
- Screw terminals for fast installation
- Installs up to 100 feet from the meter
- Long 15+ year battery life
- UL and cUL/CSA, CE Recognized



## Accu-CT® Split-Core CTs

- Safe, low voltage output, 0.333 Vac
- Primary Ratings: 5 to 600 amps, 600 Vac, 50 or 60 Hz
- UL & cUL, CE, RoHS compliant
- 0.75" and 1.25" openings
- High accuracy options C0.6, C0.3



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## AN417; WATTNODE WNB PULSE WEIGHT CALCULATION:

Watt-hours per pulse for a standard 4Hz FS output meter are shown in the right four columns of Table 6 from the Wattnode WNB user manual (copied below).

For quick calculation:

Find the Wh per pulse in table for the appropriate model

Multiply the table value by the ratio of the [Standard Full Scale Freq /Custom Full Scale Freq]

For example:

If it is a standard 4Hz output unit then multiply by 4Hz/4Hz (ie 1)

If it is a 400Hz custom output then multiply the value in the table by 4/400

For example, a 3Y-208 meter with 100Aac CT's outputs 2.5Wh per pulse (direct from the table)

If a 40Hz FS meter was ordered (custom) then each pulse would be  $2.5 \times (4/40) = 0.25Wh$

For a 300 Hz meter, each pulse =  $2.5 \times (4/300) = 0.0333 Wh$

CT Size (amps)	Pulses Per kilowatt-hour ( <i>PpKWH</i> )				Watt-hours per pulse ( <i>WhpP</i> )			
	3Y-208 3D-240	3Y-400 3D-400	3Y-480 3D-480	3Y-600	3Y-208 3D-240	3Y-400 3D-400	3Y-480 3D-480	3Y-600
5	8000.00	4173.91	3465.70	2766.57	0.125	0.2396	0.2885	0.3615
15	2666.67	1391.30	1155.24	922.190	0.375	0.7188	0.8656	1.0844
20	2000.00	1043.48	866.426	691.643	0.500	0.9583	1.1542	1.4458
30	1333.33	695.652	577.617	461.095	0.750	1.4375	1.7313	2.1688
50	800.000	417.391	346.570	276.657	1.250	2.3958	2.8854	3.6146
60	666.667	347.826	288.809	230.548	1.500	2.8750	3.4625	4.3375
70	571.429	298.137	247.550	197.612	1.750	3.3542	4.0396	5.0604
100	400.000	208.696	173.285	138.329	2.500	4.7917	5.7708	7.2292
150	266.667	139.130	115.523	92.219	3.750	7.1875	8.6563	10.844
200	200.000	104.348	86.643	69.164	5.000	9.5833	11.542	14.458
250	160.000	83.478	69.314	55.331	6.250	11.979	14.427	18.073
300	133.333	69.565	57.762	46.110	7.500	14.375	17.313	21.688
400	100.000	52.174	43.321	34.582	10.000	19.167	23.083	28.917
600	66.667	34.783	28.881	23.055	15.000	28.750	34.625	43.375
800	50.000	26.087	21.661	17.291	20.000	38.333	46.167	57.833
1000	40.000	20.870	17.329	13.833	25.000	47.917	57.708	72.292
1200	33.333	17.391	14.440	11.527	30.000	57.500	69.250	86.750
1500	26.667	13.913	11.552	9.2219	37.500	71.875	86.563	108.44
2000	20.000	10.435	8.6643	6.9164	50.000	95.833	115.42	144.58
3000	13.333	6.9565	5.7762	4.6110	75.000	143.75	173.13	216.88
any	<u>40.000</u> <i>CtAmps</i>	<u>20.870</u> <i>CtAmps</i>	<u>17.329</u> <i>CtAmps</i>	<u>13.833</u> <i>CtAmps</i>	<u>CtAmps</u> 40	<u>CtAmps</u> 20.87	<u>CtAmps</u> 17.329	<u>CtAmps</u> 13.833

Table 6: Scale Factors - Bidirectional Outputs