Continental Control Systems LLC

LCDA-E Energy Display

Overview

The LCDA-E energy display has eight digits with an adjustable scale factor and decimal point position, to allow for the accurate display of energy levels from hundredths of a watt-hour to 100,000 megawatt-hours. By adjusting the scale factor and decimal point position, you can display energy in watt-hours, kilowatt-hours, or megawatt-hours. The LCD display can be used with the Advanced Pulse WattNode with a maximum output frequency of 20Hz. The long life battery maintains the total energy value, even if power to the WattNode fails. The RST▲ button resets the energy total to zero. If you wish to disable this feature, use program screen 4 as described in the Durant manual.

Wiring

Connect the WattNode's 'P1' output terminal to the IN B 2 (Contact input) terminal on the LCD display. Connect the WattNode's 'COM' output terminal to the GND 1 (Ground) terminal on the LCD display. The maximum length of wire between the WattNode and LCD display is 200 meters. Refer to the Durant Totalizer Installation manual for details.
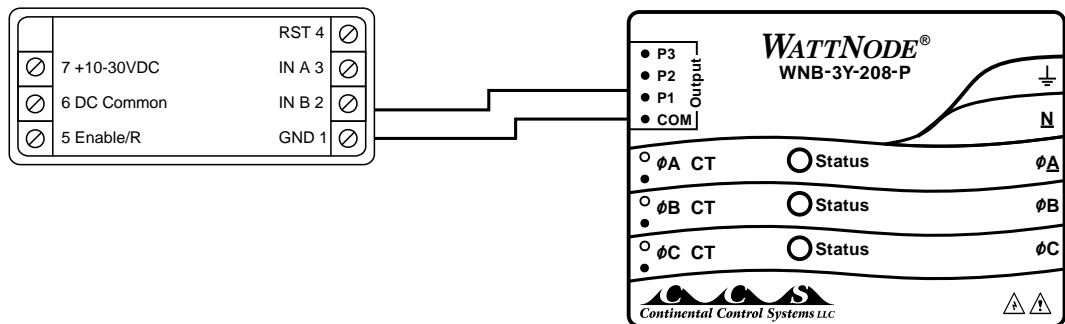

Figure 1: LCDA-E Wiring Diagram

Programing the Energy Display (Watt-hours)

The LCDA-E is shipped pre-programmed if ordered with an Advanced Pulse WattNode and current transformers. To make changes to the original program, follow the steps below:

1) Select a display format for energy from the following table:

Display Format	Multiplier	Recommended CT Sizes
0000000.0 Watt-hours	10	5–30 amps
00000000 Watt-hours	1	5–100 amps
00000.000 Kilowatt-hours	1	5–100 amps
000000.00 Kilowatt-hours	0.1	15–600 amps
0000000.0 Kilowatt-hours	0.01	100–1500 amps
00000000 Kilowatt-hours	0.001	600–1500 amps
00000.000 Megawatt-hours	0.001	600–1500 amps

Note: Watt-hours, kilowatt-hours, or megawatt-hours will not appear on the LCD display.

Your choice will affect both display resolution, and time until display overflow, so you may wish to try more than one format to find the optimum choice. The LCD will display the count

of received pulses times the totalizer count scale value (*CntScale*). The decimal point is then superimposed on the displayed number—to understand this better, note that *CntScale* is the same when displaying kilowatt-hours or thousandths of megawatt-hours; the only difference is the position of the decimal point.

2) Compute the totalizer count scale value.

$$CntScale = WHpPpA \cdot CTAmps \cdot Multiplier$$

Where *WHpPpA* is the 'Watt-hours per pulse per CT Rated Amp' from the back label of the WattNode (also found in Table 8 of the Advanced Pulse WattNode Manual). *CTAmps* is the rated current of the current transformers being used, and *Multiplier* comes from the table above.

3) If the *CntScale* is greater than 99.9999, then you will have to pick a smaller multiplier. Generally, *CntScale* values greater than 10.0000 will cause the display to overflow too quickly. If *CntScale* is less than 0.0500, then there is the possibility that the rounding error may become too large. To check the rounding error, follow step 4.

4) To compute the rounding error, round *CntScale* to four decimal places (xx.xxxx) to get *RndCntScale*. Compute the error with the following equation:

$$Error\% = 100 \cdot \frac{RndCntScale - CntScale}{CntScale}$$

Generally, it is desirable to keep the error below 0.25% so that it does not significantly affect the total system accuracy. If the error is too large, then change to a display format with a larger *Multiplier*.

5) Check the time to display overflow at continuous maximum power consumption.

$$DaysToOverflow = \frac{1150}{CntScale \cdot FSHz}$$

FSHz is the 'Full-scale pulse frequency' from the back label of the WattNode (also found in Table 7 of the Advanced Pulse WattNode Manual). Under normal conditions, the average load will be less than maximum power, so the actual time to display overflow will typically be longer than *DaysToOverflow*. When the display overflows, it wraps around to zero and starts counting up again. If the *DaysToOverflow* is too small, then change to a display format with a smaller Multiplier. Making *Multiplier* 10 times smaller will make *DaysToOverflow* 10 times larger.

6) Once you have found the desired display format and *CntScale* value, program them into the LCD as described in the Durant manual. Enter *CntScale* in programming screen 1. Position the decimal point in programming screen 2 to match the Display Format selected in the table above.