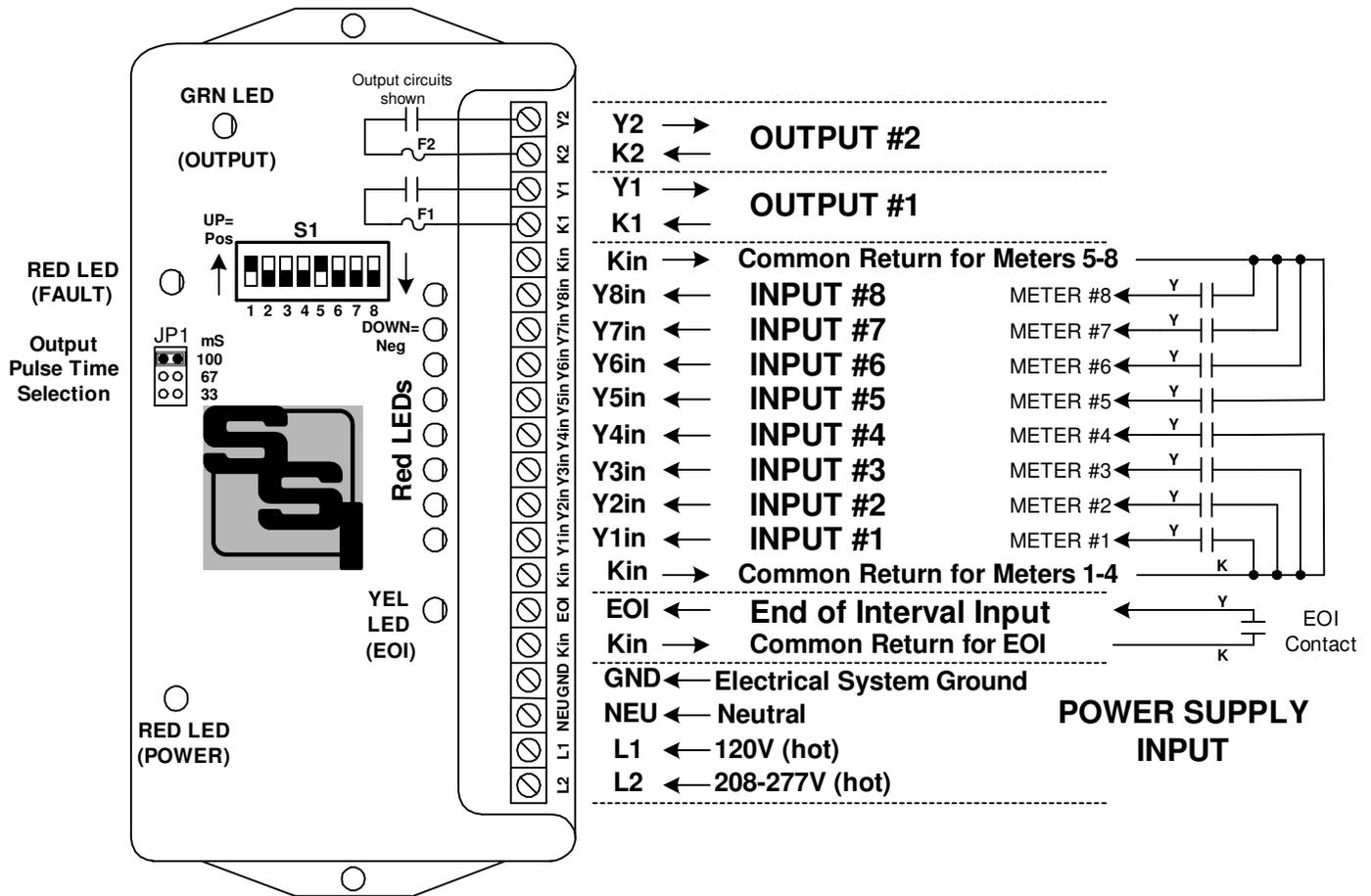


# NPR-8

Standard Solid State

# NET PULSE VALUE REGISTER INSTRUCTION SHEET



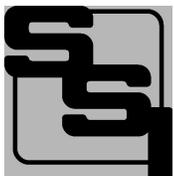
**MOUNTING POSITION** - The NPR-8 may be mounted in any position.

**POWER INPUT** - To power the NPR-8 with a 120VAC power supply, use the **NEU** and the **L1** power supply input terminals. For 208, 240 or 277 VAC operation, use the **NEU** and **L2** power supply input terminals. Connect the **GND** terminal to the electrical system ground.

**METER CONNECTIONS** - The NPR-8's **Kin** terminals provide the common return for all of the meters' **K** terminals. The NPR-8 utilizes only 2-Wire inputs. Connect each meter's **Y** terminal to the **Y(x)in** terminal of the desired input channel "x" of the NPR-8. Each **Y** input provides its own wetting (sense) voltage to the meter's **Y** terminal. Meter's pulse output must be dry-contact, solid state or mechanical. Connect the End-of-Interval contact closure to the **EOI** input terminal and the **Kin** Common Return. This input also provides its own wetting (sense) voltage to the meter's **EOI** terminal.

**PULSE SIGN SWITCH** - Set each of the eight switches on dip switch **S1** to the correct sign for its respective input, either positive(+)=up or negative(-)=down. Switch **S1.1** sets the sign for Input #1; **S1.2** sets the sign for input #2, etc. The sign determines whether the pulse on the respective input will be added or subtracted.

**OUTPUTS** - Two 2-wire (Form A) isolated outputs are provided on the NPR-8. Arc suppression for the contacts of the solid-state relays is provided internally. The output loads should be limited to 1/10th Amp by fuse **F1**. Two 1/10 Amp fuses are supplied standard. Fuses are 3AG (AGC) fast blow type.



## SOLID STATE INSTRUMENTS

a division of Brayden Automation Corp.  
 6230 Aviation Circle, Loveland Colorado 80538  
 Phone: (970)461-9600 Fax: (970)461-9605  
 E-mail: support@solidstateinstruments.com

**OPERATION-** The NPR-8 is intended to collect pulses from up to 8 meters over a demand interval and keep a running net arithmetic result of the positive and negative pulses. Each time a pulse is received on a positive input by the NPR-8, the Count Register is incremented by one. Each time a pulse is received on a negative input by the NPR-8, the Count Register is decremented by one. The maximum count in the register is 16 bits or 65,536. At the end of the interval, upon the EOI input being closed for 1 second, the count register is tested to see if the result is positive. If the count is positive, the contents of the Count Register are outputted at the rate of one pulse per 100mS (or the selected rate) and continues until the register has decremented to zero. The pulse interval is set by JP1 (see below). The default output pulses are 200mS in length with a 50/50 format with 100mS high (closed-active) and 100mS low (open-inactive). See more on JP1 below. In this manner, an interval recorder will be able to record the positive energy delivered over the interval. If the result of the register test is negative, the register is zeroed out and returns to normal operation. Note that the pulses collected by the recorder are one interval behind.

**CLEARING THE REGISTER** - Upon commencing the start of counting, the Count Register should be zeroed. This can be accomplished in two ways. Either you can power up the NPR-8, making sure that no input pulses will occur, then hold the EOI input low (connected to Kin) and wait until the green LED stops flashing; or secondarily turn off power, set all eight of the input sign switches DOWN and reset the power. Turn off power again. Set the switches to their desired position and then restore power for normal operation. This procedure clears all the registers.

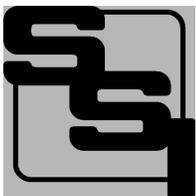
**LEDs** - Eight Red LED's are provided, one for each input. Each time the pulse input is active, the LED will light. In this manner, the inputs from the meters may be monitored. A Yellow LED is provided to monitor the status of the End-Of-Interval signal. Each time the controlling meter sends an EOI switch closure, the Yellow LED will light. A Green LED is provided for the output. Following the end of an interval after the EOI input is closed, you will observe the Green LED flashing at a rate dependant on JP1 until the register is empty. These visual indicators will allow you to troubleshoot the application, if necessary, without any external test equipment. An additional Red LED is provided for a FAULT condition. See the section below on output faults.

**OUTPUT PULSES** - In the event that there is a positive number in the Count Register when the EOI input is toggled, the contents of the Count Register is transferred to the Output Register. The Count Register is then reset to zero. The NPR-8's microcontroller begins counting the next interval's pulses, while simultaneously outputting the Output Register's pulses to the receiving device(s) using the two dry-contact outputs provided. In this way, no pulses are lost, and an accurate number of pulses is recorded in each interval. The NPR-8's output algorithm has a 50%/50% duty cycle output format. The output time can be selected by means of the 3 position jumper header JP1. The selections are 33mS, 67mS or 100mS. Select the position on JP1 and matches the desired ON and OFF output times and place the shunt in that position. For example, if the 100mS time is selected, the active output time (output closed) will be 100mS and the inactive output time (output open) will also be 100mS, thereby making the complete pulse interval 200mS. If JP1 has no jumper shunt in place, the default is 100mS for both on and off times. If more than one jumper is selected, the result will also be 100mS. Make sure to set this output time selection for the highest number of output pulses that will occur in the interval. For example, if you select 100mS, there are five complete pulse intervals per second. There are 900 seconds in a 15 minute demand interval, thereby making the maximum number of output pulses 4500 at a 100mS selection. If 67mS is selected then the maximum pulses per demand interval is  $(900\text{sec} \times (1/((.067\text{s} \times 2)))=6,716$  pulses per 15 minutes.

**FAULT LED** - If there are still pulses left in the Output Register when the EOI input is toggled for the next interval, the remainder will be lost and the Fault LED will be lit. This remains lit until the next time the power is cycled. In this way, metering personnel will be alerted that the Output Pulse time interval is too long and must be shortened.

**POWER FAILURES** - In the event of a power failure, the contents of the Count and Output Registers are saved in non-volatile memory. Once power is restored to the NPT-8, the contents are reloaded into RAM memory and the counting continues from where it left off.

**MAXIMUM POWER DISSIPATION OF OUTPUTS** - Output devices are rated at a maximum of 800mW. Care should be taken to insure that the wetting voltage used across the output device times the current (or burden) of the input of the downstream device, does not exceed the maximum power output dissipation of 800mW. Normally this is not a problem since most downstream instrumentation devices are high impedance and present a very low burden, usually less than 10mA.



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E-mail: [support@solidstateinstruments.com](mailto:support@solidstateinstruments.com)