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# SOLID STATE INSTRUMENTS DPR-4 High Speed Dividing Pulse Relay Instruction Manual

**Contents**

**SOLID STATE INSTRUMENTS DPR-4 High Speed Dividing Pulse Relay**

## Specifications

- Model: DPR-4
- Manufacturer: Solid State Instruments, a division of Brayden Automation Corp.
- Input Voltage: 120VAC to 277VAC
- Output: Solid State Relay
- Mounting Position: Can be mounted in any position

## FAQs

**Q: Can the DPR-4 be mounted in any position?**

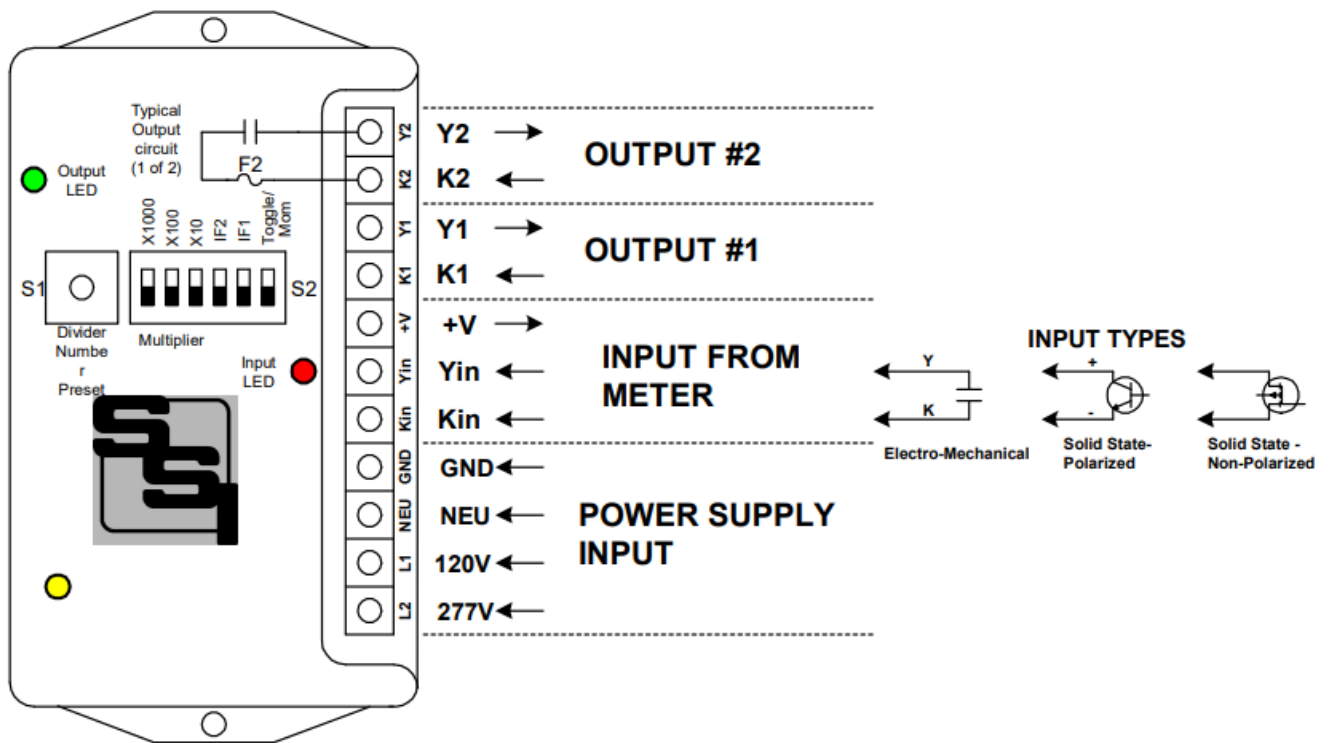A: Yes, the DPR-4 can be mounted in any position.

**Q: What type of fuses does the DPR-4 use?**

A: The DPR-4 uses 3AG or AGC-type fuses up to 1/10th Amp in size.

**Q: How can I reset the pulse count to zero?**

A: To reset the pulse count to zero, set both switches 4 and 5 up, recycle power, and then set switches for the desired setting.

## OVERVIEW

## MOUNTING POSITION

The DPR-4 can be mounted in any position.

## POWER INPUT

**POWER INPUT** – For a power supply voltage of 120 VAC, connect the hot lead (Black) to the L1 terminal. For 208 to 277VAC, connect the hot lead to the L2 terminal. Connect the neutral lead (White) to the NEU terminal. Connect the GND terminal to the electrical system ground. The Ground lead must be connected and cannot be left floating (unconnected).

## METER CONNECTIONS

The DPR-4 has a 2-wire (Form A) input. The DPR-4's Kin and Yin input terminals should be connected to the meter's "K" and "Y" terminals. The DPR-4's "Kin" is common & provides the return from the meter's K terminal. The "Yin" input provides a "pulled-up" +5VDC to the meter's "Y" terminal. When connecting to a gas or water meter with a polarized output, connect the positive (+) to the Yin terminal and the negative (-) to the Kin terminal. If the meter's transmitter must be powered, it can be powered by the auxiliary power supply terminal +V which can supply +12VDC at up to 40mA to the meter.

- **OUTPUT** – Two 2-wire (Form A) isolated outputs with transient voltage suppression are provided. Outputs are rated up to 120VAC/125VDC at 100mA (1/10th Amp) with a maximum of 800mW.
- **FUSE** – The fuses are 3AG or AGC type and may be up to 1/10th Amp in size.

## DIVISION NUMBER and MULTIPLIER SWITCHES

The divider number and multiplier switches are located just above the microcontroller in the center of the board. See the table on Page 2 for dividing number switch settings from 1 to 10,000

## CHOOSE THE DIVIDER

The Divider # is the number of pulses IN for each pulse OUT. It is equal to the 1-10 Switch Preset Number times the Multiplier. Choose the desired DIVIDER # by determining a number from 1 to 10 and the multiplier, X1, X10,

X100 or X1000. All possible divider combinations are shown in Table 1. Rotate the Switch (S1) to the desired number from 1 to 10 ("0" = 10). Set the multiplier jumper to one of the four possible configurations in Table 2 below. For example, to divide by 700, set Switch S1 at "7" and the Multiplier Jumper to "X100". When 700 pulses are received, the output will output either a toggle or momentary pulse, depending on the pulse output mode selected.

**SET MAXIMUM INPUT FREQUENCY**: The DPR-4 also features input debouncing. Table 3 below shows possible configurations. Set the next highest input frequency higher than the maximum input pulse frequency of your application. Use switches 4 and 5 of Switch S2

**SET OUTPUT MODE**: For the TOGGLE output mode, set switch position #6 of S2 to the "DOWN" position. For the MOMENTARY mode, set switch #6 of S2 in the "UP" position. In the toggle mode the output will change to the opposite state when the divider number is reached. In the momentary mode, a 100mS output pulse will occur.

**RESET COUNT**: The DPR-4 saves the current pulse count in the event that power is lost to the unit. It may be desirable to reset this count, particularly during testing and/or if the divider number is large. To reset the count to zero, set both switches 4 and 5 up. Recycle power. Set switches 4 and 5 of S2 for the desired setting.

**LED INPUT & OUTPUT INDICATORS**: The DPR-4 includes a high-brightness Red LED for the input and a Green LED for the output. The Red LED will light when the input is active. The Green LED will light when the output is "closed". The Yellow LED is a power supply indicator that lights whenever +5V is present.

**TABLE 1**     MULTIPLIER

| SWITCH PRESET NUMBER | X1 | X10 | X100 | X1000 |
|---|---|---|---|---|
| 1 | 1 | 10 | 100 | 1000 |
| 2 | 2 | 20 | 200 | 2000 |
| 3 | 3 | 30 | 300 | 3000 |
| 4 | 4 | 40 | 400 | 4000 |
| 5 | 5 | 50 | 500 | 5000 |
| 6 | 6 | 60 | 600 | 6000 |
| 7 | 7 | 70 | 700 | 7000 |
| 8 | 8 | 80 | 800 | 8000 |
| 9 | 9 | 90 | 900 | 9000 |
| 10 | 10 | 100 | 1000 | 10000 |

**TABLE 2**   SETTING THE MULTIPLIER

| X | S2.1 | S2.2 | S2.3 |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 10 | 0 | 0 | 1 |
| 100 | 0 | 1 | 0 |
| 1000 | 1 | 0 | 0 |

0 = Switch DOWN

1 = Switch UP

Only the highest multiplier is used if more than one multiplier switch is in the "UP" position.

SETTING THE MAX. INPUT FREQUENCY (IF1 and IF2)

**TABLE 3**

| Hz | S2.4 (IF2) | S2.5 (IF1) |
|---|---|---|
| RST | 1 | 1 |
| 100 | 1 | 0 |
| 1000 | 0 | 1 |
| 5000 | 0 | 0 |

SETTING THE OUTPUT MODE

**TABLE 4**

| S2.6 | MODE |
|---|---|
| 0 | Toggle |
| 1 | Momentary |

## DPR 4 OUTPUT MODES

**TOGGLE MODE**: The DPR-4's output when in toggle mode, will change state to the opposite state when a pre-defined number of pulses is received. In Figure 1 below, a count is registered when the input closes and there is continuity between the Kin and Yin input terminals. The return to the original state (input open) does not count as a pulse. When the number or pulses received is equal to the count preset number (n), the output changes to the opposite state. This mode is used when both positive and negative output transistors are counted.

**Figure 1: Input to Output Operation-Toggle Mode**
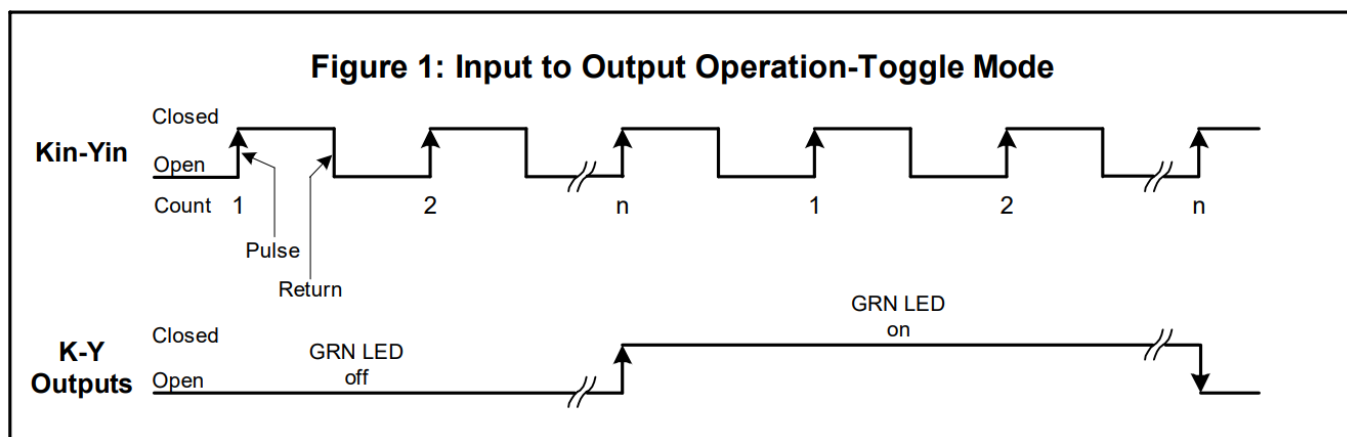
**MOMENTARY MODE**: When the DPR-4's output is set for momentary mode, a 100mS output pulse will occur when the pre-defined number of pulses is received. In Figure 2 below, a count is registered when the input closes and there is continuity between the Kin and Yin input terminals. The return to the original state (input open) does not count as a pulse. When the number or pulses received is equal to the count preset number (n), the output changes to the "closed" state for 100mS and then returns to the "open" state. This mode is used when only the closing of the output is counted.



**Figure 2: Input to Output Operation-Momentary Mode**
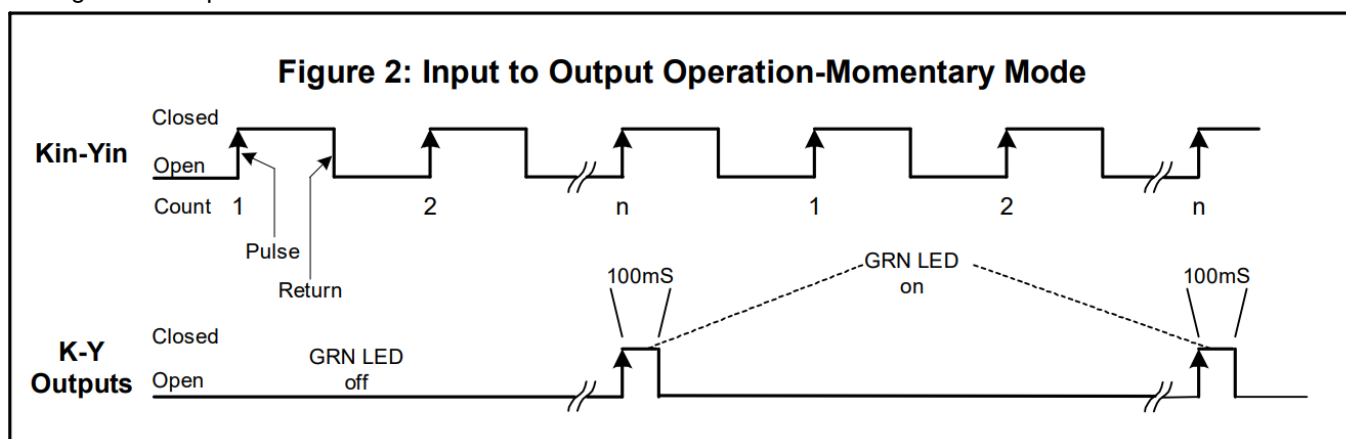
The DPR-4 can output a fixed maximum rate of 5 pulses per second of 100mS in duration, with 100mS spaces between the pulses. In the event that the frequency of incoming pulsesis high and the divider number is low, such that the output frequency exceeds 5 pulses per second, the DPR-4 will store up to 255 pulses and output them when possible. If this problem persists, a higher divider number is recommended which will result in fewer pulses of greater value.

## POWERING A WATER METER TRANSMITTER

+V OUTPUT: Some water meters require a power source to run the electronics ("transmitter") required to give a pulse output. In the event that you have a water meter with this requirement, the DPR-4 includes a power supply output terminal for this purpose. This terminal is marked "+V" and is the 7th terminal up from the bottom. The voltage of this output pin varies with load between +12 and +18VDC. Current available on this pin to power the water meter transmitter is limited to 40mA. The drawing below shows the connection of the water meter to the DPR-4.
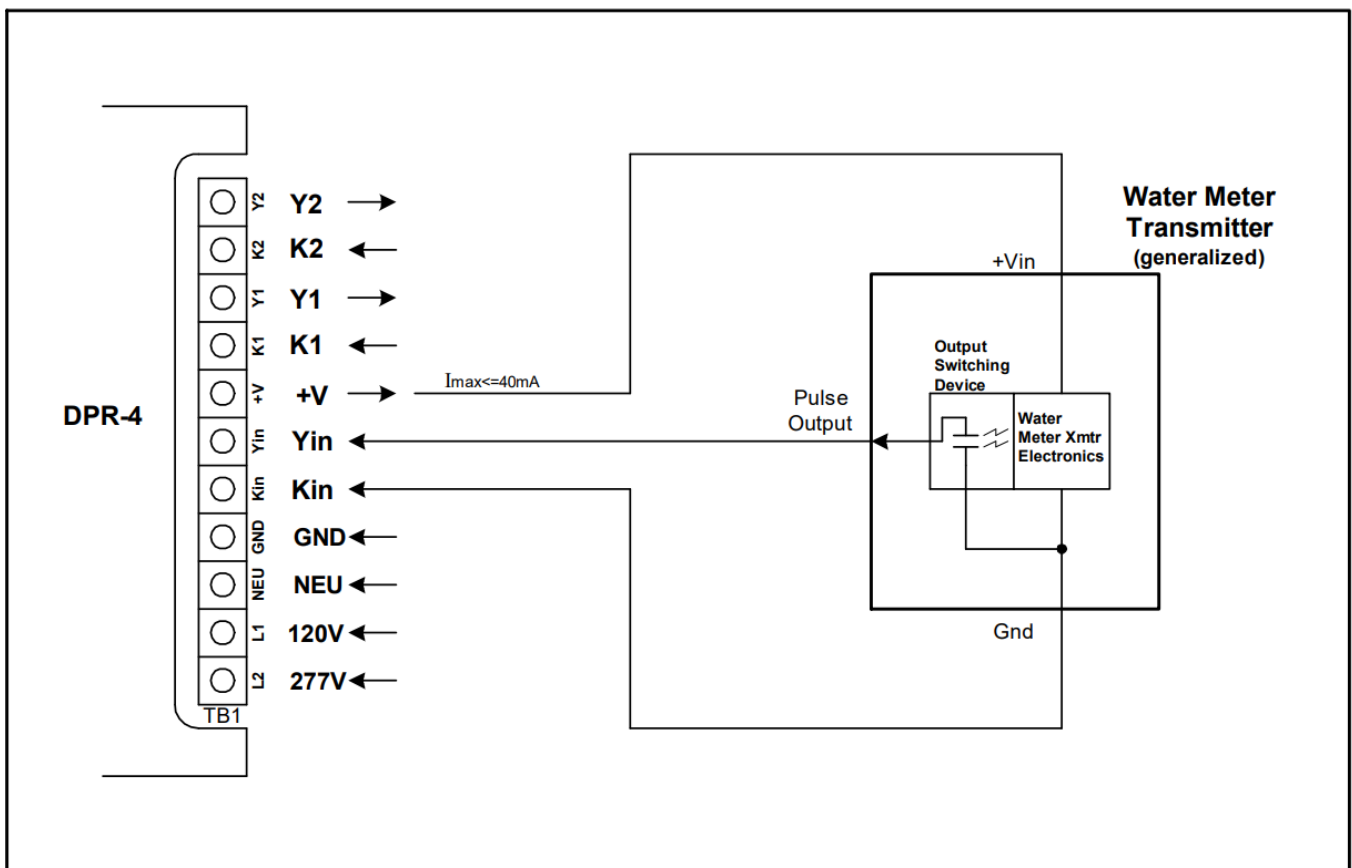
The DPR-4 supplies power via the +V pin to the water meter's power supply terminal, often marked +V, +DC input or similar. The common ground or negative of the power supply connects to the "Kin" terminal of the DPR-4. It is important to note that this is the power supply ground as well as the return for the pulse output. You will note in the drawing above that one terminal of the pulse output switching device is internally tied to the common ground terminal. This may vary from device to device but in general terms seems to be the most common configuration. The pulse output pin of the water meter connects directly to the "Yin" terminal. This usually requires a pull-up resistor between the +V input pin and the Yin terminal but the DPR-4 supplies this internally so the installer need not supply this.

## USING THE V POWER SUPPLY FOR VOLTAGE INPUTS

If you need to "wet" the output contact(s) of the DPR-4 to run the pulses into a sourced voltage input of a meter or other telemetry equipment, the DPR-4's V+ terminal can be used for that purpose. This will source the +12VDC voltage available at the V+ terminal through the DPR-4's output(s) to the receiving equipment. Jumper the V+ terminal to the K1 terminal. The Y1 output terminal is the switched voltage which then can be connected to the pulse receiving equipment's + input terminal. Connect the Kin input terminal of the DPR-4 to the common or (-) negative input of the receiving equipment to complete the circuit and allow a common reference between the systems. Each time the Green LED on the DPR-4 lights a+12V voltage representing a pulse should be present at the receiving equipment's input terminal.
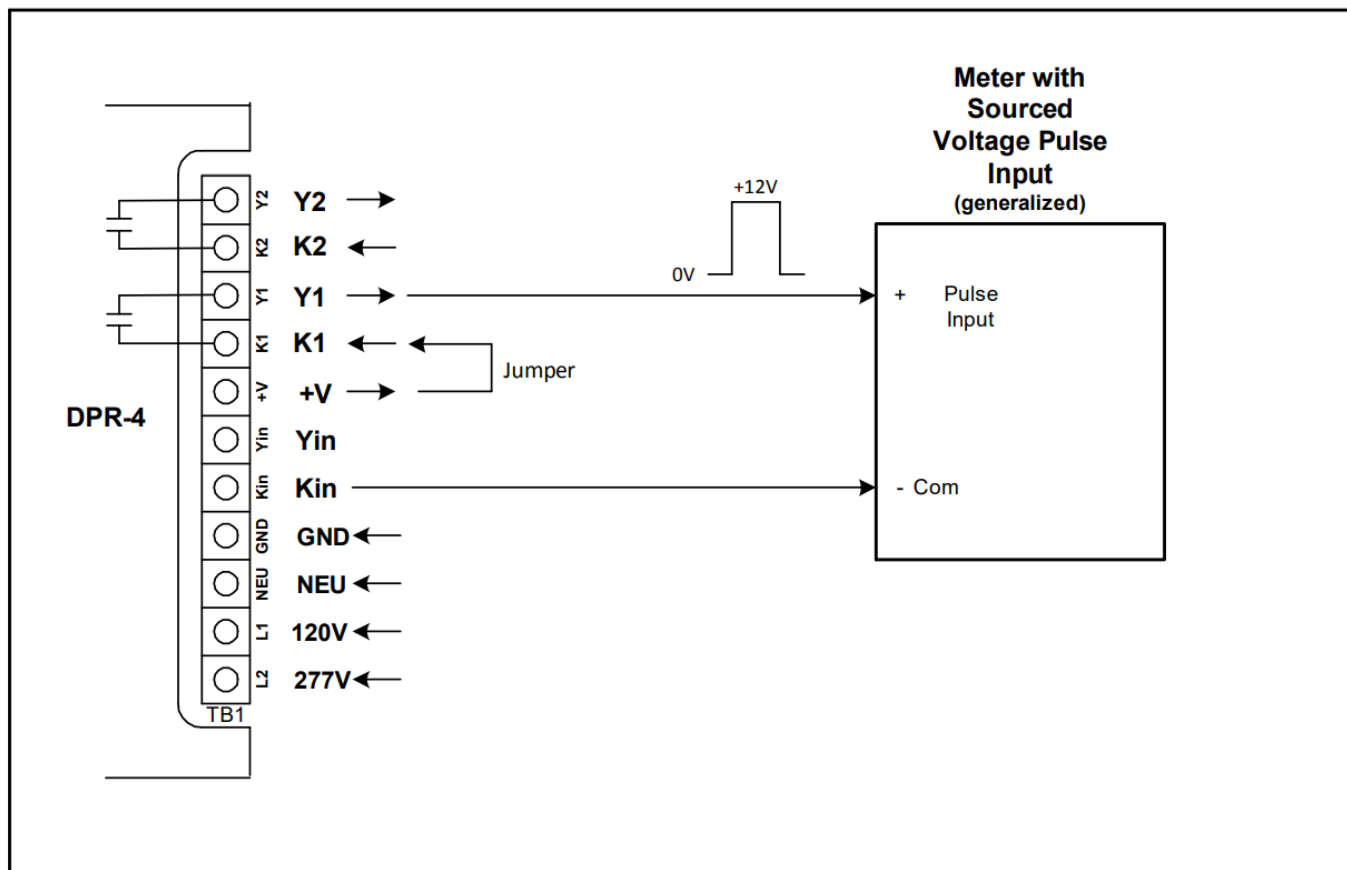
## CONTACT INFORMATION

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- 6230 Aviation Circle, Loveland Colorado 80538
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## Documents / Resources
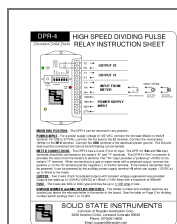


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DPR-4 High Speed Dividing Pulse Relay, DPR-4, High Speed Dividing Pulse Relay, Speed Dividing Pulse Relay, Dividing Pulse Relay, Pulse Relay, Relay

## References

- **User Manual**