DPR-4 B-Series
Standard Solid State

HIGH SPEED DIVIDING PULSE RELAY INSTRUCTION SHEET

OUTPUT #2 — Y2 →, K2 ←

OUTPUT #1 — Y1 →, K1 ←

+V → Auxiliary +12VDC OUT

INPUT FROM METER — Yin ←, Kin ←

GND ←

POWER SUPPLY INPUT — NEU ←, 120-277V ←

INPUT TYPES

Electro-Mechanical

Solid State- Polarized NPN Bi-Polar Open-Collector Xstr

Solid State - Polarized N-Chan Open-Drain FET Xstr

Solid State - Non-Polarized N-Chan Open-Drain FET Xstrs
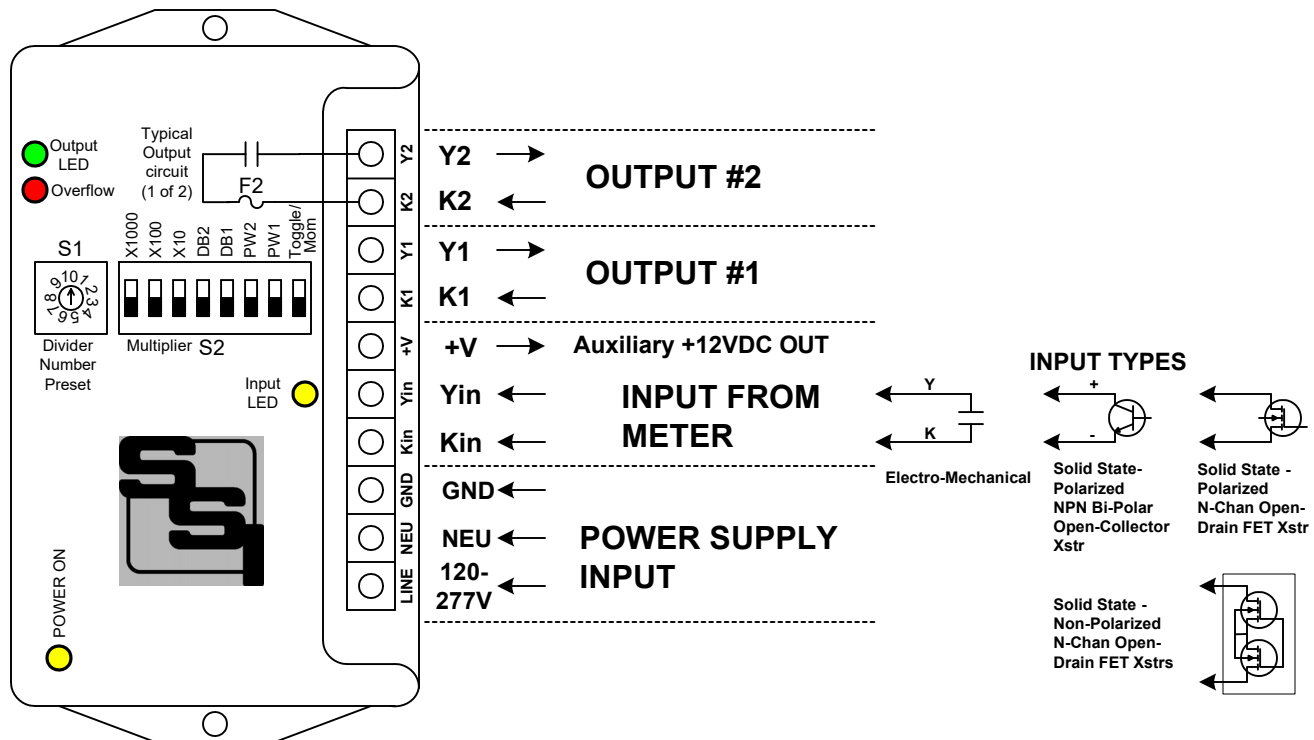
MOUNTING POSITION - The DPR-4 can be mounted in any position.

POWER INPUT - For a power supply voltage of 120 to 277 VAC, connect the hot lead (Black) to the **LINE** terminal. Connect the neutral lead (White) to the **NEU** terminal. Connect the **GND** terminal to the electrical system ground. The DPR-4 must be connected Phase-to-Neutral. Do not connect Phase-to-Phase. 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" +12VDC 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 power transmitter must be powered, it can be powered by the auxillary 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 multipler 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.
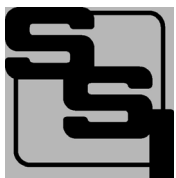
SOLID STATE INSTRUMENTS
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CHOOSE THE DIVIDER #: The Divider # is the number of pulses IN for each pulse OUT. It is equal to the 1-10 Switch Preset Number times the Multipler. Choose the desired DIVIDER # by determining a number from 1 to 10 and the multiplier, 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 DIP Switches S2.1 to S2.3 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 S2 in the UP position for "X100". When 700 pulses are received, the output will output either a toggle or momentary pulse, depending on the pulse output mode selected on DIP Switch S2.8.

SET INPUT DEBOUNCING: The DPR-4 also features input debouncing. Table 3 below shows possible configurations. Set the lowest input pulse width that will be seen the the meter or sending device. This will filter out any noise shorter than that that could be interpreted as a pulse.

SET OUTPUT MODE: For the TOGGLE output mode, set switch position #8 of S2 to the "DOWN" position. For the MOMENTARY mode, set switch #8 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, the selected millisecond output pulse will occur. Set Dip Switches 6 and 7 as desired. See Table 5 below for available pulse width outputs.

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 desired setting.

LED INPUT & OUTPUT INDICATORS: The DPR-4 includes a high-brightness Yellow LED for the input and a Green LED for the output. The Yellow LED will light when the input is active. The Green LED will light when the output is "closed". A separate Yellow LED is a power supply indicator which 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 OUTPUT MODE

TABLE 4

S2.8	MODE
0	Toggle
1	Momentary
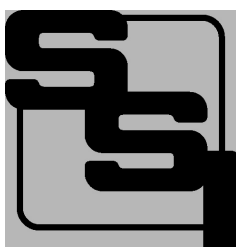
TABLE 3

SETTING THE MIN. INPUT PULSE WIDTH (DB1 and DB2)

uS/mS	S2.4 (DB2)	S2.5 (DB1)
RST	1	1
25mS	1	0
250uS	0	1
50uS	0	0

TABLE 5

SETTING THE OUTPUT PULSE WIDTH (PW1 and PW2)

uS/mS	S2.6 (DB2)	S2.7 (DB1)
200mS	1	1
100mS	1	0
50mS	0	1
25mS	0	0

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*"We're all about K,Y and Z"*

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 transistions are counted.

Figure 1: Input to Output Operation-Toggle Mode
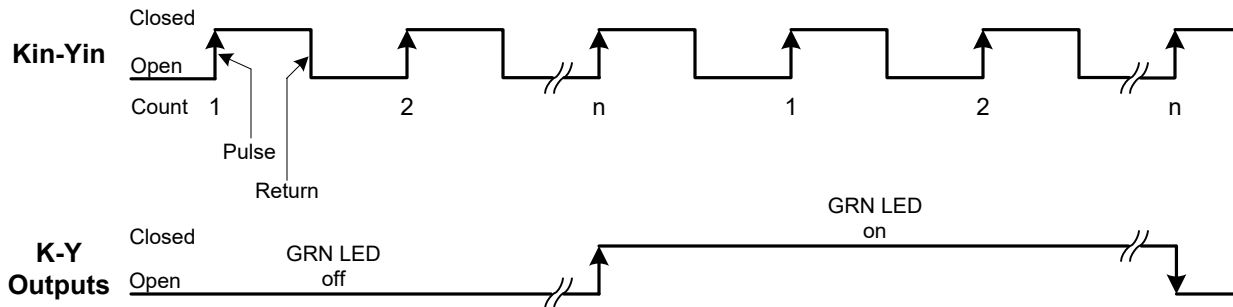
MOMENTARY MODE: When the DPR-4's output is set for momentary mode, an output pulse of the selected width will occur when the pre-defined number of pulses is received. In Figure 2 below, a count is registered when the input closes and there is continuity between the Kin and Yin input terminals. The return 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 the mS selected 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
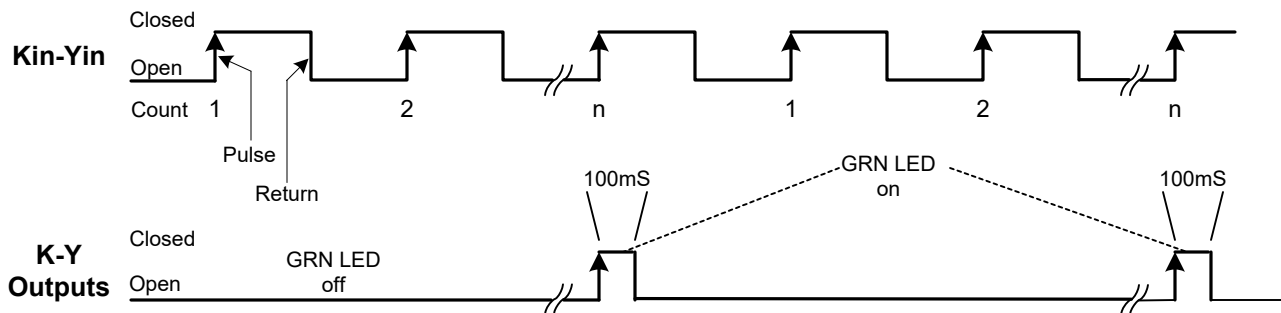
The DPR-4 can output a fixed maximum rate of 5 pulses per second @ 100mS in duration, with 100mS spaces between the pulses. In the event that the frequency of incoming pulses is high and the divider number is low, such that the output frequency exceeds 5 pulses per second, the DPR-4 will store up to 64,535 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 6th terminal up from the bottom. The voltage of this output is approximately +12VDC. 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.
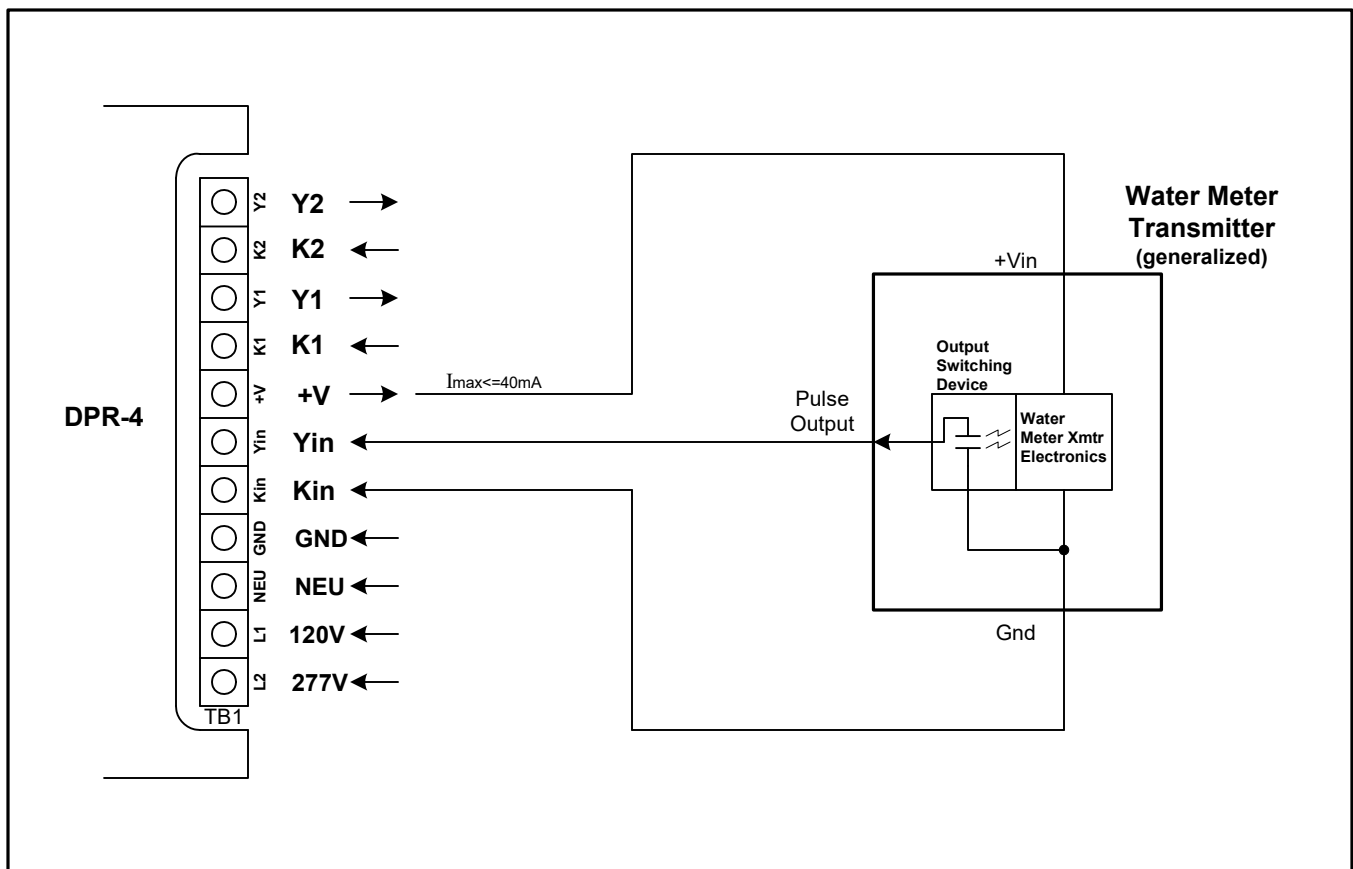
The DPR-4 supplies power via the +V pin to the water meter's power supply terminal, often marked +V, +DC input or similar. The common ground or negative of the power supply connects to the "Kin" terminal of the DPR-4. It is important to note that this is the power supply ground as well as the return 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.