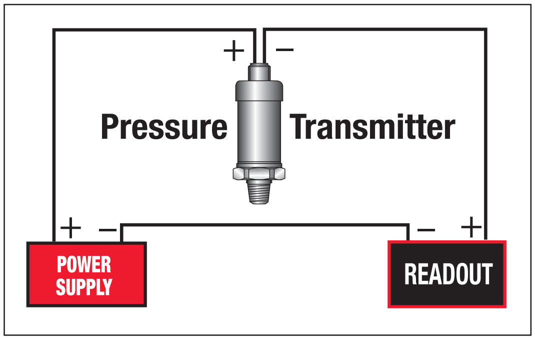
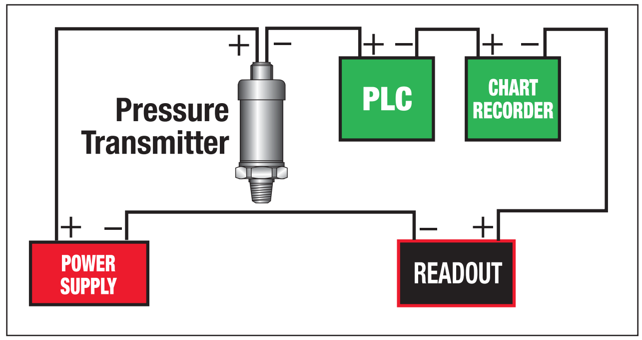


Single instrument 2 wire current loop



Single instrument 2 wire current loop

For the single instrument 2 wire current loop, the minimum power supply voltage is equal to the required voltage across the transmitter plus the voltage drop across the instrumentation plus the voltage drop caused by the resistance of the wiring.

As an example, for a 100 series (4 mA to 20 mA output) pressure transmitter, Vtransmitter = 10 Vdc

Vwiring = Resistance of the wiring (handbook data) X 20 mA maximum current flow in the circuit. If the instrumentation has an input resistance of 250 Ω and if the resistance of the wiring is minimal (100 ft of 24 AWG leadwire has less than 0. 6 Ω (negligible) of resistance), then the calculation including the leadwire is as follows:

Vmin = 10 Vdc + (250 Ω) x .020 Amp + (0.6 Ω) x .020 Amp = 15.012 Vdc

The power supply must provide at least this voltage with the current consumption of .020 Amp.

In a multiple instrument 2 wire current loop, if the second instrument also has an input resistance of 250 Ω, then a second component on the right side of the equation must be included. In this case, the Vmin= 20.012 Vdc. A power supply of 24 Vdc, 1 Amp would be a typical choice.

If there is more than 1 transmitter loop operating off of the same power supply then the current (.020 Amp) must be multiplied by the number of loops. It is recommended that the power supply provide 20% to 30% higher excitation voltage than that calculated above.

Load Limitations 4 mA to 20 mA output
Vmin = 10V + (.020 x R_L)
R_L = Loop resistance (Ω)
$R_L = R_S + R_W$
R_S = Sensor resistance (Ω)
R_W = Wire Resistance (Ω)