Application Note APN0012
D1070, D1072, D1073 Signal Converter DIN Rail

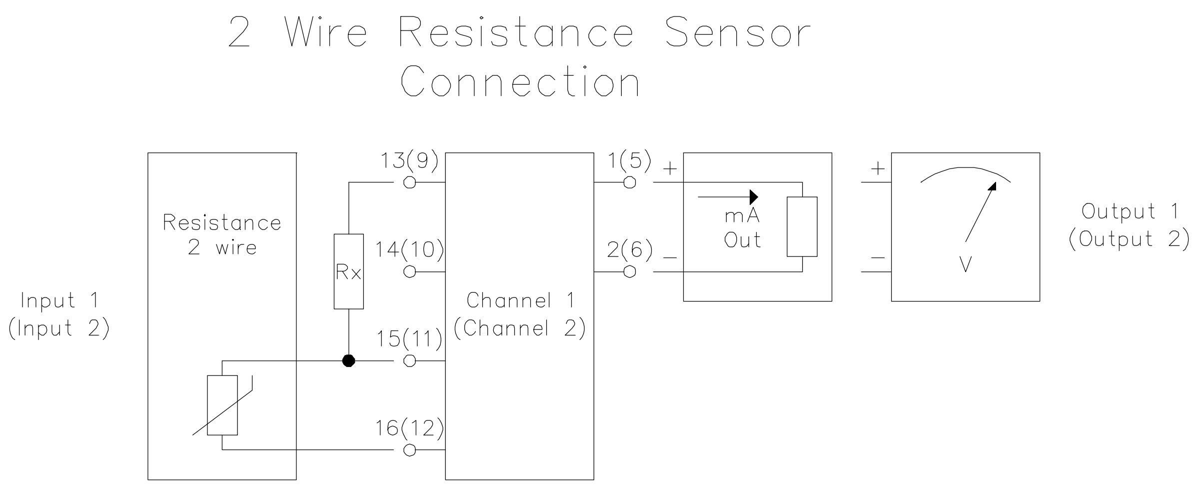
Application Note APN0012 for barrier model:

D1070S	1 channel Temperature Trip Amplifiers DIN Rail
D1072S	1 channel Temperature Signal Converter DIN Rail
D1072D	2 channels Temperature Signal Converter DIN Rail
D1072X	Duplicator Temperature Signal Converter DIN Rail
D1072Y	Adder-Subtractor Temperature Signal Converter DIN Rail
D1073S	1 channel Temperature Signal Converter + Trip Amplifiers DIN Rail

This application note is intended to be read and used in conjunction with the D1070, D1072, D1073 data sheet and Installation Sheet (DTS0042, DTS0025, DTS0043 and ISM0017, ISM0018, ISM0019).

Application

The Series D1070 is suitable to interface 2 wire resistance sensor (maximum value 10 KΩ) as shown in figure (normal connection is for 3 wire transmitter potentiometer):



Rx Value: must be equal to maximum value of resistance to obtain 50% full scale value (input connection as for 3 wire transmitting potentiometer).

The unit interface a 2 wire resistance sensor applying an external resistance (same value of the maximum resistance sensor value) between the terminal “13” (“9” for second channel) and the terminal “15” (“11” for second channel) of the barrier (positive supply and cursor of the potentiometer); the resistance sensor is connected between terminal “15” and “16” (“11” and “12” for second channel).
Configure the unit as 3 wire potentiometer input.

Note that some restrictions may apply:

- The full scale input is 50% of the range (the “potentiometer” resistance is equal to the external resistance and so the unit read the 50% of the input range). Correct the “UP Scale” input value to obtain full scale output at 50% of the range.

- The linearity of the resistance sensor must be corrected in the acquisition system because the input follow the formula:

$$Input\% = \frac{R_{SENSOR}}{R_{SENSOR} + R_X} * 100$$

where:
Rsensor is equal to the resistance of the sensor
Rx is equal to the external resistance (maximum value of the resistance sensor)

- Output scaling follow the formula:

$$Output = \frac{Input\%}{Full\_Scale\_Input\%} * Output\_Span + Low\_Scale\_Output\_Value$$

where:
Output is equal to the output variable value
Full_Scale_Input% is equal to maximum input value (in this case 50%)
Ouput_Span is equal to the output span (the difference from full scale value and low scale value output)
Low_Scale_Output_Value is equal to the start value of the analog output

Example (1 KΩ resistance sensor, 0-50% input range, 4-20 mA output range):

Input sensor at 0% (0 Ω cursor value)	Input is equal to 0% (0 Ω input reading)	Output is 4 mA
Input sensor at 100% (1 KΩ cursor value)	Input is equal to 50% (1 KΩ input reading)	Output is 20 mA
Input sensor at 25% (250 Ω cursor value)	Input is equal to 20%	Output is 10.40 mA
Input sensor at 50% (500 Ω cursor value)	Input is equal to 33.33%	Output is 14.66 mA
Input sensor at 75% (750 Ω cursor value)	Input is equal to 42.85%	Output is 17.71 mA