

1 Signals conversion

Temperature of the process can change within $T = -5\text{ }^{\circ}\text{C} \dots +140\text{ }^{\circ}\text{C}$. This process is measured by the sensor with working range from $-50\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$, which is converted to the current of $4\text{ mA} \dots 20\text{ mA}$, respectively. This signal is sent to the inputs of the PLC with range $0\text{ mA} \dots 20\text{ mA}$. Processed values $N = 0 \dots 4095$, converted to the degrees Celsius ($T(N)$), provide information about process temperature to the operator.

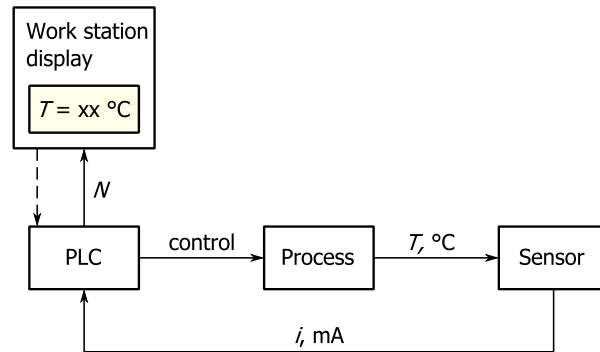


Figure 10.1: Signals conversion

1. Provide equation $T(N)$, where N is an integer value used by a PLC.
2. What are the maximum and minimum values of N for the process?

2 Thermocouple

A type S thermocouple with a $21\text{ }^{\circ}\text{C}$ reference measures 12.120 mV . What is the junction temperature?

Comments

Have you found the S type Thermocouple Table? What are the nearest exact values to the measured one?

3 RTD

What is the resistance of the platinum resistor at $250\text{ }^{\circ}\text{C}$, if its resistance at $20\text{ }^{\circ}\text{C}$ is $1080\ \Omega$? (Temperature coefficient $\alpha = 0.00385\ \Omega/^{\circ}\text{C}$)