

What is Signal Conditioning?



from

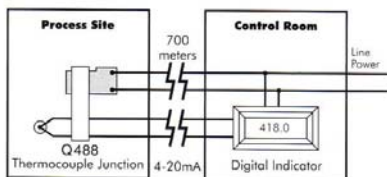


What is Signal Conditioning?

Signal conditioners are electronic instruments used in factory or machine automation. They can amplify, convert, boost, transform, buffer, filter, alarm and isolate process control signals. There seems to be no limit to the variety of things control engineers want to do with control signals. Signal conditioners are known by many names: converters, transducers, isolators, transmitters, and black boxes. Conventionally, most signal conditioners and isolators fall into two categories based on the number of wires required for power and signal.

Four-wire Transmitters

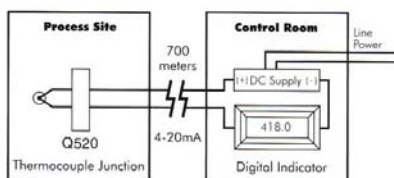
A four-wire transmitter has two wires for power and two wires for the signal output. A four-wire transmitter can be either AC or DC powered. Four-wire transmitters provide a powered output, either a voltage signal (e.g., 0-10V, 1-5V); a current signal (e.g., 4-20mA, 10-50mA); or in some cases a relay (e.g., solid state or contact closure). Four-wire transmitters require a power supply - they do not use power from the input or output signal lines. The power supply allows four-wire transmitters to power their output signal. Because of this, they are often used to boost signal strength for retransmission.



Four-wire Transmitter

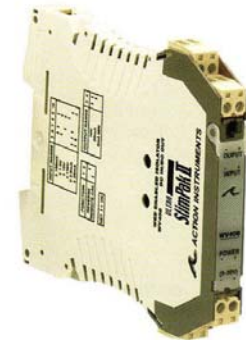
Two-wire Transmitters

A two-wire transmitter is powered by the same two wires that carry the output signal. A two-wire transmitter is always DC powered and the output can only be a current signal, typically 4-20mA, or sometimes 10-50mA. The two-wire transmitter is considered a field device and requires very little power (milliwatts). It is therefore appropriate for hazardous (explosive) environments, such as chemical refineries and pharmaceutical plants. The low DC power requirement, which ranges from 10-48VDC at currents as low as 4mA, reduces the chances of an electrical spark causing ignition of flammable vapors or dust. Additionally, two-wire transmitters save on wire costs



Two-wire Transmitter

the control room is possible and at half the wiring cost of a four-wire transmitter. It is important to note that two-wire transmitters can be isolated or non-isolated. Many low cost two-wire transmitters are not isolated, which makes it important to ensure that the input sensor is not grounded. All of Action's two-wire transmitters are fully isolated. Members of this group include the TransPak series and most of the Q5xx products.



WW408 Ultra SlimPak II

Limit Alarms

Limit alarms are considered a four-wire transmitter since they have two wires for power and at least two wires for the relay signal output. Limit alarms are similar to a thermostat. On your thermostat at home you may have the temperature set to a cozy 72°F or 23°C. If the room temperature falls below that "setpoint" the heater will turn on. This is an example of on/off control. A limit alarm performs the same function. It has a setpoint which is compared to a process signal. If the temperature gets too high, the limit alarm is used to alert an operator or shut down the process. Other applications include limit alarms that can also act as backup for a control system to perform a controlled shutdown process in order to prevent damage or other hazards.



Tempcon Instrumentation Ltd.
 Unit 19 Ford Lane Business Park Ford Lane
 Ford Nr. Arundel West Sussex BN18 0UZ
 Tel: ++44 (0)870 774 6222 Fax: ++44 (0)870 774 6555
 Email: info@tempcon.co.uk Web site: www.tempcon.co.uk