

Why Engineers Still Trust the 4–20mA Signal



For more than half a century, the 4–20mA current loop has remained the gold standard for transmitting analogue signals in industrial automation. While digital communication protocols continue to evolve, engineers still rely on 4–20mA because of its exceptional reliability, simplicity, and compatibility with virtually every industrial control system.

One of the key advantages of the 4–20mA standard is its 4mA live zero. This enables control systems to distinguish between a genuine zero measurement and a fault, such as a broken wire, which would result in a 0mA signal. This built-in fault detection improves plant safety, simplifies troubleshooting, and reduces downtime. Additionally, unlike voltage signals, a 4–20mA current loop is largely unaffected by electrical noise and voltage drops, allowing process measurements to be transmitted accurately over long cable distances. In practice, the terms "4–20mA signal" and "current loop" are often used interchangeably because the signal is transmitted through a dedicated current loop between the field transmitter and the receiving instrument.

This simple yet highly reliable method has become the industry standard for analogue process measurement. This proven signalling method is widely used across modern industrial instrumentation, from temperature and level measurement to local process indication. The versatility of the 4–20mA standard is evident across a wide range of industrial instrumentation.

A good example is the TxRail-USB Temperature Transmitter, which converts inputs from thermocouples, Pt100, Pt1000, NTC sensors, and millivolt signals into industry-standard 4–20mA or 0–10V outputs. Its USB configuration, high measurement accuracy, and configurable diagnostics make it an efficient solution for modern process control.

Liquid level monitoring is another application where 4–20mA signalling excels. The WL320 Hydrostatic Submersible Level Transmitter and WL420 Submersible Hydrostatic Level Transmitter both use the hydrostatic principle to deliver stable 4–20mA outputs for tanks, reservoirs, boreholes, pumping stations, and water management systems. Their rugged stainless steel construction and dependable long-term performance make them ideal for demanding industrial environments.

Reliable process indication is just as important as accurate signal transmission. The panel-mounted DPM 942 4–20mA Loop Powered LCD Meter provides a large, easy-to-read display for operators, while the compact DPM 342 4–20mA Loop Powered LCD Meter offers the same dependable loop-powered operation where panel space is limited.

As industrial technology continues to advance, the 4–20mA current loop remains the trusted foundation for accurate, reliable, and universally compatible process measurement. Its proven performance, combined with modern transmitters and indicators, ensures it will continue to play a vital role in industrial automation for years to come.

Call us for more information on 4-20mA electronic devices.

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