

Why is the 4-20mA signal so Popular?

It's almost as old as the hills yet still performs a vital role in process control throughout the World. So what is it about the common 4-20mA signal that makes it so popular? Well, as is the case with many seemingly complex matters, simplicity appears to be the key.

A clever chap, **Gustav Kirchhoff** (below) devised a number of electrical circuit laws beginning starting in 1845. Kirchhoff was an Electrical engineering pioneer. His first law stated that:-



“At any node (junction) in an electrical circuit, the sum of currents flowing into that node is equal to the sum of currents flowing out of that node.”

This means that a current is constant at any point in a single loop.

Analogue transducers (pressure, temperature, flow etc) act like variable resistors in control loops so it is the transducer that varies the current value (usually to a maximum value of 22mA or so).

Current output signals are far more user friendly than voltage outputs. Voltage drops occur over long signal cables and although this can be corrected the subsequent signals are affected badly by electrical noise. The humble 4-20mA signal can travel for literally miles and is relatively unaffected by noise.

Why use an elevated Zero or 4mA?

Lets say a process signal, 0-100% is represented by 0-10Vdc or 0-20mA. All is fine so long as everything works perfectly. However in the event of a broken circuit or failed transducer, the process output will always fall to 0Vdc or 0mA.

An operator or process PLC has no way to differentiate if the process signal is correct or just 'low'. The elevated 4mA 'zero' allows a very fast diagnostic to show a fault condition. Very simple and the best thing of all? **It works!**

February 22 Christchurch Earthquake:

We are happy to report that all our staff are safe and our Christchurch office is operating normally following the 6.3 earthquake situated near Christchurch which has caused major damage to the central city and, most tragically, the loss of many lives. Our thoughts and sympathy go to all victims of the quake and their families.

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Intech don't do Fire sales...So here is an **UNBELIEVABLE 'DEAL'!!!**



**Fairchild I/P
Transducers
@ \$200.00 ex GST.**

4-20mA / 3-15PSi.
Ex-stock Christchurch.
Available now.

The I/P Transducer

One of the most influential process control devices of the 21st Century, the common Control Valve can be used to modulate **flow, pressure, temperature and level.**

Now, here at **Intech**, we 'love' electrical signals. You name it, we'll have some device to manipulate a signal in some way. Unfortunately electrical control just doesn't cut the mustard in all scenarios, particularly those in Hazardous areas or where ultimate reliability and safety simply cannot be compromised.

Enter PNEUMATIC control.

Pneumatic control was once the only way to control critical processes and in recent years it has made somewhat of a comeback. It's safe, very reliable and is unaffected by electrical noise, induced harmonics or signal transmission degradation.



I/P transducers provide the brains behind Pneumatic control. Ironically enough they most commonly require our old friend the 4-20mA signal as a primer to operate. In most situations 4-20mA = 3-15PSI of pressure, so again we have an elevated zero. Although this can be attributed as a failsafe method, 3PSI places a constant a load on a control valve spring and maintains linearity.

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