

Fieldbus Replacement For The 4-20mA Loop

We are all familiar with the isolated 4-20mA current loops presently being used in most industrial applications to provide remote information to a control room in a real time fashion. The first industrial bus was the foreman walking into the control and saying "Bubba, put on your raincoat and go down and read the boiler pressure." In actuality, the first recognized industrial bus was a 3-4 psi pneumatic loop. For parameters that needed monitoring, air hoses were run from the sensors to the control room and the values displayed on rotameters. In the sixties, the pneumatic loops were replaced by newer technology, the isolated 4-20mA loop. The 4-20mA loops are now being replaced by newer Fieldbus digital technology.

Fieldbus is a standard that describes a new digital communications network which will be used in industry to replace the existing 4-20mA analog signal. The network is a digital, bi-directional, multidrop, serial bus, communications network used to link isolated field devices. Fieldbus is a new technology, designed to take advantages of the capabilities present in today's new 'smart' sensors and field instrumentation.

The Fieldbus technology promises to improve quality, reduce costs and boost efficiency. This is derived partly from the fact that information which a field device is required to transmit or receive is transmitted digitally. This is a great deal more accurate than transmitting using analog methods which were used previously. Each field device is also a 'smart' device and can carry out its own control, maintenance and diagnostic functions. As a result it can report if there is a failure of the device or manual calibration is required, this increases the efficiency of the system and reduces the amount of maintenance required.

Fieldbus communications support three rates, 31.25Kbit/s, 1.0 Mbit/s, and 2.5 Mbit/s. The 31.25 Kbit/s option allows the Fieldbus to operate on existing 4-20mA wiring that is useful for cost effective plant upgrades. The 31.25Kbit/s option also supports intrinsically safe Fieldbus segments with bus powered devices. The Field bus interconnection architecture is based on a three layer subset of the architecture from the OSI (open systems interconnect) reference model developed by ISO (International Organization for Standardization). The three major functional components are: 1) the physical layer, 2) the data link layer, and 3) the application layer.

Fieldbus is developing as an international accepted standard. Although a couple of Fieldbus standards may become dominant worldwide, one factor is worthy of note. World committees are telling instrument manufacturers that an analog output is no longer needed or desired. If one is offered, it will not be used. This should lead to lower costing instrumentation because the generation of an analog output is an added, and relatively expensive, cost. H2NS products reflect this modernization and neither want nor need an analog output from instrumentation.

One version of the Protocol Converting Device, (PCD) offered by H2NS can provide a conversion from an RS-232 serial output offered by an instrument to an isolated Fieldbus network protocol. Please contact H2NS for more detail.