

UNDERSTANDING FOUNDATION FIELDBUS

BY TOM RUDD

The days of bulky products with slow speed and limited capabilities are behind us. Efficiency and effectiveness are the driving forces in today's industries, with a focus on products that can deliver maximum results in minimal time.



Foundation Fieldbus exemplifies this trend as a digital, bi-directional multi-drop communication link for multiple intelligent field devices and automation systems with a communications rate of 31.25 kB/s. Up to 32 sensors and actuators are possible on a fieldbus link with a maximum transmission distance of 1900m. Fieldbus cables carry both power and signal on the same one pair shielded cable.

SEGMENTS

A fieldbus segment starts at an interface device called an H1 card at the control system and consists of a Control Station, a terminator at each end, power conditioner/power supply, fieldbus cable and various devices which are all connected to a computer and operator workstation(s) via high speed ethernet (HSE). HSE is generally the control backbone of choice. HSE runs at 100 Mbits/second and supports the entire range of fieldbus capabilities.

Foundation Fieldbus is an open and flexible protocol that can be utilized, as required, for thousands or merely a handful of data points. It is able to be expanded at any time by simply adding to any segment.

DEVICES

32 devices (or more if repeaters are utilized) can be supported on a one pair Fieldbus cable. Variables that will reduce this number of devices are the power required, loop execution speed and process modularity. Typical segments will have from 1 to 16 devices with each device providing for multiple data variables.

A single pair fieldbus cable performs many functions for each device such as auto error correction, diagnostics and control

Some typical devices well suited for Fieldbus applications include:



- Flow Meters
- Valve Positioners
- Gas Detectors
- Actuators
- Pressure & Level Transmitters

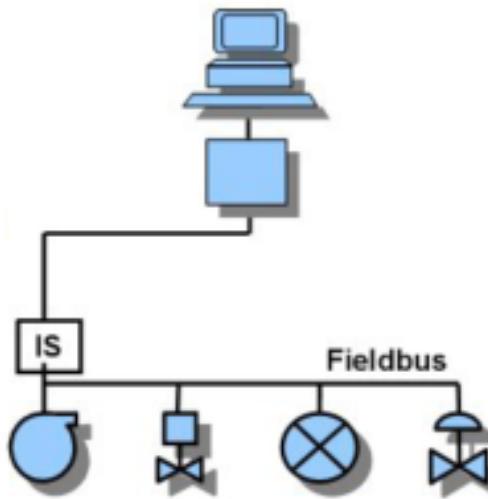
ADVANTAGES

Control in the field offers improved performance for pressure and flow applications over control in the DCS due to faster samples rates and shorter delays in the control loop cycle.

The new Fieldbus protocol provides very fast update rates up to 125 milliseconds. The communication

TECHNICAL ARTICLE

occurs between devices, actuators and controllers which have the capability to support control function block execution, allowing this rate to be possible.



The Fieldbus protocol is not solely beneficial for its speed, but for its use of multi-variables from a single multi-channel instrument, predictive maintenance scheduling due to enhanced diagnostics, remote calibration and operational statistical data. These benefits result in a safer operation with lower process variability, higher quality products, higher manufacturing productivity and reduced maintenance costs.

INSTALLATION

The installation process for a Foundation Fieldbus cable is much simpler than for an instrumentation cable in the same application. Less cable and fewer connections are required when using Foundation Fieldbus cables.

The grounding of a fieldbus installation must take into account safety, explosion protection, electromagnetic compatibility and all function requirements. Neither conductor of the fieldbus cable should be connected to earth or ground plus the shield must be grounded at one end of the cable only, which is typically done in the control room.

For any critical process segments it is recommended to provide redundancy on the main trunk cable in case something happens such as, damage to the cable from a forklift or water penetrating the cable. If a problem arises, the system can be switched to the backup segment with no lost time or cost.

Fieldbus technology is increasingly pertinent, particularly in process industries and power plants, due to its ability to generate an immense amount of live data that is available for remote calibration and improved problem diagnostic capability.

ShawFlex, a ShawCor company, has been a proud producer of Foundation Fieldbus Cables for various applications since 2009.



In 2010 ShawFlex celebrated 50 years in the wire and cable industry. For more information on ShawFlex please visit www.shawflex.com.