

Design, Installation and Maintenance of the Fieldbus System

This tutorial examines some of the Design, Installation and maintenance issues with Fieldbus and DeviceNet systems. It is broken down into:

- ◆ Wiring and Instruments
- ◆ Process Control Loops
- ◆ Maintenance
- ◆ Wiring and Instruments

The number of instruments that can be connected to a bus segment can vary depending on the Fieldbus standard being used. Typically with Foundation Fieldbus and Profibus-PA for example the following are the limits :

- ◆ 32 Devices if they are powered separately from the bus segment
- ◆ 12 Devices if they draw power from the bus
- ◆ 6 Devices for an Intrinsic Safe installation (and only 4 devices on the hazardous side)

Try and connect all instruments to a bus based on the Process Loop basis rather than physical location (ie how close they are). Doing it on the physical location can minimise cabling but it makes the system so much more complex and increases the risk in cases of failure.

Process Control Loops

An appealing feature of Foundation Fieldbus for example is to migrate the control logic (eg PID Blocks) down to the field level. If you are doing this a few simple principles are:

- ◆ Minimise the impact of device failure
- ◆ Assess carefully the impact on loop scheduling...how often the function blocks get serviced (and thus operate)
- ◆ Make troubleshooting of the device easy when a device fails
- ◆ Keep simple control algorithms in the valve positioner rather than the sensor

Maintenance

A suggested approach for calibrating a DP transmitter in a Foundation Fieldbus system could include:

- ◆ Get Agreement from all members of the Process Plant to proceed with maintenance activities on this particular device.
- ◆ Advise the operator that you wish to commence with calibration
- ◆ Operator switches function blocks to manual/out of service
- ◆ Operator disables all alarms and trips
- ◆ Operator disables all interaction with other function blocks
- ◆ Technician & Operator confirms that the correct instrument is being worked on
- ◆ Technician in the field manipulates the flow rate
- ◆ Zero and Calibrate the instrument
- ◆ Confirm that ranges and other settings are correct
- ◆ Confirm that the operator interface gives correct settings
- ◆ Put the instrument back to original process connections
- ◆ Handover back to the operator
- ◆ Update the documentation (including the change management documentation)