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## Remote I/O in Zone 1 at French Pharmaceuticals

**A company for highly pure pharmaceutical products in France have recently decided to modernize their production plant using Remote I/O and operator stations. For their production processes they wanted to employ advanced control technologies to ensure the highest quality and reliability. The following article deals with the advantages they have gained from this type of instrumentation.**

### The Engineering Task

The project was engineered to find a solution for Zone 1 hazardous areas distributed around the plant. Several buildings had to be linked to a central control system since PLCs or digital control systems are typically not suitable for Zone 1 mounting. Therefore it was decided to employ ATEX approved Remote I/O and operator stations, for personnel to control the process locally.

Each section had to fulfil a specific task. Churners, dryers, centrifuges, and other production equipment had to be interfaced with the process control system. In order to allow operators to control the production process locally and switch parameters as required an HMI system (human machine interface) was installed. This contains an operator station VisuNet, a panel PC for Zone 1/21, on which a SCADA-Package or a Soft-SPS is running.

The panel PCs were mounted at each location in Zone 1. This was made possible by the Ex-q (sand filling) method of explosion protection. The analog and digital inputs and outputs of the different process variables were connected to local Zone 1 Remote I/O to arrive at the shortest possible distance between the process I/O and the SCADA system. A PROFIBUS connection would then exchange data with the central DCS. This saved wiring on a major scale and helped to reduce costs.

VisuNet is designed not only for hazardous areas but also for rough operating conditions on the production floor. It has a stainless steel housing with an IP 66 degree of protection. Trackballs and joysticks are available to simplify control. This gives the production team the required flexibility to handle changing conditions and batches.

### **Benefits**

The combination of a powerful DCS system with a scaleable and flexible Remote I/O gave the end user a solution that employed automation & instrument technology, implemented in a simple manner at the same time providing a fast method of changeover when required.

All Remote I/O modules, including power supplies, are hot swappable. This fulfils an important precondition for maintaining operation even during maintenance work. During servicing, modules can be exchanged without additional work because the functions of the module being replaced are automatically transferred to the new one via the gateway. This prevents the connection of incorrect modules. The individual galvanically isolated circuits and the ready availability of the redundantly structured system contribute to the reliability envisaged by the planning team.

The Remote I/O supplier gave his full support from the initial concept and design stages through to the FAT extending also to installation and commissioning.

### **Remote I/O are intelligent junction boxes**

One of the outstanding features of the installation is the use of PROFIBUS. The reduced wiring requirements and the elimination of marshalling cabinets led to significant cost savings. Furthermore, the technology offers immense operating benefits thanks to central engineering and the option of requirement-oriented maintenance.

Remote I/O substations often also titled intelligent junction boxes (IJB) were used to connect the sensors and actuators. The IJBs are located in explosion-hazardous areas Zone 1. They are equipped with numerous Remote I/O modules in which the data streams are collected from the field and transmitted to the process control or local SCADA system via the PROFIBUS.

*Fig. 3*

### **Preventive Maintenance**

HART field devices can be configured and parameterized independently of the control communication protocol, using PACTware as a separate engineering tool. This supports the open, non-proprietary FDT concept and can be connected to the Remote I/O via the same PROFIBUS already being used by the DCS system. The two do not interfere with one

another as PACTware can run on a separate workstation. It employs PROFIBUS DPV1 features to make use of the time slots between control communications. This has proved to be extremely stable to this day.

The acyclic PROFIBUS DPV1 services allow on-demand access to all the device-specific parameters of the HART field devices via the FDT/DTM concept. Conversion of the HART information is performed entirely by the Remote I/O from Pepperl+Fuchs. The HART protocol is employed more and more throughout the industry to view field device parameters which can be used for preventive maintenance or stretching the regular maintenance intervals to reduce operating costs.

### **Summary**

The cost benefits during installation and the simple operation of the system have been sustained in the every day work. The local SCADA systems operating from the Zone 1 mounted displays, keyboards, and Remote I/O gave the operators the required flexibility for their batch processes.

Key words: VDU, operator work station, SCADA, panel PC, local display, local control, Zone 1, hazardous area, Remote I/O, operationally proven, integration in the process control system, FDT, preventive maintenance, intelligent junction boxes, VisuNet, operator station, Soft-SPS, IP 66

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Fig. 1: Plant for highly pure pharmaceuticals products



Fig. 2: Human Machine Interface



Fig. 3: Remote I/O acting as an intelligent junction box