Device Management – A tool checks everything
Remote control via DSV401 (SMART VISION), PROFIBUS
and the open interface FDT/DTM

Stadtwerke Kiel AG is a local power supplier who together with the strong partner MVV Energie AG dynamically and consistently meets the challenges of the liberalized market. In addition to the core business – the safe and reliable supply of current, gas, water and long-distance heating – the public utilities in Kiel aligned all activities with the future.

With five independent associations: 24|sieben GmbH, SWKiel Netz-GmbH, SWKiel Service GmbH, SWKiel Erzeugung GmbH and 24solution GmbH flexibility, speed and customer orientation are guaranteed in order to be the leading local energy provider also in the future.

Figure 1: With the consistent development of the energy trade, public utilities expanded a further line of business and daily benefit from the resulting chances.

Modern supply networks and the use of latest control systems ensure the round-the-clock supply of today’s and future generations. When planning modernization measures for a thermal power station with power and heat coupling, the public utilities in Kiel decided to install an efficient field device management. After thorough order examination, PROFIBUS was chosen.

The main task was to refurbish an old control room with miniature control room technology to a modern, computer-aided operation and observation system. The plant consists of three steam boilers, three steam turbines as well as of different ancillary facilities. Furthermore, a new heat exchanger should be integrated for capacity extension. The scope of signals was approx. 1800 data points (29 % analog / 71% digital).

Technical Background

PROFIBUS is a protocol agreement based on the RS485 transmission standard. It serves to connect various field devices with the higher-ranking control. PROFIBUS is available in two versions: as DP bus for “quick” or energy-intensive field devices or as ex-capable and power feeding variant PROFIBUS PA.

For this project a lot of analog signals (0/4…20 mA and/or 0…10V), which come from the field devices, had to be decoupled and converted to Profibus. This is effected by standard Remote-I/O units. New PROFIBUS PA transmitters from ABB replaced outdated transmitters, above all concerning the temperature and pressure measurements. For reasons of redundancy the various subsystems were split to different bus lines.

Fast the question arose how the parameter setting, commissioning and diagnosis of the connected PROFIBUS transmitters can be effected centrally and user-friendly.

In Figure 2 the basic principle is shown:

Since DSV401 (SMART VISION) from ABB as FDT/DTM-capable application was already introduced and accepted by the customer, ABB suggested to extend the existing DSV401 (SMART VISION) Stand-Alone-Tool by a PROFIBUS/Ethernet-Gateway. The equipment is an industrial personal computer for control cabinet installation. The PROFIBUS connection is realized with plug-in cards. The 1.5 Mbit/s cards have two PROFIBUS masters class 2 and the 12Mbit/s cards have one. The maximum stage of extension is six plug-in cards. Thus it is possible to manage up to 12 PROFIBUS lines (up to 1.5 Mbit/s) or 6 lines (up to 12 Mbit/s). In this way the Gateway can be extended as required. Windows NT is used as operating system. The addressing in the Ethernet is made via the IP address and/or the computer name.

The configuration computer only needs DSV401 (SMART VISION) with the respective communication modules. As usual in DSV401 (SMART VISION), the communication
module in the project tree is drawn by drag and drop to the left side under the Host PC as for example a COM interface. Then the individual PROFIBUS devices can be inserted easily under the communication module. Under the computer root (Host-PC) up to 12 communication modules can be linked. One communication module is required for each PROFIBUS line. When die project tree is finished and stored, the computer name or the IP address of the PROFIBUS Gateway as well as the card number and the card connection must be entered for the communication module under "Edit". For PROFIBUS communication: the bus address and the bus parameters. Thus all bus lines connected to the gateway and/or all configurable Fieldbus devices can be accommodated in a project. It is also possible to link different gateways and their bus lines to the respective project. Just like the parameter files the project file is filed centrally on a server. The advantage is that a remote access to the plant is possible by a DSV401 (SMART VISION) computer which is linked in the company network. Due to this the fault diagnosis in distributed plants becomes easier and the downtimes of the individual plant sections are reduced. The use of an Ethernet gateway does not at all affect the further functions of DSV401 (SMART VISION), for example it is still possible to access to serial or HART-capable field devices.

The FDT/DTM Concept

The FDT (Field Device Tool) technology has been developed by a working group of representatives from more than 20 well-known automation companies, such as ABB, CEAG, codeWRIGHTS, COMSOFT, Endress+Hauser, hilscher, ICS, ifak system, ifm, infoteam, invensys, KH-Automation Projects, KROHNE, metso, Moeller, MTL, M&M, OMRON, PEPPERL+FUCHS, PHOENIX CONTACT, Rockwell Automation, SICK, SIEMENS, Smar, Softing, STAHL, Trebing & Himstedt, TURCK, tyco / Flow Control, VEGA, wetcon, Woodhead and Yokogawa (Status: May 2005). The target is to specify an open communication interface for the device configuration and management which is independent of manufacturer and protocol. The result is the FDT specification on the basis of the Microsoft technology. (ActiveX/COM, XML, …) (1)

By means of FDT it is possible to include devices smoothly into engineering or stand-alone tools and control systems where a software component with the designation DTM (Device Type Manager) is used.

The DTM is made available by the device manufacturer, includes all information of the device and allows the complete configuration, maintenance and management of the device via a user-friendly standardized graphic surface. In Figure 3 the FDT/DTM principle in connection with the DSV401 (SMART VISION) topology used by "Stadtwerke Kiel" is described.

Figure 3: Use of a DTM for Field Device Management

Summary

“Stadtwerke Kiel” has developed an efficient field device management network where the DSV401 (SMART VISION) is used in order to configure and to manage all DTM-capable field devices. This system allows to determine faults from the distance as well as to preconfigure the necessary spare parts for a target-oriented installation. Thus, a back and forth between place of application and workshop becomes void. Since this system is open and manufacturer-independent, it is possible to extend the hardware and/or device management software (FDT/DTM) at any time. The extension by Ethernet/Profibus gateways can also be implemented without any problems. For smaller and medium-sized installations a one- to three-channel version of the Ethernet gateway is available on the market. This device is suitable for top hat rail assembly.

(1) FDT: Field Device Tool for the process control industry.

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