

Software for Power Distribution

18



18/2 Introduction

Configuring, Visualizing and Controlling with SIMATIC

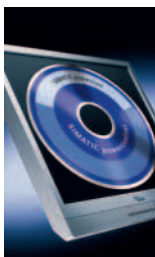
SIMATIC powercontrol

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Configuring, Visualizing and Controlling with SENTRON

Switch ES Power

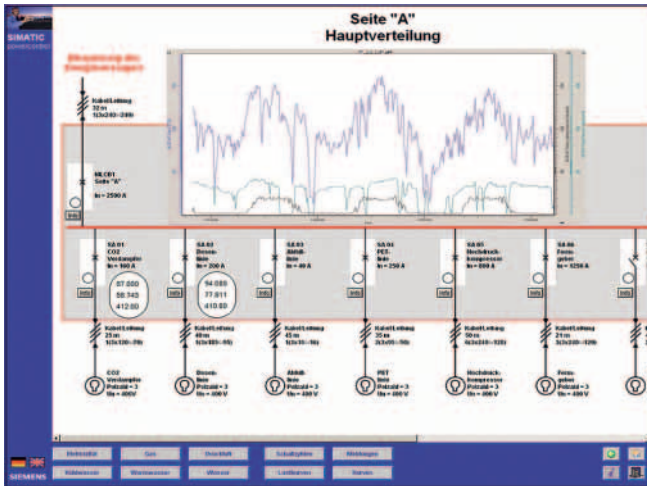
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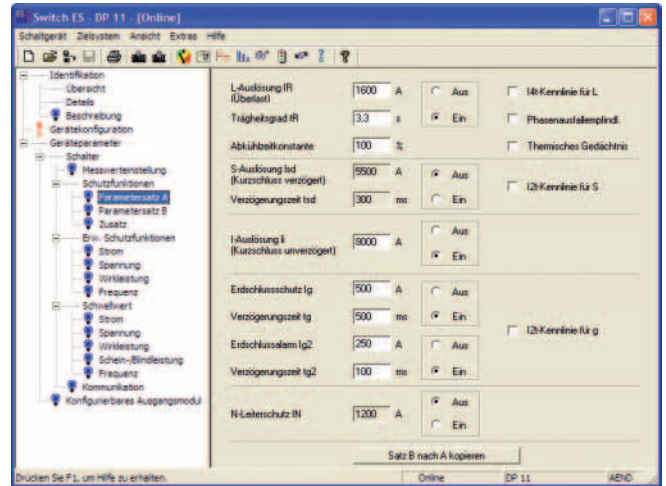
Software for Power Distribution

Introduction

Overview



SIMATIC powercontrol



Switch ES Power

SIMATIC powercontrol

Throws light on power flows - from infeed through distribution to loads - in order to permanently reduce the operating costs of power distribution systems:

- Central overview of all the power flows in a power distribution system
- Detailed overview of all switch states
- Knowledge of the demand profile from the continuous acquisition of power data
- Detailed consumption information and load-related assignment of amounts of power and costs
- Display and archiving of the consumption values, e.g. as 15-minute mean values
- Combination of different power types in one tool

Switch ES Power

Shared software platform for communication-capable SENTRON 3WL and SENTRON 3VL circuit breakers:

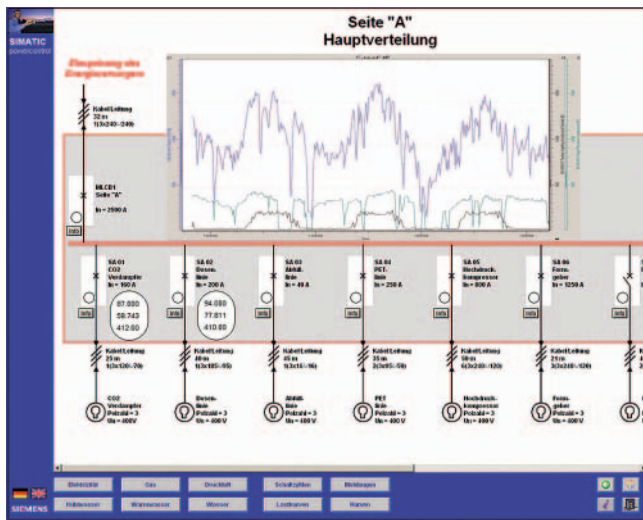
- Parameterization, documentation, operation and monitoring in one software
- Clear representation of all available parameters
- All the available status information and measured values are displayed in dialog boxes
- Software for SENTRON 3WL and SENTRON 3VL

Software for Power Distribution Configuring, Visualizing and Controlling with SIMATIC

SIMATIC powercontrol

Overview

SIMATIC powercontrol



By visualizing the energy flows in the entire power distribution system, i.e. from the infeed to the loads, SIMATIC powercontrol allows cost-effective power consumption within the system.

The continuous, complete measurement of all data relevant to energy ensures a high level of transparency and also makes it possible to draw conclusions on the energy behavior and possible savings potentials using standard assessments.

Current information on complete power distribution increases the availability of energy and the safety in the system, i.e. malfunctions are detected quickly, reported based on their causes and can therefore be remedied promptly and systematically.

With the automatic assignment of power consumption and energy costs to individual cost centers (consumption units), this provides a tool to assign power consumption and the associated costs based on causes and to indicate savings potentials.

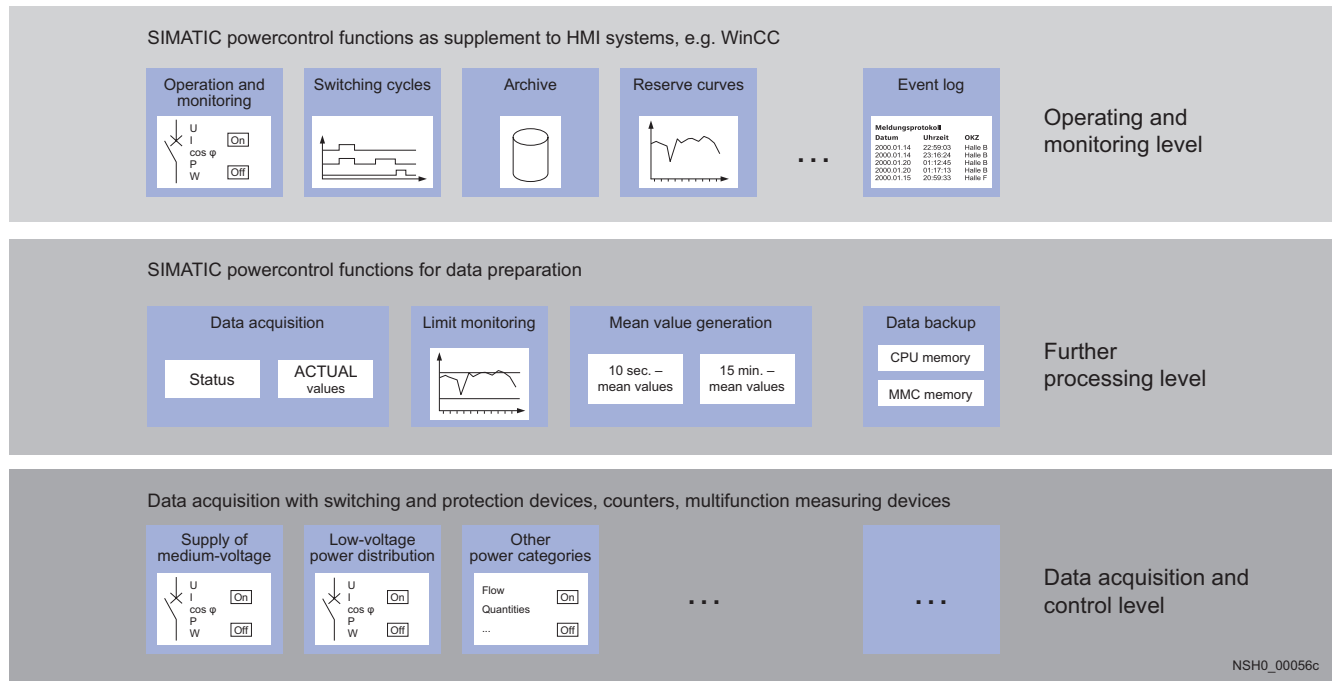
More information can be found on the Internet at:
<http://www.siemens.com/powermanagementsystem>

Software for Power Distribution

Configuring, Visualizing and Controlling with SIMATIC

SIMATIC powercontrol

Design



In the data acquisition and control level, the electrical power data are collected using the integrated measurement functions of the switching and protection devices for low-voltage and medium-voltage. Recording the consumption data of other types of energy is possible using suitable sensor technology.

SIMATIC powercontrol works with the 15-minute time cycles customary among power suppliers in the power industry. For indication of the ACTUAL value, the measured values in the processing level are recorded cyclically every 500 ms by a SIMATIC S7. Every 10 seconds, a so-called 10-second mean value is formed from the ACTUAL values. From a total of 90 of these 10-second mean values, one 15-minute mean value is calculated every quarter of an hour. In order to record the full range of the power consumption, the smallest and the biggest 10-second mean values are also saved in addition to the long-term power data on a 15-minute basis. Should the communication link to the operating and monitoring level fail, the power data are saved in the CPU memory or a multi-memory card.

All SIMATIC powercontrol functions in the operating and monitoring level are characterized by an open and standardized programming and communication structure based on Windows. All power-relevant data, such as measured values, switching operations or alarms are saved in a database. The saved data are evaluated, using pre-assembled image elements (so-called OCX elements). These are displayed in a standardized, user-configurable form with the help of status displays, reserve curves or switching cycle lists.

Switching units and protective units from Siemens can be integrated using pre-assembled OCX elements.

Software for Power Distribution Configuring, Visualizing and Controlling with SIMATIC

SIMATIC powercontrol

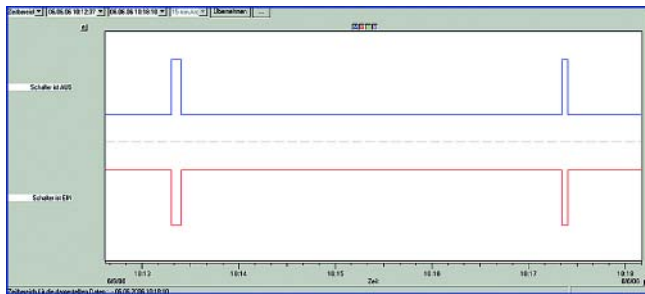
Function

SIMATIC powercontrol enables central visualization of the entire power flow in the control room. The individual power currents are evaluated, summarized and documented according to requirements. Power consumption thus becomes really transparent. Potential savings are systematically revealed, and a higher level of system efficiency is achieved.

Control room

The status of the power distribution system and the power flow in the various system sections are presented directly and centrally online in the control room. Current statuses and values as well as archived statuses and values from the past are drawn on for this purpose. In addition to the functions described in detail below, SIMATIC powercontrol also provides the possibility of remote switching directly from the control room. This enables fast and selective reactions and provides greater safety for personnel.

Switching cycle lists



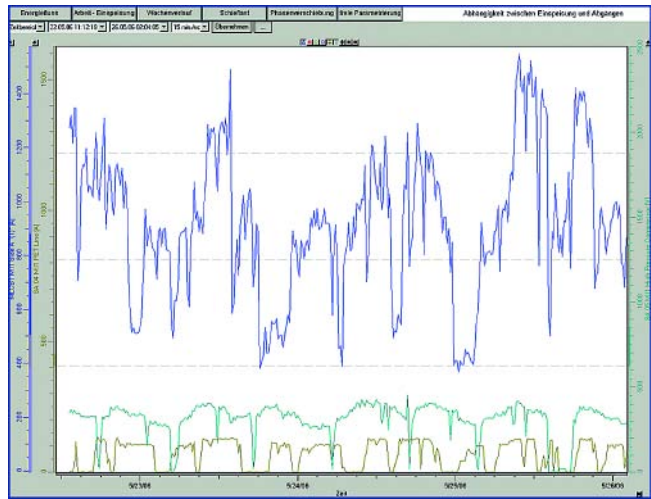
In addition to indicating the current status, its development over time can also be presented in the form of switching cycle lists. The switching cycle list documents the transition of a status and provides a possibility of identifying relationships between the signal curves. It becomes perfectly clear what caused the switching and from where. Each switching of a switching device is recorded regardless of whether it was triggered centrally from the control room or by hand directly on site.

Message protocol

Zeitstempel	MessageID	Quelle	Obj.	Obj.	MessageID	Obj.	MessageID
20.06.2008 11:18:24.810	1118	Information	PLC08_008_AUS	1	1118	1118	1118
20.06.2008 11:18:24.820	1118	Information	SA 08_Bayer_Halle	1	1118	1118	1118
20.06.2008 11:18:24.830	1118	Information	SA 08_High-Pressure-Compressor	1	1118	1118	1118
20.06.2008 11:18:24.840	1118	Information	SA 08_Werk	1	1118	1118	1118
20.06.2008 11:18:24.850	1118	Information	SA 08_Polymer	1	1118	1118	1118
20.06.2008 11:18:24.860	1118	Information	SA 08_Canister	1	1118	1118	1118
20.06.2008 11:18:24.870	1118	Information	SA 08_CSD_Vaporizer	1	1118	1118	1118
20.06.2008 11:18:24.880	1118	Information	PLC08_Cooling-Heil	1	1118	1118	1118
20.06.2008 11:18:24.890	1118	Information	SA 08_Factory's lighting bridge and Guards	1	1118	1118	1118
20.06.2008 11:18:24.900	1118	Information	11.2 Light 1	1	1118	1118	1118
20.06.2008 11:18:24.910	1118	Information	11.2 Light 2	1	1118	1118	1118
20.06.2008 11:18:24.920	1118	Information	PL 04 Lighting-Problem 1	1	1118	1118	1118
20.06.2008 11:18:24.930	1118	Information	PL 04 Lighting-Problem 2	1	1118	1118	1118

All status changes in the distribution and limit violations are documented in the form of a message according to defined parameters (date/time; site, system, device and function IDs and detailed message text). Each message can be assigned to various types of acknowledgement and is automatically archived. Actions and reactions in the power distribution system over a long period of time can thus be verified. All switching operations and limit violations are displayed as transparent.

Reserve curves



Measurements over a period of time are graphically represented by reserve curves. Here, it is possible to work with 15-minute time cycles or user-defined time cycles. On the one hand, it is thus possible to document the utilization of feeders or the overall plant in a clearly arranged and simple manner. On the other hand a comparison can be drawn with the original configuration of the power distribution. Plant extensions within the existing framework can be implemented with greater precision and cost-effectiveness – additional infeeds and unnecessary investments are avoided.

Cost center management

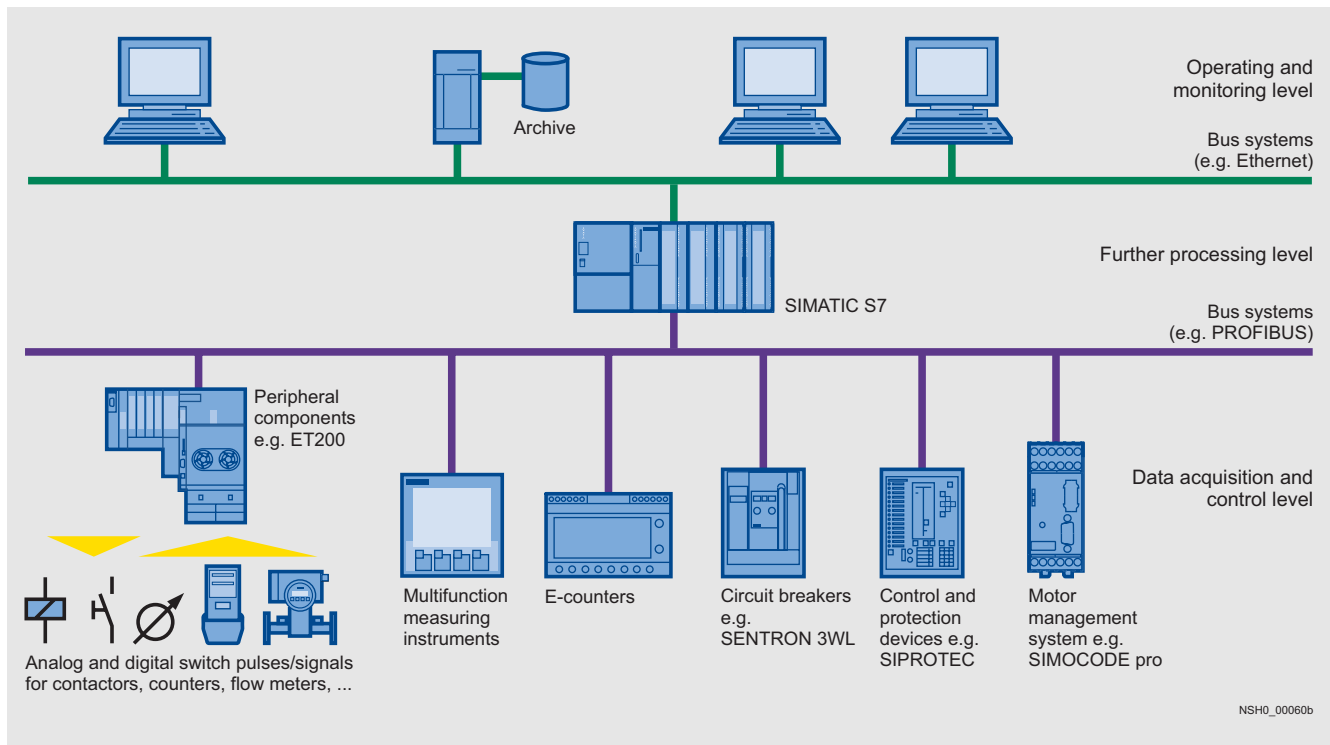
It is possible to show the resulting costs per cost center at any time through easy-to-follow reports. The cost center reports can be issued cyclically, event-based or as necessary and thereby allow a comparison of consumption/costs over different times or cost centers.

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SIMATIC powercontrol

Integration



Connection

The connection of the power distribution to SIMATIC powercontrol takes place in the data acquisition and control level using the integrated measurement functions of bus-capable units such as SENTRON circuit breakers, multifunction measuring instruments and power meters, as well as medium-voltage protective equipment such as SIPROTEC. The existing measuring instruments can remain in use if they have standardized interfaces (S0 interface, 20 mA, 10 V, PT100).

Recording the consumption data of other types of energy is possible using suitable measuring equipment through the central or distributed I/Os of the SIMATIC S7. The wide range of possibilities provided by SIMATIC S7 gives the user the necessary freedom for recording other types of energy using e.g. analog signals or for connecting devices from other manufacturers.

Data transmission and storage

SIMATIC S7 modules which were parameterized with SIMATIC powercontrol are responsible in the further processing level for processing all the collected data such as standardization, mean-value generation, time stamping and limit monitoring. The complete archiving of data is assured by the short-time backup in the SIMATIC S7 (up to 7 days depending on the volume of data and the size of the available memory) should the communication connection to the operating and monitoring level be faulty. All temporarily stored power data are automatically transmitted to the operating and monitoring level as soon as the connection is available again. An Ethernet-based communication system, e.g. PROFINET, is used as the connection medium.

The long-term archiving as well as indication of all power-relevant data is assured in a database in the operating and monitoring level. Through the complete data recording, beginning in the data acquisition and control level and extending through the processing level to the operating and monitoring level, the user is assured of finding all the power data in a seamless time sequence. In overview diagrams, the user is informed about the current status of his power distribution system. Various presentations enable an evaluation of the power data in order to track down potential for optimization. All SIMATIC powercontrol functions in the operating and monitoring level can be integrated in all Windows-based HMI systems, e.g. WinCC, thanks to the open and standardized programming and communication structure.

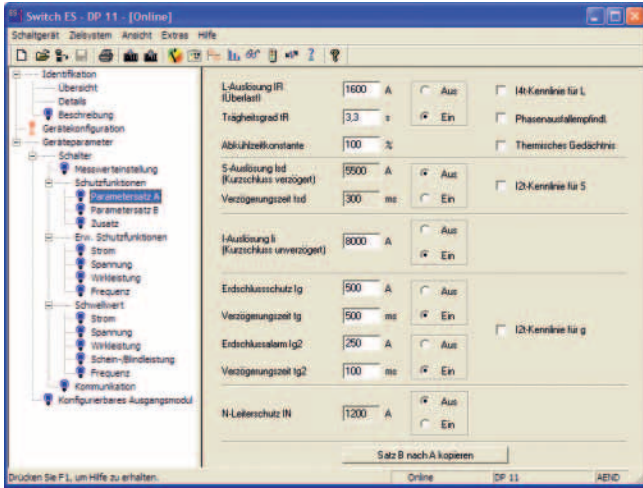
Software for Power Distribution

Configuring, Visualizing and Controlling with SENTRON

Switch ES Power

Overview

Switch ES Power



Adjustment of parameter set A with Switch ES Power

Switch ES Power is the shared software platform for communication-capable SENTRON circuit breakers. This has the advantage that all device-specific setting options are identical in terms of appearance and handling.

Switch ES Power can be used to configure, document, operate and monitor the SENTRON 3WL and SENTRON 3VL circuit breakers through PROFIBUS DP.

More information can be found on the Internet at: <http://www.siemens.com/sentron>

Design

The design of both the data tree and the individual data windows has been cross-referenced and harmonized with the structure of the Breaker Data Adapter. As a result, the same functions and information are available. Due to its support of the innovative PROFIBUS DPV1 function, it is particularly easy to link up a computer to the PROFIBUS using Switch ES Power. Simply connect, select the PROFIBUS address and start communication, even if the SENTRON circuit breakers are simultaneously exchanging data with another station (e.g. S7) via the PROFIBUS.

With Switch ES Power, it is also possible to create parameter sets offline without a direct connection to the circuit breaker. These parameter sets can then be transmitted to the SENTRON circuit breakers in the plant at a later stage.

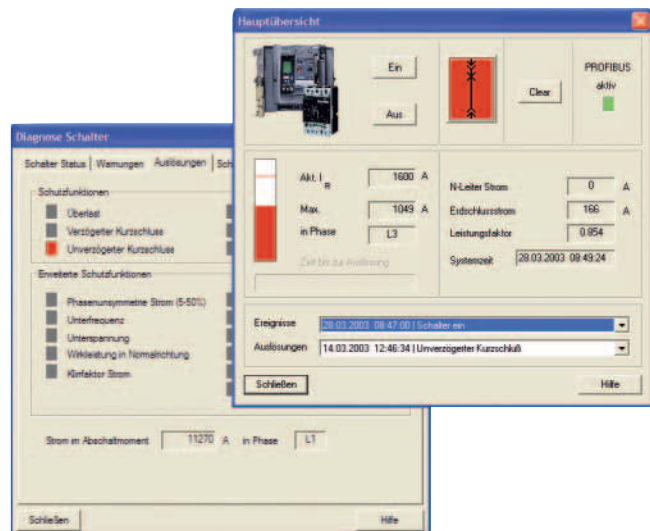
Function

The Switch ES Power is used to load and display the control identification data. Depending on the circuit breaker configuration, the parameters for the protection function (LSING), the extended protection function, the configurable threshold values, the communication, and the configurable output module are displayed. These can be modified accordingly and loaded and stored on the switching device. Various online dialog boxes are available depending on the type of circuit breaker:

- Main view
- Diagnostics window
- Measured values window
- Window for displaying the harmonic analysis
- Window for displaying the curve form memory
- Dialog box for maintenance and statistics

The memory formats of the BDA and Switch ES Power are identical, which means that it is for example possible to generate central parameter files with Switch ES Power and then copy them to a notebook with the BDA for use by service personnel.

Switch ES Power supports all PROFIBUS cards for the Siemens PC/notebook. Some cards require an additional software package (driver); for more details refer to the interactive Catalog CA 01.



Online functions with Switch ES Power

Integration

Object manager of Switch ES Power

The Object Manager (OM) of Switch ES Power is used to integrate Switch ES Power into the STEP 7 environment, and therefore also into the Totally Integrated Automation (TIA) concept. This allows Switch ES Power to be called from the HWConfig Tool from STEP 7, and the SENTRON 3WL/3VL circuit breakers to be parameterized. This data is then stored in the STEP 7 database and automatically transferred to the circuit breaker via the PROFIBUS DP during every start-up (PLC, slave).



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Notes

