Ecologically valuable. Economically unbeatable.

Power Management for Efficient Energy Utilization

Power Management

Answers for industry.

SIEMENS
Energy costs traps abolished

“s” as in saving potentials – through intelligent power management
Whether electricity, water or gas – against the background of rising prices and the increased sensitivity towards environmental issues, energy is becoming an ever more valuable resource. This is a major challenge in application areas where high energy volumes, maximum availability and permanent cost reductions are crucial factors. In the process- and production-oriented industries and the functional building sector, the subject of energy saving is a fixed part of the everyday agenda. But, where are the starting points? Which measures bear the largest potential? And how can these measures’ effectiveness be detected and documented after their implementation? These are multifaceted questions which can be clarified with a single solution: our power management system.

The power management system by Siemens provides you with an innovative and future-proof solution for optimized energy utilization and considerably reduced power costs – with saving potentials of up to 20 %. This complete solution meets the requirements in terms of maximum power consumption transparency and energy quality, as well as in terms of power distribution reliability. The precise data acquisition of the switching, protection and measuring devices – such as the SENTRON PAC3200 power monitoring device – is the ideal basis for optimization measures. Power values can be easily displayed and evaluated by means of the SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate power management add-ons with comprehensive functions, which are integrated in Totally Integrated Automation. This not only facilitates the power consumption’s transparent representation, but also cause-based cost center allocation, as well as automatic load management.

Systematic power distribution control

Siemens offers a unique and integrated portfolio for the entire field of low-voltage power distribution – all from a single source. It represents the market’s broadest portfolio and is comprised of power distribution boards, busbar trunking systems, switching, protection and measuring devices, and intelligent power management solutions. The consistency, modularity and intelligence of our components offer a multitude of advantages – over your systems’ entire service life.

Our first-class products and systems form part of Totally Integrated Power, our technological platform for integrated, efficient and reliable power distribution in functional and industrial buildings. Our portfolio is rounded off by a comprehensive service and support concept which you can rely upon in all cases. You no longer need to worry about your power distribution – thanks to the support of our system.

Optimized utilization of valuable energy resources:
Systematic Power Management
With the integrated power management system by Siemens, you can easily optimize your energy consumption and drastically reduce your operating costs – in three phases with significant step-by-step results.

First, you are provided with the basis for increased energy efficiency: maximum transparency of your power flows through constant and seamless data acquisition. The better the overview is of your consumption, the more efficiently existing energy saving potentials can be detected and utilized.

In the second phase, the detected consumption data are represented in a cost-by-cause manner. This discloses the location and volume of your energy consumption and increases the power cost awareness throughout your company. In the last step, you are enabled to perfectly plan and control your energy utilization in order to reliably avoid costly consumption peaks and fully utilize unused resources.
Advantages of the Power Management System at a Glance

- Reduced operating costs...
  - Identification of energy-intensive consumers for the implementation of energy-efficient measures
  - Support of energy purchasers through the provision of historic demand profiles and energy consumption samples
  - Optimized capital expenditures for system expansion projects through the localization of hidden power distribution reserves
  - Improved energy cost awareness in the departments through accurate cost center allocation
  - Reduced demand costs of power supply contracts through limitation of load peaks
  - Avoidance of additional costs through load management

- ... and increased system availability
  - Prolonged operating periods through immediate and automatic detection of critical conditions (e.g. alarm and event logs)
  - Avoidance of overload situations through early detection of the power distribution’s capacity limits
  - Assured quality of the electrical energy through continuous monitoring and analysis
  - Optimized maintenance expenditures through analysis of the power distribution components’ application
With our power management system, we offer a unique solution – fully integrated in Totally Integrated Automation and based on SIMATIC.

Our portfolio is unrivaled as SIMATIC-based power management offers the following benefits:
- Full integration of the electrical power distribution in your automation environment
- Broad application of the power management system thanks to optimum support of all energy types
- Continuous evaluations and analyses of your power consumption
- Transparency as a basis for sustainably increased and controlled energy efficiency

**Unbeatable:**
*One principle for all requirements*

Thanks to the unique SIMATIC automation platform and intelligent field devices, both the sectors of production automation, as well as those of process automation can utilize innovative power management as an additional instrument for reduced costs and increased efficiency. The technological approach of a SIMATIC-based power management system is always identical: The energy data are measured via intelligent sensors and actuators, collected by SIMATIC PCS 7 and SIMATIC WinCC powerrate, processed, and then saved in the standard PCS 7 or WinCC archive. The data are displayed via SIMATIC HMI operator stations, after which further evaluations can be carried out.

**Benefit from the advantages of the unique SIMATIC platform:**
- Considerable cost reductions thanks to an integrated system approach: already available automation components such as controllers, operator stations and bus structures can be utilized
- Increased acceptance and reduced engineering expenditures through uniform technology
- Avoidance of redundant data storage and information islands
- Assurance of consistent information such as time stamps and event sequence
- Maximum flexibility through direct access to the power distribution status and process organization according to energy-optimized conditions
- Significant effort and cost savings, as many energy values are already frequently available in the automation solution (S7/PCS 7)
- Clear avoidance of additional integration expenditures, as standard interfaces – e.g. to SIMATIC IT – can be used
Methodical system layout:

**Power Management Integrated in Totally Integrated Automation and Totally Integrated Power**

With power management by Siemens, you invest in an innovative and future-proof system. Based on industrial technology, it meets particularly high requirements in terms of quality and availability. As part of Totally Integrated Automation and Totally Integrated Power, it provides you with the benefits of product and system consistency, application of standard components, uniform operating philosophy, and reduced engineering expenditures. In short: Power management by Siemens reaches the full potential of an integrated solution’s optimization.

**Flexible applicability:**

**Powerful components**

Communication-capable products from the SENTRON and SIRIUS ranges, such as the SENTRON PAC3200, the SIMOCODE pro motor management system and the SENTRON 3WL circuit breakers, can be easily integrated in the superior power management system. For example, the SIMOCODE pro measured value block under SIMATIC PCS 7 provides the input variables for the power detection blocks of SIMATIC PCS 7 powerrate on the basis of electrical active power. Devices for medium-voltage or for non-electrical measuring variables can also be easily integrated. Also the data of non-communication-capable field devices are provided – via the connection of I/O modules such as SIMATIC ET200 to PROFIBUS. The consumption data of other energy types can be detected via the central or distributed I/O of the SIMATIC S7 by means of corresponding measuring technology.
Innovative power management add-ons:
SIMATIC PCS 7 powerrate and SIMATIC WinCC powerrate

Whether process-oriented sectors, such as the chemical, glass, food & beverages industries, or production-oriented sectors such as the automotive industry – we offer a uniform power management approach for all industrial sectors.

The SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate add-ons, based on tried-and-tested industrial technology, support the transparency and control of your power distribution system and costs – in the same way in which you already rely on SIMATIC WinCC and PCS 7 for your technological process.

Energy data are continuously acquired, archived, processed, allocated to cost centers, and monitored for load peaks on the basis of comprehensive and reliable functions. This facilitates efficient power procurement and thus supports reduced energy and operating costs.

Creating transparency: Measured-value acquisition and processing

Power distribution, current values and consumption curves at a glance

The transparency of your power distribution forms the prerequisite for any kind of energy optimization. SIMATIC PCS 7 powerrate and SIMATIC WinCC powerrate provide a perfect overview of your power consumption – from the infeed down to the consumer.

Energy transparency: The basis for further optimizations

With continuous power data acquisition and central evaluation, you are provided with comprehensive information on the energy flow. In addition, the correlation between process flows and consumption is revealed. The add-ons support a broad range of applications: In addition to electrical energy, SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate can also be employed for all other energy types such as water, gas, heat or compressed air.
Improved information flow: Determination and representation of consumption data

Knowledge of how much energy is consumed in the system and where – this requirement is met by both add-ons in multiple ways. You can have all of the acquired power values displayed online on the monitor in predefined faceplates and directly enter the energy data of non-communication-capable meters in the system. For the detection of electrical power values, the SENTRON PAC3200 power monitoring device offers prefabricated drivers for seamless integration into the world of Totally Integrated Automation.

Targeted optimization: Graphical comparison options

Your power data are not only displayed online, but are also saved as demand or energy values. For adjustment to diverse media, these values can be calculated and archived with independent interval times. For comparison, the average values can be displayed as load curves. For predictive monitoring of the power demand limit, an estimation of the complete period is calculated, based on current consumption, and visualized in the faceplate. This way, any pending limit violations are immediately detected. The choice between energy and demand values is up to you – both types are supported.

Efficient data processing: Interfaces and export function

Thanks to the seamless integration in Totally Integrated Automation, all available standard mechanisms, such as messages and connection to SIMATIC IT, can be effortlessly utilized. Furthermore, open interfaces offer numerous options for specific adjustments. For example, a calculation function for heat enthalpy is available. The export to Excel represents a convenient option for additional analysis and reporting: All measured values are available for further processing after simply entering the period and the variables to be exported.

Cost-by-cause allocation: Cost center management

The automatic, cause-based allocation of energy and costs to individual corporate units supports versatile possibilities: On the one hand, it facilitates transparent energy cost allocation and, on the other hand, it forms the important basis for benchmarking activities in the field of energy saving measures.

Knowledge of the location and volume of power consumption

A cost-by-cause allocation of energy requires structured cost centers. With the help of predefined Excel macros in SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate, you can easily allocate your cost centers to the corresponding consumption measuring points. For optimum adjustability to the process, measuring points can either be allocated to a cost center on percentage basis or measurements can be interlinked via a freely definable formula. Also, manually entered consumption data can be incorporated.

Improved efficiency

Besides the actual energy consumption, the resulting costs are also decisive. Within the Excel macros of SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate, on-peak, off-peak and holiday tariffs can be specified. The power costs per cost center are calculated on this basis.

Comfortable evaluation

SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate calculate the overall consumption and the power costs for a specified period in Excel. The calculation is based on the exported consumption data, as well as the configured cost centers and tariffs. Two standard reports are available – in table or bar chart form. With Excel as standard tool, the reports can be user-specified or expanded.
**Reliable power demand limit monitoring: Load management**

Most contracts with power supply companies also include an agreement on the demand rate, in addition to the costs for the consumed work (e.g. kWh). The maximum average power demand value period specified in the power supply contract – which typically amounts to 15 min. with electrical energy – has to be complied with, as exceedance frequently results in drastically increased costs. Therefore, the monitoring of your power demand limit is an important aspect for maintaining the power budget.

**The first step: Trend calculation and comparison**

As a basis for staying within the power demand limit, the predicted demand has to be determined early in the measurement period. This predicted value is compared with the specified power demand limit. In case of a forecasted limit exceedance, you are informed via a warning or alarm in the WinCC message list. This enables you to manually intervene with the process in order to avoid limit exceedance and also demonstrates the efficiency of which the specified limit is utilized by the process.

**Safe monitoring: Automatic load management**

In addition to trend calculation and message generation in case of pending limit exceedance, you are also offered the capability of directly managing your consumers. This means that the system generates so-called release or blockage signals on the basis of a specified priorities list. These signals either cause a direct disconnection of the consumer or signal the appropriate equipment to reduce load. To eliminate unnecessary switching operations, various parameters are available to adjust the load management to the specific process and consumer conditions. For example, settling times in the form of min./max. switch-off times as well as minimum switch-on times can be specified.

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**The advantages of SIMATIC WinCC powerrate and SIMATIC PCS 7 powerrate at a glance**

- Reduced operating costs through increased transparency of the power flows
- Increased energy cost awareness through cost-by-cause allocation
- Avoidance of high penalties through monitoring of the power demand limit specified in the procurement contract
- Application reliability through certified system components which comply with Totally Integrated Automation
Ordering Information, Scope of Supply and System Requirements

SIMATIC WinCC powerrate V 2.0 and SIMATIC PCS 7 powerrate V 2.0 are available as basic version (engineering + 1 runtime license for one automation system) and expansions per automation system (1 runtime license). The licensing thus depends on the number of SIMATIC S7 units installed in your system, i.e. you only require as many licenses as the number of PLCs employed.

**SIMATIC WinCC powerrate**

<table>
<thead>
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<th>Engineering + 1 AS runtime license</th>
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The product CD-ROM contains:
- S7 blocks
- Faceplates for WinCC
- Excel macros
- User manual

System requirements:
- SIMATIC WinCC V 6.2 SP2
- or SIMATIC WinCC V 7.0
- MS Excel 2000 or MS Excel 2003
- PLC: S7-317 CPU 317 or higher or S7-400

**SIMATIC PCS 7 powerrate**

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The product CD-ROM contains:
- S7 blocks
- Faceplates for WinCC
- Excel macros
- User manual

System requirements:
- SIMATIC PCS 7 V 6.1 SP1
- or SIMATIC PCS 7 V 7.0 SP1
- MS Excel 2000 or MS Excel 2003
- PLC: S7-400
If you want to sustainably reduce your power costs, you first need an overview of your electrical system’s actual current consumption and power flows. This is where the SENTRON PAC3200 power monitoring device comes in: This power meter not only precisely and reliably indicates the power values for electrical feeders and consumers, but also important measurements such as voltage, current, power, power factor and several other parameters. For further processing of the measured data, our SENTRON PAC3200 can be easily connected to power management systems thanks to its multitude of communication options.

Precise control of electrical characteristics and power:
The SENTRON PAC3200 Power Monitoring Device

Comprehensive and precise: Power measuring
The SENTRON PAC3200 detects active, reactive and apparent power – imported and exported. The power monitoring device is highly flexible and measures power values for both on-peak and off-peak tariffs. In addition, the SENTRON PAC3200 measures each period’s power demand values for active and reactive power. These values can be archived in load profiles in a power management system.

Multifunctional: Integrated communication
The highlight of the SENTRON PAC3200: It is communication-capable and equipped with an Ethernet interface as a standard – an exception compared to competitive devices in this performance class.

This way, the power monitoring device can easily be integrated in any power management or automation system via Ethernet, PROFIBUS DP or MODBUS RTU. Via communication, the SENTRON PAC3200 supplies measured values to the monitoring systems, where the data can be further processed for indication or control tasks, facilitating intelligent and sustainable power management. Furthermore, a PCS 7 block library, which allows for a seamless integration of the power monitoring device in the PCS 7 process architecture, is offered with SIMATIC PCS 7 Library PAC3200.
Operating menu example:
The texts can be displayed in several languages. Language selection is carried out directly on the device. The large, graphical LC display supports reading even from great distances. For optimum readability – also with poor light conditions –, the SENTRON PAC3200 features an adjustable background illumination.

Fully graphical LC display with indication of:
- Display title
- Phase
- Measured value
- Unit
- Function key labeling

4 function keys for device operation with context-sensitive key description on the display

Highlights at a glance

- **Broad application area** due to a large function and performance scope
  - Direct connection to industrial networks up to 690 V, CATIII
  - Optional measuring via voltage transformer
  - Connection to current transformer x/1 A or x/5 A
  - Application in systems with UL/CSA requirements
  - Application in harsh environments: dust and splash water protection (IP65) through standard built-in gasket

- **Minimum space requirements through compact design:**
  96 x 96 x 56 mm (W x H x D), installation depth: 51 mm or 73 mm with expansion module

- **Basis for accurate cost allocation** through high accuracy energy measurement Class 0.5S in acc. with IEC 62053-22 for active power

- **Superior readability even in poor lighting conditions** due to a large, illuminated graphical LC display

- **Easy operation** through intuitive user prompt with multilingual plain text displays

- **Rapid mounting** through easily latching retainers, also mounting without tools possible

- **Comprehensive consumption data** through 10 energy meters for active, reactive and apparent energy, on- and off-peak tariff, import and export

### Ordering information

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<tr>
<th>Equipment Description</th>
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<tr>
<td>SENTRON PAC3200 power monitoring device with DC extra-low voltage power supply unit and screw-type terminals</td>
<td>7KM2111-1BA00-3AA0</td>
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<tr>
<td>SENTRON PAC3200 power monitoring device with AC/DC wide-voltage power supply unit and ring lug terminals</td>
<td>7KM2112-0BA00-2AA0</td>
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<td>SENTRON PAC PROFIBUS DP expansion module</td>
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<td>SENTRON PAC RS485 expansion module</td>
<td>7KM9300-0AM00-0AA0</td>
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<td>SIMATIC PCS 7 Library PAC3200 block library for integration in PCS 7</td>
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Service and Support

Information

Easy download of catalogs and information material
The latest catalogs, customer magazines, brochures, demo software and special bargain packages are available for download or ordering in our Information and Download Center:
www.siemens.com/lowvoltage/catalogs

Planning

Configurators for ease of handling
Our configurator selection is available at:
www.siemens.com/lowvoltage/configurators

Ordering

E-business
24/7-access to a comprehensive information and ordering platform for products and systems of the low-voltage controls and distribution portfolio? Comprehensive information on our complete portfolio? Product selection, order tracking, service, support and training information? All this can be conveniently found in our Mall at:
www.siemens.com/lowvoltage/mall

Newsletter
Always up to date: Our regular newsletter provides you with topical information on our industrial controls and power distribution products. Simply register at:
www.siemens.com/lowvoltage/newsletter

Online support
Reports and technical data sheets for our products can be found at:
www.siemens.com/lowvoltage/support
Online support
Detailed technical information on our products and systems of the low-voltage controls and distribution portfolio, product support and further services and support based on helpful support tools can be found at:
www.siemens.com/lowvoltage/support

Technical Assistance
You are looking for the right product suit- ing your application? You have technical questions, require spare parts or want to localize a regional expert? Our expe- rienced team of engineers and techni- cians will be pleased to assist you:
- Personally from Monday to Friday, 8.00 am to 5.00 pm (CET) via tele- phone support: +49 911-895-5900
- Via e-mail: technical-assistance@siemens.com
- Via fax: +49 911-895-5907

At www.siemens.com/lowvoltage/technical-assistance, you can also access the Service & Support Internet platform for Industry Automation and Drive Technologies. Here, you can search the FAQ database for information and solutions matching your task or di- rectly send your questions to our technical consultants via the support request.

Training
Our training centers at numerous sites worldwide offer individual training pro- grams covering all fields of automation and industrial solutions. Moreover, with the help of our online courses and vari- ous learning software, you can acquire new know-how even more time- and cost-efficiently. More information on our comprehensive SITRAIN training program is available on the Internet at www.siemens.com/sitrain-cd

Or contact us personally:
- Via information hotline: +49 1805 25 36 11
- or fax: +49 1805 23 56 12
For further information ...

please contact your local Siemens sales partner.

For technical questions, please contact:
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Tel.: +49 911 895-5900
E-mail: technical-assistance@siemens.com

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