Measuring Devices and Power Monitoring

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PC-based power monitoring system

Overview

Components of the PC-based power monitoring system

User interface of powermanager

Power monitoring system with the SENTRON product family

The SENTRON product family offers the user not only power monitoring software in the form of the powermanager, but also the corresponding hardware in the form of 7KT/7KM PAC measuring devices and 3WL/3VL circuit breakers for implementing a complete power monitoring system.

The components are optimally coordinated with each other. For example, special drivers for the SENTRON devices are integrated in the powermanager software so that on the one hand, power data acquisition can take place without any great configuration effort and, on the other, the most important measured values or states are indicated by predefined displays.

This reduces the engineering work for the customer and gives the user the assurance of knowing that the device functions are optimally supported in the software.

Features of powermanager

The powermanager power monitoring software is the central feature of the PC-based power monitoring system and

- is an independent power monitoring software.
- can be operated using a PC and measuring devices with Ethernet connection.
- is expandable from the simple standard application to a fully flexible customer solution.
- is fully scalable with regard to the number of devices and the software's functions.
- ensures optimum integration of measuring devices from the 7KT/7KM PAC range, as well as 3WL/3VL circuit breakers and other Modbus devices.

Benefits

- Transparency of power flows
- Exact knowledge of the consumption profile
- Increased power efficiency
- Optimization of power supply contracts
- Compliance with contractual terms
- Allocation of power costs to cost centers
- Optimization of plant maintenance
- Identification of critical plant conditions
- Available languages:
  German, English, Spanish, Portuguese
- Support of the various device communication interfaces (Modbus RTU, Modbus TCP)
- Status display of devices

Application

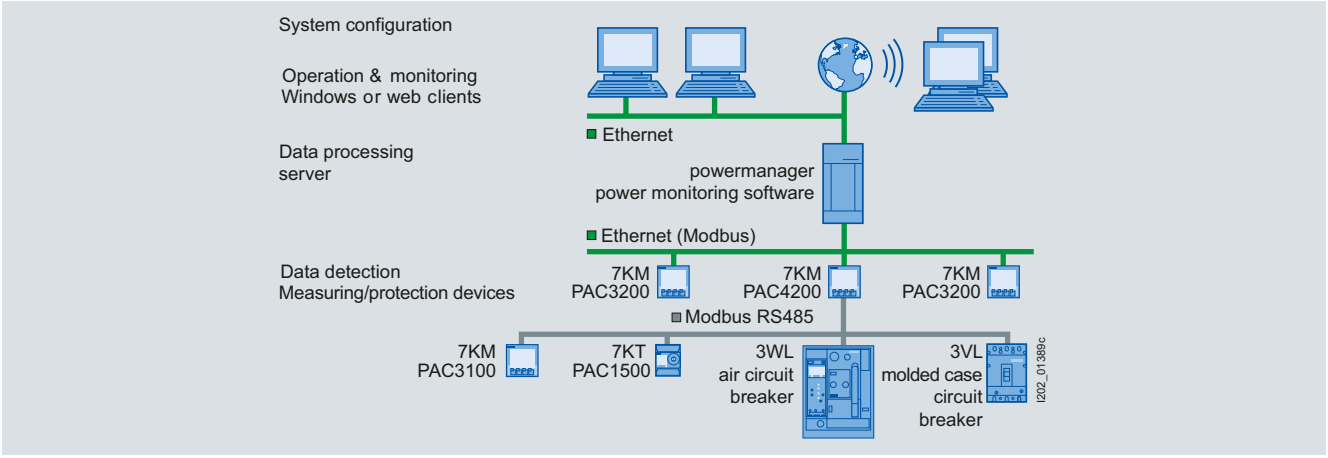
Applications

The product offers a standard power monitoring solution which provides the user with the following basic functions:

- Collection of measured quantities from the devices
- Presentation of the measured quantities from the devices in a predefined standard view for the 7KT PAC1500, 7KM PAC3100, 7KM PAC3200, 7KM PAC4200 measuring devices and 3WL/3VL circuit breakers
- Free presentation of measured quantities possible, including those from non-Siemens devices using generic Modbus drivers
- Archiving of measured quantities
- Monitoring of status and limits, with generation of corresponding signals
- Load curve display for visualizing the archived data and online data
- Cost center reports based on predefined tariffs and the archived consumption data
- OPC server
- Configuration of the system including user management
- Load monitoring for complying with power limits
- Virtual computation

This standard solution is designed with cost-efficiency and simple system commissioning in mind.

PC-based power monitoring system



System overview

System configuration

- Integration of measuring devices by means of predefined device templates for the 7KT/7KM PAC measuring devices and the 3WL/3VL circuit breakers
- Easy integration of existing modbus-capable detecting devices
- Communication through Standard Ethernet
- Integration of devices with RS 485 interface (ModbusRTU) through Modbus gateway, e.g. the 7KM PAC4200 measuring device can be used as the gateway

Industries

The energy efficiency that can be achieved with consistent power monitoring and the derived optimization measures is crucial for all industries, e. g. the manufacturing industry, in non-residential buildings, in the field of services, and in infrastructure projects. This has a particular impact on competitiveness, particularly in view of rising energy prices.

More information

Components of the PC-based power monitoring system

The hardware components of the PC-based power monitoring system are

- 7KM PAC measuring devices, in this chapter
- 3WL air circuit breakers, see chapter 1
- 3VL molded case circuit breakers, see chapter 2

Software of the PC-based power monitoring system

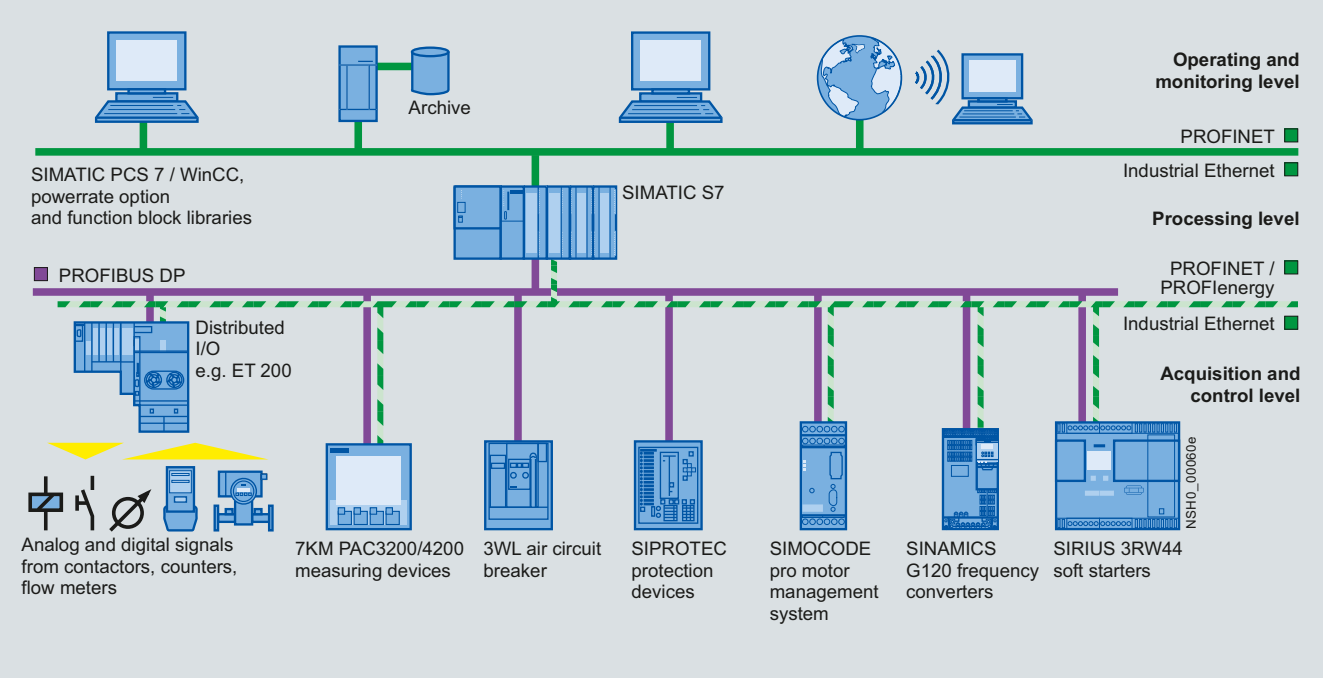
The software of the PC-based power monitoring system is powermanager, see chapter 13.

Internet

You can find more information on the Internet at:
www.siemens.com/lowvoltage/powermonitoring

SIMATIC based power data management system

Overview



SIMATIC based solutions for the process and manufacturing industry

A key feature of the process and manufacturing industry is its very high power consumption. It therefore makes sense to integrate a power data management system in existing systems.

Communication through PROFIBUS DP

PROFIBUS DP enables integration of a wide range of devices:

- For the protection of distribution boards and loads: protective devices, such as circuit breakers
- For open-loop and closed-loop control: frequency converters, motor management systems and soft starters
- For detection
  - electrical measured quantities: via the 7KM PAC3200/4200 measuring devices
  - non-electrical measured quantities: via analog/digital converters

PROFINET and PROFIenergy

An increasing number of devices in automation technology offer PROFINET. An expansion module is also available for the 7KM PAC3200 and 7KM PAC4200 measuring devices 7KM PAC Switched Ethernet PROFINET.
PROFIenergy is a "Common Application Profile" from Profibus International. Thanks to PROFIenergy it is possible to create a power data management system with standardized device interfaces.

Function block libraries for SIMATIC PCS 7 and WinCC

The function block library for SIMATIC PCS 7 and WinCC ensures device integration as follows:

- Measured quantities and states can be connected via CFC.
- Structured display of measured quantities and protection parameters for the 3WL/3VL circuit breakers.
- Limit value violations are displayed, archived and acknowledged in the relevant communications system in the usual way
- Circuit breakers can be program-controlled or manually operated with the appropriate user authorization.

SIMATIC powerrate

SIMATIC powerrate forms the core of the SIMATIC based power data management system in the form of a PCS 7 / WinCC option and

- ensures power consumption transparency
- continuously collects, archives and processes power data
- enables the evaluation of power consumption per batch
- prevents load peaks through active load management together with SIMATIC S7
- collects archived data, which can be exported to Excel and presented in various reports

Benefits

- Increased energy efficiency due to precise knowledge of the load profile
- Optimization of power supply contracts
- Allocation of power costs to cost centers
- Optimization of plant maintenance
- Identification of critical plant conditions
- Reliable monitoring of the power limit through automatic load management

Application

The SIMATIC PCS 7 and WinCC function block libraries and powerrate are used in all industries where PCS 7 and WinCC are used and where the transparency and monitoring of power flows is crucial.

More information

Hardware components

The hardware components of the SIMATIC based power data management system are

- 7KM PAC measuring devices in this chapter
- 3WL air circuit breakers, see chapter 1
- 3VL molded case circuit breakers, see chapter 2

Software components

The software components of the SIMATIC based power data management system are

- SIMATIC powerrate for WinCC/PCS 7
- Library 7KM PAC3200 for SIMATIC PCS 7
- Library 3WL/3VL for SIMATIC PCS 7
- Library 7KM PAC3200 for SIMATIC WinCC

For more information on all software components, see chapter 13.

You can find more information on the Internet at: www.siemens.com/lowvoltage/powermonitoring

Hardware and software components

Overview

7KT/7KM PAC measuring devices

	7KT PAC1500	7KM PAC3100	7KM PAC3200	7KM PAC4200
				
	The entry-level solution when it comes to energy measurement	The cost-effective solution for digital measurement	The specialist solution for precise energy measurement	The professional solution for communication and monitoring
Measuring range/connection				
• Max. input voltage L-L/L-N	400 V/230 V	480 V/276V	690 V/400 V[1]	690 V/400 V[1]
• Transformer connection version	x/5A	x/5A	x/1A/x/5A	x/1A/x/5A
• Direct connection version	80 A/125 A	–	–	–
• DC power supply unit with extra-low voltage version	–	–	22 ... 65 V	22 ... 65 V
• Single-phase counter version	3	–	–	–
Basic measured quantities				
• Voltage, current, power, frequency, power factor	✓[2]	✓	✓	✓
Energy measurement				
• Apparent, active, reactive energy	– I ✓ I ✓	– I ✓ I ✓	✓ I ✓ I ✓	✓ I ✓ I ✓
Extended measured quantities				
• Load profile record with time stamp and min/max values	–	–	–	✓
• Distortion factor THD (voltage, current)	–	–	✓	✓
• Harmonics (voltage, current)	–	–	–	3. - 31.
• Phase angle/phase chart	–	–	–	✓
Monitoring functions				
• Operating hours counter	–	–	✓	✓
• Limit monitoring	–	–	✓	✓
• Logic functions	–	–	✓	✓
• Event log	–	–	–	> 4000 events
• Gateway function	–	–	–	✓
System integration and communication				
• Digital inputs (DI)/digital outputs (DO)	–	2/2	1/1	2/2
• S0 interface	✓	✓	✓	✓
• 4DI/2DO expansion module	–	–	–	Optional
• M-Bus	Optional	–	–	–
• Instabus KNX	Optional	–	–	–
• Modbus RTU	Optional	✓	Optional	Optional
• Ethernet with Modbus TCP	–	–	✓	✓
• PROFIBUS DPV1	–	–	Optional	Optional
• PROFINET IO/ PROFIenergy	–	–	Optional	Optional
• Parameterization software	✓	powerconfig	powerconfig	powerconfig
• Integration in power monitoring system	powermanager	powermanager	powermanager, powerrate	powermanager, powerrate
General data				
• Measuring accuracy, active energy, reactive energy	1 I 2	1 I 2	0.5 S I 2	0.2 S I 2
• MID version	✓	–	–	–
• Installation	Standard mounting rail	Front mounting	Front mounting	Front mounting
• Dimensions (1 MW = 18 mm)	2 MW/4 MW/6 MW	96 × 96 × 56 mm	96 × 96 × 56 mm	96 × 96 × 82 mm

1) With the exception of devices with power supply units with extra-low voltage

2) On the display - energy values only. Additional measured quantities are transmitted via the optional expansion modules 7KT Modbus and 7KT M-Bus

✓ Available/possible

-- Not available/not possible

Accessories for 7KT PAC measuring devices





	7KT PAC expansion modules				7KT LAN couplers
	M-Bus	Modbus RTU	RS485	KNX	Web servers
Specification	Up to 9,600 Baud	Up to 115,200 Baud	For connection to the 7KT LAN coupler	Up to 19,200 Baud	For up to 30 7KT PAC1500 measuring devices

Accessories for 7KM PAC measuring devices

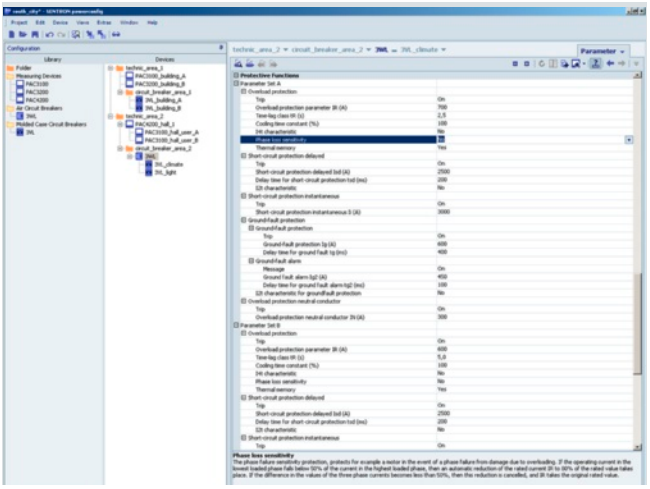




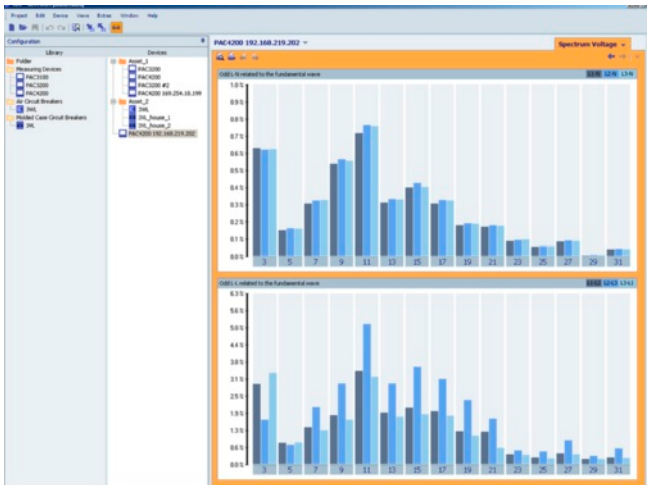
	7KM PAC expansion modules				Standards mounting rail adapter
	Switched Ethernet	PROFIBUS DP	RS485	4DI/2DO	7KM PAC TMP2
	For 7KM PAC3200, 7KM PAC4200	For 7KM PAC3200, 7KM PAC4200	For 7KM PAC3200, 7KM PAC4200	For 7KM PAC4200 (number of digital inputs/ outputs per module 4/2)	For 7KM PAC3100/3200/ 4200 for mounting on a standard mounting rail
Maximum number of modules that can be connected	1	1	1	2	
Protocol	PROFINET IO PROFIenergy Modbus TCP	DPV1	Modbus RTU	S0 interface	

The powerconfig software for commissioning

	Software tool for the efficient commissioning and diagnosis of communication-capable SENTRON components
License	Free use
Supported devices	7KM PAC3100/3200/4200 measuring devices, incl. expansion modules 3WL/3VL circuit breakers
General range of functions	The PC-based tool facilitates parameterization of the devices, resulting in substantial time savings, particularly when several devices have to be set up. The device settings can be stored in the PC and printed out. The tool enables monitoring of instantaneous measured quantities, which can be printed out if required. Execution of specific device functions, such as resetting of devices and setting of energy counters
Supported languages	English, German
Service functions	Firmware updates and switching of language packs for 7KM PAC measuring devices
Range of functions with 7KM PAC4200	Readout of data stored in the device (events; load profile history; daily energy counters), which are saved in csv format



Setting the parameters of a SENTRON device



Display of current measured variables (harmonics)

For more information on powerconfig, see page 13/19

Introduction

Overview

Devices	Page	Application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
7KM PAC measuring devices						
 **7KM PAC3100 measuring device** AC/DC wide-range power supply unit, screw connection	11/11	Control panel instrument with graphics display, integrated digital inputs and outputs and an RS485 interface for the transmission of measured values and configurations. Display of 30 electrical measured values and consumption values in switchgear assemblies, infeeds or outgoing feeders. International standards and multi-lingual displays for worldwide use.	IEC 61557-12	✓	--	✓
 **7KM PAC3200 measuring device** 3 versions: • AC/DC wide-range power supply unit, screw connection • DC power supply unit with extra-low voltage, screw connection • AC/DC wide-range power supply unit, ring cable lug connection	11/12	Control panel instrument with graphics display, integrated digital inputs and outputs and an integrated Ethernet interface for the transfer of measured values and configurations. Display of over 50 electrical measured values for switchgear assemblies, infeeds or outgoing feeders. Dual-tariff measuring devices for precise energy measurement for power import and feedback. The following components are available: • 7KM PAC Switched Ethernet PROFINET • 7KM PAC RS485 • 7KM PAC PROFIBUS DP	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
 **7KM PAC4200 measuring device** 3 versions: • AC/DC wide-range power supply unit, screw connection • DC power supply unit with extra-low voltage, screw connection • AC/DC wide-range power supply unit, ring cable lug connection	11/14	Control panel instrument with graphics display, user-defined displays, memory, clock and calendar function, digital inputs and outputs and an integrated Ethernet interface with gateway function to transfer measured values and configurations. Display of over 200 electrical measured values for switchgear assemblies, infeeds or outgoing feeders. Extensive functions for precise energy measurement for power import and feedback and assessment of the system quality. The following components are available: • 7KM PAC Switched Ethernet PROFINET • 7KM PAC RS485 • 7KM PAC PROFIBUS DP • 7KM PAC 4DI/2DO	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
 **7KM PAC expansion modules for measuring devices**	11/17	• The 7KM PAC Switched Ethernet PROFINET expansion module serves to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices to Switched Ethernet PROFINET (PROFIenergy). • The 7KM PAC PROFIBUS DP expansion module is used to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices to the PROFIBUS DPV1 • The 7KM PAC RS485 expansion module is used for connecting simple devices with RS485 interface, such as the 7KM PAC3100, and supports the Modbus RTU protocol. • The 7KM PAC 4DI/2DO expansion module is used to expand the 7KM PAC4200 measuring device to up to 10 digital inputs and 6 digital outputs.	IEC 62053-31	✓	--	✓

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Devices		Page	Application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
7KT PAC measuring devices							
	**7KT PAC1500 measuring device, three-phase** 7KT1 54	11/19	Measurement of consumption data in three-phase systems of plant sections, offices or holiday apartments.	EN 50470-1, EN 50470-3 EN 62052-23, EN 62053-31	✓	✓	✓
	**7KT PAC1500 measuring device, single-phase** 7KT1 53	11/21	For the measurement of consumption data in single-phase systems, e.g. in industrial plants, offices and apartments in apartment blocks.	EN 50740-1, EN 50470-3, EN 62053-31	✓	✓	✓
	**7KT PAC expansion modules for measuring devices** 7KT1 9	11/22	Communication interfaces with IrDA infrared interface for 7KT PAC1500 measuring devices. Modules are available for the following bus systems: • M-Bus • Modbus RTU • RS485 (7KT1391 LAN coupler connection) • KNX/EIB	EN 13757 ISO/IEC 14543-3 EN 50090, EN 13321-1	✓	✓	✓
	**7KT LAN couplers**	11/23	Web server with 2 GB internal storage, for up to 30 7KT15.., 7KT13.. measuring devices Global view and Excel export of current consumption data via LAN or Internet using a web browser, such as Firefox	IEEE 802	✓	--	✓

Introduction

Devices		Page	Application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
Other measuring devices							
	**Digital measuring devices** 7KT1 11, 7KT1 12	11/25	Voltage and current measurement with large 3-digit LEDs for monitoring incoming/outgoing currents and device currents in order to prevent plant overload.	DIN 43751-1, DIN 43751-2	✓	--	✓
	**Time and pulse counters for standard rail mounting** 7KT5 8	11/26	For monitoring operating hours and starting operations for the planning of preventative maintenance tasks and preventing sudden shutdowns	IEC 60255-6, EN 60255-6, UL 94	✓	✓	✓
	**Time counters for front-panel mounting** 7KT5 5, 7KT5 6	11/28	For monitoring operating hours and starting operations for planning preventative maintenance tasks and preventing sudden shutdowns.	IEC 60255-6, EN 60255-6	✓	✓	✓
Accessories							
	**7KT1 2 current transformers**	11/29	Straight-through transformers for installation in distribution boards and non-contact measuring of primary currents. Ideal for combination with switch disconnectors, measuring devices and counters.	IEC 60044-1, EN 60044-1	✓	--	✓
	**7KT9 0 measuring selector switches**	11/30	For switching over the phases for voltmeters and ammeters		✓	--	✓

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Overview

The 7KM PAC measuring devices are used to measure and display all relevant system parameters in low-voltage power distribution. They can be used for both single-phase and multi-phase measurements in 3 and 4-conductor power supply systems (TN, TT, IT).

They record energy values for main distribution boards, electrical branches or individual loads precisely and reliably, and supply key measured values for assessment of the state of the plant and the quality of the power supply.

The 7KM PAC3100 measuring device is fitted with an integrated Modbus RTU interface via RS485, so no expansion module is required.

Benefits

- Simple mounting and commissioning
- High IP65 degree of protection (front side, when installed) permits usage in extremely dusty and wet environments
- Intuitive operation using 4 function buttons and multilingual plain text displays
- Easy adaptation to different systems using integrated and optional
  - Digital inputs and outputs
  - Communication interfaces
- Worldwide use
  - At least 8 languages
  - International approvals
  - Developed and tested to European and international standards
- Low mounting depth
- Free, intuitive configuration software powerconfig

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 7KM3 133-0BA00-3AA0	**7KM PAC3100 measuring device** Control panel instrument 96 mm x 96 mm screw connections for current and voltage connection AC/DC wide-range power supply unit U_{AUX}: 100 … 240 V AC ±10 %, 50/60 Hz 110 … 250 V DC ±10 % Measuring inputs U_e: max. 3 AC 480/277 V, 50/60 Hz I_e: /5 A		**Screw connection**					
			7KM3 133-0BA00-3AA0		1	1 unit	133	0.456

* You can order this quantity or a multiple thereof.

7KM PAC3200 measuring devices

Overview

The 7KM PAC measuring devices are used to measure and display all relevant system parameters in low-voltage power distribution. They can be used for both single-phase and multi-phase measurements in 3 and 4-conductor power supply systems (TN, TT, IT).

They record energy values for main distribution boards, electrical branches or individual loads precisely and reliably, and supply key measured values for assessment of the state of the plant and the quality of the power supply.

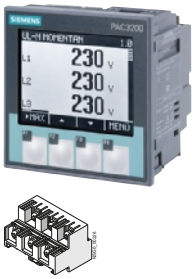
Benefits

- Simple mounting and commissioning
- High IP65 degree of protection (front side, when installed) permits usage in extremely dusty and wet environments
- Intuitive operation using 4 function buttons and multilingual plain text displays
- Easy adaptation to different systems using integrated and optional
  - Digital inputs and outputs
  - Communication interfaces
- Worldwide use
  - At least 8 languages
  - International approvals
  - Developed and tested to European and international standards
- Low mounting depth

Additional performance characteristics of the 7KM PAC3200

- Precise energy measurement
- Versatile system integration
  - Integrated Ethernet interface
  - Optional communication modules available
  - Multifunctional digital inputs and outputs
  - Limit monitoring
- Can be connected directly to power supply systems up to 690 V AC (UL-L) and CATIII without voltage transformers (with the exception of devices with power supply units with extra-low voltage)
- Intuitive configuration software powerconfig included in the scope of delivery

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 7KM2 112-0BA00-3AA0	**7KM PAC3200 measuring device** Control panel instrument 96 mm x 96 mm screw connections for current and voltage connection AC/DC wide-range power supply unit U_{AUX}: 95 … 240 V AC ±10 %, 50/60 Hz 110 … 340 V DC ±10 % Measuring inputs U_e: max. 3 AC 690/400 V, 50/60 Hz I_e: /1 A or /5 A		**Screw connection** **7KM2 112-0BA00-3AA0**		1	1 unit	133	0.476
 7KM2 111-1BA00-3AA0	**7KM PAC3200 measuring device** Control panel instrument 96 mm x 96 mm screw connections for current and voltage connection DC power supply unit with extra-low voltage U_{AUX}: 22 … 65 V DC ±10 % Measuring inputs U_e: max. 3 AC 500/289 V, 50/60 Hz I_e: /1 A or /5 A		**Screw connection** **7KM2 111-1BA00-3AA0**		1	1 unit	133	0.466
 7KM2 112-0BA00-2AA0	**7KM PAC3200 measuring device** Control panel instrument 96 mm x 96 mm Ring cable lug connections for current and voltage connection AC/DC wide-range power supply unit: U_{AUX}: 95…240 V AC ±10 %, 50/60 Hz 110…340 V DC ±10 % Measuring inputs U_e: max. 3 AC 690/400 V, 50/60 Hz I_e: /1 A or /5 A		**Ring cable lug connection** **7KM2 112-0BA00-2AA0**		1	1 unit	133	0.494

More information

For accessories and information on current transformers and software components see page 11/16

* You can order this quantity or a multiple thereof.

7KM PAC4200 measuring devices

Overview

The 7KM PAC measuring devices are used to measure and display all relevant system parameters in low-voltage power distribution. They can be used for both single-phase and multi-phase measurements in 3 and 4-conductor power supply systems (TN, TT, IT).

They record energy values for main distribution boards, electrical branches or individual loads precisely and reliably, and supply key measured values for assessment of the state of the plant and the quality of the power supply.

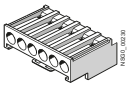
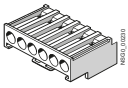
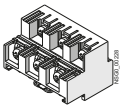
Benefits

- Simple mounting and commissioning
- High IP65 degree of protection (front side, when installed) permits usage in extremely dusty and wet environments
- Intuitive operation using 4 function buttons and multilingual plain text displays
- Easy adaptation to different systems using integrated and optional
  - Digital inputs and outputs
  - Communication interfaces
- Worldwide use
  - At least 8 languages
  - International approvals
  - Developed and tested to European and international standards
- Low mounting depth

Additional performance characteristics of the 7KM PAC4200:

- Precise energy measurement
- Versatile system integration
  - Integrated Ethernet interface
  - Optional communication modules available
  - Multifunctional digital inputs and outputs
  - Limit monitoring
- Can be connected directly to power supply systems up to 690 V AC (UL-L) and CATIII without voltage transformers (with the exception of devices with power supply units with extra-low voltage)
- Intuitive configuration software powerconfig included in the scope of delivery
- Monitoring the plant status and the power supply quality
  - Basic information for evaluating the power supply quality
  - Logging of plant history in the form of operation, control and system-related events
- Recording of the power range through power averaging (load profile)
- Daily energy meters for apparent, active and reactive energy across 365 days for cut-off date assessment
- Detection of gas, water, compressed air or other energy sources via pulse counter to the digital inputs
- Can be expanded using modules to up to 10 digital inputs and 6 digital outputs
- Counters for apparent, active and reactive energy for the precise detection of the power consumption of a partial process or manufacturing process
- 10/100 Mbit/s Ethernet interface with gateway function for the easy connection of devices with serial RS485 interface via expansion module 7KM PAC RS485 to an Ethernet network
- Comprehensive user-friendly indicators, such as user-defined displays, bar and status indicators, phase diagram and list and histogram graphics
- Satisfies the accuracy requirements of class 0.2S high-precision meters used by power supply companies according to IEC 62053-22, which are normally reserved for exacting industrial applications

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
  7KM4 212-0BA00-3AA0	**7KM PAC4200 measuring device** Control panel instrument 96 mm x 96 mm screw connections for current and voltage connection AC/DC wide-range power supply unit U_{AUX}: 95 … 240 V AC ±10 %, 50/60 Hz 110 … 340 V DC ±10 % Measuring inputs U_e: max. 3 AC 690/400 V, 50/60 Hz I_e: /1 A or /5 A		**Screw connection**  **7KM4 212-0BA00-3AA0**		1	1 unit	133	0.547
  7KM4 211-1BA00-3AA0	**7KM PAC4200 measuring device** Control panel instrument 96 mm x 96 mm screw connections for current and voltage connection DC power supply unit with extra-low voltage U_{AUX}: 22 … 65 V DC ±10 % Measuring inputs U_e: max. 3 AC 500/289 V, 50/60 Hz I_e: /1 A or /5 A		**Screw connection**  **7KM4 211-1BA00-3AA0**		1	1 unit	133	0.537
  7KM4 212-0BA00-2AA0	**7KM PAC4200 measuring device** Control panel instrument 96 mm x 96 mm Ring cable lug connections for current and voltage connection AC/DC wide-range power supply unit: U_{AUX}: 95…240 V AC ±10 %, 50/60 Hz 110…340 V DC ±10 % Measuring inputs U_e: max. 3 AC 690/400 V, 50/60 Hz I_e: /1 A or /5 A		**Ring cable lug connection**  **7KM4 212-0BA00-2AA0**		1	1 unit	133	0.544

More information

For accessories and information on current transformers and software components see page 11/16

* You can order this quantity or a multiple thereof.

Accessories for 7KM PAC

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 7KM9 900-0XA00-0AA0	**7KM PAC TMP2 standard mounting rail adapter** Two-tier adapter for mounting a measuring device on a standard mounting rail • Front display • For manual intervention		**7KM9 900-0XA00-0AA0**		1	1 unit	133	0.401
 7KM9 900-0YA00-0AA0	**7KM PAC TMP mounting plate** Adapter for mounting a measuring device on standard mounting rail • Display faces backwards towards standard mounting rail • Readout and evaluation of measurements solely via mains operation		**7KM9 900-0YA00-0AA0**		1	1 unit	133	0.140

More information

Current transformers

Suitable current transformers can be found

- in chapter 2 "Molded Case Circuit Breakers"
- In the Industry Mall, section "Industry Automation and Drive Technologies --> "Low-Voltage Power Distribution and Electrical Installation Technology" --> "Protective Devices" --> "Molded Case Circuit Breakers" --> "3VL Molded Case Circuit Breakers" --> "3VL Molded Case Circuit Breakers up to 1600 A" --> "Accessories and Spare Parts"

Software components

For more information on software components see chapter 13 and visit the Internet at www.siemens.com/lowvoltage/powermonitoring

More information

More information is available on the Internet at: www.siemens.de/lowvoltage/powermonitoring

* You can order this quantity or a multiple thereof.

Overview

Expansion modules are used as communication interfaces and for expanding the digital inputs/outputs for 7KM PAC measuring devices.

The expansion modules are plugged in at the back of the measuring device. The device identifies the module automatically and presents the relevant parameters for this module for selection in the parameterization menu.

The following expansion modules are available (shown from left to right in the figure on the left):

- 7KM PAC Switched Ethernet PROFINET expansion module
- 7KM PAC PROFIBUS DP expansion module
- 7KM PAC RS485 expansion module
- 7KM PAC 4DI/2DO expansion module

More information

For more information on software components see chapter 13 and visit the Internet at www.siemens.com/lowvoltage/powermonitoring

Expansion module	Use in 7KM		
	PAC3100	PAC3200	PAC4200
Expansion modules for 7KM PAC measuring devices			
 **7KM PAC Switched Ethernet PROFINET expansion module** The 7KM PAC Switched Ethernet PROFINET expansion module is a plug-in communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices. It provides the following features: • Standardized PROFIenergy interface to the measured quantities. • The measured quantities can be individually selected using a GSDML file. This permits use of cost-effective S7 CPUs. • Easy parameter assignment using the device display and STEP 7. • Integrated Ethernet switching allows networking with short cables without additional switches. • Direct integration in production machine networks using IRT (IRT = Isochronous-Real-Time). • Full support of PROFINET IO (DHC, DNS, SNMP, SNTP). • Device replacement without PG in the PROFINET assembly using LLDP. • Deterministic reversing time through ring redundancy (MRP). • Modbus TCP communication • Communication with powermanager or powerconfig • 2 x Ethernet (RJ45) sockets. • Baud rates 10 and 100 Mbit/s. • Protocols PROFINET IO, PROFIenergy and Modbus TCP. • No external auxiliary power necessary • Additional display via the device display and via LEDs on the module All measured quantities from 7KM PAC3200 and 7KM PAC4200 can be individually selected and cyclically transmitted by means of the GSDML file. This enables optimum use of the process image of the PROFINET controller, e.g. CPU 315-2 PN/DP of SIMATIC S7. The measured quantities can be read out in acyclic mode using PROFIenergy, a PNO protocol profile. Thanks to PROFIenergy, it is possible to assemble a power monitoring system with devices from various manufacturers using PROFINET.	--	✓	✓
 **7KM PAC PROFIBUS DP expansion module** The 7KM PAC PROFIBUS DP expansion module has the following features: • Plug-in communication module for measuring devices for connection to PROFIBUS DPV1 • 7KM PAC3200 and 7KM PAC4200 • Configurable from the front of the device or using parameterization software • Using PROFIBUS DPV1, data can be transferred in both cyclic and acyclic modes • Easy engineering thanks to integration in SIMATIC STEP 7 and/or simple integration via GSD file for other programming systems • Optimum use of process image of a control system for selection of individual measured quantities for cyclical transfer • All baud rates from 9.6 kbit/s up to 12 Mbit/s are supported • Connection through 9-pole Sub-D connector according to IEC 61158 • No external auxiliary power necessary • Additional display via the device display and via LEDs on the module	--	✓	✓

7KM PAC expansion modules

Expansion module	Use in 7KM		
	PAC3100	PAC3200	PAC4200
 **7KM PAC RS485 expansion module** The 7KM PAC RS485 expansion module has the following features: • Plug-in 7KM PAC RS485 communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices • Configurable from the front of the device or using parameterization software • Support for the Modbus RTU protocol • Plug and play • Baud rates 4.8/9.6/19.2 and 38.4 kbit/s are supported • Connection by means of 6-pole screw terminals • No external auxiliary power necessary • Status indication by LED on the module • The 7KM PAC RS485 expansion module is required for the gateway function of the 7KM PAC4200 for communication with simple devices with RS485 interface, such as the 7KM PAC3100, via Ethernet (Modbus TCP).	--	✓	✓
 **7KM PAC 4DI/2DO expansion module** The 7KM PAC 4DI/2DO expansion module is used to expand the 7KM PAC4200 measuring device to up to 10 digital inputs and 6 digital outputs and offers the following features: • Up to two 7KM PAC 4DI/2DO modules can be plugged onto a 7KM PAC4200. • The 7KM PAC 4DI/2DO expansion modules mean that the internal digital inputs and outputs can be expanded by up to 8 inputs and 4 outputs. • The 7KM PAC 4DI/2DO expansion modules can be configured locally at the front of the device or via the powerconfig parameterization software. • The digital inputs can be used without the need for an external power supply as they are self-powered. This is particularly useful for the integration of non-electric measuring devices, such as water or compressed-air counters. • All functions of the integrated multifunctional inputs/outputs on the 7KM PAC4200 are also available in the 7KM PAC 4DI/2DO expansion module. • Inputs and outputs can be used as an S0 interface conforming to IEC 62053-31. • The connection is made via a 9-pole screw terminal. • No external auxiliary power supply is required.	--	--	✓

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Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 7KM9 300-0AE00-0AA0	**7KM PAC Switched Ethernet PROFINET expansion module** Expansion module for 7KM PAC3200 and 7KM PAC4200 (PROFIenergy)		**7KM9 300-0AE00-0AA0**		1	1 unit	133	0.077
 7KM9 300-0AB00-0AA0	**7KM PAC PROFIBUS DP expansion module** Expansion module for 7KM PAC3200 and 7KM PAC4200 (PROFIBUS DPV1)		**7KM9 300-0AB00-0AA0**		1	1 unit	133	0.078
 7KM9 300-0AM00-0AA0	**7KM PAC RS485 expansion module** Expansion module for 7KM PAC3200 and 7KM PAC4200 (Modbus RTU)		**7KM9 300-0AM00-0AA0**		1	1 unit	133	0.074
 7KM9 200-0AB00-0AA0	**7KM PAC 4DI/2DO expansion module** Expansion module for 7KM PAC4200		**7KM9 200-0AB00-0AA0**		1	1 unit	133	0.074

* You can order this quantity or a multiple thereof.

7KT PAC1500 measuring devices, three-phase

Overview

7KT PAC1500 measuring devices, three-phase, for direct connection up to 80 A / 125 A

The measuring devices (power meters) are used to record the amount of electrical energy exported or imported. Siemens compact measuring devices are designed as modular devices for alternating current and can be mounted on standard mounting rails. They comply with the metering equipment standard EN 50470 (Part 1 and 3) and come with an LCD display.

The three-phase measuring devices for direct connection are available up to 125 A and in versions with transformer connections (…/5 A to 10000/5 A).

The measuring devices store active and reactive energy and all comply with accuracy class 1 (for active energy).

All measuring devices have a pulse output (S0) and are designed for 2-tariff measurements. The calibrated versions comply with the new Measuring Instruments Directive 2004/22/EC (MID).

The measuring devices also have an integrated optical interface (IrDA) for connecting communication modules, which enables their integration in a range of other systems, such as power management systems.

Technical specifications

7KT PAC1500 measuring device, three-phase			7KT1 540 7KT1 542	7KT1 543 7KT1 545	7KT1 546 7KT1 548
Standards			EN 50470-1, EN 50470-3, EN 62053-23, EN 62053-31		
Connection					
• Direct connection			--	80 A	125 A
• Transformer current connection			.../5 A	--	--
General data					
• Enclosures	Acc. to DIN 43880	MW (1 MW = 18 mm)	4	4	6
• Mounting	Acc. to EN 60715		35 mm		
• Mounting height		mm	70		
Function					
• Connection	Single-phase or three-phase	Number of conductors	4	2 ... 4	2 ... 4
• Storage of setting and counter reading	Via (EEPROM)		Yes	Yes	Yes
• Tariffs	For active and reactive energy		T1/T2	T1/T2	T1/T2
Supply (through measuring terminals)					
• Rated control supply voltage U_n		V AC	230		
• Voltage range		V	184 ... 276		
• Rated frequency f_n		Hz	50		
Measuring accuracy at (at 23 ±1 °C)	Based on nominal value				
• Active energy and active power	Acc. to EN 50470-3		Class B		
• Reactive energy and reactive power	Acc. to EN 62053-23		Class 2		
Measuring inputs					
• Connection type			Transformer TA-TC .../5 A	Direct	Direct
• Terminal capacitance, operational and main current paths	Rigid, min. (max.) Flexible min. (max.)	mm^2 mm^2	1.5 (6) 1.5 (6)	1.5 (35) 1.5 (35)	5 (50) 5 (50)
• Voltage U_n	Phase/phase Phase/N	V V	400 230		
• Operating range voltage	Phase/phase Phase/N	V V	319 ... 480 184 ... 276		
• Current I_{ref}		A	--	5	5
• Current I_n		A	5	--	--
• Current I_{min}		A	0.05	0.25	0.25
• Operating range current (I_{st} … I_{max})	Direct connection Transformer connection	A A	-- 0.003 ... 6	0.015 ... 80 --	0.020 ... 125 --
• Transformer current	Primary current of the transformer Smallest input step	A A	5 ... 10000 5	-- --	-- --
• Input ripple form			Sinusoidal		
• Operational starting current I_{st}		mA	3	15	20
S0 interface	Acc. to EN 62053-31				
• Pulse outputs for absorbed active and reactive energy T1 + T2			Yes		
• Pulse count	For input current I_{max} Automatic for transformers	Pulses/kWh Pulses/kWh	-- 100 - 10 - 1	500 --	500 --
IR interface					
• At the side for connecting communication modules			M-Bus/Modbus RTU/RS485/KNX		

7KT PAC1500 measuring devices, three-phase

Selection and ordering data

		U_n	I_{max}	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V AC	A AC	MW							kg
	**7KT PAC1500 measuring device, three-phase**										
	Digital measuring device										
	• For transformer connection, double tariff	230	Transformer /5	4		**7KT1 540**		1	1 unit	047	0.289
	• For transformer connection, double tariff, MID	230	Transformer /5	4		**7KT1 542**		1	1 unit	047	0.293
	• For direct connection, double tariff	230	80	4		**7KT1 543**		1	1 unit	047	0.419
	• For direct connection, double tariff, MID	230	80	4		**7KT1 545**		1	1 unit	047	0.419
	• For direct connection, double tariff	230	125	4		**7KT1 546**		1	1 unit	047	0.678
	• For direct connection, double tariff, MID	230	125	4		**7KT1 548**		1	1 unit	047	0.690

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* You can order this quantity or a multiple thereof.

7KT PAC1500 measuring device, single-phase

Overview

The 7KT PAC1500 single-phase measuring devices (power meters) are used to record the amount of electrical energy exported or imported. They comply with the metering equipment standard EN 50470 (Part 1 and 3) and come with an LCD display.

The 7KT PAC1500 single-phase measuring devices for direct connection are available up to 80 A. They store active and reactive energy, and all comply with accuracy class 1 (for active energy).

All measuring devices have a pulse output (S0) and are designed for 1-tariff or 2-tariff measurements, depending on the version.

The calibrated versions comply with the new Measuring Instruments Directive 2004/22/EC (MID). The measuring devices (with the exception of 7KT1 530) also have an integrated optical interface (IrDA) for connecting communication modules.

Technical specifications

7KT PAC1500 measuring device, single-phase direct connection up to 80 A			**7KT1 530**	**7KT1 531 7KT1 533**
Standards			EN 50470-1, EN 50470-3, EN 62053-23, EN 62053-31	
General data				
• Enclosures	Acc. to DIN 43880	MW	2	
• Mounting	Acc. to EN 60715		35 mm	
• Mounting height		mm	70	
Function				
• Operating mode	Single-phase loads	Conductors	2	
• Storage of setting and counter reading	Via (EEPROM)		Yes	
• Rate	For active energy For reactive energy		T1 T1	T1 + T2 T1 + T2
Supply (through measuring terminals)				
• Rated control supply voltage U_n		V AC	230	
• Voltage range		V	184 ... 276	
• Rated frequency f_n		Hz	50	
Measuring accuracy at (at 23 ±1 °C)	Based on nominal value			
• Active energy and active power	Acc. to EN 50470-3		Class B	
• Reactive energy and reactive power	Acc. to EN 62053-23		Class 2	
Measuring inputs				
• Connection type	Phase/N		Direct	
• Terminal capacitance, operational and main current paths	Rigid, min. (max.) Flexible min. (max.)	mm^2 mm^2	1.5 (35) 1.5 (35)	1.5 (35) 1.5 (35)
• Operating range voltage	Phase/N	V AC	184 ... 276	
• Current I_{ref}		A	15	
• Current I_{min}		A	0.75	
• Operating range current (I_{st} ... I_{max})	Direct connection	A	0.025 ... 80	
• Current waveform			Sinusoidal	
• Operational starting current I_{st}		mA	25	
S0 interface	Acc. to EN 62053-31			
• Pulse outputs for absorbed active and reactive energy			Yes	
• Pulse count		Pulses/kWh	1000	
IR interface				
• At the side for connecting communication modules (M-Bus/Modbus RTU/RS485/KNX)			--	Yes

Selection and ordering data

		U_n	I_{max}	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V AC	A AC	MW							kg
	**7KT PAC1500 measuring device, single-phase** Digital measuring device										
	• For direct connection, single tariff	230	80	2		**7KT1 530**		1	1 unit	047	0.164
	• For direct connection, double tariff	230	80	2		**7KT1 531**		1	1 unit	047	0.164
	• For direct connection, double tariff, MID	230	80	2		**7KT1 533**		1	1 unit	047	0.190

* You can order this quantity or a multiple thereof.

7KT PAC expansion modules

Overview

Expansion modules for 7KT PAC1500 measuring devices, from left to right: Expansion modules for M-Bus, Modbus RTU, RS485, Instabus KNX

Expansion modules are used as communication interfaces for 7KT PAC1500 measuring devices. They have the following features:

- The expansion modules can be selected independently of the measuring device. This means they can also be retrofitted in already installed measuring devices.
- Data transmission between the measuring devices and expansion modules is executed via the IrDA infrared interface.
- The expansion modules are placed alongside the measuring devices in the installation direction so that their IrDA interfaces are exactly opposite each other.

7KT PAC M-Bus (7KT1 908) expansion module

- Power supply through bus cable
- Baud rates: 300 to 9600 kbit/s
- Status indication by LED on the module
- Can be parameterized using M-Bus Master software

7KT PAC Modbus RTU (7KT1 907) expansion module

- Power supply: 230 V AC
- Baud rates: 4.8 / 9.6 / 19.2 and 38.4 kbit/s are supported.
- Status indication by LED on the module
- Configurable via RS485 master software

7KT PAC RS485 (7KT1 903) expansion module

- Power supply: 230 V AC
- Status indication by LED on the module

7KT PAC 7KNX (7KT1 900) expansion module

- Power supply through the KNX/EIB bus cable
- Status indication by LED on the module

Selection and ordering data

	Version	Mounting width DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		MW						kg
 7KT1 908	**7KT PAC M-Bus expansion module** For connecting 7KT PAC1500 measuring devices to M-Bus	1	**7KT1 908**		1	1 unit	047	0.050
 7KT1 907	**7KT PAC Modbus RTU expansion module** For connecting 7KT PAC1500 measuring devices to Modbus RTU	1	**7KT1 907**		1	1 unit	047	0.085
 7KT1 903	**7KT PAC RS485 expansion module** For connecting 7KT PAC1500 measuring devices via RS485 to 7KT1 391 LAN couplers	1	**7KT1 903**		1	1 unit	047	0.080
 7KT1 900	**7KT PAC KNX expansion modules** For connecting 7KT PAC1500 measuring devices to Instabus KNX	1	**7KT1 900**		1	1 unit	047	0.064

* You can order this quantity or a multiple thereof.

Overview

7KT 391 LAN couplers

A LAN coupler supports worldwide data retrieval from 7KT PAC measuring devices, as long as there is a LAN link to the Internet.

Up to 30 devices can be linked to a LAN coupler via a Web browser, such as Firefox. In turn, the LAN coupler is connected to a LAN.

Data communication between the LAN coupler and the PC takes place using the TCP/IP protocol.

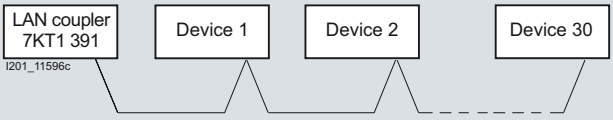
Application

Suitable 7KT PAC measuring devices

The following measuring devices can be connected to the LAN coupler:

	Order No.
Energy measuring devices	
7KT PAC1500 measuring device, three-phase	
• For direct connection 80 A, double tariff	7KT1 543
• For direct connection 80 A, double tariff, calibrated version	7KT1 545
• For transformer connection .../5 A, double tariff	7KT1 540
• For transformer connection .../5 A, double tariff, calibrated version	7KT1 542
• For direct connection 125 A, double tariff	7KT1 546
• For direct connection 125 A, double tariff, calibrated version	7KT1 548
• For direct connection 63 A, double tariff	7KT1 520
• For transformer connection .../5 A, double tariff	7KT1 521
• 7KT PAC1500 measuring device, single-phase	
• For direct connection 80 A, double tariff	7KT1 531
• For direct connection 80 A, double tariff, calibrated version	7KT1 533
7KT PAC3000 measuring devices	
• 7KT PAC3000, for direct connection	7KT1 340
• 7KT PAC3000, for transformer connection .../5 A	7KT1 341

Connecting several devices to a 7KT 391 LAN coupler



Technical specifications

			7KT1 391 LAN couplers
Standards			IEEE 802.3 AS, IEC 60950, EN 61000-6-2, EN 61000-6-3
General data			
• Enclosures	Acc. to DIN 43880		4 modules
• Mounting	Acc. to EN 60715		Mounting on standard mounting rail (35 mm)
• Mounting height		mm	70
Supply			
• Rated power dissipation P_v		VA	≤ 10
• Rated control supply voltage U_c		V AC	230
• Primary operating range		$\times U_c$	0.9 ... 1.10
• Rated frequency		Hz	50
• Frequency ranges		Hz	45 ... 65
Function			
• System start			Automatic upon switching on
• LAN server identification			Over the IP address of the PC
• Transmission rate	Limitation by LAN	Mbit/s	100
• Operating system			Windows XP/Vista/7
• Web browser			IE 7, 8; Mozilla Firefox 3.09 / 3.5.3 / 3.6; Opera 9.64 / 10 / 10.5; Safari 3.2.2 /4.0.5; Google Chrome 3.0.195.27.

* You can order this quantity or a multiple thereof.

7KT LAN couplers

			7KT1 391 LAN couplers
LAN interface			
• HW interface			Connection RJ 45
• SW interface			TCP/IP
Interface to measuring devices			
• HW interface	RS485 terminals	Number	3 (+/-/shielded twisted pair)
• Line	Version		STP (shielded twisted pair)
	Minimum cross-section	mm^2	2 × 0.2 or 2 x AWG 24
	Maximum line capacitance	pF/m	< 50
	Impedance	W	100
	Maximum overall cable length	m	≤ 1200
	Type of installation		Serial
Measuring devices can be connected directly		Number	30
Environmental conditions			
• Temperatures	In operation	°C	-10 ... +55
	Storage and transport	°C	-25 ... +70
• Relative humidity	In operation	%	≤ 80
• Vibrations	Sinus amplitude at 50 Hz	mm	± 0.25
• Safety class	Acc. to IEC 60950		III
• Degree of protection	Installed device front side (terminals)		IP20

Selection and ordering data

	Version	U_c	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V AC	MW							kg
	**LAN couplers** For connection of up to 30 devices over RS485	230	4		**7KT1 391**		1	1 unit	047	0.212

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* You can order this quantity or a multiple thereof.

Overview

Digital measuring devices: Left: 7KT1 voltmeter, right: 7KT1 ammeter

These devices for measuring voltages and currents can be used for monitoring incoming and outgoing currents or device currents in electric plants.

They are suitable for direct connection in a single-phase system or with measuring transducers in three-phase systems.

The measuring ranges of the ammeter are set locally at the device using a coding switch.

Benefits

- The ammeters have 14 measuring ranges from 0 A to 20 A and 0 A to 999 A, which can be set using a coding switch. This ensures universal application.

Technical specifications

			7KT1 110	7KT1 120
Standards			DIN 43751-1, -2	
Rated control supply voltage U_c		V AC	230	
Primary operating range		× U_c	0.9 ... 1.15	
Rated frequency		Hz	45 ... 65	
Measuring range				
• Voltage	Direct measurement	V AC	12 ... 600	--
• Current	Direct measurement	A AC	--	0.4 ... 20 direct
	Transformer measurement	A AC	--	0.1 ... 1000/5
Measuring accuracy	At 23 °C	%	±0.5 ±1 digit	
Overload capability				
• Voltage	Continuous	V	720	--
	Short-time for 1 s	V	780	--
• Current	Continuous, direct	A	--	22
	Continuous, transformer	A	--	5.5
	short-time for 1 s, direct	A	--	200
	short-time for 1 s, transformer	A	--	50
Terminals	±screw (Pozidriv)		1	
Conductor cross-sections	Rigid, max.	mm^2	1 × 6/2 × 4	
	Flexible, with end sleeve, min.	mm^2	0.75	
Degree of protection			IP20, with connected conductors	

Selection and ordering data

	Version	U_e	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V AC	MW							kg
	**Digital voltmeters**									
	Measuring range AC 12 ... 600 V	230	2		**7KT1 110**		1	1 unit	033	0.214
	**Digital ammeters for direct and transformer connection**									
	Measuring range direct: 0.4 ... 20 A transformer: 0.1 ... 1000 A/5	230	2		**7KT1 120**		1	1 unit	033	0.219

* You can order this quantity or a multiple thereof.

Time and pulse counters for standard rail mounting

Overview

Time counters: Left: electromechanical, right: Electronic

Time and pulse counters are used for the reliable monitoring of production and service times, which enables the exact planning and monitoring of production sequences, maintenance cycles and warranty times.

As well as the proven electromechanical time and pulse counters for mounting in distribution boards, we also supply digital time and pulse counters.

The fields of application for both counter types are very diverse, such as the recording of operating hours of machines, systems or building management systems, as well as pulse counting for general volume flow counting, registration of starting frequencies, starting cycles or production quantities in systems and machines.

Benefits

- Time and pulse counters help to plan maintenance intervals, which safeguard and ensure high plant availability
- Versions without zero position and with electric or manual zero position for all applications.
- Flexible application of the digital counters for power supplies of 12 V to 150 V DC and 24 V to 240 V AC in a single device.

Technical specifications

			7KT5 801	7KT5 802	7KT5 803	7KT5 804	7KT5 806	7KT5 807
Standards **Approvals**			EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55					
Rated control supply voltage U_c		V AC V DC	-- 12 ... 24	24 --	115	230	115	230
Primary operating range	At 50/60 Hz	× U_c	0.9 ... 1.1					
Rated frequency		Hz	--	50			60	
Rated power dissipation P_v		VA	< 1		< 2			
Method of operation	Counting of		Hours					
Display	Drum-type register	h	00000.00					
Terminals	± screw (Phillips)		1					
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75					
Permissible ambient temperature		°C	-10 ... +70					
Degree of protection	Acc. to EN 60529		IP20, with connected conductors					
Safety class	Acc. to EN 61140		II					
Permissible humidity		%	< 80					

			7KT5 811	7KT5 812	7KT5 814	7KT5 821	7KT5 822	7KT5 823	7KT5 833
Standards **Approvals**			EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55						
Rated control supply voltage U_c		V AC V DC	-- 12 ... 24	24 --	230 --	24 ... 240 12 ... 150			
Primary operating range	At 50/60 Hz	× U_c	0.9 ... 1.1						
Rated frequency		Hz	--	50/60					
Rated power dissipation P_v		VA	< 1		< 2	< 1			
Method of operation	Counting of		Pulses			Hours			Pulses
Display	Drum-type register LCD	⎍⎍ h ⎍⎍	0000000 -- --			-- 000000.0 --			-- -- 0000000
Counting frequency		Hz	10			--			10
Pulse duration		ms	50			--			50
Resetting	Electrical Mechanical		-- --				Yes	Yes	
Terminals	± screw (Phillips)		1						
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75						
Permissible ambient temperature		°C	-10 ... +70						
Degree of protection	Acc. to EN 60529		IP20, with connected conductors						
Safety class	Acc. to EN 61140		II						
Permissible humidity		%	< 80						

* You can order this quantity or a multiple thereof.

Selection and ordering data

		U_c	Frequency	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V	Hz	MW							kg
	**Time counters**										
	Mechanical counting mechanism, display 00000.00 h without resetting										
		12 ... 24 DC	--	2		**7KT5 801**		1	1 unit	033	0.098
		24 AC	50			**7KT5 802**		1	1 unit	033	0.093
		115 AC				**7KT5 803**		1	1 unit	033	0.093
		230 AC				**7KT5 804**		1	1 unit	033	0.093
		115 AC	60			**7KT5 806**		1	1 unit	033	0.094
		230 AC				**7KT5 807**		1	1 unit	033	0.095
	Pulse counters										
	Mechanical counting mechanism, display 0000000 ⎍⎍ without resetting										
		12 ... 24 DC	--	2		**7KT5 811**		1	1 unit	033	0.095
		24 AC	50/60			**7KT5 812**		1	1 unit	033	0.089
		230 AC				**7KT5 814**		1	1 unit	033	0.096
	**Electronic time counters**										
	LCD 000000.0h without resetting										
		12 ... 150 DC, 24 ... 240 AC	-- 50/60	2		**7KT5 821**		1	1 unit	033	0.089
	With electrical resetting										
		12 ... 150 DC, 24 ... 240 AC	-- 50/60			**7KT5 822**		1	1 unit	033	0.085
	with electrical and mechanical resetting										
		12 ... 150 DC, 24 ... 240 AC	-- 50/60			**7KT5 823**		1	1 unit	033	0.089
	Electronic pulse counters										
	LCD 0000000 ⎍⎍										
	with electrical and mechanical resetting										
		12 ... 150 DC, 24 ... 240 AC	-- 50/60	2		**7KT5 833**		1	1 unit	033	0.089

More information

Time counters count the time in hours with an accuracy of two decimal places (hundredths of hours). The pulse counter adds the number of pulses, e.g. the making operations of devices.

A power supply is required at terminals 1 and 3 of the electronic counters so that the device can constantly display the measured values. Once terminal 3 is supplied with voltage (for DC "+"), the counting procedure starts. If terminal 4 is supplied short-time with voltage (for DC "+"), the counter is reset.

In the case of electronic counters, the counting result is saved indefinitely in the event of a power failure (EEPROM). On recovery of the power, the counting is continued from the saved value. As well as a modern design, the electronic counter has a 7-digit LCD, which can be reset electrically or manually.

* You can order this quantity or a multiple thereof.

Time counters for front-panel mounting

Overview

Time counters: Left: Counting mechanism, right: Counting mechanism with front frame

Time and pulse counters for control cabinets, control systems and mechanical engineering are used, e.g. in boilers, machine tools or compressors. The pulse counters count the starting frequencies. This supports planning for preventative maintenance.

In-time and regular maintenance is the best protection against unexpected shutdowns.

Benefits

- Time and pulse counters help to plan maintenance intervals, which safeguard and ensure high plant availability.

Technical specifications

			7KT5 500	7KT5 501	7KT5 502	7KT5 503	7KT5 504	7KT5 505
Standards			EN 60255-6					
Rated control supply voltage U_c		V AC V DC	-- 10 ... 80	115 --	230	115	230	24
Rated frequency		Hz	--	50		60		50
Front-panel mounting • Without masking frame 55 mm × 55 mm • With masking frame 55 mm × 55 mm	Switchboard cutout	mm × mm Ø mm	$45.2 \times 45.2^{+0.3}$ $50.2^{+0.3}$					

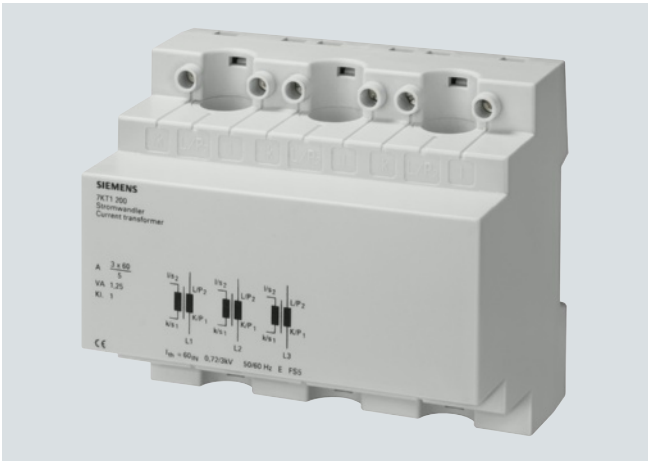
			7KT5 600	7KT5 601	7KT5 602	7KT5 603	7KT5 604
Standards			EN 60255-6				
Rated control supply voltage U_c		V AC V DC	-- 10 ... 50	115 --	230	115	230
Rated frequency		Hz	--	50		60	
Front-panel mounting	Switchboard cutout	mm × mm	$68^{+0.5} \times 68^{+0.5}$				

Selection and ordering data

		U_c	Frequency	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V	Hz	MW							kg
	**Time counters** Mechanical counting mechanism, display 00000.00 h, for front-panel mounting, front frame 48 mm x 48 mm										
		10 ... 80 DC	–			**7KT5 500**		1	1 unit	033	0.059
		24 AC	50			**7KT5 505**		1	1 unit	033	0.056
		115 AC				**7KT5 501**		1	1 unit	033	0.058
		230 AC				**7KT5 502**		1	1 unit	033	0.057
		115 AC	60			**7KT5 503**		1	1 unit	033	0.058
		230 AC				**7KT5 504**		1	1 unit	033	0.058
	For front-panel mounting, front frame 72 mm x 72 mm with narrow frame according to DIN 43700										
		10 ... 50 DC	–	2		**7KT5 600**		1	1 unit	033	0.131
		115 AC	50			**7KT5 601**		1	1 unit	033	0.128
		230 AC				**7KT5 602**		1	1 unit	033	0.129
		115 AC	60			**7KT5 603**		1	1 unit	033	0.128
		230 AC				**7KT5 604**		1	1 unit	033	0.129
	Covers for 7KT5 5 time counters										
	55 mm × 55 mm					**7KT9 020**		1	1 unit	033	0.005
	Sealing rings for 7KT9 020 covers										
	IP43 installation in switchboards with smooth surfaces (1 set = 5 units)					**7KT9 000**		1	1 set	033	0.011
	Terminal covers for 7KT5 6 time counters										
	Degree of protection, IP20, with connected conductors					**7KT9 021**		1	1 unit	033	0.003

* You can order this quantity or a multiple thereof.

Overview



7KT1 2 current transformers

The three-phase 7KT1 2 current transformer can be used in distribution boards according to DIN 43880. The measuring leads are routed vertically through the standard mounting rail.

This type of current transformer is suitable for infeeds or outgoing lines in connection with the installation of a 5TE8 switch or a 5TE1 disconnector, as the primary connecting leads do not have to be interrupted.

The current transformer is designed for cables of up to 13 mm in diameter, e.g. H07V-R with 50 mm^2 conductor cross-section.

Benefits

- The current transformer has accuracy class 1 acc. to EN 60044-1. This value is better than most measuring devices in this area of application
- The versions designed for a transformer ratio of 60/5 A, 100/5 A and 150/5 A enable an even broader range of applications.

Technical specifications

			7KT1 200	7KT1 201	7KT1 202
Standards			EN 60044-1		
Secondary rated current strength		A	5		
Accuracy class		Cl.	1		
Rated power		VA	1.25	2.5	3.75
Rated frequency f_n		Hz	50/60		
Thermal current limit I_{th}	Short-time	A	60 × I_e		
Thermal continuous current		A	1 × I_e		
Overcurrent limit factor		FS	5		
Rated impulse withstand voltage U_{imp}		kV	> 3		
Creepage distances and clearances		mm	> 3		
Rated operational voltage U_e		V AC	720		
Rated operational current I_e		A AC	3 × 60	3 × 100	3 × 150
Terminals ±screw (Pozidriv)			PZ 1		
Conductor cross-sections					
- Rigid		mm^2	0.5 ... 4		
- Flexible, with end sleeve		mm^2	0.5 ... 2.5		
Permissible ambient temperature		°C	-5 ... +60		
Resistance to climate	Acc. to EN 60068-1		20/60/4		

Selection and ordering data

	U_e	I_e	I_{sec}	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	V AC	A AC	A AC	MW							kg
Current transformers											
	720	3 × 60	5	6		**7KT1 200**		1	1 unit	033	0.499
		3 × 100				**7KT1 201**		1	1 unit	033	0.512
		3 × 150				**7KT1 202**		1	1 unit	033	0.510

* You can order this quantity or a multiple thereof.

7KT9 0 measuring selector switches

Overview

Measuring selector switch (voltmeter selector switch)

Measuring selector switches are used as CO contacts of the phases for voltages and currents in three-phase systems for voltmeters and ammeters.

The design of these switches is adapted to match the modular installation devices. They support use in compliance with EN 60947-3.

Benefits

The devices have a rated insulation voltage of 660 V. This permits use in many systems.

Selection and ordering data

		U_e	I_e	U_c	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
		V AC	A AC	V AC	MW							kg
	**Voltmeter selector switches**	400	12	6	3		**7KT9 010**		1	1/48 units	033	0.126
	**Ammeter selector switches for operation with current transformer**	400	12	6	3		**7KT9 011**		1	1 unit	033	0.128

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* You can order this quantity or a multiple thereof.