

## Measuring Devices and Power Monitoring

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<b>Power monitoring</b>	
11/2	Energy management in accordance with ISO 50001
11/5	Hardware and software components powermanager
Ch.13	PC-based power monitoring system
11/7	PC-based power monitoring system
11/9	SIMATIC-based power data management system
<b>Measuring devices</b>	
11/11	Introduction
<b>7KM PAC measuring devices</b>	
11/14	7KM PAC3100 measuring devices
11/15	7KM PAC3200 measuring devices
11/17	7KM PAC4200 measuring devices
11/19	7KM PAC5100 measuring devices <b>NEW</b>
11/20	7KM PAC5200 measuring devices <b>NEW</b>
11/22	Accessories for 7KM PAC
11/23	7KM PAC expansion modules
<b>7KT PAC measuring devices</b>	
11/26	7KT PAC1500 three-phase measuring devices
11/28	7KT PAC1500 single-phase measuring devices
11/29	7KT PAC expansion modules
11/30	7KT LAN couplers
<b>Other measuring devices</b>	
11/32	Digital voltmeters and ammeters
11/34	Time and pulse counters for standard rail mounting
11/36	Time counters for front-panel mounting
<b>Accessories</b>	
11/37	4NC current transformers
11/40	7KT12 current transformers
11/41	7KT90 measuring selector switches

**For further technical product information:**

[Configuration Manual](#)

[Measuring Devices and Power Monitoring](#)  
 Article No.: 3ZW1012-7KM42-0AC1

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# Measuring Devices and Power Monitoring

## Power Monitoring

### Energy management in accordance with ISO 50001

#### Overview

##### **A systematic approach to energy efficiency**

The standard ISO 50001 supports companies with a specific process description for introducing a corporate energy management system. Standard-compliant energy management optimizes energy utilization, while continuously enhancing energy efficiency.

##### **Defining energy policy objectives**

A central management task is the formulation of an in-house energy policy. It defines relevant strategic and operational objectives. Ongoing planning will include the identification of additional optimization potential for the business areas under scrutiny, and the development of relevant improvement measures.

##### **Introducing process optimization**

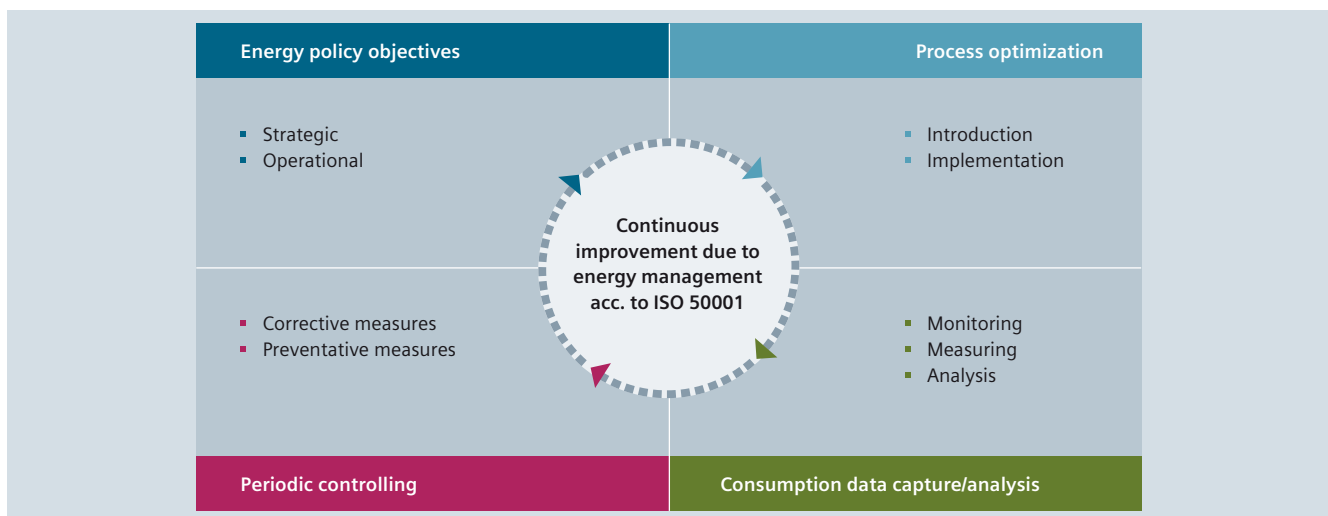
As a first step, an energy manager must be identified and nominated. He will then evaluate captured data, and derive and implement appropriate optimization measures. He will report the achieved results to corporate management.

##### **Making energy flows transparent**

As a second step, basic energy consumption and cost data, as well as information on in-house energy production must be collected and documented clearly and verifiably. This requires the development of a reliable and precise system for the capture and analysis of consumption data. The objective is to recognize sustainable savings potential, to derive appropriate measures for that potential, and to implement these measures systematically.

##### **Periodic controlling**

Periodic checks will ensure that your energy management system functions correctly, and that objectives are reached. Corrective and preventative measures can then be implemented as needed.



Introduction of a corporate energy management system in accordance with ISO 50001 for continuous improvement of energy efficiency by reducing energy consumption and costs.

**Providing the basis with power monitoring**

The power monitoring system from the SENTRON portfolio is suitable for infrastructure, industrial applications, and buildings. The 7KT/7KM PAC measuring devices record the data of outgoing feeders or individual loads.

The 3WL/3VA/3VL circuit breakers supply measured values and important information for diagnostics, fault detection, and maintenance via standardized bus systems.

With the powermanager power monitoring software, the recorded measured values can be easily visualized, analyzed, archived, and monitored.

Recording of generated energy using measuring devices in MID version

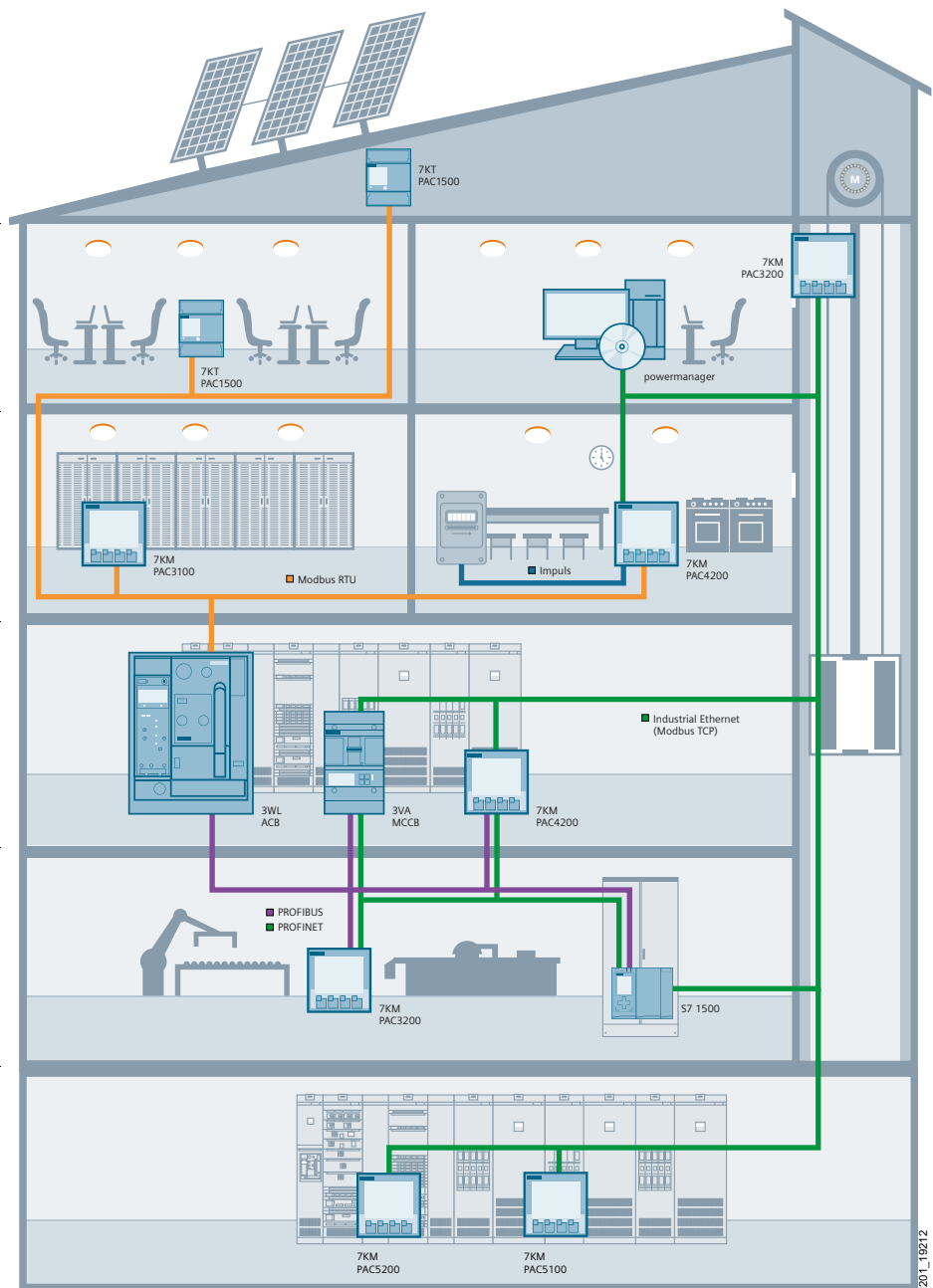
Derivation of optimization measures through transparency of the energy flows

Increased availability of energy through monitoring of critical states in the power supply

Increased system availability through continuous monitoring of switching states

Increased productivity through optimization of energy consumption and energy costs

Transparency at the infeed thanks to seamless recording of the power supply quality



## Measuring Devices and Power Monitoring

### Power Monitoring

#### Energy management in accordance with ISO 50001

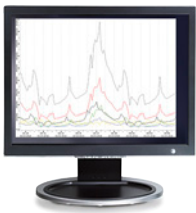
##### *Continuously increasing energy efficiency*

###### Precise cost center accounting for consumers



- Precise allocation of energy costs to cost centers
- Benchmarking between different cost centers
- Increased energy awareness

###### Detection of energy guzzlers, reduction of load peaks



- Detection of energy-intensive processes and loads
- Cost savings created by amending the power supply agreement
- Tax savings by seamless documentation of application-specific consumption

###### Protection of sensitive areas for high plant safety



- Avoidance of equipment failures due to overload
- Protection of sensitive devices against harmonics
- Early intervention possible by means of notifications

###### Monitoring of protective devices for high system availability



- Increased system availability
- Optimization of maintenance
- Fast response to service call-outs








###### Multi-site power monitoring



- Centralized, multi-site power monitoring via standard IT networks
- Benchmarking of various corporate units increases energy awareness
- Improvement of power supply conditions by bundling supply volumes

### Overview

#### 7KT PAC, 7KM PAC measuring devices and 3VA molded case circuit breakers with ETUs of the 8-series

	7KT PAC1500	7KM PAC3100	7KM PAC3200	7KM PAC4200	7KM PAC5100	7KM PAC5200	3VA ETU8..
							
	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/monitoring	The specialist solution for measured value recording	The expert solution for power supply quality	The specialist solution for protection and energy measurement
<b>Measuring range/connection</b>							
Max. input voltage L-L/L-N	400 V/230 V	480 V/276 V	690 V/400 V <sup>1)</sup>	690 V/400 V <sup>1)</sup>	690 V/400 V	690 V/400 V	690 V/400 V
Transformer connection version	x/5 A	x/5 A	x/1 A/x/5 A	x/1 A/x/5 A	x/1 A/x/5 A	x/1 A/x/5 A	Integrated
Direct connection version	80 A/125 A	–	–	–	–	–	–
DC power supply unit with extra-low voltage version	–	–	22 ... 65 V	22 ... 65 V	–	–	24 V
Single-phase counter version	✓	–	–	–	–	–	–
Electrically isolated voltage inputs	–	–	–	–	✓	✓	–
Variant without display (with web server)	–	–	–	–	✓	✓	–
<b>Measured quantities</b>							
Voltage, current, power, frequency, power factor	✓ <sup>2)</sup>	✓	✓	✓	✓	✓	✓
<b>Energy measurement</b>							
• Apparent, active, reactive energy	–   ✓   ✓	–   ✓   ✓	✓   ✓   ✓	✓   ✓   ✓	✓   ✓   ✓	✓   ✓   ✓	✓   ✓   ✓
<b>Extended measured quantities</b>							
• Distortion factor THD (voltage, current)	–	–	✓ <sup>3)</sup>	✓	✓	✓	✓
• Harmonics (voltage, current)	–	–	–	3. ... 31.	2. ... 40.	2. ... 40.	–
• Phase angle/phase chart	–	–	–	✓	✓	✓	–
• Load profile record with time stamp for min/max values	–	–	–	✓	–	✓	✓
• Flicker acc. to IEC 61000-4-15	–	–	–	–	–	✓	–
<b>Monitoring functions</b>							
Operating hours counter	–	–	✓	✓	–	–	✓
Limit monitoring	–	–	✓	✓	✓	✓	✓
Logic functions	–	–	✓	✓	✓	✓	–
Event log	–	–	–	> 4000 events	✓	✓	✓
Gateway function	–	–	–	✓	–	–	–
Reporting acc. to EN 50160	–	–	–	–	–	✓	–
Integrated fault recorder	–	–	–	–	–	✓	–
<b>System integration and communication</b>							
Digital inputs/digital outputs	–	2/2	1/1	2/2	0/2	0/2	–
S0 interface	✓	✓	✓	✓	–	–	Optional
4DI/2DO expansion module	–	–	–	Optional	–	–	Optional
M-Bus	Optional	–	–	–	–	–	–
Instabus KNX	Optional	–	–	–	–	–	–
Modbus RTU	Optional	✓	Optional	Optional	–	–	Optional
Ethernet with Modbus TCP	–	–	✓	✓	✓	✓	✓
PROFIBUS DPV1	–	–	Optional	Optional	–	–	Optional
PROFINET IO/ PROFlenergy	–	–	Optional	Optional	–	–	Optional
Parameterization software	✓	powerconfig	powerconfig	powerconfig	powerconfig	powerconfig	powerconfig
Integration of power monitoring system	powermanager	powermanager	powermanager	powermanager	powermanager	powermanager	powermanager
Web servers	–	–	–	–	✓	✓	–
<b>General data</b>							
Measuring accuracy, active energy, reactive energy	1   2	1   3	0.5 S   2	0.2 S   2	0.5 S   2	0.5 S   2	2 S   2 <sup>4)</sup>
MID version	✓	–	–	–	–	–	–
Installation	Standard mounting rail	Front mounting	Front mounting	Front mounting	Front mounting/standard mounting rail	Front mounting/standard mounting rail	See Chap. 2
Dimensions in MW (1 MW = 18 mm) or in mm	2 / 4 / 6 MW	96 × 96 × 56	96 × 96 × 56	96 × 96 × 82	96 × 96 × 100	96 × 96 × 100	96 × 96 × 82 <sup>5)</sup>

<sup>1)</sup> With the exception of devices with power supply units with extra-low voltage. ✓ Available / possible -- Not available / not possible

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

<sup>3)</sup> THD indication.

<sup>4)</sup> Measuring accuracy including current transformer

<sup>5)</sup> For display via DSP800, see chapter "Molded Case Circuit Breakers"

# Measuring Devices and Power Monitoring

## Power Monitoring

### Hardware and software components

#### Accessories for 7KM PAC measuring devices



**7KT PAC expansion modules**

M-Bus



Modbus RTU



RS 485



KNX



**7KT LAN couplers**

Web servers

Specification	Up to 9600 bit/s	Up to 115200 bit/s	For connection to the 7KT LAN coupler	Up to 19200 bit/s	For up to 30 7KT PAC1500 measuring devices
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#### Accessories for 7KM PAC measuring devices



**7KM PAC expansion modules**

Switched Ethernet  
For 7KM PAC3200,  
7KM PAC4200 and 3VA  
COM100/COM800



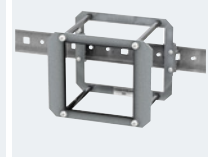
PROFIBUS DP  
For 7KM PAC3200,  
7KM PAC4200 and 3VA  
COM100/COM800



RS 485  
For 7KM PAC3200,  
7KM PAC4200 and 3VA  
COM100/COM800



4DI/2DO  
For 7KM PAC4200  
(number of digital inputs/  
outputs per module 4/2)



**Standard mounting rail adapter**

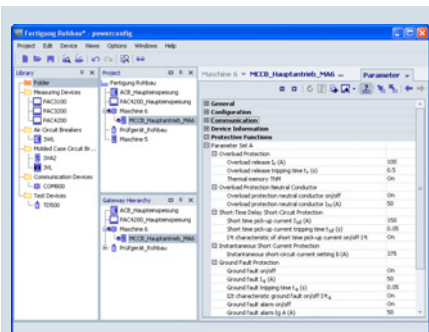
7KM PAC TMP2  
For 7KM PAC3100/  
3200/4200 for mounting  
on a standard mounting  
rail

Protocol	PROFINET IO PROEnergy Modbus TCP	DPV1	Modbus RTU	S0 interface	--
Maximum number of connectable expansion modules of the same type	1	1	1	2	--

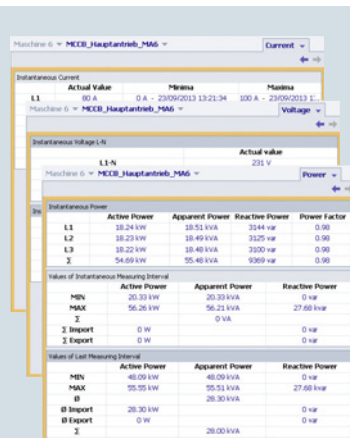
#### The powerconfig software for commissioning

Software tool for the efficient commissioning and diagnosis of communication-capable SENTRON components

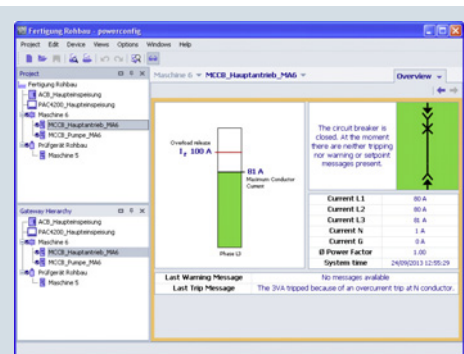
License	Free use
Supported devices	7KM PAC3100/3200/4200 measuring devices, incl. expansion modules 3WL/3VL/3VA/ATC5300 circuit breakers
General range of functions	The PC-based tool facilitates parameterization of the devices, resulting in substantial time savings, particularly when several devices have 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	German, English, Chinese, Spanish, Portuguese
Service functions	Firmware updates and switching of language packs for 7KM PAC measuring devices
Functional scope with 7KM PAC4200 and 3VA	Readout of data stored in the device (events; load profile history; daily energy counters), which are saved in csv format



Setting of parameter values



Display of actual measured quantities



Display of the circuit breaker state

For more information about powerconfig, see chapter "Software"

### Overview



Hardware components of the PC-based power monitoring system



Software component of the power monitoring software: powermanager

### Power monitoring system with SENTRON components

The TÜV-certified power monitoring system from the SENTRON portfolio consists of the 7KT/7KM PAC measuring devices, the 3WL/3VA/3VL circuit breakers, and the powermanager power monitoring software. This forms the technical basis for supporting a corporate energy management system as specified by ISO 50001.

The hardware and software components are optimally coordinated with each other. For example, special drivers for the SENTRON devices are integrated in the powermanager power monitoring software. They enable energy data to be captured without any great configuration effort and they indicate the key measured values or the status by means of predefined views.

This reduces the engineering overhead. The device functions are optimally supported in the software.

### Features of the powermanager power monitoring software

The powermanager power monitoring software constitutes the optimum technical basis for supporting a corporate power monitoring system as specified by ISO 50001:

- Independent power monitoring software
- Can be operated using a Windows PC and measuring devices with Ethernet connection
- Easy getting started with basic license, can be extended with flexible licensing concept according to customer requirements
- Fully scalable, relative to number of devices and software functions
- Ensures optimum integration of 7KT/7KM PAC measuring devices, as well as 3WL/3VA/3VL circuit breakers and other Modbus devices
- Support of the various device and communication interfaces (Modbus RTU, Modbus TCP)
- Status display of devices
- Available languages: German, English, Spanish, Portuguese, Italian, French, Turkish, Chinese

## Measuring Devices and Power Monitoring

### Power Monitoring

#### PC-based power monitoring system

#### Application

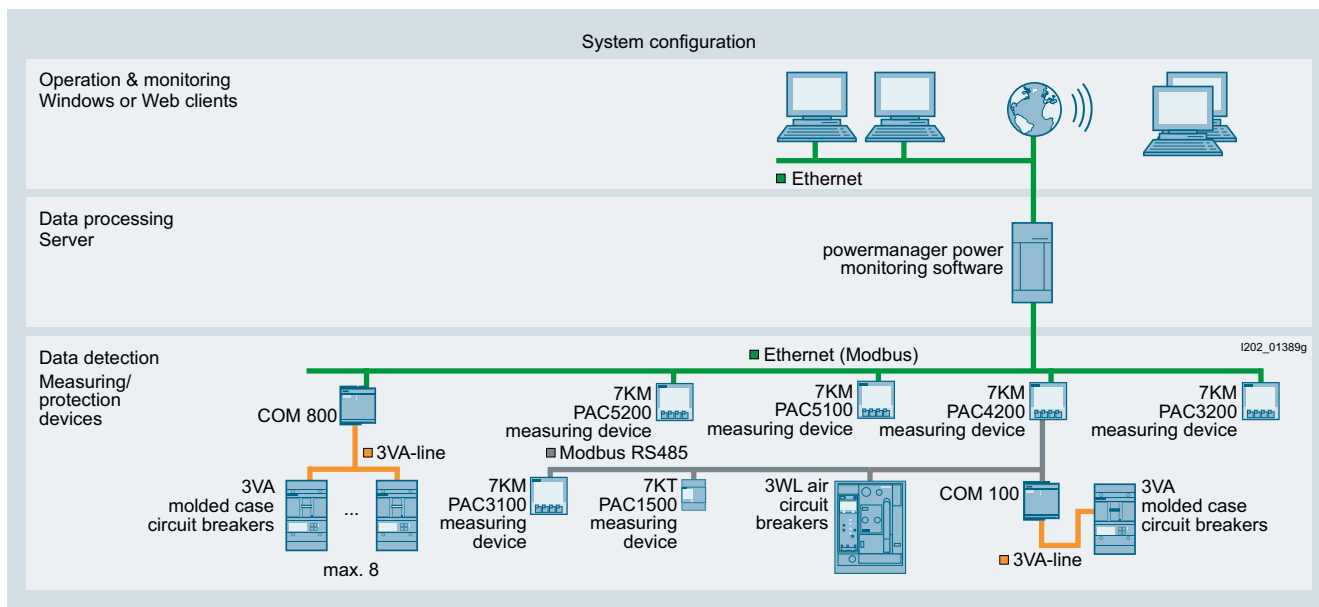
##### Industries

An energy-efficient production system enhances both the image and the productivity of the company, and thus its competitiveness.

Power monitoring as the technical basis for energy management for increasing a company's energy efficiency is thus of interest to all areas, from industrial applications to infrastructure, and buildings in the service sector.

##### System configuration

- Integration of measuring devices by means of predefined device templates for the 7KT/7KM PAC measuring devices and the 3WL/3VA/3VL circuit breakers
- Easy integration of existing modbus-capable measuring 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



Typical topology of a power monitoring system

#### More information

##### TÜV certification



The TÜV certificate is available from [www.siemens.com/tuev-certificate-of-conformity](http://www.siemens.com/tuev-certificate-of-conformity)

##### Components of the PC-based power monitoring system

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

- 7KM PAC measuring devices, [see this chapter](#)
- 3WL air circuit breakers, [see chapter "Air Circuit Breakers"](#)
- 3VL molded case circuit breakers, [see chapter "Molded Case Circuit Breakers"](#)
- 3VA molded case circuit breakers, [see chapter "Molded Case Circuit Breakers"](#)

##### Software of the PC-based power monitoring system

The software of the PC-based power monitoring system is powermanager, [see chapter "Software"](#).

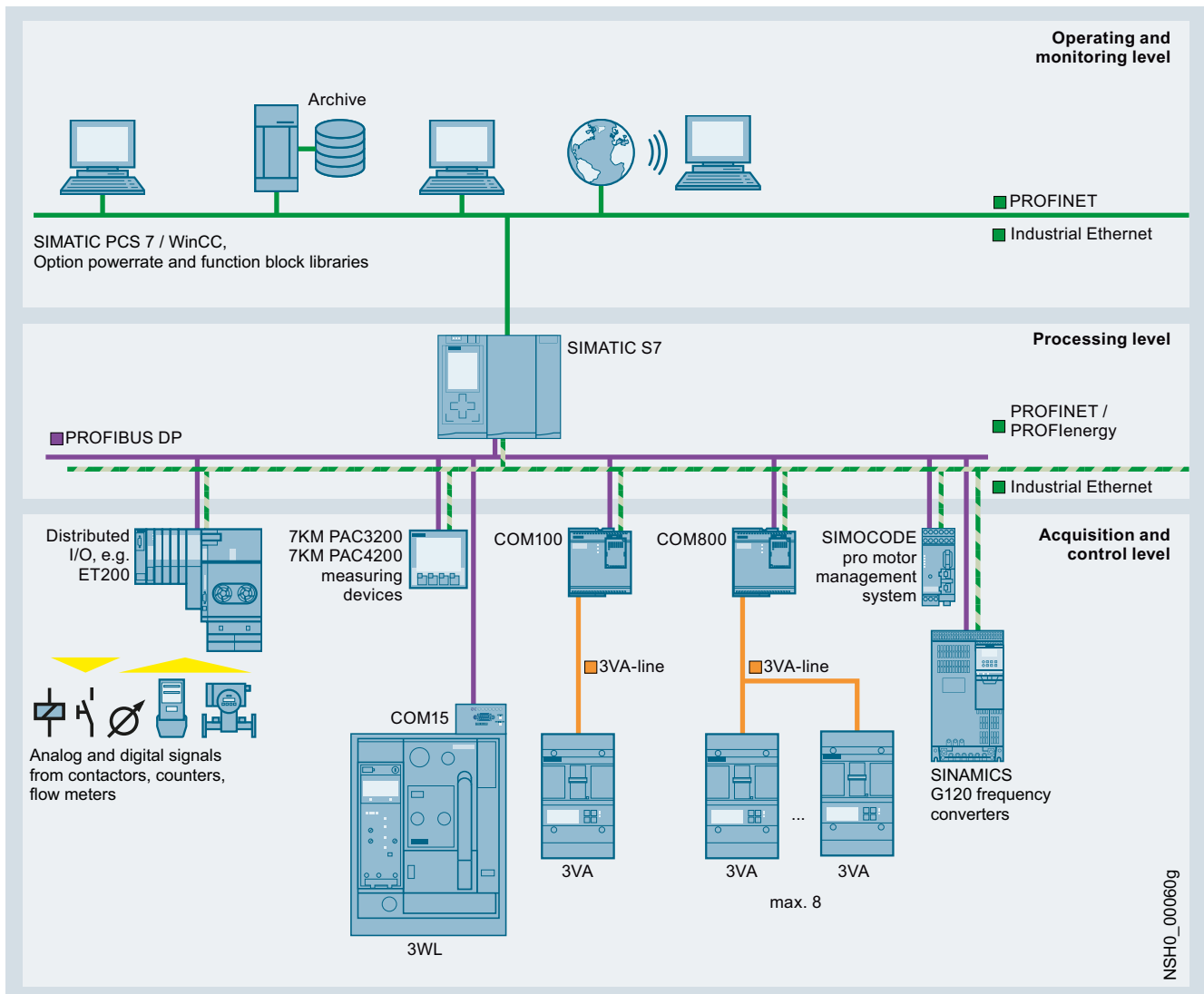
Powermanager system packages with software and hardware are an easy and low-cost way to get started in a power monitoring system, [see chapter "Software"](#).

##### Internet

You can find more information on the Internet at: [www.siemens.com/powermonitoring](http://www.siemens.com/powermonitoring)



### Overview



### SIMATIC-based solutions for the process and manufacturing industry

A key feature of the process and manufacturing industry is frequently high energy 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 PROFInergy

An increasing number of devices in automation technology offer PROFINET. The 7KM PAC Switched Ethernet PROFINET expansion module enables the 7KM PAC3200/PAC4200 measuring devices and 3VA circuit breakers to be connected to the automation systems.

PROFINergy is a "Common Application Profile" from Profibus International. Thanks to PROFInergy 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/3VA/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

## Measuring Devices and Power Monitoring

### Power Monitoring

#### SIMATIC-based power data management system

##### Benefits

- Increased energy efficiency due to precise knowledge of the load profile
- Optimization of power supply agreements
- 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-based power data management system is used in all industries in which PCS 7 and WinCC are used, and 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, [see this chapter](#)
- 3WL air circuit breakers, [see chapter "Air Circuit Breakers"](#)
- 3VL molded case circuit breakers, [see chapter "Molded Case Circuit Breakers"](#)
- 3VA molded case circuit breakers, [see chapter "Molded Case Circuit Breakers"](#)

###### **Software components**

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






- Library 7KM PAC3200 for SIMATIC PCS 7
- Library 7KM PAC3200 for SIMATIC WinCC

For information about the software components, [see chapter "Software"](#)

###### **Internet**

You can find more information on the Internet at: [www.siemens.com/powermonitoring](http://www.siemens.com/powermonitoring)

### Overview







Devices	Page	Application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
<b>7KM PAC measuring devices</b>						
 <p><b>7KM PAC3100 measuring device</b> AC/DC wide-range power supply unit, screw connection</p>	11/14	<p>Control panel instrument with graphics display, integrated digital inputs and outputs and an RS 485 interface for the transmission of measured values and configurations.</p> <p>Display of 30 electrical measured values and consumption values in switchboard assemblies, infeeds or outgoing feeders.</p> <p>International standards and multi-lingual displays for worldwide use.</p>	Measurement accuracy for energy acc. to IEC 61557-12	✓	--	✓
 <p><b>7KM PAC3200 measuring device</b> 3 versions:</p> <ul style="list-style-type: none"> <li>AC/DC wide-range power supply unit, screw connection</li> <li>DC power supply unit with extra-low voltage, screw connection</li> <li>AC/DC wide-range power supply unit, ring cable lug connection</li> </ul>	11/15	<p>Control panel instrument with graphics display, integrated digital inputs and outputs and an integrated Ethernet interface for the transmission of measured values and configurations.</p> <p>Display of over 50 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Dual-tariff measuring devices for precise energy measurement for power import and feedback.</p> <p>The following components are available:</p> <ul style="list-style-type: none"> <li>7KM PAC Switched Ethernet PROFINET</li> <li>7KM PAC RS 485</li> <li>7KM PAC PROFIBUS DP</li> </ul>	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
 <p><b>7KM PAC4200 measuring device</b> 3 versions:</p> <ul style="list-style-type: none"> <li>AC/DC wide-range power supply unit, screw connection</li> <li>DC power supply unit with extra-low voltage, screw connection</li> <li>AC/DC wide-range power supply unit, ring cable lug connection</li> </ul>	11/17	<p>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.</p> <p>Display of over 200 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Extensive functions for precise energy measurement for power import and feedback and assessment of the system quality.</p> <p>The following components are available:</p> <ul style="list-style-type: none"> <li>7KM PAC Switched Ethernet PROFINET</li> <li>7KM PAC RS 485</li> <li>7KM PAC PROFIBUS DP</li> <li>7KM PAC 4DI/2DO</li> </ul>	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
 <p><b>7KM PAC5100 measuring device</b> <b>NEW</b> 2 versions:</p> <ul style="list-style-type: none"> <li>Control panel instrument with graphics display</li> <li>Standard rail instrument without display</li> </ul>	11/19	<p>Control panel instrument with graphics display and user-defined displays, or instrument for standard rail mounting in accordance with EN 60750, web server for parameterization, visualization and data management, 2 binary outputs, electrically isolated voltage inputs, synchronization via internal RTC clock or externally via NTP, 4 freely parameterizable LEDs for device status or limit violations, as well as integrated RJ45 Ethernet interface.</p> <p>Recording of more than 250 electrical measured values for switchboard assemblies, infeeds or outgoing feeders, extensive functions for precise energy measurement for power import and feedback, and for assessment of the system quality.</p>	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
 <p><b>7KM PAC5200 measuring device</b> <b>NEW</b> 2 versions:</p> <ul style="list-style-type: none"> <li>Control panel instrument with graphics display</li> <li>Standard rail instrument without display</li> </ul>	11/20	<p>Control panel instrument with graphics display and user-defined displays, or instrument for standard rail mounting in accordance with EN 60750, web server for parameterization, visualization and data management, 2 binary outputs, electrically isolated voltage inputs, flicker in accordance with IEC 61000-4-15, synchronization via internal RTC clock or externally via NTP, 4 freely parameterizable LEDs for device status or limit violations, 2 GB memory, integrated fault recorder, reporting in accordance with EN 50160, rms recorder, as well as integrated RJ45 Ethernet interface.</p> <p>Display of over 250 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Extensive functions for precise energy measurement for power import and feedback and assessment of the system quality.</p>	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓

# Measuring Devices and Power Monitoring

## Measuring Devices

### Introduction

Devices	Page	Application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
 <p><b>7KM PAC expansion modules</b></p>	11/23	<ul style="list-style-type: none"> <li>The 7KM PAC Switched Ethernet PROFINET expansion module is used to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers to Switched Ethernet PROFINET (PROFInergy).</li> <li>The 7KM PAC PROFIBUS DP expansion module is used to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers to the PROFIBUS DPV1</li> <li>The 7KM PAC RS 485 expansion module is used to connect simple devices with RS 485 interface, such as the 7KM PAC3200 and 3VA molded case circuit breaker, and it supports the Modbus RTU protocol.</li> <li>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.</li> </ul>	IEC 61784-2  IEC 61158  RS 485  IEC 62053-31	✓	-	✓
 <p><b>7KT PAC1500 three-phase measuring device</b> 7KT154</p>	11/26	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	✓	✓	✓
 <p><b>7KT PAC1500 single-phase measuring device</b> 7KT153</p>	11/28	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	✓	✓	✓
 <p><b>7KT PAC expansion modules</b> 7KT19</p>	11/29	Communication interfaces with IrDA infrared interface for 7KT PAC1500 measuring devices. Modules are available for the following bus systems: <ul style="list-style-type: none"> <li>M-Bus</li> <li>Modbus RTU</li> <li>RS 485 (7KT1391 LAN coupler connection)</li> <li>KNX/EIB</li> </ul>	EN 13321-1, EN 13757  ISO/IEC 14543-3  EN 50090	✓	✓	✓
 <p><b>7KT LAN couplers</b></p>	11/30	Web server with 2 GB internal storage, for up to 30 7KT15.. measuring devices  Global view and Excel export of current consumption data via LAN or Internet using a web browser such as Firefox.	IEEE 802	✓	--	✓

Devices	Page	Application	Standards	Used in			
				Non-residential buildings	Residential buildings	Industry	
<b>Other measuring devices</b>							
	<b>Digital measuring devices</b> 7KT111, 7KT112	11/32	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	✓	--	✓
	<b>Time and pulse counters for standard rail mounting</b> 7KT58	11/34	For monitoring operating hours and starting operations for the planning of preventative maintenance tasks and preventing sudden shutdowns	IEC 60255-6, EN 60255-6 (VDE 0435-301) UL 94	✓	✓	✓
	<b>Time counters for front-panel mounting</b> 7KT55, 7KT56	11/36	For monitoring operating hours and starting operations for planning preventative maintenance tasks and preventing sudden shutdowns.	IEC 60255-6, EN 60255-6 (VDE 0435-301)	✓	✓	✓
<b>Accessories</b>							
	<b>4NC current transformers</b>	11/37	Window-type current transformers/pin-wound transformers, particularly suitable for long measuring leads, low cable losses	EN 60044-1, VDE 0414-44-1	✓	--	✓
	<b>7KT12 current transformers</b>	11/40	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 (VDE 0414 T 44-1)	✓	--	✓
	<b>7KT90 measuring selector switches</b>	11/41	For switching over the phases for voltmeters and ammeters		✓	--	✓

## Measuring Devices and Power Monitoring

### 7KM PAC Measuring Devices

#### 7KM PAC3100 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 also supply key measured values for assessment of the state of the plant.

The 7KM PAC3100 measuring device is fitted with an integrated Modbus RTU interface via RS 485, 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
- User-friendly, free configuration software powerconfig, [see below](#)

##### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 <b>7KM PAC3100 measuring device</b> Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection AC/DC wide-range power supply unit $U_{AUX}$ : 100 ... 240 V AC $\pm$ 10 %, 50/60 Hz 110 ... 250 V DC $\pm$ 10 % Measuring inputs $U_E$ : max. 480/277 V 3 AC, 50/60 Hz $I_E$ : 15 A							
		<b>Screw connection</b> 					
		<b>7KM3133-0BA00-3AA0</b>		1	1 unit	1DD	0.469

7KM3133-0BA00-3AA0

##### More information

For current transformers, [see page 11/37](#) or [see chapter "Switch Disconnectors"](#)

For other accessories, [see page 11/22](#)

powerconfig is available free of charge at <http://support.automation.siemens.com/WW/view/en/63452759>

For more information about powerconfig, [see chapter "Software"](#)

#### 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 PAC3200 measuring device is fitted with an integrated Modbus TCP interface via Ethernet, 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

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)
- User-friendly configuration software powerconfig, [see chapter "Software"](#)

# Measuring Devices and Power Monitoring

## 7KM PAC Measuring Devices

### 7KM PAC3200 measuring devices

#### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 <p><b>7KM PAC3200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection</p> <p>AC/DC wide-range power supply unit <math>U_{AUX}</math>: 95 ... 240 V AC <math>\pm</math> 10 %, 50/60 Hz 110 ... 340 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM2112-0BA00-3AA0</p>		<b>Screw connection</b> 					
		<b>7KM2112-0BA00-3AA0</b>		1	1 unit	1DD	0.451
 <p><b>7KM PAC3200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection</p> <p>DC power supply unit with extra-low voltage <math>U_{AUX}</math>: 22 ... 65 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 500/289 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM2111-1BA00-3AA0</p>		<b>Screw connection</b> 					
		<b>7KM2111-1BA00-3AA0</b>		1	1 unit	1DD	0.459
 <p><b>7KM PAC3200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Ring cable lug connections for current and voltage connection</p> <p>AC/DC wide-range power supply unit: <math>U_{AUX}</math>: 95...240 V AC <math>\pm</math> 10 %, 50/60 Hz 110...340 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM2112-0BA00-2AA0</p>		<b>Ring cable lug connection</b> 					
		<b>7KM2112-0BA00-2AA0</b>		1	1 unit	1DD	0.470

#### More information

For current transformers, [see page 11/37](#)  
or see chapter "Switch Disconnectors"

For other accessories, [see page 11/22](#)

powerconfig is available free of charge at  
<http://support.automation.siemens.com/WWW/view/en/63452759>

For more information about powerconfig, [see chapter "Software"](#).



### 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 PAC4200 measuring device is fitted with an integrated Modbus TCP interface via Ethernet, 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

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)
- User-friendly configuration software powerconfig, [see chapter "Software"](#)
- Monitoring of plant status and 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 RS 485 interface via expansion module 7KM PAC RS 485 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

# Measuring Devices and Power Monitoring

## 7KM PAC Measuring Devices

### 7KM PAC4200 measuring devices

#### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS* P. unit	PG	Weight per PU approx. kg
 <p><b>7KM PAC4200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection</p> <p>AC/DC wide-range power supply unit <math>U_{AUX}</math>: 95 ... 240 V AC <math>\pm</math> 10 %, 50/60 Hz 110 ... 340 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM4212-0BA00-3AA0</p>		<p><b>Screw connection</b> </p> <p><b>7KM4212-0BA00-3AA0</b></p>		1	1 unit	1DD	0.543
 <p><b>7KM PAC4200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection</p> <p>DC power supply unit with extra-low voltage <math>U_{AUX}</math>: 22 ... 65 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 500/289 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM4211-1BA00-3AA0</p>		<p><b>Screw connection</b> </p> <p><b>7KM4211-1BA00-3AA0</b></p>		1	1 unit	1DD	0.537
 <p><b>7KM PAC4200 measuring device</b></p> <p>Control panel instrument, 96 x 96 mm Ring cable lug connections for current and voltage connection</p> <p>AC/DC wide-range power supply unit: <math>U_{AUX}</math>: 95 ... 240 V AC <math>\pm</math> 10 %, 50/60 Hz 110 ... 340 V DC <math>\pm</math> 10 %</p> <p>Measuring inputs <math>U_E</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_E</math>: /1 A or /5 A</p> <p>7KM4212-0BA00-2AA0</p>		<p><b>Ring cable lug connection</b> </p> <p><b>7KM4212-0BA00-2AA0</b></p>		1	1 unit	1DD	0.544

#### More information

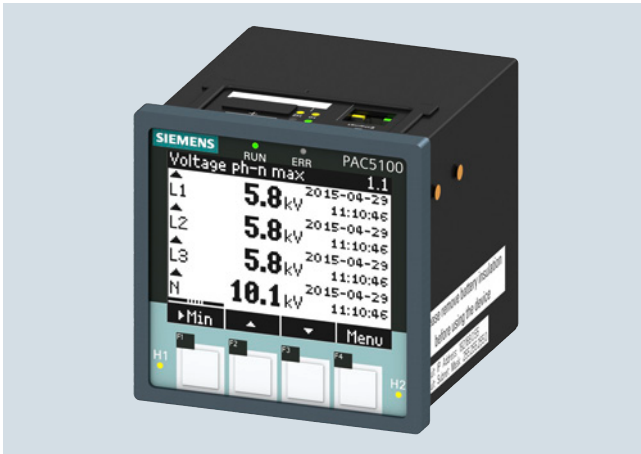
For current transformers, [see page 11/37](#)  
or [see chapter "Switch Disconnectors"](#)

For other accessories, [see page 11/22](#)

powerconfig is available free of charge at  
<http://support.automation.siemens.com/WWW/view/en/63452759>

For more information about powerconfig, [see chapter "Software"](#)

### Overview



7KM PAC5100 measuring device





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 PAC5100 measuring device has an integrated Modbus TCP interface via Ethernet and a web server for parameterization, visualization and data management.

### Benefits

- Simple mounting and commissioning
- Intuitive operation via 4 function keys
- Integrated web server for parameterization, display and evaluation
- 4 parameterizable LEDs
- Worldwide use
  - International approvals
  - Developed and tested to European and international standards
- Low mounting depth
- Precise energy measurement
- Versatile system integration
  - Integrated Ethernet interface
  - Multifunctional digital outputs
  - Limit monitoring
- Can be directly connected to power supply networks up to 690 V AC (UL-L), CATIII without voltage transformer
- Electrically isolated voltage inputs
- Monitoring of plant status and 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
- Energy counters for apparent energy, active energy, reactive energy, as well as import, supply, inductive and capacitive
- Comprehensive user-friendly indicators, such as user-defined displays, bar and status indicators
- Measurement up to the 40th individual harmonic of current and voltage

### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 <b>7KM PAC5100 measuring device</b> Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection AC/DC wide-range power supply unit $U_{AUX}$ : 110 ... 230 V AC $\pm$ 10 %, 50/60 Hz 24 ... 250 V DC $\pm$ 10 % Measuring inputs $U_G$ : max. 690/400 V 3 AC, 50/60 Hz $I_e$ : /1 A or /5 A		<b>Screw connection</b> 					
		<b>7KM5212-6BA00-1EA2</b>		1	1 unit	1DD	0.807
 <b>7KM PAC5100 measuring device</b> Standard rail instrument without display Screw connections for connecting current and voltage AC/DC wide-range power supply unit $U_{AUX}$ : 110 ... 230 V AC $\pm$ 10 %, 50/60 Hz 24 ... 250 V DC $\pm$ 10 % Measuring inputs $U_G$ : max. 690/400 V 3 AC, 50/60 Hz $I_e$ : /1 A or /5 A		<b>Screw connection</b> 					
		<b>7KM5212-6CA00-1EA8</b>		1	1 unit	1DD	0.753

### More information

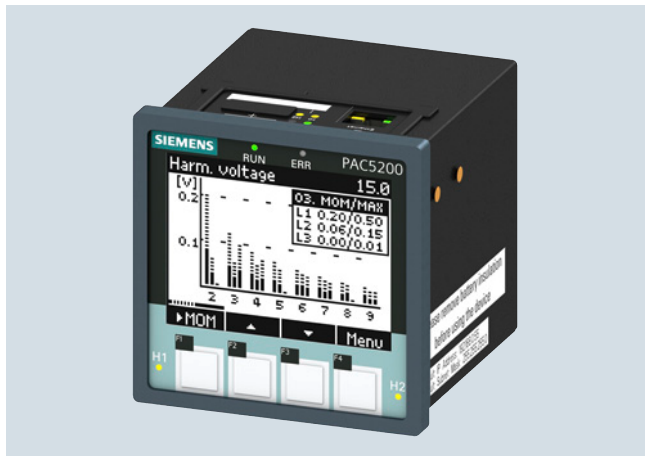
For current transformers, see page 11/37  
or see chapter "Switch Disconnectors"

## Measuring Devices and Power Monitoring

### 7KM PAC Measuring Devices

7KM PAC5200 measuring devices **NEW**

#### Overview



7KM PAC5200 measuring device

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 PAC5200 power quality measuring device has an integrated Modbus TCP interface via Ethernet and a web server for parameterization, visualization and data management.

#### Benefits





- Simple mounting and commissioning
- Intuitive operation via 4 function keys
- 4 parameterizable LEDs
- Integrated web server for parameterization, display and evaluation
- Worldwide use
  - International approvals
  - Developed and tested to European and international standards
- Low mounting depth
- Precise energy measurement
- Versatile system integration
  - Integrated Ethernet interface
  - Multifunctional digital outputs
  - Limit monitoring
- Can be directly connected to power supply networks up to 690 V AC (UL-L), CATIII without voltage transformer
- Electrically isolated voltage inputs
- 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
  - Flicker acc. to IEC 61000-4-15
- Energy counters for apparent energy, active energy, reactive energy, as well as import, supply, inductive and capacitive
- Comprehensive user-friendly indicators, such as user-defined displays, bar and status indicators
- Measurement up to the 40th individual harmonic of current and voltage
- Integrated 2 GB SD card for recorder functions
- Flexible recorder:
  - Measured value recorder
  - Trend recorder
  - Event recorder
  - Fault recorder
- Integrated PQ recording and reporting in accordance with EN 50160
- Data export:
  - COMTRADE
  - PQDif
- Classification of events
- ITIC /CBEMA evaluation in the device

## Measuring Devices and Power Monitoring

### 7KM PAC Measuring Devices

**NEW** 7KM PAC5200 measuring devices

#### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 <p><b>7KM PAC5200 measuring device</b> Control panel instrument, 96 x 96 mm Screw connections for current and voltage connection AC/DC wide-range power supply unit <math>U_{AUX}</math>: 110 ... 230 V AC <math>\pm</math> 10 %, 50/60 Hz 24 ... 250 V DC <math>\pm</math> 10 % Measuring inputs <math>U_e</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_e</math>: /1 A or /5 A</p> <p>7KM5412-6BA00-1EA2</p>		<b>Screw connection</b>  <b>7KM5412-6BA00-1EA2</b>		1	1 unit	1DD	0.809
 <p><b>7KM PAC5200 measuring device</b> Standard rail instrument without display Screw connections for connecting current and voltage AC/DC wide-range power supply unit <math>U_{AUX}</math>: 110 ... 230 V AC <math>\pm</math> 10 %, 50/60 Hz 24 ... 250 V DC <math>\pm</math> 10 % Measuring inputs <math>U_e</math>: max. 690/400 V 3 AC, 50/60 Hz <math>I_e</math>: /1 A or /5 A</p> <p>7KM5412-6CA00-1EA8</p>		<b>Screw connection</b>  <b>7KM5412-6CA00-1EA8</b>		1	1 unit	1DD	0.754

#### More information

For current transformers, see page 11/37  
or see chapter "Switch Disconnectors"





## Measuring Devices and Power Monitoring

### 7KM PAC Measuring Devices

#### Accessories for 7KM PAC

#### Selection and ordering data

##### For 7KM PAC3100/3200/4200

	Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
	<b>7KM PAC TMP2 standard mounting rail adapter</b> Two-tier adapter for mounting a measuring device on a standard mounting rail • Front display • For manual intervention		<b>7KM9900-0XA00-0AA0</b>		1	1 unit	1DD	0.397
	<b>7KM PAC TMP mounting plate</b> 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		<b>7KM9900-0YA00-0AA0</b>		1	1 unit	1DD	0.146
	<b>Compact holder</b> Device holder for 7KM PAC3100/3200/4200: • 10 holders for 5 PAC devices • For seamless side-by-side mounting of the devices (without spaces)		<b>7KM9900-0GA00-0AA0</b>		1	1 unit	1DD	0.148
	<b>7KM PAC spare parts</b> Spare parts comprising: • Device holders for panel mounting (2X) • Screw terminal for connection of voltage inputs • Screw terminal for connection of current inputs • Terminal block inputs/outputs for 7KM PAC3100/4200 • Terminal block inputs/outputs for 7KM PAC3200 • RS 485 terminal block for 7KM PAC3100		<b>7KM9900-0SA00-0AA0</b>		1	1 unit	1DD	0.118

#### More information

##### Current transformers

For current transformers, [see page 11/37](#)

##### Software components

For more information about the software components, [see chapter "Software"](#) and on the Internet at [www.siemens.com/lowvoltage/powermonitoring](http://www.siemens.com/lowvoltage/powermonitoring)

##### More information

More information is available on the Internet at: [www.siemens.com/lowvoltage/powermonitoring](http://www.siemens.com/lowvoltage/powermonitoring)

### 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.

### Versions

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 RS 485 expansion module
- 7KM PAC 4DI/2DO expansion module

### Connection for 3VA molded case circuit breakers

The following expansion modules can be mounted on the front of the COM800/COM100 data breaker servers of the 3VA molded case circuit breaker:

- 7KM PAC Switched Ethernet PROFINET and
- 7KM PAC PROFIBUS DP

For further details, see chapter "Molded Case Circuit Breakers" or in the manual at <http://support.automation.siemens.com/WW/view/en/90318775>

### More information

For more information about the software components, see chapter "Software" and on the Internet at [www.siemens.com/lowvoltage/powermonitoring](http://www.siemens.com/lowvoltage/powermonitoring)

### Version

### Use in

#### 7KM PAC

PAC3100

PAC3200

PAC4200

PAC5100

PAC5200

#### 3VA

COM800/  
COM100

### 7KM PAC expansion modules



#### 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 and 3VA molded case circuit breakers.

It provides the following features:

- Standardized PROFINET 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
- Transmission rates 10 and 100 Mbit/s
- Protocols PROFINET IO, PROFINET 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 PROFINET, a PNO protocol profile. Thanks to PROFINET, it is possible to assemble a power monitoring system with devices from various manufacturers using PROFINET.

	PAC3100	PAC3200	PAC4200	PAC5100	PAC5200	COM800/ COM100
	--	✓	✓	--	--	✓

## Measuring Devices and Power Monitoring





### 7KM PAC Measuring Devices

#### 7KM PAC expansion modules

Version	Use in					
	7KM PAC					3VA
	PAC3100	PAC3200	PAC4200	PAC5100	PAC5200	COM800/ COM100
 <p><b>7KM PAC PROFIBUS DP expansion module</b></p> <p>The 7KM PAC PROFIBUS DP expansion module is a plug-in communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers.</p> <p>The 7KM PAC PROFIBUS DP expansion module has the following features:</p> <ul style="list-style-type: none"> <li>• Plug-in communication module for measuring devices for connection to PROFIBUS DPV1</li> <li>• For 7KM PAC3200 and 7KM PAC4200</li> <li>• Parameterizable via device front or using parameterization software</li> <li>• Data can be transferred both cyclically and acyclically via PROFIBUS DPV1</li> <li>• Easy engineering thanks to integration in SIMATIC STEP 7 and/or simple integration via GSD file for other programming systems</li> <li>• Optimum use of process image of a control system for selection of individual measured quantities for cyclical transfer</li> <li>• Supports all baud rates from 9.6 kbit/s up to 12 Mbit/s</li> <li>• Connection through 9-pole Sub-D connector according to IEC 61158</li> <li>• No external auxiliary power necessary</li> <li>• Additional display via the device display and via LEDs on the module</li> </ul>	--	✓	✓	--	--	✓
 <p><b>7KM PAC RS 485 expansion module</b></p> <p>The 7KM PAC RS 485 expansion module has the following features:</p> <ul style="list-style-type: none"> <li>• Plug-in 7KM PAC RS 485 communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices, and 3VA molded case circuit breakers</li> <li>• Parameterizable via device front or using parameterization software</li> <li>• Support for the Modbus RTU protocol</li> <li>• Plug and play</li> <li>• Supports transmission rates of 4.8/9.6/19.2 and 38.4 kbit/s</li> <li>• Connection by means of 6-pole screw terminals</li> <li>• No external auxiliary power necessary</li> <li>• Status indication by LED on the module</li> <li>• The 7KM PAC RS 485 expansion module is required for the gateway function of the 7KM PAC4200 for communication with simple devices with RS 485 interface, such as the 7KM PAC3100, via Ethernet (Modbus TCP).</li> </ul>	--	✓	✓	--	--	--
 <p><b>7KM PAC 4DI/2DO expansion module</b></p> <p>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:</p> <ul style="list-style-type: none"> <li>• Up to two 7KM PAC 4DI/2DO modules can be plugged onto a 7KM PAC4200</li> <li>• 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.</li> <li>• The 7KM PAC 4DI/2DO expansion modules can be configured locally at the front of the device or via the powerconfig parameterization software</li> <li>• 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</li> <li>• All functions of the integrated multifunctional inputs/outputs on the 7KM PAC4200 are also available in the 7KM PAC 4DI/2DO expansion module</li> <li>• Inputs and outputs can be used as an S0 interface conforming to IEC 62053-31</li> <li>• The connection is made via a 9-pole screw terminal</li> <li>• No external auxiliary power supply is required</li> </ul>	--	--	✓	--	--	--



### Selection and ordering data

Version	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 <b>7KM PAC Switched Ethernet PROFINET expansion module</b> Expansion module for 7KM PAC3200 and 7KM PAC4200 (PROFInergy) and COM100/800 (3VA) breaker data server 7KM9300-0AE01-0AA0		<a href="#">7KM9300-0AE01-0AA0</a>		1	1 unit	1DD	0.070
 <b>7KM PAC PROFIBUS DP expansion module</b> Expansion module for 7KM PAC3200 and 7KM PAC4200 (PROFIBUS DPV1) and COM100/800 (3VA) breaker data server 7KM9300-0AB01-0AA0		<a href="#">7KM9300-0AB01-0AA0</a>		1	1 unit	1DD	0.079
 <b>7KM PAC RS 485 expansion module</b> Expansion module for 7KM PAC3200 and 7KM PAC4200 (Modbus RTU) and COM100/800 (3VA) breaker data server 7KM9300-0AM00-0AA0		<a href="#">7KM9300-0AM00-0AA0</a>		1	1 unit	1DD	0.074
 <b>7KM PAC 4DI/2DO expansion module</b> Expansion module for 7KM PAC4200 7KM9200-0AB00-0AA0		<a href="#">7KM9200-0AB00-0AA0</a>		1	1 unit	1DD	0.073

## Measuring Devices and Power Monitoring

### 7KT PAC Measuring Devices

#### 7KT PAC1500 three-phase measuring devices

##### Overview



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

The measuring devices (power meters) are used to record the amount of electrical energy and power exported and 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 MID versions comply with the new Measuring Instruments Directive 2004/22/EC.

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 three-phase measuring device			7KT1540 7KT1542	7KT1543 7KT1545	7KT1546 7KT1548
<b>Standards</b>			EN 50470-1, EN 50470-3, EN 62053-23, EN 62053-31		
<b>Connection</b>					
• Direct connection			--	80 A	125 A
• Transformer current connection			.../5 A	--	--
<b>General data</b>					
• Enclosure	Acc. to DIN 43880	MW (1 MW = 18 mm)	4	4	6
• Mounting	Acc. to EN 60715		35 mm		
• Mounting height		mm	70		
<b>Function</b>					
• 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
<b>Supply (through measuring terminals)</b>					
• Rated control supply voltage $U_n$		V AC	230		
• Voltage range		V	110... 276		
• Rated frequency $f_n$		Hz	50		
<b>Measuring accuracy (at 23 ± 1 °C)</b>					
• Active energy and active power	Acc. to EN 50470-3		Class B		
• Reactive energy and reactive power	Acc. to EN 62053-23		Class 2		
<b>Measuring inputs</b>					
• Connection type			Transformer TA-TC .../5 A	Direct	Direct
• Terminal capacitance, operational and main current paths	Rigid, min. (max.)	mm <sup>2</sup>	1.5 (6)	1.5 (35)	5 (50)
	Flexible min. (max.)	mm <sup>2</sup>	1.5 (6)	1.5 (35)	5 (50)
• Voltage $U_n$	Phase/phase	V	400		
	Phase/N	V	230		
• Operating range voltage	Phase/phase	V	190 ... 480		
	Phase/N	V	110 ... 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	A	--	0.015 ... 80	0.020 ... 125
	Transformer connection	A	0.003 ... 6	--	--
• Transformer current	Primary current of the transformer	A	5 ... 10000	--	--
	Smallest input step	A	5	--	--
• Input ripple form			Sinusoidal		
• Operational starting current $I_{st}$		mA	3	15	20
<b>S0 interface</b>					
• Pulse outputs for absorbed active and reactive energy T1 + T2			Yes		
• Pulse count	For input current $I_{max}$	Pulses/kWh	--	500	500
	Automatic for transformers	Pulses/kWh	100 - 10 - 1	--	--
<b>IR interface</b>					
• At the side for connecting communication modules			M-Bus/Modbus RTU/RS 485/KNX		

## Measuring Devices and Power Monitoring

### 7KT PAC Measuring Devices

#### 7KT PAC1500 three-phase measuring devices

#### Selection and ordering data

	$U_n$	$I_{max}$	Mount- ing width	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	V AC	A AC								
<b>7KT PAC1500 three-phase measuring device</b>										
Digital measuring device										
• For transformer connection, double tariff	230	Transformer /5	4		<a href="#">7KT1540</a>		1	1 unit	1DD	0.257
• For transformer connection, double tariff, MID	230	Transformer /5	4		<a href="#">7KT1542</a>		1	1 unit	1DD	0.254
• For direct connection, double tariff	230	80	4		<a href="#">7KT1543</a>		1	1 unit	1DD	0.409
• For direct connection, double tariff, MID	230	80	4		<a href="#">7KT1545</a>		1	1 unit	1DD	0.408
• For direct connection, double tariff	230	125	6		<a href="#">7KT1546</a>		1	1 unit	1DD	0.705
• For direct connection, double tariff, MID	230	125	6		<a href="#">7KT1548</a>		1	1 unit	1DD	0.710



## Measuring Devices and Power Monitoring

### 7KT PAC Measuring Devices

#### 7KT PAC1500 single-phase measuring devices

##### Overview



The 7KT PAC1500 single-phase measuring devices (power meters) are used to record the amount of electrical energy and power exported and 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 MID versions comply with the new Measuring Instruments Directive 2004/22/EC. The measuring devices (with the exception of 7KT1530) also have an integrated optical interface (IrDA) for connecting communication modules.

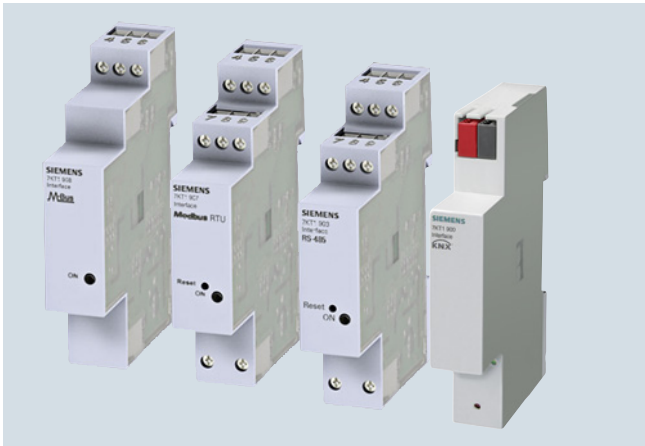
##### Technical specifications

7KT PAC1500 measuring device, single-phase direct connection up to 80 A			7KT1530	7KT1531 7KT1533
<b>Standards</b>			EN 50470-1, EN 50470-3, EN 62053-23, EN 62053-31	
<b>General data</b>				
• Enclosure	Acc. to DIN 43880	MW	2	
• Mounting	Acc. to EN 60715		35 mm	
• Mounting height		mm	70	
<b>Function</b>				
• Operating mode	Single-phase loads	Conductors	2	
• Storage of setting and counter reading	Via (EEPROM)		Yes	
• Tariff	For active energy		T1	T1 + T2
	For reactive energy		T1	T1 + T2
<b>Supply (through measuring terminals)</b>				
• Rated control supply voltage $U_n$		V AC	230	
• Voltage range		V	110 ... 276	
• Rated frequency $f_n$		Hz	50	
<b>Measuring accuracy (at <math>23 \pm 1</math> °C)</b>				
• Active energy and active power	Based on nominal value		Class B	
• Reactive energy and reactive power	Acc. to EN 50470-3		Class 2	
	Acc. to EN 62053-23			
<b>Measuring inputs</b>				
• Connection type	Phase/N		Direct	
• Terminal capacitance, operational and main current paths	Rigid, min. (max.)	mm <sup>2</sup>	1.5 (35)	1.5 (35)
	Flexible min. (max.)	mm <sup>2</sup>	1.5 (35)	1.5 (35)
• Operating range voltage	Phase/N	V AC	110... 276	
• Current $I_{ref}$		A	5	
• Current $I_{min}$		A	0.25	
• Operating range current ( $I_{st} \dots I_{max}$ )	Direct connection	A	0.015 ... 80	
• Current waveform			Sinusoidal	
• Operational starting current $I_{st}$		mA	15	
<b>S0 interface</b>			Acc. to EN 62053-31	
• Pulse outputs for absorbed active and reactive energy			Yes	
• Pulse count		Pulses/kWh	1000	
<b>IR interface</b>				
• At the side for connecting communication modules (M-Bus/Modbus RTU/RS 485/KNX)			--	Yes

##### Selection and ordering data

	$U_n$	$I_{max}$	Mount- ing width	DT	Article No. <a href="http://www.siemens.com/product?Article.No.">www.siemens.com/ product?Article.No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
	V AC	A AC	MW							
 <b>7KT PAC1500 single-phase measuring devices</b> Digital measuring device										
• For direct connection, single tariff	230	80	2		7KT1530		1	1 unit	1DD	0.206
• For direct connection, double tariff	230	80	2		7KT1531		1	1 unit	1DD	0.207
• For direct connection, double tariff, MID	230	80	2		7KT1533		1	1 unit	1DD	0.208

### Overview



Expansion modules for 7KT PAC1500 measuring devices, from left to right: Expansion modules for M-Bus, Modbus RTU, RS 485, 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 expansion module (7KT1908)

- 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 expansion module (7KT1907)

- 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 RS 485 master software





#### 7KT PAC RS 485 expansion module (7KT1903)

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

#### 7KT PAC 7KNX expansion module (7KT1900)

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

### Selection and ordering data

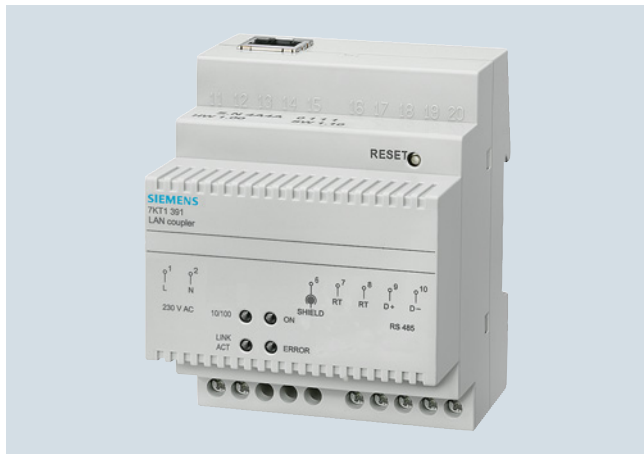
Version	Mounting width	DT	Article No. <a href="http://www.siemens.com/product?ArticleNo.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	MW							kg
 <b>7KT PAC M-Bus expansion module</b> For connecting 7KT PAC1500 measuring devices to M-Bus	1		<a href="#">7KT1908</a>		1	1 unit	1DD	0.055
 <b>7KT PAC Modbus RTU expansion module</b> For connecting 7KT PAC1500 measuring devices to Modbus RTU	1		<a href="#">7KT1907</a>		1	1 unit	1DD	0.084
 <b>7KT PAC RS 485 expansion module</b> For connecting 7KT PAC1500 measuring devices via RS 485 to 7KT1391 LAN couplers	1		<a href="#">7KT1903</a>		1	1 unit	1DD	0.085
 <b>7KT PAC KNX expansion modules</b> For connecting 7KT PAC1500 measuring devices to Instabus KNX	1		<a href="#">7KT1900</a>		1	1 unit	1DD	0.063

# Measuring Devices and Power Monitoring

## 7KT PAC Measuring Devices

### 7KT LAN couplers

#### Overview



7KT 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.

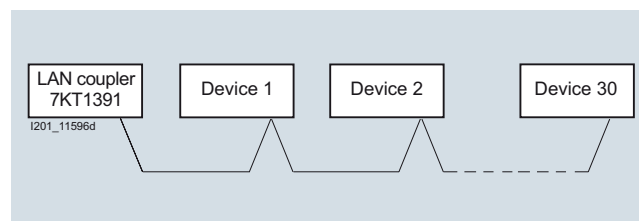
#### Application

##### Suitable 7KT PAC measuring devices

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

	Article No.
<b>Energy measuring devices</b>	
7KT PAC1500 three-phase measuring device	
• For direct connection 80 A, double tariff	7KT1543
• For direct connection 80 A, double tariff, MID	7KT1545
• For transformer connection .../5 A, double tariff	7KT1540
• For transformer connection .../5 A, double tariff, MID	7KT1542
• For direct connection 125 A, double tariff	7KT1546
• For direct connection 125 A, double tariff, MID	7KT1548
7KT PAC1500 single-phase measuring device	
• For direct connection 80 A, double tariff	7KT1531
• For direct connection 80 A, double tariff, MID	7KT1533

##### Connecting several devices to a 7KT LAN coupler



#### Technical specifications

		7KT LAN couplers
<b>Standards</b>		IEEE 802.3 AS, IEC 60950, EN 61000-6-2, EN 61000-6-3
<b>General data</b>		
• Enclosure	Acc. to DIN 43880	4 modules
• Mounting	Acc. to EN 60715	Mounting on standard mounting rail (35 mm)
• Mounting height	mm	70
<b>Supply</b>		
• 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
<b>Function</b>		
• 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
• 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.
<b>LAN interface</b>		
• HW interface		Connection RJ 45
• SW interface		TCP/IP

7KT LAN couplers			
<b>Interface to measuring devices</b>			
• HW interface	RS 485 terminals	Number	3 (+/-/shielded twisted pair)
• Line	Version		STP (shielded twisted pair)
	Minimum cross-section	mm <sup>2</sup>	2 × 0.2 or 2 × 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
<b>Environmental conditions</b>			
• Temperatures	In operation	°C	-10 ... +55
	Storage and transport	°C	-25 ... +70
• Relative humidity	In operation	%	≤ 80
• Vibrations	Sine 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	Article No. <a href="http://www.siemens.com/product?ArticleNo">www.siemens.com/product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	V AC	MW							kg
<b>LAN couplers</b>									
For connection of up to 30 devices over RS 485	230	4		<b>7KT1391</b>		1	1 unit	1DD	0.215



## Measuring Devices and Power Monitoring

### Other Measuring Devices

#### Digital voltmeters and ammeters

##### 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

			7KT1110	7KT1120	
<b>Standards</b>			DIN 43751-1, -2		
<b>Rated voltage <math>U_e</math></b>		V AC	230		
<b>Primary operating range</b>	$\times U_e$		0.9 ... 1.15		
<b>Rated frequency</b>		Hz	50/60		
<b>Rated operational power <math>P_S</math></b>		VA	<2		
<b>7+1-segment display</b>			3 digits		
<b>Measuring range</b>					
• Voltage	Direct measurement	V AC	12 ... 600 ( $U_n$ )	--	
• Current	Direct measurement	A AC	--	0.4 ... 20 ( $I_n$ )	
	Transformer measurement	A AC	--	25/5, 40/5, 50/5, ...1000/5	
<b>Lower display value</b>	From the full-scale value	%	2		
<b>Measuring resistance</b>					
• Current	Direct measurement 20 A	m $\Omega$	--	5	
	Transformer measurement	m $\Omega$	--	10	
• Voltage	Direct measurement 600 V	M $\Omega$	1	--	
<b>Measuring frequency</b>			Hz	45 ... 65	
<b>Measuring cycle</b>			/s	4	
<b>Measuring accuracy</b>			At 23 °C $\pm 1$ °C	%	$\pm 0.5 \pm 1$ digit
<b>Temperature influence</b>			%/°C	$\pm 0.03$	
<b>Overload capability</b>					
• Voltage	Continuous	V	$1.2 \times U_n$	--	
	Short-time for 1 s	V	$1.3 \times U_n$	--	
• Current	Continuous, direct	A	--	$1.1 \times I_n$	
	Short-time for 1 s, direct	A	--	$10 \times I_n$	
<b>Terminals</b>			$\pm$ screw (Pozidriv)	1	
<b>Conductor cross-sections</b>			Rigid, max.	mm <sup>2</sup>	$1 \times 6/2 \times 4$
	Flexible, with end sleeve, min.	mm <sup>2</sup>	0.75		
<b>Degree of protection</b>			IP20, with connected conductors		
<b>Permissible ambient temperature</b>			IP20, with connected conductors		
• Operation		°C	-10 ... +55		
• Storage		°C	-40 ... +70		



### Selection and ordering data

Version	$U_e$	Mounting width	DT	Article No. <a href="http://www.siemens.com/product?Article.No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
	V AC	MW							
<b>Digital voltmeters</b> Measuring range 12 ... 600 V AC	230	2		<b>7KT110</b>		1	1 unit	1BK	0.214
									
<b>Digital ammeters for direct and transformer connection</b> Measuring range Direct: 0.4 ... 20 A Transformer: 0.1 ... 1000 A/5	230	2		<b>7KT120</b>		1	1 unit	1BK	0.224

## Measuring Devices and Power Monitoring

### Other Measuring Devices

#### 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

		7KT5801	7KT5802	7KT5803	7KT5804	7KT5806	7KT5807	
<b>Standards Approvals</b>		DIN VDE 0435-110; EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55						
<b>Rated control supply voltage <math>U_c</math></b>	V AC V DC	-- 12 ... 24	24 --	115	230	115	230	
<b>Primary operating range</b>	At 50/60 Hz	$\times U_c$ 0.9 ... 1.1						
<b>Rated frequency</b>	Hz	--	50			60		
<b>Rated power dissipation <math>P_V</math></b>	VA	< 1		< 2				
<b>Method of operation</b>	Counting of	Hours						
<b>Display</b>	Drum-type register	h 00000.00						
<b>Terminals</b>	$\pm$ screw (Phillips)	1						
<b>Conductor cross-sections</b>	Rigid Flexible, with end sleeve, min.	mm <sup>2</sup> 1.5 mm <sup>2</sup> 0.75						
<b>Permissible ambient temperature</b>	°C	-10 ... +70						
<b>Degree of protection</b>	Acc. to EN 60529	IP20, with connected conductors						
<b>Safety class</b>	Acc. to EN 61140/VDE 0140-1	II						
<b>Permissible humidity</b>	%	< 80						
		7KT5811	7KT5812	7KT5814	7KT5821	7KT5822	7KT5823	7KT5833
<b>Standards Approvals</b>		DIN VDE 0435-110; EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55						
<b>Rated control supply voltage <math>U_c</math></b>	V AC V DC	-- 12 ... 24	24 --	230 --	24 ... 240 12 ... 150			
<b>Primary operating range</b>	At 50/60 Hz	$\times U_c$ 0.9 ... 1.1						
<b>Rated frequency</b>	Hz	--	50/60					
<b>Rated power dissipation <math>P_V</math></b>	VA	< 1		< 2	< 1			
<b>Method of operation</b>	Counting of	Pulses			Hours		Pulses	
<b>Display</b>	Drum-type register LCD	h 		--		000000.0		--
		h 		--		--		0000000
<b>Counting frequency</b>	Hz	10		--		10		
<b>Pulse duration</b>	ms	50		--		50		
<b>Resetting</b>	Electrical Mechanical	--		--		Yes		Yes
<b>Terminals</b>	$\pm$ screw (Phillips)	1						
<b>Conductor cross-sections</b>	Rigid Flexible, with end sleeve, min.	mm <sup>2</sup> 1.5 mm <sup>2</sup> 0.75						
<b>Permissible ambient temperature</b>	°C	-10 ... +70						
<b>Degree of protection</b>	Acc. to EN 60529	IP20, with connected conductors						
<b>Safety class</b>	Acc. to EN 61140/VDE 0140-1	II						
<b>Permissible humidity</b>	%	< 80						

#### Selection and ordering data

	$U_c$	Frequency	Mounting width	DT	Article No. <a href="http://www.siemens.com/product?ArticleNo.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg	
	V	Hz	MW								
	<b>Time counters</b>										
	Mechanical counting mechanism, display 00000.00 h without resetting										
	12 ... 24 DC	--	2		<a href="#">7KT5801</a>		1	1/60 units	1BK	0.094	
	24 AC	50			<a href="#">7KT5802</a>		1	1 unit	1BK	0.093	
	115 AC				<a href="#">7KT5803</a>		1	1 unit	1BK	0.092	
	230 AC				<a href="#">7KT5804</a>		1	1 unit	1BK	0.093	
	115 AC	60			<a href="#">7KT5806</a>		1	1 unit	1BK	0.091	
230 AC				<a href="#">7KT5807</a>		1	1 unit	1BK	0.093		
	<b>Pulse counters</b>										
	Mechanical counting mechanism, display 0000000  without resetting										
	12 ... 24 DC	--	2		<a href="#">7KT5811</a>		1	1 unit	1BK	0.092	
	24 AC	50/60			<a href="#">7KT5812</a>		1	1 unit	1BK	0.094	
	230 AC				<a href="#">7KT5814</a>		1	1 unit	1BK	0.094	
	<b>Electronic time counters</b>										
	LCD 000000.0h without resetting										
	12 ... 150 DC,	--	2		<a href="#">7KT5821</a>		1	1 unit	1BK	0.090	
	24 ... 240 AC	50/60									
	With electrical resetting										
	12 ... 150 DC,	--			<a href="#">7KT5822</a>		1	1 unit	1BK	0.087	
	24 ... 240 AC	50/60									
With electrical and mechanical resetting											
12 ... 150 DC,	--			<a href="#">7KT5823</a>		1	1 unit	1BK	0.087		
24 ... 240 AC	50/60										
	<b>Electronic pulse counters</b>										
	LCD 0000000  With electrical and mechanical resetting										
	12 ... 150 DC,	--	2		<a href="#">7KT5833</a>		1	1 unit	1BK	0.087	
24 ... 240 AC	50/60										

#### 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 2 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.

## Measuring Devices and Power Monitoring

### Other Measuring Devices

#### 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

		7KT5500	7KT5501	7KT5502	7KT5503	7KT5504	7KT5505
<b>Standards</b>		DIN VDE 0435-110; EN 60255-6					
<b>Rated control supply voltage <math>U_c</math></b>	V AC V DC	-- 10 ... 80	115 --	230	115	230	24
<b>Rated frequency</b>	Hz	--	50		60		50
<b>Front-panel mounting</b>	Switchboard cutout						
	mm × mm	45.2 × 45.2 <sup>+0.3</sup>					
	Ø mm	50.2 <sup>+0.3</sup>					

		7KT5600	7KT5601	7KT5602	7KT5603	7KT5604
<b>Standards</b>		DIN VDE 0435-110; EN 60255-6				
<b>Rated control supply voltage <math>U_c</math></b>	V AC V DC	-- 10 ... 50	115 --	230	115	230
<b>Rated frequency</b>	Hz	--	50		60	
<b>Front-panel mounting</b>	Switchboard cutout					
	mm × mm	68 <sup>+0.5</sup> × 68 <sup>+0.5</sup>				

##### Selection and ordering data

	$U_c$	Frequen- cy	Mount- ing width	DT	Article No. <a href="http://www.siemens.com/product?Article.No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg	
	V	Hz	MW								
 <p><b>Time counters</b> Mechanical counting mechanism, display 00000.00 h, for front-panel mounting, front frame 48 x 48 mm</p>	10 ... 80 DC	--			<a href="#">7KT5500</a>		1	1 unit	1BK	0.058	
	24 AC	50			<a href="#">7KT5505</a>		1	1 unit	1BK	0.057	
	115 AC				<a href="#">7KT5501</a>		1	1 unit	1BK	0.055	
	230 AC				<a href="#">7KT5502</a>		1	1/60 units	1BK	0.059	
	115 AC	60			<a href="#">7KT5503</a>		1	1 unit	1BK	0.057	
	230 AC				<a href="#">7KT5504</a>		1	1 unit	1BK	0.058	
	 <p>For front-panel mounting, front frame 72 x 72 mm With narrow frame according to DIN 43700</p>	10 ... 50 DC	--	2		<a href="#">7KT5600</a>		1	1 unit	1BK	0.134
		115 AC	50			<a href="#">7KT5601</a>		1	1 unit	1BK	0.138
		230 AC				<a href="#">7KT5602</a>		1	1 unit	1BK	0.131
		115 AC	60			<a href="#">7KT5603</a>		1	1 unit	1BK	0.134
230 AC					<a href="#">7KT5604</a>		1	1 unit	1BK	0.134	
<b>Covers for 7KT55 time counters</b> 55 x 55 mm					<a href="#">7KT9020</a>		1	1 unit	1BK	0.004	
<b>Sealing rings for 7KT9020 covers</b> IP43 installation in switchboards with smooth surfaces (1 set = 5 units)					<a href="#">7KT9000</a>		1	1 set	1BK	0.004	
<b>Terminal covers for 7KT56 time counters</b> Degree of protection, IP20, with connected conductors					<a href="#">7KT9021</a>		1	1 unit	1BK	0.007	

## Overview



4NC53 current transformers

## Technical specifications

**4NC current transformers for measuring purposes**

<b>Standards</b>	EN 60044-1, VDE 0414-44-1
<b>Window-type current transformers</b>	The conductor to be measured (busbar or cable) is passed through the window opening and constitutes the primary circuit of the window-type current transformer. Pin-wound transformers: An economical solution especially for small primary currents of 5 ... 75 A are window-type current transformers when the conductor to be measured is pin-wound several times.
<b>Rated primary current <math>I_{pn}</math></b>	Current transformers can be continuously loaded with 1.3 times the rated primary current ( $I_{pn}$ ).
<b>Rated secondary current <math>I_{sn}</math></b>	
1 A	Particularly suitable for longer measuring leads. Cable losses of only 4 % in contrast to 5 A current transformers.
5 A	5 A current transformers generate 25 times the power losses on measuring leads as compared with 1 A current transformers. These stray losses result in higher power in the case of long cables. Only recommended for use with short measuring leads.
<b>Accuracy class</b>	
Class 1	Operation measurement, internal metering Current error $\pm 1$ % at $1 \times I_{pn}$ and $1.2 \times I_{pn}$
Class 3	Coarse measurement Current error $\pm 3$ % at $0.5 \times I_{pn}$ and $1.2 \times I_{pn}$
<b>Rated power <math>P_n</math></b>	The rated power of transformers is specified in VA. The actual load rating should be similar to the rated power; a lower actual load rating (underburden) increases the overcurrent factor and measuring devices are not sufficiently protected in case of a short-circuit, a higher actual load rating (overburden) has a negative effect on the accuracy. With a frequency of 60 Hz the rated power increases to 1.2 times. With $16^{2/3}$ Hz the output power decreases to $1/3$ of the rated power.
<b>Maximum voltage for equipment <math>U_m</math></b>	This is the rms value of the maximum voltage between the conductors of a system. For this voltage the insulation must be rated at normal operating conditions. 4NC5 current transformers are suitable for 720 V.
<b>Overcurrent limiting factor FS</b>	The overcurrent limiting factor is expressed using the characters FS and a factor, e.g. FS5 or FS10. When a short-circuit current flows through the primary winding of a current transformer, the stress on the measuring devices connected to the current transformer is the lower the smaller the overcurrent limiting factor is.
<b>Rated short-time thermal current <math>I_{th}</math></b>	The rated short-time thermal current $I_{th}$ is the rms value of the primary current with a duration of one second, whose heat effect the current transformer can resist without being damaged in the event of a short-circuited secondary winding.
<b>Rated impulse current <math>I_{dyn}</math></b>	The rated impulse current $I_{dyn}$ is the highest instantaneous value of the current after a short circuit whose force the current transformer can resist without being damaged. The rated impulse current is specified as peak value.

## Measuring Devices and Power Monitoring

### Accessories

#### 4NC current transformers

#### 4NC51 window-type current transformers, used as pin-wound transformers, classes 1 and 3, from 5 A to 75 A

Pin-winding increases the primary current of the current transformer. Consequently, window-type current transformers can also be used for low primary currents.

Basic type		4NC5112	4NC5113	4NC5115	4NC5117	4NC5121	4NC5122	4NC5123	
Rated primary current	A	50	60	75	100	150	200	250	
Rating	VA	2.5	2.5	2.5	2.5	2.5	5	5	
Primary current to be measured	A	Number of required pin windings							
		Class 3			Class 1				
		5	10	--	--	--	--	--	--
		10	5	6	--	10	--	--	--
		15	--	4	5	--	10	--	--
		20	--	3	--	5	--	10	--
		25	2	--	3	4	6	8	10
		30	--	2	--	--	5	--	--
		40	--	--	--	--	--	5	--
		50	--	--	--	2	3	4	5
75	--	--	--	--	2	--	--		



4NC51 used as pin-wound transformer

#### Selection and ordering data

#### 4NC current transformers for measuring purposes

Rated primary current $I_{pn}$	Rating $P_n$	DT	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
A	VA							kg
<b>Classes 1 and 3, from 50 to 1 500 A</b>								
<b>Rated secondary current 1A</b>								
<b>Class 3</b>								
<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 17.5 mm</li> <li>For busbars up to max. 12 × 10 mm</li> </ul>								
50	2.5		4NC5112-0BC20		1	1 unit	1CL	0.424
60	2.5		4NC5113-0BC20		1	1 unit	1CL	0.434
75	2.5		4NC5115-0BC20		1	1 unit	1CL	0.428
<b>Class 1</b>								
<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 17.5 mm</li> <li>For 1 busbar up to max. 12 × 10 mm</li> </ul>								
100	2.5		4NC5117-0CC20		1	1 unit	1CL	0.334
150	2.5		4NC5121-0CC20		1	1 unit	1CL	0.326
200	5		4NC5122-0CE20		1	1 unit	1CL	0.356
250	5		4NC5123-0CE20		1	1 unit	1CL	0.341
<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 28 mm</li> <li>For 1 busbar up to max. 30 × 10 mm</li> <li>For 2 busbars up to max. 25 × 5 mm</li> </ul>								
200	5		4NC5222-0CE20		1	1 unit	1CL	0.456
250	5		4NC5223-0CE20		1	1 unit	1CL	0.466
300	5		4NC5224-0CE20		1	1 unit	1CL	0.359
400	5		4NC5225-0CE20		1	1 unit	1CL	0.371
<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 36 mm</li> <li>For 1 busbar up to max. 50 × 10 mm</li> <li>For 2 busbars up to max. 40 × 5 mm</li> </ul>								
400	5		4NC5325-0CE20		1	1 unit	1CL	0.460
500	5		4NC5326-0CE20		1	1 unit	1CL	0.417
600	5		4NC5327-0CE20		1	1 unit	1CL	0.430
750	5		4NC5328-0CE20		1	1 unit	1CL	0.390
<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 45 mm</li> <li>For 1 busbar up to max. 60 × 10 mm</li> <li>For 2 busbars up to max. 60 × 10 mm</li> <li>For 3 busbars up to max. 60 × 5 mm</li> </ul>								
1000	10		4NC5431-0CH20		1	1 unit	1CL	0.647
1250	10		4NC5433-0CH20		1	1 unit	1CL	0.681
1500	10		4NC5434-0CH20		1	1 unit	1CL	0.702



4NC5112-0BC20



4NC5117-0CC20



4NC5222-0CE20



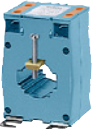




4NC5325-0CE20



4NC5431-0CH20

**4NC51 window-type current transformers, used as pin-wound transformers, classes 1 and 3, from 5 A to 75 A**

	Rated primary current $I_{pn}$	Rating $P_n$	DT	Article No. <a href="http://www.siemens.com/product?ArticleNo.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
	A	VA							
<b>Rated secondary current 5 A</b>									
<b>Class 3</b>									
	<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 17.5 mm</li> <li>For 1 busbar up to max. 12 × 10 mm</li> </ul>								
	50	2.5		<a href="#">4NC5112-2BC20</a>		1	1 unit	1CL	0.429
	60	2.5		<a href="#">4NC5113-2BC20</a>		1	1 unit	1CL	0.424
	75	2.5		<a href="#">4NC5115-2BC20</a>		1	1 unit	1CL	0.424
4NC5112-2BC20									
<b>Class 1</b>									
	<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 17.5 mm</li> <li>For 1 busbar up to max. 12 × 10 mm</li> </ul>								
	100	2.5		<a href="#">4NC5117-2CC20</a>		1	1 unit	1CL	0.336
	150	2.5		<a href="#">4NC5121-2CC20</a>		1	1 unit	1CL	0.324
	200	5		<a href="#">4NC5122-2CE20</a>		1	1 unit	1CL	0.349
	250	5		<a href="#">4NC5123-2CE20</a>		1	1 unit	1CL	0.344
4NC5117-2CC20									
	<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 28 mm</li> <li>For 1 busbar up to max. 30 × 10 mm</li> <li>For 2 busbars up to max. 25 × 5 mm</li> </ul>								
	200	5		<a href="#">4NC5222-2CE20</a>		1	1 unit	1CL	0.461
	250	5		<a href="#">4NC5223-2CE20</a>		1	1 unit	1CL	0.476
	300	5		<a href="#">4NC5224-2CE20</a>		1	1 unit	1CL	0.359
	400	5		<a href="#">4NC5225-2CE20</a>		1	1 unit	1CL	0.374
4NC5222-2CE20									
	<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 36 mm</li> <li>For 1 busbar up to max. 50 × 10 mm</li> <li>For 2 busbars up to max. 40 × 5 mm</li> </ul>								
	400	5		<a href="#">4NC5325-2CE20</a>		1	1 unit	1CL	0.461
	500	5		<a href="#">4NC5326-2CE20</a>		1	1 unit	1CL	0.415
	600	5		<a href="#">4NC5327-2CE20</a>		1	1 unit	1CL	0.435
	750	5		<a href="#">4NC5328-2CE20</a>		1	1 unit	1CL	0.388
4NC5325-2CE20									
	<ul style="list-style-type: none"> <li>For circular conductors with max. diameter 45 mm</li> <li>For 1 busbar up to max. 60 × 10 mm</li> <li>For 2 busbars up to max. 60 × 10 mm</li> <li>For 3 busbars up to max. 60 × 5 mm</li> </ul>								
	1000	10		<a href="#">4NC5431-2CH20</a>		1	1 unit	1CL	0.656
	1250	10		<a href="#">4NC5433-2CH20</a>		1	1 unit	1CL	0.650
	1500	10		<a href="#">4NC5434-2CH20</a>		1	1 unit	1CL	0.705
4NC5431-2CH20									

**More information**

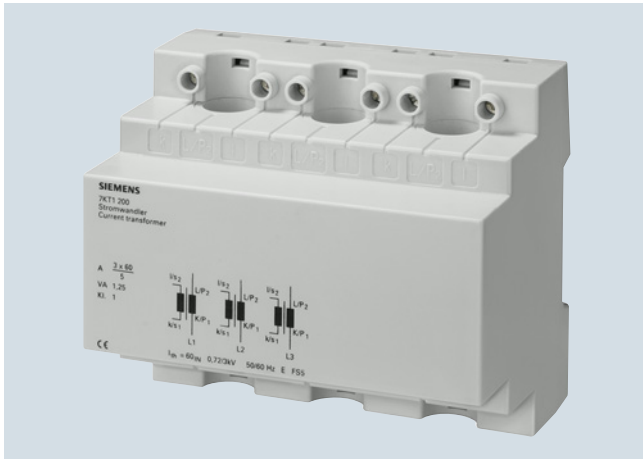
For other current transformers for measuring purposes, see chapter "Switch Disconnectors"

## Measuring Devices and Power Monitoring

### Accessories

#### 7KT12 current transformers

##### Overview



7KT12 current transformers

The three-phase 7KT12 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<sup>2</sup> conductor cross-section.

##### Benefits

- The current transformer has accuracy class 1 in accordance with EN 60044-1.
- 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

		7KT1200	7KT1201	7KT1202
<b>Standards</b>		EN 60044-1		
<b>Secondary rated current strength</b>	A	5		
<b>Accuracy class</b>	Cl.	1		
<b>Rated power</b>	VA	1.25	2.5	3.75
<b>Rated frequency <math>f_n</math></b>	Hz	50/60		
<b>Thermal current limit <math>I_{th}</math></b>	Short-time	A 60 × $I_e$		
<b>Thermal continuous current</b>		A 1 × $I_e$		
<b>Overcurrent limit factor</b>	FS	5		
<b>Rated impulse withstand voltage <math>U_{imp}</math></b>	kV	> 3		
<b>Creepage distances and clearances</b>	mm	> 3		
<b>Rated operational voltage <math>U_e</math></b>	V AC	720		
<b>Rated operational current <math>I_e</math></b>	A AC	3 × 60	3 × 100	3 × 150
<b>Terminals ±screw (Pozi driv)</b>		PZ 1		
<b>Conductor cross-sections</b>				
- Rigid	mm <sup>2</sup>	0.5 ... 4		
- Flexible, with end sleeve	mm <sup>2</sup>	0.5 ... 2.5		
<b>Permissible ambient temperature</b>	°C	-5 ... +60		
<b>Resistance to climate</b>	Acc. to EN 60068-1	20/60/4		

##### Selection and ordering data

	$U_e$	$I_e$	$I_{sec}$	Mounting width	DT	Article No. <a href="http://www.siemens.com/product?Article.No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
	V AC	A AC	A AC	MW							
<b>Current transformers</b>	720	3 × 60 3 × 100 3 × 150	5	6		<b>7KT1200</b> <b>7KT1201</b> <b>7KT1202</b>		1	1 unit	1BK	0.535
								1	1 unit	1BK	0.543
								1	1 unit	1BK	0.558





### 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	Article No. <a href="http://www.siemens.com/product?Article No.">www.siemens.com/ product?Article No.</a>	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
	V AC	A AC	V AC	MW							
 <p><b>Voltmeter selector switches</b></p>	400	12	6	3		<b>7KT9010</b>		1	1/48 units	1BK	0.137
 <p><b>Ammeter selector switches for operation with current transformer</b></p>	400	12	6	3		<b>7KT9011</b>		1	1 unit	1BK	0.137

## Measuring Devices and Power Monitoring

Accessories

Notes

11

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[3.242.201.075](#) [3.245.201.351](#) [TFG-3610E](#) [TG5012A](#) [AX-DG105](#) [AX-DG2010AF](#) [3.100.200.383](#) [HMF2525](#) [3.130.251.075.056](#)  
[3.130.251.351.056](#) [BZ1224](#) [BZ220A](#) [3.220.401.351](#) [3.240.201.351](#) [3.241.201.351](#) [3.242.201.351](#) [3.245.201.075](#) [3.474.901.075](#)  
[3.474.901.084](#) [3.474.911.373](#) [DDS-3X25](#) [0.170.000.075](#) [0.135.200.373](#) [TFG-3620E](#) [0.170.000.351](#) [TGF4162](#) [TGF4242](#) [GFG-3015 + RS232](#)  
[HK30.G.48.230VAC/50HZ](#) [HK30.G.48.24VAC/50HZ](#) [0.135.200.302](#) [1803D](#) [53220A/903](#) [1856D](#) [GFG-8215A](#) [GFG-8250A](#) [BG4017-1248](#)  
[BW4018-23050](#) [BW4018-2450](#) [BW7089-23050](#) [190.004](#) [190.003](#)