# PAC3220
Power Meter

Reliable and precise monitoring of electrical power systems

The PAC3220 is a powerful compact power monitoring device that is suitable for use in industrial, government and commercial applications where basic metering and energy monitoring is required. The meter may be used as a stand alone device monitoring over 100 parameters or as part of an industrial control, building automation or global power monitoring system.

Metering and monitoring applications range from simple analog volt and amp meter replacements to stand-alone sub billing or cost allocation installations with multiple tariffs. The PAC3220 can also be used to support LEED certification and provide the needed energy metering data for federal/local government energy reduction programs.

The PAC3220 provides open communications using Modbus RTU/TCP, PROFINET and PROFIBUS-DP protocols for easy integration into any local or remote monitoring system. Simple configuration of the meter can be done from the front display or by using a PC with SENTRON powerconfig setup free software available for download from Siemens website.

usa.siemens.com/pds

96 mm
3.78 in.

96 mm 3.78 in.
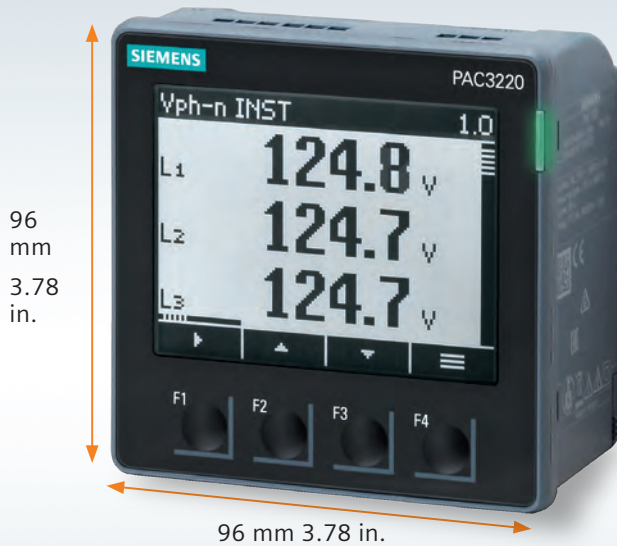
Full graphic LCD display to indicate:
• Display title or designation of the displayed measurements
• Phase
• Measured value Unit
• Labeling of function keys
• Color LED for status indicators

Example of operating menu:
The texts can be displayed in several languages, which can be selected directly on the device.[1] The large graphic LCD display facilitates reading even from a distance. For optimum visibility even in poor light conditions, the PAC3200 comes with a gradually adjustable background illumination.

When, where and how much power is consumed?

96

96

57,9

PAC3220 makes consumption apparent
To accomplish a sustainable reduction of power costs, you must first analyze the electrical system's current consumption and power flows. The PAC3220 power meter precisely and reliably delivers the required information of power values to put you on the path to reduce your power cost.

Applications summary
● Replace multiple analog meters
   An ideal replacement for analog meters. Use it for stand-alone metering in custom panels, switchboards, switchgear, gensets, motor control center and UPS systems, PDU, RPPs, etc.

● Basic Metering
   The PAC3220 offers high-accuracy power, energy and demand measurements.
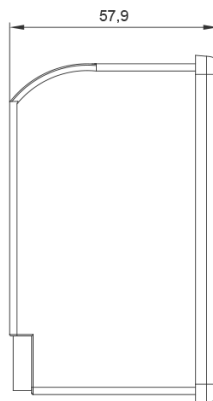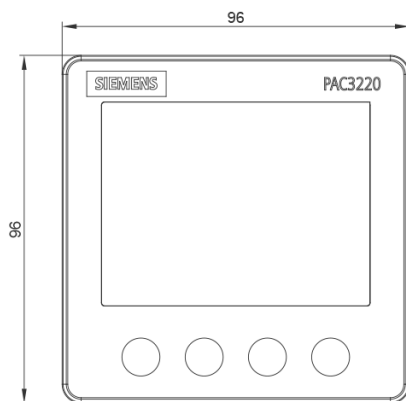
Webserver and Modbus TCP integrated into the meter as standard, Dual 10/100 Ethernet ports for daisy chaining over Ethernet, 3 concurrent active

PAC3220 PROFIBUS DP, MODBUS RTU, PROFINET and In / Idiff, analog expansion modules for remote data transmission

2 DI and 2 DO for remote switching, and DI also for kWh, kVAh, kvarh pulse measurement

Terminal blocks for voltage and current measuring, control power (available with compression terminals)

- Cost allocation / Energy monitoring
  Perfect for monitoring right down to the tool level, the meter can help monitor cost centers, identify opportunities for demand control and check energy consumption patterns.

- Automation integration
  Monitor critical equipment processes and tie directly to the Siemens family of PLCs and automation networks.

- Sub-metering
  Low cost, high accuracy and simple retrofit installation enables economical measurement of commercial and residential tenant space. Integrate the PAC3220 with existing energy management systems and RTUs. Reduce energy consumption by eliminating previously uncontrolled expenses.

These revenue accurate values can be used for bill verification, monitoring backup power on critical systems and offering cost-effective energy solutions.

Power management and PAC3220
The PAC3220 can easily be integrated into a power management system using Modbus TCP (standard), Modbus RTU (option), PROFINET (option) or PROFIBUS. With communication, the PAC3220 transmits measured values to the supervisory systems, where the data can be further processed for display and control.

Siemens offers a low cost Powermanager or enterprise level WinPM.Net power monitoring software which can provide easy integration to the PAC3220 meter. Powermanager or WinPM.Net provide standard overview displays allowing detailed analysis of the electrical power, which allows for easy allocation of power consumption and cost. Additionally, unexpected operating conditions can be detected on a timely basis.

[1] Languages included as standard in the meter are English, German, French, Spanish, Italian, Portuguese, Polish, Turkish, Russian and Chinese.

Functional features

Instantaneous values			
Voltage	Phase-phase / phase-neutral	✓	
Currents	Per phase	✓	
Apparent, active and reactive power	Per phase and total	✓	
Power factor	Per phase and total	✓	
Frequency	45...65 Hz	✓	
THD for voltage and current	Per phase	✓	
Min. / max. values	Voltage – phase-phase, phase-neutral Current / Power / Power factor / THD per phase Frequency Three phase average voltage and current	✓	
Average values (2 configurable periods)	Voltage – phase-phase, phase-neutral Voltage min. / max. for phase-phase-phase-neutral Current Current min. / max.	✓	
Energy measurement			
Active energy	Import / export; high / low tariff	✓ / ✓	
Reactive energy	Positive / negative; high / low tariff	✓ / ✓	
Apparent energy	High / low tariff	✓	
Energy demand per measuring period	Three phase average rating for active and reactive power	1 to 60 min.	
Min. / max. rating values within the measuring period		✓	
Meter running counter	Uptime in hours	✓	
Universal counter	Pulse counting of external devices like water, gas, etc.	✓	
Logging	Active energy history Daily consumption values for last 64 days Monthly consumption values for last 24 months	✓	
Measurement accuracy			
Voltages		± 0.2%	
Currents		± 0.2%	
Power factor and power		± 0.5%	
Active energy		Class 0.5S in acc. with IEC 62053-22 / ANSI 12.20 class 0.5	
Reactive energy		Class 2 according to IEC61557-12 and/or IEC62053-23	
Monitoring functions			
Set point monitoring	V, I, power, VAR, VA, Freq. THD, PF	Up to 6 values	
Simple logic functions for alarming	Alarm via digital	Output or software	
Phase unbalance	Voltage and / or >< current	✓	
Communication			
Ethernet	Integrated	10/100 Base-T (10/100 Mbit/sec)	
Modbus TCP	Integrated RJ45 - 2 ports	10/100 Base-T (10/100 Mbit/sec)	
Webserver	Integrated10/100 Baste-T (10/100 Mbit/sec)		

PROFIBUS DP expansion module	Optional
	• Parameterization via device front
	  or with SENTRON powerconfig
	  software
	• Transition of data via GSD file
		• Support of all baud
		  rates from 9600 BPS to
		  12 MBPS (9.6 Kbit/ sec
		  to 12 Mbit/sec)	

Modbus RTU expansion module	Optional
	• Parameterization via device front
	  or with SENTRON powerconfig
	  software
	• Transition of data via MODBUS
	  register based points
		• Support of all baud rates of
		  4800, 9600, 19.2K and
		  38.4K BPS (4.8 / 9.6 / 19.2
		  and 38.4 kB/sec	

Switched Ethernet Expansion Module
(Supports PROFINET and Dual RJ45
Ethernet Ports)
	Optional
	• Parameterizatio via device front
	  or with powerconfig software
	• Transition of data via GSDML file
		• Support of 10 and 100 Mbit/s
		  baud rates	

Functional features (continued)

Inputs / Outputs	
Input voltage / at digital input • initial value for signal<1>-recognition • at DC / rated value • Full-scale value for signal <0> recognition	13 V 24 V 8 V
Number of digital outputs	2
Number of digital inputs	2
Digital output version	Switching or pulse output function
Input current / at digital input • for signal <1>	7 mA
Output current • at digital output / with signal <0> / maximum • at digital output / for signal <1> / minimum • at digital output / for signal <1> / maximum • at the digital outputs / at DC / maximum	0.2 mA 27 mA 27 mA 130 mA
Output delay / at digital output • for signal <0> to <1> / maximum • for signal <1> to <0> / maximum	5 ms 5 ms
Operating voltage / as output voltage / at DC / maximum permissible	30 V
Property of the output / Short-circuit proof	Yes
Input delay time / at digital input • for signal <0> to <1> / maximum • for signal <1> to <0> / maximum	5 ms 5 ms
Internal resistance / at the digital outputs	55 Ω
Measuring category / for digital signals	CATII
Switching frequency / at digital output / maximum	17 Hz
Measuring inputs Outer conductors and neutral conductors internal resistance / for voltage measurement	1.05 MΩ
Measurable supply voltage • between (PE)N and L / at AC / minimum • between (PE)N and L / at AC / maximum • between (PE)N and L / at AC / maximum rated value • between the outer conductors / at AC / minimum • between the outer conductors / at AC / maximum • between the outer conductors / at AC / maximum rated value	40 V 480 V 400 V 70 V 831 V 690 V
Voltage measuring range extension / with external voltage transformers	Yes
Current measuring range extension / with external current transformers	Yes
Measuring category / for voltage measurement	CATIII
Supply voltage / between the outer conductors / at AC / maximum permissible	831 V
Consumed active power / for current measurement / per phase	115 mW
Continuous current / at AC / maximum permissible	10A
Measuring category / for current measurement	CATIII
Zero suppresion / for current measurement	0.1...10 %
Relative measurable current / at AC • minimum • maximum	1 % 120 %
Measuring procedure / for current measurement	TRMS
Measurable current / 1 / at AC / Rated value	1/5 A
Short-time current resistance (Icw) / limited to 1 s / rated value	100 A

Functional features (continued)

Standard inputs / outputs		
Integrated digital input	24 Vdc / 7 mA	2, dry contact, requires external power
Integrated digital output	30 Vdc max. / 10-27 mA; 100 mA max.	2
General		
Password protection		✓
Technical data		
Two-quadrant (import) / four-quadrant (import and export) measuring		4Q
Measurement types		1 ph, 2 ph, 3 ph, or 4 ph (with analog expansion module)
Applicable for network type		TN, TT, IT
Sampling rate	64 samples / cycle at 60Hz	
Measured voltage	Direct connection up to max. delta/wye without transformer	690 V / 400 V (CAT III)
Current inputs	Settable on device	1A or 5A nominal
Power supply	AC/DC	95...240V AC (±10%) / 110...340V DC (±10%)
	DC only	22...65V DC (=±10%)
Degree of protection	Front	IP65, for UL IP54
	Rear	IP20, NEMA 1A
Operating temperature	°C / °F	−10...+55 / +14...+131
Display	Type	Background-illuminated graphic LCD
	Resolution (pixels)	128 x 96
Text displays		Multilingual
Optional ports	2	Two ports are available for optional modules
MTBF		185.8 Years
Connections		
Type of electrical connection • at the measurement inputs for voltage • of the fast Ethernet interface	screw-type terminals RJ45 (8P8C)	
Mechanical Design		
Height	96 mm	
Height / of the display	54 mm	
Width	96 mm	
Width • of the display	72 mm	
Depth	56 mm	
Mounting position	vertical	
Installation depth	51 mm	
Mounting type / panel mounting	Yes	
Net weight	451 g	
Environmental conditions		
Installation altitude / at height above sea level / maximum	2 000 m	

Function features (continued)

Standard	
• for EMC for industrial sector	IEC 61000-6-2 respectively IEC 61326-1:2005, table 2
• for EMC against unloading	IEC 61000-4-2: 2001-04
• for EMC against high frequency fields	IEC 61000-4-3: 2006-02
• for EMC against conducted LF disturbance variables (industry)	IEC 61000-6-4, Group 1 Klasse A / CISPR11 Gruppe 1 Klasse A FCC Part 15 Subpart B Class A
• for EMC against conducted disturbance variables via HF fields	IEC 61000-4-6: 2001-12
• for EMC against magnetic fields with power engineering frequencies	IEC 61000-4-8: 2001-03
• for EMC against quick, transient electrical disturbances	IEC 61000-4-4: 2005-07
• for EMC against voltage drops and interruptions	IEC 61000-4-11: 2004-03
• for EMC against surge voltages	IEC 61000-4-5: 2001-12
• for free fall	IEC 60068-2-32: 1975
• for pulse emitter	according to IEC62053-31
• for cyclic, environmental damp heat check	IEC 60068-2-30
• for environmental coldness check	IEC 60068-2-1
• for environmental dry heat check	IEC 60068-2-2
Relative humidity / at 25 °C / without condensation / during operation	
• minimum	5 %
• maximum	95 %
Ambient temperature	
• during operation / minimum	-25 °C
• during operation / maximum	55 °C
• during storage / minimum	-25 °C
• during storage / maximum	70 °C
Certificates	
Certificate of suitability	
• as EC declaration of conformity	IEC 61010-1: 2001 (2nd Ed.) with Corr. 1, EN 61010-1: 2001 (2nd Ed.) and DIN EN 61010-1:2002 with "Berichtigung 1"
• as approval for Canada	UL 61010-1, 2nd Ed. CAN/CSA-C22.2 NO. 61010-1-04
• as approval for USA	UL 61010-1, 2nd Ed. CAN/CSA-C22.2 NO. 61010-1-04
Reference identifier / acc. to DIN EN 61346-2	P

General Product Approval

Declaration of Conformity

CE

UL

Order information

Product	Order Number
PAC3220 Power Meter, LCD, AC/DC, 2DI/2DO, 2RJ45, Modbus TCP standard	**7KM32200BA011DA0**
PAC3220 Power Meter, LCD, 20-60 VDC only, 2DI/DO, 2RJ45, Modbus TCP standard	**7KM32201BA011EA0**
Expansion module - MODBUS RTU Module for PAC 3200 or 4200	**7KM93000AM000AA0**
Expansion module - PROFIBUS DP Module for PAC 3200 or 4200	**7KM93000AB010AA0**
Expansion module - Switched Ethernet PROFINET V3, plug-in, for 7KM PAC3220 / 4200 / 3VA COM100/ 800	**7KM93000AE020AA0**
Expansion Module - I(N), I(Diff), Analog for PAC3220 or 4200	**7KM92000AD000AA0**
Adapter Plate for 4700/4720 meter cutout	**93-47ADAPTER**
SITOP Power Supply AC 99-264VAC, 24 VDC, 0.5A	**6EP13315BA00**