# Measuring point concept
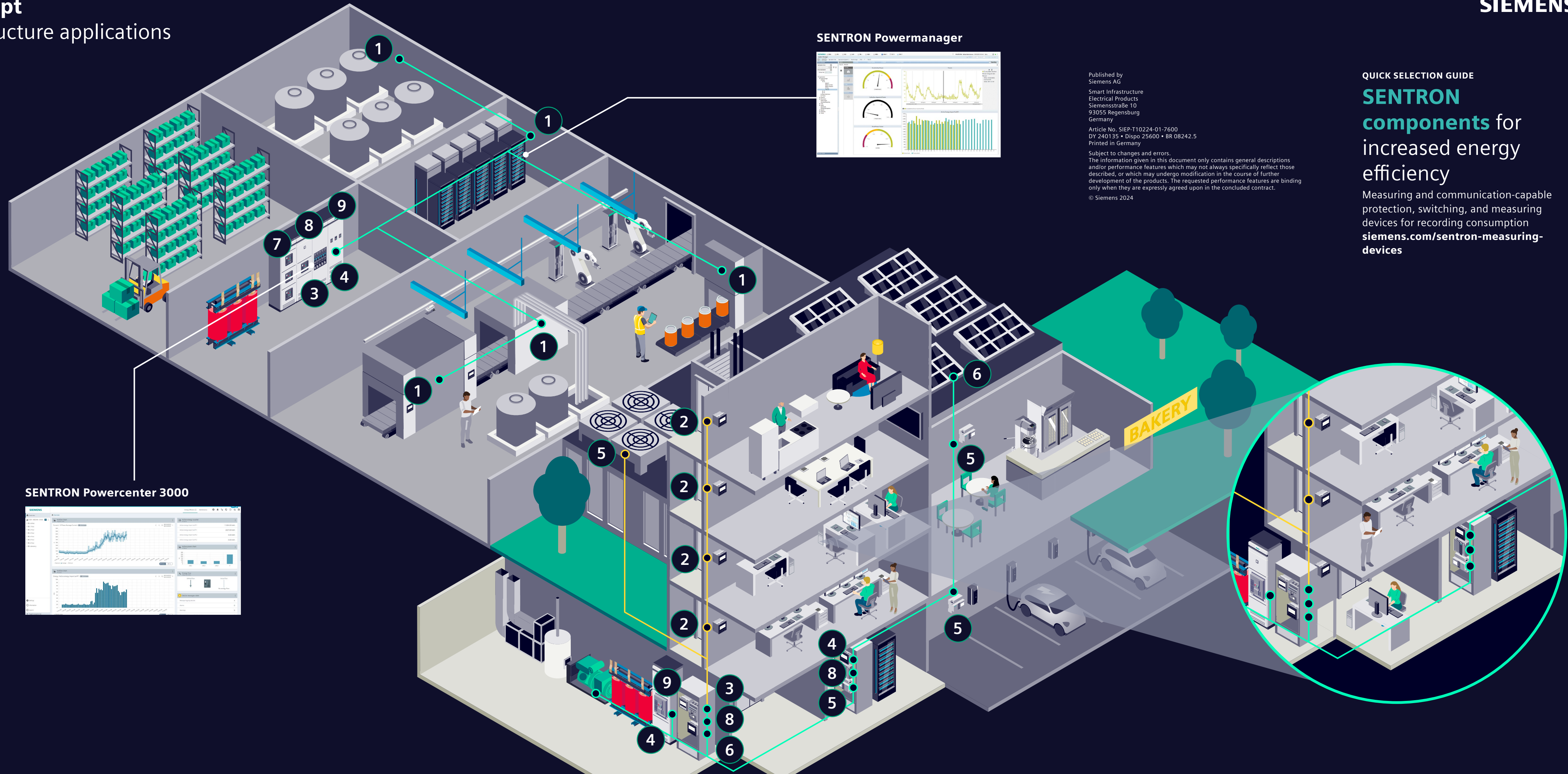## for industrial and infrastructure applications
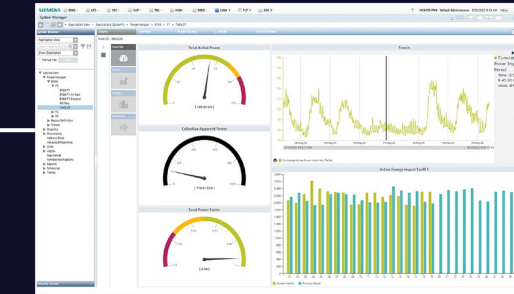
**SIEMENS**

### What and where to measure?

Whether in buildings, industrial plants, or infrastructure, energy efficiency is a prerequisite for reduced carbon emissions, climate neutrality, and a distributed power supply that is successful over the long term. It starts with the measurement of energy consumption, which requires the cooperation of hardware and software with an optimally coordinated measuring point concept.

Note: All consumers that are relevant for billing energy costs to external cost centers must be measured using MID-certified meters.

**SENTRON Powermanager**
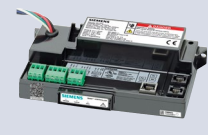
## SENTRON components for increased energy efficiency

Measuring and communication-capable protection, switching, and measuring devices for recording consumption
**siemens.com/sentron-measuring-devices**

**SENTRON Powercenter 3000**

1. SENTRON 7KM PAC3220
2. SENTRON 7KM PAC3120
3. SENTRON 7KM PAC4220
4. SENTRON 7KM PAC5200
5. SENTRON 7KM PAC2200
6. SENTRON 7KT PAC1600
7. SENTRON Powercenter 3000
8. SENTRON 3VA molded case circuit breaker
9. SENTRON 3WA open circuit breaker

| | Multichannel current measuring system | Multichannel current measuring system | Measuring device | Measuring device | Measuring device | Measuring device | Measuring device | Measuring device | Measuring device | Measuring device | Multifunctional recorder | Modular measuring device | Molded case circuit breaker | Air Circuit Breaker | Electronic circuit protection device | Arc fault detection device and miniature circuit breaker | Data transceiver | IoT data platform |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7KT PAC1200 | SEM3 | 7KT PAC1600 / 7KT PAC1600 MID | 7KM PAC1020 | 7KM PAC2200 (MID / CLP) | 7KM PAC3120 / 7KM PAC3120 MID | 7KM PAC3200T | 7KM PAC3220 / 7KM PAC3220 MID | 7KM PAC4220 | 7KM PAC5200 | SICAM Q100 / Q200 | AI Energy Meter | 3VA2 ETU 8-series | 3WA | ECPD 5TY1 COM | AFDD/LS 5SV6 COM, LS 5SL6 COM | SENTRON Powercenter 1000 | SENTRON Powercenter 3000 |
| **SENTRON portfolio for power monitoring** | The flexible solution for multichannel measuring in final circuits | The efficient solution for multichannel current measuring in the main distribution | The entry-level solution when it comes to energy measurement | The cost-effective entry into power measurement and transparency | The energy meter solution for DIN rail | The cost-effective solution for digital measurement | The compact solution for precise energy measurement | The specialist solution for precise energy measurement | The professional solution for communication and monitoring | The specialist solution for measured value recording and power supply quality | The class A solution for power supply quality | The integrated energy measurement in automation | The specialist solution for protection and energy measurement | The incoming circuit breaker with communication | Innovation – the electronic circuit protection device | The communication-capable circuit protection devices | **Comprehensive data acquisition from communication and measuring capable circuit protection devices** • High degree of transparency in the branch circuit • Easy derivation of measures — **Connection of up to 24 end devices and caching of selected data** • Comprehensive data availability — **Integrated bluetooth interface** • Mobile data readout on-site via the SENTRON Powerconfig mobile app — **Integrated MODBUS TCP interface** • Enables connection to SENTRON Powerconfig configuration software and SENTRON Powermanager power monitoring software for easy visualization and evaluation of data • Connection to cloud solutions (Insights Hub) for data analysis with SENTRON Powercenter 3000 or with other cloud gateways — **Compact design** • Low space requirements in the distribution board (1 MW) | **The plug & operate solution for efficient power and condition monitoring** • Central interface into the switchboard • Data collection and analysis for up to 32 lower-level devices as the default, expandable to max. 212 devices • Connectivity function to cloud/Insights Hub • Integrated, user-definable web interface • Parameterization via SENTRON Powerconfig — **Your benefits:** • Quick and easy commissioning • Minimization of security efforts • Early detection and prevention of downtimes • Reduction of error frequency and duration • Easy digitalization of brownfield projects • Basis for energy management according to ISO 50001 |
| U, I, P, f, λ | $U^{[1]}$, I, P, S, $Q^{[1]}$, $f^{[1]}$, $λ^{[1]}$ | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | |
| Apparent \| active \| reactive energy \| cosφ | x \| x \| x \| x | x \| x \| x \| – | x \| x \| x \| x | – \| x \| x \| – | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x \| x \| x \| x | x* \| x* \| x* \| x | x \| x \| x \| x | | |
| Maximum input voltage L-L / L-N | 400 V / 230 V | 480 V / 277 V | 400 V / 230 V | 400 V / 230 V | 400 V / 230 V | 690 V / 400 V | 400 V / 230 V | 690 V / 400 V | 690 V / 400 V | 690 V / 400 V galvanically separated | 690 V / 400 V galvanically separated | 690 V / 400 V (integrated) | 480 V / 277 V (integrated) | 690 V / 400 V | 1000 V / 577 V | – \| 230 V | | |
| Current transformer connection \| direct measuring | x \| x (up to 63 A) | x \| – | x \| x (up to 63A – 1-phase, up to 80A – 3-phase) | x/1 A \| x/5 A | x \| x (bis 65 A) | x \| – | x \| – | x \| – | x \| – | x \| – | x \| – | x \| – | Transformer (integrated) | Transformer (integrated) | – \| x | – \| x | | |
| DI / DO | – | 2/1 | 1/2 | 1/1 | 1/1 | 2/2 | 1/1 | 2 / 2 (10 / 6 with expansion module) | 2 / 2 (10 / 6 with expansion module) | 0/2 | Q100: 2/2  Q200: 6/6 | via ET200 / via S7-1200 | EFB300 (optional) | optional | 1/1 | – | | |
| Integrated communication | Modbus TCP | BACnet IP, MSTP, SNMP, NTP, SMT, Modbus TCP, Modbus RTU | Modbus RTU, M-Bus, S0 | Modbus RTU | Modbus TCP, Modbus RTU, M-Bus | Modbus RTU | Modbus TCP | Modbus TCP | Modbus TCP | Modbus TCP, IEC 61850 | Modbus TCP, IEC 61850 | PROFINET PROFIBUS | – | – | Wireless | Wireless | | |
| Communication via expansion module | – | – | – | – | PROFINET via SENTRON PROFINET Proxy SPP2000 | – | PROFINET via SENTRON PROFINET Proxy SPP2000 | Modbus RTU PROFINET PROFIBUS | Modbus RTU PROFINET PROFIBUS | – | Q100: 1 x Modbus TCP + IEC 61850  Q200: 2 x Modbus TCP + IEC 61850 | Modbus TCP via CPU | Modbus TCP Modbus RTU PROFIBUS | Modbus TCP PROFINET | Modbus TCP via SENTRON Powercenter 1000 | Modbus TCP via SENTRON Powercenter 1000 | | |
| I(N), I(Diff) | – | – | – | – | – | – | – | with expansion module | with expansion module | – | – | – | x | x | x | Optional RCM | | |
| Analog input | – | – | – | – | – | – | – | with expansion module | with expansion module | – | – | via ET200 / via S7-1200 | – | – | – | – | | |
| Load profile record | x | x | – | – | x (PAC2200 CLP) | – | – | – | x | x | x | in S7 CPU | x | | | | | |
| Software interfaces | Webinterface, App (iOS & Android), SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SENTRON Powermanager | SENTRON Powerconfig, SENTRON Powermanager | SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SENTRON Powerconfig, SENTRON Powermanager | SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SIMATIC Energy Suite, SIMATIC Energy Manager PRO, SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SIMATIC Energy Suite, SIMATIC Energy Manager PRO, SENTRON Powerconfig, SENTRON Powermanager | Webinterface, SENTRON Powerconfig, SENTRON Powermanager | Webinterface / SICAM PQS / PQA, SENTRON Powermanager (real-time values) | SIMATIC / SIMATIC Energy Suite | SIMATIC Energy Suite, SIMATIC Energy Manager PRO, SENTRON Powerconfig, SENTRON Powermanager | SIMATIC Energy Suite, SIMATIC Energy Manager PRO, SENTRON Powerconfig, SENTRON Powermanager | via SENTRON Powercenter 1000: SENTRON Powerconfig, SENTRON Powermanager | via SENTRON Powercenter 1000: SENTRON Powerconfig, SENTRON Powermanager | | |
| THD \| Flicker, fault recorder, EN 50160 reporting | – \| – | – \| – | – \| – | – \| – | – \| – | x \| – | x \| – | x \| – | x \| – | x \| x | x \| x  Transient recording up to 1 μs (Q200) | x \| x | x \| – | x \| – | – \| – | – \| – | | |
| Harmonics | – | 1. … 15.[2] | – | – | – | – | – | – | 1. … 64. | 2. … 40. | Q100: 2–50 kHz  Q200: 2–63 kHz, 2–9 kHz, 9–150 kHz Harmonic Direction | 2. … 40. | 1. … 19. | 2. … 31. | – | – | | |
| Accuracy class active energy \| reactive energy | 1[1] \| 1[1]  ;  2 \| – | 0.2 \| 1 | 1 \| 2 | 1 \| 2 | 1 \| 1 | 0.5 \| 2 | 0.5 \| 1 | 0.5 \| 2 | 0.2 \| 2 | 0.5 \| 2 | 0.2 S \| 2 | 0.5 \| 1 | 2 S \| 2 (incl. transformer) | 2 S \| 2 (incl. transformer) | Class 1[6] | Class 1[6] | | |
| Standard measuring devices | IEC 62053-21 | IEC 62052-11, IEC 62053-23, IEC 61010-1, UL 61010-1 | IEC 50470-3, IEC 62053-21, IEC 62053-23 | IEC 62053-21[3]), IEC 62053-23[3]) | IEC 62053-22, IEC 62053-23, IEC 61557-12 | IEC 62053-22, IEC 62053-23, IEC 61557-12 | IEC 62053-22, IEC 62053-23, IEC 61557-12 | IEC 62053-22, IEC 62053-23, IEC 61557-12, UL 61010-1 | IEC 62053-22, IEC 62053-23, IEC 61557-12, UL 61010-1 | IEC 62586-1, IEC 61000-4-30, IEC 61000-4-7, IEC 61000-4-15 | | | IEC 61557-12 | IEC 61557-12 | IEC 61557-12, IEC 62053-22, IEC 62053-23[6]) | IEC 61557-12, IEC 62053-22, IEC 62053-23[6]) | | |
| MID certified | – | – | x[5] | – | x[4] | x[5] | – | x[5] | – | – | – | – | – | – | – | – | | |
| PMD class according to IEC60364-8-1 | PMD 1 | PMD 2 | PMD 2 | PMD 1 | PMD 2 | PMD 3 | PMD 3 | PMD 3 | PMD 3 | PMD 3 | PMD 3 | PMD 3 | PMD 3 | PMD 1-3 | PMD 2 | PMD 2 | | |
| Order information | siemens.com/product?7KT12 | siemens.com/product?US2:SEM3 | siemens.com/product?7KT16 | siemens.com/product?7KM1020 | siemens.com/product?7KM22 | siemens.com/product?7KM31 | siemens.com/product?7KM32 | siemens.com/product?7KM32 | siemens.com/product?7KM42 | siemens.com/product?7KM5 | siemens.com/product?7KG9 | siemens.com/product?6ES7 | siemens.com/product?3VA2 | siemens.com/product?3WA | www.siemens.com/product?5TY1 | siemens.com/product?Messfunktion%2C%20kommunikation | siemens.com/product?7KN | siemens.com/product?7KN |

[1] Measured in data manager
[2] 7KT PAC1600 Multimeter
[3] Uncertainty limit acc. to these standards
[4] CLP version additionally certified acc. to PTB A50.7
[5] Versions available with or without MID
*) Apparent | active | reactive power
[6] Values correspond to the standards/classes