SATEC

PRO SERIES ADVANCED POWER METERS

Revolutionary Design

Superior Performance

PM335: PANEL MOUNT

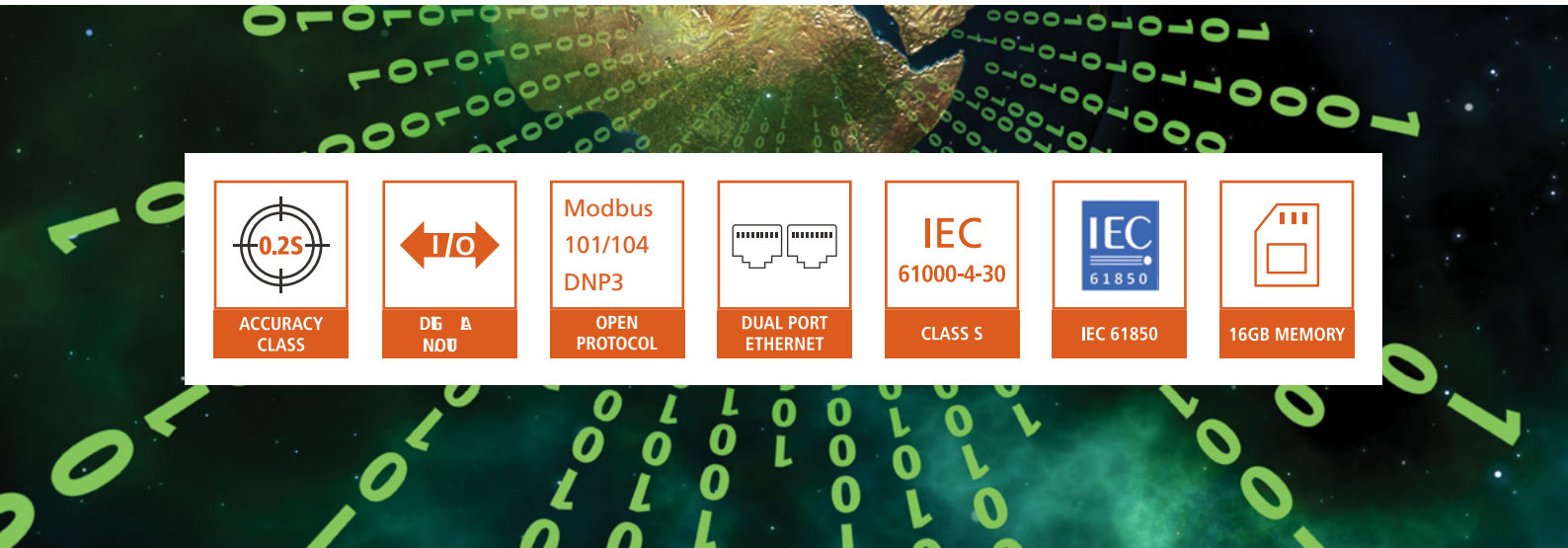
EM235: DIN RAIL

HIGHLIGHTS

- Class 0.2S accuracy
- 16GB on-board
- **IEC 61850**
- **Power Quality**: Class S
- EN50160 reports
- Dual Port Ethernet
- **DC Metering** via Hall Effect Sensors
- 4th current input for neutral current
- Up to 27 digital and analog I/O
- **Ultra-compact design** (50mm depth)

The PRO Series is SATEC's cost-effective line of power meters for advanced power monitoring applications. With waveform recording capabilities and 16GB of storage, it is a powerful Class S power-quality analyzer and event recorder.

Featuring multiple protocols (IEC 61850, DNP3 and IEC 60870-5-101/104) and dual-port ethernet, this is the ultimate solution for power monitoring, meeting and exceeding the most current requirements in utility and industrial applications.



Revolutionary Design

Superior Performance

CONNECTIVITY

Featuring trending protocols such as IEC 61850, DNP3 and Dual-port Ethernet, the PRO Series is geared towards the modern digital substation and SCADA compatibility.

COMPLIANCE

The PRO Series is designed to comply with IEC/AS 62052-11, IEC 62053-22/24, IEC 61557-12 (PMD-Sx), EN 50470, WELMEC 7.2, MID MI-003 and ANSI C12.1/20 standards.

SUBSTATION REVENUE METERING AND POWER MONITORING COMBINED

Designed as revenue-grade (anti-tamper construct), the PRO meters combine and bundle, in one ultra-compact IED, multiple features which typically are found in several different pieces of equipment. No need for device duplication.

DC METERING

This unique capability for accurate direct metering of DC systems (via Hall Effect sensors) is available in the PRO meter alongside standard AC metering. PRO DC metering advantages include 4 current channels per device.

INDUSTRIAL/UTILITY PLC CONTROL

The PRO Series meters can simultaneously host a variety of attachable I/O (digital and analog) modules.

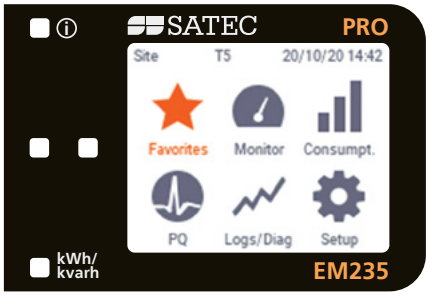
These I/Os, combined with the measured electrical parameters and programmable setpoints following PLC logic, enable a variety of control functionalities.

These capabilities include setting external digital and analog signals, such as activation triggers.

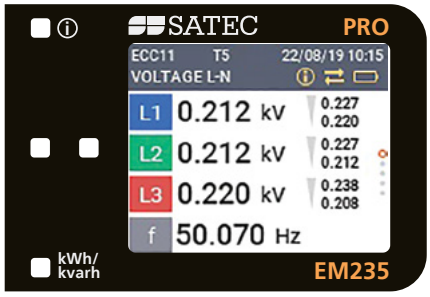
Intuitive User Interface

The PRO Series is designed with special emphasis on user experience. For example, the PRO graphic interface is user-configurable enabling the user to create their own personal favorites area.

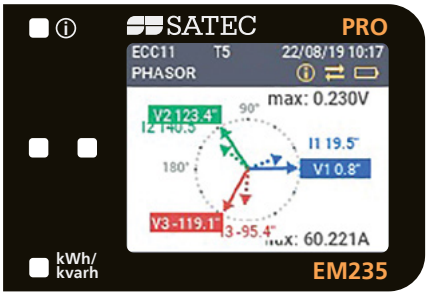
EM235 SCREENS



Main Menu with Favorites Area



Monitoring: L-N Voltage



Phasor Diagram

VERSATILE CURRENT READING

In addition to standard 1A/5A inputs, the PRO Series features special current inputs compatible with:

- **Hall Sensors** 0-4,000A Direct Current metering
- **Rogowski Coil** For easy installation
- **HACS** SATEC's High Accuracy Current Sensors, solid core or clamp-on, capable of remotely monitoring loads, up to 200m away from metering unit

DC Metering Hall Sensors

Rogowski Flex Coil

5-3,000 HACS CT Range

Technical Specifications

PRECISION REVENUE METERING (BILLING)

- Class 0.2S/0.2 per IEC 62053-22/ANSI C12.20 (active energy)
- Class 0.2 per IEC 61557-12 (PMD standard)
- Cycle-by-cycle RMS measurements updated every ½ cycle
- Up to 16 TOU tariffs profile and up to 16 register sources; internal or external tariff control
- Anti-tamper protection seals

POWER QUALITY AND MEASUREMENT CAPABILITIES

- Class S PQ Analyzer
- Individual harmonics, up to the 63rd harmonic; THD of voltage & current, custom alarming, TDD, K factor, Crest factor
- Voltage analysis: ½ cycle RMS calculation, symmetrical components, Voltage Dips/Sags, Interruptions, Swells, Unbalance, Transient and THD event recording
- Waveform capture
- Screen display of waveforms and power quality data

COMMUNICATION

- Ports
  - 2 × ETH (independent interfaces /daisy chain)
  - USB
  - RS-485
  - optical port
- Protocols
  - IEC61850 (MMS and Goose support)
  - DHCP support
  - Modbus RTU/TCP, MODBUS Master
  - DNP3/DNP/TCP (level 2)
  - IEC60870-5-101/104
  - IEC 62056-21 for local meter data exchange

CURRENT INPUT OPTIONS

- 1A or 5A inputs from CT secondary
- Flex Clamp: 200A/2V, 30A-300A-3000A/3V
- Optional: 40mA input designed for:
  - SATEC HACS CTs (5-3000A options)
  - DC metering: current measurements using Hall Effect Sensors

VOLTAGE INPUTS

- Operating range:
  10-1000V AC *(L-L) @ 50/60 Hz
  10-3000V DC**

INPUTS / OUTPUTS AND ADDITIONAL MODULES

- Built-in I/Os (optional): 2 digital inputs; 1 SSR output; 1 analog input
- Add-on I/Os: Up to 3 add-on I/O modules: up to a total of 26 DI (dry/wet) / 9 DO per unit
- Auxiliary power supply (normally needed for 3 I/O or COM modules)

PROGRAMMABLE LOGICAL CONTROLLER

- 64 control setpoints with programmable operate and release delays
- Setpoint using OR/AND logic, extensive triggers, programmable thresholds and delays
- 16GB memory for recording billing data, PQ logs, data logs, event logs and waveforms
- 16 user-definable data logs

FRONT PANEL

- Backlit color LCD display
- Simultaneous viewing of 4CH values on a single screen
- Display language may be set and changed through the front panel

POWER SUPPLY

- 57.7-277V AC L-N ±15%
  40-290V DC ± 15%
- Optional Auxiliary power supply plug-in module:
  88-264V AC, 125-300V DC
- RTC battery backup

ENVIRONMENTAL

- Meter operating temperature:
  -40 to 70°C (-13 to 158°F)
- Display operating temperature:
  -20 to 70°C (-4 to 158°F)

EMC & SAFETY

- Immunity
  - Per IEC 62052-11, CLC/TR 50579 (conducted disturbances 2-150kHz), IEEE C62.41 and C37.90.1
  - Emission per EN55011/22 class B and FCC p.15 class B
  - Insulation: dielectric withstand for 1 minute (ETH) = 4kV
- Safety
  - IEC 61010-1 3rd ed., IEC 62052-11 & IEC 61557-12, protective class II
  - IEC 62052-11
  - UL 61010-1 3rd ed., CAT III
  - AS 62052-11
  - NMI M6-1

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* UL listing covers nominal voltage up to 277/480V AC (L-N/L-L)

** An additional adaptor is required for voltage measurement above 820V DC