

EM132

MULTI-FUNCTION TRANSDUCER

SATEC EM132 is a Smart DIN Rail Multi-Function Transducer with a local display. It is based on SATEC's best seller PM130 PLUS with an off-the-shelf LCD display (similar to the BFM136 display). The EM132 provides the full functionality of the PM130P PLUS combined with energy measurement and battery backup for the real time clock. The EM132 is fully compatible with all PM130 PLUS modules.

The EM132 can serve any application from residential energy metering, through industrial energy and harmonic analysis through utility comprehensive substation automation. It provides multi-functional 3-phase power metering, revenue metering and basic power quality information. The EM132 features an internal real time clock (RTC), battery backup and onboard non-volatile memory for event and data logging. The device includes 16 set points and 4 counters that operate various analog and digital I/O add-ons.

The EM132 offers wide range of network configurations and versatile voltage and current connections: 57 to 400V AC, up to 100A direct current measurement, connection of standard CTs (1A, 5A) and a wide range of remote CTs (split or solid cores).



Main Features

Multi-functional 3-Phase Transducer

- True RMS, volts, amps, power, power factor, neutral current, voltage and current unbalance, frequency
- Ampere/Volt demand meter
- 25, 50, 60 and 400 Hz measurements
- 128 samples per cycle

Energy Meter

- Accuracy Class 0.5S
- Four-quadrant active and reactive energy poly-phase static meter
- Three-phase total and per phase energy measurements; active, reactive and apparent energy counters
- Automatic daily energy and maximum demand profile log for total and tariff registers

Harmonic Analyzer

- Voltage and current THD, TDD and K-Factor

Real-time Waveform Capture (via PC)

- Real-time “scope mode” waveform monitoring capability
- Simultaneous 6-channel 8-cycle waveform capture at a rate of 64 samples per cycle

Programmable Logical Controller

- Embedded programmable controller
- 16 control set points; programmable thresholds and delays
- Relay output control
- 1-cycle response time

Event and Data Recording

- Non-volatile memory for long-term event and data recording for at least 90 days history storage capabilities
- Event recorder for logging internal diagnostic events and setup changes
- Two data recorders; programmable data logs on a periodic basis; automatic daily energy and maximum demand profile log

Display

- Easy to read 2 x 16 Characters LCD display, adjustable update time
- Auto-scroll option with adjustable page exposition time; auto-return to a default page

Real-time Clock

- Backup for 260 days

Inputs/Outputs

- Optional module 4 Digital Inputs and 2 digital outputs (Solid State or Electro Mechanical)
- Optional module 4 Analog Outputs

Communications

- Standard 2-wire RS-485 communication port
- Optional multipurpose RS-232/422/485 port
- Optional 10/100Base T port
- Optional PROFIBUS port
- Optional RF module (available in certain regions only)
- Optional GPRS modem

Communication protocols

- Modbus RTU
- SATEC ASCII
- DNP 3.0
- IEC 60870-5-101 (option)
- IEC 60870-5-104 (option)

Meter Security

- 3 levels Password security for protecting meter setups and accumulated data from unauthorized changes

Upgradeable Firmware

- Easy upgrading device firmware through a serial or Ethernet port.

Software Support

- Includes comprehensive Power Analysis Software (PAS) for configuration and data acquisition
- Optional *eXpertpower*[™] client for communicating with the SATEC proprietary *eXpertpower*[™] Internet services

Specifications

VOLTAGE INPUTS

| | |
|-------------------------------|--|
| Voltage Connections | 3 phases, 1 Neutral |
| Voltage Ratings | Direct voltage connection: → 220 to 400V (L-N) → 380 to 690V (L-L) → Range 0-800VAC Via PT (Power Transformer): → 57.7 to 120V (L-N) → 100 to 207V (L-L) → Range 0-250VAC |
| Starting Voltage | 0.2% U_N |
| Input Impedance | $\geq 1M\Omega$ |
| Burden with Aux. Power supply | $\leq 0.2VA/\text{phase}$ |
| Overload withstand | 4000 VAC (L-G) for 1 min. |
| Impulse Voltage | 6kV |
| Terminal Blocks | 4 Sealed, pitch 7-10mm 2.5 to 4 mm ² |

CURRENT INPUTS

| | |
|-----------------------|---|
| Current Connections | 3 galvanic isolated inputs |
| Current Ratings | Choice of 4 options: → ../5A CT connection → ../1A CT connection → Direct up to 100A → Remote CT (40mA) |
| Starting Current | 0.2% I_N |
| Burden per phase | $< 0.2 VA$ (../5A) $< 0.05 VA$ (../1A) |
| Overload (continuous) | $2 \times I_N$ ($1.2 \times I_N$ for 100A model) |
| Over current | $50 \times I_N$ (for 1 second) |
| Galvanic isolation | 4000 VAC (L-G) for 1 min. |
| Terminal Blocks | 6 Sealed, pitch 7-10mm 4 to 16 mm ² |

AUXILIARY POWER SUPPLY

| | |
|---------------------------------|--|
| Rated Input | 40-300 V AC/DC |
| Insulation Dielectric withstand | 4000 VAC for 1 min. |
| Output power | 4W |
| Terminal Blocks | 2 Sealed, pitch 7-10mm 2.5 to 4 mm ² |

BUILT IN COMMUNICATION

| | |
|--------------------|---|
| Communication Type | RS-485 |
| Max. Baud Rate | 115.2 kb/s |
| Isolation | 4000 VAC (L-G) for 1 min. |
| Max. Cable Length | 1000 m |
| Protocols | MODBUS RTU/ASCII DNP 3.0 IEC 60870 -5-101 (option) IEC 60870 -5-104 (option) |
| Terminal Blocks | 3 Sealed, pitch 7-10mm 2.5 to 4 mm ² |

INFRA RED COMMUNICATION

| | |
|-----------|-------------------|
| Baud rate | Up to 19.200 kb/s |
| Protocols | MODBUS RTU/ASCII |

ADD-ON MODULES

| | |
|-------------------|--|
| Max. # of Modules | 1 |
| Available Modules | RS-232; PROFIBUS; ETHERNET; Digital I/O; Analog Outputs |

FRONT PANEL

| | |
|----------------|---|
| Display type | 2x16 Characters Transflective LCD with backlight |
| Character size | 3.2x1.85 mm |
| Viewing area | 46x11 mm |
| LEDs | Total 6 LEDs: → 1 Pulse calibration output → 3 voltage indication → 2 RX/TX activity |
| Keypad | 2 buttons |
| Nameplate | According to IEC 60688 and IEC 62052-11 |

MECHANICAL

| | |
|--------------------|---|
| Enclosure | DIN Rail mount Complies with EN50022 |
| Dimensions [WxHxD] | 125 x 90 x 75mm |
| Enclosure Material | Reinforced Polycarbonate |

TEMPERATURE

| | |
|-------------|---------------|
| Operational | -25°C to 60°C |
| Storage | -30°C to 85°C |

Standards Compliance specifications

EMC per IEC 60688 and IEC 62052-11:

Immunity:

- IEC61000-4-2: Electrostatic discharge, 15/-air/contact
- IEC61000-4-3: Electromagnetic RF Fields, 10V/m @ 80MHz – 1000MHz
- IEC61000-4-4: Fast Transients burst, 4KV on current and voltage circuits and 2 KV for auxiliary circuits
- IEC61000-4-5: Surge 4KV on current and voltage circuits and 1 KV for auxiliary circuits
- IEC61000-4-6: Conducted Radio-frequency, 10V @ 0.15MHz – 80MHz
- IEC61000-4-8: Power Frequency Magnetic Field

Emission (radiated/conducted):

- EN55022: 2010 Class A (CISPR 22)
- FCC p.15 Class A mandatory

Safety

- UL/IEC 61010-1

Insulation

- IEC 62052-11: Insulation impulse 6KV/500Ω @ 1.2/50 μs
- IEC 62053-22: AC voltage tests related to ground, 4 kV AC @ 1mn, for power and signal ports (above 40V)
- 2.5KVAC r.m.s. @ 1mn, for other ports (below 40V)

Atmospheric Environment

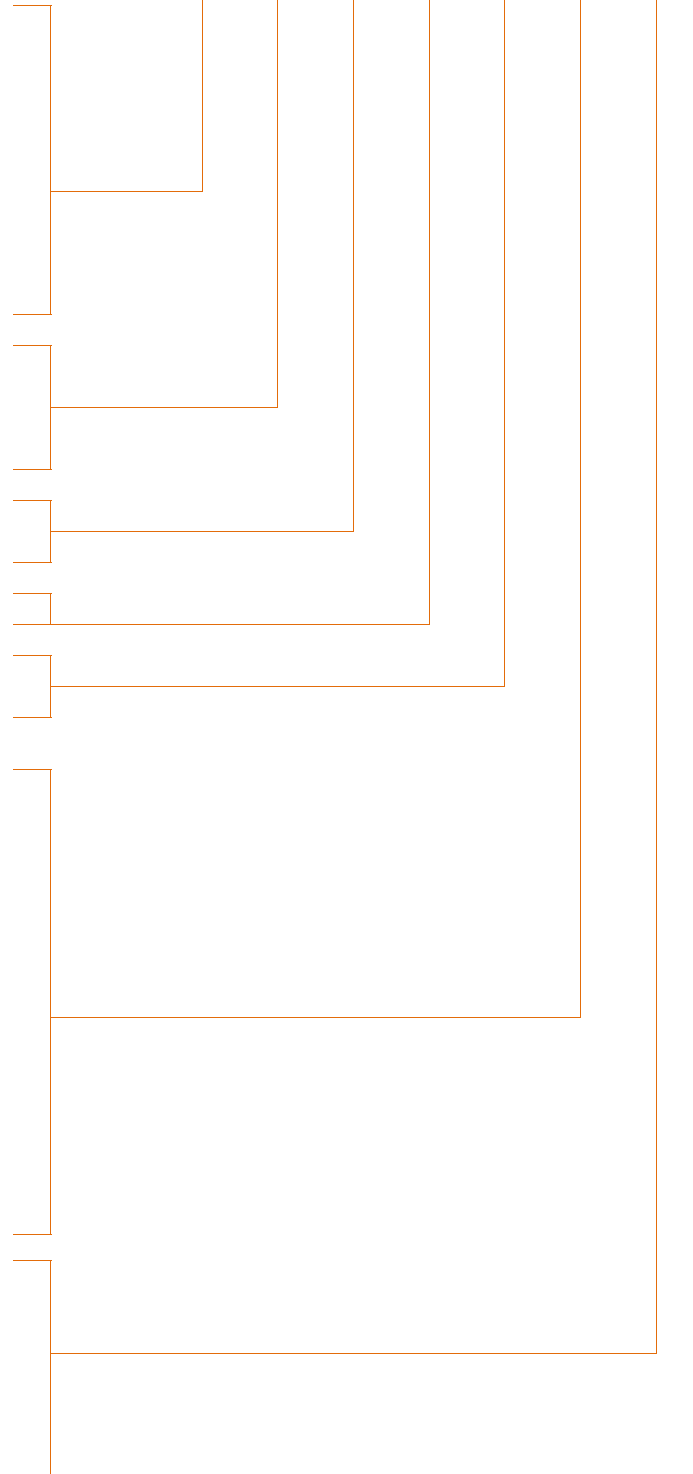
- Operational ambient temperature range: -25°C to +60 °C
- Long-term damp heat withstand according to IEC 68-2-3 <95% (non condensing), +40 °C
- Transport and storage temperature range: – 30°C to +85 °C
- IEC 60068-2-6: Vibration
- Frequency range: 10Hz to 150Hz
- Transition frequency: 60Hz
- Constant movement amplitude 0.075mm, f<60Hz
- Constant acceleration 9.8 m/s² (1g), f > 60Hz
- Additional Transport vibration and shocks:
- Longitudinal acceleration: 2.0 g
- Vertical acceleration: 1.2 g
- Transversal acceleration: 1.2 g
- Enclosure protection: IP20

Accuracy according to:

- IEC 62053-22, class 0.5S – active energy
- IEC 62053-21, class 0.5 – reactive energy
- IEC 60688, class 0.5S – active energy
- IEC 60688, class 1 – reactive energy

Order String

| OPTIONS | |
|--|---------|
| Current Inputs | |
| 5 Ampere | 5 |
| 1 Ampere | 1 |
| Direct current measurement up to 100A | 100 |
| Remote CTs: 100A, 12mm hole, solid core (set of 3) | 3xCT1 |
| Remote CTs: 100A, 23mm hole, solid core (set of 3) | 3xCT1L |
| Remote CTs: 100A, 16mm hole, split core (set of 3) | 3xCT1S |
| Remote CTs: 400A, 26mm hole, solid core (set of 3) | 3xCT4 |
| Remote CTs: 400A, 30.5mm hole, split core (set of 3) | 3xCT4S |
| Remote CTs: 800A, 80x50mm hole, split core (set of 3) | 3xCT8S |
| Remote CTs: 1200A, 180x120mm hole, split core (set of 3) | 3xCT12S |
| Calibration at Frequency | |
| 25 Hz | 25HZ |
| 50 Hz | 50HZ |
| 60 Hz | 60HZ |
| 400 Hz | 400HZ |
| Resolution | |
| Low Resolution 1A, 1V | - |
| High Resolution 0.01A, 0.1V | H |
| Power Supply | |
| 40-300V AC/DC | ACDC |
| Communication Protocol | |
| Modbus and DNP 3.0 | - |
| Modbus and IEC 60870-101/104 | 870 |
| Expansion Module (Max. 1 module per instrument, can be ordered separately) | |
| Analog Output: ±1mA | AO1 |
| Analog Output: 0-20mA | AO2 |
| Analog Output: 0-1mA | AO3 |
| Analog Output: 4-20mA | AO4 |
| Analog Output: 0-3mA | AO5 |
| Analog Output: ±3mA | AO6 |
| Analog Output: 0-5mA | AO7 |
| Analog Output: ±5mA | AO8 |
| Digital Input (Dry Contact) / Relay Output 250V / 5A AC | DIOR |
| Digital Input (Dry Contact) / SSR Output 250V / 0.1A AC | DIOS |
| Communication: Ethernet (TCP/IP) | ETH |
| Communication: PROFIBUS | PRO |
| Communication: RS232 | RS232 |
| Communication: GPRS | GPRS |
| Communication: RF (see note) | RF-x |
| RF Accessories (see note) | |
| Concentrator - ROW | CON-ROW |
| Concentrator External for 2 x ETC2002 | CON-EXT |
| Repeater | REP |
| Antenna 1: without cable (module or concentrator) | AN-1 |
| Antenna 2: with 2M cable (module or concentrator) | AN-2 |
| Antenna 3: external for concentrator only | AN-3 |
| Antenna 4: external for module or concentrator | AN-4 |

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Note: The RF module and accessories are available in certain regions only. Please consult your local supplier.