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 reacive 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

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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

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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	≥ 1MΩ
Burden with Aux. Power supply	≤0.2VA/phase
Overload withstand	4000 VAC (L-G) for 1 min.
Impulse Voltage	6kV
Terminal Blocks	4 Sealed, pitch 7-10mm 2.5 to 4 mm²

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 mm²

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 mm²

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 mm²

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	2×16 Characters Transflective LCD with backlight
Character size	3.2×1.85 mm
Viewing area	46×11 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 [W×H×D]	125 × 90 × 75mm
Enclosure Material	Reinforced Polycarbonate

TEMPERATURE

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

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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/s^2 (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
High Accuracy Current Sensors (HACS). Requires ordering of 3 HACS - please refer to SATEC's **HACS Datasheet**.	HACS
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
Communication: Ethernet (TCP/IP)	ETH
Communication: PROFIBUS	PRO
Communication: RS232/422/485	RS232
Communication: GPRS	GPRS
Communication: RF (see note)	RF-x
Digital Input (Dry Contact) / Relay Output 250V / 5A AC	DIOR
Digital Input (Dry Contact) / SSR Output 250V / 0.1A AC	DIOS
12 Digital Inputs (Dry Contact)/4 Relay Outputs 250V/5A AC	12DIOR-DRC
12 Digital Inputs (250VDC) / 4 Relay Outputs 250V/5A AC	12DIOR-250V
12DIOR-DRC with Ethernet	12DIOR-DRC-ETH
12DIOR-250V with Ethernet	12DIOR-250V-ETH
12DIOR-DRC with RS-485	12DIOR-DRC-485
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

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

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