

# 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 <sup>2</sup>

### 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 <sup>2</sup>

### 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 <sup>2</sup>

### 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 <sup>2</sup>

### 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/s<sup>2</sup> (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	EM132						
<b>Current Inputs</b>							
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 <b>HACS Datasheet</b> .	HACS						
<b>Calibration at Frequency</b>							
25 Hz	25HZ						
50 Hz	50HZ						
60 Hz	60HZ						
400 Hz	400HZ						
<b>Resolution</b>							
Low Resolution 1A, 1V	-						
High Resolution 0.01A, 0.1V	H						
<b>Power Supply</b>							
40-300V AC/DC	ACDC						
<b>Communication Protocol</b>							
Modbus and DNP 3.0	-						
Modbus and IEC 60870-101/104	870						
<b>Expansion Module</b> (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						
<b>RF Accessories (see note)</b>							
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.