

ACCURACY CLASS 0.5S
AS/IEC 62053-22 COMPLIANT
NITP14 VERIFIED
NMI APPROVED 14/2/72
[View the EM133-XM product page on satec-global.com.au](https://satec-global.com.au)

EM133-XM

NMI-Approved Smart Multifunction Energy Meter — 5A CT Direct Input

The EM133-XM is SATEC's advanced expertmeter™ smart multifunction, DIN rail mounted, tariff (TOU) energy meter for commercial, industrial, solar and residential applications. It is approved by the National Measurement Institute (NMI) for use as an electricity billing meter, verified to NITP 14 test procedures and certified to IEC 62052-11, and is designed for revenue billing, energy management and NABERS/Green Star reporting. The XM is the enhancement of SATEC's discontinued AR model.

The EM133-XM provides 2 built-in digital pulse inputs for direct connection to pulse-output water, hot water, gas and steam meters, with expansion modules available to add 4, 8 or 12 further pulse inputs. It measures three-phase and per-phase active, reactive and apparent energy across four quadrants, with time-of-use registers spanning 8 tariffs, 4 seasons and 4 day types, alongside an embedded programmable logic controller, harmonic analyser and real-time waveform capture.



5A / 10A (CT Operated)

Standard current input via conventional 5A current transformers or extended range CTs

Direct Connect up to 100A

Direct current measurement up to 100A, no external CTs required

HACS Remote Sensor

100–3000A remote current sensor input (NMI CS1, CS1L, CS1S only – see the HACS datasheet)

Main Features

- Four (4) quadrant import/export, 3 phase and 3 single-phase configuration
- True RMS volts, amps, power, power factor, voltage and current unbalance, frequency
- Neutral current calculation
- Ampere/Volt demand meter
- 50Hz measurement (400Hz optional)
- Extended range CT input (5A/10A)
- Energy test mode and transformer correction
- 128 samples per cycle, *8MB of memory
- 3 year warranty

Feature Capabilities

Billing / TOU Energy Meter

- Energy accuracy Class 0.5S
- Four-quadrant active and reactive energy
- Import/export per phase as single-phase configuration
- Three-phase total and per-phase energy measurement – active, reactive and apparent energy counters
- Time-of-Use: 8 totalisation and tariff energy/demand registers × 8 tariffs, 4 seasons × 4 types of days, 8 tariff changes per day
- One-time easy programmable tariff calendar schedule
- Automatic daily energy and maximum demand profile log for total and tariff registers
- Cost calculation (upon application)
- CO2 (upon application)

Water and Gas Measurement

- Direct connection to pulse output water and gas meters
- Setting of multiplication factors and units
- Display of consumption in real values
- Up to 14 digital pulse inputs

Harmonic Analyser

- Voltage and current THD, TDD and K-Factor, up to 40th order harmonic
- Voltage and current harmonic spectrum and angles

Real-Time Waveform Capture

VIA PC WITH PAS FREE LICENSED SOFTWARE

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

Programmable Logical Controller

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

Event and Interval Data Recording

- Non-volatile memory with interval data logging for load surveys and energy usage
- *Interval data logging @ 30 minutes = 1365 days
- *Interval data logging @ 15 minutes = 682 days
- *Interval data logging @ 5 minutes = 227 days
- *Interval/data logging time period user-definable 1–60 minutes
- *Interval/data logging for up to 16 parameters/channels, user-definable
- 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

Feature Capabilities (continued)

Display

- Easy to read 2 × 16 characters LCD display, adjustable update time
- Signal strength display reading for modem and WiFi module
- Auto-scroll option with adjustable page exposition time; auto-return to a default page

Real-Time Clock

- With backup battery
- Low battery indication

Meter Security

- 3 levels password security protecting meter setups and accumulated data from unauthorised changes

Upgradeable Firmware

- Easy upgrading of device firmware through serial, Ethernet, WiFi or modem communications

Inputs / Outputs

- Built-in 2 digital inputs and 1 form-A solid state digital output
- Optional module 4 digital inputs and 2 digital outputs (solid state or electro-mechanical)
- Optional module 8 digital inputs
- Optional module 12 digital inputs and 4 digital outputs (plus Ethernet or RS-485)
- Optional module 4 analogue outputs

Communications

- Standard 2-wire RS-485 communication
- Built-in IR communication port (IEC)

Dual Communications (Add-on Module)

- Optional multipurpose RS-232/422/485 port
- Optional 10/100Base T port
- Optional external 4G modem (on application)

Communication Protocols

- Modbus RTU
- Modbus TCP/IP
- Modbus assignable registers
- MV-90 xi Translation Interface Module (TIM) for EM133-XM

Software Support & Firmware

- **Power Analysis Software (PAS)** – free licensed software for configuration, data acquisition and forensic analysis
- **ExpertPower™** – SATEC's internet-based energy management software
- **eXpertConnect™ App** – mobile connection to the meter for configuration, readings and diagnostics

eXpertConnect™ Cloud-Based Software as a Service (SaaS)

- KWH (energy) billing, water billing, gas billing
- Energy management and power monitoring
- Power quality forensic analysis
- Data pushed to cloud service via Ethernet, WiFi or modem communications

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	$\geq 1M\Omega$
Overload withstand	4000 VAC (L-G) for 1 min.
Impulse voltage	12kV
Terminal blocks	4 sealed, pitch 7–10mm, 2.5 to 4 mm ²

CURRENT INPUTS

Current connections	4 galvanic isolated inputs
Current ratings	Choice of 3 options: • ../5A CT connection • Direct up to 100A • HACS input – NMI approved (refer HACS datasheet for inputs up to 3000A)
Starting current	0.2% I_N
Burden per phase	<0.2 VA (../5A)
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	Self powered
Insulation dielectric withstand	4000 VAC for 1 min.
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
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

ADD-ON MODULES

Max. # of modules	1
Available modules	RS485/RS-232; Ethernet; digital I/O; analogue output

Specifications (continued)

FRONT PANEL		MECHANICAL	
Display type	2×16 characters transfective LCD with backlight	Enclosure	DIN rail mount, complies with EN50022
Character size	3.2×1.85 mm	Dimensions [W×H×D]	125 × 90 × 75mm
Viewing area	46×11 mm	Enclosure material	Reinforced polycarbonate
LEDs	Total 6 LEDs: • 1 pulse calibration output • 3 voltage indication • 2 RX/TX activity	TEMPERATURE	
Keypad	2 buttons	Operational	−25°C to 60°C
Nameplate	According to IEC 60688 and IEC 62052-11	Storage	−30°C to 85°C

Standards Compliance

EMC Immunity (per IEC 60688 and IEC 62052-11)

- IEC 61000-4-2: electrostatic discharge, 15/- air/contact
- IEC 61000-4-3: electromagnetic RF fields, 10V/m – 80MHz–1000MHz
- IEC 61000-4-4: fast transients burst, 4KV on current and voltage circuits and 2KV for auxiliary circuits
- IEC 61000-4-5: surge 4KV on current and voltage circuits and 1KV for auxiliary circuits
- IEC 61000-4-6: conducted radio-frequency, 10V @ 0.15MHz–80MHz
- IEC 61000-4-8: 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

- Impulse tested to SP-Method 1618, impulse voltage 12kV @ 1.2/50 μ s
- AS/IEC 62053-22: AC voltage tests related to ground, 4kV AC @ 1 min, for power and signal ports (above 40V)
- 2.5KVAC r.m.s. @ 1 min, 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, $f < 60$ Hz
- Constant acceleration 9.8 m/s² (1g), $f > 60$ Hz
- Additional transport vibration and shocks – longitudinal acceleration 2.0g, vertical acceleration 1.2g, transversal acceleration 1.2g
- Enclosure protection: IP50

Standards Compliance (continued)

Accuracy According To

- AS/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

AER / AEMO / AEMC

- NEM12/13 data, available via **ExpertPower™** or **eXpertConnect™**

National Measurement Institute (NMI) (Australia)

- NMI M6 compliant
- NMI approved 14/2/72
- Verification per NITP14 test procedures
- ISO17025 certified manufacturing facilities

Ordering Information

EM133-XM - **CURR.** - **50HZ** - **SE** - **CC**

CURRENT INPUTS

5 Ampere (CT operated) **5**

Direct current measurement up to 100A **100**

HACS (refer HACS datasheet) – NMI CS1, CS1L, CS1S only **HACS**

CALIBRATION AT FREQUENCY

50Hz **50HZ**

400Hz **400HZ**

POWER SUPPLY

Self energised / powered **SE**

RS485/MODBUS COMMUNICATIONS

RS485/Modbus (standard) **–**

NMI APPROVED

NITP 14 verification **CC**

Expansion module (max. 1 per instrument) is ordered separately – see the following page.

Ordering Information (continued)

EXPANSION MODULE — MAX. 1 PER INSTRUMENT, ORDERED SEPARATELY

Analogue Outputs

4 analogue output: $\pm 1\text{mA}$	A01
4 analogue output: 0–20mA	A02
4 analogue output: 0–1mA	A03
4 analogue output: 4–20mA	A04
4 analogue output: 0–3mA	A05
4 analogue output: $\pm 3\text{mA}$	A06
4 analogue output: 0–5mA	A07
4 analogue output: $\pm 5\text{mA}$	A08

Communication

Ethernet (TCP/IP)	ETHD
RS232/422/485	RS232D
Modem – 4G (optional external on application)*	T4T-x

*Modem antennas: x = T – top, or F – front (other options refer to price list)

Digital I/O & Relay Outputs

4 digital inputs (dry contact) / 2 relay output 250V/5A AC	DIOR
4 digital inputs (dry contact) / 2 SSR output 250V/0.1A AC	DIOS
8 digital inputs (dry contact) / 2 SSR output 250V/0.1A AC	8DI
12 digital inputs (dry contact) / 4 relay outputs 250V/5A AC	12DIOR-DRC
12 digital inputs (48VDC) / 4 relay outputs 250V/5A AC	12DIOR-48V
12 digital inputs (125VDC) / 4 relay outputs 250V/5A AC	12DIOR-125V
12 digital inputs (250VDC) / 4 relay outputs 250V/5A AC	12DIOR-250V
As above, with RS485 – dry contact / 48V / 125V / 250V	...-485
As above, with Ethernet – dry contact / 48V / 125V / 250V	...-ETH



PLACE AN ORDER

To place an order or request a quotation for the EM133-XM, contact the SATEC Australia sales team, or scan the QR code.

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Document Revision History

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