

ADVANCED *expertmeter*<sup>™</sup> FOR  
COMMERCIAL, INDUSTRIAL, SOLAR  
AND RESIDENTIAL APPLICATIONS.  
NMI APPROVED WITH NITP 14 VERIFICATION  
AND AS 62052-11 CERTIFICATION

SATEC *expertmeter*<sup>™</sup> EM133-XM is a Smart Multifunction DIN Rail mounted, Tariff (TOU) Energy Meter designed for Revenue Billing, Energy Management, NABERS/Green Star and approved by National Measurement Institute (NMI) for use as an electricity billing meter.

The XM is the enhancement of our discontinued AR model.

The EM133-XM provides 2 pulse inputs for direct connection to pulse output meters, such as cold water, hot water, gas and steam. Expansion Modules provide 4, 8, or 12 additional pulse inputs.

## Main Features

### Advanced *expertmeter*<sup>™</sup>

#### 3 Phase & 3 Single Phase Configuration

- Four (4) Quadrant Import/Export
- True RMS, volts, amps, power, power factor, voltage and current unbalance, frequency
- Neutral Current Calculation
- Ampere/Volt demand meter
- 50Hz measurements.
- 400Hz measurement (Optional)
- Extended Range CT Input (5A/10A)
- Energy Test Mode
- Transformer Correction
- 128 samples per cycle
- \*8MB of memory
- 5 Year Warranty

#### Billing/TOU Energy/Solar 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 measurements; active, reactive and apparent energy counters
- Time-of-Use, 8 totalization and tariff energy/demand registers x 8 tariffs, 4 seasons x 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 40<sup>th</sup> 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

## Display

- Easy to read 2 x 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

## 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 RS485)
- 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 Wi-Fi
- Optional 3G modem
- Optional 3G modem with 2 Analogue Inputs
- Optional 4G modem (on application)

## Communication Protocols

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

## Meter Security

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

## Upgradeable Firmware

- Easy upgrading device firmware through Serial, Ethernet, WiFi or Modem communications.

## Software Support

- Free Licensed Power Analysis Software (PAS) for configuration, data acquisition and forensic analysis.

## 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: <ul style="list-style-type: none"> <li>➔ 220 to 400V (L-N)</li> <li>➔ 380 to 690V (L-L)</li> <li>➔ Range 0-800VAC</li> </ul> Via PT (Power Transformer): <ul style="list-style-type: none"> <li>➔ 57.7 to 120V (L-N)</li> <li>➔ 100 to 207V (L-L)</li> <li>➔ Range 0-250VAC</li> </ul>
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 <sup>2</sup>

### CURRENT INPUTS

Current Connections	4 galvanic isolated inputs
Current Ratings	Choice of 3 options: <ul style="list-style-type: none"> <li>➔ * ../5A CT connection</li> <li>➔ Direct up to 100A</li> <li>➔ HACS Input - Not NMI Approved (refer HACS Data Sheet for Inputs up to 3000A)</li> </ul>
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 <sup>2</sup>

### 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 <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
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

### ADD-ON MODULES

Max. # of Modules	1
Available Modules	RS485/RS-232; ETHERNET; Digital I/O; Analogue Output; Modem; WiFi

### FRONT PANEL

Display type	2x16 Characters Transflective LCD with backlight
Character size	3.2x1.85 mm
Viewing area	46x11 mm
LEDs	Total 6 LEDs: <ul style="list-style-type: none"> <li>➔ 1 Pulse calibration output</li> <li>➔ 3 voltage indication</li> <li>➔ 2 RX/TX activity</li> </ul>
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

- Impulse Tested to SP-Method 1618, Impulse Voltage 12KV @ 1.2/50  $\mu$ s
- IEC 62053-22: AC voltage tests related to ground, 4 kV AC @ 1min, for power and signal ports (above 40V)
- 2.5KVAC r.m.s. @ 1min, 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: IP50

#### 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

### National Measurement Institute (NMI) (Australia)

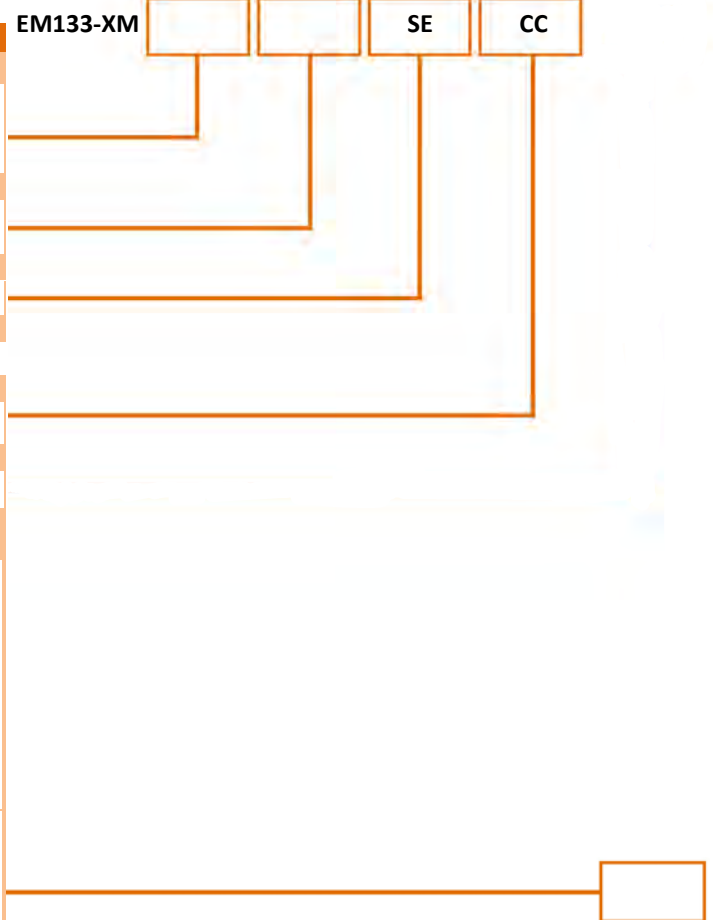
- NMI M6 Compliant
- NMI Approved 14/2/72
- Verification per NITP14 Test Procedures
- ISO17025 Certified Manufacturing Facilities

#### AER/AEMO/AEMC

- NEM12/13 Data (via eXpertPower or eXpertConnect)

## Order String

OPTIONS	
<b>Current Inputs</b>	
5 Ampere (CT Operated)	5
Direct current measurement up to 100A	100
HACS (Refer HACS Data sheet) NMI CS1,CS1L,CS1S Only	HACS
<b>Calibration at Frequency</b>	
50HZ	50HZ
400HZ	400HZ
<b>Power Supply</b>	
Self Energised/Powered	SE
<b>RS485/Modbus Communications</b>	
RS485/Modbus	Standard
<b>NMI Approved</b>	
NITP 14 Verification	CC
<b>Special Calibration</b>	
NITP 14 Verification for 3 x Single Phase Configuration	3
<b>Expansion Module</b> (Max. 1 module per instrument, can be ordered separately)	
4 Analogue Output: ±1mA	AO1
4 Analogue Output: 0-20mA	AO2
4 Analogue Output: 0-1mA	AO3
4 Analogue Output: 4-20mA	AO4
4 Analogue Output: 0-3mA	AO5
4 Analogue Output: ±3mA	AO6
4 Analogue Output: 0-5mA	AO7
4 Analogue Output: ±5mA	AO8
Communication: Ethernet (TCP/IP)	ETHD
Communication: RS232/422/485	RS232D
Communication: Modem - 3G*	T3G-x
Communication: Modem 3G with 2 Analogue Inputs*	T3G-x-2AI
Communication: Modem - 4G (Requires Minimum Quantity Order)*	T4T-x
Communication: WiFi	WiFi
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
12 Digital Inputs (Dry Contact)/4 Relay Outputs 250V/5A AC, with RS485	12DIOR-DRC-485
12 Digital Inputs (48VDC) /4 Relay Outputs 250V/5A AC, with RS485	12DIOR-48V-485
12 Digital Inputs (125VDC) /4 Relay Outputs 250V/5A AC, with RS485	12DIOR-125V-485
12 Digital Inputs (250VDC) /4 Relay Outputs 250V/5A AC, with RS485	12DIOR-250V-485
12 Digital Inputs (Dry Contact)/4 Relay Outputs 250V/5A AC, with Ethernet	12DIOR-DRC-ETH
12 Digital Inputs (48VDC)/4 Relay Outputs 250V/5A AC, with Ethernet	12DIOR-48V-ETH
12 Digital Inputs (125VDC)/4 Relay Outputs 250V/5A AC, with Ethernet	12DIOR-125V-ETH
12 Digital Inputs (250VDC)/4 Relay Outputs 250V/5A AC, with Ethernet	12DIOR-250V-ETH



\*Modem Antennas: x = T - Top or F - Front (other options refer price list)