

ACCURACY CLASS 0.2S
AS/IEC 62053-22 COMPLIANT
IEC 61000-4-30 CLASS A
EN 50160 PQ RECORDER
[View the EM720 product page on satec-global.com.au](#)

EM720

Power Quality Analyser and Class 0.2S Revenue Meter

The EM720 eXpertmeter™ is SATEC's high accuracy revenue meter and power quality analyser in one three-phase instrument. It combines a Class 0.2S energy meter with a fault recorder, data recorder and programmable controller. It is built for utility, substation, industrial and commercial billing sites where reliable power quality monitoring and high device availability are essential.

The meter records fault currents up to 10 times nominal current (50A), performs harmonic analysis to the 50th order and captures disturbances in detail. The EM720T model adds a fast transient recorder for voltage transients up to 2kV. A backlit graphical LCD, a front infrared port and plug-in RS-232/RS-485, USB and Ethernet modules support local reading and remote automatic meter reading. Three hot-swap expansion slots let you add I/O, communications and backup power in the field.



EM720

Class 0.2S revenue energy meter with EN 50160 power quality analyser, fault and event recording, metering and control

EM720T

All EM720 functionality plus a high-voltage fast transient recorder for impulsive and oscillatory overvoltages

120V or 480V Versions

120V version for connection via PTs, or 480V version for direct connection to the network

Main Features

- AS/IEC 62053-22 Class 0.2S active energy metering
- Time-of-use billing with 8 tariffs, 4 seasons and 4 day types
- EN 50160 power quality recorder with compliance reports
- IEC 61000-4-30 Class A power quality methods
- Harmonics and interharmonics to the 50th order
- IEC 61000-4-15 flicker measurement
- Digital fault recorder for currents up to $10 \times I_n$ (50A)
- Transient recording up to 2kV peak (EM720T)
- 8MB standard or 16MB expanded log memory
- Three hot-swap expansion slots for I/O and communications
- Optional IEC 61850 over Ethernet
- Optional Li-ion battery for up to 6 hours full operation

Feature Capabilities

Billing/TOU Energy Meter

- AS/IEC 62053-22 Accuracy Class 0.2S active and reactive energy polyphase static meter
- Time-of-use with 10 billing energy and maximum demand registers, 8 tariff rates, 4 seasons × 4 day types and 8 tariff changes per day
- One-time programmable tariff calendar schedule; one-time programmable or calendar scheduled daylight saving switch dates
- Configurable end of billing period: automatic monthly, local from the front display (password protected) or via communications
- Automatic recording of billing energy, maximum demand and cumulative maximum demand registers for the last 24 billing periods
- Automatic 120-day daily energy and maximum demand profile
- Automatic 120-day/15-minute or 240-day/30-minute energy load profile
- Easy access to the three previous billing periods from the front display
- Transformer and line loss compensation
- PT/CT corrections at up to 8 points

Multi-functional Power Meter

- Enhanced three-phase power meter: true RMS volts and amps, powers, power factors, unbalance, neutral current and frequency
- Demand meter: amps, volts, harmonic demands, block and sliding power demands
- Harmonic analyser: volts and amps to the 50th harmonic; fundamental volts, amps, power and power factor; phasors and symmetrical components

Waveform Recorders

- Seven channel simultaneous recording of three voltage and four current channels
- Selectable sampling rate of 32, 64, 128 or 256 samples per cycle
- 20 pre-fault cycles and up to 3 minutes of continuous recording at 32 samples per cycle
- Optional 4-channel transient voltage recording at 1024 samples per cycle (EM720T)
- Synchronised waveforms from multiple devices in a single plot
- Waveform export in COMTRADE and PQDIF file formats

Power Quality

- EN 50160 power quality recorder with onboard analyser, programmable limits, event log, compliance statistics and harmonics survey statistics
- Power frequency, voltage variations, rapid voltage changes, IEC 61000-4-15 flicker, voltage dips, interruptions, temporary and transient overvoltages and voltage unbalance
- IEC 61000-4-7 harmonic and interharmonic voltage and mains signalling voltage
- High-voltage fast transient recorder (EM720T) for impulsive and low frequency oscillatory overvoltages with peaks up to 2kV and durations from 20 microseconds
- Ready-to-use compliance statistics reports

Fault Recorder

- Fast digital fault recorder with up to 8 external digital triggers from protection relays
- Onboard voltage and current fault detector: zero-sequence currents and volts, current and voltage unbalance
- Programmable fault thresholds and hysteresis
- Records fault currents up to 10 × nominal current (50A)
- Ready-to-use fault reports: fault current magnitudes and duration, coincident voltage magnitude, fault waveforms and fast RMS trace

Data Recorders

- Sixteen fast data recorders
- Programmable periodic data logs, or logs on any internal or external trigger, including the fault recorder, PQ recorder or control setpoints
- Data trend export in PQDIF file format
- Fast fault and PQ data profiling (trending) triggered from the fault and PQ recorders: ½ cycle to 10-minute RMS envelopes with up to 20 pre-fault and post-fault cycles

Event Recorder

- Logs internal diagnostic events, setpoint operations and I/O operations

Feature Capabilities (continued)

Programmable Logical Controller

- Embedded programmable controller with 16 control setpoints
- OR/AND logic, extensive triggers, programmable thresholds and delays, relay control and event-driven data recording
- 8 digital counters for pulses from external sources and internal events
- 4 programmable timers from 1 cycle to 24 hours for periodic recording and time-based triggering

Display

- High contrast graphical 128 × 32 pixel LCD with backlight
- Multi-page data display with auto-scroll: time, billing, instrumentation and service data
- Menu-driven setups

Extended Security

- 3-level password security protects meter setups and accumulated data from unauthorised changes

Digital I/O

- Four embedded digital inputs with 1ms scan time
- Replaceable 2DI/2DO expansion I/O modules with ½ cycle scan and update time

Memory

- 8MB or 16MB flash memory for long-term billing, event, waveform and data recording

Software Support

- **Power Analysis Software (PAS)**: free software for meter configuration, control, data acquisition and power quality reporting
- **Expertpower™**: SATEC's internet-based energy management platform for data collection, billing, dashboards and power quality analysis

Time and Clock

- High accuracy real-time clock with lithium backup battery
- 1ms digital input synchronisation
- Satellite-synchronised clock option (IRIG-B time-code input)
- SNTP clock synchronisation option
- One-time programmable or calendar scheduled daylight saving time (DST) switch dates with configurable DST start and end times

Communications

- Front infrared port to IEC 62056-21 (IEC 62056-21, Modbus RTU/ASCII and DNP3 protocols)
- Plug-in RS-232/RS-485 serial port (Modbus RTU/ASCII and DNP3 protocols)
- Plug-in full speed USB 1.1 port (Modbus RTU protocol)
- Plug-in Ethernet port (Modbus/TCP and DNP3/TCP protocols, optional IEC 61850) with up to 5 simultaneous connections

Expansion I/O and Communication Slots

- 3 hot-swap expansion slots for plug-in I/O and communication modules

Backup Power Supplies

- Heavy-duty lithium backup battery for the RTC, setup and data logging information
- Optional high-capacity rechargeable Li-ion battery for up to 6 hours full operation
- Optional auxiliary 24V DC backup power supply module

Upgradeable Firmware

- New features can be added by updating the firmware through any communication port

- **eXpertConnect™ App**: mobile connection to the meter for configuration, readings and diagnostics
- Supplemental communication software or your own data acquisition software via Modbus and DNP3

Specifications

AC VOLTAGE INPUTS		ENVIRONMENTAL CONDITIONS	
Inputs	V1, V2, V3, VN and VG, 50/60Hz	Operating temperature	−40°C to +70°C
Versions	120V: for connection via PTs 480V: for direct connection	Full accuracy operating temperature	−25°C to +60°C
Voltage rating, 120V version	3 × 57.73/100V 3 × 63/110V 3 × 69/120V 3 × 57.73V, 3 × 63V, 3 × 69V	Storage temperature	−45°C to +85°C
Voltage rating, 480V version	3 × 120/207V 3 × 220/380V 3 × 230/400V 3 × 277/480V 3 × 220V, 3 × 230V, 3 × 277V	Humidity	0 to 95% RH, non-condensing
Voltage range and crest factor	120V: 0 to 144V, ≥2 (peak up to 300V) 480V: 0 to 320V RMS, ≥2 (peak up to 700V)	CONSTRUCTION	
Temporary overvoltage, live conductors to earth	240V RMS (120V version); 1000V RMS (480V version)	Enclosure	Reinforced, corrosion resistant plastic with sealing cover
Transient overvoltage, live conductors to earth (15µs to milliseconds)	2kV peak	Flammability	UL94V0
Starting voltage	0.5% Un	Size (H × W × D)	303 × 177 × 144mm
Burden per phase	<0.2VA (120V version); <0.5VA (480V version)	Weight (including battery)	3.95kg
Overload withstand, 1 minute phase to ground (AS/IEC 62053-22, protective class II)	4000V RMS	Mounting	DIN 43857
Rated impulse voltage (AS/IEC 62052-11, protective class II)	6000V	POWER SUPPLY	
Terminal wire size	2.5 to 6mm ²	3P POWER SUPPLY (MPS): FROM MEASURED AC VOLTAGE INPUTS	
AC CURRENT INPUTS		High range (480V version)	Nominal 207–480V AC 50/60Hz; operating range 96–575V AC
Inputs	4 galvanically isolated inputs	Low range (120V version)	Nominal 100–120V AC 50/60Hz; operating range 45–250V AC
Reference current	In = 5A or In = 1A	Burden (IEC 62053-61 multi-function meter requirements)	3W and <15VA per phase
Continuous overload (Imax)	2 × In	BATTERY BACKUP POWER SUPPLY (BPS): OPTIONAL	
Maximum measurable short circuit current	10 × In	Built-in rechargeable Li-ion battery, redundant to MPS	Up to 6 hours backup
Burden per phase	<0.2VA (In = 5A); <0.05VA (In = 1A)	AUXILIARY POWER SUPPLY (APS): OPTIONAL	
Starting current	0.1% In (I1, I2, I3); 0.5% In (I4)	24V DC module, redundant to MPS	24V DC ±15%; 6W maximum
Overcurrent withstand, 1 second non-recurring	50 × In	AC/DC module	88–265V AC 50/60Hz or 90–290V DC
Galvanic isolation rating	4000V RMS	Dielectric insulation withstand	4kV AC for 1 minute
Terminal wire size	2.5 to 6mm ²	Terminal wire size	2 × 4mm ²
REAL-TIME CLOCK		CONSOLE DISPLAY UNIT	
Accuracy	5ppm at 25°C (2.7 minutes per year)	Display	Backlit graphic LCD, multiple screens, 128 × 32 dot resolution
RTC backup data retention	5 years	Viewing area	99.0 × 24.0mm
		Display operating temperature	−20°C to +70°C
		Backlight	Timeout operation
		LEDs	2 (active and reactive energy pulse)
		Buttons	2 sealed buttons (SCROLL and SELECT/ENTER) for monitoring and configuration

Specifications (continued)

DIGITAL INPUTS: BASIC

Inputs	4 dry contact, optically isolated
Wetting	24V DC internal supply (5mA wetting current per contact)
Open / closed contact impedance	>1MΩ / <100Ω
Sampling rate	1ms
Dielectric insulation withstand	4kV AC for 1 minute
Terminal wire size	8 × 2.5mm ²

2DI/2DO MODULE: DIGITAL INPUTS (OPTIONAL)

Inputs	2 dry contact, optically isolated
Wetting	24V DC internal supply (5mA wetting current per contact)
Open / closed contact impedance	>1MΩ / <100Ω
Sampling rate	½ cycle (50/60Hz)
Dielectric insulation withstand	4kV AC for 1 minute
Terminal wire size	4 × 2.5mm ²

2DI/2DO MODULE: SOLID STATE OUTPUTS (OPTIONAL)

Outputs	2 SSR, Form C
Maximum switching voltage	250V AC/DC
Make and carry capacity	0.12A maximum
Maximum operate / release time	1ms / 1ms
Dielectric insulation withstand	4kV AC for 1 minute
Terminal wire size	6 × 2.5mm ²

2DI/2DO MODULE: RELAY OUTPUTS (OPTIONAL)

Outputs	2 electromechanical relays, Form C
Maximum switching voltage	250V AC / 110V DC
Make and carry capacity	10A maximum
Maximum operate / release time	7ms / 5ms
Dielectric insulation withstand	4kV AC for 1 minute
Terminal wire size	6 × 2.5mm ²

LOG MEMORY

Type	Non-volatile, 20 years data retention
Standard / expanded	8MB / 16MB

COMMUNICATION PORTS

COM1: INFRARED (FRONT PANEL)

Port type	Optical communication port, IEC 62056-21
Maximum baud rate	19.2kb/s
Protocols	Modbus RTU/ASCII and DNP3.0

COM3: RS-232/RS-485 (PLUG-IN, ISOLATED)

Port type	Versatile RS-232/RS-485, field installable
Maximum baud rate	115.2kb/s
Protocols	Modbus RTU/ASCII and DNP3.0
Isolation	4kV AC for 1 minute
Terminal wire size	5 × 2.5mm ²

IRIG-B MODULE

Isolation	4kV AC for 1 minute
Time code signal	Unmodulated (pulse-width coded), unbalanced 5V
Connector	BNC

Recommended cable	51Ω low loss RG58A/U (Belden 8219 or equivalent)
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Recommended GPS time code generator	Masterclock GPS-200A
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ETHERNET 10/100BASE-T (OPTIONAL PLUG-IN MODULE)

Port type	Wired LAN, IEEE 802.3, field installable
Baud rate	10/100Mb/s, auto-negotiation
Protocols	Modbus/TCP or DNP3.0/TCP, up to 5 non-intrusive simultaneous connections; Telnet service port
Isolation	3kV AC for 1 minute
Connector	Standard RJ-45

USB (OPTIONAL PLUG-IN MODULE)

Port type	Full speed device, field installable
Baud rate	12Mb/s
Protocols	Modbus RTU/ASCII and DNP3.0
Isolation	1.5kV AC for 1 minute
Connector	Mini-USB type B

REAL-TIME CLOCK BATTERY BACKUP

Standard	According to IEC 61038
Field replaceable lithium battery	More than 3 consecutive years backup; more than 10 years service life

Standards Compliance

EMC

- IEC 61000-2

Immunity

- ESD: IEC 61000-4-2 / AS/IEC 62052-11, 15kV air/contact
- Electromagnetic RF fields: IEC 61000-4-3 / AS/IEC 62052-11, 30V/m at 80MHz to 1000MHz
- Fast transient burst: IEC 61000-4-4 / AS/IEC 62052-11, 4kV on current and voltage circuits and 2kV on auxiliary circuits
- Surge: IEC 61000-4-5 / AS/IEC 62052-11, 4kV on current and voltage circuits and 1kV on auxiliary circuits
- Conducted radio frequency: IEC 61000-4-6 / AS/IEC 62052-11, 10V at 0.15MHz to 80MHz
- Power frequency magnetic fields: IEC 61000-4-8
- Damped oscillatory waves: IEC 61000-4-12 / AS/IEC 62052-11, common mode 2.5kV and differential mode 1kV at 100kHz and 1MHz

Emission

- Radiated and conducted: CISPR 22 Class A

Safety

- IEC 61010

Insulation

- Impulse, protective class II: AS/IEC 62052-11, 6kV/500Ω at 1.2/50μs
- Dielectric withstand, protective class II: AS/IEC 62053-22, 4kV RMS for 1 minute

Measurement and Accuracy

- AS/IEC 62052-11
- AS/IEC 62053-22: active energy measurement, Class 0.2S
- IEC 62053-23: reactive energy measurement, Class 0.5S

Power Quality

- PQ measurement methods: IEC 61000-4-30 Class A
- Harmonics and interharmonics: IEC 61000-4-7 Class I
- Flicker: IEC 61000-4-15 Class I
- Reporting: EN 50160

Ordering Information

MODEL

- VOLTAGE

- FREQ.

- CURRENT

- BATTERY

- MEMORY

- MODULES

MODEL

Basic model	EM720
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Transient Power Master	EM720T
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VOLTAGE INPUTS

480V AC (L-L)	480V
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120V AC (L-L)	120V
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CALIBRATION AT FREQUENCY

50Hz	50HZ
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60Hz	60HZ
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CURRENT INPUTS

5 Ampere	5
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1 Ampere	1
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RECHARGEABLE BATTERY

Without battery	-
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With battery	B
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MEMORY

Standard memory: 8MB	-
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Expanded memory: 16MB	XM
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OPTIONAL MODULES (SEE NOTES)

[1] Ethernet, USB and 2nd RS-232/485	COM-ETH
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[1] Ethernet with IEC 61850 support, USB and 2nd RS-232/485	COM-IEC
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[1] Exchanging the IRIG-B with Ethernet and USB	COM-UPG
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[2] 2DI/2 relay outputs (Form C) 250V AC/5A	DIO-R
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[2] 2DI/2 solid state relay outputs (Form A) 250V AC/0.1A	DIO-S
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[3] Auxiliary PS: 88–265V AC and 90–290V DC	AUX-ACDC
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[3] Auxiliary PS: 24V DC	AUX-24
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Notes

- Maximum 2 modules per device, with the following limitations:
- [1] Maximum 1 module with Ethernet per device
- [2] Maximum 2 I/O modules per device
- [3] Maximum 1 auxiliary power supply module per device



PLACE AN ORDER

To place an order or request a quotation for the EM720, contact the SATEC Australia sales team or scan the QR code.

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Document Revision History

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