BFM-II

BRANCH FEEDER MONITOR

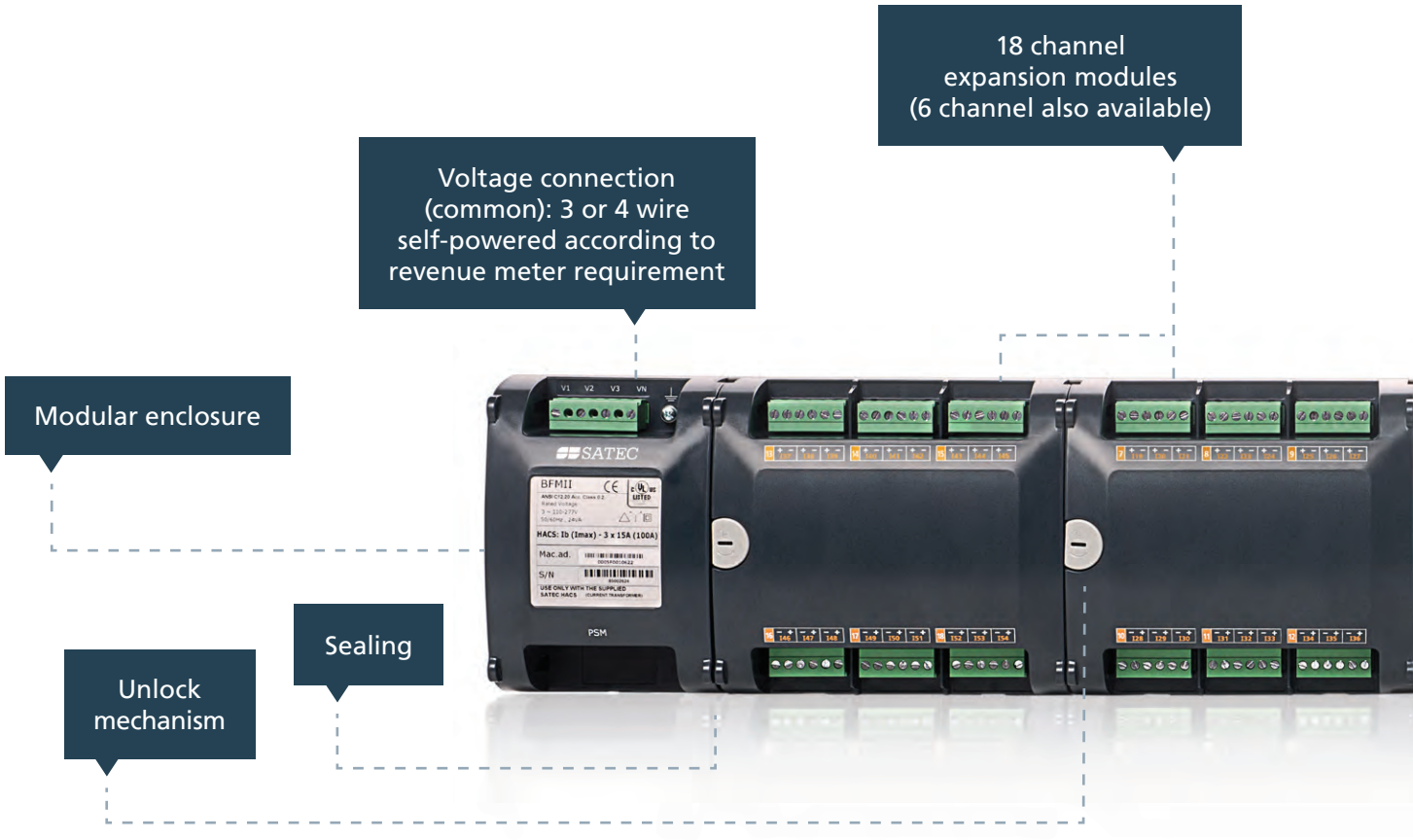
THE PERFECT SOLUTION FOR MULTI-CIRCUIT METERING

- ☑ MODULAR DESIGN
  CUSTOMIZED FOR ANY NEED
- ☑ TENANT BILLING & MONITORING
- ☑ MULTI-CIRCUIT ENERGY READING
- ☑ BUILT-IN COMMUNICATION PLATFORMS
- ☑ TIME-OF USE (TOU) METERING
- ☑ DATA LOGGING

SATEC

BFM-II

Branch Feeder Monitor



SATEC's BFM-II is the second generation of the Branch Feeder Monitor™, providing energy management for multi-point power solutions. Ideal for both new and retrofit projects, the BFM-II automatically provides metering, demand and energy readings, logging and multi-tariff (TOU) data.

The BFM-II monitors up to 18 three-phase circuits, 54 single-phase circuits, or any combination of single or three-phase circuits. This flexibility makes the BFM-II perfect for multi-tenant facilities such as residential projects, office buildings and shopping malls. Its modular design offers a selection of 18, 24, 30, 36, 42 or 54 channels to fit any requirement and to fit easily into existing panel boards or be flush mounted nearby, thus eliminating the need for expensive retrofit projects or for allocating extra space for the device.

The BFM-II supports power quality monitoring to identify existing and potential operational problems, such as overloading or malfunctioning due to voltage or current harmonics, or voltage sags and swell (contact SATEC for availability).

The BFM-II utilizes High Accuracy Current Sensors (HACS), which measure and report the current consumed by each of the branch circuits at the panel board. For billing purposes, single or multiple circuits can be defined for each customer. This flexibility allows for a simple reassignment of circuit groups without wiring changes, and enables easy changes when tenants move in and out. Main panel board or load center installation makes for a valuable saving of both time and money.

The BFM's user-defined and easily configured alarm system enables users to take predictive maintenance action in order to avoid unnecessary outages.

18 channels module configurable as 18 single-phase or 6 three-phase

Standard Ethernet port

Optional cellular modem & 2nd COM port

Redundant aux. power supply (option)

18 digital inputs (option)

4 analog inputs (option)

Wall or DIN rail mounting

9 relay outputs (option)

Built-in RS-485 and USB ports

Optional graphic color touch screen

Built-in TOU

256MB data logging

Higlights & Features

- Multi-channel submetering – up to 54 single-phase, 27 two-phase or 18 three-phase meters in a single device. Any combination of single-, two-, and three-phase consumers can be chosen up to a total of 54 current inputs.
- Automatic totalization of energy consumption of selected consumers
- Modular design allows the selection of 18, 24, 30, 36, 42 or 54 submeters
- Compatible with high accuracy, Class 0.5S rated, current transformers
- 3-phase/2-phase/single-phase meters (true RMS, volts, amps, power, power factor, neutral current)
- Ampere/Volt demand meter
- Time-of-Use, 8 energy/demand registers x 8 tariffs, 4 seasons x 4 types of days, 8 tariff changes per day, easy programmable tariff schedule
- Automatic 120-day daily profile for energy and maximum demand readings (total and tariff registers) for each submeter
- Power quality monitoring including voltage and current harmonics (up to the 25th), voltage sags, voltage swells and interruptions (contact SATEC for availability)
- Event recorder for logging internal diagnostic events and setpoint operations
- Data recorders: programmable periodic data logs for each submeter
- Embedded programmable controller (4 control setpoints, programmable thresholds and delays) for each submeter
- Optional 3.5" 320×240 pixel touch screen display with backlight
- Internal clock, keeping the clock running for years, independent of an external power supply
- Standard RS-485, Ethernet and USB ports
- Optional cellular communication port plug-in module
- Optional 9/18 digital inputs or 4 analog inputs module
- Modbus RTU, Modbus TCP, DNP3.0 and DNP/TCP communication protocols
- Easy field upgrading device firmware

HACS

High Accuracy Current Sensors

The BFM-II should be ordered with dedicated High Accuracy Current Sensors (HACS).

All HACS have a built-in automatic protection circuit for maximum safety, eliminating the need to use shorting bars.

*** Note**: CS05S is compatible with the RS5 version only. All other HACS are compatible with the non-RS5 version.

Accuracy:
Solid Core: 0.1% / Split Core: 0.5%

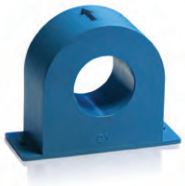
All HACS are supplied with 8ft / 2.5m cable.
Maximum cable length: 650ft / 200m.

P/N	RATING	CORE	OPENING	
			INCH	MM
CS05S*	10A	Split	Ø 0.62	Ø 16
CS1	100A	Solid	Ø 0.47	Ø 12
CS1L	100A	Solid	Ø 0.9	Ø 23
CS1S	100A	Split	Ø 0.63	Ø 16
CS1H	100A	Split	Ø 0.5	Ø 13
CS2	200A	Solid	Ø 0.9	Ø 23
CS2S	200A	Split	0.96x0.9	24.5x23.1
CS2SL	200A	Split	1.69x1.3	43x33

P/N	RATING	CORE	OPENING	
			INCH	MM
CS4	400A	Solid	Ø 1.02	Ø 26
CS4S	400A	Split	1.69x1.3	43x33
CS4L	400A	Solid	Ø 1.77	Ø 45
CS8	800A	Solid	4x1.28	100x32
CS8S	800A	Split	1.9x3.1	50x80
CS12S	1200A	Split	3.1x4.7	80x120
CS20S	2000A	Split	3.15x6.3	80x160
CS30S	3000A	Split	3.15x6.3	80x160


CS05S


CS1


CS1L

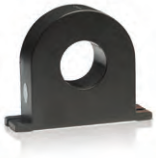

CS1S


CS1H

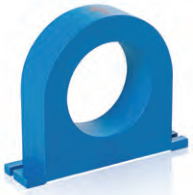

CS2


CS2S


CS2SL


CS4


CS4S


CS4L


CS8


CS8S


CS12S


CS20S


CS30S

Tenant Billing & Monitoring

Large and medium facilities, such as commercial buildings, residential complexes, shopping centers, malls, data centers and universities are facing an increasingly competitive environment in which tenants expect to receive better service for less cost. Tenant billing and monitoring is an ideal solution for guaranteeing, and increasing, a permanent revenue stream for facility owners, while providing improved service for tenants.

VALUE PROPOSITION

Tenant billing by the facility manager is an ideal solution, as it provides a win-win result for tenants and facility owner (or energy retailer). In other words, instead of being billed for electricity directly by the utility, energy is retailed to tenants by the facility owner, who in turn, purchases the electricity directly from the utility.

ADVANTAGES FOR OWNERS

Tariff differences. Large scale consumers have access to better prices, more tariff schemes as well as the option for a markup for the supply of low voltage electricity, converted from medium voltage. The resulting revenue from this makup can reach 40%. A "what-if function" allows selecting the best tariff schemes to maximize revenues.

Quantity & proportional fee. When electricity is subject to additional, progressive charges, such as transmission fee, service fee or taxes, the owner profits from the economy of scales.

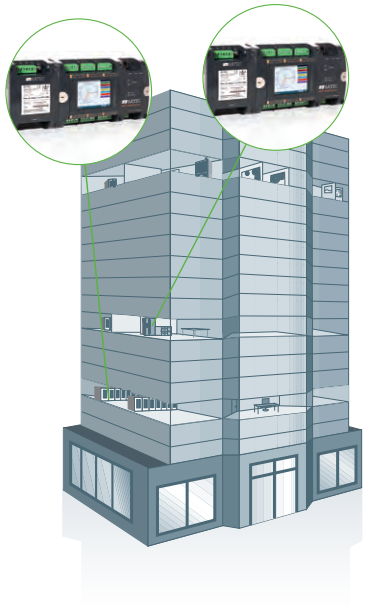
Penalties and demand. When bills include surcharges such as low power factor (PF) or peak demand charges, charging collectively may reduce the total amount (e.g., one tenant has peak demands in the morning and the other in the afternoon).

Fixed charges per tenant. Electric bills contain a fixed amount that covers the cost of the meter, cost of reading etc. Since monitoring with the BFM-II is centralized, the per tenant cost is significantly lower, allowing extra budget for technology (meters, communication), management (issuing bills, maintenance) as well as extra revenue in the property owner's account.

Time Of Use (TOU). SATEC billing system allows charging tenants by TOU, avoiding the risk of subsidizing tenants (in cases where the facility itself is charged according to a TOU scheme and charges in turn a flat rate).

Additional services. Tenant billing is regarded as added value by the tenant, increasing customer satisfaction.

Energy savings. Efficient energy management provides a typical 12% saving on the electric energy consumption, by saving on energy consumption in common/public spaces as well as in the offices of facility management.



Preventing utility errors. Metering electricity independently of the utility, along with generating an energy balance within the site, allows facility managers to easily detect utility errors and prevent overcharges.

Identifying tenant undercharge. An energy balance procedure ensures that no tenant can use electricity without being charged.

Accurate forecasting. Our award winning proprietary consumption forecasting algorithm helps negotiate utilities for better pricing, using short and long term forecasting.

Saving on space and cost. The multi-channel meter occupies up to 75% less space, allowing more area for the main designation of the facility. The additional space required by utility meters is more expensive than utilizing BFM-II.

Full automation. all tasks are performed automatically, from data collection through client billing and exporting the data to existing accounting software.

ADVANTAGES FOR TENANTS

No change in cost. The charges by the facility owner are the same, or lower, than the utilities'. This means tenants can't lose.

Energy bills actually mirror consumption. Compared to facilities that charge based on floor area, monitoring is accurate and reflects precisely the real consumption, doing away with crude estimate-based billing and cross-charges between tenants.

Accuracy. SATEC energy monitors are more accurate than utility meters. The periodic energy balancing ensures correct measurement at all times.

Monitoring of energy expenses. Real time energy monitoring allows energy saving, reducing energy costs and increasing profit.

Improved services. The tenant's energy provider is local, which means any request can be answered by the local team on site, providing better service than the utility, which only has a helpdesk and a characteristically delayed response time.

One Bill. A single bill includes rental and electricity, as well as the possibility to add other energies (e.g., water, air conditioning and gas), making it easier to monitor expenses.

BFM-II VS. 3-PHASE METERS

In comparison with 3-phase meters, the BFM-II offers a great saving of cost, time and space, compared with typical installation:

- A single BFM-II device replaces up to 18 three-phase meters
- Saves 60% on hardware cost
- Saves 75% on installation cost
- Saves 75% on installation time, including wiring
- Saves 75% on panel space for 3-phase or 90% for single-phase
- The BFM-II uses only 1 TCP/IP address for all submeters, compared with up to 54 addresses when using separate meters, thus making better use of IP Addresses.

Substation Enhancement

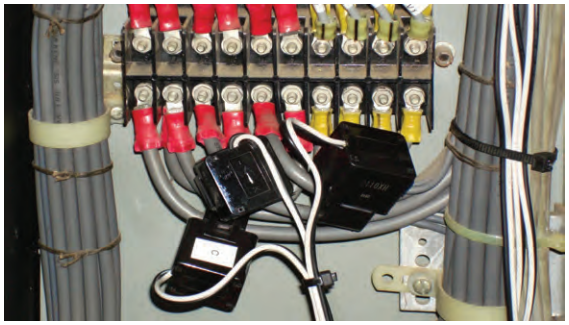
The BFM-II is ideally designed to upgrade existing substations with electro-mechanical relays and to provide real-time information and control over these highly reliable, yet limited, devices.

Many distribution substations include conventional electro-mechanical protection relays with limited or no remote communication access. Until recently, upgrading such substations was too costly and time consuming, preventing investment in such upgrades. The introduction of the revolutionary BFM-II makes it simple and low-cost to upgrade, providing very quick Return On Investment (ROI). Installation of the BFM-II allows, without power down, to upgrade the entire substation to fully monitor every load, as well as remote control using the optional digital and analog I/Os (Breaker Status): one BFM-II can monitor up to 18 three-phase circuits that are located up to 200m/650ft away from the meter base. The installation is performed using unique split core High Accuracy Current Sensors (HACS) that simply clamp around the secondary wiring of the existing 5 Amp CTs. This eliminates the need of interfering with your protection circuit. The installation no longer requires a "Trip Test" saving the time and equipment needed for testing. By utilizing our Clip-On technology the time needed for installation is reduced by more than half the time needed to install a traditional meter, thereby eliminating the need for a full shutdown or interruption of the substation. The SATEC BFM-II allows upgrading legacy substation to modern digital substation in just a few hours. The BFM-II can be powered from either AC or DC and its local high resolution display allows both programming and monitoring of each circuit.

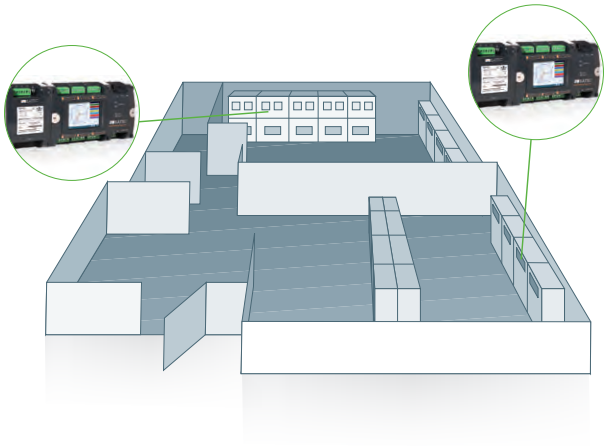
The information monitored by the BFM-II is communicated to the substation SCADA using DNP 3.0 or Modbus protocols (via RS-485 or Ethernet) and/or to SATEC ExpertPower Energy Management System (EMS). A local USB communication port allows easy configuration and monitoring using SATEC's PAS software (supplied with any SATEC device purchased), installed on any portable computer. The information is also sent to a central monitoring site, allowing remote control/automation, reducing requirements for on-premise presence. By easily collecting the data, otherwise not automatically provided by the electro-mechanical relays themselves, network reliability is increased, as well as the standard of power quality and customer satisfaction. You maximize the value of these highly reliable devices by integrating them into your communication network enabling you to monitor their status via communication.

ADVANTAGES

- Ultra-rapid cost-effective substation upgrading without interruption of service
- Local and remote monitoring of relay & breaker operation
- Local and remote supervision using digital and analog inputs as Breaker Status indication
- Advance alerting of possible trips increases network reliability
- Applying preventive maintenance strategy, reducing maintenance costs
- Long term memory of trend and load profiles
- Min/Max with time stamp of current demands
- Power Quality information such as Harmonics
- Substation communication protocols IEC 60870-5-101/104 and DNP 3.0



Data Centers

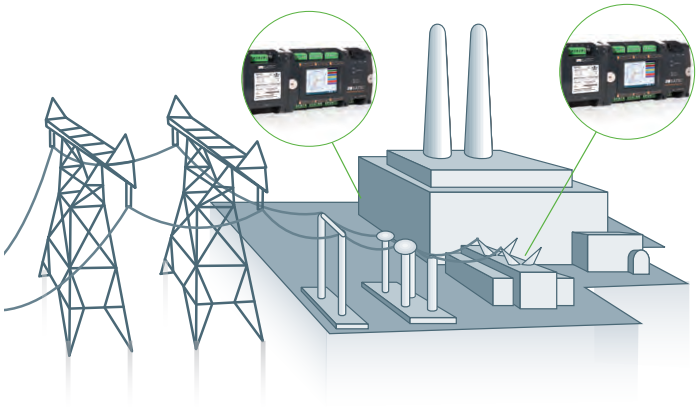


Energy consumption of data centers is constantly rising, following the increase in computing performance. Monitoring the PUE (Power Usage Effectiveness—Total Facility Energy divided by the IT Equipment Energy) is essential. According to the US DoE (Department of Energy), data centers can achieve energy savings of 20-50% by utilizing today's best practices, including "continuously monitor energy" and "monitor energy at all levels."

The practice of monitoring energy is becoming prevalent and modern data centers now include rack level monitoring at the design stage. The BFM-II monitors up to 54 single-phase loads and is ideal for PDU branch circuit monitoring, allowing for energy saving and offering high reliability.

In addition to the above benefits, collocation centers can benefit substantially from tenant billing (see pages 6-7).

Industrial Plants



Typically, industrial plants have many loads that are fed from the same MCC. It has been proven that online monitoring of the consumption down to a single load level results in energy saving of up to 30%. Utilizing the BFM-II is the most compact and efficient method for monitoring several loads located up to 200m from the device, with incomparable accuracy. The use of a single device rather than separate meters makes it easy to install and provides fully integrated communication, channeled through one single port, simplifying maintenance.

Software Integration

ExpertPower™

For automated monitoring, comprehensive billing service, and highly advanced analysis options, SATEC offers ExpertPower™, the web-based energy management system.

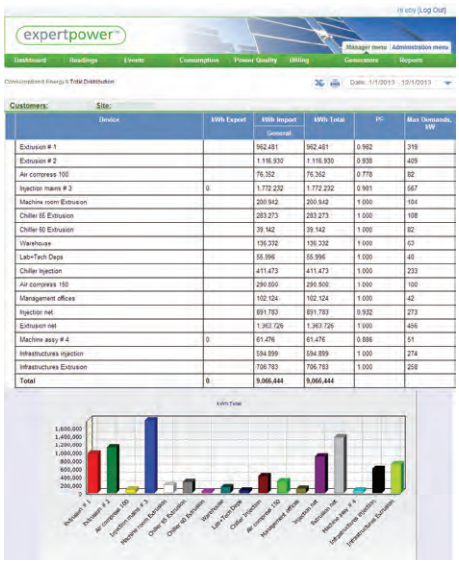
This service provides automatic monitoring, billing and analysis for electric power systems.

ExpertPower™ delivers total visibility for entire power systems over the internet, providing alarms, power diagrams, power profiles and demands, event logging, history and graphs.

For more information on our service, see SATEC ExpertPower™ brochure.

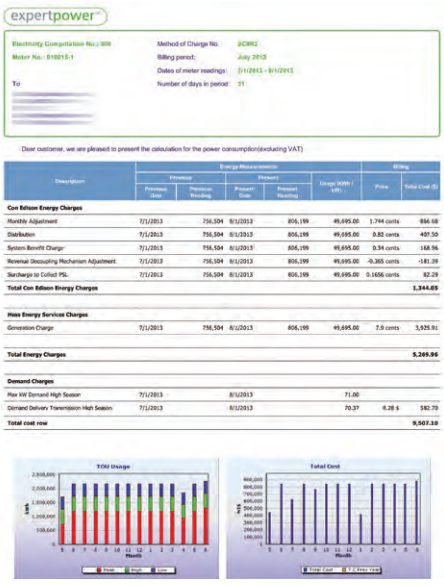
SUMMARY TOU

The summary TOU (Time of Use) page displays energy and cost values for each metered point for a selected site. The pie chart presents a clear view for comparing the profile of each measured point.



ENERGY BILLING

The energy billing page details all the data required to generate a bill for a selected period. The bill is constructed based on tariff definitions. Energy and cost indicator graphs are also available.



ENERGY INTELLIGENCE

SATEC's unique Energy Intelligence (EI) module is the ultimate tool for retrieving insight on energy usage. It performs comparisons between various sites, parameters, periods and, most importantly, parameters from external systems. Using the EI module allows understanding the energy usage, thus enabling its reduction.

Software Integration

PAS

For remote reading and control, the BFM-II is supported by SATEC PAS software, designed for remote setup, data viewing and analysis.

PAS provides real-time access to data, downloading scheduler and automatic export to .mdb files for MS Access, MS Excel and database integration.

The BFM-II operates as up to 54 separate modbus slaves for simple integration.

ENERGY DAILY PROFILE

BFM-II SETUP: CHANNEL ASSIGNMENTS

BFM-II SETUP

BFM-II SETUP: ENERGY—TOU

Third-Party Software Integration

In addition to SATEC software solutions (ExpertPower™ and PAS), the BFM-II is designed to easily integrate with any third-party software. It supports Modbus/RTU, Modbus/TCP, DNP 3.0 and DNP/TCP, which allows easy connection to Building Management Systems (BMS), Supervision, Control and Data Acquisition (SCADA) systems as well as any Energy Management Systems (EMS).

All accumulated data, including the various logs, are available to the user via communication. Unique technologies have been implemented to make it easier for the system integrator. For example, from a communications point of view, each measurement channel is designated as a separate device, which means no special design is required. SATEC proprietary address mapping patent allows access to any set of 120 parameters in a single read cycle, which provides outstandingly fast and reliable communication. The special 16 bit encoding reduces the communication bandwidth by 50% and data compression enables even lower bandwidth usage.

Measurement Parameters*

	Display	Comm.
ENERGY MEASUREMENTS (PER SUBMETER)		
Import/export active energy total	■	■
Import/export reactive energy total	■	■
Apparent energy total	■	■
Active, reactive, apparent energy TOU system (6 tariffs)	■	■
AVERAGE MEASURED VALUES (per feeder)		
Neutral current for 3-phase feeders		■
L-N voltage per phase	■	■
L-L per line	■	■
Current per phase	■	■
Voltage & current angles per phase	■	■
kW per phase		■
kW total per submeter	■	■
kvar per phase		■
kvar total per submeter	■	■
Power factor per phase		■
Power factor total per submeter	■	■
kVA per phase		■
kVA total per submeter	■	■
Frequency	■	■
Neutral current for 3-phase submeter		■

Measurement Parameters*

	Display	Comm.
PRESENT DEMAND		
Volts per phase		■
Amperes per phase		■
Total kW per submeter		■
Total kvar per submeter		■
Total kVA per submeter		■
MAXIMUM DEMAND		
Volts per phase	■	■
Amperes per phase	■	■
Total kW per submeter	■	■
Total kvar per submeter	■	■
Total kVA per submeter	■	■
kW, kvar, kVA per tariff (6 tariffs) per submeter	■	■
SERVICE		
Self-diagnostic test	■	■
Password per meter	■	■
Device serial no.	■	■
Software version	■	■
COM1 & COM2 info	■	■
Current direction	■	

* More measured parameters available.
Contact SATEC Sales for more information

Measurement Specifications

PARAMETER	FULL SCALE@ INPUT RANGE	ACCURACY (1)			RANGE
		% READING	% FS	CONDITIONS	
Voltage	V_L=230V; V_L=120V	0.3	0.05	100 to 300V	0 to Vmax=600 V
Line current	Instrument HACS I_L=100%	0.5	0.05	1 to 100% FS	0 to HACS primary current. Starting current: 0.1% FS
Active power	2 x Vmax x I_L/1000, kW	0.5S/1(2)	0.02	|PF| ≥ 0.5(3)	-120,000 to 120,000 kW
Reactive power	2 x Vmax x I_L/1000, kvar	0.5S/1(2)	0.02	|PF| ≤ 0.9(3)	-120,000 to 120,000 kvar
Apparent power	2 x Vmax x I_L/1000, kVA	0.5S/1(2)	0.02	|PF| ≥ 0.5(3)	0 to 120,000 kVA
Power factor	1.0	-	1.0	|PF| ≥ 0.5, I ≥ 2% FSI	-0.999 to +1.000
Active energy		Class 0.5S under conditions as per IEC 62053-22:2003(2)			0 to 99,999,999.9 kWh
Reactive energy		Class 1 under conditions as per IEC 62053-21:2003, |PF| ≤ 0.9(2)			0 to 99,999,999.9 kvar
Apparent energy		Class 1 under conditions as per IEC 62053-21:2003(2)			0 to 99,999,999.9 kVAh

NOTES

(1) Accuracy is expressed as (percentage of reading + percentage of full scale) ± 1 digit. This does not include inaccuracies introduced by the user's potential and current transformers. Accuracy is calculated at a 1-second average.

- Specifications assume: voltage and current waveforms with THD ≤ 5% for kvar, kVA and PF; reference operating temperature: 20°C-26°C.
- Measurement error is typically less than the maximum error indicated here.

(2) Class 0.5S accuracy (BFM-II), Class 0.5S (HACS), Class 1 (Total)
(3) @ 80% to 115% of voltage FS and 1% to 100% of current FS
FSV—voltage full scale
FSI—current full scale

Technical Specifications

PARAMETER	VALUE
Environmental Conditions	
Operating temp.	-30°C to +70°C (22°F to 158°F)
Storage temperature	-40°C to +85°C (40°F to 185°F)
Humidity	0 to 95% non condensing
Altitude	≤ 2000m
Construction	
OVERALL DIMENSIONS	
Width	278 mm/10.94" (18 channels) 554 mm/21.81" (54 channels)
Height	128 mm/5.04"
Depth	72.5 mm/2.85"
Weight	1.6kg (36 channels)
MATERIALS	
Enclosure & Panels	Polycarbonate
PCB	FR4 (UL94-V0)
Terminals	PBT (UL94-V0)
Plug-in connectors	Polyamide PA6.6 (UL94-V0)
Packaging case	Carton and Stratocell (Polyethylene Foam) Brackets
Labels	Polyester film (UL94-V0)
Power Supply	
Withstanding Insulation: 4kV AC @ 1min	
3-phase power supply (1, 2 or 3-phase operation) 3 X120/208 – 277/480V AC ±20%	
Burden for 277V	< 17 VA
Wire Size	28-12 AWG (0.1-3 mm^2)
Terminal pitch	10 mm, 4 pins + ground stud
Input Ratings	
AC VOLTAGE INPUTS: V1, V2, V3, VN	
Measuring range	3 x 120/208 – 277/480V AC ±20%
Impedance Input	10MΩ

PARAMETER	VALUE
Burden for 277V	≈ 0.08 VA
Burden for 120V	≈ 0.02 VA
Galvanic Isolation, withstanding insulation	4kV AC @ 1min
Connector Type	Removable, 4 terminals
Wire Size	28-12 AWG (0.1-3 mm^2)
Terminal pitch	10 mm
AC CURRENT INPUTS	
Connector Type	Removable, 6 terminals for 3 current inputs
Wire Size	28-12 AWG (0.1-3 mm^2)
Terminal pitch	5 mm
I1 – I54 – HACS Input via SATEC HACS 100A to 3000A	
Operating range	Maximum continuous 120% I max, i.e 120A for HACS 100A
Nominal measured Current	50A RMS (HACS 100A)
Burden	< 0.15 VA
Overload Withstand	100A RMS continuous
I1 – I54 – RS5 Input via SATEC HACS CS05S	
Operating range	Maximum continuous: 10A (primary current)
Nominal measured Current	5A RMS (primary current)
Burden	< 0.15 VA
Overload Withstand	12A RMS continuous
Communication Ports	
COM1 – STANDARD (MCM)	
Serial EIA RS-485 optically isolated port	
Withstanding Insulation	4kV AC @ 1 min
Connector Type	Removable, 3 terminals
Terminal pitch	5 mm
Wire Size	28-16 AWG (0.1-1.5 mm^2)
Baud Rate	up to 115,200 bps
Supported Protocols	MODBUS RTU/ASCII, DNP 3.0

Technical Specifications

PARAMETER	VALUE
Communication Ports — Cont.	
COM3 – STANDARD	
Serial TTL RS-232 non-isolated port for the GDM	
Baud Rate	up to 460,800 bps
Supported Protocols	MODBUS RTU
USB PORT – STANDARD	
Isolated USB 1.1 port	
Withstanding Insulation	4kV AC @ 1 min
Connector Type	A male, standard USB cable, max. length 2 meters
Supported protocols	MODBUS RTU
ETHERNET PORT – STANDARD	
Transformer-isolated	10/100Base-T port
Withstanding Insulation	4kV AC @ 1 min
Connector Type	RJ45 modular

PARAMETER	VALUE
Supported Protocols	MODBUS TCP (Port 502), DNP3/TCP (port 20000), IEC 60870-5-101/104 (port 2404)
Number of simultaneous connections (sockets): 5	
SNTP – time synchronization	

General

REAL-TIME CLOCK	
Accuracy: better than 5 sec/month @ 25°C	
MEMORY LOG	
Standard onboard memory: 256 Mbytes	
GRAPHICAL DISPLAY MODULE – OPTION	
3.5 Inch Touch-Panel LCD graphic TFT display	
Resolution	320 x 240
Operating temperature	-20°C - +70°C
Communication	Serial TTL RS-232 non-isolated port

Add-On Modules

9 OR 18 DIGITAL INPUTS

- Optically isolated input, dry contact sensing (voltage-free)
- Internal power supply 5V DC
- Sensitivity:
  Open @ input resistance >16kOhm,
  Closed @ input resistance <10kOhm
- Scan time: 1cycle.
- Withstanding insulation: 4kV AC@1min
- Wire: 28-16 AWG (0.1-1.5 mm²),
  600V isolation
- Terminal pitch: 3.81mm

RELAY OUTPUTS

- 9 relays - SPST Form A
- Contact rating:
  5A @ 250V AC, 5A @ 30V DC
- Update time: 1 cycle
- Recommended Wire Size:
  18 AWG (1 mm²), 600V isolation
- Terminal pitch: 3.81 mm

4 ANALOG INPUTS

- Ranges (upon order):
  - ±1 mA (100% overload)
  - 0-20 mA
  - 4-20 mA
  - 0-1 mA (100% overload)
- Accuracy: 0.5% FS
- Scan time: 2 cycles
- Withstanding Insulation: 4kV AC@1min
- Wire: 28-16 AWG (0.1-1.5 mm²),
  600V isolation
- Terminal pitch: 3.81mm

CELLULAR COMMUNICATION

- Cellular Modem
- Technologies (upon order):
  - GSM
  - CDMA
- Withstanding Insulation: 4kV AC@1min
- Connector type: SMA
- Supported Protocols:
  MODBUS TCP (Port 502),
  DNP 3.0/TCP (Port 20000)

AUXILIARY POWER SUPPLY

- Withstanding Insulation: 4kV AC@1min
- AC/DC Power Supply: L/+, N/- and GND
- Rated input: 50-290V AC 50/60Hz,
  40-290V DC (between -20°C to 60°C.
  In other temperatures from 90V DC),
  max. 10W
- Wire: 28-16 AWG (0.1-1.5 mm²),
  600V isolation
- Terminal pitch 7.5mm, three pins

Standards Specifications

EMC

- IEC 62052-11, IEC 62053-22, ANSI C12.1 and ANSI C12.20
- 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 6KV 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
- IEC61000-4-12: Damped oscillatory waves, 2.5kV CM and 1kV DM
- ANSI C12.1 – 4.7.3.3.1: 100kHz Ring Wave surge, 6kV @ 0.5kA (per IEEE C62.41.2-2002)
- ANSI C12.1 – 4.7.3.3.2: line surge, 1.2/50µs – 8/20µs, 6kV @ 3kA (per IEEE C62.41.2-2002)
- ANSI C12.1 – 4.7.3.11: SWC 2.5kV (per IEEE 37.90.1)
- CISPR 22 – class B

INSULATION

- IEC 62052-11 (per NMI M6-1): Insulation impulse 12 kV/50Ω @ 1.2/50 µs
- IEC 62053-22: AC voltage tests related to ground, 4 kV AC @ 1mn, for power and signal ports (above 40V), or according to UL 61010-1/916 for basic and/or double insulation and Installation Category III

SAFETY

- UL 916
- NMI M6-1

ACCURACY

- IEC/AS 62053-22, class 0.5S
- ANSI C12.20-2010, Class 100, 400, accuracy 0.5%

ATMOSPHERIC ENVIRONMENT

- Accuracy Operational ambient temperature range: –25°C to +60°C
- Operational ambient temperature range: –40°C to +70°C
- Long-term damp heat withstand according to IEC 68-2-3 <95% (non-condensing), +40°C
- Transport and storage temperature range: –40°C to +85°C
- IEC 62052-11 (ref. 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/s2 (1g), f > 60Hz
- IEC 62052-11(ref. IEC 60068-2-27): Shock
  - Half sine pulse
  - Peak acceleration: 30gn (300 m/s2)
  - Additional Transport vibration and shocks:
    - Longitudinal acceleration: 2.0 g
    - Vertical acceleration: 1.2 g
    - Transversal acceleration: 1.2 g
- IEC 60529: IP50

BFM-II ORDER STRING

BFM-II [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

OPTIONS	
CURRENT (FOR STANDARD 18 CHANNELS)	
100A to 3000A High Accuracy Current Sensors (HACS)[a]	HACS
5A split core Remote High Accuracy Current Sensor (HACS)[b]	RS5
Use of 3VAC current clamps (should be purchased locally)	FLEX
CALIBRATION AT FREQUENCY	
50 Hz	50HZ
60 Hz	60HZ
DISPLAY OPTIONS	
Detachable Graphic Display Module	G
Blank Panel	X
TESTING AND CERTIFICATE	
Full functional test, calibration at various work loads & detailed test report	-
Same as above, plus ISO 17025 and ILAC certified calibration certificate	CC

OPTIONAL MODULES (ORDERED SEPARATELY)	
CURRENT INPUT MODULE (CIM) (UP TO 2 CIM'S PER DEVICE)	
6 current input module (CIM 6) - HACS version*	C6H-BFM II
6 current input module (CIM 6) - RS5 version**	C6R-BFM II
18 current input module (CIM 18) - HACS version*	C18H-BFM II
18 current input module (CIM 18) - RS5 version**	C18R -BFM II
CALIBRATION AT FREQUENCY	
50 Hz	50HZ
60 Hz	60HZ
TESTING AND CERTIFICATE	
Full functional test, calibration at various work loads & detailed test report	-
Same as above, plus ISO 17025 and ILAC certified calibration certificate	CC

EXTENSION	
Set of two modules and a cable to separate between the measurement modules and add-on modules	EXT-BFM II
COMMUNICATIONS OPTIONS	
2G/3G GSM modem+2nd RS-422/485 communication port[c]	T3G-BFM II
I/O OPTIONS	
9 Digital Inputs Module - Dry Contact	DI9-DRC-BFM II
9 Digital Inputs Module - 24VDC	DI9-24V-BFM II
9 Digital Inputs Module - 125VDC	DI9-125V-BFM II
9 Digital Inputs Module - 250VDC	DI9-250V-BFM II
18 Digital Inputs Module - Dry Contact	DI18-DRC-BFM II
18 Digital Inputs Module - 24VDC	DI18-24V-BFM II
18 Digital Inputs Module - 125VDC	DI18-125V-BFM II
18 Digital Inputs Module - 250VDC	DI18-250V-BFM II
9 Form A Relay Outputs Module (max. 2 modules per device)	RLY9-BFM II
4 Analog Inputs Module - ±1mA	AI1-BFM II
4 Analog Inputs Module - 0-20mA	AI2-BFM II
4 Analog Inputs Module - 0-1mA	AI3-BFM II
4 Analog Inputs Module - 4-20mA	AI4-BFM II
AUXILIARY POWER SUPPLY (MAX 1 MODULE PER DEVICE)	
Auxiliary Power Supply AC/DC 50-290V AC / 40*-290V DC * Above 60°C - minimum 90 VDC	AUX-ACDC-BFM II

Notes
- a Requires ordering of up to 18 HACS
- b Requires ordering of up to 18 CS05S
- c Supplied with bendable antenna

www.satec-global.com

HEADQUARTERS

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