EnergíaVerde
RMS
Ahorra y contribuye con tu ambiente ®

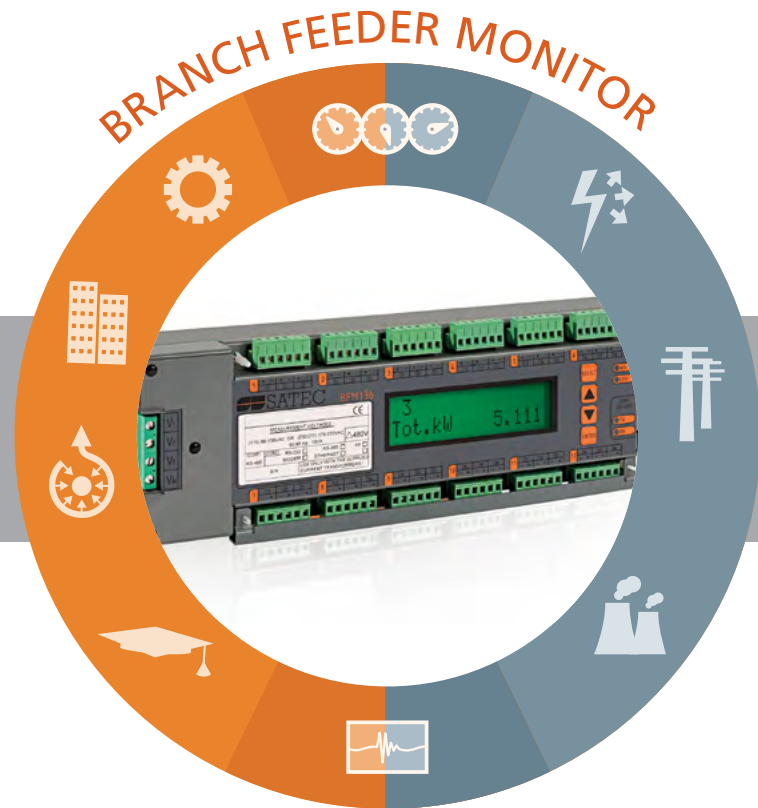# BFM136

BRANCH FEEDER MONITOR

SATEC
Powerful Solutions

THE PERFECT SOLUTION FOR
MULTI-CIRCUIT, MULTI-CLIENT METERING

Multi-client billing

Multi-circuit energy reading

Built-in communication platforms

Time-of-Use (TOU) metering
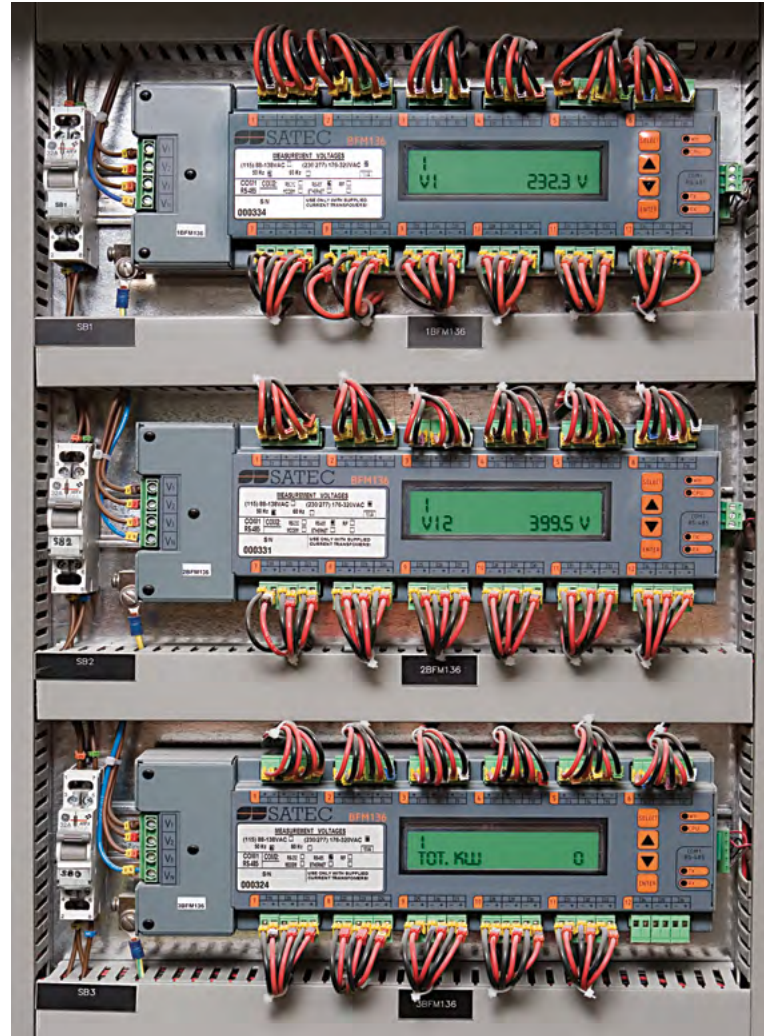
Data Logging

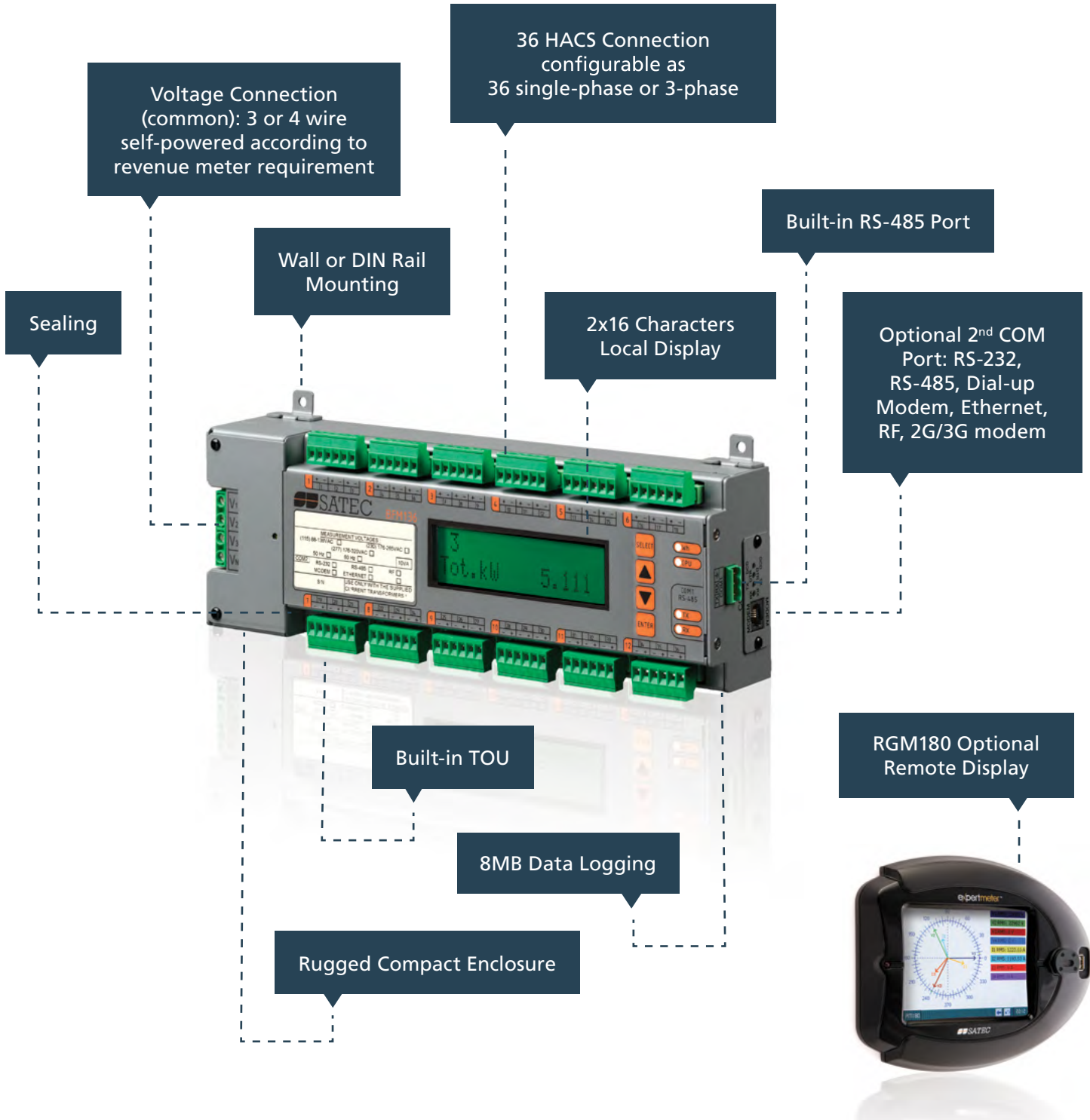# BFM136
Branch Feeder Monitor

SATEC's BFM136 Branch Feeder Monitor™ is the next generation in energy management metering for multi-point power solutions. Ideal for both new and retrofit projects, the BFM136 automatically provides metering, demand and energy readings, logging and multi-tariff (TOU) data.

The BFM136 monitors up to 12 three phase circuits, 18 two phase or 36 single phase circuits, or any combination of single, two or three phase circuits. This flexibility makes the BFM136 perfect for multi-tenant facilities such as residential projects, office buildings, data centers and shopping malls. The compact BFM136 is designed to easily fit 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.
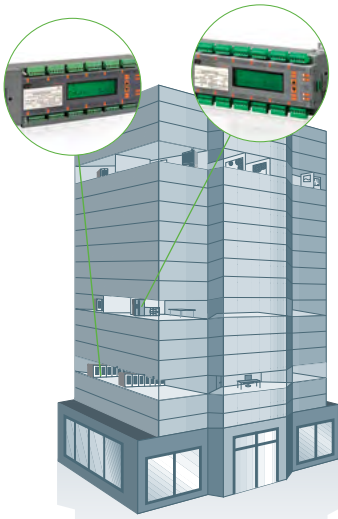
The BFM136 monitors up to 36 currents via High Accuracy Current Sensors (HACS). Each HACS measures and reports the current consumed by each of the branch circuits at the panel board. For billing purposes, single or multiple circuits can be defined for each customer. This flexibility allows a simple reassignment of circuit groups without wiring changes, and allows for 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 BFM136's user-defined and easily configured alarm system enables users to take predictive maintenance action in order to avoid unnecessary outages.

Voltage Connection (common): 3 or 4 wire self-powered according to revenue meter requirement

36 HACS Connection configurable as 36 single-phase or 3-phase

Built-in RS-485 Port

Wall or DIN Rail Mounting

Sealing

2x16 Characters Local Display

Optional 2nd COM Port: RS-232, RS-485, Dial-up Modem, Ethernet, RF, 2G/3G modem

Built-in TOU

RGM180 Optional Remote Display

8MB Data Logging

Rugged Compact Enclosure

Manage Your Energy System

Billing & Time Of Use (TOU)

Tariffs vary according to different criteria, such as the week day, holiday, season or consumer type (private home accounts in multi-tenant buildings, businesses, industry etc.). The BFM136 provides data for TOU billing in compliance with the rates set by the local electricity supplier. Unlike some other meters on the market, the BFM136 stores the TOU information on its non-volatile memory, protecting the data in case of communication loss or power outage.

The system also provides information on peak demands and allows for the assessment of penalty if the power factor falls below the level defined by the local electricity suppliers.

Commercial Buildings

Many commercial buildings have a single electricity connection, while the building owner/manager is responsible for distributing the electricity to the tenants. Since charging the tenants based on floor area is no longer acceptable, an accurate, reliable and flexible system should be applied. The BFM136 is specially designed for such cases, allowing the owner/manager to easily monitor the consumption in a small footprint. Using the BFM136 Adding the ExpertPower™ software will allow issuing invoices to the tenants based on real consumption.

Shopping Centers & Malls

Shopping centers usually have a single electricity connection, while the shopping center owner/manager is responsible for distributing the electricity to the shops. Since charging the shops based on floor area is no longer acceptable, an accurate, reliable and flexible system should be applied. The BFM136 is specially designed for such cases, allowing the owner/manager to easily monitor the consumption in a small footprint. Adding the ExpertPower™ software will allow issuing invoices to the shops based on real consumption. It also allows reducing the public area consumption and detection of unauthorized use of electricity.
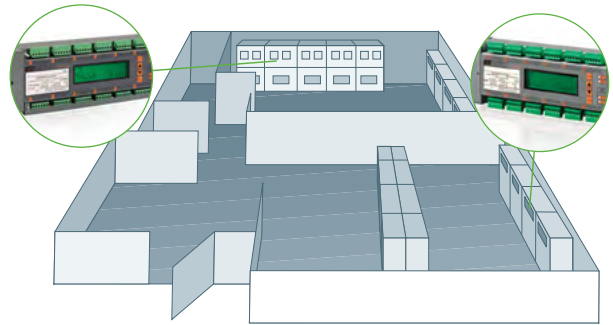

Data Centers

Energy consumption of data centers is constantly rising, following the increase of 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 BFM136 monitors up to 36 single phase loads, which is ideal for this task, allowing for energy saving and offering high reliability.

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%. The BFM136 is the most compact and efficient method to monitor several loads located up to 200m from the device, with uncomparable accuracy. The use of single device rather than separated meters makes it easy to install and maintain as well as single point for communication.
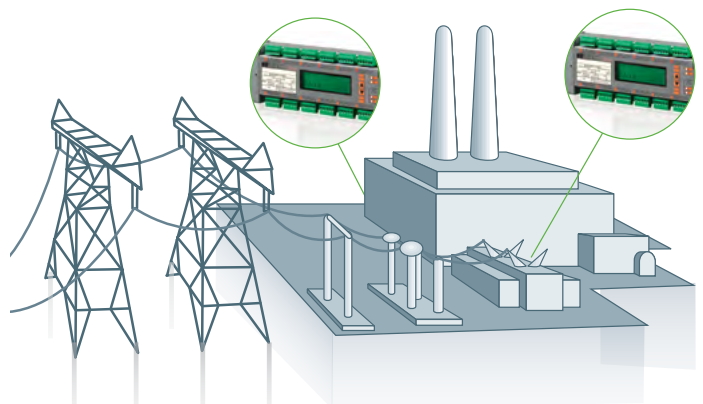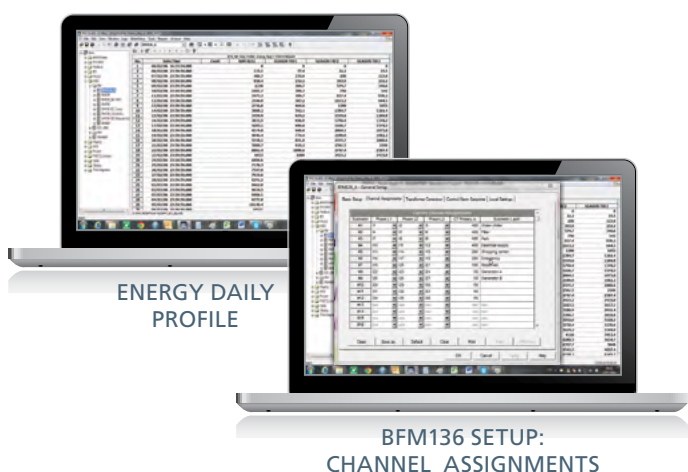
Software Integration

PAS

For remote reading and control, the BFM136 is supported by SATEC PAS software, designed for remote setup and 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 BFM136 operates as up to 36 separated modbus slaves for simple integration.

Building Management Systems

With the open Modbus protocol, the BFM136 can interface any system, such as Building Management, HMI and more.

ENERGY DAILY
PROFILE

BFM136 SETUP:
CHANNEL ASSIGNMENTS

BFM136 SETUP

BFM136 SETUP:
ENERGY—TOU

expertpower™

For automated monitoring, complete billing service, and more 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, events logging, history and graphs.

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

ENERGY BILL

WAVEFORMS

ENERGY MANAGEMENT
DASHBOARD

DASHBOARD

BFM136 vs 3-Phase Meters

Before...   **...and After**

In comparison with three-phase meters, the BFM136 offers a great saving of cost, time and space:

- A single BFM136 instrument replaces 12 3-phase meters
- Saves 60% of the hardware cost (typ.)
- Saves 75% installation cost (typ.)
- Saves 75% of installation time (typ.), including wiring

- Saves 75% of panel space for three-phase or 90% for single phase (typ.)
- While 3-phase meters use one TCP/IP address per 80 channels, the BFM136 uses only 1 TCP/IP address per 240 channels, thus saving up to ⅔ of the communication infrastructure

HACS
High Accuracy Current Sensors

The BFM136 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 INCH	OPENING MM	P/N	RATING		CORE INCH	OPENING MM
CS05S*	10A	Split	Ø 0.62	Ø 16	CS4S	400A	Split	1.69x1.3	43x33
CS1	100A	Solid	Ø 0.47	Ø 12	CS8	800A	Solid	4x1.28	100x32
CS1L	100A	Solid	Ø 0.9	Ø 23	CS8S	800A	Split	1.9x3.1	50x80
CS1S	100A	Split	Ø 0.63	Ø 16	CS12S	1200A	Split	3.1x4.7	80x120
CS2S	200A	Split	0.96x0.9	24.5x23.1	CS20S	2000A	Split	3.15x6.3	80x160
CS2SL	200A	Split	1.69x1.3	43x33	CS30S	3000A	Split	3.15x6.3	80x160
CS4	400A	Solid	Ø 1.02	Ø 26					
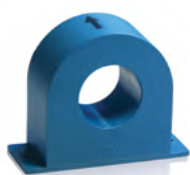
CS05S   CS1   CS1L   CS1S   CS2S   CS2SL   CS4

CS4S   CS8   CS8S   CS12S   CS20S   CS30S

Features & Benefits

- Multi-point power, energy and demand data logging
- **Data storage**
  - Real Time Clock (RTC) and Flash memory for data and event logger
  - TOU (Time of Use): the TOU function stores energy consumption data according to the programmed time schedule
  - Daily energy tariff profile and maximum demands programmable interval for load profile
- Logging for any type of parameters, for all profiles

- Local LCD display providing up to 36 channels of consumption readings for each tenant
- Cost effective, space-saving compact design for easy installation into existing electric panelboards
- High accuracy 0.5S
- **Standard Communication Platforms**
  - Protocols: Modbus RTU, Modbus TCP/IP, Modbus ASCII
  - Ports
    Standard: RS-485 port
    Optional: Ethernet TCP/IP, dial-up modem, RS-232, additional RS-485/422 port, wireless RF modem, 2G/3G modem

- **Input**
  - Current inputs: 36 per device
  - Measured currents, per phase: with unique High Accuracy Current Sensors (HACS—See pg. 7) rating from 100A to 3000A
  - Voltage measurement range*: 120 (207) to 277 (480)V AC ± 15%
  - Auto rangepower supply: 88-552V AC
- Alarm Configuration: Over/under voltage, over current, over kW, over kVA, over/under frequency
- Three-year warranty

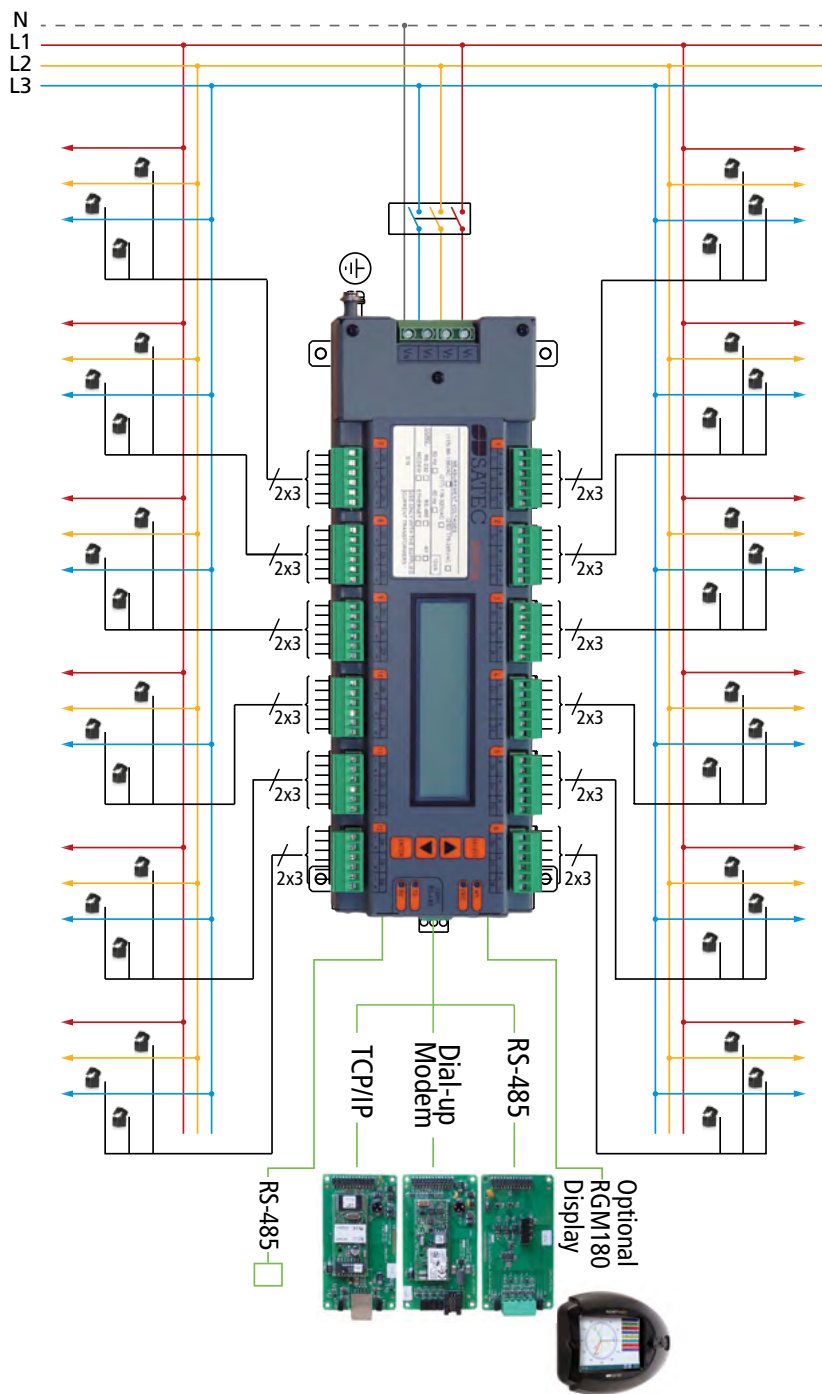***Note**: The accuracy is guaranteed to this voltage range.
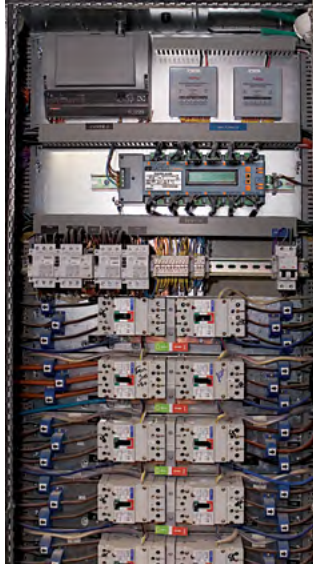
Monitoring & Data Storage

SATEC's Branch Feeder Monitor™ BFM136 collects and stores data, accessible in real-time. The BFM136 stores energy usage data in two formats, fixed-price and Time of Use (TOU). The BFM136 collects a variety of physical data such as kVA, kW, kVAr, current and voltage max demands, as well as energies—kVAh, kWh and kVArh. The BFM136 automatically transfers the information to a remote computer for display and analysis. The data can also be viewed locally on the BFM136's LCD display.
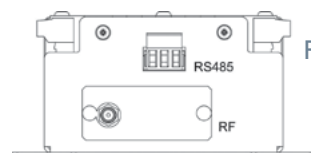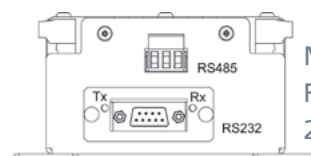
Electric Diagram

N
L1
L2
L3

2x3 (×multiple)

RS-485
TCP/IP
Dial-up Modem
RS-485
Optional RGM180 Display

* Required to be selected at time of ordering

RS485 · RF — RF MODEM

RS485 · Tx · Rx · RS232 — MODEL R2 RS-232 / EXTERNAL 2G/3G MODEM
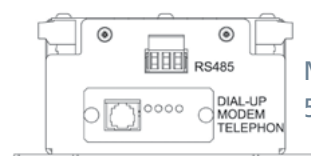
RS485 · DIAL-UP MODEM TELEPHON — MODEL MOD 56K MODEM
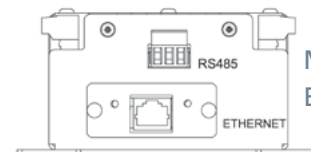
RS485 · ETHERNET — MODEL ETH ETHERNET

RS485 · RS485/422 — MODEL R4 RS-485
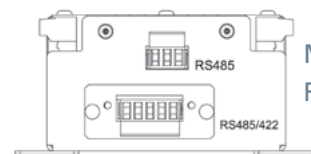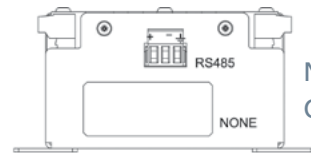
RS485 · NONE — NO COM 2 OPTION

Dimensions
4.2x13x2.3" / 107x331x58mm (HxWxD)

Measurement Parameters*

ENERGY MEASUREMENTS (PER SUBMETER)	Display	Comm.	Alarms
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*

PRESENT DEMAND	Display	Comm.	Alarms
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 & CMO2 ID	■	■	
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	0.3	0.05	184 to 260V	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 calculated at 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 (BFM136), 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

Input Ratings

PARAMETER	VALUE
Nominal frequency	50/60Hz
AC VOLTAGE	4 wires: 3 phases + neutral
Maximum Line to Neutral voltage	320V
Maximum Line to Line voltage	552V
Burden per phase	<1.5W
Isolation	2.5 kV RMS, 60Hz, 1 min Impulse 6kV
PT ratio	1-6500
AC CURRENT	36 current circuits
Nominal current	50% of HACS Rating
Maximum input direct current	100% of HACS Rating
Maximum momentary overcurrent	3000% of HACS Rating
Burden per phase	< 0.1VA
Isolation	2.5 kV RMS, 60Hz, 1 min
Primary current	1-10000A
HARDWARE	
LCD display	2 Rows, 16 digits in each
Push buttons	4
Non-Volatile Memory storage life	20 years
RTC storage upon loss of power	24 Hours minimum, 1 Week typical
Voltage inputs terminal	10 AWG Max.
Weight	1.85 Kg

Environmental Conditions

Operating Temperature	-20°C to 60°C (-4°F to 140°F)
Storage Temperature	-25°C to 80°C (-13°F to 176°F)
Humidity	0 to 95% non-condensing

Standards Specifications

Accuracy

IEC 62052-11: 2003
IEC 62053-22: 2003 Class 0.5S
ANSI C12.20-1998 Class 0.5

EMC (Electromagnetic Compatibility)

EN 61000-3-2: 2000
Limits for harmonic current emissions

EN 61000-3-3: 1995
Limits of voltage changes, voltage fluctuations and flicker

IEC 61000-4-2: 1995 (Electrostatic Discharge)

IEC 61000-4-3: 2002 (Radiated Field)

IEC 61000-4-4: 1995 (Fast Transient)

IEC 61000-4-5: 1995 (Conductive Surge)

IEC 61000-4-6: 1996 (Conductive Disturbance)

IEC 61000-4-11: 1994 (Voltage Dip/ Interruption)

Safety

UL 61010-1-2003

Authorized Labs— Approvals

UL: Listed for the US & Canada
NY State/NY City PSC
MET Labs
CE
ISO
VNIIMS

BFM136 ORDER STRING

BFM136 ☐ ☐ ☐ ☐ ☐

MODEL

BFM136 Branch Feeder Monitor	**BFM136**

OPTIONS

VOLTAGE CONNECTION

Wye Network (UL listed)	**-**
Delta or Wye Network	**N**

CURRENT

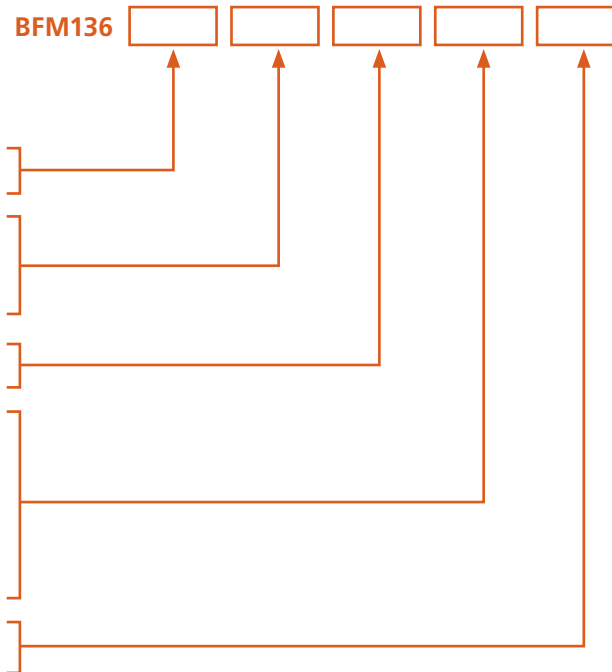|	
100A or higher High Accuracy Current Sensors (HACS). Requires ordering of up to 36 HACS	**-**
5A split core remote high accuracy current sensor (HACS). Requires ordering of up to 36 CS05S	**RS5**

FREQUENCY

50 Hz	**50HZ**
60 Hz	**60HZ**

COM2 SECOND COMMUNICATION PORT

None	**-**
RS-232	**R2**
RS-485	**R4**
Dial up MODEM	**MOD**
Ethernet (TCP/IP)	**ETH**
RF (please contact SATEC for details)	**RF-x-y**
2G GPRS External Module	**GPRS**
2G/3G External Module	**R3G**

SEAL

No Terminal Seal (Standard)	**-**
With Terminal Seal	**S**

EnergíaVerde
RMS ®

Ahorra y contribuye con tu ambiente