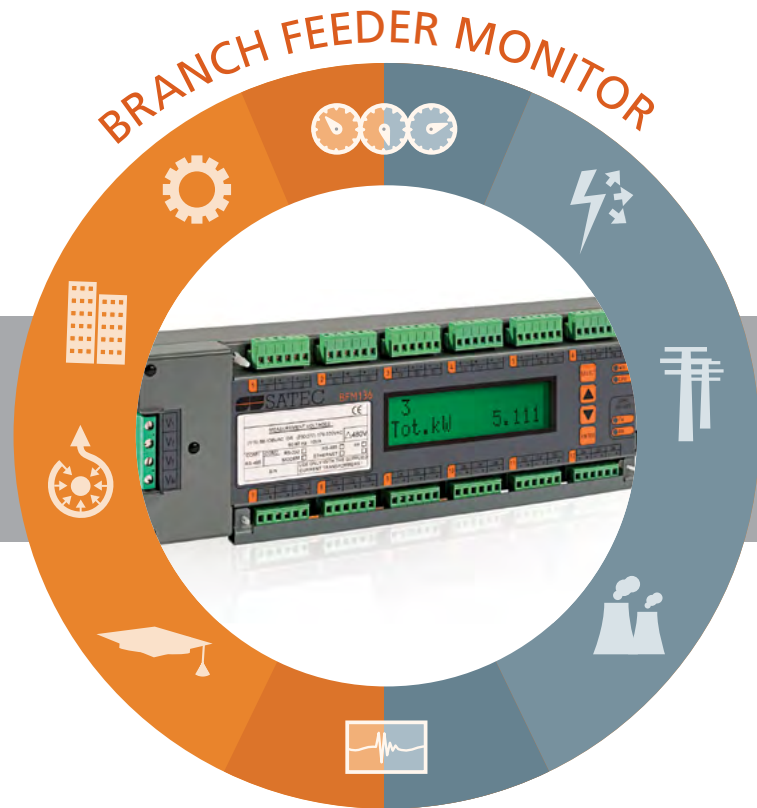


# BFM136

## NMI Approved



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

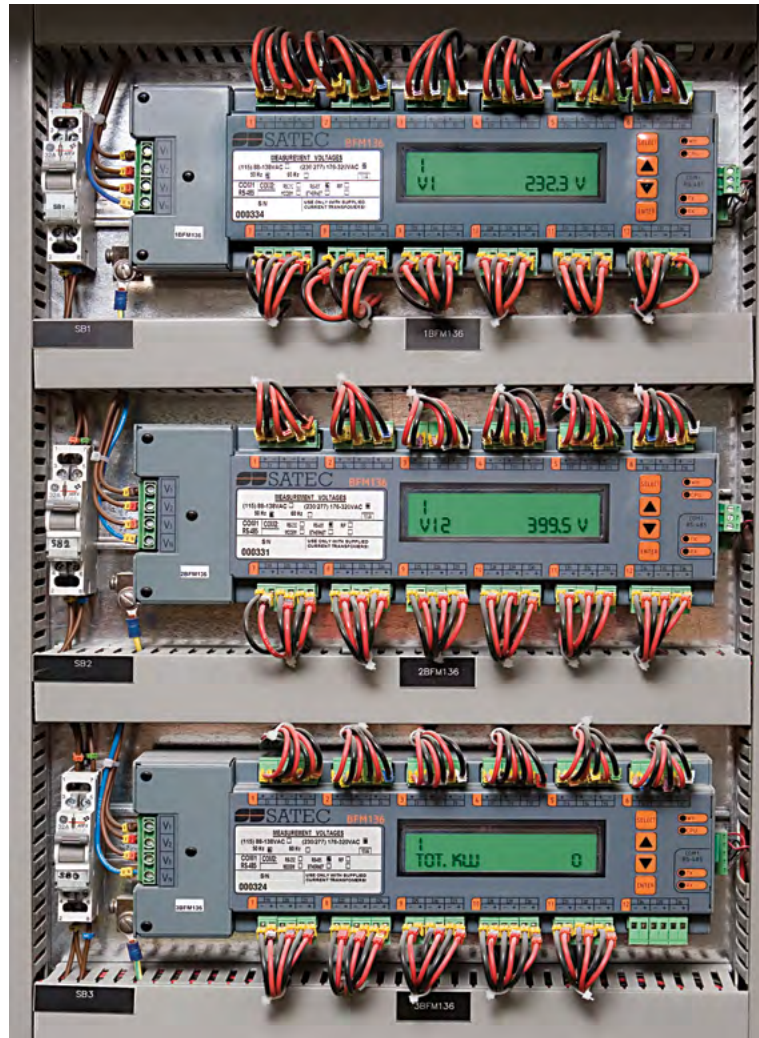
## Branch Feeder Monitor

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.

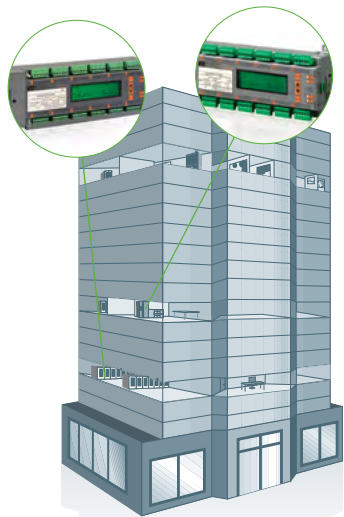
The BFM136's user-defined and easily configured alarm system enables users to take predictive maintenance action in order to avoid unnecessary outages.







# 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.

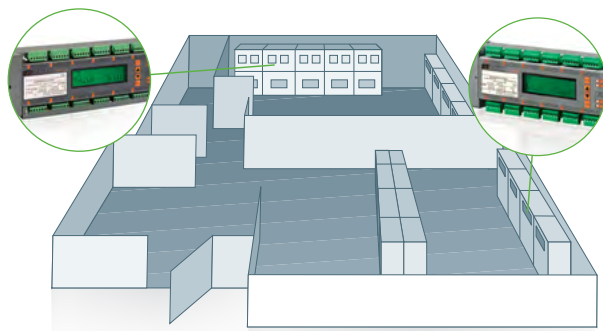
The system also provides information on peak demands and allows for the assessment of penalty if the power factor falls below the level defined by the local electricity suppliers.

## 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.



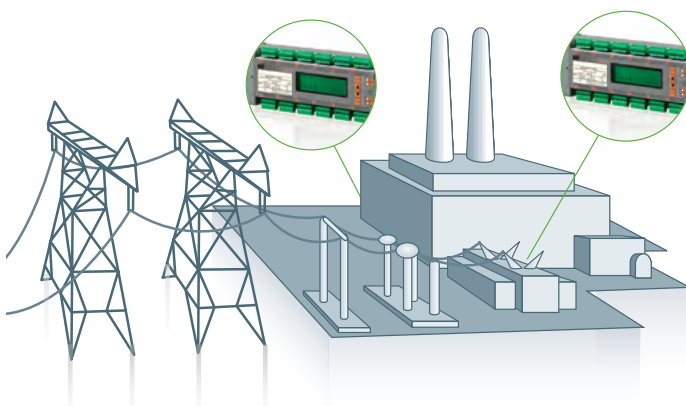
## Data Centers

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.



## 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.



# BFM136 VS. 3-Phase Meters



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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  $\frac{2}{3}$  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.

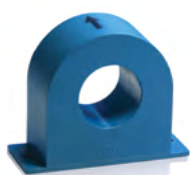
P/N	RATING	CORE	OPENING	P/N	RATING	CORE	OPENING
		INCH	MM			INCH	MM
CS05S*	10A	Split	Ø 0.62	CS4S	400A	Split	1.69x1.3
CS1	100A	Solid	Ø 0.47	CS8	800A	Solid	4x1.28
CS1L	100A	Solid	Ø 0.9	CS8S	800A	Split	1.9x3.1
CS1S	100A	Split	Ø 0.63	CS12S	1200A	Split	3.1x4.7
CS2S	200A	Split	0.96x0.9	CS20S	2000A	Split	3.15x6.3
CS2SL	200A	Split	1.69x1.3	CS30S	3000A	Split	3.15x6.3
CS4	400A	Solid	Ø 1.02				



CS05S



CS1



CS1L



CS1S



CS2S



CS2SL



CS4



CS4S



CS8



CS8S



CS12S



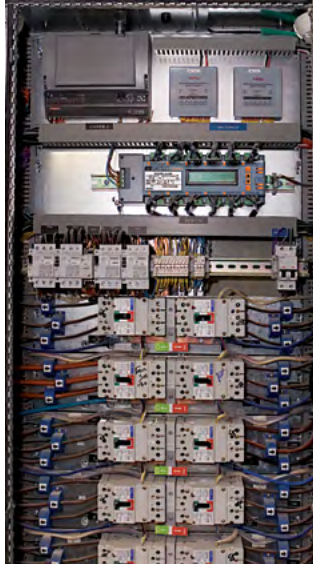
CS20S



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  $\pm 15\%$
    - ▣ Auto range power 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.



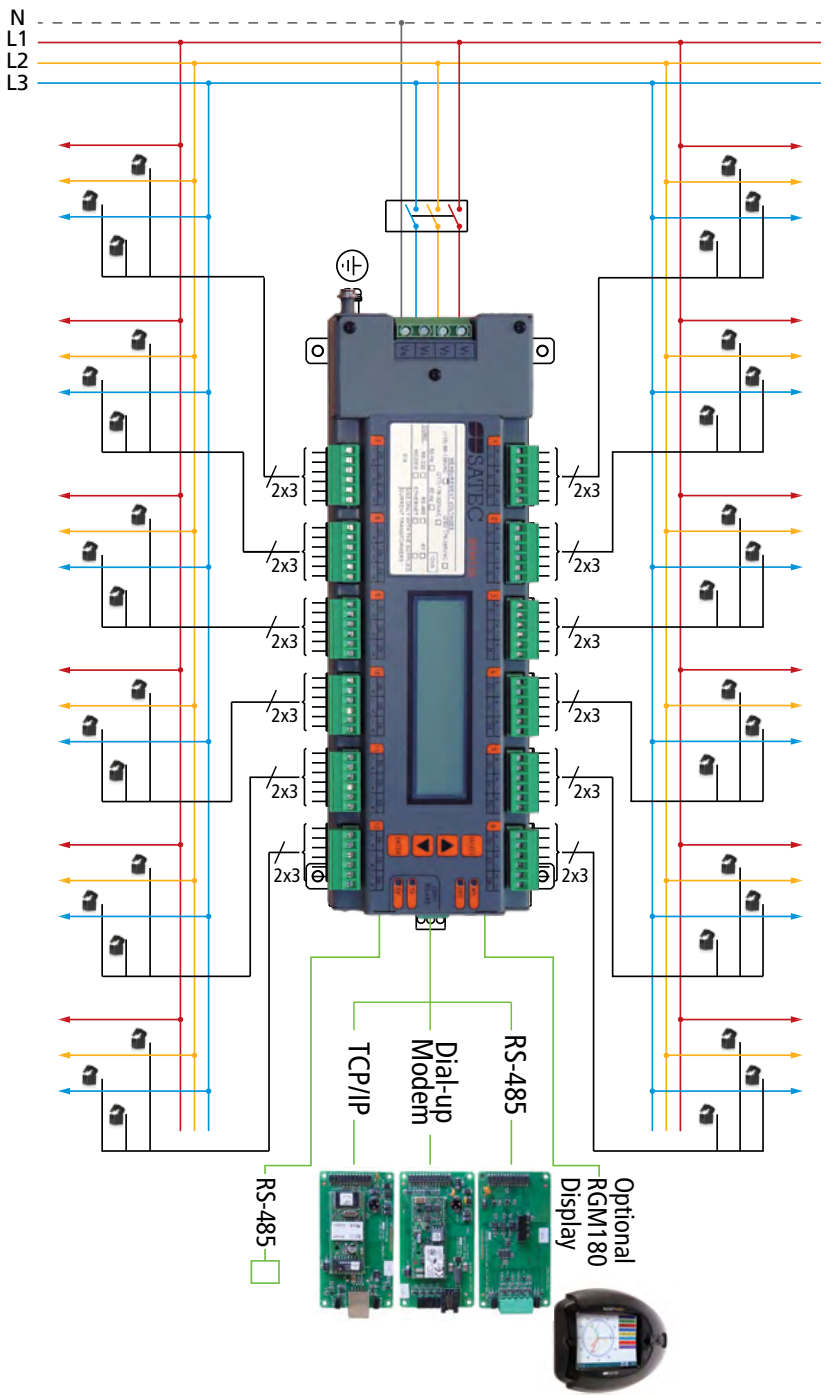
## Monitoring & Data Storage

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.



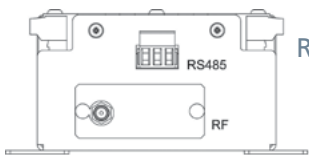


# Electric Diagram

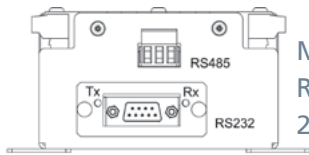


# Optional COM 2 Communication Add-On Port

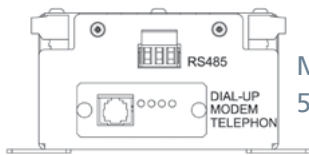
\* Required to be selected at time of ordering



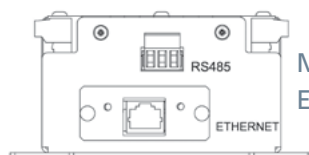
RF MODEM



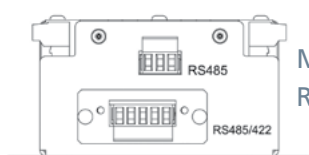
MODEL R2  
RS-232 / EXTERNAL  
2G/3G MODEM



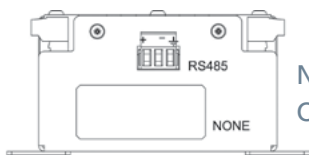
MODEL MOD  
56K MODEM



MODEL ETH  
ETHERNET



MODEL R4  
RS-485



NO COM 2  
OPTION

## Dimensions

4.2x13x2.3" / 107x331x58mm (HxWxD)



## Measurement Parameters\*

Alarms  
Comm.  
Display

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\*

Alarms  
Comm.  
Display

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 & CMO2 ID		■	■	
Current direction		■		

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

## Measurement Specifications

PARAMETER	FULL SCALE@ INPUT RANGE	ACCURACY <sup>(1)</sup>			RANGE
		% READING	% FS	CONDITIONS	
Voltage	$V_L=230V$	0.3	0.05	184 to 260V	0 to $V_{max}=600V$
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	$2 \times V_{max} \times I_L/1000$ , kW	0.5S/1 <sup>(2)</sup>	0.02	$ PF  \geq 0.5^{(3)}$	-120,000 to 120,000 kW
Reactive power	$2 \times V_{max} \times I_L/1000$ , kvar	0.5S/1 <sup>(2)</sup>	0.02	$ PF  \leq 0.9^{(3)}$	-120,000 to 120,000 kVAr
Apparent power	$2 \times V_{max} \times I_L/1000$ , kVA	0.5S/1 <sup>(2)</sup>	0.02	$ PF  \geq 0.5^{(3)}$	0 to 120,000 kVA
Power factor	1.0	-	1.0	$ PF  \geq 0.5$ , $I \geq 2\%$ FSI	-0.999 to +1.000
Active energy		Class 0.5S under conditions as per IEC 62053-22:2003 <sup>(2)</sup>			0 to 99,999,999.9 kWh
Reactive energy		Class 1 under conditions as per IEC 62053-21:2003, $ PF  \leq 0.9^{(2)}$			0 to 99,999,999.9 kvar
Apparent energy		Class 1 under conditions as per IEC 62053-21:2003 <sup>(2)</sup>			0 to 99,999,999.9 kVAh

### NOTES

(1) Accuracy is expressed as (percentage of reading + percentage of full scale)  $\pm 1$  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  $\leq 5\%$  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
<b>AC VOLTAGE</b>	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
<b>AC CURRENT</b>	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
<b>HARDWARE</b>	
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

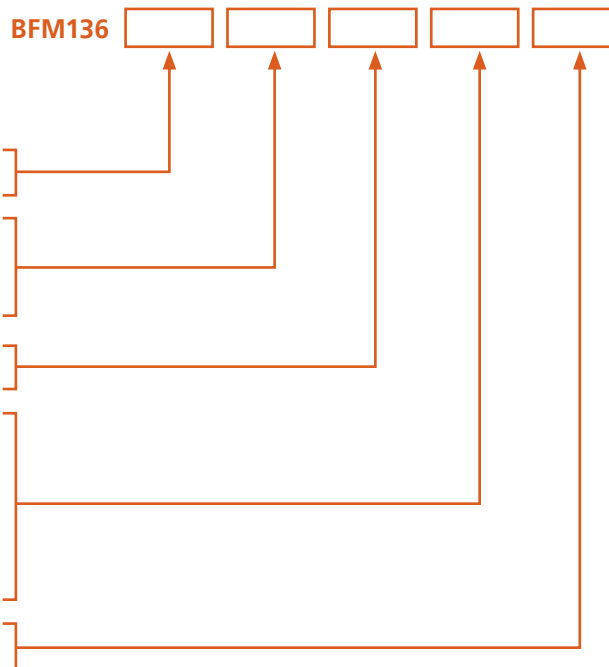
UL 61010-1-2003

## Authorized Labs— Approvals

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



BFM136 ORDER STRING	
<b>MODEL</b>	
BFM136 Branch Feeder Monitor	<b>BFM136</b>
<b>OPTIONS</b>	
<b>VOLTAGE CONNECTION</b>	
Wye Network (UL listed)	-
Delta or Wye Network	<b>N</b>
<b>CURRENT</b>	
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	<b>RS5</b>
<b>FREQUENCY</b>	
50 Hz	<b>50HZ</b>
60 Hz	<b>60HZ</b>
<b>COM2 SECOND COMMUNICATION PORT</b>	
None	-
RS-232	<b>R2</b>
RS-485	<b>R4</b>
Dial up MODEM	<b>MOD</b>
Ethernet (TCP/IP)	<b>ETH</b>
RF (please contact SATEC for details)	<b>RF-x-y</b>
2G GPRS External Module	<b>GPRS</b>
2G/3G External Module	<b>R3G</b>
<b>SEAL</b>	
No Terminal Seal (Standard)	-
With Terminal Seal	<b>S</b>



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