M B Control & Systems Pvt. Ltd.

Innovative Electronics For You

M. B. Control & Systems Pvt. Ltd.
Email : enquiry@mbcontrol.com
url: www.mbcontrol.com

COMPANY DETAILS

Private Limited Company formed in 1983

Headquartered in Kolkata, West Bengal

Marketing and Service Presence in Delhi, Mumbai, Hyderabad, Bhopal, Jaipur, Lucknow, Patiala and Shimla

Dealers / Representatives through out India

ISO 9001:2015 Certified

In-house development for Hardware and Software (Industrial)

PRODUCT & SERVICES PORTFOLIO

Automatic Weather Stations (AWS)

Discharge Monitoring Station

Multi-Function Power Meters and Power Quality Meters

Energy Management System (EMS)

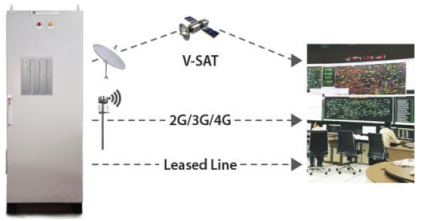
Substation Automation System (SAS)

SCADA Systems

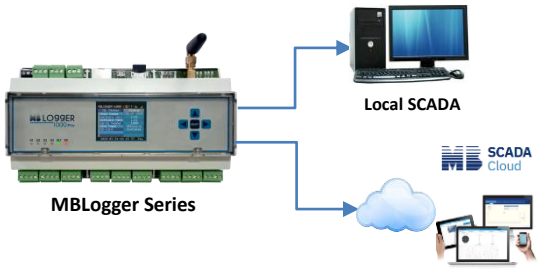
RTU and F-RTU Systems

Telemetry System

To Dispatch Centre in IEC 60870-5-104

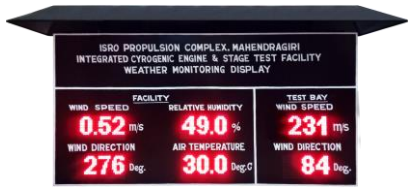


Datalogging System



Exclusive systems for Indian Navy

LED Display System



Innovative Electronics For You

SATEC

Energy and Power Quality Measurement & Management

Manufacturing, Sales & Support

Sales & Support

SATEC
Powerful Solutions

The Full Range of Electricity Management Solutions for Every Application

RS232/422/485, Profibus, TCP/IP, Dialup modem, GSM/CDMA, RF, USB, CanBus

Modbus RTU, ASCII, DNP3.0, Modbus/TCP, DNP3/TCP, Profibus, IEC 61850, IEC 60870, CanOpen

EM132/3 PM130 PLUS PM135 BFM136 BFM-II PM172 PM174/5 EM720 EM920 PM180 ezPAC

SATEC Product line (metering hierarchy)

SATEC Product line

Low cost panel meter	DIN-Rail Billing meter	SCADA Power meter	Advanced 61850 power meter	PQ Analyzer	Multi-feeder meter	Advanced billing meter
SATEC PM120	**SATEC EM133**	**SATEC PM130**	**SATEC PRO**	**SATEC PM180**	**SATEC BFM**	**SATEC EM720/920**
						
Class 0.5S RS-485/ETH No Modules	**Class 0.5S/0.2 RS-485/ETH Modules Harmonics 8 MB Memory DTMU App. IEC60870-5-101/104**	**Class 0.2S RS-485/ETH Add. Modules Harmonics DTMU App. IEC60870-5-101/104**	**Class 0.2S 2 x ETH Add. Modules Waveform IEC61850**	**Class 0.2S Full PQ IEC61000-4-30 Waveform IEC61850 PMU DFR**	**Multy-channel Class 0.5S Waveform IEC60870-5-101/104 DFR**	**Class 0.2S Billing (SE) Full PQ Waveform IEC61850**

The SATEC PM120

SATEC
Powerful Solutions

SATEC signature Load-bar

Class 0.5S

Ease of Use

Communication RS-485/ETH

2 DI/ 1DO

Ultra-Compact Design

Main R&D milestones

- Cost effective
- Accuracy and communication
- Compact design

Tech. Specifications

Precision metering

- Class 0.5S accuracy IEC 62053-22 for active energy
- Industry leading Class 0.5S accuracy for reactive energy (IEC 62053-24)
- Cycle-by-cycle RMS measurements
- Phase / Total Import, Export and Net energy metering

Non-volatile Memory:

- Setup Parameters
- Internal Memory Size: 32kB
- Energy, stored every 15 minutes in case of shut down

Tech. Specifications

Communications, IOs & Key Features

- RS-485, with MODBUS RTU protocol
- Real time clock
- 2DI + 1DO on board
- Up to 25th harmonic measurement
- 64 samples / cycle

PRO Series


SATEC
PRO
VOLTAGE L-N
L1
0.231 kV
L2
0.231 kV
L3
0.214 kV
f
50.685 Hz
PM3350

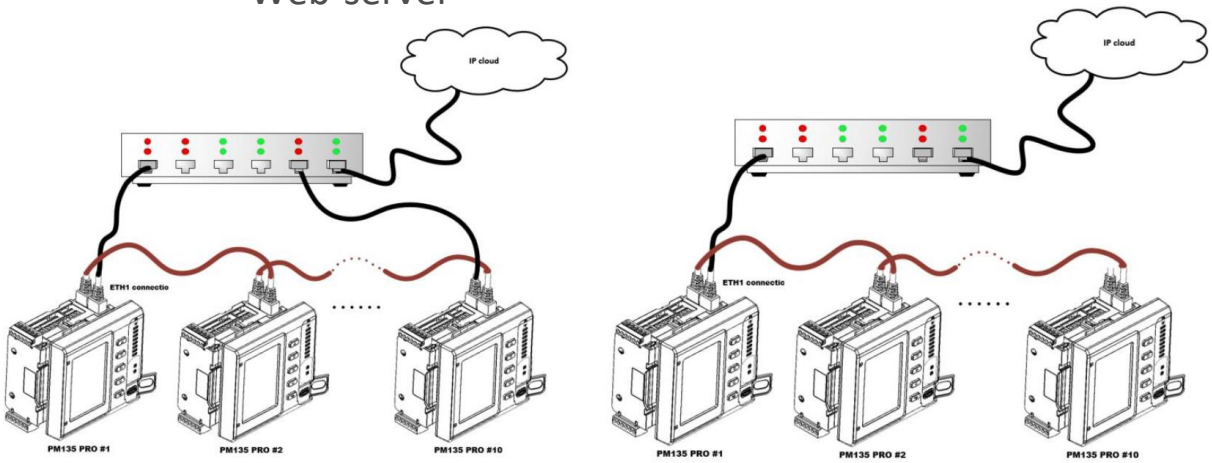

SATEC
PRO
Favorites
Monitor
Power Qual
Logs/Diag
Setup
EM3250

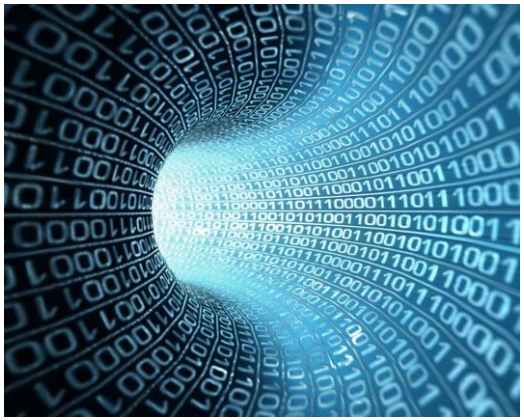
Main R&D milestones

- More functionality and features (IIoT, Communication)
- Modular platform
- User-friendly UI
- Compact design
- New Safety level (CAT IV)

Communication

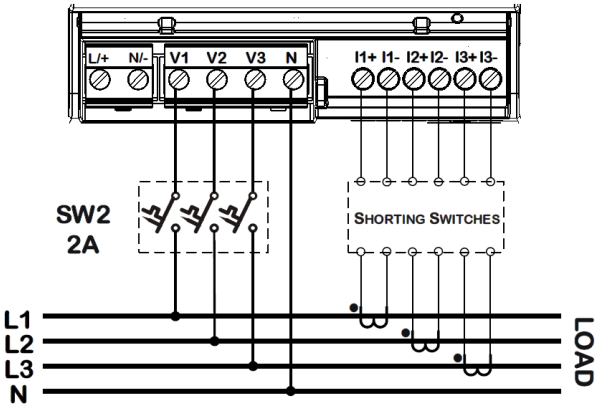
- Ports
  - 2 x ETH, USB, RS-485, Infra-red optical port
  - Additional communication ports: Serial, ETH, 3G/4G Modem, etc.
- Protocols
  - IEC61850 ed.2 (MMS and Goose support) - Cybersecurity
  - 2 independent ETH interfaces, DHCP support, RSTP
  - DLMS/COSEM
  - Modbus RTU/TCP, MODBUS Master
  - DNP3/ DNP3.0/TCP (level 2)
  - IEC60870-5-101/104
  - Web-server

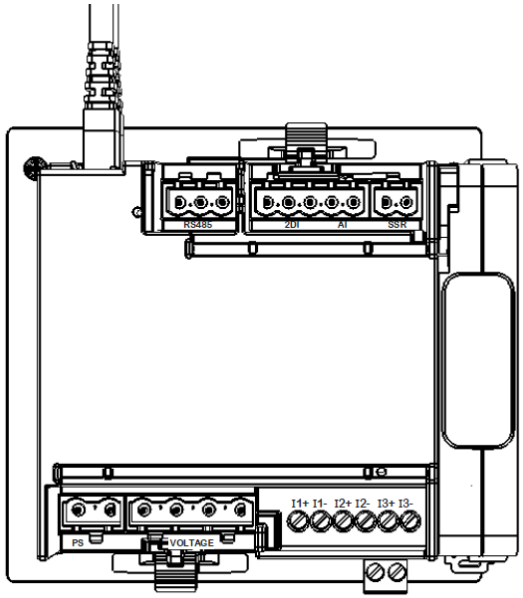




Unique Current Inputs Design

- One standard 0-10 amps universal input, for 1 and 5 amps nominal input from CT secondary
- Special option for 4th current measurement
- Unique design: detachable CT card featuring current options





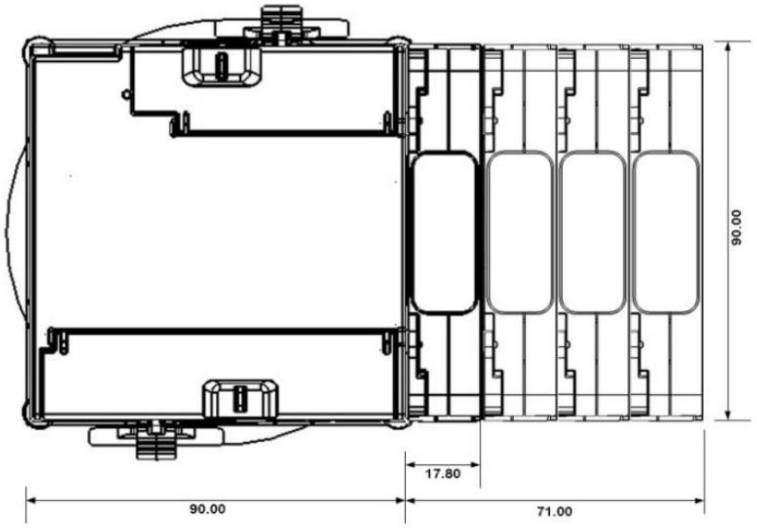
4th current measurement

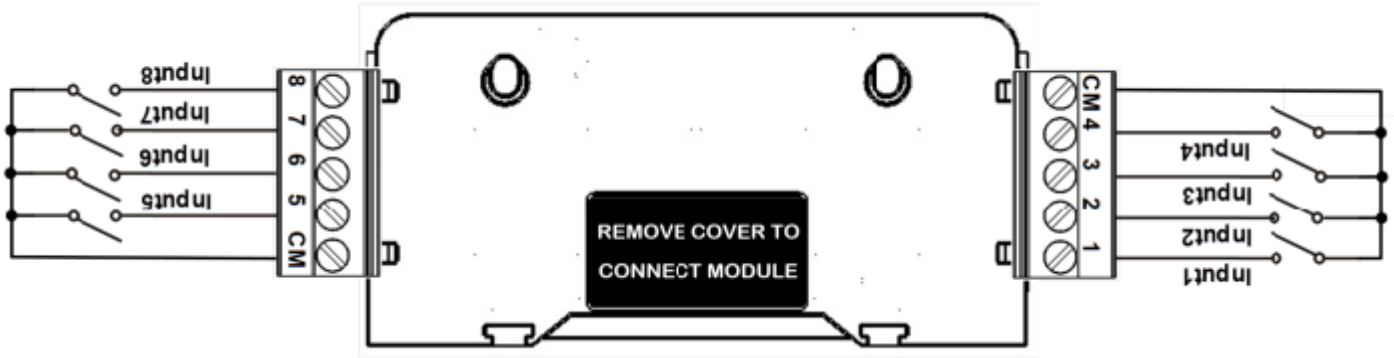
CT Type
1A/5A
HACS
RS5
CLAMP
LINDSEY
PBI
DC

Modular platform

Up to 4 additional modules

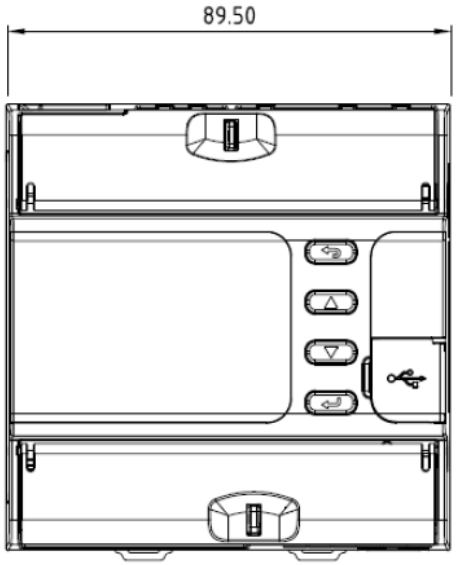
- 8 DI Module (DC DRY and **Wet contacts: 24-230V AC/DC**)
- 6 Relay Outputs
- AUX Power Supply
- 3G/4G Modem
- Analog Inputs/Outputs
- Additional current channels (BFM)
- Additional communication

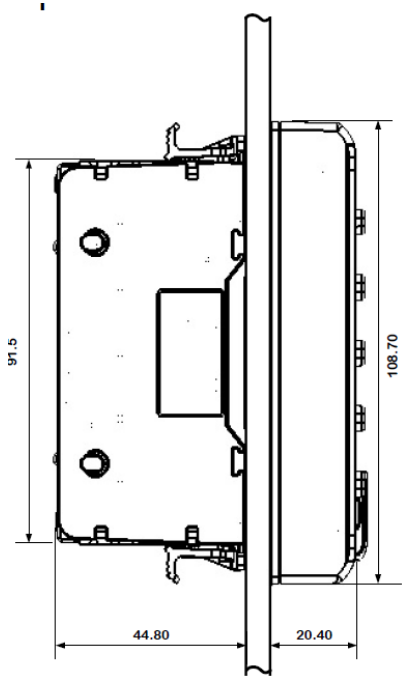


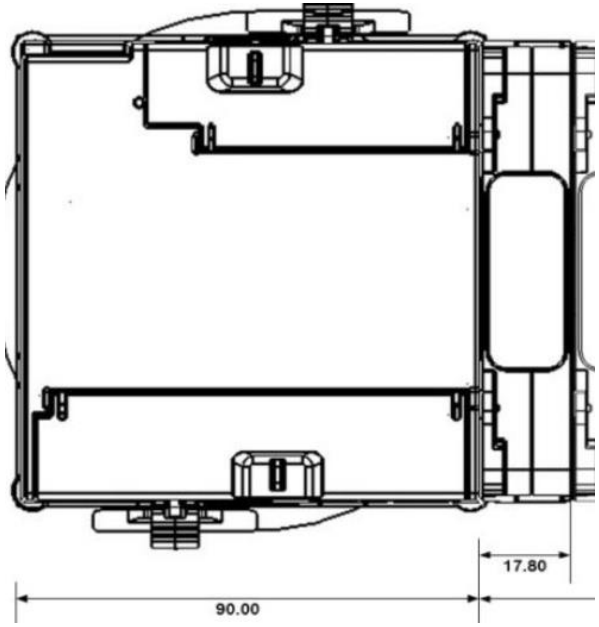


Compact design

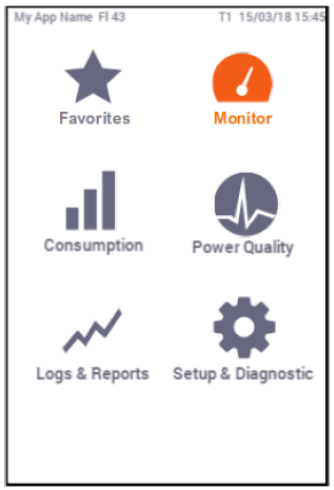
- The most compact device in the class
- Additional module width only 18 mm
- Depth only 45 mm

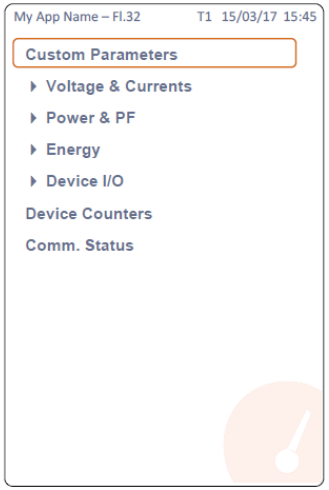


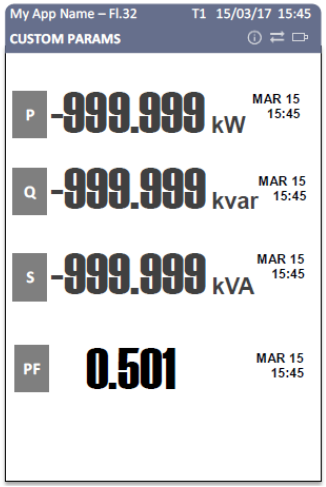


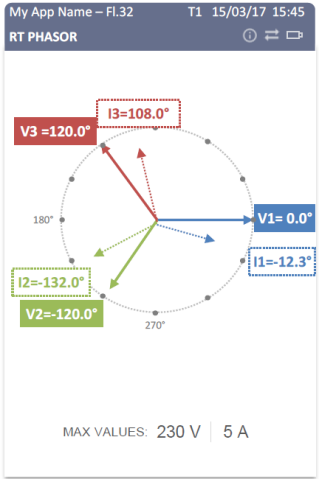


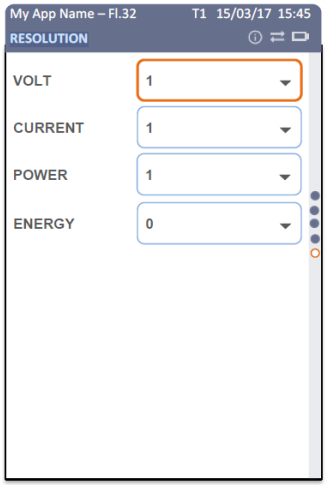
User friendly GUI

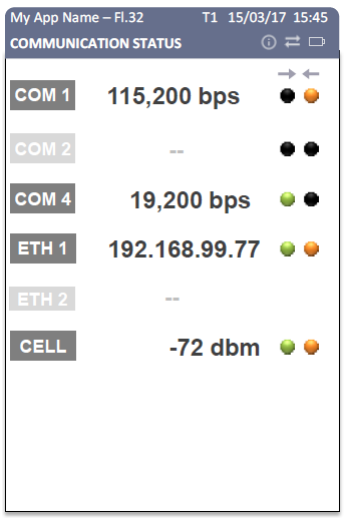


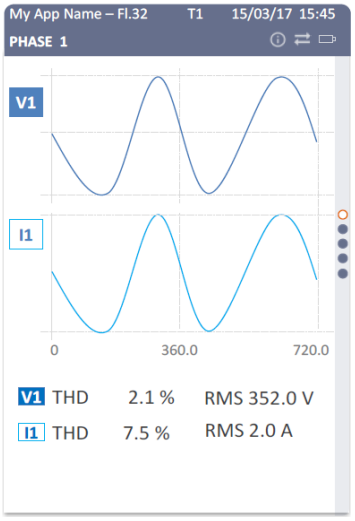








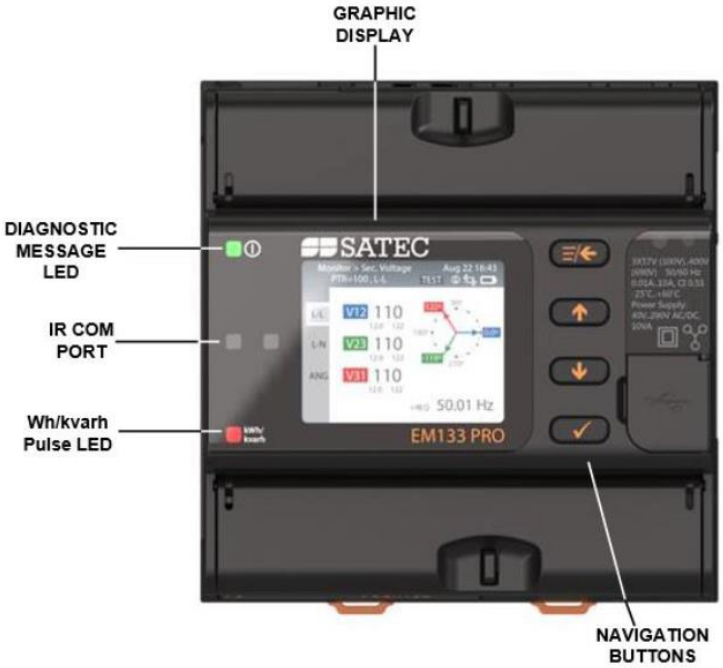




1.77'' 160 X 128 – EM3130 PRO
3.5'' 320 x 480 PM3350 PRO pixels resolution

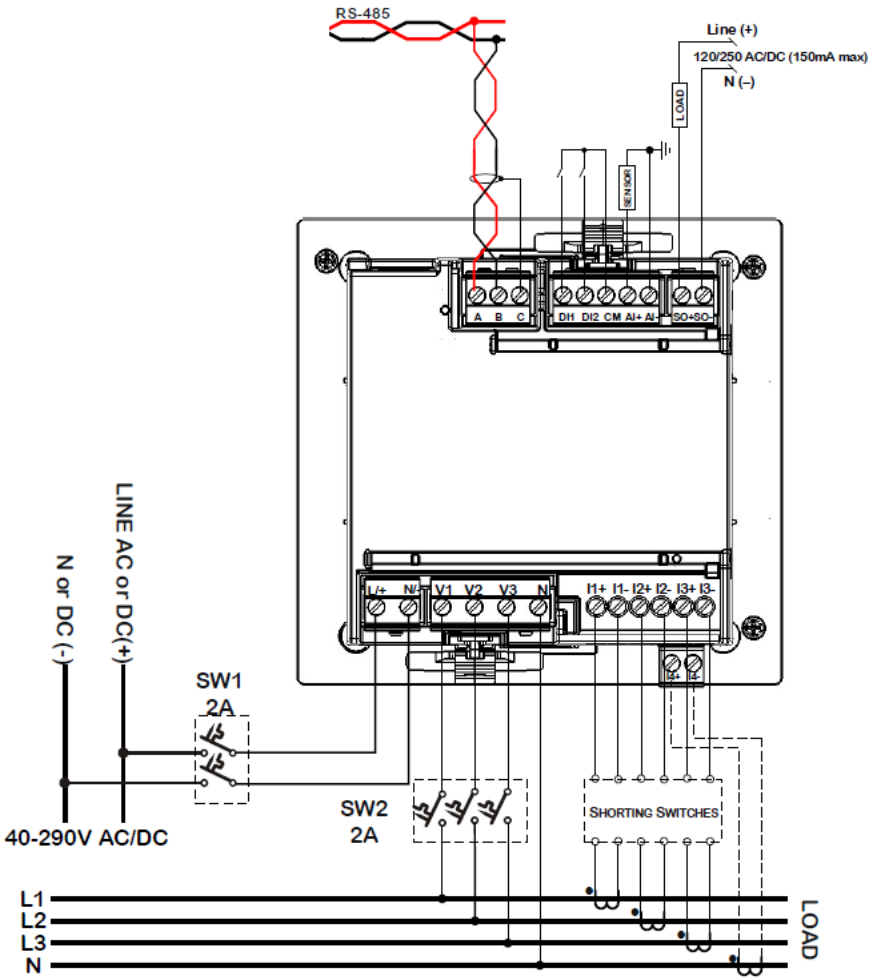
- Favorites menu
- Multi-language support
- Current direction setup
- Custom display
- Resolution setup for V, I, Power and Energy

Summary (front):



- USB, RS-485, 2 x ETH, IR on board
- Color graphical display/ multi-language menus
- SATEC Load bar graph
- Wh/kvarh pulse LED

Summary (back view)



- 2 DI on board (Dry contact, 5VDC
- 1 x RO on board (SSR)
- Additional 4th current input
- 1 x universal Analog Input (range -1mA to 20mA)

Precision metering:

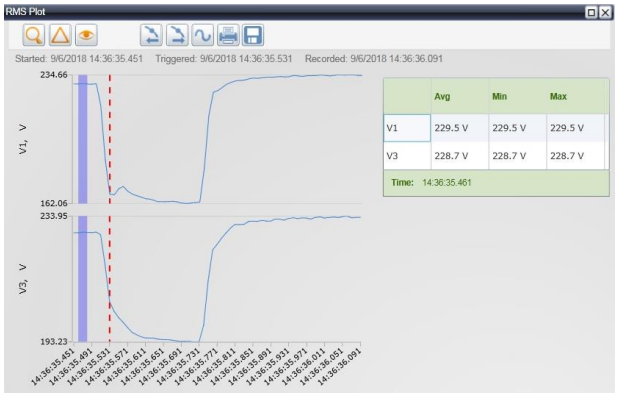
The PM13X/EM13x SERIES design to comply with IEC/AS 62052-11, IEC 62053-22/24, IEC 61557-12 (PMD-Sx), EN 50470, WELMEC 7.2, MID MI-003 and ANSI C12.1/20 standards.

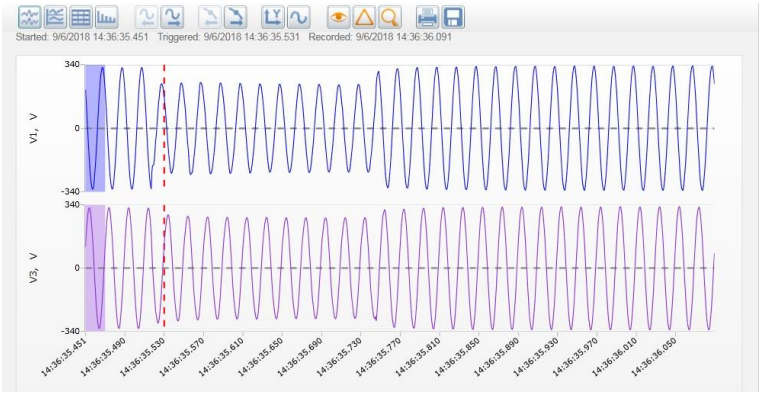
Accuracy:

- Class 0.2S accuracy IEC 62053-22, ANSI C12.20 Class 0.2 (active energy)
- IEC 61557-12 class 0.2 (performance measuring and monitoring functions)
- Industry leading Class 0.5S accuracy for reactive energy (IEC 62053-24)
- Power Factor – class 0.2 as per IEC 61557-12
- Frequency – class 0.2 as per IEC 61557-12
- Current & Voltage – class 0.2 as per IEC 61557-12

PQ and Measurement Capabilities:

- Harmonic analysis:
  - THD on voltage and current, per phase, min/max, custom alarming, total distortion demand, K-factor, Crest factor
  - Individual harmonics/interharmonics magnitudes and angles on voltage and current, up to the 63rd harmonic.
- Symmetrical components
- Voltage Dips/Sags, Interruptions, Swells, Variations, Unbalance, Transient and THD events registration and recording
- Waveform capture: triggered manually or by setpoint, captured waveforms available directly from the meter memory (resolution: 256 samples/cycle).
- Disturbance detection and capture: sag/swell voltage, alarm on disturbance event, waveform capture with per-event information; PQDIF format support.





Programmable Logical Controller (PLC and RTU)

- 64 control setpoints with programmable operate and release delays
- Each setpoints evaluates a logical expression with up to 8 arguments using OR/AND logic, extensive triggers, programmable thresholds and delays
- 4GB, of standard non-volatile memory. dedicated to record billing data, PQ logs, data logs, events logs and waveforms
- Events/Alarm log, 16 user-defined data logs, PQ logs and up to 8 Waveform logs

Digital Inputs | Relay Outputs | Counters | Transformer Correction | Periodic Timers | Local Settings
Basic Setup | Device Options | Control/Alarm Setpoints | Analog Outputs | Analog Inputs

Setpoint No. 1

Setpoint Triggers

OR/AND	Input Group	Trigger Parameter	Relation	Operate limit	Release limit
OR	SETPOINTS	SP1	ON	----	----
OR	RMS (1/2 cycle)	V1	Delta+	828.0	----
OR	POWERS (3 sec)	kW L1	>=	33.000	33.000
OR	----	----	----	----	----
OR	----	----	----	----	----
OR	----	----	----	----	----
OR	----	----	----	----	----
OR	----	----	----	----	----

Actions

No.	Action	Target	Parameter
1	SEND NOTIFICATION	----	----
2	EVENT LOG	OPER	----
3	WAVEFORM LOG	#1	----
4	----	----	----

Delays, s

Operate delay	0.000
Release delay	0.000

Applications:

- PLC/RTU/Substation automation/telecontrol
- User Defined Power quality/Fault recorder
- IED – Intelligent Electronic Device (IEC61850)
- Revenue meter (0.2S)
- Leakage current detection

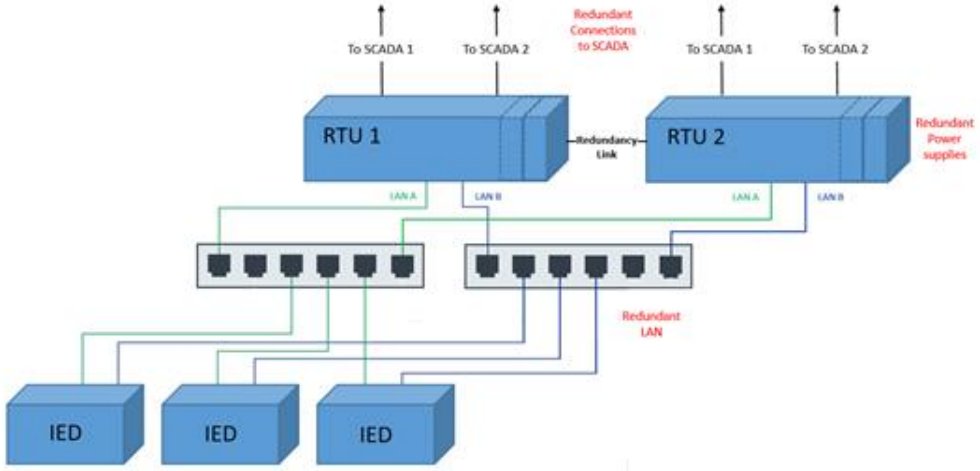
PLC/RTU/Substation automation/telecontrol

You no longer need RTU, The PRO will collect and store all the information from the BAY, with 1msec timestamp and will transmit to SCADA using standard protocols.

- Cycle-by-cycle RMS measurements updated every ½ cycle.
- Total of 26 DI, 18 RO, 9 AI, AUX PS
- MODBUS MASTER
- 2 x ETH + 4G + USB
- IEC60870-5-104/DNP
- RTC with SNTP

61850 Meter

- 2 x ETH
- IEC61850-8, MMS, GOOSE messages
- RTC with SNTP - Simple Network Time Protocol
- PRP - Parallel Redundancy Protocol
- 24 DI, RO,



PM180

High End Multi Purpose Analyzer and Controller

6-in-1 solution for cost-effective automation, control and analysis:

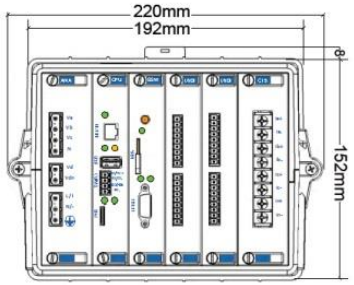
- Revenue Metering
  - 0.2S Accuracy TOU meter
- PMU
  - C37.118.1 (P, M) + C37.118.2
- Power Quality
  - EN50160 and custom events
  - IEC61000-4-30 class A
- Distributed Fault Recorder
  - Up to 1024 samples/cycle
- Sequence of Events (SoE)
  - 128 inputs, 1ms resolution
- Backup Protection Equipment + BCU
  - Virtual circuit breaker algorithms

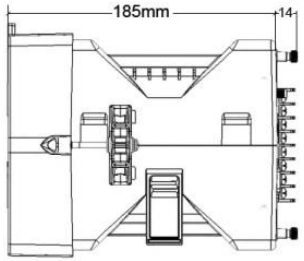
High Performance Analyzer for Versatile Uses

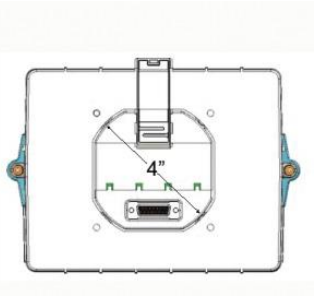
- Appications:
  - Industrial Substation Automation controller
  - High performance Power Quality Analyzer (PQA)
  - Digital Fault Recorder (DFR) with distance to fault calculation
  - Sequence of Events (SoE) power meter with IEC 61850
  - Supports IEC 61131 PLC Configuration (LD, FBD)
  - Synchrophasor and frequency measurements (PMU)

Displays and mounting

- DIN-Rail
- LED Display
- LCD-touch screen







Device Overview

Standard communication:
Ethernet, RS-485 & USB

Four galvanically isolated voltage channels (standard)

50-290V AC,
90-290V DC
power supply

Wide range of control and alarm options: digital & analog I/O, GPS time sync. and more

Auxiliary PS for redundancy

Four galvanically isolated current channels up to 20xIn (standard)

Accurate distance to fault calculation

Option for fast transient recording (16µSec)

Add-on communication options: serial, fiber optic & 2G/3G cellular modules

Displays

5.7” Graphic color touchscreen

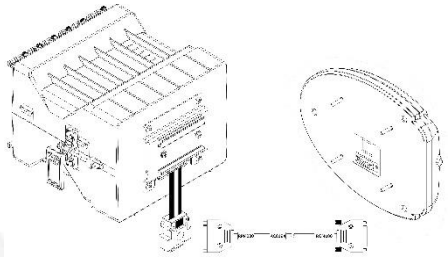
Multilingual user interface

Controls up to 36 devices

TFT technology with LED backlight

IR port & front USB port

Wide range operating temperature:
–4°F to +158°F
–20°C to +70°C



RDM180
3-row bright red LED display module

RDM312
Multi-window bright red LED display module

RGM180-G1

RS-485 with 12V DC power supply for direct connection to a single PM180

RGM180-G3

RS-485 with 12V DC power supply & Ethernet with PoE supply (can be connected simultaneously)

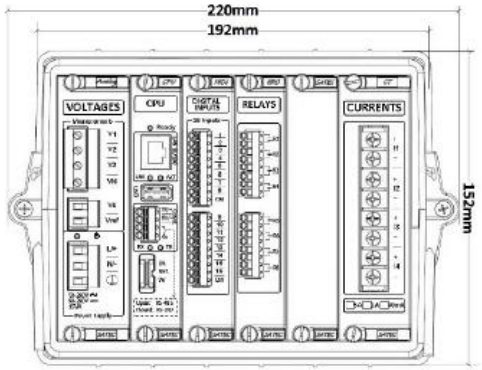
PM180

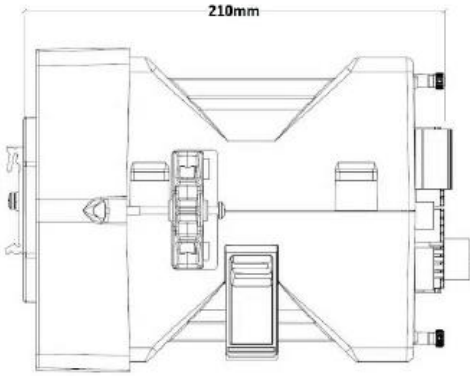
High End Multi Purpose Analyzer and Controller

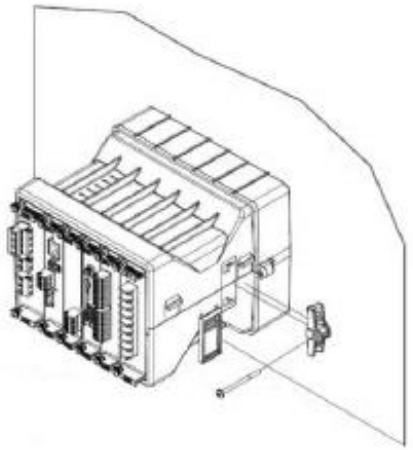
- 4 voltages (4th voltage AC/DC), 4 currents
- Measurement and Power Quality at 256 samples per cycle
- Transient recording (option) of 2kV at 1024 samples per cycle (16/20µS)
- Full galvanic isolation for all voltage and current channels
- Digital fault recorder function – up to 50/100A current
- Optional additional 4 channels for fault analysis
- 256MB on board memory
- Standard communication:
  Ethernet, USB (front & rear), RS-232/485 and IR (on front panel)
- 3 hot swap expansion slots:
  - Communication: FO Ethernet, 3G/4G Modem
  - Inputs/Outputs: 16DI; 8DO; 4AI; 4AO and IRIG-B
  - Auxiliary Power Supply: 85-265V AC and 40-290V DC
- Support to IEC 61850 protocols

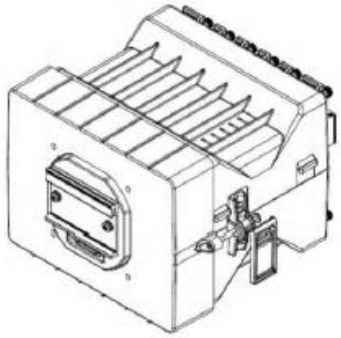
Construction

- 6 cards – 3 default (voltages, currents, communication) and 3 optional hot swap cards (future model with 13 cards)
- 192 (220)×152×210mm rectangular enclosure
- Three mounting options:
  - Panel mount (4” round, 96×96 cutout)
  - DIN rail (3 options - on each side)
  - 19” rack mount (3U, 1 or 2 devices)
- Auto-range AC/DC Power Supply (85-265V AC and 88-290V DC)
- Redundant Power Supply option

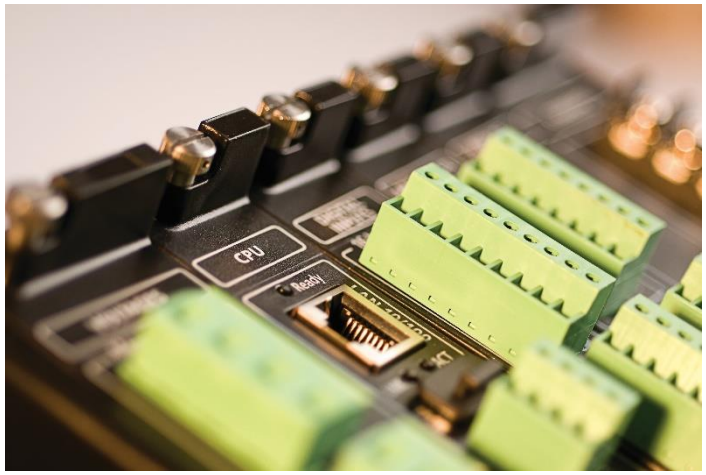






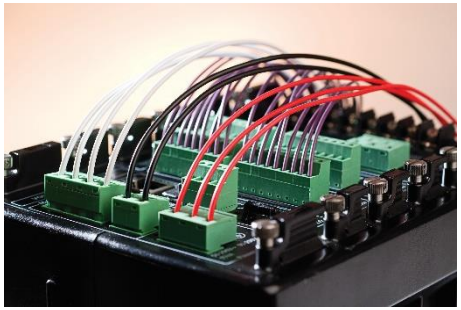


Measurement



- 4 voltages (4th voltage AC/DC), 4 currents
- Full galvanic isolation for all voltage and current channels
- Measurement at 256 samples per cycle
- Advance Power Quality Recorder according to various standards; sags/swells, interruptions, frequency variations; flicker, temporary overvoltage, transient overvoltage, voltage unbalance, harmonic and inter-harmonic voltages
- Harmonic Analyzer (to 128'th harmonic volts and amps, directional power harmonics and power factor, Phasor and symmetrical components)
- Comprehensive data and waveform logging with 256MB
- Optional additional 4 channels for fault analysis
- Transient recording (option) of 2kV at 1024 samples per cycle (16/20µS)
- Digital fault recorder (option) – up to 200A (calibrated to 50A) current with fully programmable thresholds and hysteresis, zero-sequence currents and volts, current and volt unbalance; under-voltage, neutral current; ready-for-use fault reports - fault currents magnitude and duration, fault waveforms and RMS trace
- Anti-aliasing 5th order filter

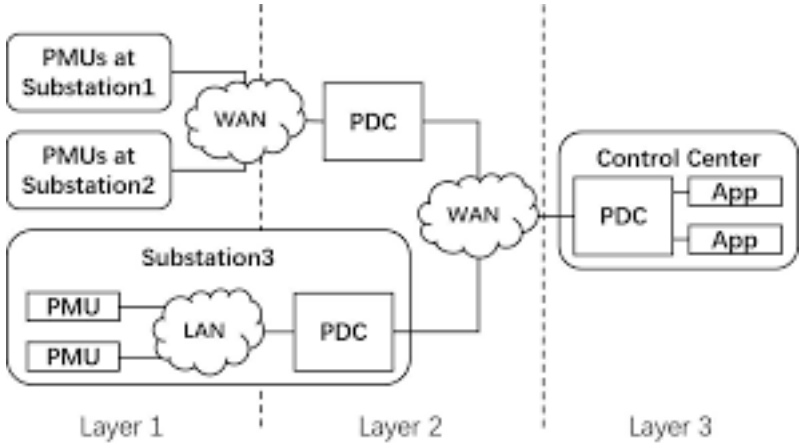
Control and Sequence of Events



- Various I/O modules:
  - 16 DI (max. 48 DI)
  - 8 RO (max. 24 RO)
  - 4 DI/2RO (Form C SSR or EMR, max. 12DI/6RO)
  - 4 AI/AO (max. 12 AI/12 AO)
- Comprehensive Programmable Logic:
  - 64 control setpoints, AND/OR logic, extensive triggers, programmable thresholds and delays, relay control, event-driven data recording
  - Cross triggering between multiple devices via the Ethernet for synchronous event capture and recording
  - 32 Counters, 16 Timers
- Sequence of Events logging at 1ms resolution
- 56-channel simultaneous recording with 7 AC, one AC/DC and 48 digital input channels
- Time Synchronization:
  - SNTP (Single Network Time protocol) via Ethernet port
  - External Digital Inputs synchronization
  - IRIG-B input (1-ms)

PM180, PMU MODULE - WAMS

- IEEE C37.118.1 - class P (Protection)
- Frequency of data transmission — 50 frames/second
- Frequency measurement error (FE): +/-1 mHz at 50 Hz
- Total vector error (TVE) : 0.08% at 0 degrees.
- Communication protocols:
  - IEEE C37.118.2
  - IEC61850-9-2 (SV)
  - DNP/IEC60870-5-101/104
- Time synchronization: IRIG-B



SATEC
Powerful Solutions

SATEC DC Metering

DC METERING

Systems which either produce or consume direct current are becoming commonplace. This includes commercial clients and industrial applications, raising the demand for accurate metering of DC systems. SATEC has adapted several products for compatibility with DC metering via Hall Effect sensors. This now allows accurate metering of DC systems, combining the familiar SATEC features of datalogging, high-accuracy and our advanced communication protocols and control options.

Compatible Meters

EM13X Series
PM13X Series
BFM-II
PRO Series

APPLICATIONS

INDUSTRIAL MONITORING

DATA CENTER

RENEWABLE ENERGY

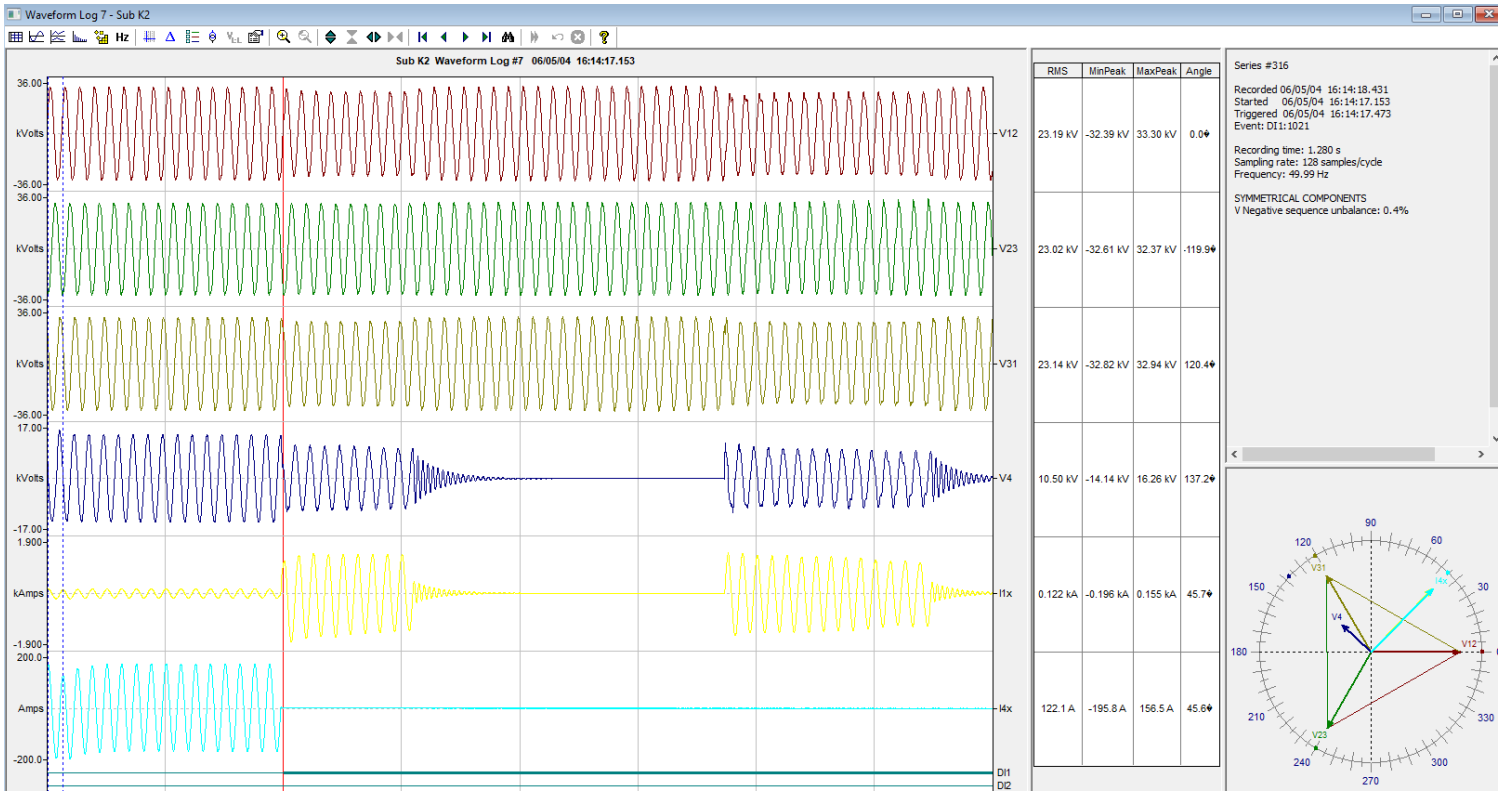
FEATURES

- Average and Real time values: Voltage, Current, Power, Bi-directional DC energy calculation
- Events & Data logs
- Voltage range: 20-3000VDC*
- Current range: up to 3000ADC**
- Energy accuracy class: Class 1 / 0.5**
- External Power supply is needed

* Additional adaptor is needed for voltage measurement above 800VDC
** Depends on type of DC hall effect sensor

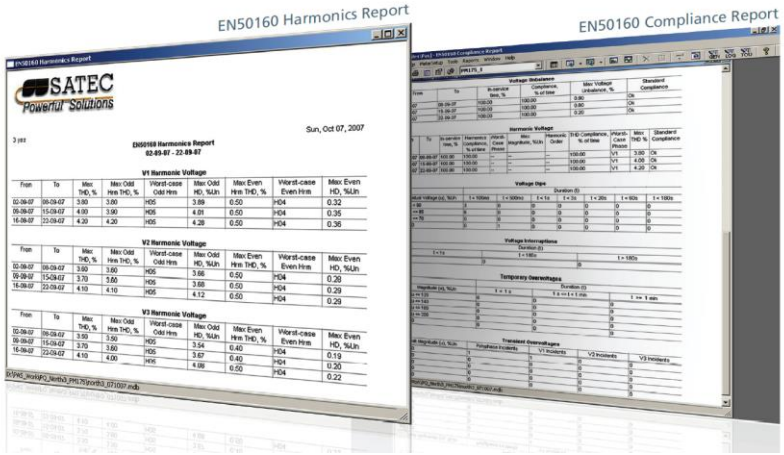
Waveform capture

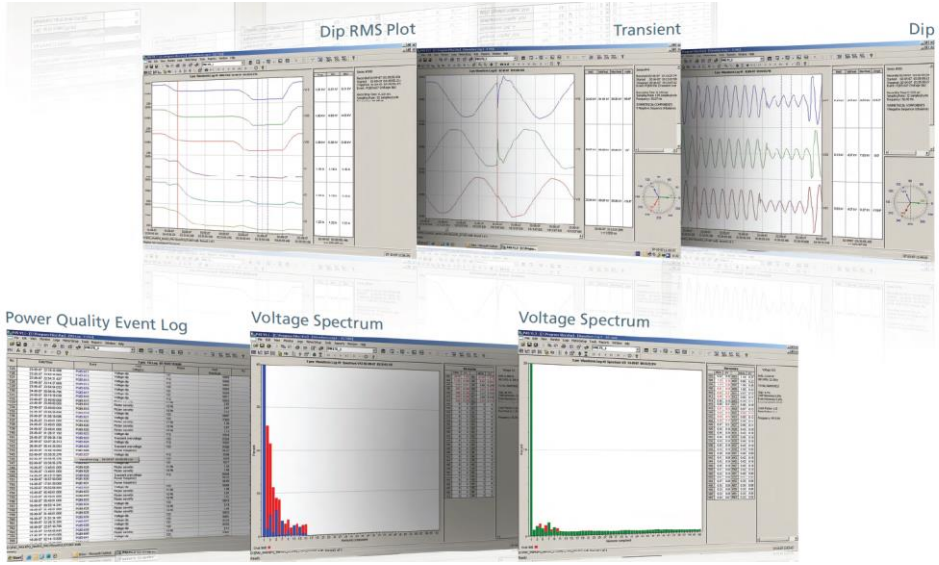
- Eight fast Waveform Recorders (simultaneous 8-channel AC, VDC and 16-channel digital inputs
- Exporting waveforms in COMTRADE and PQDIF file formats
- recording in a single plot; selectable AC sampling rate of 32, 64, 128 or 256 samples per cycle and 512 or 1024 samples per cycle (TRM); 20 pre-fault cycles, 1-ms resolution for digital inputs.



Power Quality Analyser

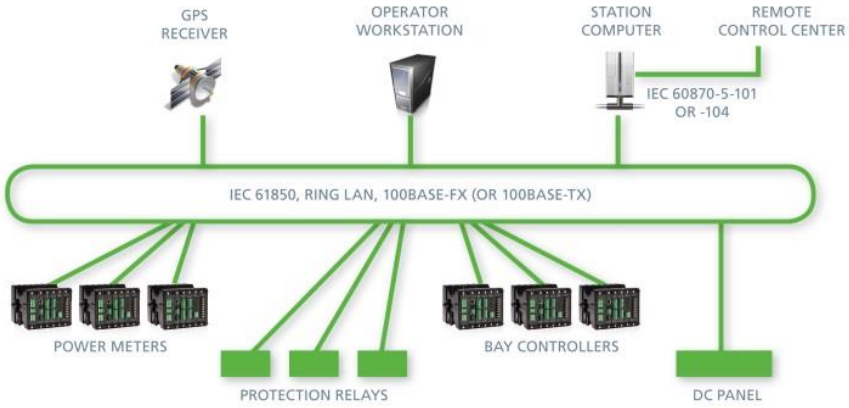
- IEC61000-4-30:2015 (ed.3) Class A certifited
- EN 50160 Power Quality recorder: onboard power quality analyzer; programmable limits; EN 50160 power quality event log, EN 50160 compliance statistics; EN 50160 harmonics survey statistics; ready-for-use compliance statistics reports; power frequency, voltage variations, rapid voltage changes, IEC 61000-4-15 flicker, voltage dips, interruptions, temporary Overvoltages, transient Overvoltages, voltage unbalance, IEC 61000-4-7 harmonic and Interharmonic voltage, mains signaling voltage.





Communication

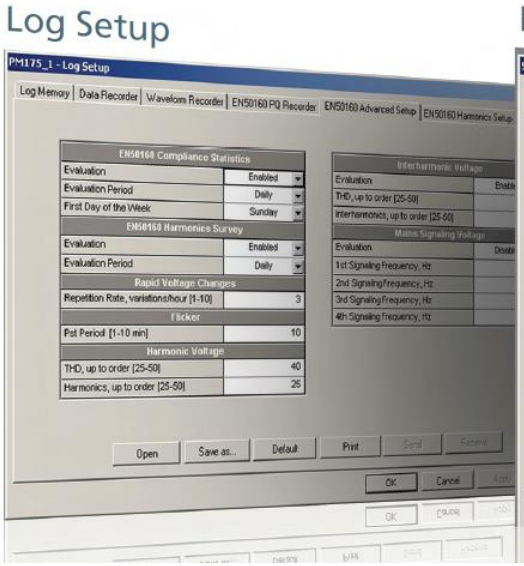
- Standard communication:
  - 10/100Base T (up to 12 simultaneous connections)
  - USB
  - RS-232/485 (up to 115,200 bps)
- Optional communication cards:
  - Fiber optic Ethernet 100Base FX port
  - 3G/4G cellular modem
  - Infra red (on front panel)
- Standard protocols: Modbus / DNP3.0 / IEC60870-5-101/104/ Optional protocol: IEC 61850 ed.2

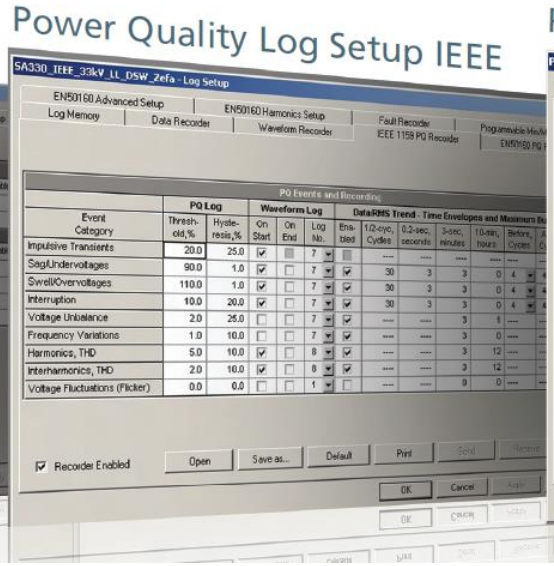


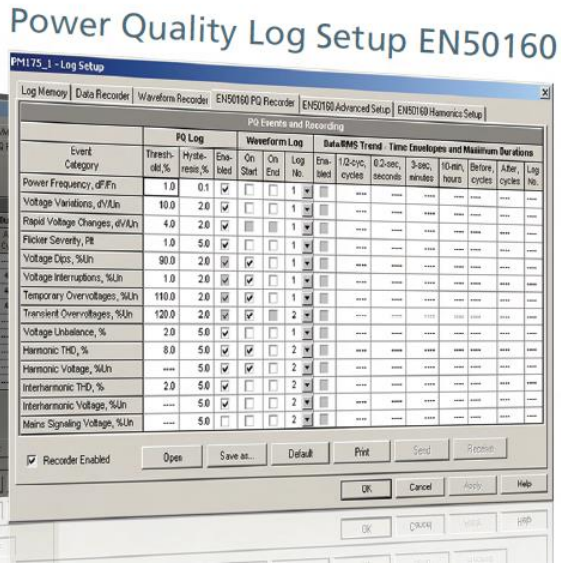
PAS – Power Analysis software

PAS is SATEC's comprehensive engineering and analysis software, designed to program, configure and monitor all SATEC devices. It includes a variety of additional tools to assist in system setup, such as the communication debugging module.

PAS is bundled with all SATEC instruments at no extra charge.







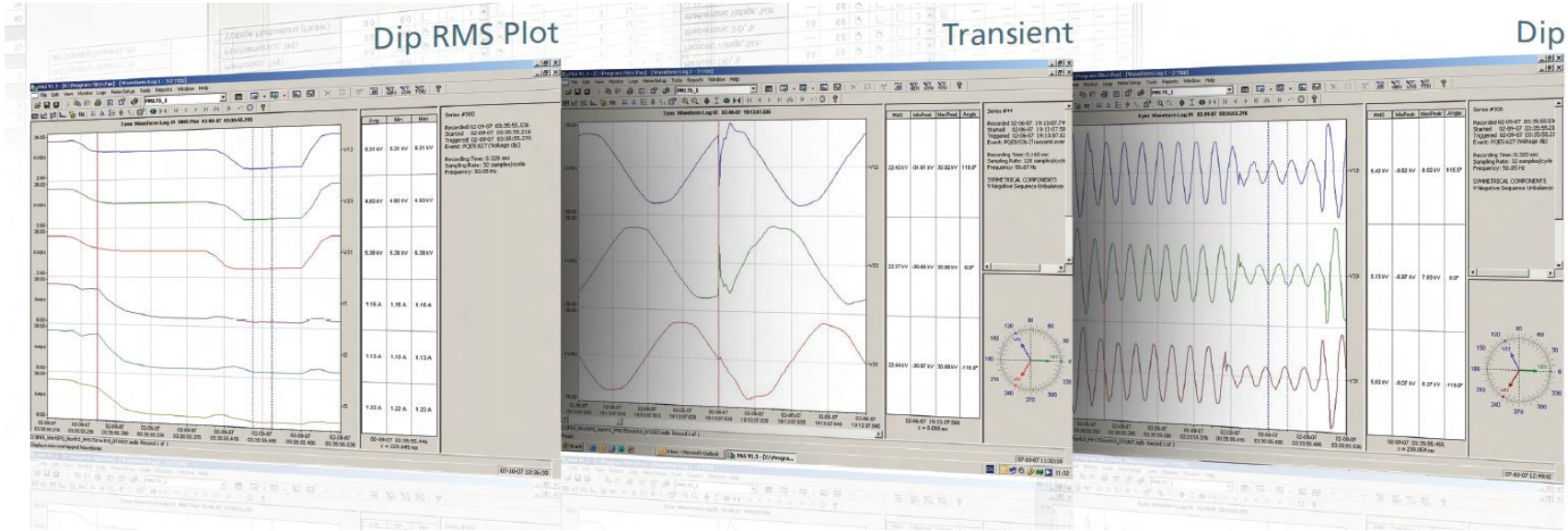
PAS Features

FEATURES

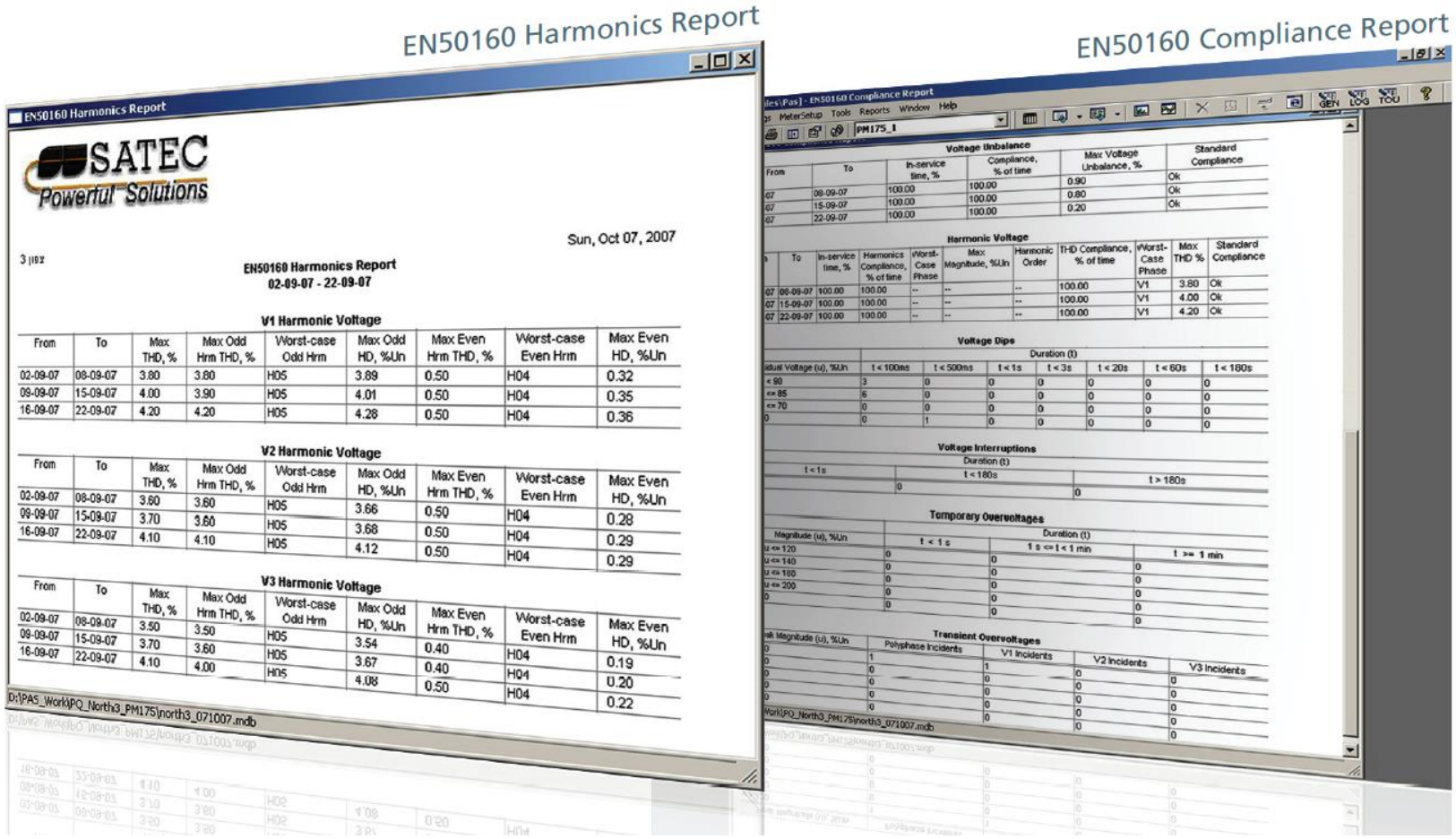
- Programming and control for all SATEC devices
- Automatic power quality reports for EN50160, IEEE1159 & GOST 32144-2013
- Extensive graphic and reporting capabilities for waveforms and harmonics
- Export COMTRADE
- PQDIF for waveforms and data logs
- Automatic polling of devices
- Simple off-line instrument setup
- Easy export to Word or Excel
- Self-test
- Remote device configuration
- User-defined line diagram
- Multiple TOU programming

Comprehensive analysis

- Data logs—historical or current
- Trends
- Waveform analysis
- Harmonic spectrum
- Harmonics power direction
- Vector analysis/phasor diagram
- G5/4 comparison tables for HV and LV applications
- Automatic power quality and fault categorization
- Synchronized waveforms from multiple devices in a single plot
- ITI (CBEMA) curve
- Automatic sort and filter capabilities
- Alarms with variable setpoints



PAS EN50160:2010 Reports



ExpertPower PLUS for PQ

SATEC
Powerful Solutions

Main ExpertPower Applications

- Power Quality Systems
- Energy Management Systems
- Billing systems

Key-facts

- Based on SQL Database
- Local or Cloud installation
- Unlimited number of work stations. Any PC with a standard browser (CHROME, Explorer)
- Multi-language support (English, Spanish, Russian, Czech, Turkish, Hebrew)

PQ System

SATEC was able to create the ideal product for collecting data from PQ analyzers located on separate substations. As a manufacturer of PQ devices, we clearly understand how and what information needs to be displayed and stored, and how to make it as clear and useful for the client. How to make the PQ system bring real benefits.

- Geolocation
- Historical and Real-time data
- EN50160 - Reports
- Waveform analisys and excport to PQDIF, Comtrade
- SOE, with 1 msec time-stamp
- PQ Statistics and Graphs

EN50160 – summary Report (Week by week)

Category Overview

Customer: SATEC **Site:** PM175 SATEC EMB **Location:** Main Load **Device:** PM175 Help

Category	Week 10 Mar 01-Mar 07	Week 11 Mar 08-Mar 14	Week 12 Mar 15-Mar 21	Week 13 Mar 22-Mar 28
Power Frequency	✓	✓	✓	✓
Voltage Variations	✓	✓	✓	✓
Rapid Voltage Changes	✓	✓	✓	✓
Flicker Severity	✓	✓	✓	✓
Voltage Unbalance	✓	✓	✓	✓
Harmonic Voltage	✗	✗	✗	✗
Interharmonics	✓	✓	✓	✓
Mains Signaling Voltage	✓	✓	✓	✓
Voltage Dips	Weekly statistics not applicable			
Undervoltages	Weekly statistics not applicable			
Short Voltage Interruptions	Weekly statistics not applicable			
Long Voltage Interruptions	Weekly statistics not applicable			
Temporary Overvoltage	Weekly statistics not applicable			
Transient Overvoltage	Weekly statistics not applicable			

EN50160 – compliance Report

Week by week

Power Quality \\ EN50160-2007 Standard \\ **Compliance Report**

Date: 3/1/2020 - 3/28/2020

Customer: SATEC **Site:** PM175 SATEC EMB **Location:** Main Load **Device:** PM175 Help

Power Frequency

From Date	To Date	In-service time, %	Compliance, +/-1%, % of time	Compliance, +4/-6%, % of time	Min Frequency, Hz	Max Frequency, Hz	
3/1/2020	3/7/2020	100	100	100	49.66	50.2	✓
3/8/2020	3/14/2020	100	100	100	49.78	50.27	✓
3/15/2020	3/21/2020	100	100	100	49.59	50.42	✓
3/22/2020	3/28/2020	99.41	99.96	100	49.14	50.28	✓

Voltage Variations

From Date	To Date	In-service time, %	Compliance, +/-10%, % of time	Compliance, +10/-15%, % of time	V1 Min	V1 Max	V2 Min	V2 Max	V3 Min	V3 Max	
3/1/2020	3/7/2020	100	100	100	231.1	237.1	232.1	237.9	231.6	238.2	✓
3/8/2020	3/14/2020	100	100	100	231.3	236.9	233	238.2	232.3	237.8	✓
3/15/2020	3/21/2020	99.9	100	100	232.2	236.7	233.4	238	233.1	237.6	✓
3/22/2020	3/28/2020	99.6	100	100	231.8	236.7	231.9	237.8	231.8	237.3	✓

Rapid Voltage Changes

From Date	To Date	Polyphase Incidents	V1 Incidents	Max V1 Variation, %Un	V2 Incidents	Max V2 Variation, %Un	V3 Incidents	Max V3 Variation, %Un	
3/1/2020	3/7/2020	0	0	0	0	0	0	0	✓
3/8/2020	3/14/2020	0	0	0	0	0	0	0	✓
3/15/2020	3/21/2020	0	0	0	0	0	0	0	✓
3/22/2020	3/28/2020	0	0	0	0	0	0	0	✓

Flicker Severity

From Date	To Date	In-service time, %	Compliance Plt <= 1, % of time	Max V1 Plt	Max V2 Plt	Max V3 Plt	
3/1/2020	3/7/2020	100	98.81	2.21	2.13	0.76	✓
3/8/2020	3/14/2020	100	95.18	2.68	2.24	2.76	✓
3/15/2020	3/21/2020	100	98.78	1.45	0.67	0.81	✓
3/22/2020	3/28/2020	98.81	100	0.61	0.8	0.73	✓

Voltage Unbalance

From Date	To Date	In-service time, %	Compliance, % of time	Max Voltage Unbalance, %	
3/1/2020	3/7/2020	100	100	0.3	✓
3/8/2020	3/14/2020	99.9	100	0.3	✓

EN50160 – compliance Report

Voltage Dips, Voltage Interaptions, Overvoltages statistic

Voltage Dips

Residual Voltage(u), %Un	t < 100ms	t < 500ms	t < 1sec	t < 3sec	t < 20sec	t < 60sec	Total
3/1/2020 - 4/4/2020							
85 < u < 90	6	1	0	0	0	0	7
70 < u <= 85	4	1	0	0	0	0	5
40 < u <= 75	0	0	0	0	0	0	0
u <= 40	0	0	0	0	0	0	0
Total	10	2	0	0	0	0	12

Undervoltages

Residual Voltage (u), %Un	60sec <= t < 180sec
3/1/2020 - 4/4/2020	
85 < u < 90	0
70 < u <= 85	0
40 < u <= 75	0
u <= 40	0
Total	0

Short Voltage Interruptions

	t < 1sec	t < 180sec	Total
3/1/2020 - 4/4/2020	0	0	0

Long Voltage Interruptions

	t >= 180sec
3/1/2020 - 4/4/2020	0

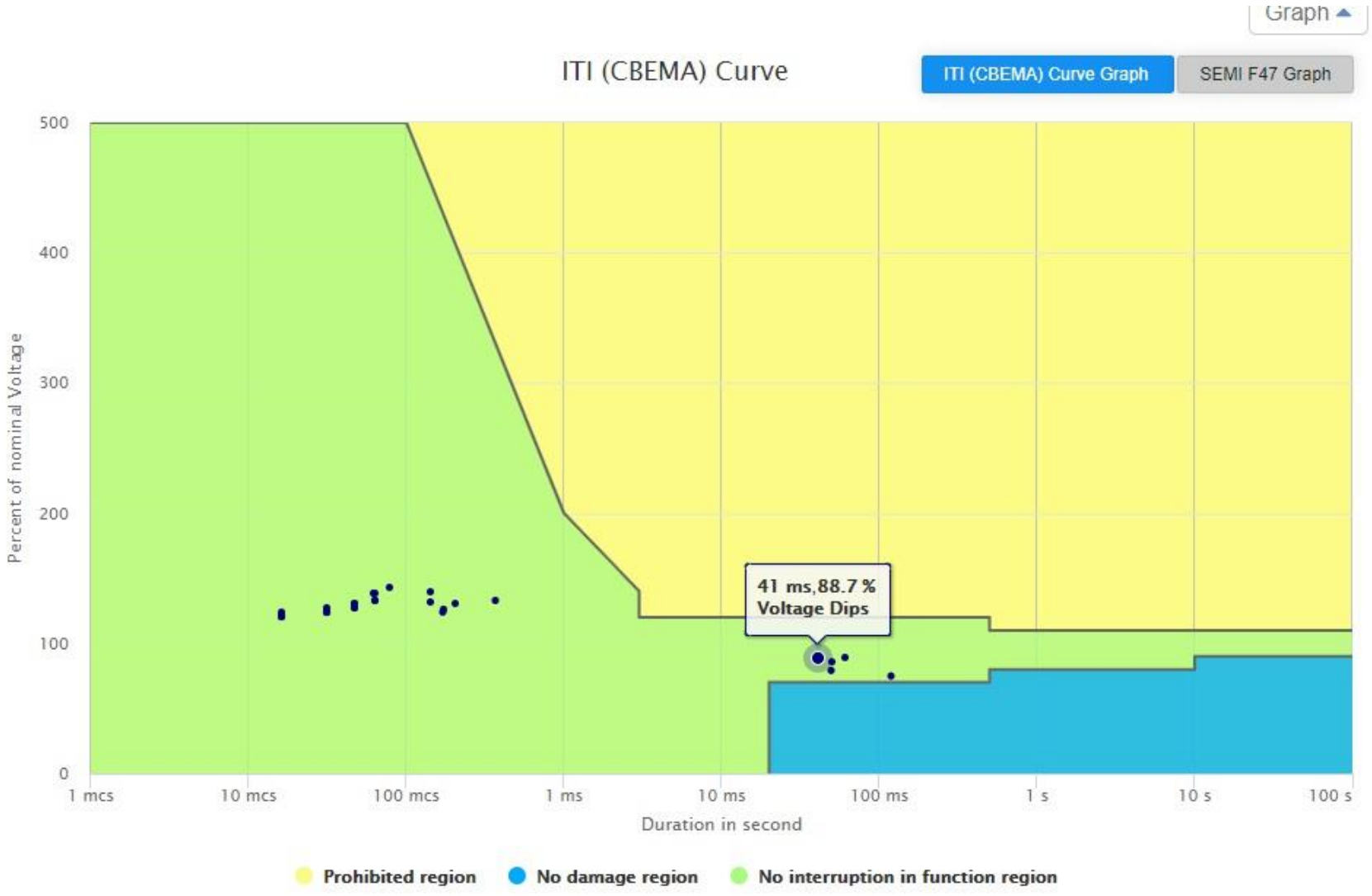
Temporary Overvoltage

Magnitude (u), %Un	t < 1sec	t < 60sec	t >= 60sec	Total
3/1/2020 - 4/4/2020				
110 < u <=120	0	0	0	0
120 < u <=140	0	0	0	0
140 < u <=160	0	0	0	0
160 < u <=200	0	0	0	0
u > 200	0	0	0	0
Total	0	0	0	0

Transient Overvoltage

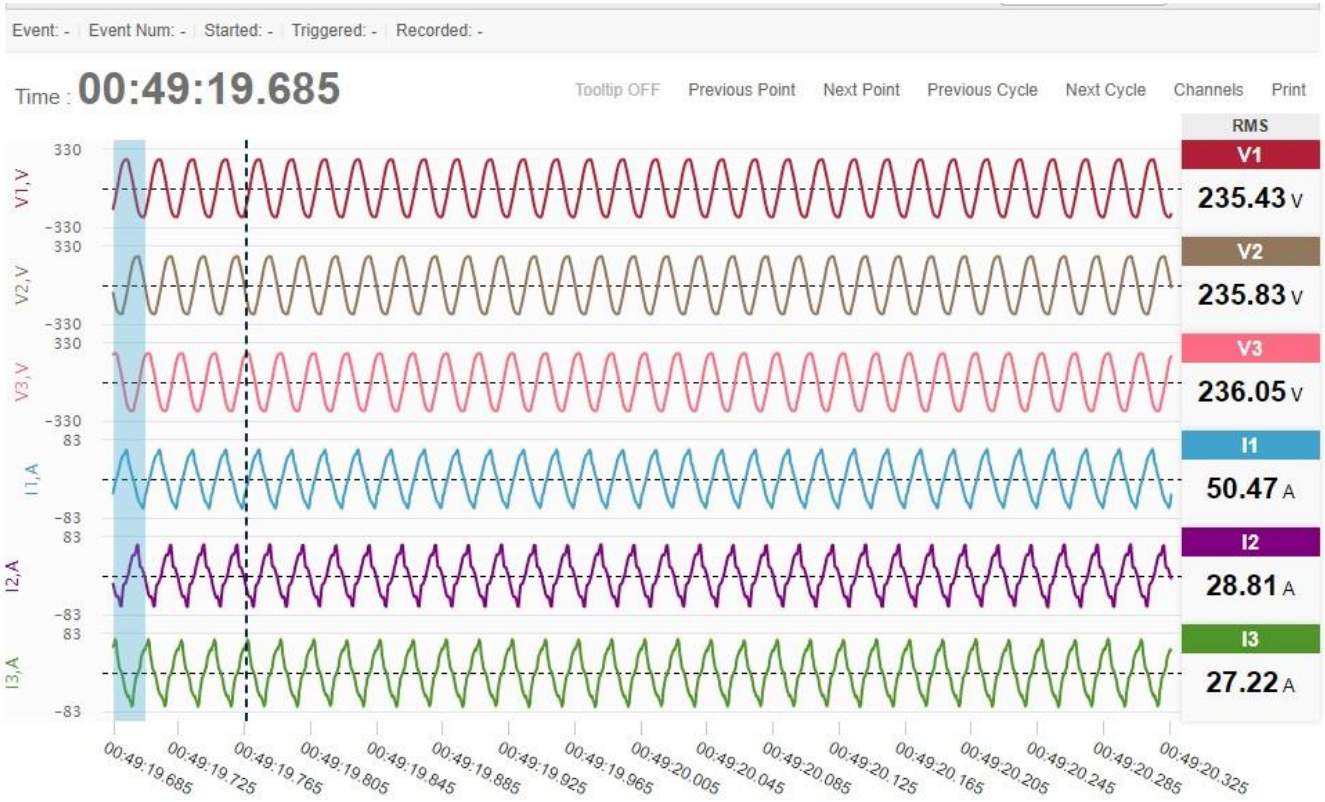
Peak Magnitude (u), %Un	Polyphase Incidents	V1 Incidents	V2 Incidents	V3 Incidents
3/1/2020 - 4/4/2020				
u > 120	0	0	0	0
u > 150	0	0	0	0
u > 200	0	0	0	0
u > 250	0	0	0	0
u > 300	0	0	0	0
Total	0	0	0	0

PQ – CBEMA Report

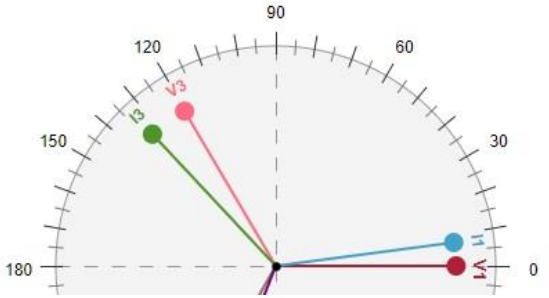


PQ – Waveform

Built-in Analisys tools, Export to COMTRADE and PQDIF



00:49:19.685	RMS	Min. Peak	Max. Peak	Angle
V1	235.43 V	-324 V	325 V	0 °
V2	235.83 V	-326 V	326 V	-119.5 °
V3	236.05 V	-327 V	323 V	120.5 °



PQ – Event list

Voltage dips with 1 msec timestamps and links to Waveforms

Power Quality \\ PQ Events \\ **Events**

Date: 4/1/2019 - 4/1/2020

Customer: SATEC **Site:** PM175 SATEC EMB **Location:** Main Load **Device:** PM175 Help

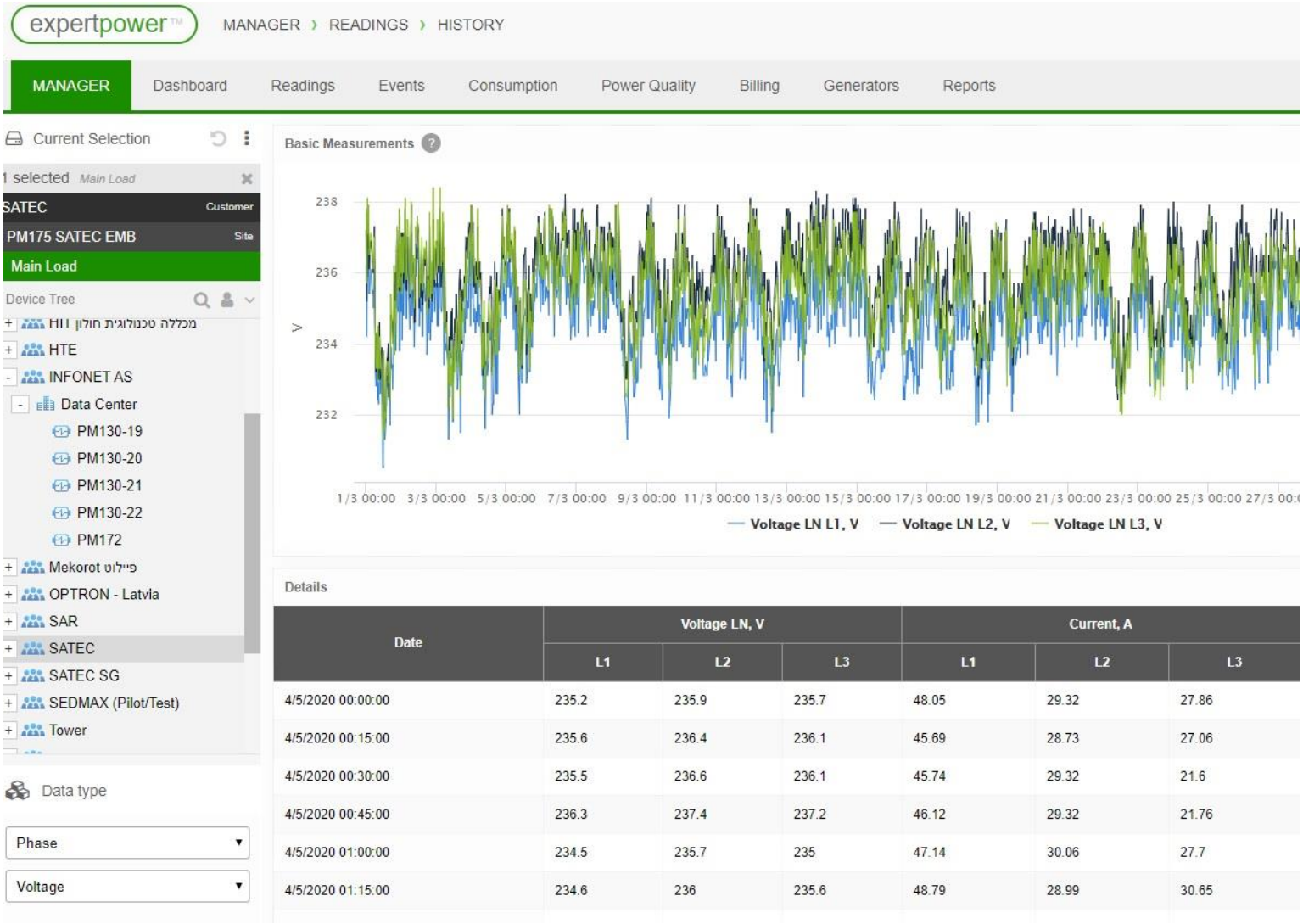
Drag a column header here to group by that column

Event No.	Date	Time	Category	Location	Site	Phase	Value	pu	Duration	WF	TR
45960	5/23/2019	14:35:46:570	Voltage Dips	Main Load	PM175 SATEC EMB	L3	206.7	0.899	00:00:00.020		
45961	5/23/2019	14:35:47:320	Voltage Dips	Main Load	PM175 SATEC EMB	L1	199.8	0.869	00:00:00.090		
45962	5/23/2019	14:35:47:320	Voltage Dips	Main Load	PM175 SATEC EMB	L2	202.2	0.879	00:00:00.090		
45963	5/23/2019	14:35:47:320	Voltage Dips	Main Load	PM175 SATEC EMB	L3	165.7	0.72	00:00:00.090		
45964	5/23/2019	14:41:38:165	Voltage Dips	Main Load	PM175 SATEC EMB	L1	152.6	0.663	00:00:00.130		
45965	5/23/2019	14:41:38:165	Voltage Dips	Main Load	PM175 SATEC EMB	L2	190.2	0.827	00:00:00.130		
45966	5/23/2019	14:41:38:165	Voltage Dips	Main Load	PM175 SATEC EMB	L3	196.9	0.856	00:00:00.130		
46152	7/9/2019	17:45:24:449	Voltage Dips	Main Load	PM175 SATEC EMB	L1	178.6	0.777	00:00:00.159		
46153	7/9/2019	17:45:24:449	Voltage Dips	Main Load	PM175 SATEC EMB	L3	206.4	0.897	00:00:00.159		
46154	7/9/2019	17:45:24:988	Voltage Dips	Main Load	PM175 SATEC EMB	L1	180.4	0.784	00:00:00.130		
46199	7/31/2019	03:38:26:688	Voltage Dips	Main Load	PM175 SATEC EMB	L1	203.7	0.886	00:00:00.100		
46200	7/31/2019	03:38:26:688	Voltage Dips	Main Load	PM175 SATEC EMB	L2	202.2	0.879	00:00:00.100		

Page 1 of 134 < 1 2 3 4 5 6 7 ... 132 133 134 >

PQ – Historical data

Built-in Analisys tools to Excel, PDF

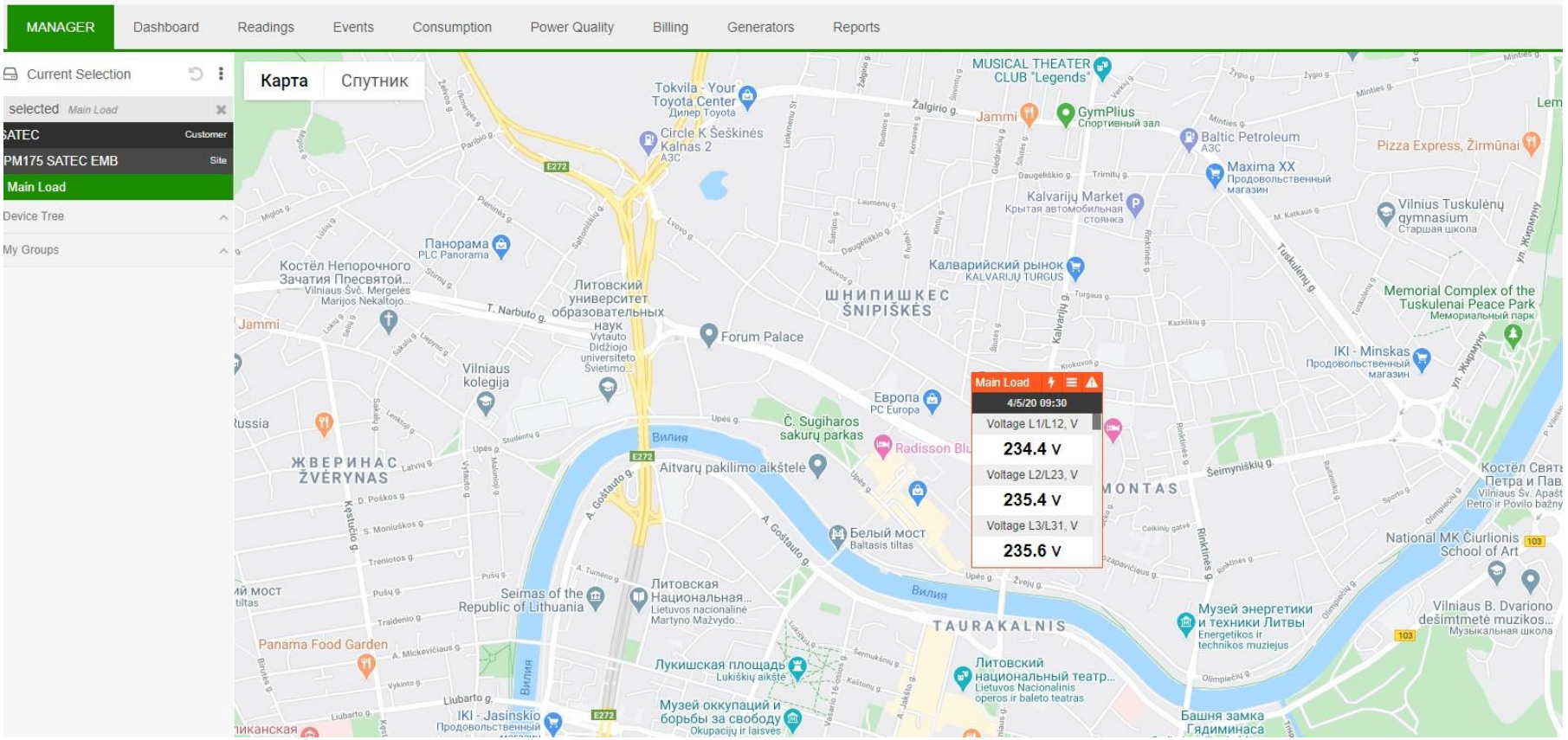


Date	Voltage LN, V			Current, A		
	L1	L2	L3	L1	L2	L3
4/5/2020 00:00:00	235.2	235.9	235.7	48.05	29.32	27.86
4/5/2020 00:15:00	235.6	236.4	236.1	45.69	28.73	27.06
4/5/2020 00:30:00	235.5	236.6	236.1	45.74	29.32	21.6
4/5/2020 00:45:00	236.3	237.4	237.2	46.12	29.32	21.76
4/5/2020 01:00:00	234.5	235.7	235	47.14	30.06	27.7
4/5/2020 01:15:00	234.6	236	235.6	48.79	28.99	30.65

Geolocation

Quick and easy adding any number of PQ devices to GOOGLE MAPS. See the video here:

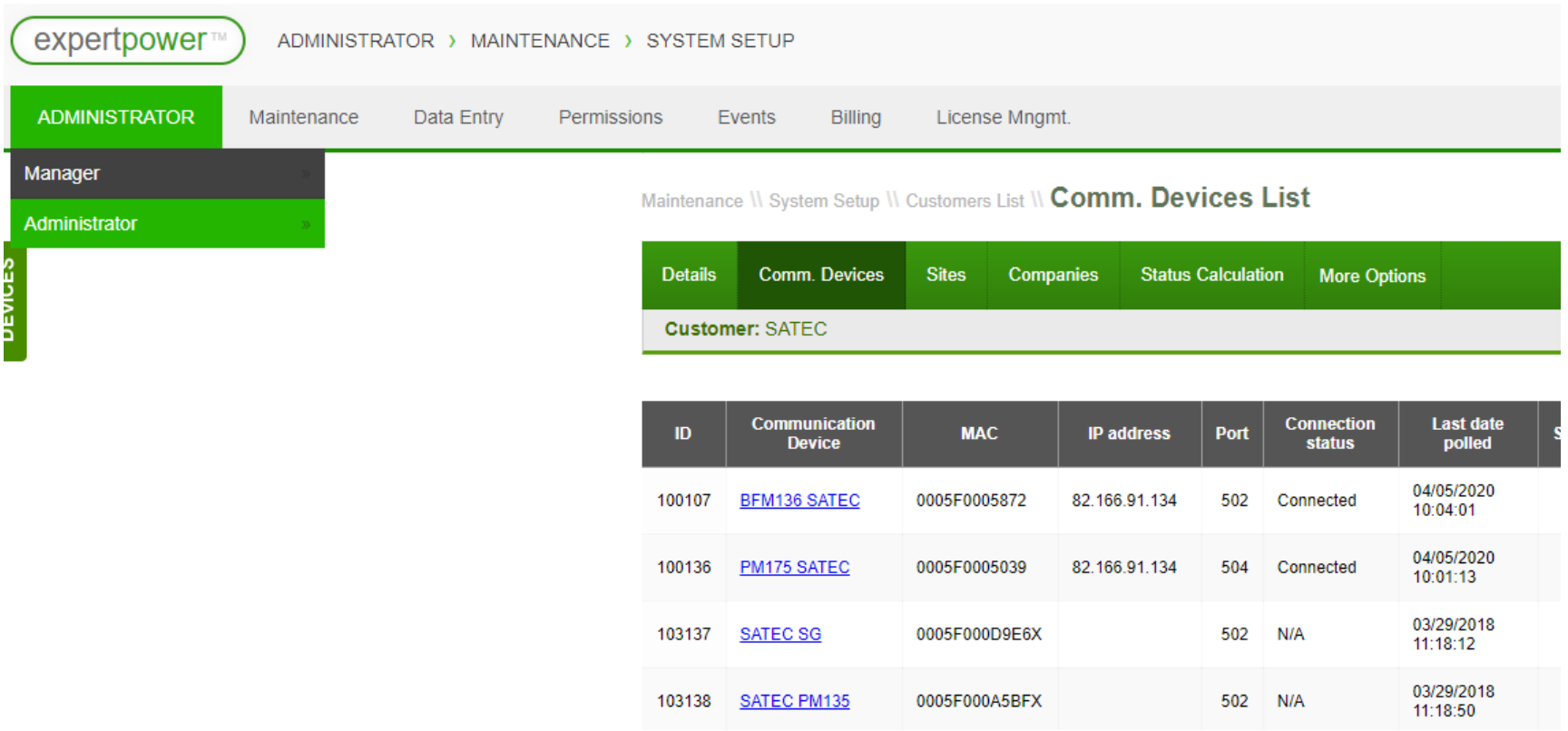
https://www.youtube.com/watch?v=NEfl8tBJiFM&feature=youtu.be



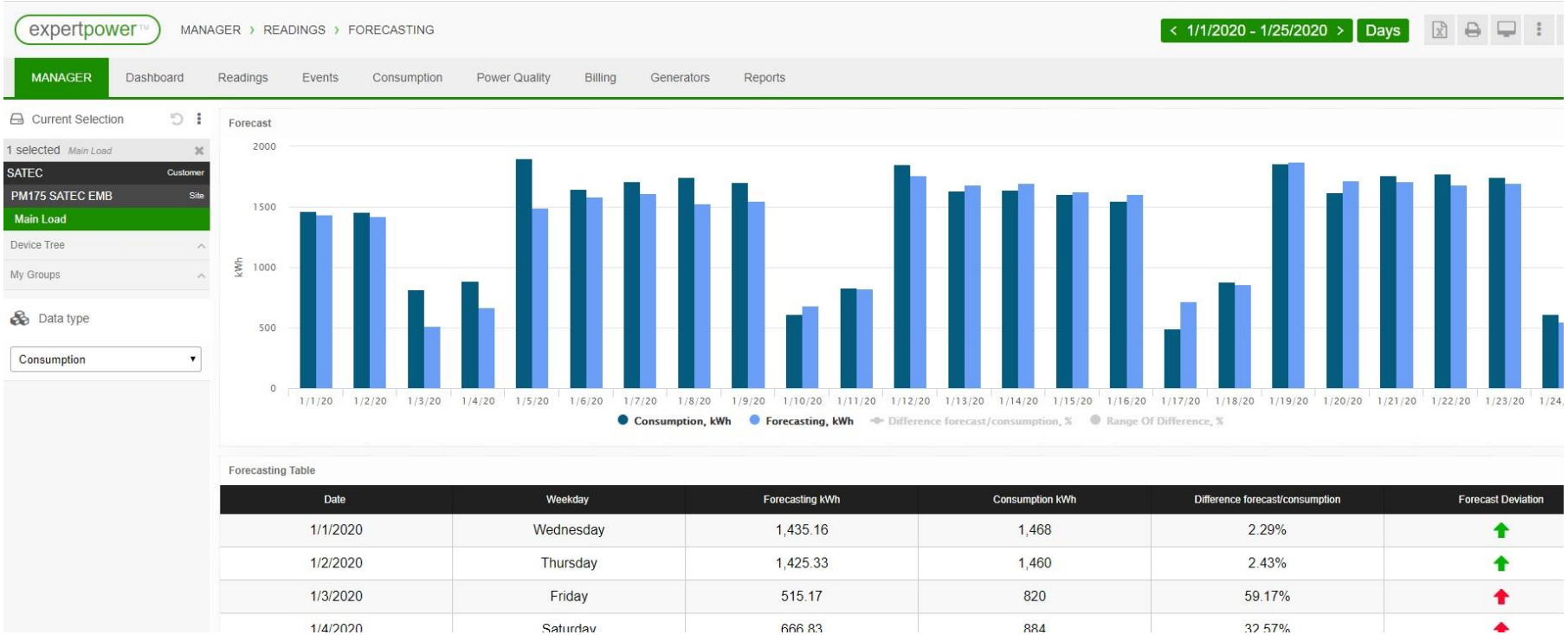
Manager and Administrator - menus

Built-in tools to add/configure devices

All system settings can be made through the Admin menu. No need to contact the program developer/programmer



Energy Forecasting



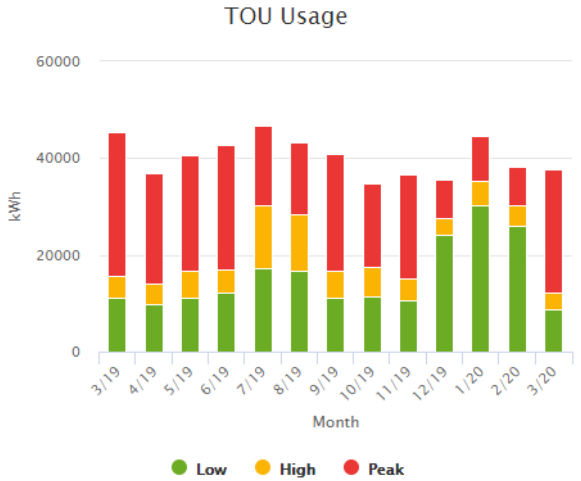
Forecasting Table

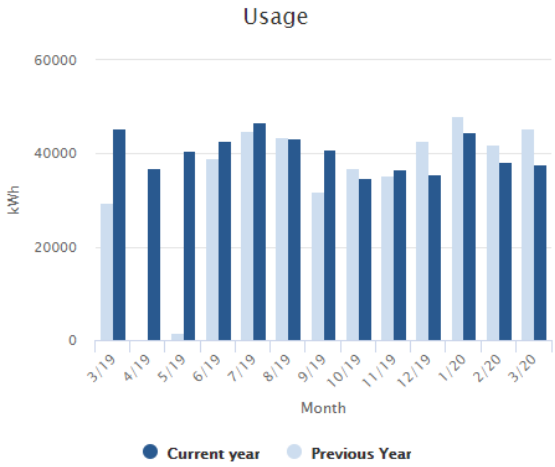
Date	Weekday	Forecasting kWh	Consumption kWh	Difference forecast/consumption	Forecast Deviation
1/1/2020	Wednesday	1,435.16	1,468	2.29%	↑
1/2/2020	Thursday	1,425.33	1,460	2.43%	↑
1/3/2020	Friday	515.17	820	59.17%	↑
1/4/2020	Saturday	666.83	884	32.57%	↑

Energy Billing

Bill period	04/01/2019 - 04/01/2020	Number of days in bill period	366
Metering period	04/01/2019 - 04/01/2020	Number of days in metering period	366
Billing month	March 2020	Method of Charge	216 תעו"ד מ"נ
Meter No.	1007850	Device name	Main Load
Total Area (m2)	250		
UnitID	12345		

Description	Energy Measurements								Billing	
	Usage code	Season	Tariff	Previous		Present		Usage (kWh / kW)	Cost per kWh (agorot)	Total cost (NIS)
				Previous Date	Previous Reading	Present Date	Present Reading			
TOU Energy	77	Summer	Peak	07/01/2019	988,049	09/01/2019	1,019,536	31,487.00	107.25	33,769.81
TOU Energy	78	Summer	High	07/01/2019	299,706	09/01/2019	324,420	24,714.00	48.75	12,048.08
TOU Energy	79	Summer	Low	07/01/2019	901,382	09/01/2019	935,300	33,918.00	33.66	11,416.80
TOU Energy	177	Winter	Peak	12/01/2019	1,082,424	01/01/2020	1,090,177	7,753.00	97.73	7,577.01
TOU Energy	177	Winter	Peak	01/01/2020	1,090,177	03/01/2020	1,103,685	17,612.00	93.10	16,396.77
TOU Energy	178	Winter	High	12/01/2019	340,629	01/01/2020	344,319	3,690.00	59.22	2,185.22
TOU Energy	178	Winter	High	01/01/2020	344,319	03/01/2020	3,926	9,130.00	56.22	5,132.89
TOU Energy	179	Winter	Low	12/01/2019	968,433	01/01/2020	992,464	24,031.00	36.48	8,766.51
TOU Energy	179	Winter	Low	01/01/2020	992,464	03/01/2020	1,035,798	56,291.00	34.70	19,532.98
TOU Energy	777	Fall/Spring	Peak	04/01/2019	915,488	07/01/2019	988,049	72,561.00	47.67	34,589.83
TOU Energy	777	Fall/Spring	Peak	09/01/2019	1,019,536	12/01/2019	1,082,424	62,922.00	47.67	29,994.92
TOU Energy	777	Fall/Spring	Peak	03/01/2020	1,103,685	04/01/2020	1,128,967	25,282.00	45.44	11,488.14
TOU Energy	778	Fall/Spring	High	04/01/2019	285,279	07/01/2019	299,706	14,427.00	39.50	5,698.66
TOU Energy	778	Fall/Spring	High	09/01/2019	324,420	12/01/2019	340,629	16,209.00	39.50	6,402.56
TOU Energy	778	Fall/Spring	High	03/01/2020	3,926	04/01/2020	7,551	3,625.00	37.65	1,364.81
TOU Energy	779	Fall/Spring	Low	04/01/2019	868,038	07/01/2019	901,382	33,344.00	32.70	10,903.49
TOU Energy	779	Fall/Spring	Low	09/01/2019	935,300	12/01/2019	968,433	33,133.00	32.70	10,834.49
TOU Energy	779	Fall/Spring	Low	03/01/2020	1,035,798	04/01/2020	1,044,496	8,698.00	31.07	2,702.47
Subtotal				**04/01/2019**		**04/01/2020**		**478,827.00**		**230,805.42**
kW Max DMD		General	General	04/01/2019		04/01/2020		155.33		
PF		General	General	04/01/2019		04/01/2020		0.981		
סף נדרש 0.92										
VAT				**04/01/2019**		**04/01/2020**			**17.00%**	**39,236.92**
Total Charge				**04/01/2019**		**04/01/2020**				**270,042.34**





Energy Consumption – heat map

Weekly Distribution

Sensitivity Heatmap

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Avg.
00:00 - 01:00	1,867	1,684	1,727	1,747	1,719	1,552	1,521	1,688.14
01:00 - 02:00	1,844	1,680	1,699	1,734	1,685	1,541	1,520	1,671.86
02:00 - 03:00	1,792	1,668	1,690	1,722	1,710	1,513	1,511	1,658
03:00 - 04:00	1,752	1,670	1,684	1,711	1,689	1,512	1,513	1,647.29
04:00 - 05:00	1,738	1,689	1,691	1,723	1,701	1,535	1,512	1,655.57
05:00 - 06:00	2,045	2,040	2,015	2,019	1,949	1,525	1,511	1,872
06:00 - 07:00	3,503	3,415	3,386	3,396	3,450	1,577	1,500	2,889.57
07:00 - 08:00	4,097	4,006	3,988	4,023	3,986	1,632	1,588	3,331.43
08:00 - 09:00	4,755	4,556	4,615	4,641	4,587	1,683	1,844	3,811.57
09:00 - 10:00	5,060	4,866	4,886	4,902	4,842	1,734	2,025	4,045
10:00 - 11:00	5,088	4,914	4,898	4,928	4,854	1,786	1,970	4,062.57
11:00 - 12:00	5,062	4,844	4,887	4,899	4,877	1,776	1,832	4,025.29
12:00 - 13:00	5,025	4,823	4,831	4,847	4,834	1,772	1,679	3,973
13:00 - 14:00	5,039	4,877	4,852	4,852	4,878	1,759	1,658	3,987.86
14:00 - 15:00	5,026	4,873	4,804	4,729	4,865	1,728	1,651	3,953.71
15:00 - 16:00	4,800	4,751	4,659	4,576	4,727	1,703	1,652	3,838.29
16:00 - 17:00	4,642	4,641	4,536	4,525	4,585	1,676	1,634	3,748.43
17:00 - 18:00	4,375	4,398	4,299	4,269	4,281	1,621	1,631	3,553.43
18:00 - 19:00	4,336	3,980	3,924	3,844	3,836	1,579	1,693	3,313.14
19:00 - 20:00	3,158	2,949	2,929	2,908	2,827	1,566	1,817	2,593.43
20:00 - 21:00	2,285	2,295	2,372	2,171	2,041	1,556	1,890	2,087.14
21:00 - 22:00	1,982	1,978	2,020	1,915	1,731	1,538	1,898	1,866
22:00 - 23:00	1,765	1,868	1,921	1,794	1,620	1,537	1,879	1,769.14
23:00 - 24:00	1,667	1,777	1,844	1,752	1,560	1,524	1,914	1,719.71
Avg.	3,445.96	3,343.42	3,339.88	3,317.79	3,284.75	1,621.88	1,701.79	

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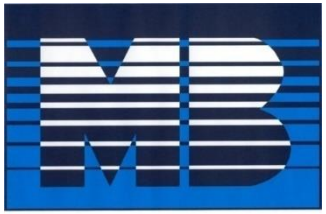
THANK YOU



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