

# Power quality meter with web server technology

These high power quality meters are packed with features such as the ability to determine the location of a disturbance quickly and accurately and determine the direction of the disturbance relative to the meter. Analysis results are captured in the event log, along with a time-stamp and confidence level indicating level of certainty.

Fast sampling rates and extensive memory make this the perfect choice for critical power systems making analysis of issues possible for correction and prevention. As a data accumulator, the 9510 and 9610 meters can also save money and time by simplifying wiring and networking. Information from the meter and downstream devices can be displayed on the large LCD display, on customizable web pages in reports and screens in WinPM.Net.

Applications for the 9510 and 9610 meters range from critical power applications such as data centers to industrial, commercial and government power and power quality monitoring systems. The 9510 and 9610 meters are offered in a number of forms from single meter enclosures to integrated into Siemens switchgear, switchboard and panelboards.

Why guess if you need power factor correction, harmonic mitigation or if your system is being hit with voltage spikes or sags that can reduce the life of the components or total system? Place these high end power quality meters throughout the power distribution system where critical information is desired. Know what is happening in your facility and get maximum efficiency.



## 9510/9610 meters

[www.usa.siemens.com/pds](http://www.usa.siemens.com/pds)

**SIEMENS**

# Power quality meter with web server technology

The 9610 adds expanded 512 samples/cycle power quality analysis and compliance reporting to help you quickly characterize your power. Other highlights include transient capture, an increased sampling rate to 1024 samples/ cycle, enhanced harmonics, and more memory.

Used at key distribution points and sensitive loads, the 9510 and 9610 power quality meters offer unmatched value, functionality, and ease of use. The 9510 features a large graphical display, high accuracy measurements, 256 samples/ cycle, 1/2 cycle set point response, power quality analysis, energy and demand tracking, historical trending, protocol support, web compatibility and control capabilities.

The meters come with an extensive selection of pre-configured data screens and measurements so you can use them right out of the box, or customize either meter to fit your unique requirements.

Integrate them with our WinPM.Net™ software or other energy management and SCADA systems via multiple communication channels and protocols.

Patented technology lets you customize metering or analysis functions at your workstation, without any hard-wiring. Just graphically link a few drag-and-drop icons, or select default setups, and you're ready to go.

## Applications summary

### Compliance monitoring

Use the 9610 to summarize power quality measurements into simple pass/fail indicators. Monitor compliance with international standards such as EN50160, IEC 61000-4-7 (harmonics), and IEC 61000-4-15 (flicker). Or configure the unit for IEEE 519-1992, IEEE 1159 and SEMI F47.<sup>1)</sup>

### Disturbance analysis

Unique dynamic-ranging inputs maintain revenue accuracy at the regular measurement range while simultaneously capturing large-scale disturbances other

meters can miss. Discover the sources of power quality events, harmonics, and voltage sags/swells. Analyze problems and avoid repeat interruptions.

### Cost allocation and billing

Determine cost centers, identify demand control opportunities and check energy consumption patterns.

### Demand and power factor control

Avoid penalties with automated load shedding, scheduling, peak shaving or capacitor bank control.

### Load studies and circuit optimization

Determine the capacity of your electric network and run at peak efficiency. Perform load trending.

## Trending



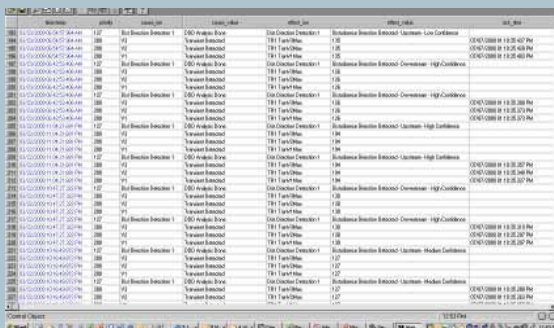
Meter web page with trending and forecasting graphic display

## Fault direction power quality WinPM screen



WinPM.Net power quality screen showing data available from the 9610 meter including fault direction detection

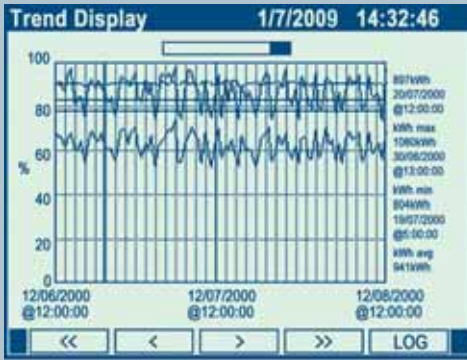
## Fault direction event log WinPM screen



WinPM.Net event log screen showing fault direction information from the 9610 meter as it is logged

1) Not all features listed are available with every model. Please refer to the detailed descriptions within for a complete list of feature availability.

### Trending



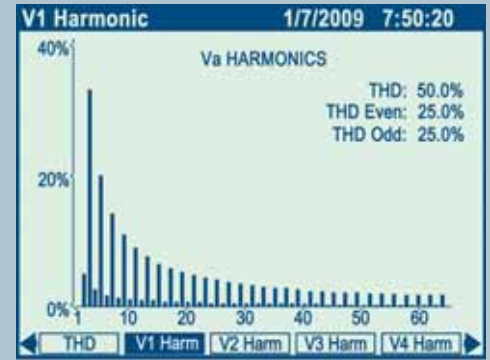
Display kWh usage trends directly on the meter's front panel

### Measure up-time using nines



The meters display system reliability in nines (e.g., 99.9% up-time)

### Harmonic distortion metering



On screen graphic display of Harmonics

### Equipment monitoring and control

Improve process yields and extend equipment life. Meter utilities including air, gas, steam and water.

### Preventative maintenance

Set up alarms to warn of pending problems. Log events and alarms for all critical conditions.

### Features summary

#### Measurements

- Exceeds Class 0.2 revenue accuracy
- Instantaneous 3-phase voltage, current, frequency, power factor
- Energy: bi-directional, absolute, net, time-of-use, loss compensation
- Demand: sliding window, predicted, thermal
- Harmonics: individual and total harmonic distortion up to the 63rd (511th in software)
- Transient detection, 17  $\mu$ s @ 60 Hz, (20  $\mu$ s @ 50 Hz) and sag/swell recording

#### Communications

- The 9510 / 9610 meters have gateway functionality simplifying communications architecture and reduces leased line or connection costs
- Concurrent, independent ports communicate with protocols such as ION, DNP 3.0, Modbus<sup>®</sup> RTU, Modbus TCP and Modbus Master
- Allows for 32 concurrent Modbus/TCP server connections
- Has dial-out capability even when memory is near full
- Has data push capability through SMTP (email)

### On-board data logging

- Scheduled or event-driven logging
- Sequence-of-events, min/max logging, waveform, faults and transient logging

### Set points for control and alarms

- Set point on any parameter or condition
- 1 second or 1/2 cycle operation

### Inputs and outputs

- Standard format includes eight digital inputs, three Form C relay outputs (electromechanical) for control functions, and four Form A digital outputs (solid state) for pulse functions.
- Also available with eight additional digital inputs, four analog outputs, and/or four analog inputs

### Front panel display

The meters offer unique, easy-to-read 3 1/2 x 4 1/2 inch, (89 x 114 mm) LCD display screens with bright back lighting and adjustable contrast.

A selection of character sizes enhance visibility under difficult lighting conditions or at long distances. It provides a user-friendly interface with a screen-based menu system to configure meter settings and an extensive choice of pre-configured display screens, for common applications.

### Metering

#### Energy



The units are fully bi-directional and meter energy in four quadrants. They provide active, reactive and apparent energy parameters and can integrate any instantaneous power parameter to supply measurements like Volt-Hours, Amp Hours, etc. Energy registers can be logged automatically on a programmed schedule.

- kWh delivered and received
- kWh, kVARh, kVAh net (delivered - received)
- kWh, kVARh, kVAh total (delivered + received)
- kVARh, kVAh delivered and received
- Volt-hours and Amp-hours
- Integration of any instantaneous measurement

#### Demand

The units support all standard demand calculation methods, including block, sliding window (rolling block), thermal (exponential), and predicted demand. They can measure demand on any instantaneous value and record peak (maximum) and minimum demand with date and time stamps to the second. Peak demand registers can be reset manually (password protected) or logged and reset automatically on a programmed schedule.

- kW, kVAR, kVA demand, min/max
- Amps, volts demand, min/max
- Demand on any instantaneous measurement

## Data and event recording

Event Log				1/7/2009 10:01:25	
DATE	TIME	SOURCE	EVENT		
06/06/2003	8:56:43	9600 ION	Label Written		
06/06/2003	8:56:43	9600 ION	Setpoint		
06/06/2003	8:56:43	9600 ION	Label Written		
06/06/2003	8:56:43	SS1 Swell Lim	ACTIVE		
06/06/2003	8:56:43	SS1 Swell Lim	INACTIVE		
06/06/2003	8:56:43	9600 ION	Label Written		
06/06/2003	8:56:43	CM2 Protocol	SEAbus/ON		
06/06/2003	8:56:43	9600 ION	Label Written		
06/06/2003	8:56:43	9600 ION	Label Written		

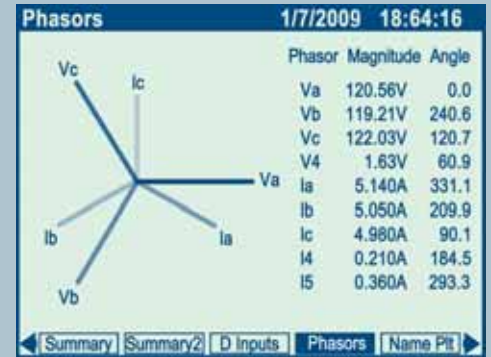
On screen display of event log that are also saved in non volatile memory

## Modbus master

PAC3200		1/7/2009 8:01:25	
V <sub>o</sub> avg	276.8	KW tot	92.1
V <sub>l</sub> avg	480.8	KVAR tot	12.8
I avg	121.8	KVA tot	101.8
I dmd	115.4	KW pk dmd	115.4
Freq	60.0	KVAR pk dmd	15.4
PF sign tot	.82 lg	KVA pk dmd	126.4
V1 THD	208.8	KWh del	11208.8
V2 THD	208.8	KVARh del	1208.8
V3 THD	208.8	KWh del	14208.8

Display of up to 32 Modbus slave devices down stream of the 9510/ 9610 devices

## Vector diagram



Unique vector diagram with magnitude and phase angle can help reduce installation time

## Transformer / line loss compensation

- Flexible compensation methods
- Easy configuration
- Updated every second
- Available through all supported protocols

## Instantaneous

Both units provide a choice of high accuracy, one second or high-speed, 1/2 cycle measurements, including true RMS, per phase and total for:

- Voltage and current
- Active power (kW) and Reactive Power (kVAR)
- Apparent power (kVA)
- Power factor and frequency
- Voltage and current unbalance
- Phase reversal

## Time-of-Use

The meters offer comprehensive time-of-use (TOU) metering, configurable in accordance with virtually any utility tariff structure. Automatically record TOU register values at user-specified time intervals, at pre-scheduled dates and times, or when internal or external events occur.

## Trending

Both meters offer access to historical data right at the front panel. The meters display, trend and continuously update historical data with date- and time-stamps for up to four parameters simultaneously.

## Power Quality Metering Compliance Monitoring<sup>1)</sup>

- EN 50160 compliance monitoring
- IEC 61000-4-7 harmonics and inter-harmonics
- IEC 61000-4-15 flicker
- CBEMA/ITIC
- IEEE 519 and IEEE 1159

## Waveform recording

The meters can simultaneously capture all voltage and current channels.

- Sub-cycle disturbance capture, using patented 4 times over sampling for more accurate waveform analysis
- Record back-to-back waveforms for up to several seconds
- Display and compare multiple waveforms from differing time frames in WinPM.Net software
- Up to 512 samples/cycle with 9610, optional 1024 samples/cycles
- Up to 256 samples/cycle with 9510
- Customizable pre-event waveform triggering
- The maximum number of cycles per event on a continuous waveform capture is 214,000 (16 samples/cycle x 96 cycles)

## Measure Up-time using nines

Measure the number of nines of reliability (9 nines or 2 cycles downtime) with the 9510 and 9610 advanced meters.

## Out-of-limit detection indicators

Detect, record, and report the specifics of voltage or current imbalances and loss, frequency/power factor variations, over and under voltage, total outage time and out of tolerance duration.

## Harmonic distortion metering

Complete harmonic distortion metering, recording and real-time reporting, up to the 63rd harmonic, (511th for 9610 via WinPM.Net software), for all voltage and current inputs.

- Individual harmonics, (including magnitude, phase and inter-harmonics for the 9610)
- Total even harmonics and total odd harmonics
- Total harmonics (even + odd)
- K-factor, Crest factor

## Symmetrical components<sup>1)</sup>

Zero, negative and positive sequences including phase and magnitude for voltage and current inputs. Identify harmful voltage and current unbalances in equipment before they cause damage.

## Sag/swell detection

The 9510 and 9610 incorporate a dedicated sag/swell capture capability that can be used to analyze the severity and potential impact of sags and swells.

- Magnitude and duration data suitable for plotting on voltage tolerance curves
- Per-phase triggers for waveform recording or control operations

## Transient Capture<sup>1)</sup>

- The 9610 can detect and record sub cycle transients as short as 17  $\mu$ s @ 60 Hz, (20  $\mu$ s @ 50 Hz)

1) Available only on 9610.

### Data and Event Recording

The 9510 and 9610 meters come equipped with 5 MB of configurable, non volatile memory standard and an option for 10MB for waveform, event and log storage.

### Load Profiling

The 9610 incorporates 640 channels via 40 data recorders, the 9510 provides 320 channels via 20 data recorders. Channel assignments are configurable for historical trend recording of energy, demand, voltage, current, power quality, or any other measured parameter. Trigger recorders based on time interval, calendar schedule, alarm/event condition, or manually.

### High-Speed Data Recording

High-speed "burst" recording (as fast as 1/2-cycle intervals) stores detailed characteristics of disturbances or outages. Trigger recording by a user-defined set-point, or from external equipment. Gated recording logs data only during the critical event so that memory is conserved.

### Coincident Min/Max Recording

Log the values of key parameters or equipment conditions coincident with an extreme condition, complete with date/time stamping. For example, record all feeder voltages and currents at the moment a peak demand condition occurs.

### Time Synchronization and GPS

A real-time clock allows internal events and data records to be date-stamped and time-stamped to millisecond resolution. The clock can be synchronized to any one of three sources:

- The meter's internal crystal (+/- 50ppm)
- The line frequency of the electrical network being metered
- An external GPS receiver with an accuracy of +/- 1 millisecond

The serial port used for GPS time synchronization is dedicated exclusively as a GPS input.

### Logic, math, and control

Perform on-board calculations on any measured value, calculate true quantities from pulse inputs (e.g., BTUs) and calculate transformer loss compensation values. You can also implement real time billing schemes.

### Mathematical functions

Define formulas using the following operators:

- Arithmetic (+, x, -, ÷)
- Comparison (>, <, =, ≥, ≤, ≠)
- Logical (AND, OR, NOT, TRUE, FALSE, IF)
- Trigonometric (SIN, COS, TAN, ASIN, ACOS, ATAN)
- Math (PI, SQRT, POWER, SUM, SUMSQ, AVG, RMS, LOG10, LN, MAX, MIN)

### Programmable logic and set point

Twenty-four set points can be set for 1-second or 1/2 cycle operation and can be triggered by any over or under condition. Set points can trigger:

- Audible, (through software) and visible alarms
- Modem/pager dial-back
- Data logging
- Waveform recording with control over pre-event and post-event capture
- Relay control
- Clearing and reset functions
- Relative set point

### Software integration

Extensive communication capabilities enable the meters to be easily integrated into energy management and distribution control systems.

### WinPM.Net

Both units are compatible with our Windows® WinPM.Net power monitoring software. WinPm.Net displays real-time and logged data and offers manual control/configuration capabilities. It provides enterprise-wide data sharing in a secure networked environment.

### Modbus master

The meters can read and write data to Modbus slave devices through a designated serial port. This powerful feature allows meters to collect data from Modbus devices, process it, then deliver condensed information in a variety of ways.

Modbus Master read capability lets you perform detailed sub-metering by acquiring data from nearby, low-cost meters. Data acquired from attached Modbus slave devices (such as voltage, current, power factor and energy) can be recorded in on-board memory, presented on the graphical display or monitored using built-in set point.

Modbus Master write capability lets you send commands and data to attached Modbus slave devices. Applications for this capability include controlling remote I/O points, resetting set point or configuration parameters on PLCs and simple data exchange with other information systems.

### Internet Connectivity

#### MeterM@il

Meters equipped with an Ethernet port can automatically e-mail alarm notifications or scheduled system-status updates. MeterM@il messages can be received like any e-mail message, at a workstation, cell phone, pager or PDA. Data logs can also be sent on an event-driven or scheduled basis via e-mail, while conveniently accommodating firewall restrictions.

### WebMeter

An on-board customizable Web server, combined with an Ethernet port offers quick and easy access to real-time energy power quality information without special software. Built-in web pages display a range of energy and basic power quality information without special software. Standard or custom screens can be viewed from any PC running Internet Explorer 5.5 or higher.

### XML Compatibility

The units can also exchange information using industry-standard XML format. It's simple machine readable-format supports easy integration with custom reporting, spreadsheet, database and other applications.

### Communications

#### Multi-port, Multi-protocol access

Simultaneous communication on up to 4 ports provides secure, data sharing with a variety of energy management systems using a choice of communication standards and protocols.

#### RS-232/RS-485 port

Selectable between RS-232 and RS-485

- Protocols: ION®, DNP 3.0, Modbus RTU, GPS, EtherGate, or ModemGate
- Baud rate: 300 bps to 115,200 bps

#### RS-485 Port

- Protocols: ION, DNP 3.0, Modbus RTU, GPS, EtherGate, or ModemGate
- Baud rate: 300 bps to 57,600 bps

### Infrared data port

The ANSI Type 2 compliant optical port can download real-time data to a portable PC.

- Protocols: ION, Modbus RTU, DNP 3.0
- Baud rate: Up to 19,200 bps

### Internal modem

Available internal telephone modem features fast connect time, and ModemGate, a gateway letting up to 31 additional devices share a meter's internal modem via the remaining serial ports. (Optical port and Internal Modem cannot be operated simultaneously)

- Protocols: ION, Modbus RTU and DNP 3.0
- Baud rate: Up to 33.6 kbps

### Ethernet port

Optional 10/100 Base-T or 10/100 Base-FL port offers direct access through an Ethernet LAN/WAN and features EtherGate, which permits the direct transfer of data between an Ethernet network and up to sixty-two devices via the meter's two serial ports. The meter can also support two masters via the Ethernet port allowing communications with separate supervisory systems at the same time.

- Protocols: TCP/IP, ION, Modbus TCP, DNP 3.0, Telnet
- Baud rate: Up to 10 Mbps

### UTS software support

The meters are fully compatible with UTS software platforms including MV-90,® MVP, MVRS, MVLT and MVCOMM, and are unique in offering a direct Ethernet connection to MV-90.

### Flash-based firmware

Perform upgrades via communications without removing the unit from the site.

### Inputs/outputs

Standard digital and optional analog I/O allows you to monitor a wide range of conditions, such as flow rates, RPM, fluid levels, oil pressures and transformer temperatures. You can output energy pulses to an RTU or perform equipment control operations.

### Digital inputs/outputs

- 8 digital inputs can monitor status or count pulses from external "volts free" dry contact
- 4 solid state relay output ports and 3 on-board relays can be controlled automatically by internal set point or manually via a communications port

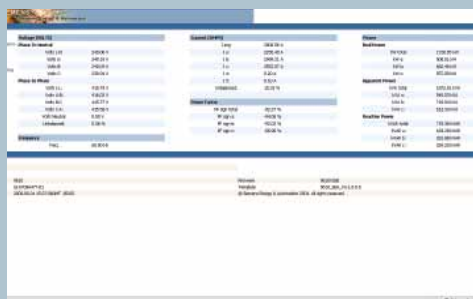
### Analog inputs/outputs

Either meter can be equipped with an optional analog I/O card featuring:

- 8 digital inputs
- 4 analog inputs accepting 0–1mA or 0–20 mA, (scalable to 4–20mA)
- 4 analog outputs accepting -1–1mA or 0–20 mA, (scalable to 4–20mA)
- 4 analog inputs accepting 0–20 mA and 4 analog output accepting 0–20 mA
- 4 analog inputs accepting 0 to 1mA and 4 analog outputs accepting -1 to 1 mA

Contact Siemens for supported I/O combinations.

9610 WebMeter



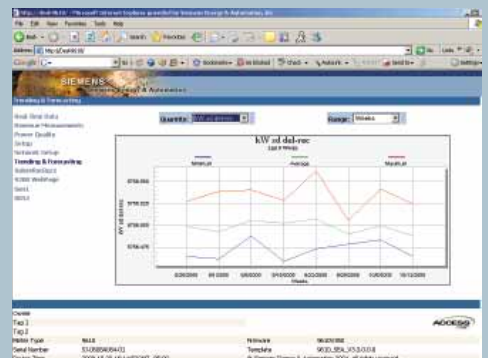
Built-in web server provides browser access to extensive real-time meter data

9610 Trending



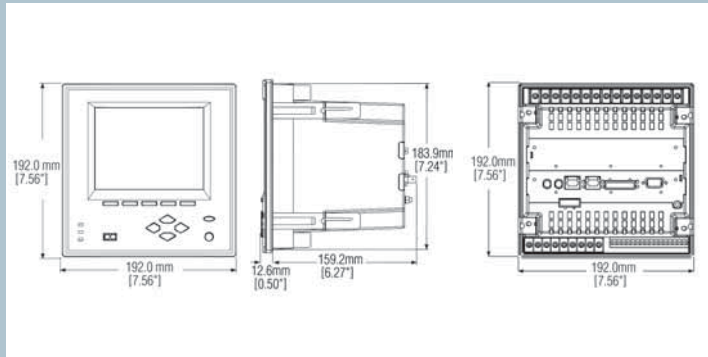
Built-in web server provides browser access to extensive real-time meter data

Trending Forecasting



Built-in web server provides browser access to extensive real-time meter data

### Meter with integral display dimensions

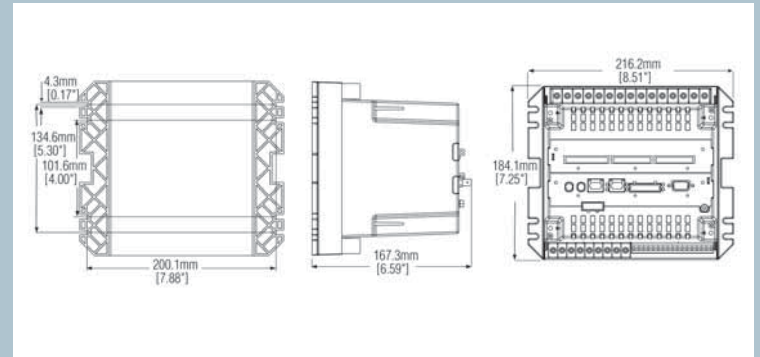


Front view

Side view

Front view, TRAN model

### Meter transducer unit (w/o display) dimensions



Back View

Side view, TRAN model

Rear view, TRAN model

### Simple configuration tools

The meters are based on patented object oriented technology, which ensures the longevity of your metering solution because it can adapt as your needs change and lets you take advantage of our ongoing advances in technology. The measurements and other functions of both units are provided by modules. You can quickly add or rearrange functions with drag-and-drop icons and a few clicks of a mouse. Imagine new features and build them.

### Mounting

The 9510 and 9610 can be panel mounted in a single DIN standard 186 mm X 186 mm cutout.

- Bezel size: 192 x 192 mm (DIN)
- A distance of 160 mm (6 1/2 inches) clearance is required behind the panel (plus allowance for connectors and cables)
- An adapter plate is available to facilitate the conversion from our 4000 series meters to the 9610 and 9510. Please contact us for more information.

TRAN models have no integrated display and can be flush-mounted against any flat surface.

### Connections

#### Installation

- 4-wire Wye, 3-wire Wye, 3-wire Delta, Direct Delta and Single Phase systems
- 4 voltage and 5 current inputs
- All inputs pass ANSI/IEEE C37.90-1989 surge withstand and fast transient tests

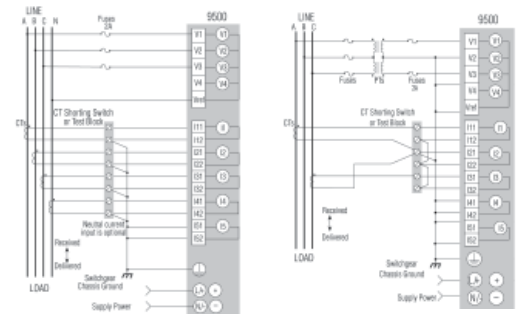
### Voltage and current inputs

- Autoranging 57 through 347 I-n/600 I-I inputs
- No PTs needed for Wye systems up to 347/600 VAC
- Standard 5 to 20 Amp current inputs
- Optional 1 Amp current inputs
- Low voltage current option

### Control power

The 9510 and 9610 standard power supply has a voltage range of 85 to 240 VAC and 110 to 330 VDC, and can be powered from a dedicated fused feed

### Example connections



4-Wire Wye (Direct connection)

3-Wire Delta (2 PTs and 2 CTs)

### Measurement specifications

Parameter	Accuracy ± (%reading)	Register bounds
<b>1 second</b>		
Voltage (I-I) (I-n)	0.1%	0 to 1x10 <sup>6</sup> V
Frequency	0.01%	47 to 63 Hz
Current (I1, I2, I3)	0.1%	0 to 1x10 <sup>6</sup> A
Current (I4, I5)	0.4%	0 to 1x10 <sup>6</sup> A
kW, kVAR, kVA*	class 0.2	0 to ± 3.3x10 <sup>7</sup>
kWh, kVARh, kVAh*	class 0.2	0 to ± 1037
KW, KVA Demands	class 0.2	0 to ± 3.3x10 <sup>7</sup>
Power Factor @ Unity PF	0.5%	-0.01 to -100.00, 100.00 to 0.01
Harmonics (to 40th)	IEC 61000-4-7	0 to 1x10 <sup>6</sup>
Harmonics (to 63rd)	1% Full Scale	0.0001 to 100.00
K Factor	5% Full Scale	0 to 1x10 <sup>6</sup>
Crest Factor	1% Full Scale	0 to 10
Symmetrical Components	Voltage: 0.2% FS <sup>2)</sup>	Magnitude: 0 to 1x10 <sup>6</sup> ; Phase: -180 to 180
Current: 0.4% FS		

1) Refer to Compliance section on page 6.

2) FS = Full Scale Display resolution meets or exceeds accuracy.

### User Programmable Log Capacity

Parameter	Format	5MB (Max)	10MB (Max)	5MB (Default)	10MB (Default)
Events	—	20,000 events	20,000 events	500 events	500 events
Data	15 minute intervals	1.6 years	3.3 years	35 days	95 days
(16 parameters)	60 minute intervals	6.4 years	13.2 years	—	—
Waveforms	7 cycles @128 samples/cycle	185	390	30	30
(6 Channels)	22 cycles @16 samples/cycle	365	785	—	—

## Specifications

### Voltage inputs

- Inputs: V1, V2, V3, V4, VREF
- Rated Input: 347 LN/600 LL VAC RMS
- Overload: 1500 VAC RMS continuous
- Dielectric Withstand: 3250 VAC RMS, 60Hz for 1 minute
- Impedance: 5 MOhms/phase
- Fault Capture: 1200 Vpeak

### Current inputs

- Inputs: I1, I2, I3, I4, I5

### Standard current transformers

- Class 2
  - Rated nominal: 1A, 2A, 5A, and/or 10A
  - Starting current: 0.001A RMS
  - Fault capture: 17.5A (instantaneous) peak
  - Max. voltage: 600V RMS (CAT III IEC61010-1)
  - Overload: 50A RMS for 1 second, nonrecurring
  - Dielectric withstand: 3250VAC, 60Hz for 1 minute
  - Burden: 0.015VA per phase (at 1A)
  - Impedance: 0.015 Ohms per phase
- Class 20
  - Rated nominal: 5A, 10A and/or 20A
  - Starting current: 0.005A RMS
  - Fault capture: 70A (instantaneous) peak
  - Max. voltage: 600V RMS (CA III IEC61010-1)
  - Overload: 500A RMS for 1 second, nonrecurring
  - Dielectric withstand: 3250VAC, 60Hz for 1 minute
  - Burden: 0.05VA per phase (at 5A)
  - Impedance: 0.002 Ohms per phase

### Digital inputs

- 8 Inputs: S1-S8, SCOM self-excited, dry contact sensing, no external voltage required
- Minimum pulse width: 1msec
- Maximum pulse rate: 20 pulses/sec.
- Scan Time: 1/2 cycle
- Timing resolution: 1 ms
- Isolation: 300 Vpeak for 10s, 60 Hz
- Max rated voltage 120VDC (external excitation)

### Electromechanical relays

- 3 Relays: R1 - R3, Form C
- Rated voltage: 250 VAC / 30 VDC
- Max. voltage: 380 VAC, 125 VDC
- Rated load @ 10 A AC/DC resistive, Rated voltage: 7.5 A (AC) / 5 A (DC) Inductive (p.f. = 0.4)
- Max. switching load: 2500 VA resistive, 1875 VA inductive (p.f. = 0.4)
- Turn-on time: 15ms max
- Turn-off time: AC: 10ms max, DC: 5ms max
- Isolation: 5,000 VAC for 1 minute
- Lifetime: 10,000,000 operations (no load), 100,000 operations (rated voltage and load)
- Update Time: 1/2 cycle or 1-second

### Solid state outputs

- 4 Solid State Outputs: D1-D4, Form A
- Maximum voltage: 30 V
- Maximum current: 80 mA
- Isolation: Optically isolated. Max 5000 Vrms isolation (UL:E64380)
- Scan Time: 1/2 cycle or 1-second

### Analog outputs (optional)

- Outputs: 4: A01 – A04
- Signal type: DC current
- Range: 0-20mA (scalable 4-20), or -1-1mA (scalable 0-1)
- Driving capability: 500 Ohms (20mA), or 10K Ohms (1mA)
- Accuracy: +/- 0.2% of full scale
- Update rate: 1/2 cycle or 1 second
- Isolation: 750V to earth

### Analog inputs (optional)

- Inputs: 4: AI 1 to AI 4
- Signal type: DC current
- Range: 0 to 20mA (scalable 4 to 20), or 0 to 1mA
- Input impedance: 24 Ohms (20mA), or 475 Ohms (1mA)
- Accuracy: +/-0.2% of full scale
- Update rate: 1 second
- Isolation: 750V to earth
- Common mode: Max. 400k Ohms (channel to channel)

### Power supply

- Rated Inputs: AC: 85-240 VAC (+/- 10%), 47-63 Hz DC: 110-330 VDC (+/- 10%)
- Dielectric Withstand: 2000 VAC RMS, 60Hz for 1 min.
- Burden: Typical: 20 VA, Max: 35 VA
- Ride-through: Min: 100ms (6 cycles @ 60 Hz @ 96 VAC) 200ms (12 cycles @ 60 Hz @ 120 VAC), 800ms (48 cycles @ 60 Hz @ 240 VAC)

### Alternate low voltage DC power supply

- Rated Inputs: 20-60Vdc +/- 10%
- Burden: Typical 12 VA, Max 18 VA
- Ride through: None

### Communications

#### Serial ports

- 1 RS-232/485 and 1 additional RS-485 port
- Protocols: ION, DNP 3.0, Modbus RTU, GPS
- Ethergate, ModemGate, Modbus Master
- Baud rate: RS-232: 300bps to 115,200bps
- RS-485: 300bps to 57,600 bps

#### ANSI type 2 optical port

- Interface: ANSI Type 2 Optical Port
- Baud rates: 1200-19,200bps
- Duplex: Half
- Protocols: ION 2.0, Modbus RTU, DNP 3.0
- Location: Front of Meter

#### Internal modem

- Data rate: 300bps - 33.6kbps (V3.4, V.32 bis, V.32, V.22 bis, V.22 A/B, V23, V21, Bell 212A, Bell 103)
- Automatic data rate detection is supported
- Error correction: V.42 LAPM, MNP 2-4, MNP 10
- Data compression: V.42bis/MNP 5
- Interface: RJ11 (tip and ring)
- Government approvals: FCC P68 (USA), Industry Canada CS-03, CTR21 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK)



### Ethernet port

- Protocols: TCP/IP, Telnet, ION, Modbus TCP, DNP 3, XML
- Interface: IEEE 802.3-1993, ISO/IEC 8802-3:1993 (Ethernet) 10/100 Base-T or 10/100 Base-FL (optional)
- 10/100 Base-T:
  - Cabling: Unshielded twisted pair cable, 0.5mm (24 AWG), max. length 100 meters
  - Connector: RJ45
  - Isolation: Transformer isolated, min. isolation voltage: 1500VAC RMS/2250VDC
- 10/100 Base-FL:
  - Cabling: Fiber optic cable, 62.5/125um nominal, wavelength 1308nm, max. length 2000 meters
  - Connector: ST (male)
  - Isolation: Optical

### Environmental conditions

- Operating Temp: -20°C to +70°C (no formation of ice) (-4°F to 158°F)
- Storage: -40°C to +85°C (-4°F to 185°F)
- Humidity: 5 to 95% non-condensing

### Shipping

- 7.1 lbs / 3.2 kg
- 17 x 10 x 11 inches (0.98 cu. ft.)
- 40.8 x 24 x 27.9 cm (0.0235 cu. m)

### Display

- Type: FSTN Liquid Crystal Display (LCD)
- Resolution: 320 x 240 pixels (1/4 VGA)
- Temperature: Display operational -20°C to +70°C
- Backlight: LED

### Standards compliance

#### Accuracy<sup>1)</sup>

- Independent Compliance with IEC62053-22 0.2S, 1A and 5A tested by KEMA<sup>2)</sup>
- Complies with ANSI C12.20, Class 10 and Class 20
- Complies with Measurement Canada AE-1021

#### Safety/construction

- IEC1010-1 (EN61010-1) Safety requirements for electrical equipment for measurement, control and laboratory use
- CSA C22.2 No 1010-1 Canadian Standards Association
- UL3111-1 Measuring, Testing and Signal Generation Equipment

#### Electromagnetic immunity

- IEEE C.37-90.1-1989 IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems (ANSI) (All inputs except for the network communication port)
- IEC1000-4-2 (EN61000-4-2/IEC801-2) Electrostatic Discharge (B)
- IEC1000-4-3 (EN61000-4-3/IEC801-3) Radiated EM Field Immunity (A)
- IEC1000-4-4 (EN61000-4-4/IEC801-4) Electric Fast Transient (B)
- IEC1000-4-5 (EN61000-4-5/IEC801-5) Surge Immunity (B)
- IEC1000-4-6 (EN61000-4-6/IEC801-6) Conducted immunity

- IEC1000-3-2 (EN61000-3-2) Limits for harmonic currents emissions (equipment input current < 16 amps per phase)
- IEC1000-3-3 (EN61000-3-3) Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current < 16 amps
- EN51040 Radiated EM Field Immunity(A)
- EN51041 Conducted EM Field Immunity(A)
- EN50082-2 Electromagnetic, Compatibility, Immunity

#### Electromagnetic emission

- FCC Part 15 Subpart B, Class A Digital Device, Radiated Emissions
- EN55011 (CISPR 11) Radiated/Conducted Emissions (Group 1, Class A)
- EN55022 (CISPR 22) Radiated/Conducted Emissions (Class A)
- EN50081-2 Electromagnetic Compatibility Emissions

<sup>1)</sup> Products meet or exceed the accuracy requirements of the standards listed. All products tested internally by Siemens. Some products tested by third-party laboratory. Due to form factor of some meters, not all ANSI/IEC compliance tests may apply. Contact Siemens for further clarification.

<sup>2)</sup> KEMA certification pending. Contact factory for availability.



**Order Information for 95/9610 Power Meters**

**Catalog Number**

**Description**

9 X 1 0 D C - 1 1 5 6 - C Z Z A

Description						9	X	1	0	D	C	-	1	1	5	6	-	C	Z	Z	A					
<b>Meter base unit and display options</b>																										
• Meter with integrated display and 5MB logging memory										D																
• Meter with integrated display and 10MB logging memory										E																
• Meter without display (Tran version) and 5MB logging memory										T																
• Meter without display (Tran version) and 10MB logging memory										U																
<b>Sampling rate</b>																										
• Standard sampling (256 for 9510) ( 512 for 9610) per cycle maximum										C																
• 1024 Samples per cycle (9610 only)										H																
<b>Power Supply</b>																										
• 85-240 Vac / 110-300 Vdc																						1				
• 20-60 Vdc																							2			
<b>Input Voltage</b>																										
• 120 to 347 L-N / 208 to 600 L-L V AC																							1			
<b>Input Current</b>																										
• 1A Nominal (10 Amp full scale)																							1			
• 5A Nominal (20 Amp full scale)																								5		
<b>Frequency</b>																										
• 50 Hz																								5		
• 60 Hz																									6	
<b>Communication Cards</b>																										
RS232/RS485 (Selectable)	RS485	Infrared (Note 1)	Modem (Notes 1 & 2)	10/100 Base-T	10/100 Base-FX																					
•	•	•																					A			
•	•	•	•																				C			
•	•	•		•																			G			
•	•	•	•	•																			H			
•	•	•		•	•																		J			
•	•	•	•	•	•																		K			
<b>Auxiliary I/O Cards</b>																										
• None (base meter includes 8 digital in and 7 digital out)																								Z		
• 8 Binary Inputs; 4 Analog Inputs 0 to 20 mA and 4 Analog Outputs 0 to 20 mA																									F	
• 8 Binary Inputs; 4 Analog Inputs 0 to 1 mA and 4 Analog Outputs -1 to 1 mA																									G	
<b>Tropicalization Option</b>																										
• None																								Z		
• Yes																									T	
<b>Specials</b>																										
• None																									A	
• Password protected and hardware lockable (lock enabled/disabled via jumper on comm card)																										B
• EN50160 Compliance Monitoring (available on 9610 only)																									C	
• EN50160 Compliance Monitoring with password protected and hardware lockable (lock enabled/disabled via jumper on comm) (available on 9610 only)																										D

Note 1 – The infrared and modem connections cannot be operated simultaneously. The connection type is configurable.

Note 2 – The listed modems are not suitable for European applications. Contact Siemens for special versions.

Features List	9510	9610/9610H
<b>Power Quality</b>		
Sag/Swell Monitoring	•	•
Symmetrical Components: zero, positive, negative		•
Transient detection, microseconds		17 $\mu$ s @ 60 Hz, (20 $\mu$ s @ 50 Hz)
Harmonics (individual, even, odd, total) up to	63rd	127th / 256th
Harmonics: magnitude, phase and inter-harmonics		
Sampling rate, maximum samples per cycle	256	512 / 1024
Flicker, (harmonics to EN50160, IEC 6100-4-7/4-15)		•
Configurable for IEEE 519 - 1992, IEEE1159, SEMI/ITIC		•
Uptime in number of nines	•	•
<b>Logging and Recording</b>		
Standard memory capacity	5 MB	5 MB
Maximum optional memory capacity	10 MB	10 MB
Minimum/maximum logs for any parameter	•	•
Historical logs, # of logs/total points	20 / 320	40 / 640
Waveform logs, max # of consecutive cycles per event	96	96
Time-stamps, resolution in seconds	0.001	0.001
Historical trend information via front panel display	•	•
GPS time synchronization	•	•
<b>Communications and I/O</b>		
RS-232 ports	1	1
RS-485 ports	2	2
Ethernet ports	1	1
Infrared optical port	1	1
Internal Modem	1	1
DNP 3.0 through serial, modem and I/R ports	•	•
Modbus RTU slave on serial, modem and I/R ports	•	•
Modbus RTU Master on serial ports	•	•
Modbus TCP through Ethernet	•	•
EtherGate, data transfer between Ethernet & RS-485	•	•
ModemGate, data transfer between internal modem & RS-485	•	•
MeterM@il, logged data and alarms via e-mail	•	•
WebMeter, on board web server	•	•
XML	•	•
Analog Inputs (optional)	4	4
Analog Outputs (optional)	4	4
Digital status inputs/counter (standard / optional)	8 / 8	8 / 8
Digital relay outputs (Form C / Form A)	4 / 3	4 / 3
<b>Set points, Alarming and Control</b>		
Set points, minimum response time	½ cycle	½ cycle
Set points, number of	65	65
Math, logic, trig, log, linearization formulas	•	•
Single and multi-condition alarms	•	•
Call-out on alarms	•	•
<b>Revenue Metering and Standards</b>		
ANSI C12.16 accuracy compliant	•	•
ANSI C12.20 0.2 compliant	•	•
IEC 60687 0.2S compliant	•	•
IEC 60687 accuracy class 0.5S compliant	•	•
ANSI class 2, IEC 1/10 (1A nominal, 10A max)	•	•
ANSI class 20, IEC 5/20 (5A nominal, 20A max)	•	•
MV-90 on serial, Ethernet ports	•	•
Time-of-Use	•	•
Transformer/line loss compensation	•	•

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