

9300
9330
9350

Advanced
Power Meters



product GUIDE



SIEMENS

Global network of innovation

Advanced Power Meters

Used in diverse applications from metering equipment and buildings, through monitoring the status of feeders and key interchange points, the 9300 series offers unmatched value, functionality, and ease of use.

The 9300 is an ideal analog meter replacement. It offers hundreds of 3-phase power, energy, demand, and harmonics measurements, digital outputs, an optional Ethernet port, Internet connectivity and many space-saving configurations

The 9330 meter gives you all the high-accuracy measurements of the 9300, plus on-board data storage, setpoints, digital I/O, an optional Ethernet port and optional built-in modem, either of which can be used as a gateway to as many as 31 serial devices.

The 9350 meter is further augmented by a sampling rate of 64 sample/cycle, waveform recording, sag/swell, enhanced harmonics and a call-back function for prompt response to critical alarms.

Integrate any of the 9300 Series products with our WinPM.Net™ software or other automation systems for information-sharing among many departments and user groups.

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.

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

Applications Summary

Power and Energy Metering

Each meter in the versatile 9300 series gives you hundreds of high-accuracy power, energy, demand and harmonics measurements. Use the revenue-certified models for billing, bill verification, and sub-metering applications.

Power Quality Analysis

Discover the sources of harmonics and voltage sags/swells. Analyze problems and avoid repeat interruptions.

Cost Allocation and Billing

Determine cost centers, identify opportunities for demand control 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.

Equipment Monitoring and Control

Improve process yields and extend equipment life. Meter all your utilities including gas, steam, water and more.

Preventative Maintenance

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

Features Summary

Measurements

- Energy: bi-directional, absolute and net
- Demand: Sliding Window, Predicted, and Thermal
- Harmonics: individual and total harmonic distortion up to the 15th or 31st
- Advanced logic and mathematical functions

Communications

- Two RS-485 ports
- Optional built-in modem with ModemGate™ allows modem access for 31 other devices
- Optional Ethernet port with EtherGate™ allows direct Ethernet-to-RS-485 data transfer to 31 other devices
- Infrared data port standard
- Modbus™ RTU, DNP 3.0, and PROFIBUS DP
- Call-back feature offers fast alarm response
- Web server, Meter M@il® allows distribution of metered data and alarms over the Internet

On-Board Data Logging

- Scheduled or event-driven logging of up to 96 parameters
- Sequence-of-events and min/max logging

Setpoints for Control and Alarms

- Setpoint on any parameter or condition
- 1 second operation

Inputs and Outputs

- 4 digital inputs for status/counter functions
- 4 digital outputs for control/pulse functions

Example Display Format

I a	265.7
I b	256.4
I c	259.2
I avg	260.4

Front Panel

The front panel of the 9300 series supports local data display and basic setup:

- Easy-to-read LCD with back lighting
- Adjustable contrast
- Remote display option up to 1.8 m (6 ft.) from base unit
- 8 data display screens that can be customized through the communications port, to show the parameters of your choice and scrolled manually or automatically.
- Four display formats: 4-parameter to single-parameter large character displays
- Custom parameter labels (programmable via communications)

Metering

The 9300 series provide fully bi-directional, 4-quadrant, revenue accurate or revenue-certified energy metering. They can replace discrete energy meters, demand meters and pulse initiators and perform a wide range of other metering and instrumentation functions.



4-Quadrant Energy

The units are fully bi-directional and meter energy in all four quadrants. They provide all traditional active, reactive and apparent energy parameters and can provide measurements like Volt-Hours, Amp-Hours, etc.

- kWh, imported, exported, net (imported and exported), and total (imported and exported)
- kVARh imported, exported, net (imported and exported), and total (imported and exported)

A 9350 with Remote Display



- kVAh total
- kVAh, imported, exported, net, (9330 and 9350)
- Volt-hours and amp-hours
- Integration of any instantaneous measurement

Demand

The 9300 series support block, sliding window (rolling interval), thermal, and predicted demand. The meters calculate demand on any instantaneous measurement and records peak (maximum) and minimum demand. Peak demand registers can be reset manually (password protected) from the front panel or via communications.

Default setup:

- kW demand and min/max
- kVAR demand and min/max
- kVA demand and min/max
- Amps demand and min/max
- Volts demand and min/max
- Demand on any instantaneous measurement

Instantaneous

The 9300 series offer the most comprehensive array of instantaneous (real-time) measurements available in the industry. Measurements include true RMS, per phase and total for:

- Voltage and current
- kW, kVAR and kVA
- Power factor
- Frequency
- Voltage and current unbalance



Time-of-Use

The 9330 and 9350 provide:

- 2 year internal calendar
- Up to 15 daily tariff profiles
- Programmable triggers
- Separate energy and demand accumulators

Harmonics

The 9300 series meters feature harmonic distortion metering.

- Total Harmonic Distortion and individual harmonics to the 15th (31st on 9350), on voltage and current inputs
- K-factor for current inputs

Universal Metering

The 9300 series meters can be equipped with a variety of digital and analog I/O combinations, for universal metering. You can replace PLCs and RTUs (monitoring pressure, temperature, and power transducers), as well as traditional power transducers. The 9330 and 9350 can accept input pulses from gas, water, steam, or other metering equipment and convert pulses into actual consumption values.

Residual Current

When set to 4-Wire Wye, any of the meters can calculate neutral or ground current based on three phase current measurements.

Min/Max Recording

The 9300 will record each new minimum and new maximum value with date- and time-stamp for the following parameters.

- Voltage and current min/max
- kW, kVAR, and kVA min/max
- Power factor
- Frequency
- Voltage unbalance
- Plus any measured value

Logging and Recording

The 9330 and 9350 provide data and event logs. Non-volatile memory ensures that valuable information can be preserved between intervals when the logs are retrieved via communications.

Historical Logging

Any combination of measurements can be recorded at scheduled intervals or by setpoints, logic conditions or manually. Standard 30 days of recording capacity at 15 minute interval data.

- Defaults: all basic power parameters and total harmonic distortion every 15 minutes
- The 9350 offers 6 data logs, each recording up to 16 user defined parameters concurrently, for a total of 96 parameters

- The 9330 offers 2 data logs, each recording up to 16 user defined parameters concurrently, for a total of 32 parameters

Min/Max Logging

- Perform min/max logging on any parameter, over any time interval (e.g., daily, monthly)
- Easily record other values coinciding with the new minimum or maximum
- Defaults: min and max for all basic power parameters. Voltage (I-I-I-n) per phase, Current per phase, kW, kVAR, kVA, Power Factor, Frequency, and Sliding Window Demand for kW, kVAR and kVA

Event Logging and Alarming

Configurable event priorities allow you to define alarm conditions.

- Sequence-of-events time-stamped to ± 10 ms accuracy and 1 ms resolution
- Time-stamped record of all configuration changes, setpoint and min/max events

Waveform Recording

- The 9350 simultaneously captures events on all channels, up to 48 cycles each
- Resolution: 64 samples per cycle

Sag/Swell Monitoring

- Detect sags or swells on any voltage channel and record instantaneous values and waveforms with the 9350

Logic, Math, and Control

The 9330 and 9350 offer sophisticated logic and mathematical functions to perform on-board calculations on any measured value. You can calculate true quantities from pulse inputs (e.g., BTU calculations) or use the math functions to calculate other values.

Mathematical Functions

Define custom formulas using:

- Arithmetic (+, x, -, \div)
- Comparison (>, <, =, \geq , \leq , \neq)
- 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 Setpoints

The 9330 and 9350 can use logical operators and setpoints to set alarms, implement advanced back up protection to equipment, and to define basic control algorithms for capacitor and demand control.

Twelve setpoints are configurable for 1-second operation. Each setpoint can be triggered on the over or under conditions you specify.

Use setpoints to trigger:

- Data logging
- Digital outputs
- Clearing and reset functions
- Pulse outputs
- Call-back (9350)

Software Integration

The meters can be easily integrated within an energy management or SCADA system to provide remote display of all measured parameters at a PC workstation, as well as remote configuration and manual control capabilities.

WinPM.Net

The meters are compatible with our Microsoft® Windows® 2000-based WinPM.Net power monitoring software. WinPM.Net web-enabled software displays real-time and logged data and offers manual control/configuration capabilities. It provides enterprise-wide data sharing in a secure networked environment.

Internet Connectivity

MeterM@il

When equipped with an Ethernet port, the 9330 and 9350 can automatically e-mail alarm notifications or scheduled 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 Web server, when combined with an Ethernet port, offers quick and easy access to real-time energy and basic power quality information without special software. Built-in web pages display a range of energy and basic power quality information through any web-enabled device and even support basic meter configuration tasks.

Communications

RS-485 Ports

The 9300 is equipped with a single RS-485 port, while the 9330 and 9350 can have two RS-485 ports, depending on the communications options selected.

- Optically isolated
- Baud rates up to 19,200 bps
- Compatible with WinPM.Net power monitoring software and supports Modbus RTU
- The 9330 and 9350 also support DNP 3.0

Infrared Data Port

A front panel optical port is offered on all models in the 9300 series.

- Compatible with an ANSI C12.13 Type II magnetic optical communications coupler and can operate at baud rates up to 19,200 bps
- For infrared energy pulsing or communication with our own power monitoring software

Ethernet Port (optional)

All meters in the 9300 series can be ordered with an optional 10Base-T port for direct access to metering information via an Ethernet LAN/WAN.

- Protocol: ION®, Modbus TCP
- Baud rate: up to 10 Mbps
- Ping and Telnet diagnostic services
- EtherGate allows the 9330 and 9350 to act as a gateway, allowing the direct transfer of data between an Ethernet network and up to 31 RS-485 devices

PROFIBUS Port (optional)

PROFIBUS DP Standard protocol support via sub-D 9 pin female connector is offered exclusively on the 9300.

Internal Modem

The 9330 and 9350 offer an optional, space saving, internal modem which helps reduce cost and improve reliability by replacing external modems and RS-485 to RS-232 converters.

- Baud rates from 300 bps to 33,600 bps
- "ModemGate" feature lets the remote master station access the meter and up to 31 other devices connected to the RS-485 loop through a single internal modem
- Compatible with WinPM.Net power monitoring software and supports Modbus RTU or DNP 3.0
- RJ-11 or a captured wire connector
- The 9350 is offered with a call-back feature for quick alarm response

Interoperability

The 9330 and 9350 can concurrently communicate via multiple protocols so you can use its advanced features to extend an existing Modbus, DNP or WinPM.Net network. Logs and real time values are also available through Modbus. In addition, the meters are fully supported by UTS MV-90® through serial and Ethernet.

Simple Configuration Tools

The 9300 series is based on patented technology which ensures the longevity of your metering solution because it can adapt as your needs change.

The measurements and other functions of the meters 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.

Inputs/Outputs*

The 9300 series offers a variety of analog and digital I/O combinations. The analog I/O option can be specified for any 9300 series meter, allowing you to monitor a wide range of conditions, such as flow rates, device cycles (RPM), fuel levels, oil pressures and transformer temperatures. You can output energy pulses to an RTU or perform equipment control operations.

Status Inputs

Four optically isolated digital inputs on the 9330 and 9350 meters can monitor status, count transducer pulses, breaker trips and pulses from any external "volts free" dry contact.

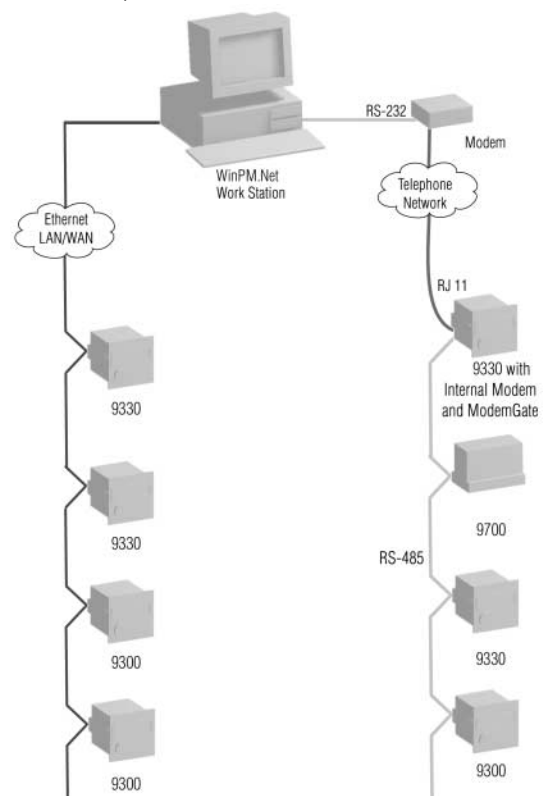
Digital Outputs

9300 series meters are equipped with 4 fully programmable digital output ports, suitable for pulsing or controlling relays. An optional extension board provides external relays that can be controlled by the digital outputs. The Infrared Data Port and/or a rear panel LED can also be used for energy pulsing.

Relay Extension Board

Optional Digital Output Extension Board extends the four digital outputs to allow relay control. A range of relay options are available. (Please contact Siemens.)

Example 9330 Communication Connections



Analog Inputs/Outputs

Any meter in the 9300 Series can be equipped with an optional analog I/O card featuring:

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

When equipped with analog I/O, TRAN base units cannot be ordered with a remote display, (RMD).

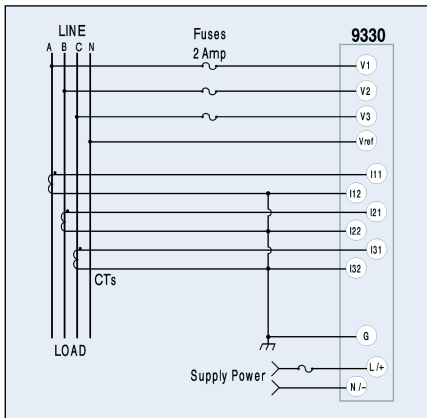
Connections and LEDs

The meters support 4-wire Wye, Delta, 3-wire Wye, direct Delta and Single Phase systems. They have 3 voltage and 3 current inputs.

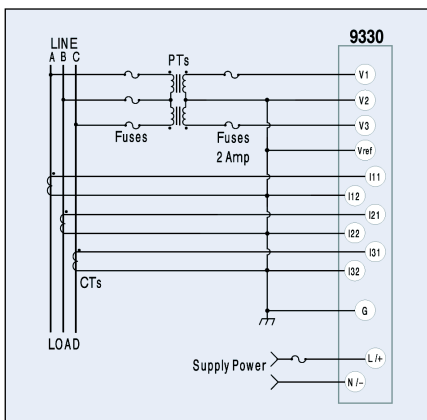
- No PTs required on the voltage inputs for Wye systems up to 347/600 VAC and Delta systems up to 600 VAC
- Accept CTs with 5 Amp nominal/10 Amp full scale outputs
- Captured-wire connector (CWC) option
- Inputs pass the ANSI/IEEE C37.90.1.1989 surge withstand and fast transient test

Example Connections

4-Wire Wye (Direct Connection)



3-Wire Delta (2 PTS and 3 CTs)



* Analog I/O is not available with all form factors and communications configurations. Please check attached order information for supported combinations.

Mounting

- Basic models have an integrated display and fit in a DIN standard 92 mm x 92 mm (3.6 in. x 3.6 in.) panel cutout, secured by sliding clamps tightened by thumbscrews.
- TRAN models have no integrated display and can be flush-mounted against any flat surface. Optional DIN rail mount is also available.
- The RMD (Remote Display Module) fits a DIN standard cutout up to 1.8 m (6 ft.) from the base unit. Off-the-shelf panel punches can be purchased. Contact us for sources.

- An adapter plate is available to facilitate the conversion from our 4000 series meters to the 9300 series. Contact us for more information.
- 9300 series units weigh approx. 6.0 lbs/2.3 kg. Box dimensions are 16x10x7 inches; 40x26x10 cm

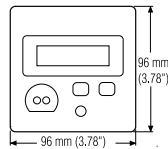
Switchboard Draw-out Cases

9300 series meters can be ordered with switchboard hardware, which is offered as a complete kit (internal cage with external casing) and as a "retro-fit" kit designed to fit into existing GE S1 or ABB FT21 switchboard cases.

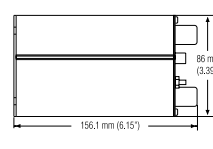
Dimensions

9300 Series Panel Meter Configurations

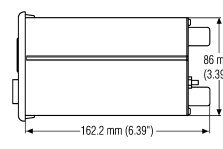
Front View of Basic, Display and RMD Models



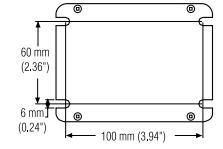
Side View of TRAN Model Base Unit



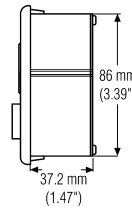
Side View of Basic and Display Models



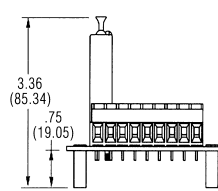
Front View of TRAN Model Base Unit



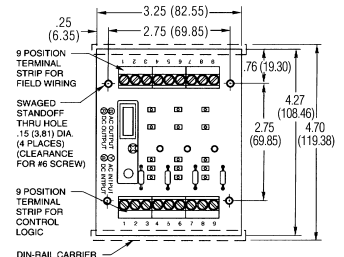
Side View RMD Display



End View of Relay Board

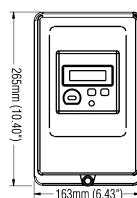


Top View of Relay Board

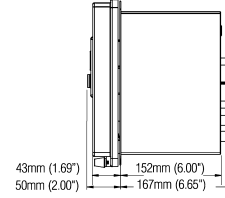


9300 Series Switchboard Drawout Case Configurations

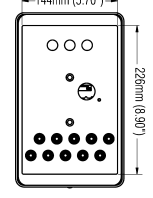
Front View of ABB FT21 Case



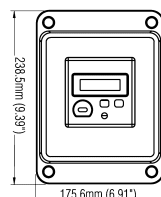
Side View of ABB FT21 Case



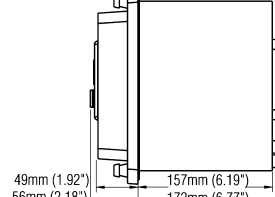
Rear View of ABB FT21 Case



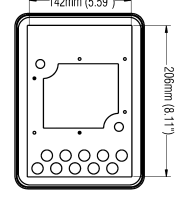
Front View of GE S1 Switchboard Case



Side View of GE S1 Switchboard Case



Rear View of GE S1 Switchboard Case



Measurement Specifications† (@50.0 Hz and 60.0 Hz @ 25°C / 77°F)

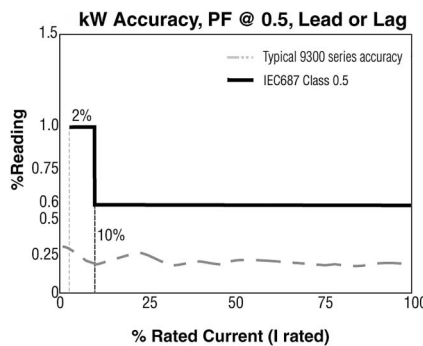
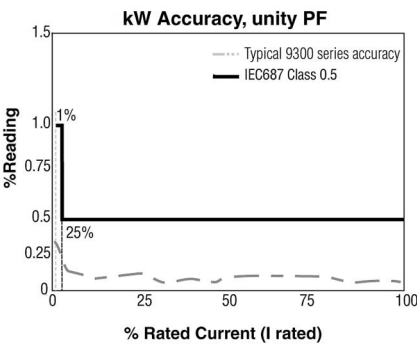
Parameter	Accuracy ± (%rdg + %FS*)
Voltage	0.25% + 0.05%
Frequency	0.01%
Current	0.25% + 0.05%
kVA	0.5% + 0.1%
kVAR (>5% F.S.)	1.5% reading
kVAh	1.0% reading
kVARh	1.5% reading
Power Factor	1.5% reading
Total Harmonic Distortion (THD)	1.0% Full Scale
I4 Derivation	1.0% reading + 0.2% unbalanced
K Factor	5.0% Full Scale

† 50 VAC to 347 VAC +25% * % Full scale voltage and current.
Display resolution meets or exceeds accuracy.

kW and kWh Measurements

	Accuracy*	Register Bounds	
		kW	kWh
ANSI 12.20 Class 0.5	0.5% reading	0 to ± 3.3x10 ⁷	0 to ± 10 ³⁸
IEC 687 Class 0.5	0.5% reading	0 to ± 3.3x10 ⁷	0 to ± 10 ³⁸

* Accuracy specifications comply with IEC 687 Class 0.5 specification and ANSI 12.20 Class 0.5 at 25°C (77°F)



User Programmable Log Capacity

Example Configurations:

	Event	Data	Waveform Recording Settings				# of days
			Channel	Samples per cycle	Cycles	Record depth	
9330	500	A	-	-	-	-	29
	500	B	-	-	-	-	118
	500	C	-	-	-	-	96
	500	D	-	-	-	-	383
9350	500	A	6	32	12	3	28
	500	B	6	32	12	3	111
	500	A	6	16	48	3	26
	500	D	6	64	16	3	331

A 16 parameters recorded every 15 minutes

B 16 parameters recorded hourly

C 4 parameters recorded every 15 minutes

D 4 parameters recorded every hour

Ratings

Voltage Inputs

- 50 to 347 VAC
- 25% overrange
- CWC Option: Pluggable captured-wire connectors.
- All Options: Overload withstand for 1500 VAC continuous, 3250 VAC for 1 second non-recurring. Input Impedance: > 2 MΩ

Current Inputs

- 5 Amp nominal / 10A full scale
- Overload withstand: 20A continuous, 500A for 1 second non-recurring
- Worst Case Burden (@10A): 0.0625 VA
- 20% Overage full accuracy

Power Supply

- Basic: 95 to 240 VAC (±10%), (47 to 440 Hz) 120 to 310 VDC (±10%), 0.2 Amp worst case loading (12W) @ 100 VAC @ 25°C (77°F)
- P24 option: 20 to 60 VDC (±10%), 0.6 A worst case loading (12W)

Environmental Conditions

- -20°C to +60°C (-4°F to +140°F) ambient air
- Storage: -30°C to +85°C (-22°F to +185°F)
- Humidity: 5% to 95% non-condensing

Digital Outputs

- 4 Optically isolated digital outputs
- Maximum forward current: 80mA
- Maximum voltage: 30V

Status Inputs (9330 & 9350)

- Self-excited, dry contact, no external voltage source required
- +30 VDC differential SCOM output to S1 through S4 inputs
- Minimum Pulse Width: 25 msec

Standards Compliance

- UL: Certified to UL 3111
- CAN/CSA C22.2 No.1010-1
- CE marked
- IEC 1010-1
- Surge Withstand: All inputs pass ANSI/IEEE C37.90-1989 surge withstand and fast transient tests
- FCC: Part15, FCC Rules for Class A Digital Device

Warranty

- 3 years



LISTED
Digital Power
Monitor
20SJ



ISO 9002-94
Registration Cert# 002188

Order Information for 9300 Series Meters

Description	Catalog Number						
	9	3	X	D	C	-	100-0ZZZZZA
Meter base unit and display options							
• Meter with integrated display				D			
• Meter with remote display (includes 6' cable)				R			
• Meter without display (Tran version)				T			
• Meter with integrated display installed in S1 retro-fit switchboard kit (meter in cage with cover, no casing)				S			
• Meter with integrated display installed in FT21 retro-fit switchboard kit (meter in cage with cover, no casing)				F			
Communications							
• RS485 with ION / Modbus RTU / DNP - Factory configured for ION					C		
• RS485 with ION / Modbus RTU / DNP - Factory configured for Modbus (Available for Tran version only)					M		
• Profibus DP (For integrated display 9300 model only)					P		
Power Supply							
• 85-240 Vac / Vdc						1	
• 20-60 Vdc						2	
Input Voltage							
• 50-347 Vac							0
Frequency							
• 50-60 Hz							0
Modem ONLY AVAILABLE WITH 9330 AND 9350 MODELS – LEAVE BLANK FOR 9300							
• None							0
• Modem w/ RJ-11 (See Note 1 below)							1
• Modem w/ plug connector (See Note 1 below)							2
• None							Z
• Yes (Enables Web Meter Functionality)							N
• 4 Analog Inputs 0 to 1 mA							B
• 4 Analog Inputs 0 to 20 mA							C
• 4 Analog Outputs 0 to 1 mA							D
• 4 Analog Outputs 0 to 20 mA							E
• 4 Analog Inputs 0 to 1 mA 4 Analog Outputs 0 to 1 mA							F
• 4 Analog Inputs 0 to 20 mA 4 Analog Outputs 0 to 20 mA							G
• None (std. screw terminals)							Z
• Yes							P
• None							Z
• Yes							D
• None							Z
• Yes							T
• None							A

NOTE 1 – The listed modems are not suitable for European applications. Contact Siemens for special versions.

Features List

	9300	9330	9350
Power Quality			
Sag/Swell Monitoring			●
Harmonics (individual, even, odd, total) up to	15th	15th	31st
Sampling rate, maximum samples per cycle	32	32	64
Logging and Recording			
Standard memory capacity		300 kB	300 kB
Minimum/maximum logs for any parameter		●	●
Historical logs, # of logs/total points		2/32	6/96
Waveform logs, maximum # of consecutive cycles per event			48
Time-stamps, resolution in seconds		0.001	0.001
Communications and I/O (maximum #)			
RS-485 ports	1	2	2
Ethernet ports	1	1	1
Infrared optical port	1	1	1
Internal Modem		1	1
PROFIBUS DP port	1		
DNP 3.0 through serial, modem and I/R ports		●	●
Modbus RTU slave on serial, modem and I/R ports	●	●	●
Modbus TCP through Ethernet port	●	●	●
EtherGate, data transfer between Ethernet and RS-485		●	●
ModemGate, data transfer between internal modem and RS-485		●	●
MeterM@il, logged data and alarms via e-mail		●	●
WebMeter, onboard web server	●	●	●
Analog Inputs	4	4	4
Analog Outputs	4	4	4
Digital status inputs/counter		4	4
Digital relay outputs	4	4	4
Setpoints, minimum response time		1 second	1 second
Math, logic, trig, log, linearization formulas		●	●
Single and multi-condition alarms		●	●
Call-out on alarms			●
Revenue Metering and Standards			
ANSI C12.16 accuracy compliant	●	●	●
IEC 60687 accuracy class 0.5S compliant	●	●	●
ANSI class 10, (5A nominal, 10A max)	●	●	●
MV-90 on serial, Ethernet ports		●	●
Time-of-Use		●	●

Siemens Energy & Automation, Inc.

Power Distribution Solutions
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For more information, call **1-800-427-2256**
or visit www.sea.siemens.com/access

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Order # PMSS-93XXA-0104 Rev. 7.5M0104 B&A Printed in USA