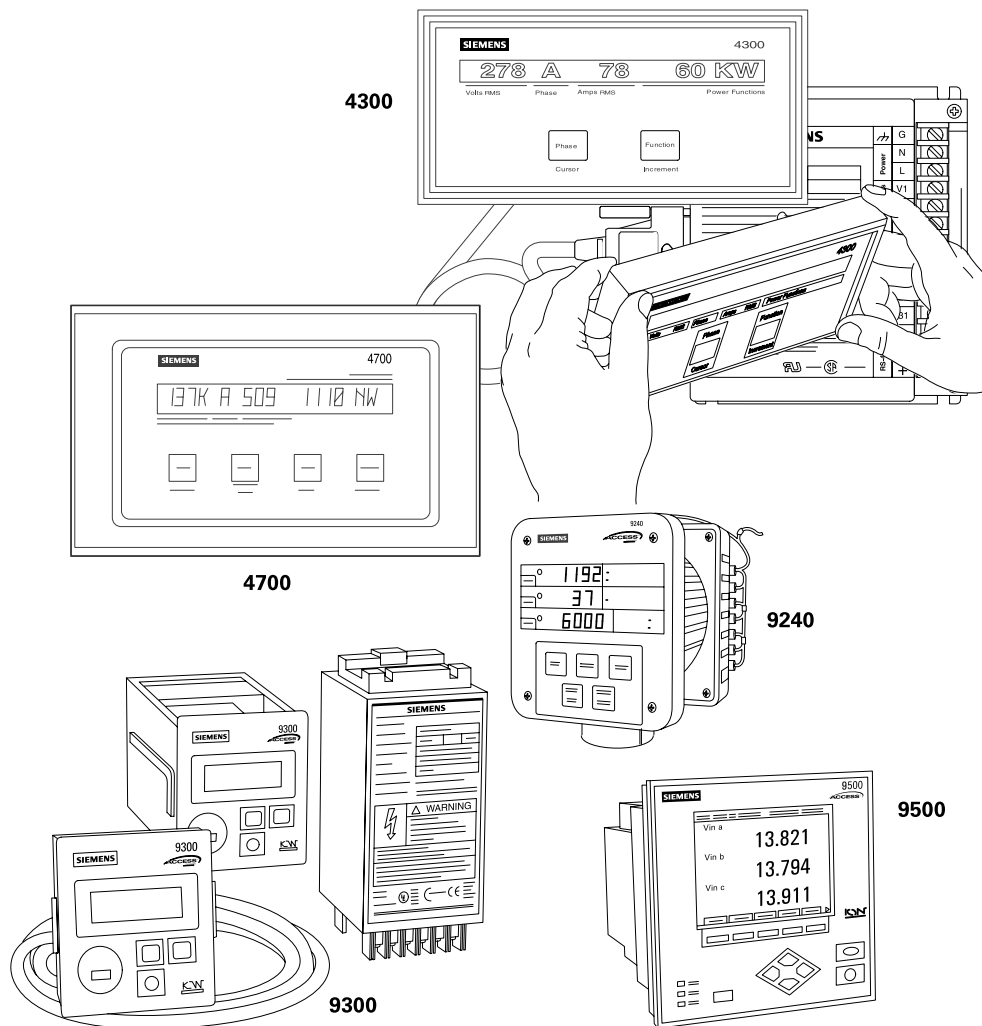


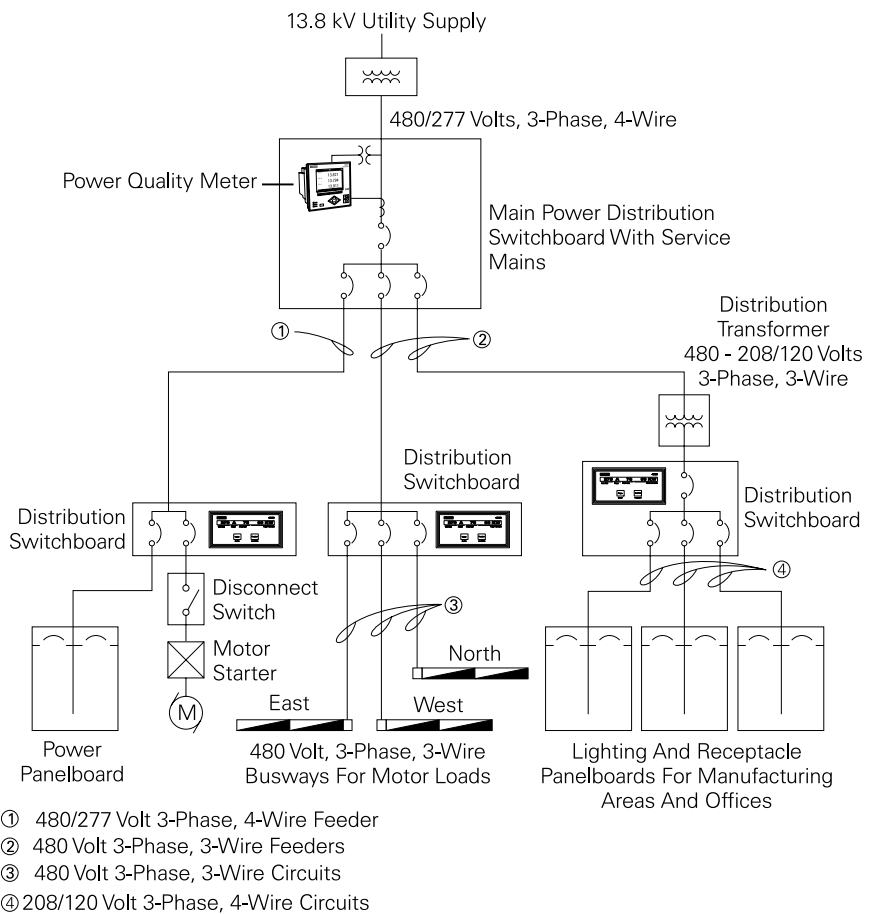
# Power Metering

In today's electronic environment, power management requires sophisticated meters. Voltage, current, and kW meters alone do not provide an adequate indication of power quality and energy consumption. Siemens power meters, in addition to measuring voltage, current, frequency, harmonics energy, power, and power factor, also capture system disturbances, log historical data, monitor the status of other equipment, and control loads.



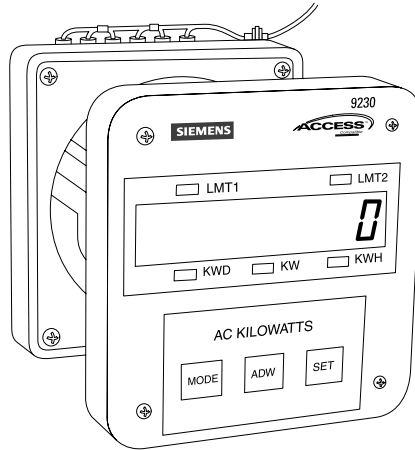
## Meter Location

Power meters should be located at key points in the electrical distribution system to effectively monitor power consumption and quality. In some applications, it is sufficient to monitor energy consumption on significant loads and monitor power quality at the utility supply point. In critical power applications it may be desirable to monitor power quality throughout the distribution system.

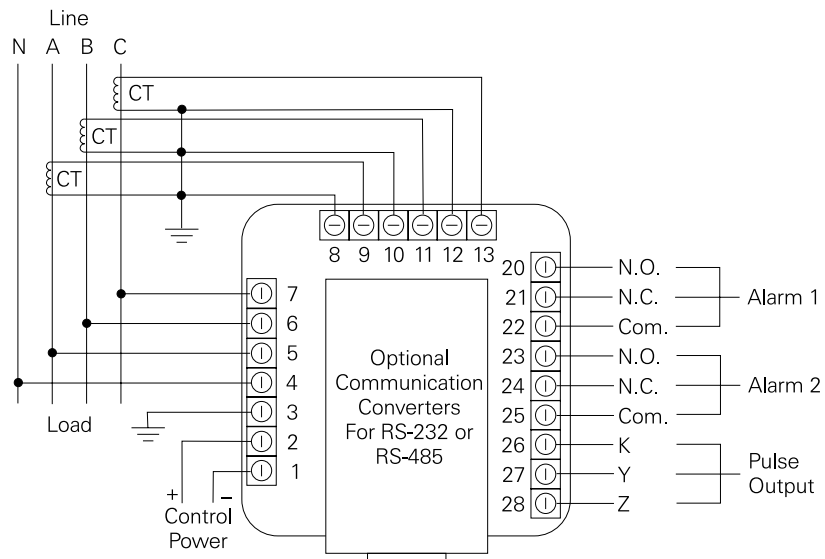


## 9230 Meter

The 9230 power meter measures real power. It will provide a readout of watts, watt-hours, and watt demand (configurable demand period). The 9230 is a full four-quadrant power meter providing bidirectional monitoring and separate positive and negative watt-hour accumulators.

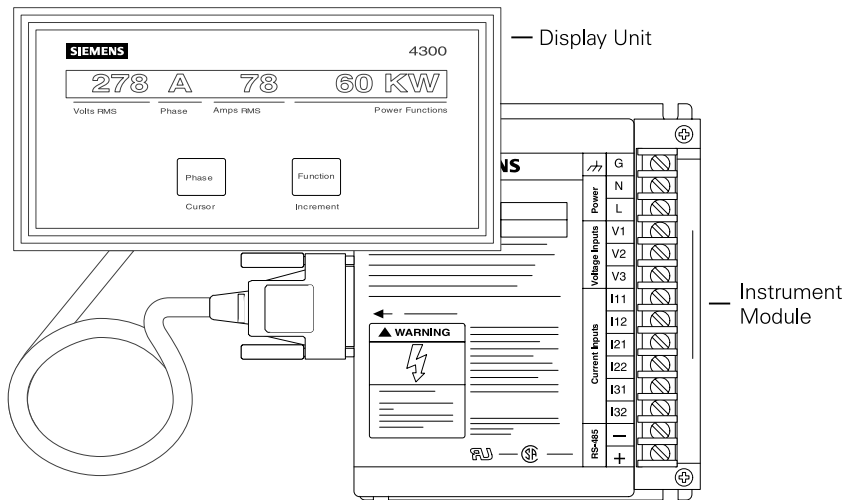


The 9230 meter measures voltage and current to calculate power. Alarm functions can be programmed to operate two relay contacts. A KYZ relay provides pulses for energy management systems. These pulses represent accumulated positive or negative watt-hours. The pulse value is configurable. SEABus communication converters or analog output modules are available.

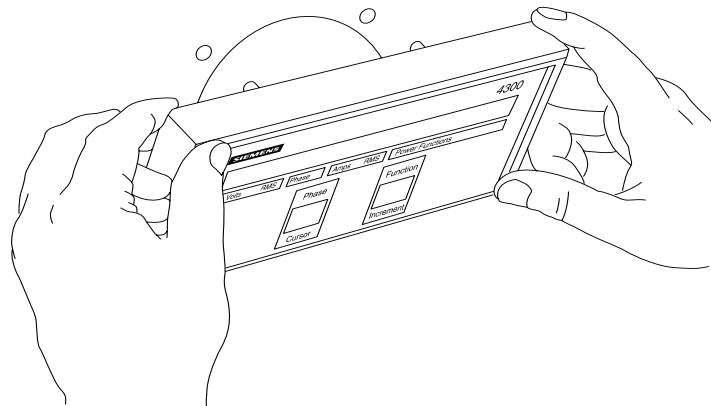


## 4300 Meter

The 4300 meter provides a readout of phase current, average phase current, line voltage, average line voltage, frequency, watts, watt-hours, peak watt demand, and power factor. Like the 9230, the 4300 is a full four-quadrant power meter. A standard communications module connects the 4300 to the Siemens ACCESS system. A separate display eliminates the need for voltage transformers on most low voltage applications because line voltage can be connected directly to the base module.



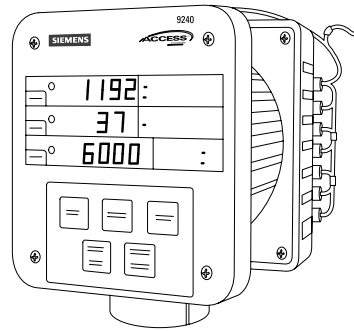
The 4300 meter is designed to fit in new or retrofit applications. The display unit will fit standard U.S. analog meter drilling patterns.



## 9240 Meter

The 9240 meter provides all significant parameters of the power system including; 3-phase volts, 3-phase current, neutral current, watts, VAR, VA, watt-hours, power factor, and frequency. The 9240 records the maximum and minimum values for most measured parameters. Three KYZ pulses are available for energy readings. The 9240 uses standard cutouts and will replace most existing analog meters.

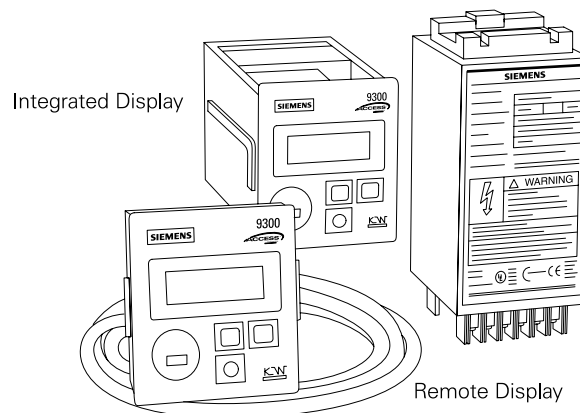
The 9240 has several protocol options to support many systems. Available protocols include SEABus (for the ACCESS system), ModBus RTU, ModBus Plus, and DNP 3.0.



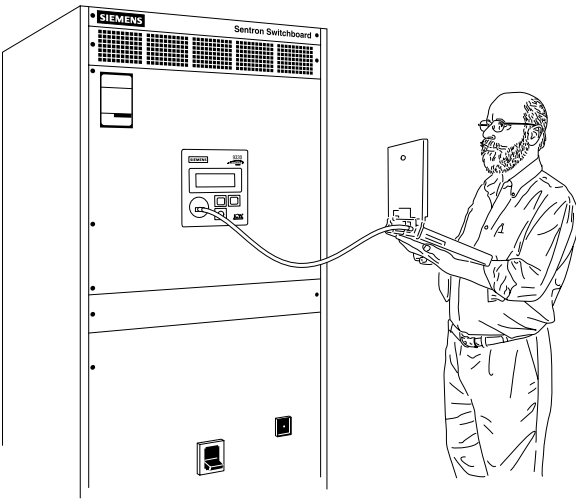
## 9300 Meter

The 9300 meter also provides all significant parameters of the power system. The 9300 meter can make predicted demand calculations based on past data. The 9300 meter monitors individual phase harmonics (up to the 15th), total harmonic distortion, and K-factor.

The 9300 includes four binary outputs that can be operated from remote software or configured as kWh pulse signals. The 9300 comes standard with SEABus (for the ACCESS System) and ModBus RTU or, optionally, with PROFIBUS DP. An Ethernet card may also be installed.



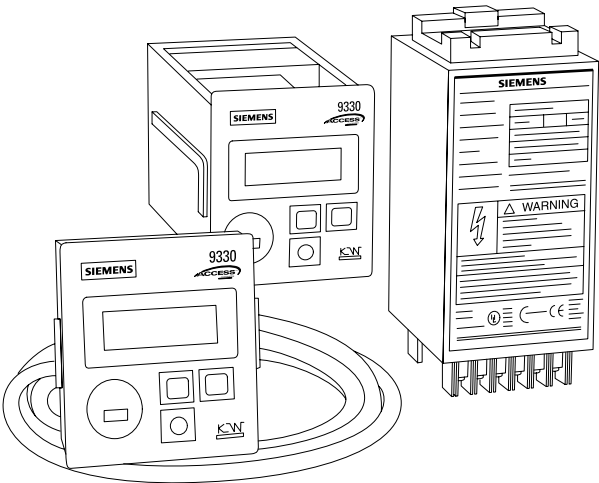
The 9300 includes a front optical data port for accessibility by a portable PC.



**9330 Meter**

The 9330 meter offers the same features as the 9300 meter. In addition, the 9330 includes setpoint capability to operate any of the four binary outputs. All events are recorded in the event log. The 9330 can also sample data continuously for future trend analysis.

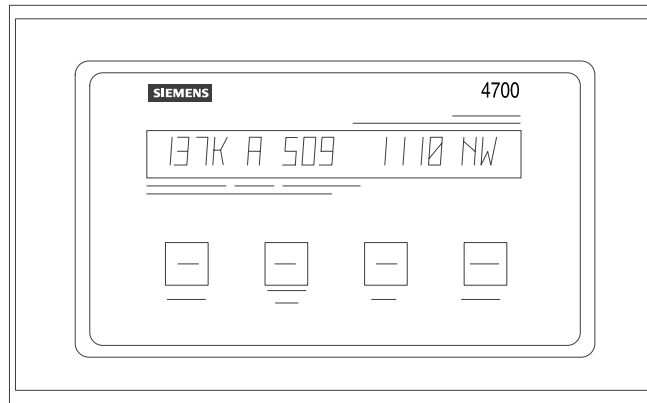
The 9330 meter features Ethernet or telephone modem connections as options. The 9330 can act as a gateway between these connections and other devices that are connected to the 9330 with an RS-485 cable. The 9330 comes standard with SEABus, ModBus RTU, and DNP 3.0.



## 4700 Meter

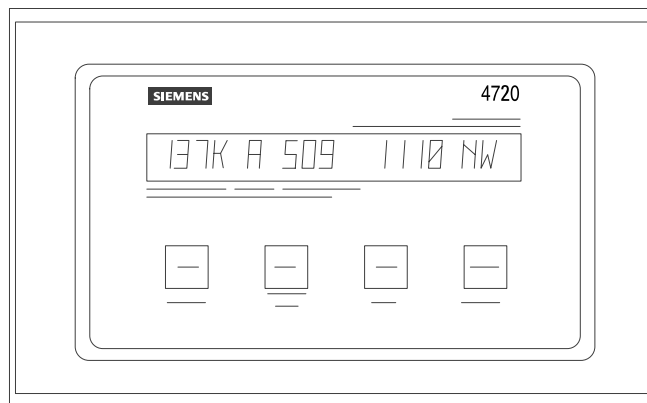
In addition to providing information on all significant parameters of a power system, the 4700 includes waveform capture for harmonic analysis up to the 63rd harmonic. The 4700 includes 4 binary inputs and 1 analog input to monitor external equipment.

There are 3 relay outputs that can be operated by set-points or used as kWh and kVARH pulse signals. The 4700 meter also includes one transducer-type analog output.



## 4720 Meter

The 4720 meter provides all of the same features as the 4700 meter. In addition, the 4720 provides on-board harmonic analysis up to the 15th harmonic. Like the 9330, the 4720 logs events and does continuous data sampling. The 4720 provides a 2-cycle trigger to record up to 36 cycles of a disturbance. The 4720 has an optional communications card for SEABus protocol.



## 9500 Meter

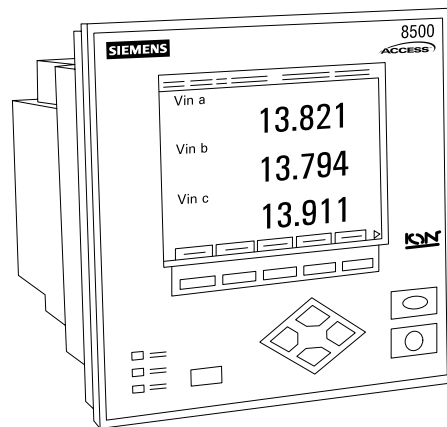
The 9500 offers three-phase power monitoring on a large, easy to read screen. The 9500 meter monitors K-factor, crest factor, individual harmonics, and total harmonics up to the 63rd harmonic.

In addition to displaying values, the 9500 also displays graphical phasor diagrams and bar graph representations. The 9500 provides a 0.5 cycle trigger and up to 4 MB of memory for extensive waveform recording of system disturbances, as well as a special sag/swell module.

Advanced features include utility-style rate structure calculations. The 9500 meter meets the accuracy requirements of the ANSI C12.20 revenue standard. The 9500 provides transformer and line loss calculations. The 9500 can communicate with the Internet and transmit email.

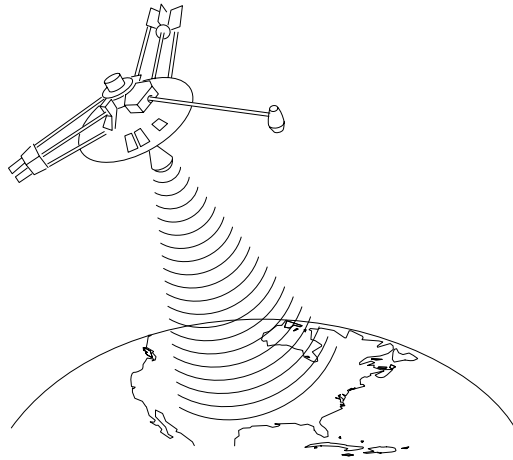
The 9500 comes standard with several protocols including SEABus, ModBus RTU, and DNP 3.0. In addition to RS-232 and RS-485, the 9500 can include a telephone modem, an Ethernet card, and a fiber optic port. Simultaneous connections are supported.

The 9500 can be equipped with 7 binary outputs, 16 binary inputs, 4 analog outputs, and 4 analog inputs.



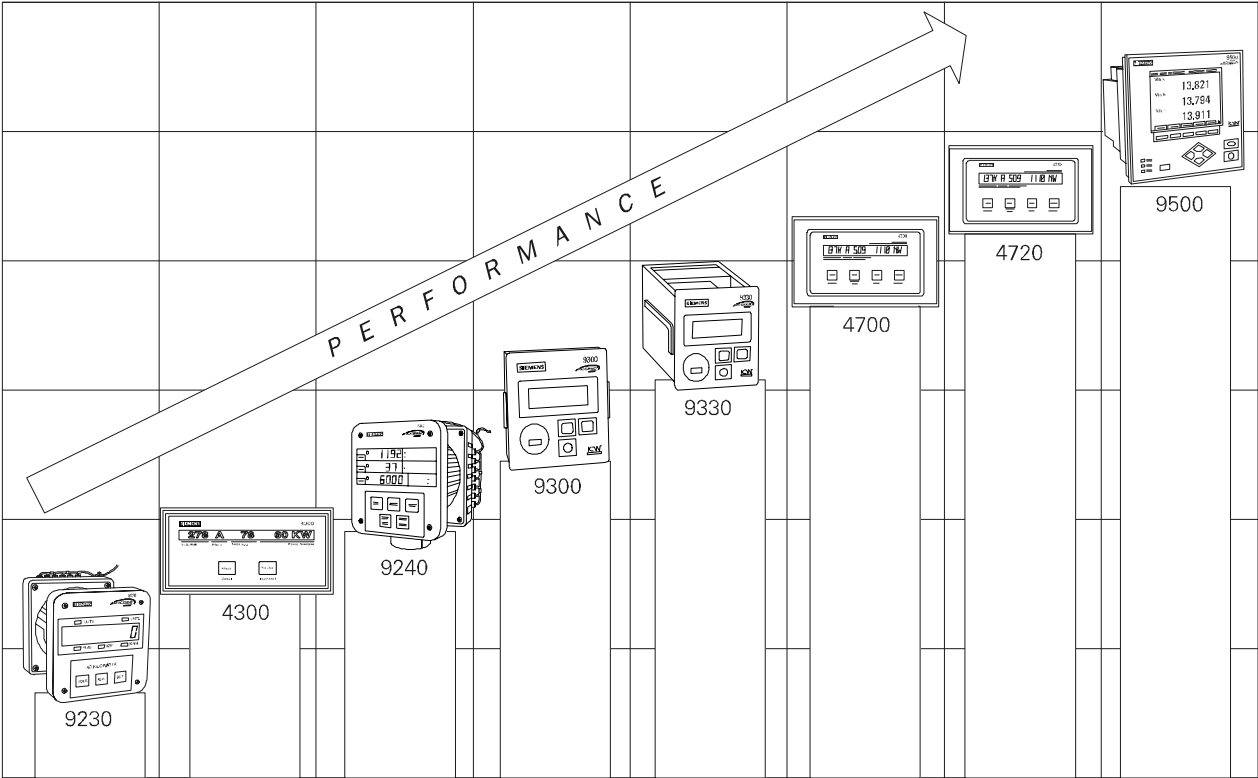


Another unique feature of the 9500 is the optional ability to connect to the Global Position Satellite (GPS) system for time synchronization with other 9500 meters in the distribution system.



# Power Meter Features

Siemens power meters have various features, depending on specific application needs. With a number of meters to choose from it may seem confusing when trying to decide which meter is right for which job. The following chart and tables are provided to help identify various features and performance capabilities for Siemens power meters. The chart is arranged in order of performance feature. The table on the following page details available features for each power meter.



		9230	4300	9240	9300	9330	4700	4720	9500
<b>Measurements</b>	Real Power	■	■	■	■	■	■	■	■
	Bi-Directional Energy	■	■	■	■	■	■	■	■
	Sliding Window Demand	■	■	■	■	■	■	■	■
	Reactive & Apparent Power	■	■	■	■	■	■	■	■
	Voltage & Current	■	■	■	■	■	■	■	■
	Power Factor	■	■	■	■	■	■	■	■
	Frequency	■	■	■	■	■	■	■	■
	Harmonic Analysis	■	■	■	■	■	■	■	■
	Thermal & Predicted Demand	■	■	■	■	■	■	■	■
	Power Harmonics	■	■	■	■	■	■	■	■
	Symmetrical Components	■	■	■	■	■	■	■	■
<b>Data Logging</b>	Min/Max	■	■	■	■	■	■	■	■
	Data Sampling	■	■	■	■	■	■	■	■
	Event Logging	■	■	■	■	■	■	■	■
	Waveform Recording	■	■	■	■	■	■	■	■
<b>Display</b>	Easy to read Alpha-numeric Display	■	■	■	■	■	■	■	■
	High resolution graphical Display	■	■	■	■	■	■	■	■
<b>I/O</b>	Relays/Pulse Outputs	■	■	■	■	■	■	■	■
	Counter/Status Inputs	■	■	■	■	■	■	■	■
	Analog Outputs	■	■	■	■	■	■	■	■
	Analog Inputs	■	■	■	■	■	■	■	■
<b>Advanced Functions</b>	Set-point Control	■	■	■	■	■	■	■	■
	Phase Reversal / Unbalance	■	■	■	■	■	■	■	■
	TOU & Line Loss Compensation	■	■	■	■	■	■	■	■
	Math & Logic	■	■	■	■	■	■	■	■
	GPS Time Synch	■	■	■	■	■	■	■	■
	Sag/Swell Detection	■	■	■	■	■	■	■	■
Transient Detection	■	■	■	■	■	■	■	■	
<b>Communications</b>	SEABus	■	■	■	■	■	■	■	■
	Modbus RTU	■	■	■	■	■	■	■	■
	DNP 3.0	■	■	■	■	■	■	■	■
	Profibus DP	■	■	■	■	■	■	■	■
	RS232 / RS485	■	■	■	■	■	■	■	■
	Ethernet	■	■	■	■	■	■	■	■
	Modem	■	■	■	■	■	■	■	■
	Fiber Optic	■	■	■	■	■	■	■	■

## Review 5

1. Power meters should be located at \_\_\_\_\_ points in the electrical distribution system.
2. The \_\_\_\_\_ and \_\_\_\_\_ meters include a front optical data port for accessibility by a portable PC.
3. The 4720 meter provides on-board harmonic analysis up to the \_\_\_\_\_ harmonic.
4. A unique feature of the 9500 meter is the optional ability to connect to \_\_\_\_\_ for time synchronization with other 9500 meters in the distribution system.
5. The \_\_\_\_\_ meter has a high resolution graphical display.