

Shark® 100S/200S

MULTIFUNCTION WIFI ELECTRIC SUBMETERS

Shark® 100S
Multifunction WiFi
Electric Submeter



Shark® 200S
Datalogging WiFi
Electric Submeter

Introduction

The Shark® 100S/200S submeters are revenue certified 0.2% energy accuracy meters. They provide standard Modbus communication over RS485 serial or simultaneous Ethernet and WiFi. WiFi communication is protected with WPA2 and other advanced WiFi encryption technology.

Advanced Submetering

- ANSI C12.20 0.2 Accuracy Class Energy Measurements
- Revenue Certifiable Test Pulse with KYZ Output
- Simultaneous Ethernet and WiFi or RS485 Communication
- WPA/WPA2/WPA2-Enterprise/WPS, Trust & Go 608 Chip WiFi Security
- Modbus ASCII/RTU/TCP and DNP3 Protocols
- Extensive Datalogging (Shark® 200S Submeter)
- Bright Red LED Display with Three .56" Lines

Additional Features Include

- Direct Interface with Most Building Management Systems
- Ideal for Bill Generation and Cost Allocation
- Harmonics Measurement (Shark® 100S Submeter)
- Transformer Line Loss and CT/PT Compensation (Shark® 200S Submeter)



Applications

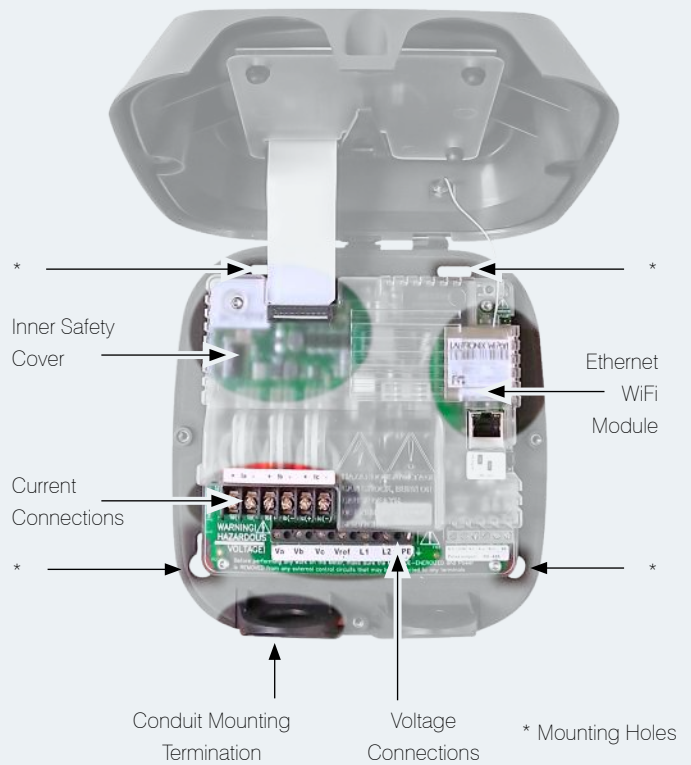
- University Energy Management
- Industrial Cost Allocation
- Commercial Building Tenant Billing
- Government Facility Energy Management
- Shopping Mall Tenant Billing
- Military Energy Management
- Airport Tenant Billing

Superior Design

- Standard 5 A or 1 A CTs.
- Submeters surface mount to any wall.
- Bright red LED display with three .56" lines for easy meter reading.
- Inner cover to ensure safety when installing
- Optional remote antenna available (model number ANT18769).
- Voltage up to 721 V line-to-line.
- Power supply up to 400 V AC.
- Simultaneous Ethernet and WiFi module.



**Revenue Certified Metering
with Modbus Ethernet
and WiFi Communication**



Shark® Series Submeter Revenue Certified Metering Accuracy

The Shark® 100S/200S meters provide ANSI C12.20 and IEC 62053-22 0.2% Class energy metering accuracy. Refer to the following accuracy chart.

Measured Values	Accuracy %
Voltage L-N	0.1% of Reading
Voltage L-L	0.1% of Reading
Current	0.1% of Reading
+/- Watts	0.2% of Reading
+/-Wh	0.2% of Reading
+/-VARs	0.2% of Reading
+/-VARh	0.2% of Reading
VA	0.2% of Reading
VAh	0.2% of Reading
PF	0.2% of Reading
Frequency	0.03 Hz (100S) / 0.007 Hz (200S)
THD (Shark® 100S only)	5.0 %
% of Load Bar	+/- 1 Segment

Traceable Watt-Hour Test Pulse for Accuracy Certification

To certify a submeter for revenue metering, power providers and utilities need to verify the meter's stated accuracy. They use field test standards to ensure that the meter's energy measurements are correct. As traceable revenue meters, the Shark® 100S/200S submeters contain a utility grade test pulse used for this accuracy verification.

Multiple Communication Paths

Modbus RS485 Communication

Use the RS485 port to connect to any serial RS485 bus using the Modbus interface. Communicate easily with most building automation or other software systems.

Standard IrDA Port

Use an IrDA-equipped laptop PC to program and read the Shark® 100S/200S submeter via its standard IrDA port.

Simultaneous Ethernet and Encrypted WiFi Communication

The Shark® 100S/200S submeters have optional Ethernet/WiFi communication. The option communicates Modbus TCP/IP over multiple, simultaneous RJ45 wired and wireless Ethernet. Choose whichever method meets the application needs and easily configure the connection using the embedded web server. Benefits include:

- Up to ten communication sockets for both RJ45 Ethernet and WiFi.
- Data is protected over WiFi with WPA/WPA2/WPA2-Enterprise/WPS, and Trust & Go 608 Chip WiFi Security.



Encrypted WiFi Communication Eliminates Cable Runs

KYZ Pulse

The unit provides a KYZ output which pulses proportional to the amount of energy consumed. Use this output for pulse counting applications or for building management systems where serial or Ethernet protocol is not available.

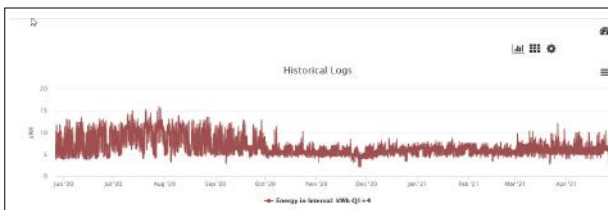


Shark® 200S Advanced Logging Features

The Shark® 200S submeter provides extensive datalogging, with three historical logs, a limits/alarm log, and a system events log. The unit's real time clock timestamps all data in the instrument when log events are created.

Historical Logs

Each of the three historical logs can be programmed with unique parameters consisting of any measured reading. Up to 64 parameters can be recorded per log.



Limits/Alarm Log

This log provides magnitude, duration, timestamp, and alarm value for up to 2048 events.

Start Date/Time	End Date/Time	Duration (s)	% Exceeded	Value	Channel	State
11/18/2022 11:58:11:759 AM	11/18/2022 12:00:01:121 PM	103.36	0.70%	112.32	Riser/Voltage C PST	Below
11/17/2022 2:38:45:022 PM	11/17/2022 3:00:00:330 PM	81.11	0.00%	0.00	EMV / Raising AverageWatts	Above
11/17/2022 2:38:55:025 PM	11/17/2022 2:40:10:996 PM	66.07	0.86%	115.20	Riser/Voltage A PST	Above
11/17/2022 2:38:55:025 PM	11/17/2022 2:40:10:996 PM	66.07	0.70%	112.32	Riser/Voltage B PST	Above
11/17/2022 2:38:55:025 PM	11/17/2022 2:40:10:996 PM	66.07	0.70%	112.32	Riser/Voltage C PST	Above

System Events (Anti-tampering) Log

To protect critical billing information, the meter records and logs the following with a timestamp:

- Demand/energy/log resets.
- Password requests.
- System startup.
- Log reads.
- Changes to meter's programmable settings.

EnergyPQA.com® AI Driven Energy Management System

The EnergyPQA.com® system provides energy analytics enterprise wide with AI-based predictions and deep insights into power quality. Its energy and demand dashboards and usage charts make it easy to compare energy consumption, power quality, and usage patterns in all metered areas of a building. The Shark® 100S/200S units integrate seamlessly with the EnergyPQA.com® system, providing the following capabilities:

- Increase energy usage efficiency with usage comparisons and load disaggregation.
- Perform proper cost allocation by billing for actual energy usage versus square footage estimations.
- Reduce costs with predicted future peak demand email alerts.
- Identify poorly performing buildings by comparing energy usage across facilities.
- Generate automated reports with detailed energy usage for metered points, facilities, and the enterprise as a whole.
- Determine impact on the environment and assess the success of sustainability initiatives by monitoring total and per location carbon footprint.



View 30 Day Predicted Energy Usage and Demand

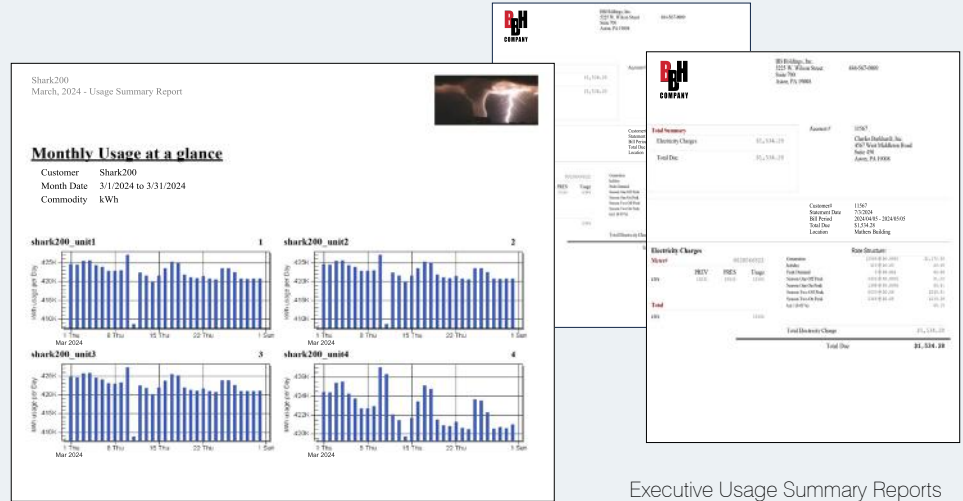


Perform Load Disaggregation for Usage Comparison

Energy Usage Analysis and Billing

Use EnergyReporterPQA™ software with the Shark® 100S/200S submeters to generate accurate customer billing. Billing for actual usage promotes energy conservation from tenants with resulting energy cost savings of up to 18%. Features of the EnergyReporterPQA™ software include:

- Automatically import usage data from the submeters.
- Set up multiple rate structures with fees, taxes, and surcharges.
- Customize and automatically generate bills and invoices.
- Track energy use by customer/location/meter.
- Set up holidays, peak and off-peak hours.
- Generate executive summary usage reports.



Generate Bills and Invoices

Advanced Features

Shark® 100S Submeter

The Shark® 100S submeter has a V-Switch™ key option that adds THD and Limits to its multifunction metering capability. EIG's exclusive V-Switch™ technology enables firmware upgrades in the field without removing the meter from installation. The Shark® 100S submeter can be ordered with THD and Limits or those features can be added later through a V-Switch™ upgrade.

Available V-Switch™ Keys

- **V3 (100S only)** – Volts, A, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh.
- **V4 (100S only)** – Volts, A, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh, THD monitoring, and limit-exceeded alarms.
- **V33 (200S only)** – Volts, A, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh, 2 MB datalogging memory, and limit-exceeded alarms.

Shark® 200S Submeter

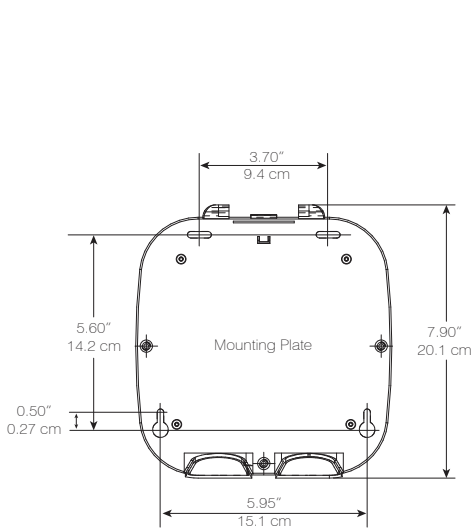
The Shark® 200S submeter has datalogging memory and Limits as a standard offering. The 200S also has Transformer Line Loss and CT/PT compensation revenue metering features.



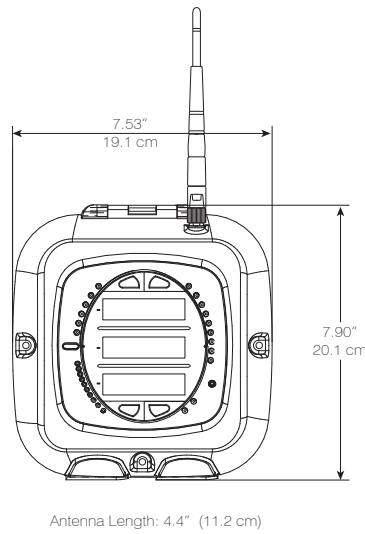
Shark® 100S Submeter - THD Screen

Shark® 100/200S Submeter Alarm Limits Polling Screen

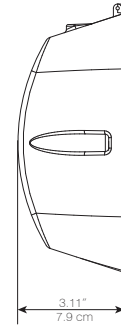
Dimensional Drawings



**SHARK® 100S/200S SUBMETER
REAR VIEW**

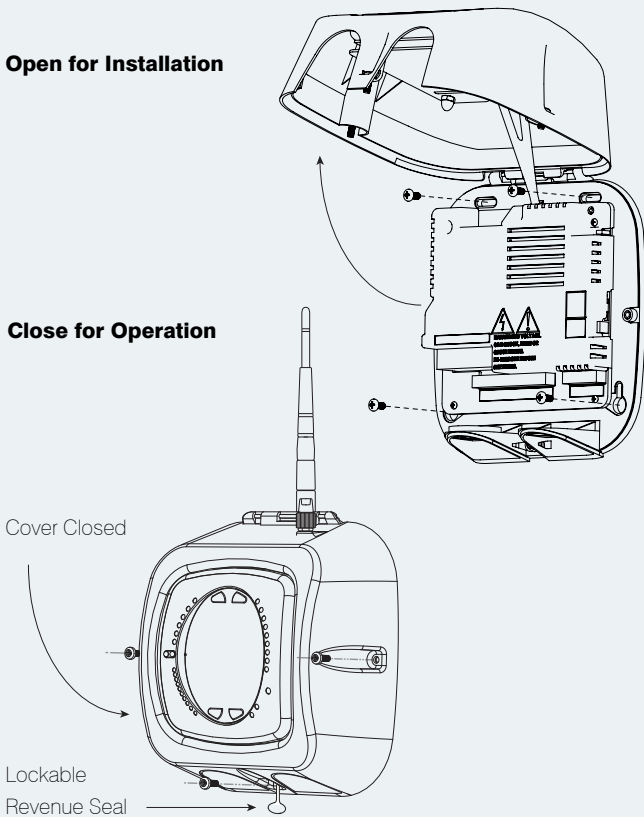


**SHARK® 100S/200S SUBMETER
FRONT VIEW**



**SHARK® 100S/200S SUBMETER
SIDE VIEW**

Installation



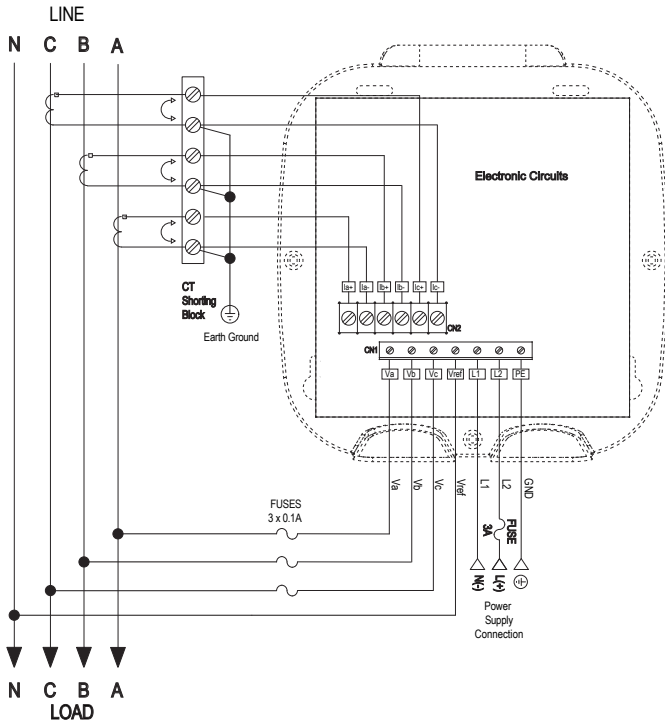
Optional Remote Antenna

Use EIG's ANT18769 remote antenna kit to extend WiFi communication for the Shark® submeters. The kit contains the antenna, magnetic base, and 2000 mm coaxial cable. Connect the antenna to the submeter's WiFi jack using the magnetic base. The remote antenna can be used with any wireless router to extend the WiFi network.

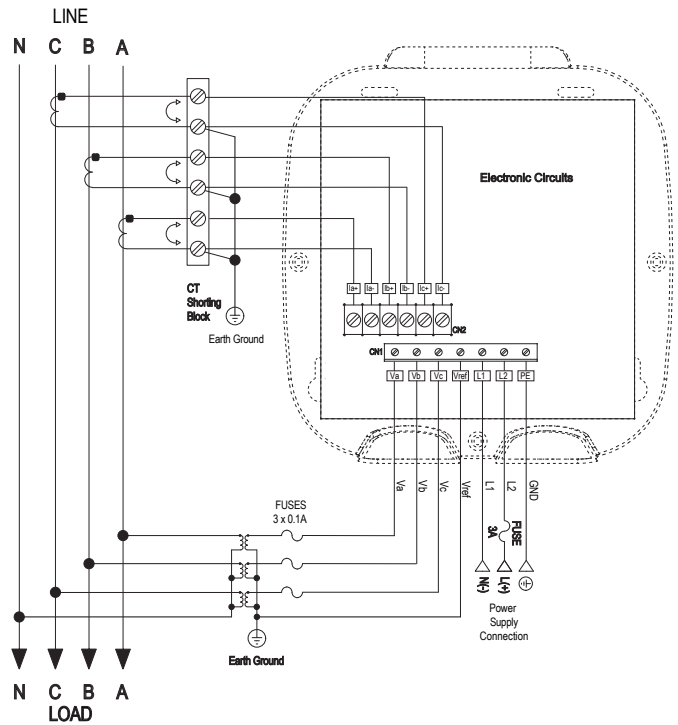


ANT18769 Remote Antenna Kit

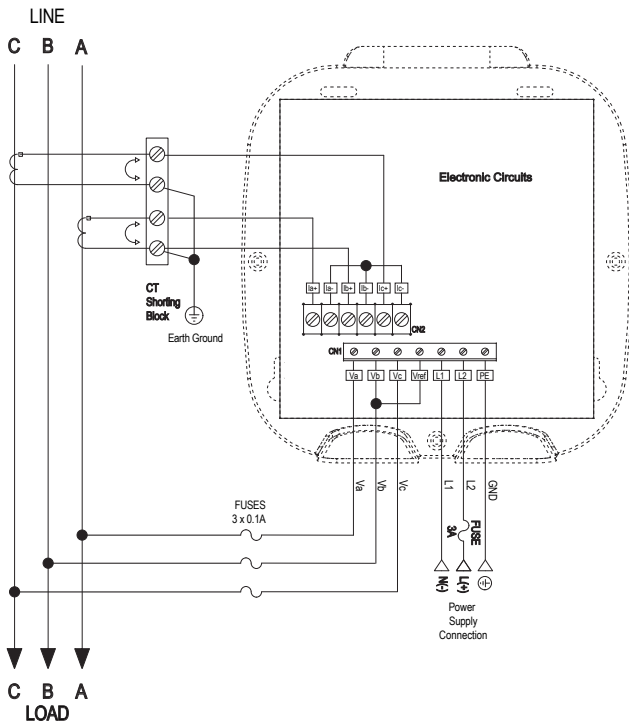
Wiring Diagrams



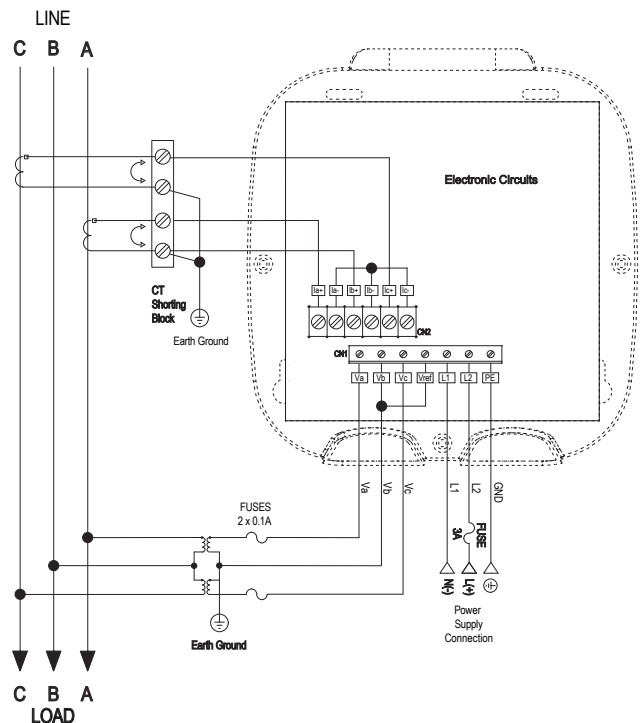
3 PHASE 4 WIRE WYE DIRECT



3 PHASE 4 WIRE WYE WITH PTS



3 PHASE 3 WIRE DELTA DIRECT



3 PHASE 3 WIRE DELTA WITH PTS

Voltage Inputs

- Absolute Range: (20-416) Volts Line to Neutral (Shark® 100S meter), (20-576) Volts Line to Neutral (Shark® 200S meter)
- (0-721) Volts Line to Line
- Universal Voltage Input
- Input Withstand Capability: Meets IEEE C37.90.1 (Surge Withstand Capability)
- Programmable Voltage Range to Any PT ratio
- Supports: 3 Element WYE, 2.5 Element WYE, 2 Element Delta, 4 Wire Delta Systems
- Burden: 0.36 VA/Phase Max at 600 V, 0.014 VA/Phase at 120 V

Current Inputs

- Class 10: 5 A Nominal CT Secondary, 10 A Max
- Class 2: 1 A Nominal CT Secondary, 2 A Max
- Programmable Current to Any CT Ratio
- Burden 0.005 VA/Phase Max at 11 A
- Pickup Current: 0.1% of Nominal
- Current Surge Withstand: 100 A/10 Seconds at 23 °C

Isolation

- All Inputs and Outputs are galvanically isolated to 2500 V AC.

Environmental Rating

- Storage: (-20 to +70) °C
- Operating: (-20 to +70) °C
- Humidity: to 95% RH (Non-Condensing)
- Protection: IP30 - Meter Front/Back

Sensing Method

- True RMS
- Sampling at over 400 Samples/Cycle on all Channels of Measured Readings Simultaneously
- THD (% of Total Harmonic Distortion) - Shark® 100S meter only

Update Rate

- Watts, VARs, and VA - Every 6 Cycles (e.g., 100 ms @ 60 Hz)
- All Other Parameters - Every 60 Cycles (e.g., 1s @ 60 Hz) (1 second for Current Only measurement, if reference voltage is not available)

Power Supply

- (90 to 400) Volts AC @50/60 Hz or (100 to 370) Volts DC/16 VA Max

Communication Format

- 2 Serial Com Ports (Back and Faceplate)
 - RS485 Port through Backplate (Optional)
 - IrDA through Faceplate
- Com Port Baud Rate: (1200 - 57600)

- Com Port Address: 1-247
- 8 Bit, Parity Setting: Odd, Even, None
- Modbus ASCII/RTU or DNP3 Protocols

Ethernet/WiFi (Optional)

- RJ45 10/100BaseT Ethernet and 802.11b WiFi
- Modbus TCP/IP Protocol
- Simultaneous Wired and Wireless Communication

Dimensions and Shipping

- Weight: 4 lbs /1.81 kg
- (7.9H x 7.5W x 3.1D) in/(20.1H x 19.1W x 7.9D) cm

Meter Accuracy

- See page 3.

Compliance

- ANSI C12.20 2010 Accuracy, 0.2 CL (100S)/ ANSI C12.20 2015, 0.2 Accuracy Class and C12.1 (MET Labs Certified) (200S)*
- ANSI C62.41 (Burst) (200S)*
- FCC, Part 15, Subpart B, Class A (Radiated and Conducted Emissions) (200S)*
- IEC 62053-22 Accuracy, Class 0.2S*/KEMA Labs Certified (200S)*
- IEC 62052-23 Edition 1 Class 2
- CE (IEC 61000-6-2 & IEC 61000-6-4 & IEC 61326-1) *

- IEC 61000-4-2 (Electrostatic Discharge)*
 - IEC 61000-4-3 (Radiated EM Immunity)*
 - IEC 61000-4-4 (EFT)*
 - IEC 61000-4-5 (Surge Immunity)*
 - IEC 61000-4-6 (Conducted Immunity)*
 - IEC 61000-4-8 (Magnetic Immunity)*
 - IEC 61000-11 (Voltage Variations Immunity)*
 - IEC/CISPR 11 Class A (Conducted, Radiated Emissions)*
 - CISPR22, Class A, Fifth Ed. (200S)*
 - IEEE C37.90.1 (Surge Withstand)
 - IEEE C62.41 (Surge Immunity)
 - EU Directive 2011/65/EU (RoHS 3 Directive)
 - REACH Compliant
 - (WiFi Module) ERM: Wideband transmission system operating in the 2.4 GHz ISM band using wideband modulation techniques. V1.6.1 (WiFi Module) Information technology equipment-Safety-part 1: General requirements: 2001
 - Certified to UL 61010-1 and CSA C22.2 No. 61010-1, UL File: E250818*
- * Third party lab tested

Ordering Information - All fields must be filled in to create a valid part number.

	Model	Frequency	Current Class	V-Switch™ Pack	Communication Format
Option Numbers:	-	-	-	-	-
Example:	Shark100S	60	10	V3	485
	Shark100S Basic Submeter	50 50 Hz System	10 5 A Nominal CT Secondary	V3* Default with Energy Counters (Shark® 100S)	485 RS485
	Shark200S Datalogging Submeter	60 60 Hz System	2 1 A Nominal CT Secondary	V4* Above with Harmonics and Limits (Shark® 100S)	WiFi WiFi and RJ45 Ethernet
* Shark® 100S meter only ** Shark® 200S meter only				V33** Multifunction Meter with 2 MB Datalogging Memory (Shark® 200S)	
Additional Accessories					
Communication Converters			Current Transformers		
CAB6490	USB to IrDA Adapter for Programming		CT200K	200/5 Ratio, 1.00" Window, 3 CTs	
Unicom 2500	RS485 to RS232 Converter		CT400K	400/5 Ratio, 1.25" Window, 3 CTs	
Software Option Numbers			CT800K	800/5 Ratio, 2.5" Window, 3 CTs	
COMPQA6P1Y	CommunicatorPQA® Software, Single License		CT2000K	2000/5 Ratio, 3.00" Window, 3 CTs	
ENERGYPQA-1Year	AI Driven Energy Management System		Note: Consult factory application engineer for additional transformer ratios, types, or window sizes.		
Compliance Documents			CT Specifications		
Calibration, Part#: CCal	Certificate of Calibration with NIST Traceable Test Data.		Frequency	(50 to 400) Hz; Insulation: 600 V, 10 kV BIL	
Remote Antenna			Flexible Leads	UL 1015, 105 °C, CSA Approved, 24" Long, AWG# 16	
ANT18769	Remote Antenna Kit				

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