

Shark 270

SOCKET & SWITCHBOARD FORM REVENUE METER



Revenue Metering

- Certified to ANSI C12.20 0.1 Accuracy Class
- Time of Use, Transformer/Line Loss Compensation, and Test Mode
- Rugged Design with Primary Surge Suppression
- Draw Out Switchboard Case Form
- WYSIWYG Screen Designer for Creating Customized Display Screens for Any Metering Application
- Pre-configured Diagnostic Screens
- Role-based Cyber Security with IP Firewalls, Encryption, and Digital Firmware Signature (INP100S Card)
- Sealing Switch and Physical Locks

Power Quality Metering

- Advanced Power Quality Analyzer
- Limits, THD Monitoring, and Harmonics Recording
- 512 Samples/Cycle Waveform Recorder on Surge and Sag and Current Fault Events
- Waveform Scope for Viewing Real Time Voltage and Current Waveforms
- Extensive Logging for Analysis, Reporting, and Viewing over the Cloud
- Email Alarm on Power Quality Events

Communication & I/O

- Real Time SCADA Communication Capability: Modbus RTU/ASCII, Modbus TCP/IP, DNP3, and IEC 61850
- Multiple Communication Ports, Including RS485, RS232, ANSI Type 2 Optical Port, and Ethernet
- Encrypted Email with SMTPS and Ethernet Card Firewalls Prevent Unauthorized Access and Hacking of Power System Data
- Certified Verizon 4G Under-glass Wireless Cellular
- Built-in I/O Instead of Expansion Modules
- Superior Keystone Connectors for I/O



Introduction

The Shark® 270 SCADA ready revenue meter enables utilities to meet the evolving needs of customer metering and distributed generation. It has 0.1% energy accuracy, advanced revenue metering capability, load profiling, and advanced power quality monitoring. The Shark® 270 meter's SCADA capability consists of multiple serial and Ethernet communication ports and multiple protocols, including Modbus, Level 2 DNP3, IEC 61850, and MV90. It is fully compatible with the EnergyPQA.com® AI driven energy management system.

Applications

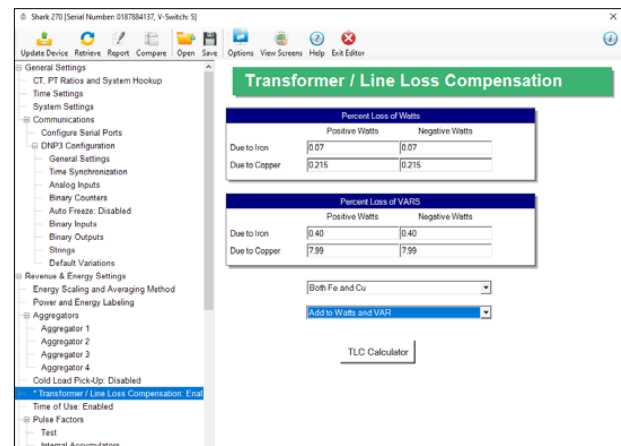
- Primary revenue metering.
- Advanced metering infrastructure.
- Customer power quality.
- Grid monitoring and substation metering.
- Distribution energy.
- Industrial and commercial metering and submetering.

Primary Revenue Metering

- 0.1% Class certified energy accuracy for grid metering and power generation.
- Designed with the latest DSP technology for reliability and long life.
- Provides reliable data for intertie billing, power generators, and distributed energy solutions.
- Offers a versatile, reliable solution for measuring energy and performing accurate cost analysis and allocation.
- Advanced metering technology and superior engineering improve both meter reliability and longevity.

Transformer/Line Loss Compensation

Properly bill utility customers for energy usage, even if the meter is placed on the secondary side of the transformer.



Parameters	Accuracy
Voltage L-N [V]	0.1% of reading
Voltage L-L [V]	0.2% of reading
Current Phase [A]	0.1% of reading
Current Neutral (calculated) [A]	2% of Full Scale
Active Power Total [W]	0.1% of reading
Active Energy Total [Wh]	0.1% of reading
Reactive Power Total [VAR]	0.2% of reading
Reactive Energy Total [VARh]	0.2% of reading
Apparent Power Total [VA]	0.2% of reading
Apparent Energy Total [VAh]	0.2% of reading
Power Factor	0.2% of reading
Frequency [Hz]	+/- 0.007 Hz
Harmonic Distortion (1 to 99.99)%	+/- 2%

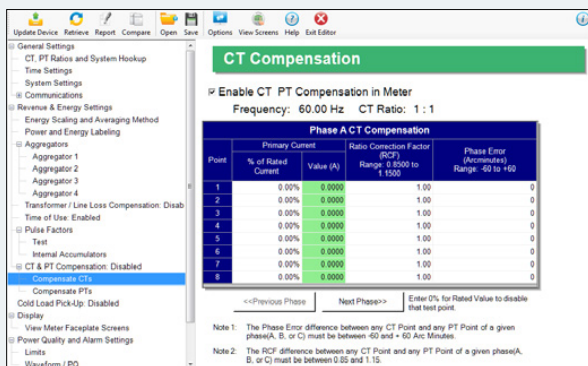
Note: See the Shark® 270 Meter User Manual for full accuracy specifications.

Time of Use

- Perpetual TOU calendar – set up only once and use indefinitely.
- Up to four customizable seasons.
- Up to 12 months per year - set independently from seasons.
- Up to 16 configurable datasets consisting of 38 channels of data, including energy channels, readings per quadrant and phase, and pulse aggregators.
- Cumulative and continuous cumulative demand.
- Flexible setup of billing periods/rates/holidays/schedules.

CT/PT Compensation

Adjust the meter to compensate for inaccuracies of the instrument transformers using both amplitude and phase angle adjustments.



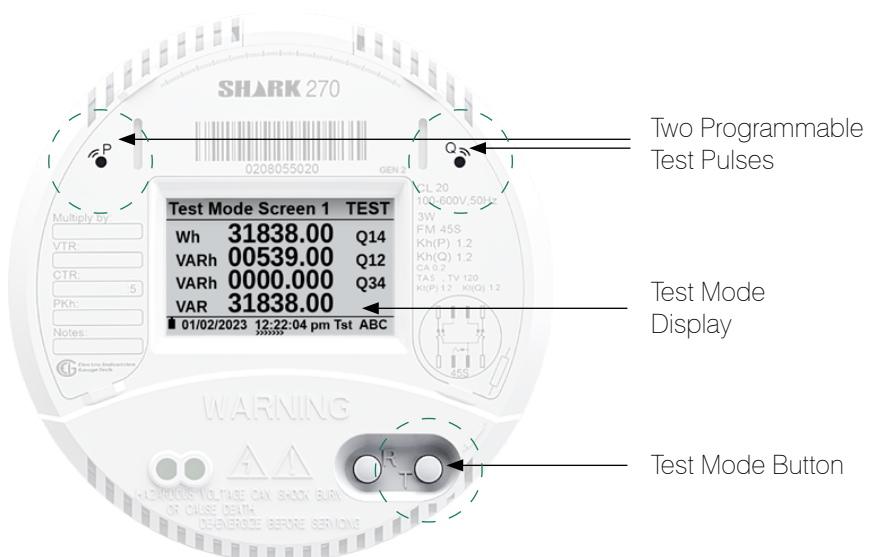
KYZ Pulse Outputs/Inputs

The meter has one standard KYZ pulse output and up to eight optional pulse outputs, enabling it to deliver energy pulses to a separate recorder, RTU, or other type of energy data collector.

With its eight optional pulse inputs, the meter can also function as a recorder. Energy values can be logged by the meter's internal profiling memory, supporting energy flow analysis over time, which is useful for billing, planning, and/or circuit efficiency analysis. Input values can also be totalized in the meter's aggregators.

Test Mode And Energy Presets

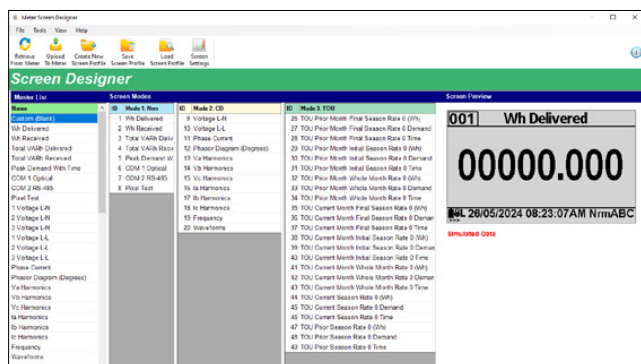
Two test pulses located on the meter's face can be used to simultaneously test watt hour and VAR hour readings for accuracy verification. When in test mode, the unit freezes and stores all energy parameters, allowing you to test and verify energy accuracy without changing meter readings. The meter can also receive preset energy values, so that it can replace an existing field installation without disturbing faceplate monthly energy reads.



Display Shows Test Status

WYSIWYG Screen Designer

The Shark® 270 meter provides one of the industry's most advanced LCD display configuration technologies. The screen designer enables fully customized display screens for any specific application, providing information on anything the meter measures. In addition to the custom displays, the meter comes pre-programmed with multiple display screens.



3 Display View Modes/ 250 Screens

Up to 250 custom and/or pre-programmed screens are available. These screens can be allocated to any of the three view modes, with any number of screens used in each of the modes.

Screen Designer to Meet Specific Needs

- Create custom screens that display any meter readings with customized scaling.
- Customize screen labels and screen order.
- Display water, gas, and other types of usage.
- Add diagnostic information.
- Provide other critical operational data.
- Use the meter as an aggregator and display total usage.



Normal Mode

- Wh, VAh, VARh delivered and received.
- Com port settings.
- Peak Rolling Window demand.
- Peak Block Window demand.

Time of Use Mode

- Wh and W demand delivered and received, total.
- VARh and VAR demand delivered and received for each register.
- VAh delivered and received for each register.
- VAh delivered and received, total.
- Present season and month, past season and month.
- Any other TOU measurements you need.

Pre-configured Diagnostic Screens

Select from a large offering of diagnostic screens, including:

- Voltage phase angles.
- Harmonic magnitudes.
- Firmware versions.
- Meter status.
- Phasor diagram.
- Per phase current and power measurements.
- Segment checks.
- Meter configuration.
- Many additional diagnostic screens available.

Data Trending & Analysis

The Shark® 270 meter has up to 128 MB of memory for data logging, used for historical trends, limit alarms, I/O changes, and sequence of events. The meter’s advanced storage means the unit can be programmed to store historical and waveform data for many years. Its real time clock allows for timestamping of all the data in the meter when log events are created. The clock is accurate to 3 ppm and is very stable over temperature.

Historical Logs

- Six assignable historical logs.
- Independently programmed trending profiles.
- Up to 64 parameters per log.

System Events Log

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

- Demand, energy, and log resets.
- System startup.
- Critical data repairs.
- Programmable settings changes.
- Password requests/sealing switch changes.

I/O Change Log

- Provides a timestamped log of any relay output.
- Provides a timestamped log of input status changes.
- 2048 events available.

Limit/Alarm Log

- Provides magnitude and duration of an event.
- Includes timestamps and alarm value.
- 2048 events available.
- Email on alarm capability with INP100S Ethernet card.

Limit Alarms and Control Capability (V4 and Above)

Limit Events:

- Any measured parameter.
- Up to 16 limits.
- Voltage unbalance.
- Current unbalance.
- Based on % of full scale settings.

Power Quality Measurement & Analysis

Waveform Recording

The Shark® 270 meter records up to 512 samples per cycle for a voltage sag or swell or a current fault event. Its advanced DSP design allows power quality triggers to be based on a 1 cycle updated RMS. Hundreds of events can be stored until the memory fills. The meter stores waveform data in a first-in/first-out circular buffer to ensure data is always recording. The table below shows the meter’s pre and post recording capability.

	Samples Per Cycle	Pre- Event Cycles	Post- Event Cycles	Max Waveforms per Event
V4	32	16	48	128
	64	8	24	64
	128	4	12	32
V5	256	2	6	16
	512	1	3	8

Note: Sampling rate based on 60 Hz systems. For 50 Hz systems, multiply by 1.2.

Waveform Scope

The unit uniquely offers a waveform scope that lets you view the real time waveform for voltage and current. The waveform scope allows the meter to be used as a basic oscilloscope throughout a power system.

Standard Communication Capabilities

The Shark® 270 meter's communication architecture is flexible and designed to integrate directly into most existing systems. Connect to EIG's software and multiple third party SCADA or other systems using the meter's standard and optional communication. Standard protocols include Modbus RTU/ASCII and Level 2 DNP3. Standard ports include a Type 2 ANSI optical port and an RS485/KYZ port.

Shark® 270 Under-glass Wireless Cellular Communication Option

- 4G LTE™ communication.*
- Certified Verizon wireless cellular.
- Cost-effective solution to supplement or replace costly AMI infrastructure.
- High-speed protocol to program meters and download data.
- Collect data with EIG software and/or MV90.
- Collect metering data and power quality waveforms from the same wireless connection.
- Secure communication using virtual private network infrastructure.
- Supports Modbus TCP/IP protocol

LTE is a trademark of ETSI.

* The cellular modem is not available with the switchboard case meter.

Secure VPN Communication Keeps Meters Off Public IP Networks



External Antenna Kit

Use EIG's optional external antenna kit for the 4GLTE cell modem to mount a wired antenna in the location that is best for your application. The antenna models are shown below. See page 16 for antenna and extension cable ordering codes.



- **EI-ANT30202-S1B** - Omni-directional; mounts on a cabinet or with a bracket.



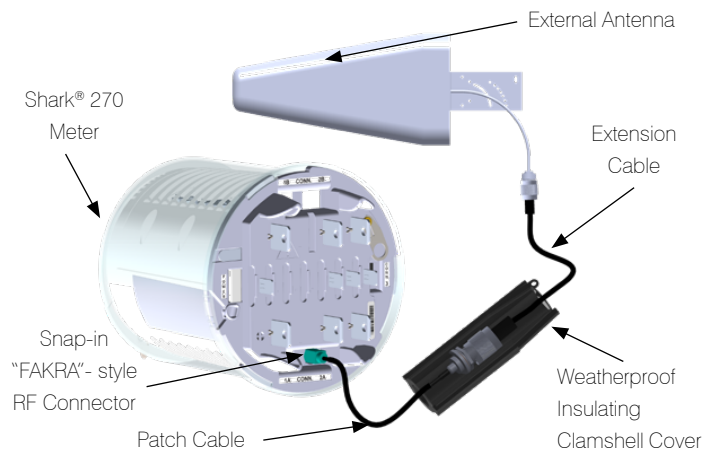
- **EI-ANT30274-R1A** - Omni-directional; mounts to any surface.



- **EI-ANT30319-R1A** - Directional; mounts to a pole.



- **EI-ANT30146-S5A** - Omni-directional; vandal-resistant design.



Field-expandable I/O & Optional Communication Capabilities

The Shark® 270 meter offers unequalled I/O and communication expandability through its two universal option card slots. The unit auto-detects installed option cards. Up to two I/O cards can be used per meter. The meter's optional communication cards support multiple open protocols, including Modbus ASCII/RTU/TCP, DNP3, and IEC 61850, for sending data to many different systems.

1. RS1S: Serial Communication Card

- Programmable RS485 or RS232 port.
- Adds up to 2 ports per meter.
- Supports Modbus and Level 2 DNP3.



2. INP100S: 100BaseT Ethernet Card

- Supports IPv4 and IPv6.
- Embedded HTML5-based web server, smartphone compatible.
- Network Time Protocol support for clock sync.
- 12 simultaneous Modbus TCP/IP connections.
- 5 simultaneous Level 2 DNP3 over TCP/IP connections.
- Encrypted alarm emails (with SMTPS) and periodic email notification of meter status/reading data.
- Firewalls to prevent unauthorized access.
- Digital firmware signature.



3. INP300S: IEC 61850 Protocol Ethernet Card

- Simultaneous Modbus TCP/IP and IEC 61850.
- 5 simultaneous MMS clients.
- Multiple Logical Nodes, including LLN0, LPHD, MMXU, MHAI, MMTR, and others.
- Polled operation mode (queried reports) and buffered and unbuffered reports.
- Configurable .CID file.
- Enhanced security to prevent unauthorized access.



4. 1mAOS: Four Channel Bi-directional 0-1 mA Outputs

- Assignable to any parameter.
- 0.1% of full scale.
- Max. load impedance 10 k Ω .
- Range: +/- (0-1) mA.
- Designed for RTUs and generating stations.



5. 20mAOS: Four Channel 4-20 mA Outputs

- Assignable to any parameter.
- 0.1% of full scale.
- 850 Ω at 24 V DC.
- Loop powered using up to 24 V DC.
- Ideal for any process control applications.



6. PO1S: Four Pulse Outputs / Four Status Inputs

- Programmable to any energy parameter and pulse value; programmable for end of interval.
- Form A: Normally open contacts.
- 120 mA continuous load current.
- Status inputs - dry contact status detection only.
- Provides KYZ outputs and pulse inputs counting.



7. RO1S: Two Relay Outputs / Two Status Inputs

- 30 V AC / 30 V DC - 0.25 A relays, form C.
- Trigger on user set alarms.
- Set delays and reset delays.
- Status inputs - dry contact status detection only.
- Allows for control, alarms, and status (must be at V4 or higher for limit alarms and control).
- Provides KYZ outputs and pulse inputs counting.



8. IRG1: IIRIG-B / Four Pulse Outputs

- Enables IIRIG-B clock synchronization.
- KYZ pulse outputs programmable to any energy parameters and pulse value; programmable for end of interval.
- Form A: Normally open contacts.



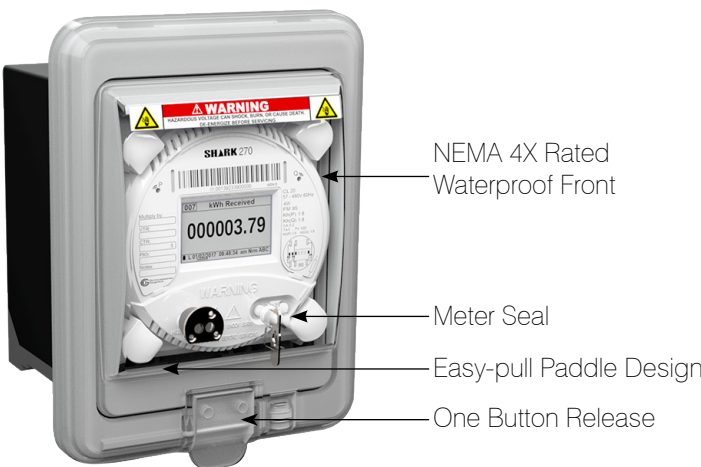
Surge Suppression

Revenue meters are often placed in remote locations susceptible to transient events, surges, sags, and other electrical anomalies. The Shark® 270 meter uniquely filters these events to prevent damage to the electronics of the instrument without limiting its ability to record event waveforms. The meter has a protection module consisting of a combination of high-power metal oxide varistor, gas tube, and high power resistors to attenuate powerful surges the meter may receive.

Draw Out Switchboard Case

EIG has designed a superior direct replacement of the existing General Electric style S1 relay case. The new case has the same measurements as the S1 case and its wiring follows industry conventions, eliminating the need for new wiring. Our unique design improves on the old classic case with many new features, including:

- Draw out meter cradle for easy testing and replacement.
- Easy-remove hinged paddle to simplify installation.
- NEMA 4X-rated cover for use in outdoor substation control panels.
- One button cover release for simpler installation and testing.



V-Switch™ Key Technology

The Shark® 270 meter is equipped with EIG’s V-Switch™ key technology. With this firmware-based technology, the meter can be upgraded in the field whenever more advanced features are needed.

Features	V-Switch Key™				
Measurements	V1	V2	V3	V4	V5
Multifunction Measurement	✓	✓	✓	✓	✓
Programmable Display	✓	✓	✓	✓	✓
Time of Use	✓	✓	✓	✓	✓
System Events		✓	✓	✓	✓
Input Status Change		✓	✓	✓	✓
Limits		✓	✓	✓	✓
Harmonics			✓	✓	✓
2 MB Memory (Up to 3 Historical Logs)		✓			
4 MB Memory (Up to 3 Historical Logs)			✓		
10 MB Memory (Up to 6 Historical Logs)				✓	
128 MB Memory (Up to 6 Historical Logs)					✓
Waveform 128 Samples per Cycle				✓	
Waveform 512 Samples per Cycle					✓
CT/PT Compensation	✓	✓	✓	✓	✓
TLC Compensation	✓	✓	✓	✓	✓
IEC 61850 Protocol			✓	✓	✓
Level 2 DNP3			✓	✓	✓
Modbus Protocol*	✓	✓	✓	✓	✓

*The meter now supports Modbus map customization. See the *CommunicatorPQA® and MeterManagerPQA® Software User Manual* for instructions on programming a custom Modbus map for the meter.

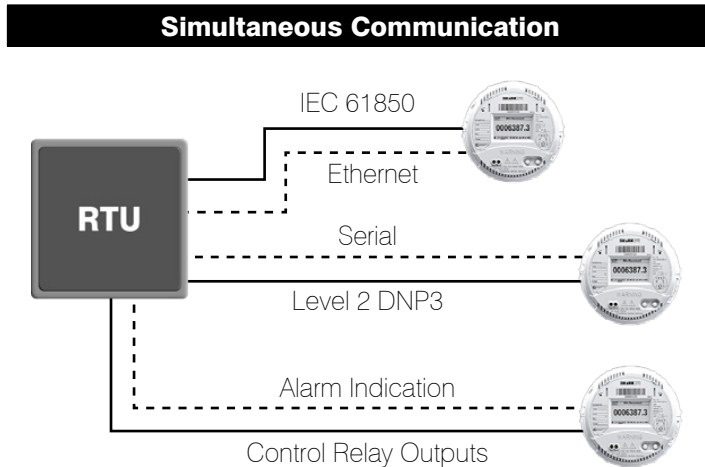
Utility Metering

Highly Accurate Measurements for Grid Metering, Power Generation, and Distributed Energy

The Shark® 270 meter's high sampling rate and latest DSP technology provide the reliable and precise measurements needed for utility metering, from intertie billing to distributed energy solutions.

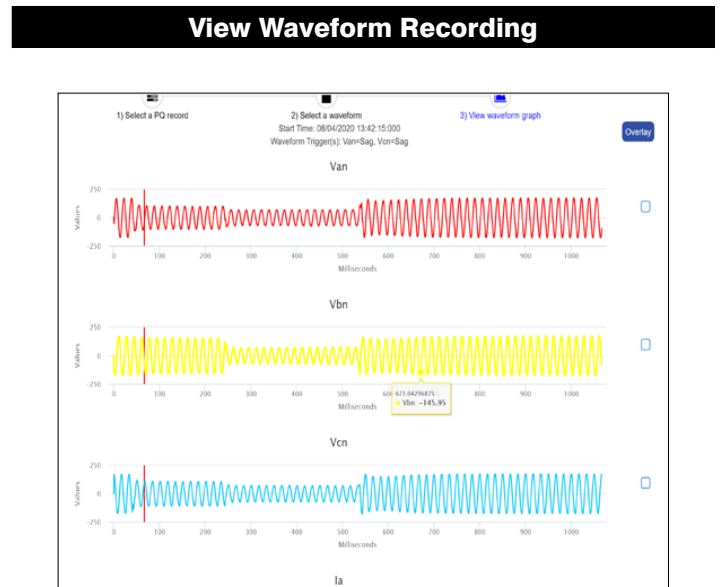
Better Communication for Advanced Smart Substation Applications

The Shark® 270 meter provides advanced communication usually found only in higher end, more costly, solutions. The meter can send data to multiple software systems, providing real time information as well as stored interval measurements. The Shark® 270 meter can communicate with an RTU to bring SCADA information back via one protocol, while itself being evaluated by other software systems for interval or power quality analysis.



Power Quality and Fault Analysis

The Shark® 270 meter's power quality features provide access to fault data and power quality information via a host of analytical tools. These tools provide easy conversion to COMTRADE and PQDIF formats, making the meter very helpful in standardizing fault data power system-wide. The meter measures and records critical power quality data, such as harmonics, PF, and phase imbalance, to provide advanced analysis options for improving power system reliability.



Cyber Security

Meet your security initiatives with the Shark® 270 meter's advanced cyber security. Security features include:

- IP Allow and Block lists.
- Password and username encryption.
- Role-based authorization (user-configurable permissions).
- Digital firmware signature (INP100S Card).

The meter additionally provides the following security features:

- Anti-tampering system events log.
- Port control, firewalls, and email encryption with SMTPS for Ethernet option cards.
- Hardware locks and sealing switch to prevent remote tampering.

Industrial & Commercial Energy Metering

The Perfect Upgrade Solution to Existing Mechanical Meters

The Shark® 270 meter is an ideal upgrade to non-communicating mechanical or older solid state meters. Replacing the existing meter with a Shark® 270 unit transforms basic metering capability into a communicating solution. The standard Shark® 270 unit has an RS485 Modbus port. With the optional Ethernet module, the meter can communicate over Ethernet to send Modbus data to most standard energy management and building automation systems.

Email on Alarm Conditions and Periodic Notifications

The Shark® 270 meter's Ethernet capability offers many advanced features that are useful for industrial and commercial applications. In addition to communicating via Modbus TCP, the meter can be configured to send email on alarm conditions, alerting facility managers to high demand, exceeded limit alarms, and other issues affecting both energy reliability and cost. The meter can also email periodic notification of measured values, such as demand and energy consumption. This is useful for sending data to energy dashboards and other cloud software applications. And it is essential for IOT applications, in which a user wants to integrate many, or all, electrical appliances and pieces of apparatus.

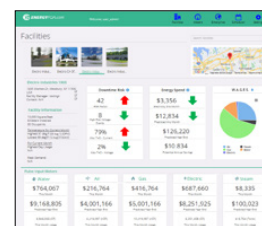
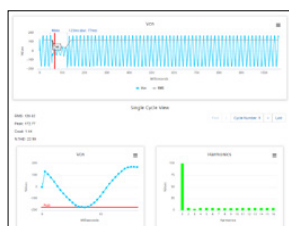
Diagnose Power Quality Events at Incoming Circuits

With the Shark® 270 meter a facility manager or engineer can view power quality events that occurred at the incoming service point, enabling analysis to determine the cause of these events and to implement remediation. They can also see how many and what types of events occurred and determine if these events may have affected their installed sensitive equipment. Captured power quality events include records of faults, voltage surges and sags, harmonics, imbalances, power factor, and many other indices. This data is automatically collected and stored in remote databases for system-wide analysis.

EnergyPQA.com® AI Driven Energy Management System

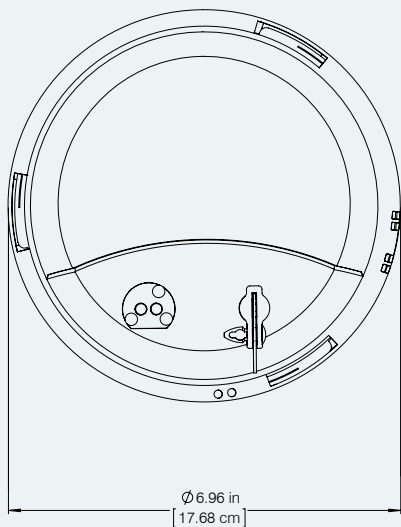
The EnergyPQA.com® system provides energy analytics and predictions enterprise wide and deep insights into power quality.

- Increase energy usage efficiency by analyzing load disaggregation and usage comparisons.
- Perform cost allocation and submetering by properly billing for actual energy usage versus square footage estimations.
- Analyze enterprise carbon footprint to determine and improve impact on the environment.

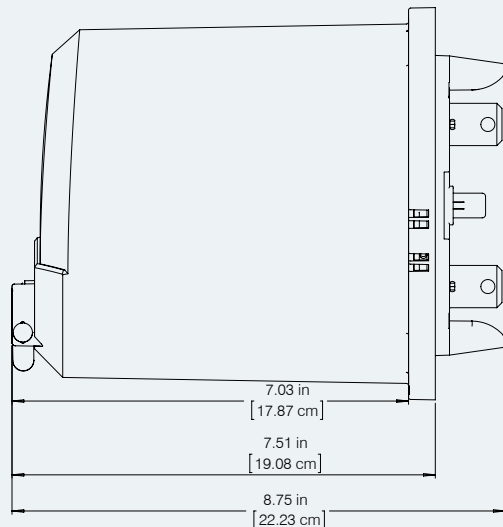


Shark® 270 Socket Meter

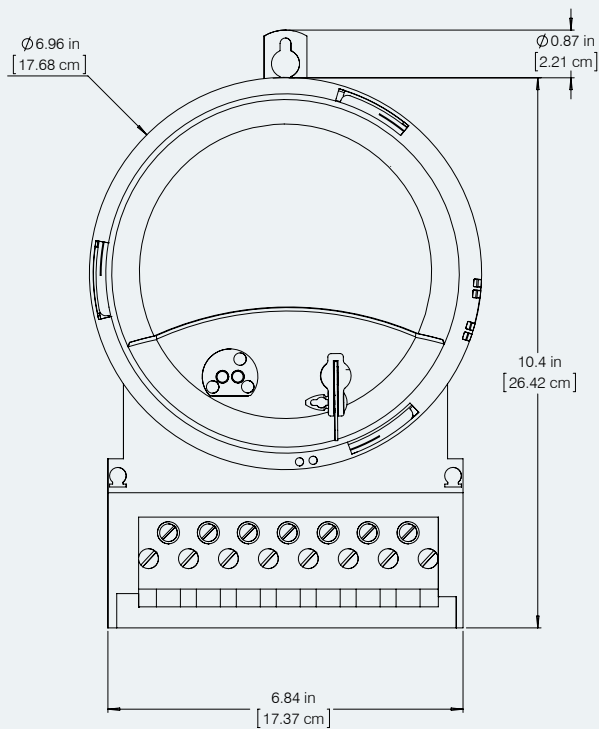
Dimensional Drawings



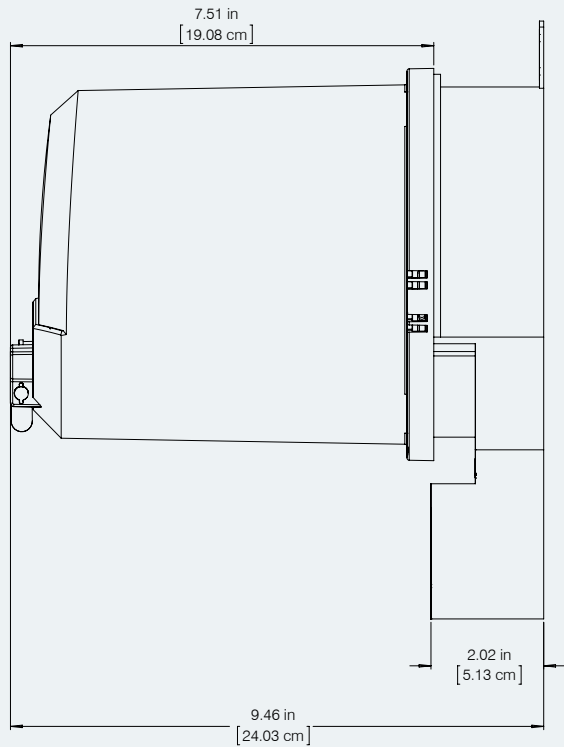
**SHARK® 270 METER
FRONT DIMENSIONS**



**SHARK® 270 METER
SIDE DIMENSIONS**



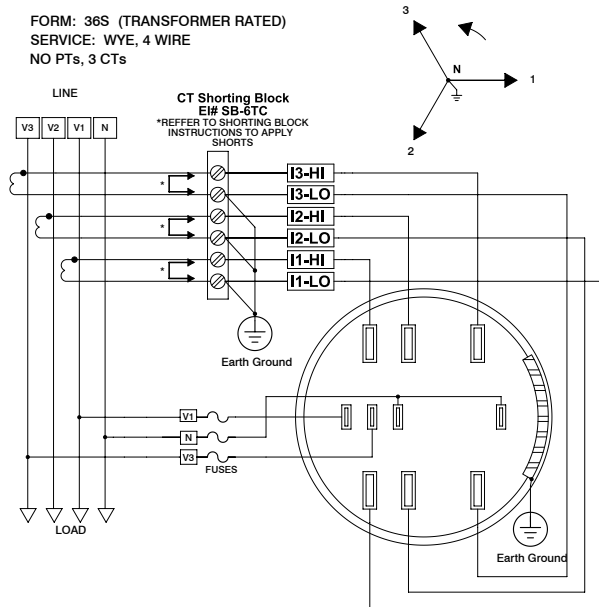
**SHARK® 270 METER IN A-BASE
FRONT DIMENSIONS**



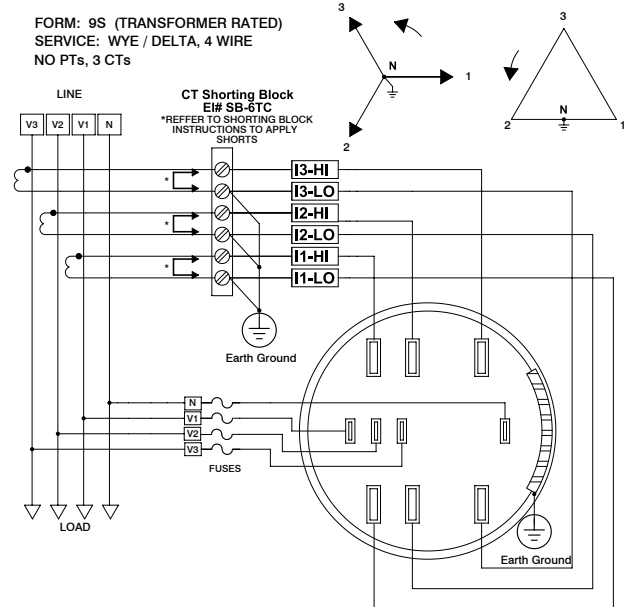
**SHARK® 270 METER IN A-BASE
SIDE DIMENSIONS**

Shark® 270 Socket Meter

Wiring Diagrams



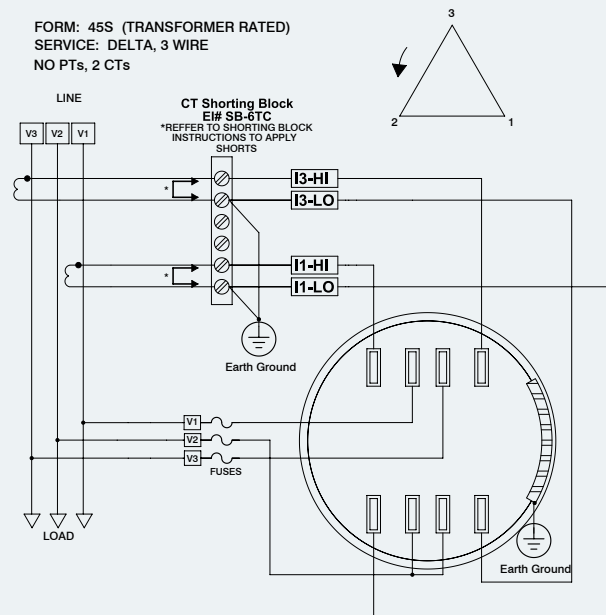
FORM 9S WYE/DELTA, 4 WIRE



FORM 36S WYE, 4 WIRE



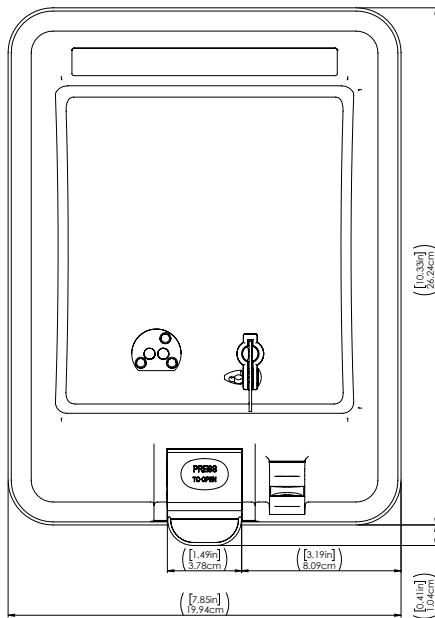
See the Shark® 270 Meter User Manual for additional information and wiring diagrams.



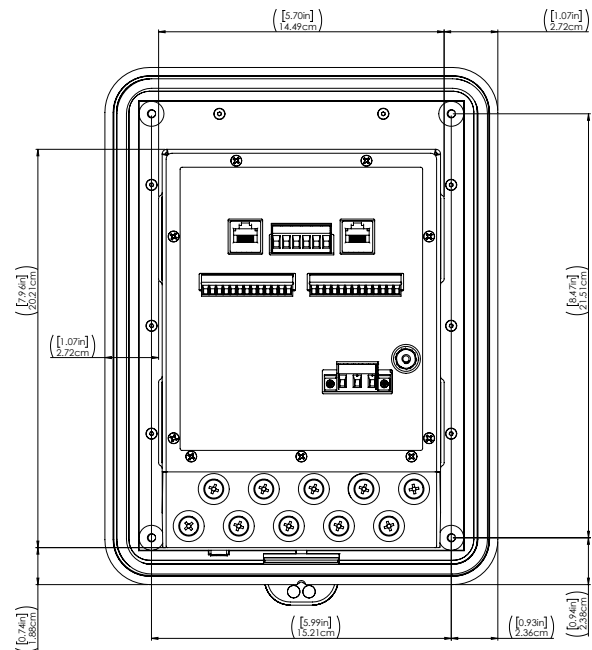
FORM 45S DELTA, 3 WIRE

Shark® 270 Switchboard Case

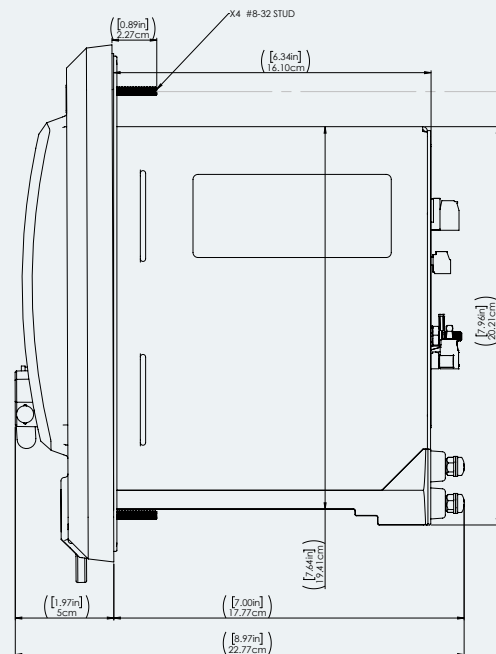
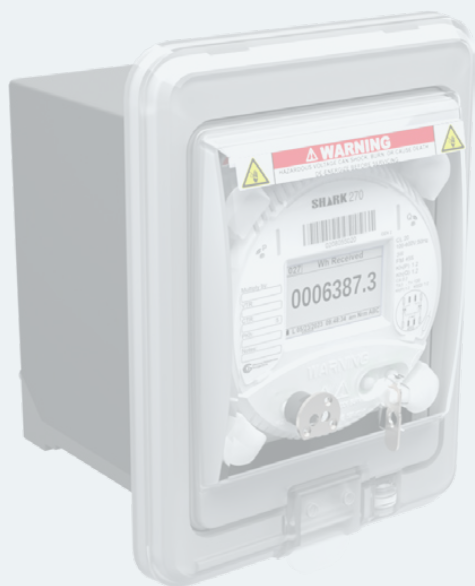
Dimensional Drawings



FRONT DIMENSIONS

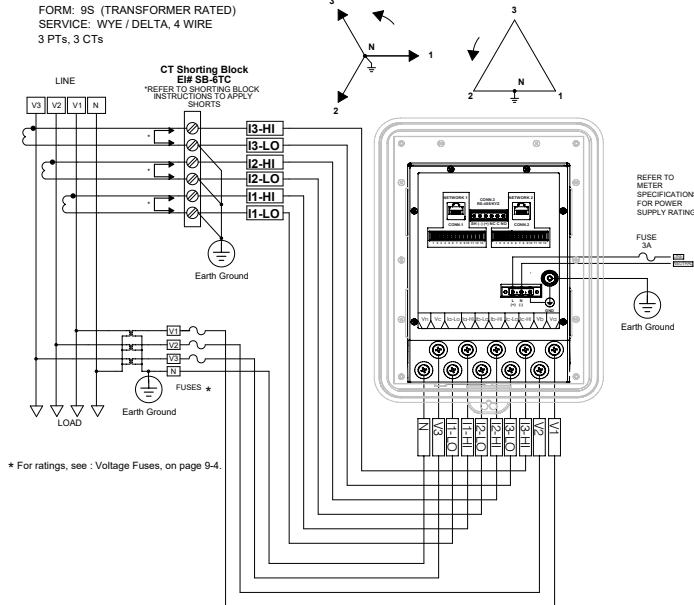


SIDE DIMENSIONS

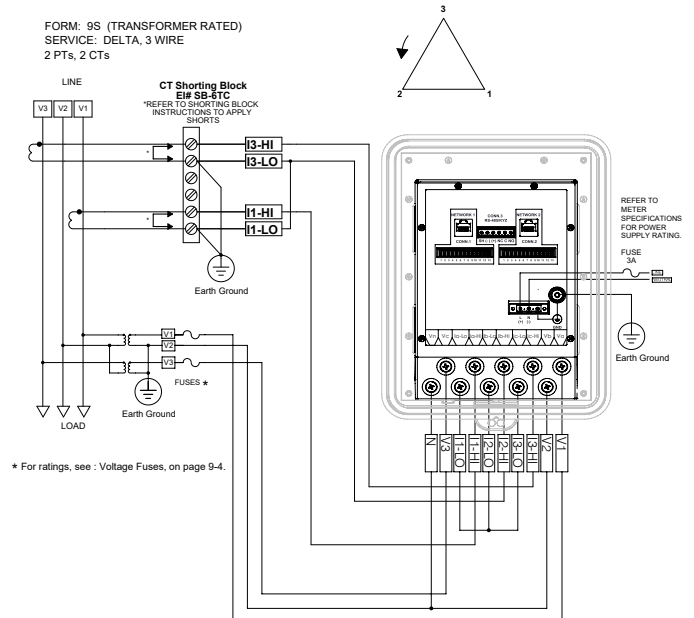


BACK DIMENSIONS

Wiring Diagrams



FORM 9S, 4 WIRE WYE/DELTA
3 PTS, 3 CTS



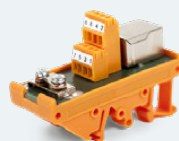
FORM 9S, DELTA 3 WIRE
2 PTS, 2 CTS

See the *Shark® 270 Meter User Manual* for additional information and wiring diagrams.

I/O Terminal Breakout Box Kit

(For Socket Form Meter)

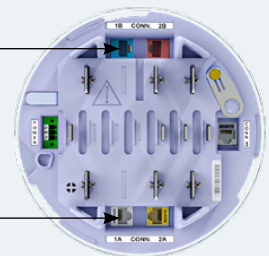
The CONN20163 gives you access to the meter's high accuracy without changing your current wiring scheme. It connects the Shark® 270 meter to your equipment in a simple, one-step process. Use the kit's cable to connect from one of the meter's RJ45 I/O connectors to the RJ45 port on the CONN20163 unit. The CONN20163 converts



Conn20163

Improved I/O Connectors

The Shark® 270 meter has keystone jacks to simplify I/O connection. All I/O uses standard RJ45 wiring, allowing cable lengths to be determined in the field.



Specifications

Voltage Inputs

- Absolute max. rating between any voltage inputs:
 - External power connection: 720 V AC
 - Powered from voltage blades ("S" option): 576 V AC
- Supported power mains with direct voltage connections:
 - Forms 9S/36S/45S with blade ("S") or external ("SE") power option: 57.7/100 V, 69/120 V, 120/208 V, 230/400 V, 277/480 V
 - Form 45S with external ("SE") power option only: 347/600 V
 - For lower or higher voltage power mains, use voltage transformers
- Input impedance: 4 MΩ per phase
- Burden:
 - With external power connection: 0.09 VA/input at 600 V AC (4 MΩ/input)
 - Unit powered from voltage blades: see power supply ratings

Current Inputs

- Transformer rated
- Two or three current inputs depending on Form (Ia, Ib, Ic)
- Class 2 - 1 A nominal CT secondary, burden 0.0112 VA at 2 A input/phase
- Class 20 - 5 A nominal CT secondary, burden 0.0112 VA at 20 A input/phase
- Pickup Current: Shall begin reading at 0.001 A (1 mA) for Class 2 and 0.005 A (5 mA) for Class 20
- Continuous maximum ratings: Class 2 - 5 A AC, Class 20 - 30 A AC
- Overcurrent ratings as the factor of Current Class: 5x - for 10 seconds, 15x - for 3 seconds, 25x - for 1 second
- The current inputs are only to be connected to external CTs

Power Supply

- Absolute maximum continuous: 576 V AC (between any voltage inputs in blade powered units, "S" option); 300 V AC or 400 V DC (externally powered units, "SE"

option)

- Absolute minimum startup/dropout voltage for blade powered, fully loaded unit ("S" option), at 60 Hz. All applicable blades are symmetrically energized:
 - 4W Wye service, Form 9S, 3 x L-N: 45/35 V AC
 - 4W Wye service, Form 36S, 2 x L-N: 50/45 V AC
 - 4W Delta service, Form 9S, 3 x L-N: 70(40)/52(30) V AC - high (low) phase
 - 3W Delta service, Form 45S, 3 x L-L: 65/55 V AC
- Absolute minimum startup/dropout voltage for externally powered, fully loaded unit ("SE" option), at 75/70 V AC or DC
- Frequency range: (45 to 65) Hz or DC
- Ride through at 120 V max. power consumption: ~33 ms
- Burden max: 8 VA/4.5 W per phase with 3 phase supply; typical burden with 1 Ethernet Card installed: 3.3 VA/1.7 W per phase at 3 phase 120 V AC

Display

- Back-lit TFT
- Size: 2.7"; 400 X 240 resolution

Isolation

- Between human accessible I/O connections and power, voltage, current inputs: 2500 V AC
- Between power and voltage and current inputs: 2500 V AC
- Between human accessible I/O connections: 500 V AC
- Hi-pot isolation tested in factory

Memory

- Up to 128 MB of flash memory

Standard Communication

- ANSI Type 2 Optical Port
 - Modbus ASCII/RTU protocol
 - Data speeds of up to 57600 bps
- RS485 serial port
 - Modbus ASCII/RTU and DNP3 Level 2 protocols
 - Data speeds of up to 115200 bps
- RS485 Transceiver; meets or exceeds EIA/TIA-485 standard
- Type: Two-wire, half duplex

- Min. input impedance: 96 kΩ
- Max. output current: ±60 mA
- Wh pulse
 - KYZ output contacts and infrared LED light pulses through face plate - "P" light port, Kh value is user definable
- Pulse width: 100 ms, fixed
- Full scale frequency: ~5 Hz
- Contact type: SPDT (NO - C - NC)
- Relay type: Solid state
- Peak switching voltage: AC/DC 30 V
- Continuous load current: 120 mA
- Peak load current: 350 mA for 10 ms
- On resistance, max.: 35 Ω
- Leakage current: 1 μA max.
- Isolation: 3750 V AC
- Reset state: (NC - C) Closed: (NO - C) Open

Optional Communication

- INP100S: Ethernet with embedded HTML5-based Web server; Modbus TCP/IP and DNP3 Level 2; IPv4 and IPv6
- INP300S: Ethernet with IEC 61850 Protocol server; Modbus TCP/IP and IEC 61850

4G LTE™ Option

- Certified Verizon
- LTE™ Category: Cat-1
- LTE™ Band: 1700/2100/700 MHz
- Dual antennas for greater sensitivity and reception
- Modbus TCP compliant
- MV90 Capable

Environmental (Temp. Specs. to Indirect Light)

- Operating Temp.: -40 to +158 °F (-40 to +70 °C)
- Display Operating Temp.: -22 to +140 °C (-30 to +60 °C)
- Humidity: 95% RH noncondensing
- Storage Temp.: -40 to +185 °F (-40 to +85 °C)
- S Form: outdoor rated, raintight Lexan cover, UV protected; Switchboard: NEMA 4X rated cover
- Protection Class: front IP65, rear IP51

Internal Battery (for Time Only)

- 3V Lithium battery maintains time during outages - replacement part #BATT21214
- Battery life typically 10 years from

date of manufacture

Compliance

- ANSI C12.20 2015 and C12.1 2014, 0.1 Accuracy Class (Eurofins/MET Labs Certified)*
- ANSI C12.18 (Type 2 Optical Port, physical properties)
- FCC Part 15, Class B (Radiated and Conducted Emissions)*
- IEC 62052-11 (KEMA Laboratories Certified)*
 - IEC 62053-22, Accuracy Class 0.2S*
 - IEC 62053-23, Accuracy 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 61000-4-11 (Voltage Variations Immunity)*
 - IEC/CISPR 11, Class B (Radiated Emissions)*
 - CISPR 16-2-1 (AC Mains Conducted Emissions)*
- IEC 61557-12 (Performance measuring and monitoring devices)
- IEEE C37.90.1 (Surge Withstand)
- IEEE C62.41 (Surge Immunity)
- EU Directive 2011/65/EU (RoHS 3 Directive)
- REACH Compliant

*Third party lab tested

Shipping Dimensions:

Socket

- Size: 10" W x 10" D x 11.50" H
- Weight: 4.4 lbs./1.83 kg. (with Option cards 5.6 lbs./2.54 kg.)

Switchboard

- Size: 16" W x 14" D x 11" H
- Weight: 16 lbs./7.25 kg. (with Option cards 19 lbs./8.62 kg.)

A-Base

- Size: 16" W x 14" D x 11" H
- Weight 9 lbs./4.08 kg. (with Option cards 9.5 lbs./4.31 kg.)

LTE is a trademark of ETSI.

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

	Model	Form	Frequency	Current Class	V-Switch™ Pack	Power Supply	I/O Slot 1	I/O Slot 2
Option Numbers:	-	-	-	-	-	-	-	-
Example:	Shark270	9S	60	2	V2	S	INP100S	X
	Shark270 (Revenue Meter)	9S 3 Element	60 60 Hz System	2 1 A Nominal CT Secondary	V1 Multifunction Meter	S Blade Powered (Not available for SWB3)	X No Option	X No Option
		36S 2.5 Element	50 50 Hz System	20 10 A Nominal CT Secondary	V2 Standard Data Logging Memory	SE Externally Powered	PO1S 4 Pulses/4 Inputs	PO1S 4 Pulses/4 Inputs
		45S 2 Element			V3 Power Quality Harmonics		RO1S 2 Relays/2 Inputs	RO1S 2 Relays/2 Inputs
		9A A Base			V4 128 Samples/ Cycle Waveform Recording		1mAOS 4 Channel Analog Output 0-1 mA	1mAOS 4 Channel Analog Output 0-1 mA
		SWB3 Switchboard Case			V5 512 Samples/ Cycle Waveform Recording Extended Memory		20mAOS 4 Channel Analog Output 4-20 mA	20mAOS 4 Channel Analog Output 4-20 mA
* A Shark® 270 meter cannot have more than one INP300S card, cannot have more than one 4GLTE / 4GLTE-ANT card, and cannot have both an INP300S card and a 4GLTE / 4GLTE-ANT card. The switchboard meter does not support the 4GLTE / 4GLTE-ANT card. Note that the meter must be at V3 or higher to use the INP300S card.							RS1S RS232/RS485 Comm Card	RS1S RS232/RS485 Comm Card

Accessories (Order one antenna and one cable.)

Software		Communication Converters		100BaseT Ethernet	100BaseT Ethernet
COMPQA6P1Y	CommunicatorPQA® 6 Software for Windows Single-Computer License (One Year)	E159343	USB Communication Cable	*INP300S IEC 61850 Protocol Ethernet	*INP300S IEC 61850 Protocol Ethernet
EnergyPQA-1Year	AI Driven Energy Management System	Unicom 2500	RS485 to RS232 Converter		
		Conn20163-KT	Terminal Breakout Box Kit for I/O	IRG1 IRIG-B and Pulse Outputs	IRG1 IRIG-B and Pulse Outputs
Standalone I/O Module Kits for the Shark® 270 Socket Form Meter **					
PO1S-KT	CommunicatorPQA® 6 Software for Windows	RO1S-KT	RO1S-KT - 2 Relays/2 Inputs plus cable		
20mAOS-KT	4 Channel, 4-20 mA Analog Outputs plus cable	1mAOS-KT	4 Channel, 0-1 mA Analog Outputs plus cable		
INP100S-KT	100BaseT Ethernet plus cable	INP300S-KT	IEC 61850 Protocol Ethernet plus cable		
RS1S-KT	RS232/RS485 plus cable	IRG1-KT	IRIG-B and 4 pulse outputs plus cable		*4GLTE Verizon Cert. Cell Modem with Internal Antenna
** I/O cards can be ordered separately using the part numbers shown above. See I/O card note in the Ordering Chart.					

External Antenna Accessories

Part Number	Remote Antenna	Part Number	Extension Cable	Part Number	Extension Cable
EI-ANT30202-S1B	Cabinet/Bracket Mount Omni Antenna	EI-ANT50603-S1A	LMR400 5' Cable 2500 Volts AC	EI-ANT50603-S6A	LMR400 100' Cable 2500 Volts AC
EI-ANT30274-R1A	High Gain Omni Antenna Any Surface Mount	EI-ANT50603-S2A	LMR400 10' Cable 2500 Volts AC	EI-ANT50206-S1A	5 FT LMR200 N-N male 1000 Volts AC
EI-ANT30319-R1A	High Gain Pole Mount Directional Antenna	EI-ANT50603-S3A	LMR400 25' Cable 2500 Volts AC	EI-ANT50206-S2A	10 FT LMR200 N-N male 1000 Volts AC
EI-ANT30146-S5A	Vandal Resistant Cabinet Mount Antenna	EI-ANR50603-S4A	LMR400 50' Cable 2500 Volts AC	EI-ANT50206-S3A	25 FT LMR200 N-N male 1000 Volts AC
EI-CABCONN-1	Connector for Joining Two Cables				

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