Accessible version (HTML): amperis.com/en/accesible/brochure-shark-200/

Shark 200

Revenue-grade metering, logging and expandable I/O

0.2 % accuracy class, waveform recording and dual Ethernet in a 4-inch panel meter

Shark 200

Data logging power and energy meter

amperis

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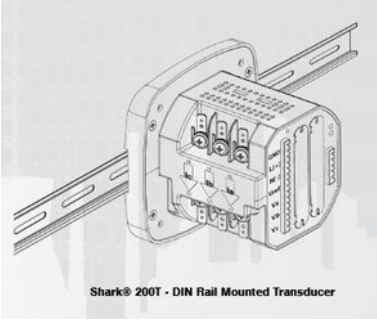
Certified 0.2 % accuracy class metering with data logging, power quality analysis and field-expandable inputs and outputs.

Product overview

Meter, plug-in I/O modules and remote access from a browser



Transducer version, mounted on DIN rail

Revenue-grade measurement

The Shark 200 meter measures voltage, current, active, reactive and apparent power, energy, power factor, frequency and demand with certified ANSI C12.20 0.2 accuracy class and IEC 62053-22 0.2S accuracy. Sampling runs at over 400 samples per cycle on every channel simultaneously, and a standard energy test pulse allows accuracy to be verified in the field.

Where it is used

- Utility, commercial, industrial and campus metering, and submetering.
- Substation telemetry, voltage recording and frequency monitoring.
- Interval load profiling, load studies and power quality studies.
- Direct replacement of analogue panel meters, reusing the existing CT and PT wiring.

At a glance

- Three assignable historical logs with 64+ parameters each, up to 4 MB of memory.
- Harmonics recorded to the 40th order; waveform capture up to 512 samples per cycle.
- Two independently addressable Ethernet ports, RS485, IrDA and KYZ pulse.
- Fits a 92 mm DIN square or an ANSI C39.1 4-inch round cut-out, only 4" deep.

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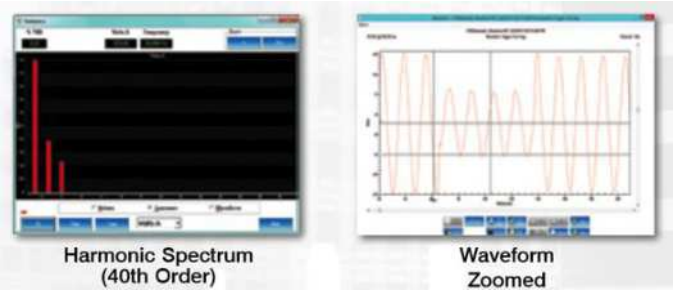
Up to 4 MB of memory records trends, alarms, I/O changes and waveforms, all time-stamped by the real-time clock.

Data logging and power quality

Historical trending of the logged parameters



Harmonic spectrum to the 40th order and waveform detail

Three historical logs

- 64+ parameters per log, each with its own trending profile.
- Independent programmable intervals for revenue and engineering data.
- Available from V2 upwards; 4 MB of logging memory at V6.

Event, alarm and I/O logs

- System events log: resets, password requests, start-ups, log reads and settings changes.
- Limit and alarm log with magnitude, duration, time stamp and alarm value; 2048 events.
- I/O change log with time stamp for every relay or status input change; 2048 events.
- Email on alarm when the Ethernet card is fitted.

Waveform recorder and scope

From V5 the meter records voltage sags and swells and current faults at up to 512 samples per cycle, with programmable pre- and post-event cycles and up to 170 stored events in a circular buffer. Triggers work on a one-cycle updated RMS, and a built-in waveform scope shows live voltage and current, so the meter also works as a basic oscilloscope.

CBEMA and SEMI F47 plotting

An independent log plots the magnitude and duration of voltage events against the CBEMA or SEMI F47 curve, which shows surges, sags and their duration without downloading waveform records.

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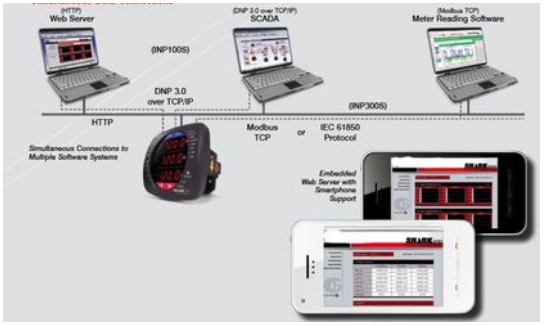
Two standard ports, two optional Ethernet ports and two field-expandable I/O slots that the meter detects automatically.

Communication and expandable I/O



Simultaneous connections to browser, SCADA and metering software

Field-expandable I/O slots; the meter detects the card type

Standard ports

- RS485 on the back plate with Modbus RTU/ASCII or DNP3, 1200 to 57600 baud, addresses 1 to 247.
- IrDA optical port on the faceplate for programming from a laptop.
- KYZ pulse output mapped to absolute energy, also used as end-of-interval pulse.

Ethernet cards

- INP100S: 100BaseT with HTML5 web server, 12 Modbus TCP/IP connections, 5 DNP3 over TCP/IP connections, NTP time server and email on alarm.
- INP300S: IEC 61850 protocol with configurable CID file, 5 Modbus connections and 5 MMS clients, plus web server.
- Both are dual Ethernet port capable and add the Exclusive Client feature against unauthorised programming.

I/O cards, two slots

- 1mAOS: four bidirectional 0-1 mA analogue outputs, 0.1 % of full scale, 10 kΩ maximum load.
- 20mAOS: four 4-20 mA outputs, 0.1 % of full scale, 850 Ω at 24 V DC, loop powered.
- PO1S: four pulse outputs and four status inputs, Form A contacts.
- RO1S: two Form C relay outputs, 250 V AC / 30 V DC 0.25 A, and two status inputs, with programmable delays.
- FOSTS and FOVPS fibre optic cards with daisy-chain logic, ST or versatile link terminated.

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One meter covers voltage recording, telemetry and load profiling across the distribution network.

Substation solutions

Voltage and frequency recording at the main transformer and the feeders

All outputs available simultaneously

Voltage and frequency recording

- Voltage reliability analysis to confirm the supply delivered to customers.
- Comparison of voltage reliability across transmission or distribution networks.
- Monitoring of substation transformers and line regulators.
- Support for conservation voltage reduction to lower system demand.
- Frequency measured to 0.001 Hz, which replaces dedicated frequency transducers.

Low-cost telemetry

Data returns over RS485, Ethernet or analogue outputs, all available at the same time, so one meter serves almost every substation application whatever the communication infrastructure. Several systems or users can read the meter simultaneously, which suits both new installations and retrofits.

Interval load profiling

- Revenue-accurate load profiling of energy, demand, voltage, current and power factor.
- Analysis of feeder capacity and utilisation over time.
- Time-based profiles for planning and estimation, and power factor distribution for efficiency studies.

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V-Switch key technology - features by key

Keys are activated in the field without removing the meter from service; each key includes the functions of the previous ones.

Feature	V1	V2	V3	V4	V5	V6
Multifunction measurement with I/O expansion	•	•	•	•	•	•
2 MB data logging		•	•	•		
3 MB data logging					•	
4 MB data logging						•
Harmonic analysis			•	•	•	•
Transformer line loss and CT/PT compensation	•	•	•	•	•	•
Limit and control functions				•	•	•
64 samples per cycle waveform recorder					•	
512 samples per cycle waveform recorder						•

The meter must be at V-Switch key 4 or higher to use the relay output features of the RO1S card.

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Accuracy chart and waveform recording

Parameter	Accuracy	Display range
Voltage L-N	0.1 %	0-9999 V or kV, scalable
Voltage L-L	0.2 %	0-9999 V or kV, scalable
Current	0.2 %	0-9999 A or kA
Watts (+/-)	0.2 %	0-9999 W, kW, MW
Watt-hours (+/-)	0.2 %	5 to 8 programmable digits
VAR (+/-)	0.2 %	0-9999 VAR, kVAR, MVAR
VAR-hours (+/-)	0.2 %	5 to 8 programmable digits
VA	0.2 %	0-9999 VA, kVA, MVA
VA-hours	0.2 %	5 to 8 programmable digits
Power factor	0.2 %	+/- 0.5 to 1.0
Frequency	+/- 0.007 Hz	(45 to 65) Hz
THD	+/- 2.0 %	1 to 99.99 %
% load bar	+/- 1 segment	(0.005 to 6) A

Waveform recording capacity

V-Switch key	Samples/cycle	Pre-event cycles	Post-event cycles	Waveforms per event	Stored events
V5	32	16	48	128	85
V5	64	8	24	64	85
V6	128	4	12	32	170
V6	256	2	6	16	170
V6	512	1	3	8	170

Applies to 3-element WYE and 2-element Delta connections. For 2.5-element programmed units, degrade accuracy by a further 0.5 % of reading.
For 1 A nominal (Class 2) inputs, degrade accuracy to 0.5 % of reading for watts and energy; all other values twice the rated accuracy.
Waveform sampling rates are given for 60 Hz systems; multiply by 1.2 for 50 Hz systems.

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Technical specifications

Voltage inputs	Universal input, (20-576) V line to neutral and (0-721) V line to line; programmable to any PT ratio; supports 3-element WYE, 2.5-element WYE, 2-element Delta and 4-wire Delta systems
Voltage input data	Input impedance 1 MΩ per phase; burden 0.36 VA per phase at 600 V and 0.014 VA at 120 V; withstand to IEEE C37.90.1; wire gauge AWG#12-26 / (0.129-3.31) mm^2
Current inputs	Class 10: (0.005 to 10) A with 5 A nominal CT secondary; Class 2: (0.001 to 2) A with 1 A nominal CT secondary; programmable to any CT ratio; pick-up 0.1 % of nominal (5 mA / 1 mA); burden 0.005 VA per phase at 11 A
Current withstand	100 A for 10 s, 300 A for 3 s and 500 A for 1 s at 23 °C; 20 A continuous on screw or pass-through connections; pass-through wire diameter 0.177" / 4.5 mm
Isolation	All inputs and outputs galvanically isolated to 2500 V
Sensing method	True RMS, over 400 samples per cycle on all channels simultaneously; harmonics to the 40th order; waveform to 512 samples per cycle
Update rate	Watts, VAR and VA every 6 cycles; all other parameters every 60 cycles
Power supply	Option D2: (90-265) V AC at 50/60 Hz or (100-370) V DC, 10 VA maximum. Option D: (18-60) V DC for 24 to 48 V DC systems, 7 W maximum
Serial communication	Two ports: RS485 on the back plate and IrDA on the faceplate; (1200-57600) baud; addresses 1 to 247; 8-bit with odd, even or no parity; Modbus RTU, Modbus ASCII or DNP3
KYZ pulse output	Form C contact; on resistance 35 Ω maximum; peak voltage 350 V DC; continuous load current 120 mA; peak load current 350 mA for 10 ms; off-state leakage 1 µA at 350 V DC
Environmental rating	Operating and storage (-20 to +70) °C; humidity to 95 % RH non-condensing; faceplate rating NEMA 12; mounting gasket included
Protection	IP30 front and back; optional DIN rail mounting and optional plug-in I/O modules

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Mounting, dimensions and compliance

Panel cut-out	92 mm DIN square or ANSI C39.1 4-inch round; one meter fits both standards
Panel depth	Mounts in only 4" of panel depth, which suits switchgear retrofits
Meter dimensions	H 4.85" x W 4.85" x L 4.25" (12.32 x 12.32 x 10.79) cm
Transducer version	Transducer version without display, mounted on DIN rail with the attached clips; RS485 Modbus or DNP3 output and the same expandable I/O
Weight	2 lb / 0.91 kg
Shipping	Shipping container 6" cube
Display	Three lines of bright red 0.56" LED digits with intuitive navigation and anti-dither algorithm for reading stability
Compliance	ANSI C12.20 0.2 accuracy class and C12.1; ANSI C62.41 burst; IEC 62053-22 0.2S; IEC 62053-23 edition 1 class 2; EN 61000-6-2 and EN 61000-6-4; EN 61000-3-2 class A and EN 61000-3-3; FCC part 15 subpart B class A; CE marking
Certification	Accuracy certified by MET Labs (ANSI) and KEMA Laboratories (IEC)

Ruggedly designed for harsh electrical environments, with industrial grade components, high surge and transient withstand and short-circuit safe current inputs whose dual input methods keep the CT connection closed under fault.

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Ordering information

Every field must be filled in to form a valid part number, in the order shown.

1. Model	Shark200 (meter with display) or Shark200T (transducer without display)
2. Frequency range	60 = 60 Hz system; 50 = 50 Hz system
3. Current input	10 = 5 A nominal CT secondary; 2 = 1 A nominal CT secondary
4. V-Switch pack	V1 multifunction meter only; V2 standard data logging memory; V3 power quality and harmonics; V4 limits and control; V5 waveform recording at 64 samples per cycle; V6 waveform recording at 512 samples per cycle
5. Power supply	D2 = (90-265) V AC at 50/60 Hz or (100-370) V DC; D = (18-60) V DC
6. I/O slot 1	X none; RO1S two relays and two status inputs; PO1S four pulses and four status inputs; 1mAOS four bidirectional 0-1 mA analogue outputs; 20mAOS four 4-20 mA analogue outputs; FOSTS or FOVPS fibre optic output; INP100S 100BaseT Ethernet; INP300S IEC 61850 Ethernet
7. I/O slot 2	Same options as slot 1, including X for none
8. Mounting	X = ANSI mounting; DIN = DIN mounting brackets

Accessories, software and converters

COMPQA6P1Y	Power monitoring software for Windows, single-computer licence for one year
EnergyPQA-1Year	Energy management system with analytics and power quality insight, one year
E205301	RS485 to USB converter
Unicom 2500	RS485 to RS232 converter
Unicom 2500-F	RS485 to RS232 and fibre optic converter
CAB6490	USB to IrDA adapter

Example of a valid part number: Shark200-60-10-V2-D2-INP100S-X-X.
I/O cards can be ordered separately and fitted later; the meter detects the card type automatically.
The meter must be at V-Switch key 4 or higher to use the relay features of the RO1S card.

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