***GENERIC SPECIFICATION FOR MULTIFUNCTION DATALOGGING POWER AND ENERGY METER WITH ADVANCED I/O AND POWER QUALITY, SHARK® 200 METER***

1. PRODUCT

2.1 POWER METER

1. The meter shall be UL listed and CE marked. Meter shall have third party certification or testing for the following standards:
	* + 1. ANSI C12.20 .2 Accuracy Class Certified.
			2. ANSI C62.41.
			3. FCC, Part 15, Subpart B, Class A.
			4. EN 61326-1 and CE subordinate standards.
			5. IEC 61850 Certified.
			6. New York State approved for residential metering.
2. Meter shall be designed for multifunction electrical measurement on 3 phase power systems.
	* + 1. The meter shall support 3 element Wye, 2.5 element Wye, 2 element Delta, 4 wire Delta systems.
			2. Voltage inputs are user programmable for voltage range to any PT ratio.
			3. Voltage burden of .36 VA per phase Max at 600 volts and 0.014 VA at 120 volts.
			4. Absolute voltage input range of (20-576) V L-N and (0- 721) Volts L-L.
			5. Color-coordinated voltage and current inputs.
			6. Phasor diagram that clearly shows wiring status.
			7. Dual input method for current inputs:
				1. CT allowed to pass directly through meter without any physical termination on meter.
				2. Provides additional termination pass-through bars, allowing CT leads to be terminated on meter.
			8. Fault current withstand of 100 A for 10 seconds, 300 A for 3 seconds, and 500 A for 1 second.
			9. Current programmable to any CT ratio.
			10. Current burden of 0.005 VA per phase, Max at 11 A.
			11. 1mA and 5mA pickup for current for appropriate current class
			12. Inputs and outputs galvanically isolated to 2500 V AC.
			13. Current inputs for Class 10: 5 A Nominal CT with overrange to 10 A secondary.
			14. Current inputs for Class: 2 1 A Nominal CT with overrange to 2 A secondary.
3. Meter shall have accuracy of +/- 0.2% or better for voltage and current, and 0.2% for power and energy. Meter shall meet accuracy requirements of IEC 62053-22 (Class 0.2S) and ANSI C12.20 (Class 0.2 CL). Meter shall have a frequency accuracy of +/- 0.007 Hz to support frequency control.
4. Meter shall be a traceable revenue meter, containing a utility-grade test pulse for accuracy verification.
	* + 1. Meter shall have CT/PT compensation.
			2. Meter shall have transformer and line loss compensation.
5. Meter shall have upgrade packs (V1-V6) that enable additional features in the field, without removing the meter from installation.
6. Meter shall have datalogging and PQ recording memory. Available logs shall consist of:
	* + 1. Three separately programmable historical trending logs of up to 64 parameters, each.
			2. I/O change log of up to 2048 relay output and input status changes.
			3. Limits/Alarm log of up to 2048 events.
			4. System events, anti-tampering log.
7. Meter shall have simultaneous voltage and current waveform recording.
	* + 1. 512 samples per cycle shall be available.
			2. PQ triggers shall be based on a 1/2 cycle updated RMS.
			3. Up to 170 waveform events can be recorded before the memory fills.
8. Meter shall provide a waveform scope for viewing voltage and current real time waveforms.
9. Meter shall provide harmonic recording to the 40th order and harmonic analysis using stored waveforms to the 255th order.
10. Meter shall store an independent CBEMA or SEMI F47 log.
11. Meter shall fully support MV90 software manufactured by Itron.
12. Meter shall provide 16 configurable limits with control output relays for alarms.
13. Meter shall have communication and I/O expandability through two option card slots on meter. Meter shall auto-detect presence of cards. Up to two cards of any type can be used in the meter.
	* + 1. Ethernet option card shall support NTP time server for high accuracy time sync, 12 simultaneous Modbus TCP/IP connections and 5 simultaneous DNP3 over TCP/IP connections. The card shall also support an embedded HTML5-based web server, email on alarm and periodic notification emails of meters status, and Exclusive Client to protect from unauthorized access.
			2. IEC 61850 protocol option card shall support simultaneous IEC 61850, and Modbus TCP/IP, 5 simultaneous MMS clients, 5 simultaneous Modbus connections, a web server for status and configuration, multiple logical nodes, a configurable CID file, and Exclusive Client to protect from unauthorized access.
			3. Fiber optic option card shall offer either ST-terminated or versatile link terminated, shall contain built-in logic to mimic RS485 half duplex bus for daisy chaining for both Modbus and DNP3.
			4. There shall be I/O option cards consisting of 4 channel bi-directional 0-1 mA outputs, four channel, 4-20 mA outputs, four pulse outputs/four status inputs, and two relay outputs/two status inputs.
14. Meter shall have standard RS485 port with Modbus and DNP3 support and a standard KYZ pulse. A faceplate IrDA port shall be available for configuration and data download.
15. Meter shall provide user configured fixed window or rolling window demand so the user can set up the specific utility demand profile.
	* + 1. Readings for kW, kVAR, kVA and PF shall be calculated using utility demand features. All other parameters shall offer max and min capability over the user selectable averaging period.
			2. Voltage shall provide an instantaneous max and min reading displaying the highest surge and lowest sag seen by the meter.
16. Meter shall have a three-line, bright red, .56” LED display, which presents a scrolling display of measured readings.
17. Meter shall install in standard ANSI or DIN cutouts. There shall be a transducer only model that shall install on a DIN rail.
18. Meter shall have a 4-year warranty.
19. The following options shall be available for ordering:

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| Model | **Frequency** | **Current Input** | **V-Switch™ Pack** | **Power Supply** | I/O Slot 1 | **I/O Slot 2** |
| Shark®200: Meter/Transducer | -50: 50 Hz | -10: 10 ANominal CT Secondary | -V1: Multifunction meter only | -D2: (90-265) VoltsAC/DC | -X: None | -X: None |
| Shark®200T:Transducer | -60: 60 Hz | -2: 2 ANominal CT Secondary | -V2: Above & 2 Megabytes Data-logging memory | -D: 18-60 Volts DC | -INP100S: 100BaseT Ethernet | -INP100S: 100BaseT Ethernet |
|  | -V3: Above & Power quality Harmonics |  | -RO1S: 2 Relays/2 Status Inputs | -RO1S: 2 Relays/2 Status Inputs |
| -V4: Above & Limit and control functions | -PO1S: 4 Pulses/4 Status Inputs | -PO1S: 4 Pulses/4 Status Inputs |
| -V5: Above & 3 Megabytes Data-logging memory; 64 samples per cycle Waveform recorder | -1mAOS: 4 Channel Analog Output, 0-1 bi-directional | -1mAOS: 4 Channel Analog Output, 0-1 bi-directional |
| -V6: Above & 4 Megabytes Data-logging memory; 512 samples per cycle Waveform recorder | -20mAOS: 4 Channel Analog Output, 4-20 mA | -20mAOS: 4 Channel Analog Output, 4-20 mA |
| -FOSTS: Fiber Optic Output ST Terminated | -FOSTS: Fiber Optic Output ST Terminated |
| -FOVPS: Fiber Optic Output Versatile Link Terminated | -FOVPS: Fiber Optic Output Versatile Link Terminated |
| -INP300S:IEC 61850 Protocol Ethernet Network Card | -INP300S:IEC 61850 Protocol Ethernet Network Card |

1. Acceptable product is Electro Industries/GaugeTech, Model SHARK200-60-10-V6-D2-INP100S-X.

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