Features
- 0.2% Class Energy and Demand Metering
- Measurements including Voltage, Current, Power, Frequency, Energy, etc.
- Optional KYZ Pulse and Standard IrDA Port
- Power Quality Measurements (THD and Alarm Limits)
- V-Switch™ Technology - Field Upgrade without Removing Installed Meter
- Large Bright Red LED Display
- % of Load Bar for Analog Meter Perception
- Optional RS485 Modbus and DNP3 Protocols
- Optional 100BaseT Ethernet
- Fits Both ANSI and DIN Cut-Outs
- Available in a Transducer-Only Version

Applications
- Utility Metering
- Commercial Metering
- Substations
- Industrial Metering
- Power Generation
- Campus Metering
- Submetering
- Analog Meter Replacement

Introduction
Electro Industries introduces one of the industry’s highest performance revenue grade panel meters. Based on an all new platform, this low cost meter significantly outperforms other devices many times its price. This unit is perfect for new metering applications and as a simple replacement of existing analog meters. The Shark® meter excels in metering energy accurately, exceeding ANSI C12.20 (0.2%) and IEC 62053-22 (0.2%) energy measurement standards. The unit utilizes high speed DSP technology with high resolution A/D conversion to provide revenue certifiable accuracy for Utility Billing, Substation Metering, Submetering and Critical Metering applications.

High Performance and Economical Pricing for High Volume Deployment
Superior Accuracy and Virtual Upgrade Switches

V-Switch™ Technology

The Shark® 100 meter is equipped with EIG’s exclusive V-Switch™ technology. This technology allows users to upgrade and add features as needed by using communication commands, even after the meter is installed.

Available V-Switches:

- V-Switch 1 – Voltage and Current Meter – Default
- V-Switch 2 – V, A, kW, kVAR, PF, kVA, Freq
- V-Switch 3 – V, A, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh and DNP3
- V-Switch 4 – V, A, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh, THD Monitoring, Limit Exceeded Alarms and DNP3

Traceable Watt-Hour Test Pulse for Accuracy Verification

The Shark® 100 device is a traceable revenue meter. It contains a utility grade test pulse allowing power providers to verify and confirm that the meter is performing to its rated accuracy. This is an essential feature required of all billing grade meters.

Additional Features Include:

- Utility Block and Rolling Average Demand
- Adjustable Demand Profiles
- Max and Min Available on Most Other Parameters
- Voltage Provides Instantaneous Max and Min for Surge and Sag Limits

Advanced Communication Capability with IrDA Interface

The Shark® 100 meter provides two independent communication ports with advanced features.

Back Mounted Communication Port with KYZ Pulse

- RS485 (Option 485P) – This port allows RS485 communication using Modbus or DNP3 Protocols. Baud rates are from 9,600 to 57,600.
- KYZ Pulse – In addition to the RS485, the meter also includes a KYZ pulse mapped to positive energy. This is a fixed energy pulse. Pulse values are:

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Class 10 Models</th>
<th>Class 2 Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 150 V</td>
<td>0.2505795630</td>
<td>0.0501151926</td>
</tr>
<tr>
<td>Above 150 V</td>
<td>1.0023038521</td>
<td>0.2004607704</td>
</tr>
</tbody>
</table>

Optional 10/100BaseT Ethernet

Ethernet (Option INP10) – 10/100BaseT Ethernet with Modbus TCP protocol.

Measured Values

<table>
<thead>
<tr>
<th>Measured Values</th>
<th>Real-Time</th>
<th>Avg</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage L-N</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Voltage L-L</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Current Per Phase</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Watts</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>VAr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>VA</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>PF</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>+/Watt-hr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>-Watt-hr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>+/VAR-hr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>-VAR-hr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>VA-hr</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Frequency</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>%THD</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Voltage Angles</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Current Angles</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>% of Load Bar</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

Measured Parameters

<table>
<thead>
<tr>
<th>Measured Parameters</th>
<th>Accuracy % of Reading</th>
<th>Display Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage L-N</td>
<td>0.1%</td>
<td>0-9999 Scalable V or kV</td>
</tr>
<tr>
<td>Voltage L-L</td>
<td>0.1%</td>
<td>0-9999 V or kV Scalable</td>
</tr>
<tr>
<td>Current</td>
<td>0.1%</td>
<td>0-9999 Amps or kAmps</td>
</tr>
<tr>
<td>+/-Watts</td>
<td>0.2%</td>
<td>0-9999 Watts, kWatts</td>
</tr>
<tr>
<td>+/-Wh</td>
<td>0.2%</td>
<td>5 to 8 Digits Programmable</td>
</tr>
<tr>
<td>+/-VARs</td>
<td>0.2%</td>
<td>0-9999 VARs, kVARs, MVARs</td>
</tr>
<tr>
<td>+/-VARh</td>
<td>0.2%</td>
<td>5 to 8 Digits Programmable</td>
</tr>
<tr>
<td>VA</td>
<td>0.2%</td>
<td>0-9999 VA, kVA, kVAR</td>
</tr>
<tr>
<td>VAh</td>
<td>0.2%</td>
<td>5 to 8 Digits Programmable</td>
</tr>
<tr>
<td>PF</td>
<td>0.2%</td>
<td>+/- 0.5 to 1.0</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.01 Hz</td>
<td>45 to 65 Hz</td>
</tr>
<tr>
<td>%THD</td>
<td>5.0%</td>
<td>0 to 100%</td>
</tr>
<tr>
<td>% Load Bar</td>
<td>1-120%</td>
<td>10 Digit Resolution Scalable</td>
</tr>
</tbody>
</table>

Note: Typical results are more accurate. Applies to 3 Element WYE and 2 Element Delta Connections. Add 0.1% of Full Scale plus 1 digit to Accuracy specs for 2.5 Element connections.

Wireless IrDA Communication

Front Mounted IrDA Communication

Uniquely, the Shark® meter also has an optical IrDA port, allowing the unit to be set up and programmed using a remote laptop PC without need for a communication cable. To configure the meter, just point at it with an IrDA-equipped PC.
Rugged and Safe Voltage and Current Inputs

The Shark® 100 meter is ruggedly designed for harsh electrical applications in both high voltage and low voltage power systems. This is especially important in Power Generation, Utility Substation and Critical User applications. The structural and electrical design of this meter was developed based on the recommendations and approval of many of our utility customers.

High Isolation Universal Voltage Inputs

Voltage inputs allow measurement of up to 416 Volts Line to Neutral and 721 Volts Line to Line. This insures proper meter safety when wiring directly to high voltage systems. One unit will perform to specification on 69 Volt, 120 Volt, 230 Volt, 277 Volt and 347 Volt power systems.

Short Circuit Safe Current Inputs

Current inputs use a unique dual input method:

- **Method One** – CT Lead Pass Through. The CT Lead passes directly through the meter without any physical termination on the meter. This insures that the meter cannot be a point of failure on the CT circuit. This is preferable to utility users when sharing relay class CTs. No Burden is added to the secondary CT circuit.

- **Method Two** – Current “Gills.” This unit additionally provides ultra-rugged termination pass-through bars, allowing the CT leads to be terminated on the meter. The Shark® meter’s stud-based design insures that your CTs will not open in a fault condition.

Dimensional Drawings

Wiring Diagrams
Easy to Use and Install

From user interface to mechanical construction, the Shark® 100 Meter was designed to be easy and intuitive, so an installer with minimal meter experience and training can easily install and use this product.

- Easy to use faceplate programming
- PC setup
- Phasor diagram showing wiring status
- Auto scroll feature
- Analog style % of Load Bar
- Shallow panel depth
- Color coordinated voltage and current inputs
- Programmable Current to 500 Amps for 1 Second
- 120 Amps for 10 Seconds
- Fault Current Withstand (at 23 °C):
  - Class 10: (0 to 10) A, 5 Amp Nominal
  - Delta, 4 Wire Delta Systems
  - 2.5 Element WYE, 2 Element WYE
  - Supports: 3 Element WYE, 2 Element Y
  - Class 20: (20 to 25) A, 12.5 Amp Nominal
  - 3.5 Element Delta, 3.5 Element WYE
  - Class 30: (30 to 35) A, 18.5 Amp Nominal
  - 4.0 Element Delta, 4 Element WYE
  - Class 40: (40 to 45) A, 25 Amp Nominal
  - 4.5 Element Delta, 4.5 Element WYE

Sensing Method
- RMS
- Sampling at 400+ Samples per Cycle on all channels measured readings simultaneously
- Harmonic THD (% of Total Harmonic Distortion)

Update Rate
- Watts, VAR and VA every 6 cycles
- All other parameters every 60 cycles

Power Supply
- Option D2:
  - (90 to 265) Volts AC and (18-60) Volts DC
  - Universal AC/DC Supply

Environmental Rating
- Storage: (-20 to +70) °C
- Operating: (-20 to +70) °C
- Humidity: to 95% RH Non-Condensing
- Altitude: up to 4000 ft
- Protection: IP30 - Meter Front/Back, DIN and ANSI C39.1 4" Round
- Mounting Gasket Included
- All Inputs and Outputs are galvanically isolated
- Off Stat Leakage Current @ 115 Volts AC: 1 mA
- Peak Load Current: 350 mA (10 ms)
- Continuous Load Current: 120 mA
- Peak Voltage: 350 V DC
- On Resistance: 23-35 Ohm
- Opto-Isolation: 3750 V (60 Hz, 1 min)
- Type Form A
- Opto-Isolation: 3750 V (60 Hz, 1 min)
- Harmonic Distortion (% of Total Harmonic Distortion)

Compliance:
- Certified to UL 61010-1 and CSA 22.2 No. 61010-1
- Certified to UL 61010-1 and CSA 22.2 No. 61010-1
- EMV: C62.41 (Burst)
- EN61000-6-2 - Immunity for Industrial Environments: 2005
- EN61000-6-4 - Emission Standards for Industrial Environments: 2007
- EN61326-1 - EMC Requirements: 2006
- Certified to UL 61010-1 and CSA 22.2 No. 61010-1, UL File: E250818

Specifications

Voltage Inputs
- (20-116) Volts Line To Neutral, (26-72) 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: 36 VA per phase Max at 600 V, 0.014 VA at 120 Volts
- Input wire gauge max (AWG 12 / 2.5 mm²)

Current Inputs
- Class 10: (0 to 10) A, 5-Amp Nominal
- Class 2: (0 to 2) A, 1 A Nominal Secondary
- Fault Current Withstand (at 23 °C): 100 Amps for 1 Seconds, 300 Amps for 3 Seconds, 500 Amps for 1 Second
- Programmable Current to Any CT Ratio
- Burden 0.005VA per phase Max at 114Amps
- 5mA Pickup Current
- Pass through wire gauge dimension: 0.177” / 4.5 mm
- Continuous current withstand: 20 A for screw terminated or pass through current connections

Isolation
- All Inputs and Outputs are galvanically isolated to 2500 Volts AC

Shark® 100 meter ANSI and DIN Mounting

The unit mounts directly in an ANSI C39.1 (4" round form) or an IEC 92 mm DIN square form. This is perfect for new installations and for existing panels. In new installations, simply use DIN or ANSI punches.

- Perfect for switchgear panel direct retrofits
- Mounts in only 4.25” panel depth
- Uses minimal panel space
- Uses standard CT or PT wiring

Ordering Information:

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Current Class</th>
<th>V-Switch Pack</th>
<th>Power Supply</th>
<th>COM</th>
<th>Mounting (Shark® 100 Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option Numbers:</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Example: Shark 100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shark® 100 (Meter/Transducer Only)</td>
<td>60</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>V2</td>
<td>D2</td>
</tr>
<tr>
<td>Shark® 100T (Transducer Only)</td>
<td>50</td>
<td>50 Hz System</td>
<td>10</td>
<td>5 A Secondary</td>
<td>V1</td>
<td>Voltage/Current</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60 Hz System</td>
<td>2</td>
<td>1 A Secondary</td>
<td>V2</td>
<td>Above with Power &amp; Freq</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V3</td>
<td>Above with DINP3 and Energy Counters</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V4</td>
<td>Above with THD &amp; Limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Accessories

Communication Converters
- 9PINC – RS232 Cable
- CAB6490 – USB to InDA Adapter
- Unicorn 2500 – RS485 to RS232 Converter
- Unicorn 2500-F – RS485 to Fiber Optic Converter
- Modem Manager, Model # MM1 – RS485 to RS232 Converter for Modem Communication

Compliance Documents
- Certificate of Calibration, Part # CCal – This provides Certificate of Calibration with NIST traceable Test Data.