

SHARK[®] 100

MULTIFUNCTION POWER AND ENERGY METER

Revenue Grade

New Ethernet
TCP/IP Option

Shark[®] 100T
Transducer Only

Shark[®] 100
Meter/Transducer

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 DNP 3.0 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 – Volts and Amps Meter – Default
- V-Switch 2 – Volts, Amps, kW, kVAR, PF, kVA, Freq
- V-Switch 3 – Volts, Amps, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh and DNP 3.0
- V-Switch 4 – Volts, Amps, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh, %THD Monitoring, Limit Exceeded Alarms and DNP 3.0

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 DNP 3.0 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:

Voltage Level	Class 10 Models	Class 2 Models
Below 150V	0.2505759630	0.0501151926
Above 150V	1.0023038521	0.2004607704

Optional 10/100BaseT Ethernet

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

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

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.

Measured Values	Real-Time	Avg	Max	Min
Voltage L-N	•		•	•
Voltage L-L	•		•	•
Current Per Phase	•	•	•	
Watts	•	•	•	•
VAR	•	•	•	•
VA	•	•	•	•
PF	•	•	•	•
+ Watt-hr	•			
-Watt-hr	•			
Watt-hr net	•			
+VAR-hr	•			
-VAR-hr	•			
VAR-hr net	•			
VA-hr	•			
Frequency	•		•	•
%THD	•		•	•
Voltage Angles	•			
Current Angles	•			
% of Load Bar	•			



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.

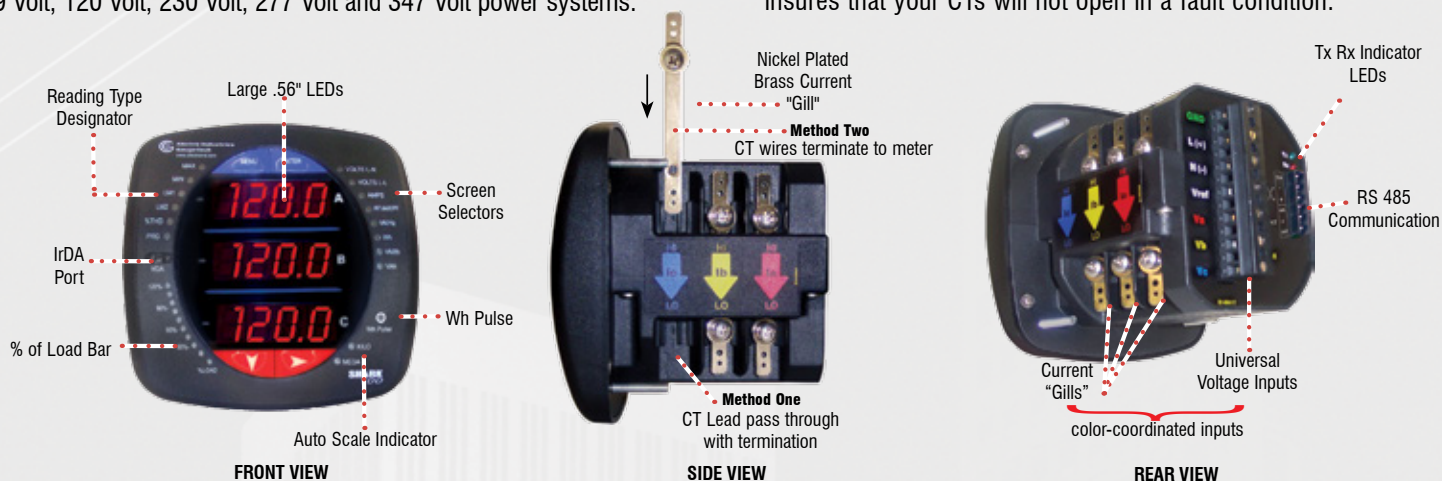
High Isolation Universal Voltage Inputs

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.

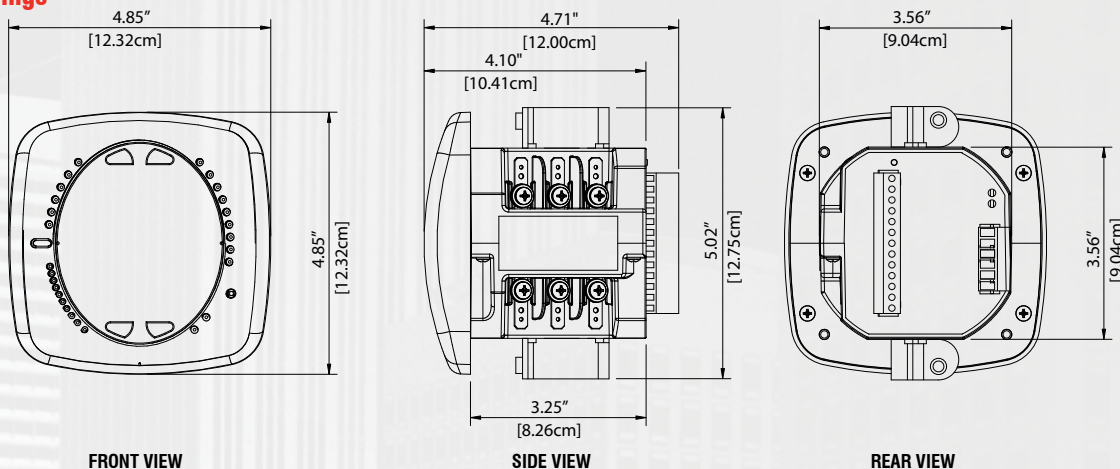
Short Circuit Safe Current Inputs

Current inputs use a unique dual input method:

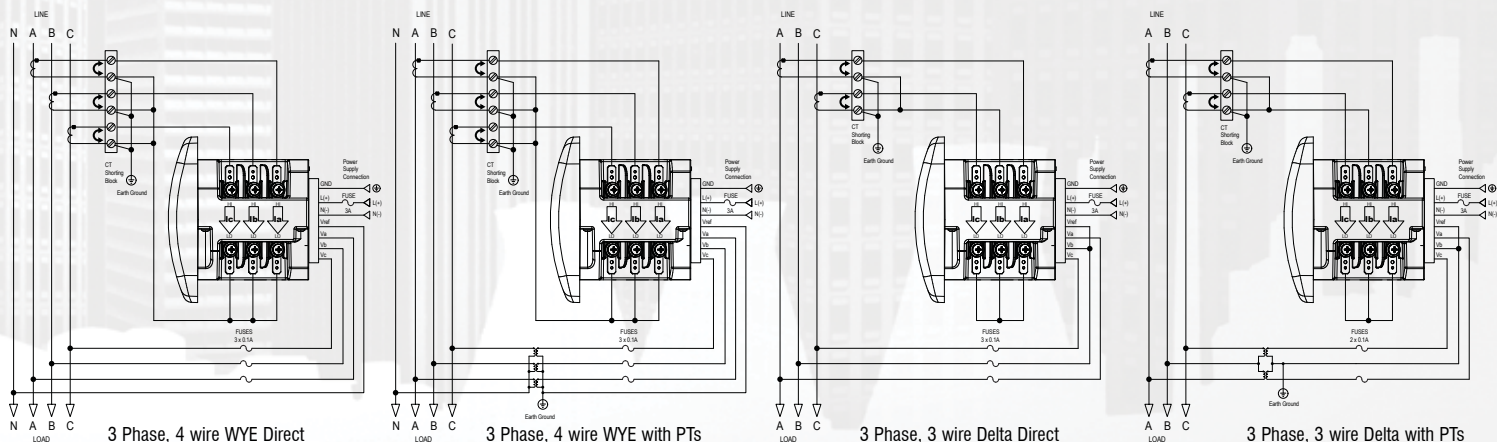
- **Method One** – CT Lead Pass Through. The CT Lead passes directly through the meter without any physical termination on the meter. This insures that the meter cannot be a point of failure on the CT circuit. This is preferable to utility users when sharing relay class CTs. No Burden is added to the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

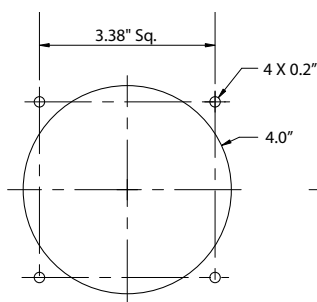
From user interface to mechanical construction, the Shark® 100 Meter was designed to be easy and intuitive, so an installer with minimal meter experience and training can easily install and use this product.

- 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

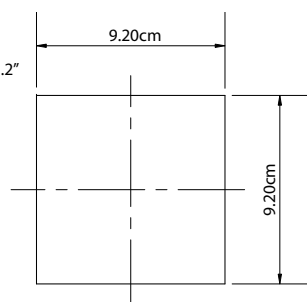
Shark® 100 meter ANSI and DIN Mounting

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

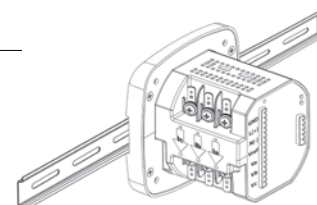
- Perfect for switchgear panel direct retrofits
- Mounts in only 4.25" panel depth
- Uses minimal panel space
- Uses standard CT or PT wiring



ANSI Mounting



DIN Mounting



Shark® 100T - DIN Rail Mounted Transducer

Specifications

Voltage Inputs

- 20-416 Volts Line To Neutral, 20-721 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: 0.36VA per phase Max at 600V, 0.014VA at 120 Volts
- Input wire gauge max (AWG 12 / 2.5mm²)
- Programmable Current to Any CT Ratio
- Burden 0.005VA per phase Max at 11Amps
- 5mA Pickup Current
- Pass through wire gauge dimension: 0.177" / 4.5mm
- Continuous current withstand: 20 Amps for screw terminated or pass through current connections

Isolation

All Inputs and Outputs are galvanically isolated to 2500 Volts AC.

Environmental Rating

Storage: (-20 to +70)° C
Operating: (-20 to +70)° C
Humidity: to 95% RH Non-Condensing
Faceplate Rating: NEMA12 (Water Resistant)
Mounting Gasket Included

Current Inputs

- Class 10: (0 to 10) A, 5 Amp Nominal
- Class 2: (0 to 2) A, 1A Nominal Secondary
- Fault Current Withstand (at 23°C): 100 Amps for 10 Seconds, 300 Amps for 3 Seconds, 500 Amps for 1 Second

Sensing Method

- RMS
- Sampling at 400+ Samples per Cycle on all channels measured readings simultaneously
- Harmonic %THD (% of Total Harmonic Distortion)
- Watts, VAR and VA every 6 cycles
- All other parameters every 60 cycles

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 (100 to 370) Volts DC. Universal AC/DC Supply

Option D:

- 18-60VDC
- Burden: 10VA max.

Communication Format

- 2 Com Ports (Back and Faceplate)
- RS485 Port (Through Backplate)
- IrDA (Through Faceplate)

10/100BaseT Ethernet Modbus TCP (INP10)

- Com Port Baud Rate: (9,600 to 57,600)
- Com Port Address: 0-247
- 8 Bit, No parity
- Modbus RTU, ASCII or DNP 3.0 Protocols

KYZ Pulse

- Type Form A
- On Resistance: 23-35 Ohm
- Peak Voltage: 350 VDC
- Continuous Load Current: 120 mA
- Peak Load Current: 350mA (10ms)
- Off Stat Leakage Current @ 350VDC: 1 mA
- Opto-Isolation: 3750V (60Hz, 1min)

Dimensions and Shipping

- Weight: 2 lbs
- Basic Unit: H4.85 x W4.85 x L4.25
- Shark100 – mounts in 92mm

DIN and ANSI C39.1 4" Round Cut-outs

- Shark100T-DIN rail mounted transducer
- Shipping Container Dimensions: 6" cube

Meter Accuracy

- See page 2

Compliance:

- IEC62053-22 (0.2% Accuracy)
- ANSI C12.20 (0.2% Accuracy)
- ANSI (IEEE) C37.90.1 Surge Withstand
- ANSI 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 C22.2 No. 61010-1, UL File: E250818

Ordering Information: To order, please fill out ordering guide:

Model	Frequency	Current Class	V-Switch Pack	Power Supply	COM	Mounting (Shark100 Only)
Option Numbers:	-	-	-	-	-	-
Example: Shark 100	60	10	V2	D2	X	X
Shark100 (Meter/Transducer)	50 50 Hz System	10 5 Amp Secondary	V1 Default V-Switch Volts / Amps	D2 (90-265)VAC or (100-370)VDC	X No Com	X ANSI Mounting
Shark100T (Transducer Only)	60 60 Hz System	2 1 Amp Secondary	V2 Above with Power & Freq	D 18-60V DC	485P RS485+Pulse (Standard in Shark® 100T Transducer)	DIN DIN Mounting Brackets
			V3 Above with DNP 3.0 and Energy Counters		INP10 10/100BaseT + Pulse	
			V4 Above with %THD & Limits			

Additional Accessories

Communication Converters

- 9PINC – RS232 Cable
- CAB6490 - USB to IrDA Adapter
- Unicom 2500 - RS485 to RS232 Converter

- Unicom 2500-F – RS485 to RS232 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.



Electro Industries/GaugeTech

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