

# SHARK<sup>®</sup> 100

## MULTIFUNCTION POWER AND ENERGY METER Revenue Grade

New Ethernet  
TCP/IP Option

Shark<sup>®</sup> 100T  
Transducer Only

Shark<sup>®</sup> 100  
Meter/Transducer

### Features

- 0.2% Class Energy and Demand Metering
- Measurements including Voltage, Current, Power, Frequency, Energy, etc.
- Optional KYZ Pulse and IrDA Port
- Power Quality Measurements (%THD and Alarm Limits)
- V-Switch<sup>™</sup> 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 100 BaseT 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<sup>®</sup>

meter excels in metering energy accurately, exceeding ANSI C12.20 (0.2%) and IEC 687 (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**



**Electro Industries/GaugeTech**



## 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

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
+/-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.

### 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

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	•			

## 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 9600 to 57.6k.
- Ethernet (Option INP10) – 10/100 BaseT Ethernet with Modbus TCP protocol.
- 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:  
 $K(h) \text{ at Test Volts less than } 150V = 0.0501151926$   
 $K(h) \text{ at Test Volts more than } 150V = 0.2004607704$

### 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 PDA or remote laptop without need for a communication cable. To configure the meter, just point at it with an IrDA-equipped PC or PDA. COPILOT EXT is a Windows Pocket PC software package that allows you to easily configure the Shark® 100 meter and poll readings.



## 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
- PDA setup using IrDA port
- Phasor diagram showing wiring status
- Auto scroll feature
- Analog style % of Load Bar
- Shallow panel depth
- Color coordinated voltage and current inputs



## 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.

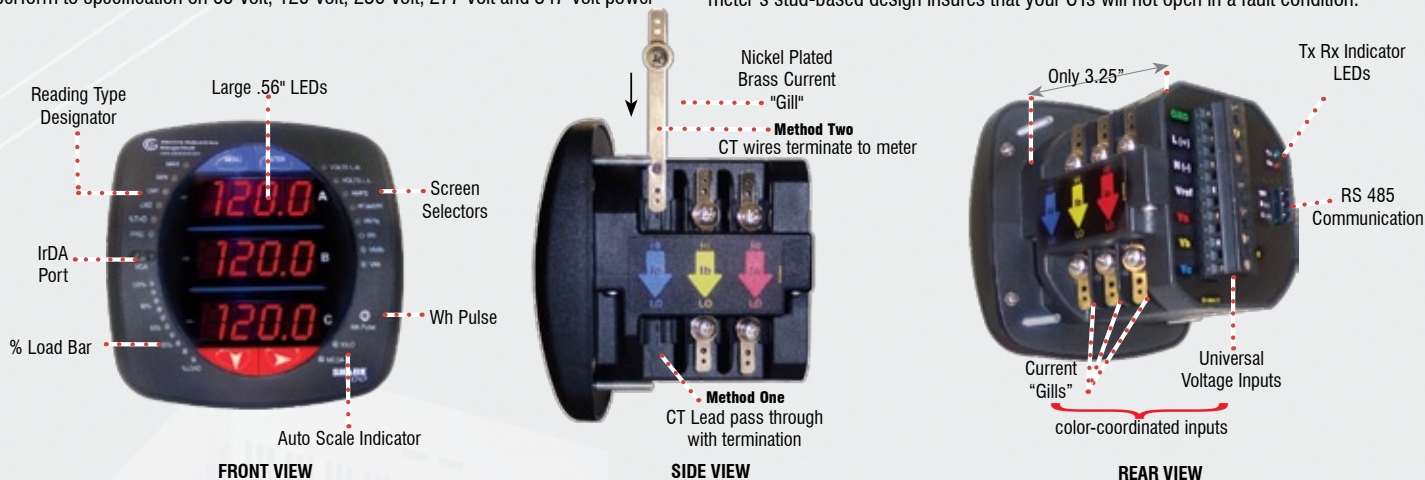
### High Isolation Universal Voltage Inputs

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.

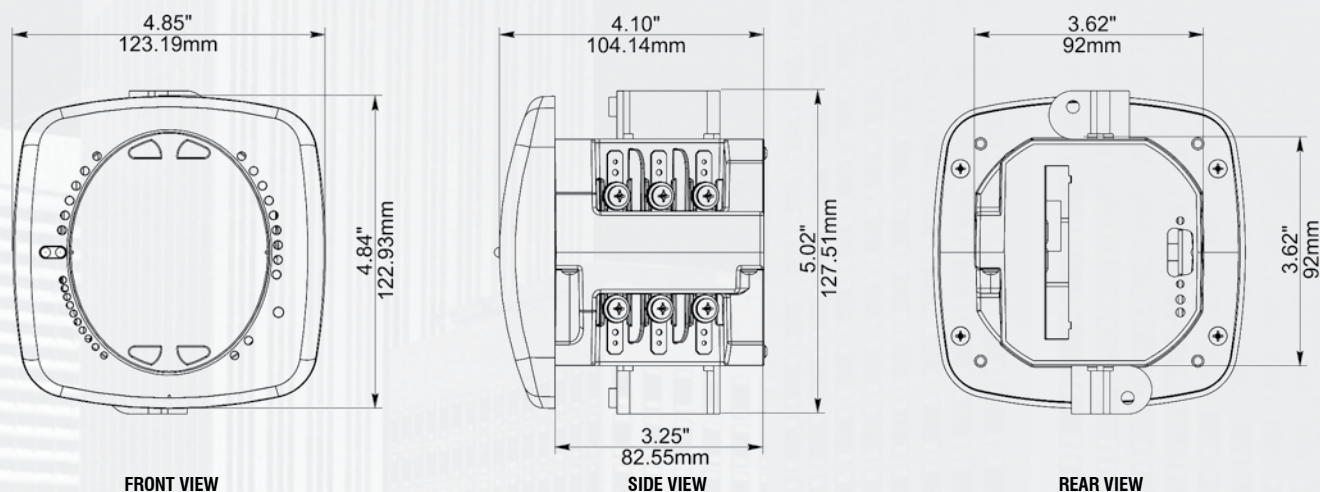
### Short Circuit Safe Current Inputs

Current inputs use a unique dual input method:

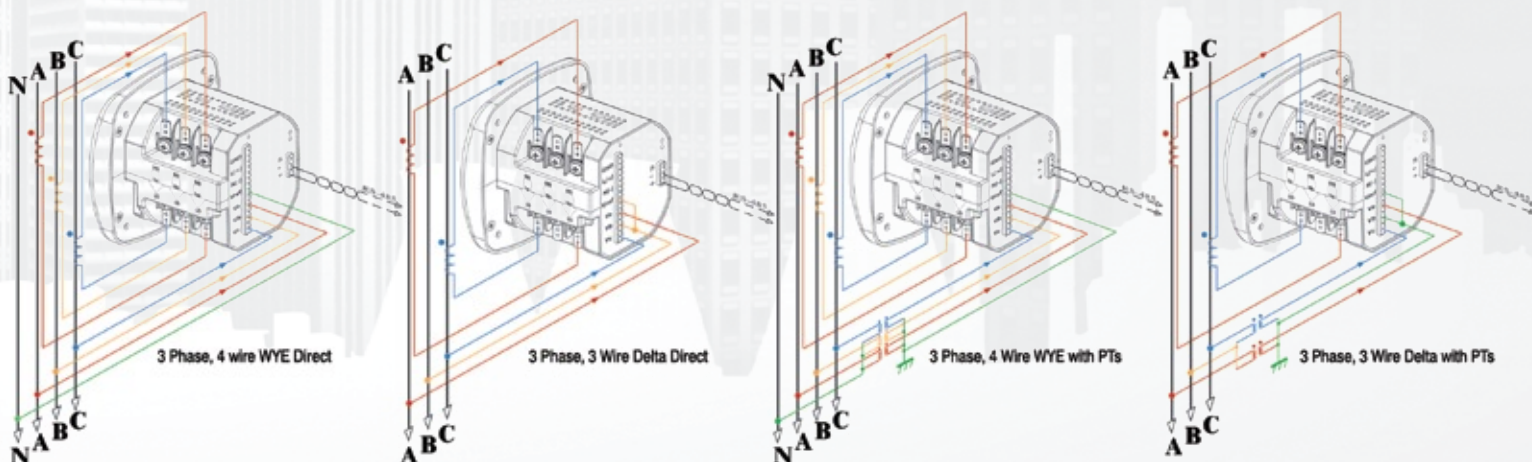
- **Method One** – CT Lead Pass Through. The CT Lead passes directly through the meter without any physical termination on the meter. This insures that the meter cannot be a point of failure on the CT circuit. This is preferable to utility users when sharing relay class CTs. No Burden is added to the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



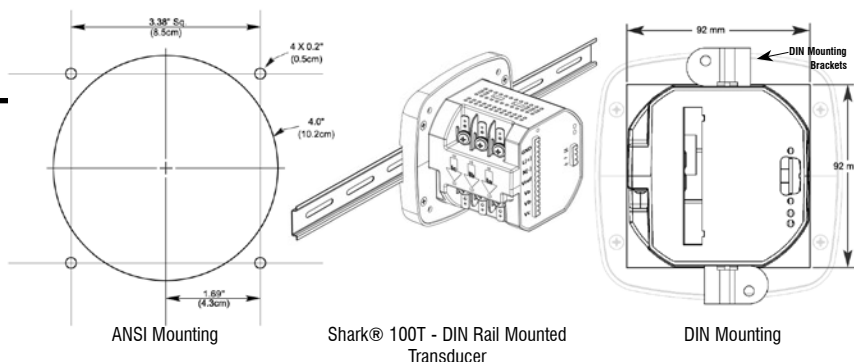
## Wiring Diagrams



## 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. For existing panels, pull out old analog meters and replace them with the Shark® 100 meter. The meter uses standard voltage and current inputs so that CT and PT wiring does not need to be replaced.

- Perfect for switch gear panel direct retrofits panel
- Uses minimal panel space
- Mounts in only 3.5" panel depth



## 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 / 2.5mm<sup>2</sup>)

### Current Inputs

- Class 10: (0 to 10) A, 5 Amp Nominal
- Class 2: (0 to 2) A, 1A Nominal Secondary
- Fault Current Withstand: 100 Amps for 10 Seconds, 300 Amps for 3 Seconds, 500 Amps for 1 Second.
- 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: (-40 to +85)° C  
Operating: (-20 to +70)° C  
Humidity: to 95% RH Non-Condensing  
Faceplate Rating: NEMA12 (Water Resistant)  
Mounting Gasket Included

### 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-100msec
- All other parameters-1second

### 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 Face Plate)
- RS485 Port (Through Back Plate)
- 10/100 BaseT Ethernet Modbus TCP (INP10)
- IrDA (Through Faceplate)
- Com Port Baud Rate: (9600 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: 23-35W ohm
- Peak Voltage: 350 VDC

- Continuous Load Current: 120 mA
- Peak Load Current: 350mA (10ms)
- Off State Leakage Current @ 350VDC: 1 mA
- Opto-Isolation: 3750V (60Hz, 1min)

### Dimensions and Shipping

- Weight: 2 lbs
- Basic Unit: H4.85 x W4.82 x L4.25
- Shark100 – mounts in 92mm DIN and ANSI C39.4" Round Cut-outs
- Shark100T-DIN rail mounted transducer
- Shipping Container Dimensions: 6" cube

### Meter Accuracy

- See page 2

### Compliance:

- IEC687 (0.2% Accuracy)
- ANSI C12.20 (0.2% Accuracy)
- ANSI (IEEE) C37.90.1 Surge Withstand
- ANSI C62.41 (Burst)
- IEC1000-4-2 – ESD
- IEC1000-4-3 – Radiated Immunity
- IEC1000-4-4 – Fast Transient
- IEC1000-4-5 – Surge Immunity

## 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
	<b>Shark100</b> (Meter/Transducer)	<b>50</b> 50 Hz System	<b>10</b> 5 Amp Secondary	<b>V1</b> Default V-Switch Volts / Amps	<b>D2</b> (90-265)VAC or (100-370)VDC	<b>X</b> No Com	<b>X</b> ANSI Mounting
	<b>Shark100T</b> (Transducer Only)	<b>60</b> 60 Hz System	<b>2</b> 1 Amp Secondary	<b>V2</b> Above with Power & Freq <b>V3</b> Above with Energy Counters <b>V4</b> Above with %THD & Limits	<b>D</b> 18-60V DC	<b>485P</b> RS485 + Pulse (Standard in Shark® 100T Transducer)  <b>INP10</b> 10/100 BaseT + Pulse	<b>DIN</b> DIN Mounting Brackets

## 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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