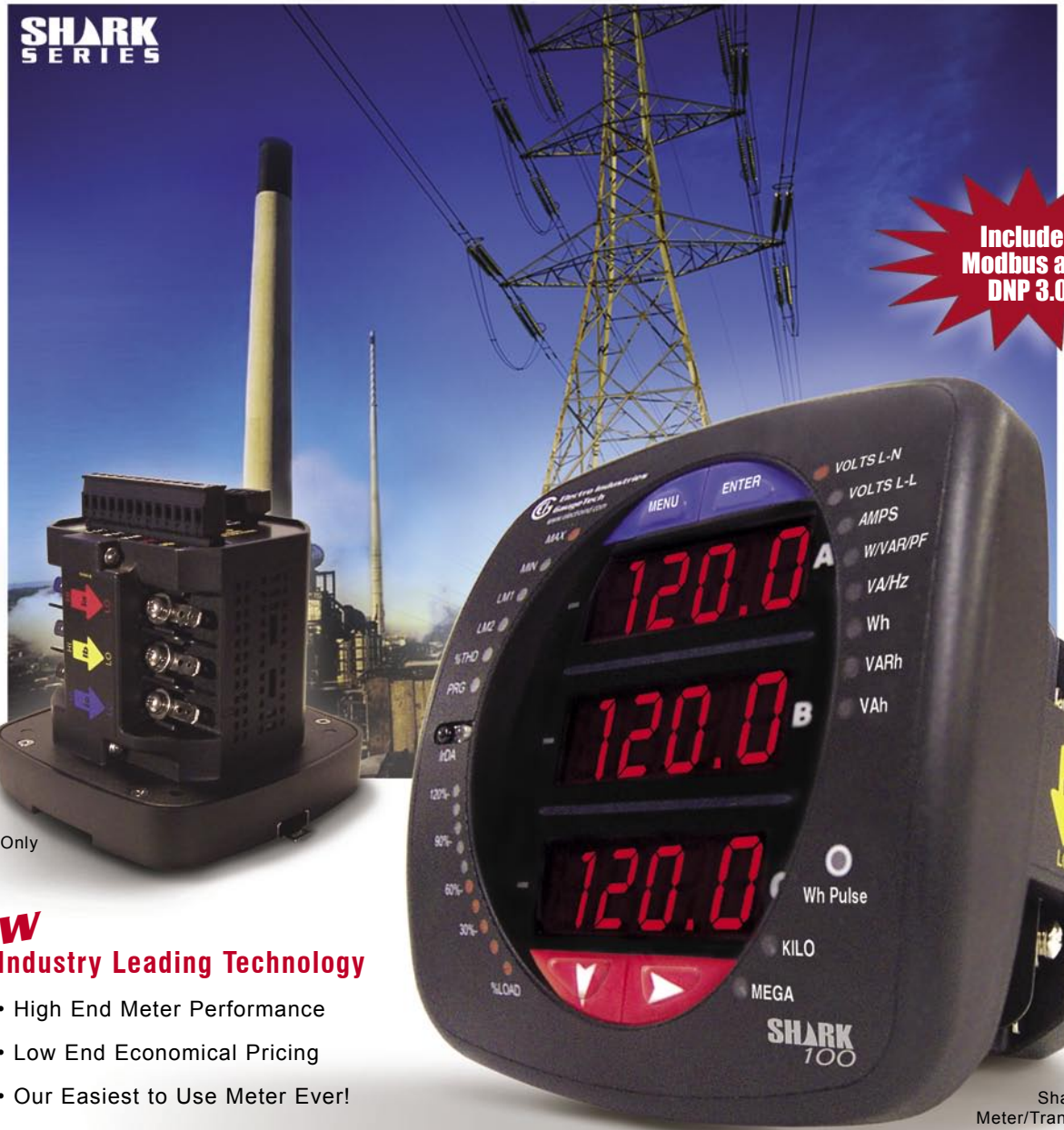
SHARK 100

MULTIFUNCTION POWER AND ENERGY METER

Revenue Grade



Includes Modbus and DNP 3.0

Shark 100T
Transducer Only

Shark 100
Meter/Transducer

NEW

Industry Leading Technology

- High End Meter Performance
- Low End Economical Pricing
- Our Easiest to Use Meter Ever!

A G G R E S S I V E T E C H N O L O G Y

Electro Industries/GaugeTech
The Leader In Web Accessed Power Monitoring
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ELECTRICAL & ELECTRONIC MEASURING & TEST EQUIP.
22CZ

ISO 9001 : 2000 REGISTERED FIRM

Feature Summary

- **0.2% Class Revenue Certifiable Energy and Demand Metering**
- **Meets ANSI C12.20 (0.2%) and IEC 687 (0.2%) Accuracy Classes**
- **Multifunction Measurements including Voltage, Current, Power, Frequency, Energy, etc.**
- **Optional KYZ Pulse**
- **Power Quality Measurements (%THD and Alarm Limits)**
- **V-Switch® Technology - Field Upgrade without Removing Installed Meter**
- **3 Line .56" Bright Red LED Display**
- **% of Load Bar for Analog Meter Perception**
- **RS485 Modbus and DNP 3.0 Protocol - 57.6K Baud**
- **IrDA Port for PDA Remote Read**
- **Ultra Compact, Easy to Install**
- **Fits Both ANSI and DIN Cut-Outs**
- **Available in a Transducer Only Version**

AGGRESSIVE TECHNOLOGY

Applications

- **Utility Metering**
- **Substations**
- **Power Generation**
- **Submetering**
- **Commercial Metering**
- **Industrial Metering**
- **Campus Metering**
- **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 for a simple replacement to existing analog meters.

The Shark 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.

V-Switch, Measurement Upgrade Packs

The Shark 100 is equipped with EIG's exclusive V-Switch® Technology. V-Switch® is a virtual firmware-based switch that allows you to enable meter features through communication, even after installation. Using V-Switches, you can purchase what you require now and field upgrade functionality as needed. This allows you to optimize your metering investment. Begin with a simple indication meter and upgrade it to full functioning energy billing meter with advanced measurement capability. Advanced versions of the Shark 100 (V3 and V4) also include DNP 3.0 communication protocol.

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

Accuracy

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.*

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	•			

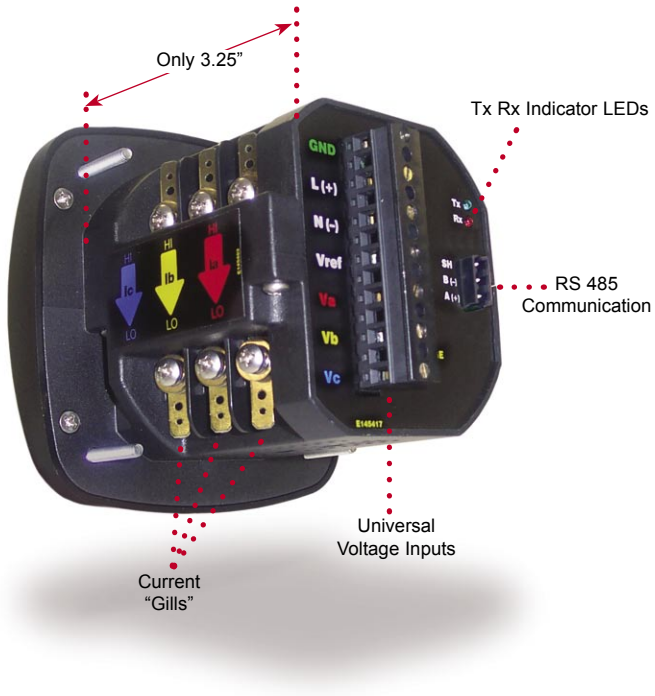
Traceable Watt-Hour Test Pulse for Accuracy Verification

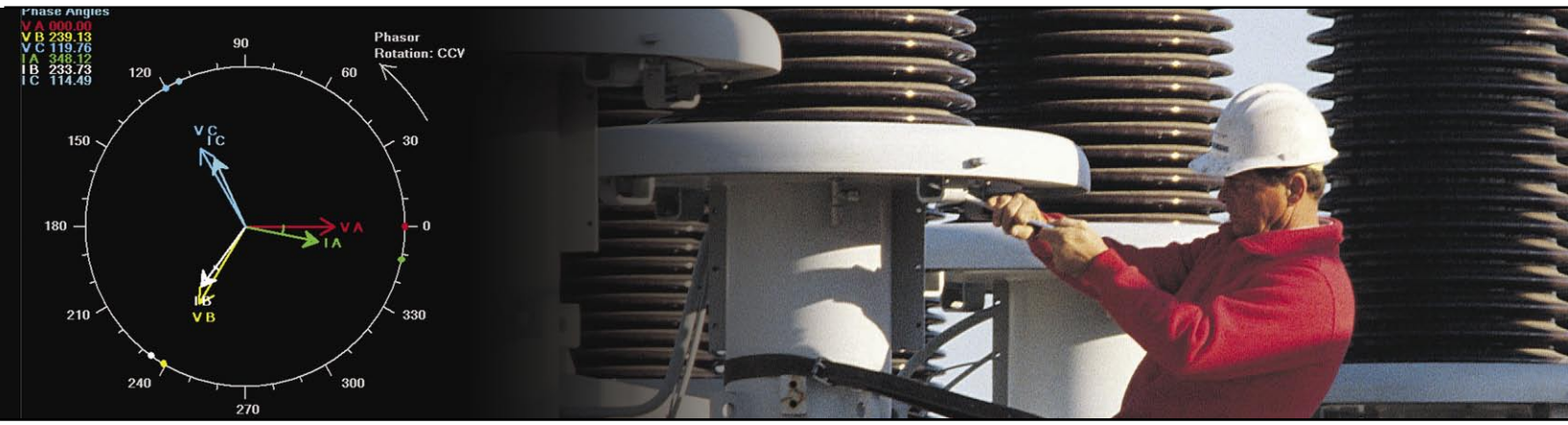
To be certified for revenue metering, power providers and utility companies need to know that the billing energy meter will perform to the stated accuracy. To verify the meter's performance and calibration, power providers use field test standards to ensure that the unit's energy measurements are correct. Since Shark 100 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.

Easy To Use and Install

EIG Engineers designed this meter to be as easy to use and install as possible. From user interface to mechanical construction, many hours were spent to make the Shark straightforward and intuitive so an installer with minimal meter experience and training can succeed with the product. Shark is programmed using a PDA, a PC Computer or through a simple keypad interface. Additionally, using the PC or PDA, a technician or electrician can see a visual phasor diagram of the vectors insuring that CT and Voltage polarities are correct. All inputs are color coordinated and have clear simple-to-understand labeling to avoid cross wiring mistakes by installers. This is very useful in OEM applications in which time of install affects the cost of the 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
- Quick Connect Voltage and Com Leads
- Quick Connect Current Pass Through
- Color Coordinated Voltage and Current Inputs





Standard Feature Includes Real Time Phasor Analysis

Superior Voltage and Current Inputs

The Shark 100 is ruggedly designed for harsh electrical applications on both high voltage as well as 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 approvals of many of our Utility customers.

Universal Voltage Inputs

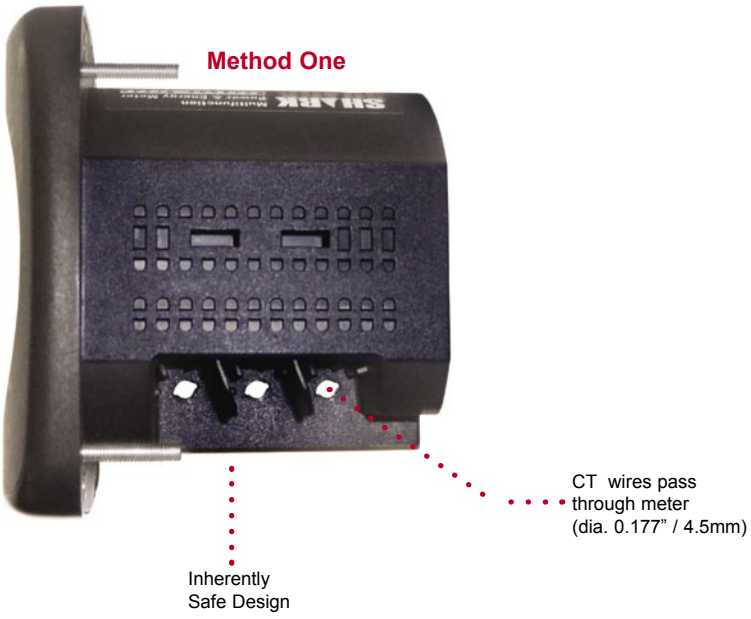
Voltage inputs allow measurement to 416 Volts Line to Neutral and 721 Volts Line to Line. This insures proper meter safety when wiring directly to high voltage systems. One unit will perform to specification on 69 Volt, 120 Volt, 230 Volt, 277 Volt and 347 Volt power systems.

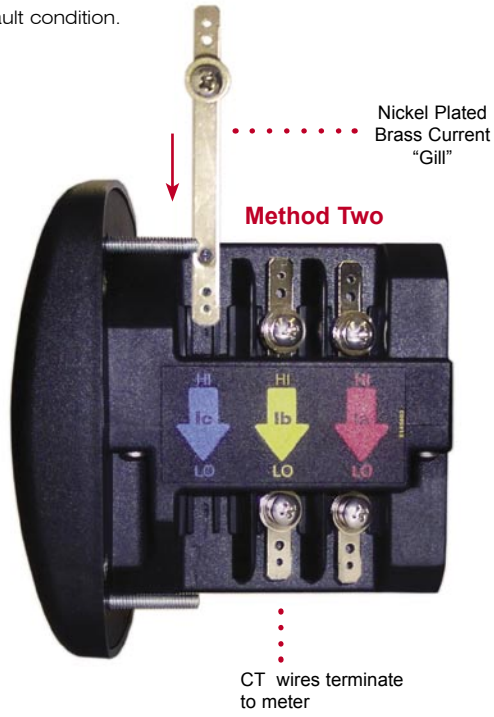
Current Inputs

Current inputs uniquely use a dual input method:

- **Method One** – CT Pass Through. The CT 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 ultrarugged termination pass-through bars, allowing the CT leads to be terminated on the meter. This, too, eliminates any possible point of failure at the meter. This method is also a preferred technique for insuring that relay class CT integrity is not compromised. Inferior designs do not provide this advanced protective aspect and utilize terminal blocks to pass CT current through a soldered connection on a printed circuit board. Shark's stud-based design insures that your CTs will not open in a fault condition.





Utility Peak Demand Metering

The Shark 100 provides user-configured Block Window or Rolling Window Demand. This allows you to set up a particular utility demand profile. Block Window Demand is demand used over a fixed user-configured demand period (usually 5, 15 or 30 minutes). Rolling Window Demand is a fixed window demand that moves for a user specified subinterval period. An example-would be a 15-minute demand using 3 subintervals, providing a new demand reading every 5 minutes based on the last 15 minutes. Readings for kW, kVAR, kVA and PF are calculated using utility demand structures. All other parameters offer max and min capability over the user-selectable averaging period. Voltage provides an instantaneous max and min reading, displaying the highest surge and lowest sag seen by the meter.

Advanced Communication Capability with IrDA Interface

The Shark 100 provides two independent Communication ports with advanced features.

Back Mounted Port with KYZ Pulse (option 485P)

- RS485 - This port allows RS485 communication using Modbus or DNP3.0 Protocols. Baud rate are from 9600 to 57.6k.
- 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) at Test Volts less than 150V=0.0501151926

  K(h) at Test Volts more than 150V=0.2004607704

Front Mounted IrDA Communication

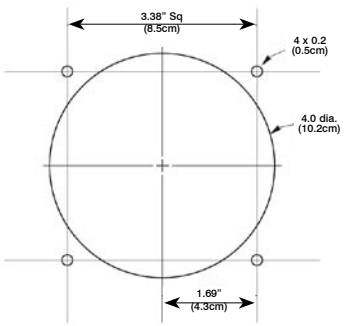
Uniquely, the Shark also has an optical IrDA port, allowing the unit to be set up and programmed using a PDA or remote laptop without need for a communication cable. Just point at the meter with an IrDA-equipped PC or PDA and configure it. COPILOT EXT is a Windows CE software package that allows you to simply point at a Shark, configure it and poll readings.

Simultaneous Dual Communication Paths

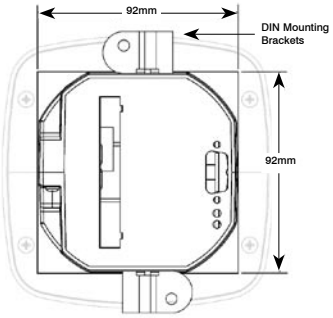
Shark 100 ANSI and DIN Mounting

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

ANSI Mounting

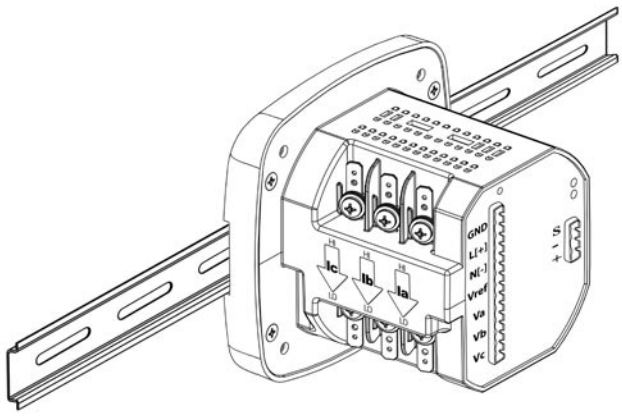


DIN Mounting



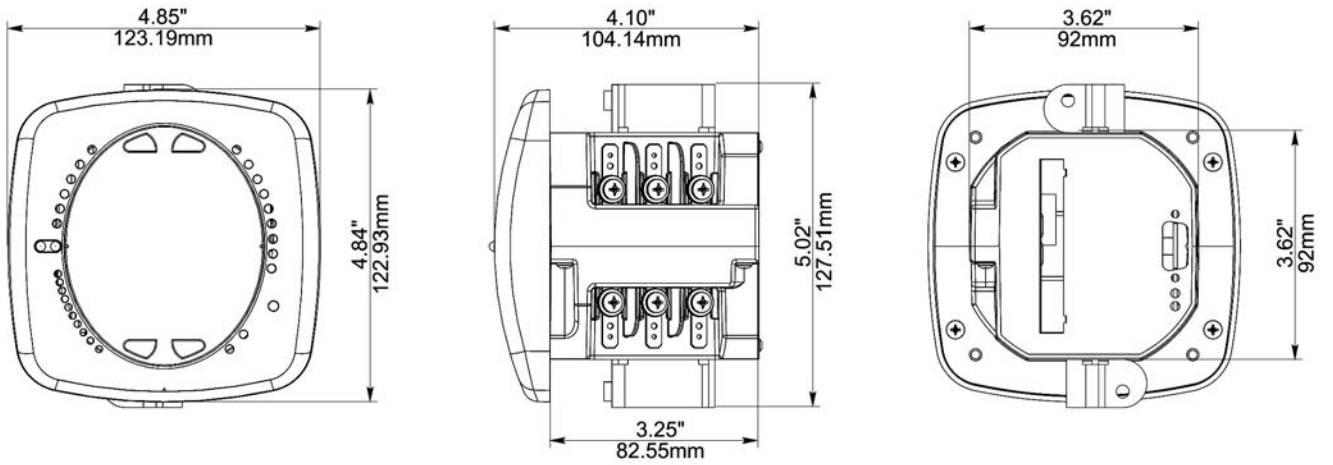
Shark 100T ANSI and DIN Mounting

The Shark 100T is a transducer version of the Shark100 which does not include a display. The unit mounts directly to a DIN rail and provides an RS485 Modbus or DNP 3.0 output.

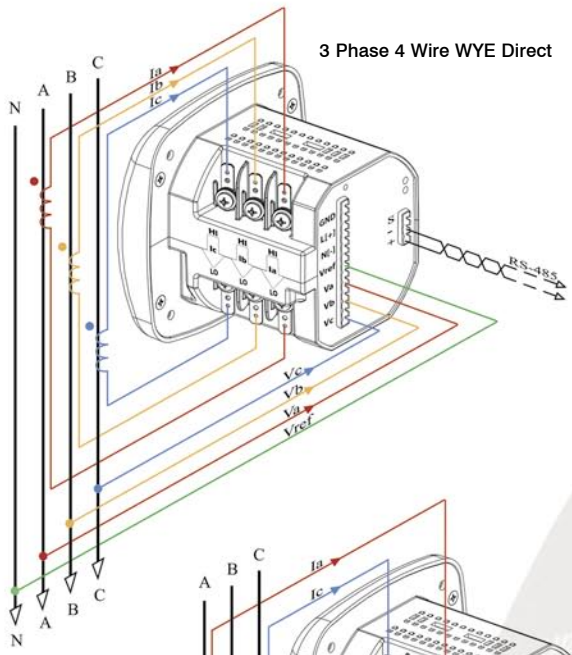


Shark 100T - DIN Rail Mounted Transducer

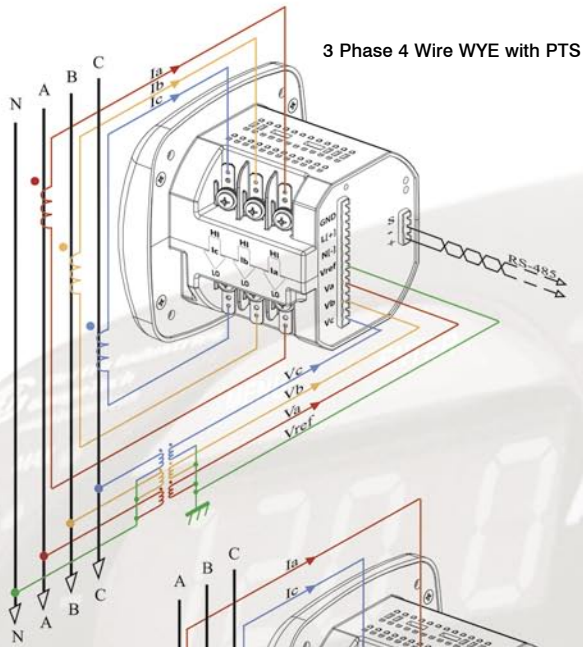
Dimensional Drawings



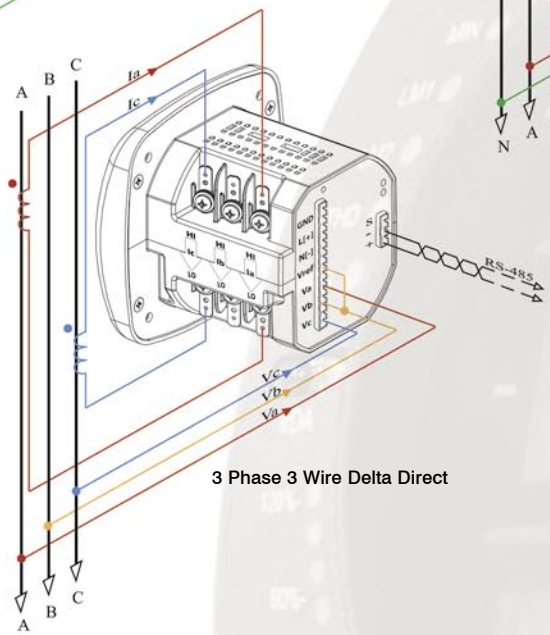
Wiring Diagrams



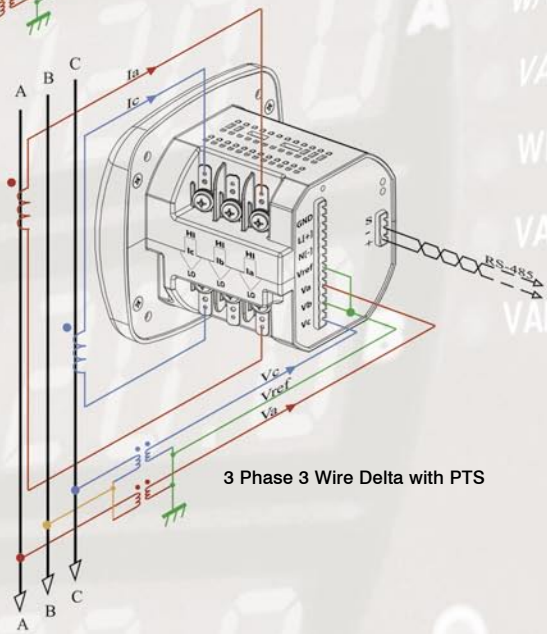
3 Phase 4 Wire WYE Direct



3 Phase 4 Wire WYE with PTS



3 Phase 3 Wire Delta Direct



3 Phase 3 Wire Delta with PTS

Specifications

Voltage Inputs

- 0-416 Volts Line To Neutral, 0-721 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^2)
- **Note:** Accuracy specs doubled for 2.5 Element connections.

Current Inputs

- Class 10: (0 to 11) 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

Isolation

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

Environmental Rating

Storage: (-40 to +85)° C
Operating: (-30 to +70)° C
Humidity: to 95% RH Non-Condensing
Faceplate Rating:
NEMA12
(Water Resistant)
Mounting Gasket Included

Sensing Method

- True 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:
- 24-48VDC +/- 10%

Burden: 10VA max.

Communication Format

- 2 Com Ports (Back and Face Plate)
- RS485 Port (Through Back Plate)
- 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
- 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 W4.82 x L4.25
- Shark100 - mounts in 92mm DIN and ANSI C39.1 Round Cut-outs
- Shark100T-DIN rail mounted transducer
- Shipping Container Dimensions: 6" cube

Meter Accuracy

- See page 3

Compliance:

- IEC 687 (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
- IEC 1000-4-4 – Fast Transient
- IEC 1000-4-5 – Surge Immunity

Ordering Information

To order, please fill out ordering guide:

	Model		Frequency		Current Class		V-Switch Pack		Power Supply		COM (Shark100 Only)		Mounting (Shark100 Only)
Option Numbers:		–		–		–		–		–		–	
Example:		-	-60	-	-10	-	-V2	-	-D2	-	-X	-	-X

Shark100 (Meter/Transducer)	-50 50 Hz System	-10 5 Amp Secondary	-V1 Default V-Switch Volts / Amps	-D2 90-265V AC/DC	-X No Com	-X ANSI Mounting
Shark100T (Transducer Only)	-60 60 Hz System	-2 1 Amp Secondary	-V2 Above with Power and Freq	-D 24-48V DC	-485P RS485+Pulse (Standard in Shark 100T)	-DIN DIN Mounting Brackets
			-V3 Above with Energy Counters			
			-V4 Above with Harmonics and 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

IrDA232 - IrDA to RS232 Adapter for Remote Read

Compliance Documents

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

Current Transformer Kits

CT200K – 200/5 Ratio .94" Window 3 CTs
CT400K – 400/5 Ratio, 1.25" Window, 3 CTs
CT800K – 800/5 Ratio, 2.06" Window, 3 CTs
CT2000K – 2000/5 Ratio, 3.00" Window, 3 CTs

CT Specifications:
Frequency: 50 to 400Hz; Insulation: 600 Volts, 10kV BIL
Flexible Leads: UL 1015 105°C, CSA Approved, 24" Long, #16AWG

Software Option Numbers

COMEXT3 – CommunicatorEXT 3.0 for Windows®

* Consult factory application engineer for additional transformer ratios, types or window sizes.

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