

# SHARK ST40

Compact DIN Rail Mounted Energy and Power Quality Meter



## Features

- Compact DIN rail mounted meter designed for small footprint applications
- Meets ANSI C12.20 0.2 Accuracy Class
- Power Quality features include waveform recording at 512 samples/cycle and harmonic analysis
- Extensive memory for usage trending
- System Events log and passwords for security
- Modbus, BACnet/IP, or DNP3 for easy software integration
- RS485 serial or RJ45 Ethernet port; standard USB front panel port
- Use with EIG's EnergyPQA.com<sup>®</sup> for energy and power quality analytics

**NEW**

Supports 0.333 V CTs and Rogowski Coil CTs

## Applications

- Machine level monitoring
- Power quality metering
- Energy management
- Commercial submetering
- Cost allocation and sub-billing
- Industrial metering
- Medical equipment monitoring
- Solar/wind/micro-turbine power generation metering
- Installations where space is limited
- Compatible with MV90 and SCADA applications



## Introduction

The ST40 is one of the smallest energy and power quality meters in the world. It was designed specifically for DIN rail installation where space is at a premium. The meter provides 0.2% class energy accuracy and advanced power quality features. These include recording PQ waveform events at up to 512 samples per cycle and harmonic readings to the 40th order.

The ST40 meter has extensive memory for storing load profiles, system events, limits, and alarms. It has either RS485 or Ethernet communication that brings data back to existing software or directly to EIG's EnergyPQA.com<sup>®</sup> energy management system for energy analytics and predictions. The meter is also compatible with MV90 and many different power monitoring software systems.

The ST40's voltage measurement range is up to 576 V L-N. Current inputs can be ordered for industry standard 5 A and 1 A current transformers, or for 0.333 V and Rogowski coil CTs for use with submetering applications. It has a separate power input connection and utilizes an extended range power supply with voltage up to 300 V AC, eliminating the need for a separate control power transformer. The ST40 is ideal for machine level monitoring, solar, wind, and other applications with limited installation space.

## Advanced Revenue Meter

- ANSI C12.20 0.2 Accuracy Class.
- Traceable watt-hour test pulse.
- Utility Block and Rolling average demand.
- Historical load profiling.
- Transformer and Line Loss compensation.
- CT/PT compensation.
- Line frequency time sync.
- Sealable voltage and current inputs.

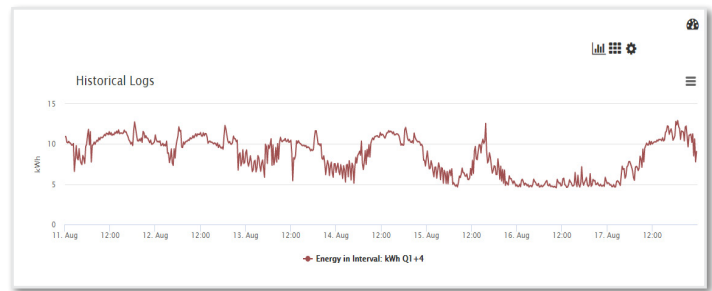
Measured Parameters	Accuracy %	Display Range
Voltage L-N	0.1%	0-9999 Scalable V or kV
Voltage L-L	0.2%	0-9999 V or kV Scalable
Current	0.2%	0-9999 A or kA
+/- Watts	0.2%	0-9999 Watts, kWatts, MWatts
+/-Wh	0.2%	5 to 8 Digits, Programmable
+/-VARs	0.2%	0-9999 VARs, kVARs, MVARs
+/-VARh	0.2%	5 to 8 Digits, 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	+/- 2.0%	1 to 99.99%

2 **Note:** Applies to 3 element WYE and 2 element Delta connections. See full accuracy specifications in the ST40 meter User Manual. Neutral current 2% accuracy.

## Extensive Data Logging Capability (V2 and Higher)

### Historical Logs

- Three assignable historical logs.
- Independently programmed trending profiles.
- Up to 64 parameters per log.
- Real time clock for timestamping.



Historical Trending

### System Events Log

To protect critical billing information, the meter records and logs the following with a timestamp:

- Demand resets.
- Password requests.
- System startup.
- Energy resets.
- Critical data repairs.
- Log resets.
- Log reads.
- Programmable settings changes.

### Power Quality Log

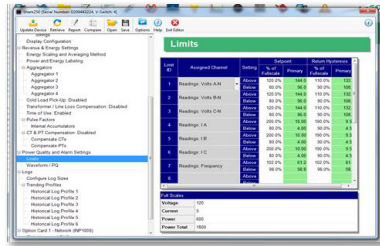
- Provides magnitude and duration of an event.
- Includes time-stamps and Alarm value.
- 2048 events available.

Power Quality Log

## Limit Alarms (V4 Option)

Limit Events:

- Up to eight limits.
- Voltage imbalance.
- Current imbalance.
- Based on % of full scale settings.



## Power Quality Measurement

### Waveform Recording

The ST40 meter records at up to 512 samples per cycle for a voltage sag/swell or a current fault event. The unit provides pre- and post-event recording capability.

	Samples per Cycle	Pre-Event Cycles	Post-Event Cycles	Max Waveform per Event
<b>V5</b>	32	16	48	128
	64	8	24	64
	128	4	12	32
<b>V6</b>	256	2	6	16
	512	1	3	8

**Note:** Sampling rate is based on 60 Hz systems. For 50 Hz systems, multiply by 1.2.

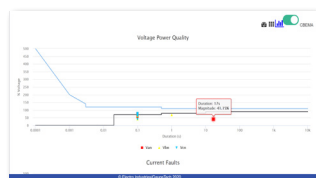
The meter's advanced DSP design allows power quality triggers to be based on a 1/2 cycle updated RMS. Store up to 170 events in the meter's FIFO buffer.



Power Quality Event

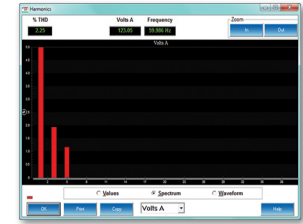
### Independent CBEMA or SEMI F47 Log Plotting

The meter stores an independent CBEMA or SEMI F47 log for magnitude and duration of voltage events. This lets you quickly view total surges, total sags, and duration, without retrieving waveform data.



## Harmonic Recording to the 40th Order

The ST40 meter provides advanced real time harmonic analysis to the 40th order for each voltage and current channel. Using the stored waveforms, harmonic analysis is available to the 255th order.



## Upgradable V-Switch™ Technology

The ST40 meter's V-Switch™ capability enables meter upgrades, even after installation.

Features	V1	V2	V3	V4	V5	V6
Multifunction Measurement	✓	✓	✓	✓	✓	✓
Basic Data Logging		✓	✓	✓		
Intermediate Data Logging					✓	
Advanced Data Logging						✓
Harmonic Analysis			✓	✓	✓	✓
TLC and CT/PT Compensation	✓	✓	✓	✓	✓	✓
Limit Functions				✓	✓	✓
64 Samples per Cycle Waveform Recorder					✓	
512 Samples per Cycle Waveform Recorder						✓

## Integration with EnergyPQA.com® Energy Management System

The meter integrates with EIG's EnergyPQA.com® AI driven energy management system. This cloud based system supports energy usage comparisons across meters and facilities, letting you easily identify energy inefficiency using AI predictions. The system also provides deep insights into power quality.



**ENERGYPQA.com®**

# Specifications

## Voltage Inputs:

- Classes 10 and 2 Current Input Models - Absolute Range: (20-576) V L-N, (0-721) V L-L
- Classes 10 and 2 per UL 61010-1: 300 V Max L-N, 600 V Max L-L
- mV Option per UL 61010-1: 600 V L-N, 600 V L-L
- 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:
  - Input Impedance: 4 MΩ per Phase
  - 0.36 VA/Phase Max at 600 Volts, 0.014 VA at 120 Volts
- Input Wire Gauge: AWG#14-26/ (0.129 - 2.08) mm<sup>2</sup>

## Current Inputs:

- Class 10: (0.005 to 10) A, 5 A Nominal CT Secondary
- Class 2: (0.001 to 2) A, 1 A Nominal CT Secondary
- Fault Current Withstand (at 23 °C): 100 A for 10 Seconds
- Continuous Current Withstand: 20 A
- Programmable Current to Any CT Ratio
- Burden 0.005 VA per Phase Max at 11 A
- mV Option: 0.333 V
  - Input Impedance: 2 MΩ
  - Maximum Voltage: 5 V
- Pickup Current: 0.1% of Nominal
  - Class 10: 5 mA
  - Class 2: 1 mA
- mV Option: 0.004 V

## Isolation:

- I/Os Isolation from Power Line Rated Connections: 2500 V AC (Hi-Pot Tested)

## Environmental Rating:

- Storage: (-20 to +70) °C
- Operating: (-20 to +70) °C (UL Evaluated to 65 °C)
- Humidity: to 95% RH Non-Condensing
- Protection: IP 30 (Front and Back)

## Sensing Method:

- True RMS
- Sampling at over 400 Samples / Cycle on All Channels of Measured Readings, Simultaneously
- Harmonics Resolution to 40th Order
- Waveform Recording at up to 512 Samples/Cycle

## Update Rate:

- Watts, VAR and VA - Every 6 Cycles
- All Other Parameters - Every 60 Cycles

## Power Supply:

- (90 - 300) V AC
- VA Rating: 10 VA Max; 8 VA Nominal

## Standard Communication

- 2 Com Ports
  - RS485 Serial Port
  - Micro USB
- Com Port Baud Rate: (1200 - 57600)
- Com Port Address: 1-247
- Parity Setting: Odd, Even, None
- Serial Modbus ASCII/RTU
- DNP3 (RS485 Only)

## Optional Communication

- INP10 Option: Modbus over Ethernet or INP10B Option: BACnet/IP over Ethernet
- RJ45 Ethernet Replaces RS485 Port

## Dimensions and Shipping

- Weight: 2 lbs / .91 kg
- Basic Unit: H 4.60"x W 4.89"x L 2.44"

- DIN Rail: Top Hat W 1.38" x H 0.30" (3.50 cm x .75 cm); Slotted Steel 3.00" (7.62 cm)

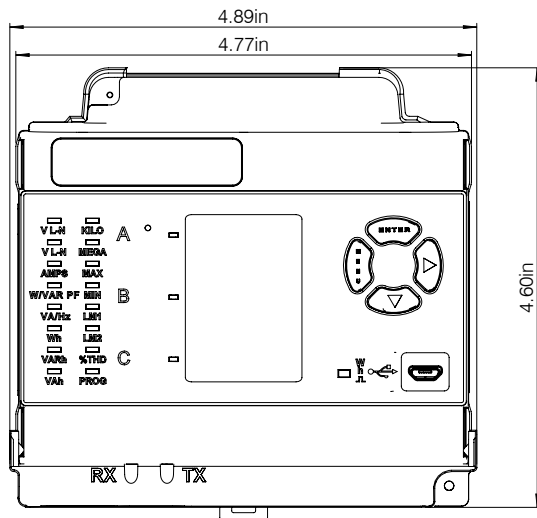
## Meter Accuracy

- See Page 2
- Note:** For 2.5 element programmed units, degrade accuracy by an additional 0.5% of reading.
- Note:** For 1A (Class 2) Nominal, degrade accuracy to 0.5% of reading for watts and energy; all other values two times rated accuracy.

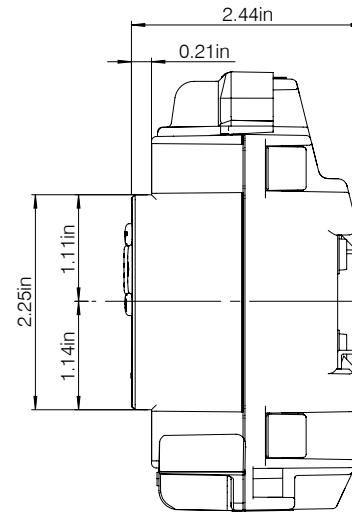
## Compliance:

- ANSI C12.20 2015 0.2 CL and ANSI C12.1
- IEC 62053-22 0.2S
- Certified to UL/IEC 61010-1 and CSAC22.2 No. 61010-1, UL File:E250818\*
- CE Marked
- \*Third party lab tested

# Dimensional Drawings



**ST40 Front Dimensions**



**ST40 Side Dimensions**

For mechanical drawings and installation wiring, please download the User Manual from: <https://www.electroind.com/products/st40-compact-din-rail-energy-meter-with-power-quality/>

## Ordering Information - All fields must be filled in to create a valid part number.

Model	Frequency Range	Current Input*	V-Switch™ Pack	Com
<b>Option Numbers:</b>	-	-	-	-
<b>Example:</b>	<b>ST40</b>	<b>60</b>	<b>V1</b>	<b>RS485</b>
<b>ST40</b> (DIN Rail Meter)	<b>50</b> 50 Hz System	<b>10</b> 5 A Nominal CT Secondary	<b>V1</b> Multifunction Meter Only	<b>RS485</b> RS485 Serial Port
	<b>60</b> 60 Hz System	<b>2</b> 1 A Nominal CT Secondary	<b>V2</b> Standard Data Logging Memory	<b>INP10</b> RJ45 Ethernet Port
		<b>mV</b> 0.333 V	<b>V3</b> Power Quality Harmonics	<b>INP10B</b> RJ45 BACnet/IP Port
			<b>V4</b> Limits & Control	
			<b>V5</b> 64 Samples/Cycle Waveform Recording	
			<b>V6</b> 512 Samples/Cycle Waveform Recording	

\*1 A, 5 A, 0.333 V CTs, and mV Rogowski Coil CTs can be ordered from EIG's website: [www.electroind.com/shop](http://www.electroind.com/shop)

