

# Multimeasurement Meter SENTINEL®

## introduction

### SENTINEL Electronic Multimeasurement Meter

The SENTINEL meter is a solid-state, electronic, multimeasurement, polyphase meter of exceptional accuracy. This self-contained or transformer-rated meter is designed for use in commercial and industrial locations, including large industrial sites and substations. An advanced analog-to-digital sampling technique samples each incoming current and voltage waveform 32 times per cycle (60Hz). Voltage and current values are calculated every two cycles using true Root Mean Square (RMS) calculation. Volt-amperes are calculated by multiplying the RMS voltage value with the RMS current value, thus providing an arithmetic calculation for VA. The SENTINEL meter also allows for a vectorial calculation of VA.

## features

### Flexible Platform

- > Electronic circuit boards fit together to perform various functions
- > Transformer input for current and resistive divider input for voltage
- > Analog-to-digital conversion and measurement processing
- > Register, load-profile, real-time clock, and communications processing
- > Input and output board for pulse accumulation or event notification

### Protocols

- > The SENTINEL meter uses PSEM (ANSI C12.18-1996) protocol
- > QDIP Protocol

### Standard Features

- > Class 0.2 accuracy
- > 5 measurement levels
- > Upgradable firmware
- > Error and event logging
- > SiteScan onsite monitoring system
- > SiteScan Diagnostic Snapshots™
- > Flexible configuration for various metering applications
- > Autoranging power supply



# features

## Available Registers

- > Register data and program information are retained in non-volatile memory in the event of a power failure
- > Selection from hundreds of items on a liquid crystal display (LCD) that is programmable by the user
- > Programmable by the user through Itron PC-PRO+® Advanced, a 32 bit Windows® based meter programming software

## Energy

- > Wh: delivered, received, net, unidirectional
- > VARh: delivered and received, net delivered, net received and 4 quadrant
- > VAh: vectorial and arithmetic, delivered, received and lagging
- > A<sup>2</sup>h: aggregate
- > V<sup>2</sup>h: aggregate
- > Ah: per phase and neutral
- > Vh: per phase and average

## Demand

- > Instantaneous values updated every second
- > Maximum, present, previous, projected, cumulative, continuous cumulative and coincident demand values are available

## Demand Register Types

- > Block and rolling demand intervals with programmable interval and subinterval lengths
- > Thermal demand calculations

## Dependable Support

- > Itron backs the SENTINEL meter with the reliable support you expect from the leading solutions provider to electric utilities. Our engineers work with you to implement the SENTINEL meter in the field and tailor its software to provide the intelligent, real-time information you need.

## Self-Read and Snapshot Data

- > Two sets of snapshot data, automatically read at demand reset
- > Four sets of self-read data, user programmable schedule
- > One set of self-read data, automatically read at season change (last season data)

## Switchboard Ready™ Meter

- > Retrofits 13 Switchboard case styles
- > Retrofits 137 different devices

## Power Quality

- > Voltage Quality:
  - \*Phase to phase or phase to ground event detection
  - \*3 levels of sags
  - \*3 levels of swells
  - \*3 levels of voltage imbalances
  - \*3 levels of current imbalances
  - \*3 classes of interruptions
- > Harmonics:
  - \*Per phase instantaneous % THD V and % TDD I
  - \*Prompt for peak demand current
  - \*Per phase data is displayable
  - \*ANSI and IEC calculation
  - \*Harmonic Distortion Check

## Ethernet Communications

- > PC-PRO+ Advanced 7.1 or higher
- > Fixed and dynamic IP addressing
- > Encryption support
- > Email On Event
  - \* 26 User Configurable Event
- > Web page support

## Internal Modem

- > The modem allows customers to remotely connect to the SENTINEL meter to program or read the meter.
- > It operates at a speed of 300/1200/2400 baud rates and is available for stand-alone or phone line sharing applications.
- > Off hook detection

## Software

- > PC-PRO+ Advanced
- > HHF meter data file creation with PC-PRO+ Advanced version 7.0 or greater
- > EnergyAudit 4.3

## Product Availability

	Transformer Rated	Self-Contained
<b>Socket</b>	Class 20 - Form 3S	Class 200 - Form 2S
	Class 20 - Form 4S	Class 200 - Form 12S
	Class 20 - Form 9S (8S)	Class 200 - Form 16S (14S, 15S, 17S)
	Class 20 - Form 45S (5S)	Class 320 - Form 2S
	Class 20 - Form 9S (8S)/46S	Class 320 - Form 12S
	Class 20 - Form 46S (6S)	Class 320 - Form 16S (14S, 15S, 17S)
	Class 20 - Form 56S (26S, 66S)	Class 150 - Form 16A (14A, 15A, 17A)
<b>A-Base</b>	Class 20 - Form 10A (9A)	
	Class 20 - Form 45A (5A)	
	Class 20 - Form 46A (6A)	
<b>Switchboard</b>	Class 20 - Form 48A (8A)	
	Class 20 - Form 9F (8A)	
	Class 20 - Form 45F (5A)	
	Class 20 - Form 46F (6A)	

## I/O Network

- > The input and output options available are determined by the type of I/O board that is installed in the meter. The SENTINEL meter supports a maximum of 4 KYZ outputs, 1 (KY) low current/high current output, and 2 (KY) pulse or solid-state inputs.

## Optional Features

- > Pulse outputs and inputs
- > MeterKey options: measurement level, TOU, load profile, power quality, bidirectional measurement, totalization
- > OEM Communication Option Boards
- > PF (avg., min., inst.)
- > RF ERT Modules: R300S (1 ERT), R300SD (2 ERTs), R300SD3 (3 ERTs)
- > Phone line thru cover
- > Three phase power supply
- > Class 320 amp meter (socket only)
- > RS-232/RS-485 (2 wire, 4 wire)
- > No potential links option

## Voltage Input Rating

- > Automatic voltage-sensing power supply, available in single-phase or three-phase
- > Single-phase power supply operates over a voltage input range of 120-480 V
- > Three-phase power supply operates over a voltage input range of 57.7-277 V

# specifications

## Accuracy Tests

Measured Quantity	Phase Angle %	Error of Reading
Volts (0.75Vn-1.15Vn)	All Phase Angles	+/- 0.2%
Amps (0.1A-0.25A)	All Phase Angles	+/- 0.4%
Amps (0.25A-20A)	All Phase Angles	+/- 0.4%
Amps (2.5A-200A)	All Phase Angles	+/- 0.4%
Watts (0.05A-0.25A)	0°, 180°	+/- 0.4%
Watts (0.25A-20A)	0°, 180°	+/- 0.2%
Watts (2.5A- 200A)	0°, 180°	+/- 0.2%
Watts (0.05A-0.5A)	-60°, +60°, -120°, +120°	+/- 0.5%
Watts (0.05A-20A)	-60°, +60°, -120°, +120°	+/- 0.3%
Watts (5.0A-200A)	-60°, +60°, -120°, +120°	+/- 0.3%
Vars (0.05A-0.25A)	-90°, +90°	+/- 0.4%
Vars (0.25A-20A)	-90°, +90°	+/- 0.2%
Vars (2.5A-200A)	-90°, +90°	+/- 0.2%
Vars (0.05A-0.5A)	-30°, +30°, -150°, +150°	+/- 0.5%
Vars (0.5A-20A)	-30°, +30°, -150°, +150°	+/- 0.3%
Vars (5.0A-200A)	-30°, +30°, -150°, +150°	+/- 0.3%
VA Arith. (0.05A-0.25A)	All Phase Angles	+/- 0.8%
VA Arith. (0.25A-20A)	All Phase Angles	+/- 0.6%
VA Arith. (2.5A-200A)	All Phase Angles	+/- 0.6%
VA Vec (0.1A-0.5A)	-60°, +60°, -120°, +120°, -30°, +30°, -150°, +150°	+/- 0.6%
VA Vec (0.5A-20A)	-60°, +60°, -120°, +120°, -30°, +30°, -150°, +150°	+/- 0.4%
VA Vec (5.0A-200A)	-60°, +60°, -120°, +120°, -30°, +30°, -150°, +150°	+/- 0.4%

In Conformance with the ANSI C12.20 standard for Class 0.2 meters.

## Specifications

<b>Power Requirements</b>	Voltage Ranges: -20% to +10% of nominal voltage (1 or 3 phase ) Frequency: 50-60 Hz	Operating Voltage: ± 20% Operating Range: 45 Hz to 65 Hz
<b>Load Profile/TOU Battery</b>	Voltage: 3.6 V nominal Carryover: 12 years minimum	Operating Range: 3.4 V- 3.8 V Shelf Life: 25 years minimum
<b>Time</b>	Line Sync: Power line frequency Crystal Sync: ±0.003% @25°C; ±0.02% over full temperature range	
<b>Operating Environment</b>	Temperature: -40° to +85°C Humidity: 0% to 95% non-condensing Transient / Surge Suppression: ANSI C37.90.1-1989 FCC Part 15, Class B ANSI C62.41-1991	
<b>Accuracy</b>	ANSI C12.20:1997 for class 0.2 meters	
<b>Characteristic Data</b>	Starting Current:	0.005 amps (Class 20) 0.050 amps (Class 200) 0.080 amps (class 320)
<b>Burden Data</b>	Voltage 120 Voltage 240 Voltage 277 Voltage 480	Watts: 1.3 Watts: 1.6 Watts: 1.7 Watts: 2.4 VA 2.2 VA 3.1 VA 3.4 VA 5.2

## Accuracy Data

The SENTINEL meter is a +/-0.2 accuracy device capable of displaying a wide range of register information as well as complying with the requirements of ANSI C12.20: 1997 for Class 0.2 meters.

## OEM Communication Options Available

- > SmartSynch® GPRS
- > Trilliant NCTR801 telephone modem
- > Motorola™ Canopy (works with SENTINEL Meter with Ethernet Communications Board)
- > BlueSpan GPRS
- > Trilliant NCGR801 GPRS
- > Trilliant NCXR801 CDMA/1xRTT
- > Trilliant NCIR801 iDEN®
- > Trilliant NCDR801 DataTAC®
- > DCSI CMT Power Line Carrier

## OEM Communication Options Pending

- > ORBCOMM satellite modem
- > Tantalus
- > Others to be named soon

## Technical Data

Conforms to:

- > ANSI C12.1: 1995
- > ANSI C12.19: 1997
- > ANSI C12.20: 1997
- > ANSI C12.21: 1999

## Surge, Impulse and RF Interference

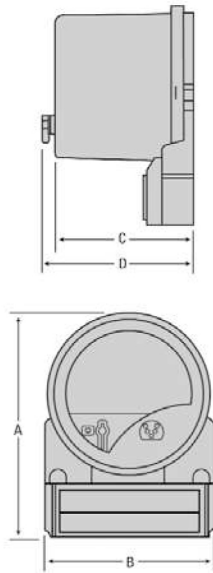
- > ANSI C37.90.1: 1989
- > ANSI C62.41: 1991
- > FCC Part 15 (Class B)

## Reference Information

- > SENTINEL Meter Technical Reference Guide
- > SENTINEL Meter Overview Brochure
- > SENTINEL Meter Specification Sheet
- > SENTINEL Meter Communication Option Specification Sheets
- > Order Specification Form
- > Site Analysis Guide
- > Electricity Price Bulletin

# specifications

## SENTINEL® A-Base Meter



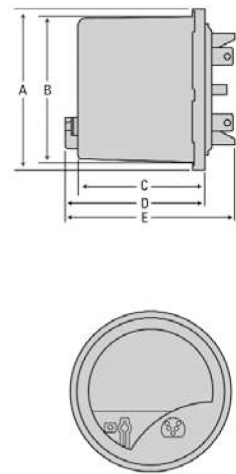
### Dimensions for A-Base

A	B	C	D
9.46"	7.28"	5.90"	6.44"
24.0 cm	18.48 cm	14.97 cm	16.35 cm

### Shipping Weights for A-Base

Net Weight	Gross Weight (Meter & Carton)
5.7 lbs (2.6 kg)	9.3 lbs (4.2 kg)

## SENTINEL® Socket Meter



### Dimensions for Socket Meter

A	B	C	D	E
6.95"	6.31"	5.46"	6.00"	7.30"
17.65 cm	16.03 cm	13.87 cm	15.24 cm	18.54 cm

### Shipping Weights for Socket Meter

Net Weight	Gross Weight (Meter & Carton)	Gross Weight (4 Pack)
4 lbs (1.8 kg)	7.5 lbs (3.4 kg)	20.2 lbs (9.2kg)