## A3 ALPHA® meter

In support of open architecture standards, the A3 ALPHA meter fully supports ANSI C12.18, C12.19, and C12.21.

## Interval data recording and self reads

The main circuit board has nonvolatile memory for storing profile, data logs, and self read data. Recording options include interval profiles of instrumentation data and up to 15 self reads. If extensive profile recording is required, an extended memory option board can be easily added to increase total memory by 1 MB.

When optional instrumentation profiling is enabled, the meter stores 2 separate sets of instrumentation data. Each data set has an independent interval length and up to 16 channels. With instrumentation profiling, each meter becomes a powerful data collection tool to monitor data and diagnose problems without installing expensive temporary monitoring equipment. One of over 50 instrumentation quantities can be assigned to each channel, and the storage algorithm for each channel can be independently selected. Four storage algorithms are available:

- minimum value per interval
- maximum value per interval
- average value per interval
- end of interval snapshot

## **Revenue metering**

The A3 ALPHA meter is a very accurate revenue meter (0.2 accuracy Class). Existing ALPHA meter users will find the basic A3 ALPHA meter types familiar. The meter provides advanced four quadrant revenue functions, transformer and line loss compensation, and increased data profiling without adding hardware option boards.

Meter type	Measured quantities
A3D	1 (watthours only)
A3T	1 (watthours only)
A3K, A3R, A3Q	2 (user selectable)
A3KA, A3RA	6 (user selectable)
A3QA	

Each measured quantity is stored in nonvolatile memory and includes energy, demand, and TOU data. Note. TOU data is not available for A3D.

## Power quality monitoring

PQM provides continuous service condition monitoring 24 hours a day. PQM looks for exceptions to user-defined thresholds for items such as voltage, current, and total harmonic distortion. Each of the 12 PQM tests can be configured to control relay activation, LCD warning, date/time stamp log entry, and even an automatic telephone call to report the condition.





Elster's A3 ALPHA meter builds on the strengths of the ALPHA meter design. The patented digital measurement techniques offer high accuracy, repeatability, and low ownership costs.



## A communication enabler

Data can be retrieved using the standard optical communications port. Additional communications interfaces are available for A3 ALPHA meters as a simple add-on option board:

- 2400 bps internal telephone modem with outage reporting capabilities
- RS-232
- RS-485
- external serial interface
- 20 mA current loop
- internal LAN controller (ILC1)
- internal LAN node (ILN1)
- Itron 50ESS ERT<sup>®</sup>

**ANSI standards** 

Aclara TWACS UMT-C-A3 transponder

Communications interfaces can be combined with alarming options in the A3 ALPHA meter to permit immediate notification of critical events. The relay option boards of all existing ALPHA meters are compatible with the A3 ALPHA meter. When relay option boards are used with the A3 ALPHA meter, the relay functions are fully programmable.

## AnyPhase<sup>™</sup> power supply

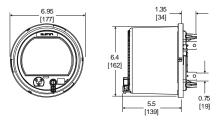
With the optional AnyPhase power supply installed, the A3 ALPHA meter is powered from all wires of the electrical service. If one or more service wires are disconnected, the meter is automatically powered from any two service wires including line-to-line or line-to-neutral.

## **About Elster Group**

A world leader in advanced metering infrastructure, integrated metering, and utilization solutions to the gas, electricity and water industries, Elster's systems and solutions reflect over 170 years of knowledge and experience in measuring precious resources and energy. Elster provides solutions and advanced technologies to help utilities more easily, efficiently and reliably obtain and use advanced metering intelligence to improve customer service, enhance operational efficiency, and increase customer benefits. Elster's AMI solutions enable utilities to cost-effectively deliver, manage, and conserve the life-essential resources of gas, electricity, and water. Elster has over 7500 staff and operations in 38 countries in North and South America, Europe, and Asia.

Maximum voltage	Continuous 528 VAC (AnyPhase option: L-L or L-N)
Maximum current	Continuous at Class amperes; temporary (1 second) at 200 % of
	meter maximum current
Surge voltage withstand	ANSI C37.90.1 Oscillatory 2.5 kV, 2500 strikes
	Fast transient 5 kV, 2500 strikes
	ANSI C62.41 6 kV at 1.2/50 μs, 10 strikes
	IEC 61000-4-4 4 kV, 2.5 kHz repetitive burst for 1 minute
	ANSI C12.1 Insulation 2.5 kV, 60 Hz for 1 minute
Voltage range	Nameplate nominal range 120 V to 480 V
	Operating range 96 V to 528 V
Current range	0 to Class amperes
Frequency range	Nominal 50 Hz or 60 Hz $\pm$ 5 %
Temperature range	-40 °C to +85 °C inside the meter cover
Humidity range	0 % to 100 % noncondensing
Power supply burden	Less than 4 W
Per phase current burden	0.1 milliohms typical at 25 °C
Per phase voltage burden	0.008 W at 120 V; 0.03 W at 240 V; 0.04 W at 480 V
Accuracy	Meets ANSI C12.20 accuracy for accuracy Class 0.2 %
Starting current	Forms 1S and 3S 10 mA for Class 20
	100 mA for Class 200
	160 mA for Class 320
	All other forms 5 mA for Class 20
	50 mA for Class 200 80 mA for Class 320
<b>D</b> 1	
Primary time base	Power line frequency (50 Hz or 60 Hz) with selectable crystal oscillator
Secondary time base	Meets the ANSI limit of 0.02 % using the 32.768 kHz crystal. Initial
	performance is expected to be equal to or better than ±55 seconds
	per month at room temperature.
Outage carryover capacity	6 hours at 25 °C. Super capacitor rated at 0.1 Farads, 5.5 V.
Communication rates	Optical port: 300 to 28,800 bps; Remote port: 1200 to 19,200 bps

C12.1; C12.10; C12.18; C12.19; C12.20; C12.21



Dimensions in inches [millimeters]. For reference only

Byram Laboratories 1 Columbia Road Branchburg, NJ 08876 T +1 800 766 1212 (US toll free)

F +1 908 252 0822

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## Advanced utility metering

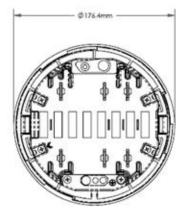


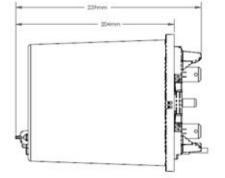
## ION8650 Functions and characteristics



PowerLogic ION8650 socket meter

#### ION8650 socket dimensions





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T +1 800 766 1212 (US toll free)

F +1 908 252 0822

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Used to monitor electric energy provider networks, service entrances and substations, PowerLogic ION8650 meters are ideal for independent power producers and cogeneration applications that need to accurately measure energy bi-directionally in both generation and stand-by modes. These meters give utilities the tools to manage complex energy supply contracts that include commitments to power quality. Integrate them with our StruxureWare Power Monitoring (ION Enterprise<sup>™</sup>) operations software or other energy management and SCADA systems through multiple communication channels and protocols, including Itron MV-90, Modbus, DNP, DLMS, IEC 61850 Ed. 2.

## Applications

- b Revenue metering.
- b Co-generation and IPP monitoring.
- b Compliance monitoring.
- b Power quality analysis.
- b Demand and power factor control.
- b Load curtailment.
- b Equipment monitoring and control.
- b Energy pulsing and totalisation.
- b Instrument transformer correction.

#### **Main characteristics**

#### ANSI Class 0.2 and IEC 62053-22/23 Class 0.2 S metering

For interconnection points on medium, high, and ultra-high voltage networks; twice as accurate as current IEC and ANSI Class 0.2 standards over all conditions and including single wide range current measurement.

#### Power quality compliance monitoring

Monitor compliance with international quality-of-supply standards (IEC 61000-4-30 Class A/S, EN 50160 Ed. 4, IEC 61000-4-7, IEC 61000-4-15, IEEE 1159, IEEE 519). Also detects disturbance direction.

#### **Digital fault recording**

Simultaneous capture of voltage and current channels for sub-cycle disturbance.

#### **Complete communications**

Multi-port, multi-protocol ports including serial, infrared, modem and ethernet. Simultaneously supports multiple industry standard protocols including: Itron MV-90, Modbus, Modbus Master, DLMS, DNP 3.0 and IEC 61850 Ed. 2.

#### Multiple tariffs and time-of-use

Apply tariffs, seasonal rate schedules to measure energy and demand values for time periods with specific billing requirements.

#### Multiple setpoints for alarm and functions

Use up to 65 setpoints for single/multi-condition alarms and I/O functions with response times down to 1/2 cycle.

#### Multiple setpoints for alarm and functions

#### Use up to 65 setpoints.

Instrument transformer correction

Save money and improve accuracy by correcting for less accurate transformers.

#### Alarm notification via email

High-priority alarms, data logs sent directly to the user's PC. Instant notification of power quality events by email.

#### Cyber security enhancements

Assign communication admin rights to selected user; prevention measures ensure no loss of security logs; support syslog for external security.

## **Commercial reference numbers**

ION8650 meters	Commercial ref. no.
ION8650A	M8650A
ION8650B	M8650B
ION8650C	M8650C

## Nexus<sup>®</sup> 1262/1272

High Performance Utility Billing Meters with Communication and Advanced Power Quality



## **Highly Advanced Revenue Meter**

- 0.06% Watt-hr Accuracy
- Precision Auto-calibrating Metrology
- Multipoint Compensation Factors
- Pulse Totalizers
- Load Profilers and I/O
- MV90 Compatible
- Available in Socket, A-Base and Switchboard Form

## **Highly Advanced Communication**

- Up to 4 Com Ports
- Modbus RTU and Modbus TCP/IP
- DNP 3.0 Serial and Ethernet
- Combo RJ11 Modem and Ethernet Port
- Web Server and Email on Alarm
- High-Speed, Power Quality Waveform Recorder
- 9 Levels of Password Security





The Nexus<sup>\*</sup> 1262/1272 meters are designed for demanding smart grid and intelligent substation applications. They provide one of the most profound analyses of electricity available in a socket form revenue meter. The units offer extensive advanced monitoring features to meet the most critical power monitoring requirements. Using advanced DSP technology, the Nexus \* meters provide immediate and stored revenue power data coupled with superior power quality and communication. To meet the sophisticated standards required by utility companies and de-regulated power providers, the Nexus<sup>®</sup> meters' basic package starts where most other meters end. Standard features in Nexus<sup>®</sup> units provide the ability to meet your future advanced metering needs.

## ACCU-MEASURE <sup>™</sup> AUTO-CALIBRATING METROLOGY

EIG's Accu-Measure<sup>™</sup> auto-calibrating metrology provides unmatched accuracy.

- Energy and Power Accuracy to within 0.06%
- Auto-calibration over Time
- Automatic Temperature Drift Adjustments
- Improved Stability and Better Long Term Accuracy

## **4 QUADRANT MEASUREMENT**

The unit is a full four quadrant meter and gathers hour data information in every quadrant.

- kWh Delivered and Received
- kVAh in Each Quadrant
- kVARh in Each Quadrant
- **Q** Hours

## TIME OF USE

The 1262/1272 offers robust time of use functionality. Standard capabili ties include:

- 8 TOU Schedules
- 4 Seasons/Year
- 20 Year Calendar
- Prior Month and Prior Season
- Programmable Freeze Regist

## TRANSFORMER AND LINE LOSS COMPENSATION

Loss Compensation adjusts for both copper and iron losses with a simple user setup.

## FIELD TEST MODE

- **Test All Energy Readings**
- Enable/Disable in Test Mode
- **Preset Accumulators**
- Freezable Accumulators



Piet OK

## LOAD AGGREGATION/UNIVERSAL METERING

Using standard pulse inputs, the Nexus 1262/1272 meter can count pulses from external meters and accumu late usage. The pulse inputs can be used to totalize electrical usage and utility values, such as water or gas use data.



- 8 Pulse Inputs
- Individual Accumulating Registers
- 4 Totalizing Registers (Add or Subtract)

## CT & PT COMPENSATION

The Nexus<sup>®</sup> units compensate for errors in current transformers and potential transformers.

- Voltage Compensatio
- **Multipoint Current** Compensation
- Multipoint Phase And Compensation
- Better than 0.01% Resolution

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to Many Hours

Cold Load Pickup

## MULTIPLE DEMAND WINDOWS

The Nexus<sup>®</sup> 1262/1272 meter simultaneously monitors five demand structures.

- **Block Window Demand**
- **Rolling Window Demand**
- **Predictive Demand**
- Thermal Demand
- **Cumulative Demand**

## TIME STAMPED MAX. DEMANDS

The units gather demand information for all power values. Each value is date/time stamped.

- kW Demand, Delivered & Received, Max/Min
- kVAR Demand, Delivered & Received, Max/Min
- kVAR Coincident with kW Demand

Interval Length from 1 Second

End of Interval Pulse Output

End of Interval Pulse Input

- kVA Demand, Max/Min
- Amps Demand, Max/Min
- Voltage, Max/Min



## Reliable, Functional and Feature-Rich Metering

## www.byramlabs.com

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# SENTINEL®

**Commercial and Industrial Meter** 

The Itron 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 C&I locations, including large industrial sites and substations. The SENTINEL Meter has the flexibility to match any utility needs ranging from a basic C&I meter applications all the way into sophisticated substation system installations.

The processes of deregulation, privatization, and globalization are forcing fundamental changes to the way utilities do business. As competition increases, so does the demand for excellence in customer service and operations efficiency. Leading utilities are looking for ways to increase efficiency and add value to their offering with innovative marketing techniques and an extensive use of quality technology.

At Itron our experience and global presence mean that we have encountered many of these challenges before. As an integrated information services provider, we use state-of-the-art tools, techniques, and experts to help clients discover the potential for total network optimization. Through our solutions approach, your company will benefit from increased operating efficiency, automated billing, and a host of other services to successfully compete in today's utility services market. The Itron SENTINEL meter is part of the solution. This solidstate, polyphase meter provides the platform for advanced communications and services in the commercial and industrial market to meet your changing business needs.

## The Competitive Advantage

The utility industry is evolving with an increasing demand from customers for more information, including voltage quality, power quality, and load profiling. The SENTINEL meter enables you to gather and deliver that information, whenever and however it is needed.

## PLATFORM FEXIBILITY

## Information Management

Demands for more information, faster information, and better information continue to increase and the future of your business depends on how well you can adapt. The SENTINEL meter lets you effectively manage the information requirements of today, while providing the flexibility to meet the challenges of tomorrow.

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## **Key Features**

The SENTINEL meter keeps your cost down and your options open for a better bottom line.

- » Class 0.2 accuracy
- » 5 measurement levels
- » Voltage Quality:
  - Voltage Imbalance
  - Phase-to-Phase or Phase-to-Ground VQ event detection
  - Sags
  - Swells
  - Current Imbalance
  - 255 VQ events
  - 3 levels of severity
- » Harmonic Detection and Triggering for Voltage and Current
- » Wide variety of singlephase and polyphase meter forms
  - 20A, 200A, and 320A options
- » Totalized registers
- » Bidirectional measurement
- » MeterKey<sup>™</sup> options:
  - Measurement level
  - Up to 7 independent TOU rates
  - Totalization
  - Up to 8 channels of Load Profile
  - Power quality
  - Bidirectional measurement
  - · Per phase voltage
  - Per phase current
- » Maximum, present, projected, previous, cumulative, continuous cumulative, and coincident demands
- » Error and event logging
- » Real-Time SiteScan<sup>™</sup> onsite monitoring system
- » SiteScan diagnostic snapshots for troubleshooting
- » Flexible configuration for various metering applications
- » Pulse outputs and inputs
- » PF (avg., min., inst.)
- » ERT Communications
- R300S (energy only)
- R300SD (energy and demand)
- R300SD3 (3 quantities) option board
- » RS-232/RS-485 option board, serial communication
- » Internal modem option board, phone line communication
- » Ethernet board; network communication requires meter
- » OEM development options for many communication technologies

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#### » Upgrade Kits Available:

- R300 Board Kits
- Modem Kit
- Switchboard Ready<sup>™</sup> Kit
- Ethernet Board Kit
- 5 Main I/O Board Kits
- 5 Supplemental I/O Board Kits

## THE COST OF OWNERSHIP

## **Unmatched Value**

The best measure of value is total cost of ownership over a measurement system's lifetime. The SENTINEL meter's value pays off during installation—its flexible design integrates easily into your existing monitoring systems - and continues through a long life of low maintenance, efficient operation, and extremely flexible upgrade capabilities. The adaptable architecture enables fast upgrading and enhancement to meet the world's changing needs.

## SENTINEL Meter Compliance

Accuracy Tests in conformance with the ANSI C12.20 standard for class 0.2 meters.

Conforms to:

- » ANSI C12.1: 2001
- » ANSI C12.10: 1997
- » ANSI C12.18: 1996
- » ANSI C12.19: 1997
- » ANSI C12.20: 2002
- » ANSI C12.21: 1999

## Surge, Impulse and RF Interference

Conforms to:

- » ANSI C37.90.1: 1989 (reaffirmed 1991)
- » ANSI C62.45
- » FCC Part 68
- » FCC Part 15 (Class B)

## THE COST OF OWNERSHIP NEW FEATURES

Whether your needs are basic or complex, the Itron SENTINEL polyphase meter offers any utility an electric meter solution with meter data management software that is easy to use. As the industry leader in software tools for metering applications, Itron is setting the standard for advanced metering. Our PC-PRO+ Advanced software package offers every utility the knowledge necessary for expert program creation with new innovative backup capabilities and critical time savings features.



## GE Energy Digital Energy

## Commercial & Industrial Electricity Metering

## Versatile metering for demanding applications

GE Digital Energy's kV2c meter family is designed for revenue class metering in commercial and industrial applications. The kV2c meter moves beyond revenue metering to real time instrumentation, true power quality monitoring and real cost of service measurements. Whether you are metering the simplest energy rate or collecting critical quality of service and load analysis information on a polyphase or a single phase circuit, there is a kV2c meter configuration to meet your needs.

The GE kV2c meter family is one of the most widely accepted ANSI commercial and industrial meter with over 2 million units deployed in the field since its introduction. The robust revenue-grade meter design is based on GE's cutting edge technology that provides the highest accuracy and reliability in the market.

The GE kV2c product family includes 2 models to provide the ultimate in flexibility and customer choice, including the first to offer a polyphase product available for 600V applications.

## Commercial & Industrial Meters



## KV2c

Solutions for the Most Demanding Applications Offering the required revenue grade metering functionality and advanced power guality monitoring for polyphase metering



## KV2c+

## AMI/AMR Communication for Extreme Conditions

Ideal for extremely harsh environments, this model builds on our kV2c design and includes a more robust power supply and suitability for 600V applications



## Communications

- AMI/AMR options including RF, Power Line Carrier, Cellular Networks, Ethernet
- Allows interchangeability of AMR/AMI plug & play options
- Supports connectivity and integration with 3rd party communications solutions providers

## Smart Configuration

- Customize advanced metering options to suit customer needs
- Versatile programming softswitches allowing the selection of advanced functionality such as expanded recording features, harmonic analysis, time of use, load profile, and power quality measures.
- Options available to provide totalization capability, pulse outputs, telephone modem, and RS-232/485 communications
- Tamper detection tools and installation verification capabilities to automatically catch errors, wiring changes, tampering, and billing issues.

## Reliability

- Robust revenue-grade watt-hour and demand meter with advanced recording options.
- Based on GE's high-quality technology, providing 0.2% accuracy and reliability.
- Enable utilities with tools to lower operational cost and provide accurate metering solutions



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## **kV2c** Solutions for the Most Demanding Applications

GE's most advanced electricity metering product, the kV2c, delivers world class capability around revenue metering and protection, power quality, and cost of service measurements. Designed around a GE proprietary data acquisition chip, this product outperforms the market in relation to sampling and data analytics capability.

## Versatility

The kV2c meter family is a versatile metering platform for commercial and industrial applications. The kV2c meter offers easy and powerful functional upgrades with a unique combination of softswitches and option boards to meet your metering needs in a rapidly evolving smart metering space. The kV2c starts as a bi-directional, coincident demand meter with five demand measures, real-time pricing, and real time data monitoring.

Softswitches are available to add such functions as TOU, transformer and line loss compensation, power factor, 4 quadrant measurements, instrument transformer correction, and increased recording channels. For a full description of available firmware enhancements, see the attached product specification table.

## **Power Quality**

The kV2c meter offers advanced power quality tools to measure compliance to power quality agreements or gather data to help set power quality requirements. These tools include:

- Programmable sag and swell monitor that logs voltage sag and swell duration down to one cycle, minimum or maximum voltage, coincident current, and date and time of occurrence.
- Voltage and Current THD per phase, TDD (Total Demand Distortion), Distortion Power Factor, Displacement Power Factor, Distortion kVA, and Distortion kVAh (all recordable).
- Harmonic analysis (MeterMate 5.00 and above) plots odd and even harmonic magnitudes and phase angles).
- Programmable diagnostics for voltage imbalance, distortion, current imbalance, reversed polarity, high neutral current. These events may be logged, set an alert, and initiate a call-in.

# 

## Inventory Management

The kV2c wide range voltage power supply (120V to 480V) combined with the FitzalI<sup>TM</sup> feature enables a significant meter inventory reduction while covering all applications. FitzalI<sup>TM</sup> is a GE exclusive tool for commercial and industrial electronic meter inventory reduction, which allows two meter forms, 9S for transformer rated and 16S for self-contained to meter any service type.

## Installation Verification and Tamper Detection

The Site Genie<sup>™</sup> Monitor provides a simple, automatic way to catch errors, tampering and wiring changes before billing problems occur. Site Genie also provides the phasor information and diagnostics needed to fix the problems it finds.

## Cost of Service Measurements

Knowing what it costs to serve a site is a key piece of competitive information for both Generation and Distribution utilities. With modern loads, measuring energy and power factor isn't enough. The kV2c family of meters will simultaneously measure all of the components of service cost (real & reactive – with and without harmonics, distortion, and vector apparent power).

## Communications

The kV2c meter family offers a large range of possible AMI communication technologies including RF Mesh, Cellular, Power Line Carrier and Ethernet to support all of your Smart Grid applications. Additionally, the kV2c family provides "KYZ" and other I/O options to support local energy management solutions typically found in commercial and industrial facilities. The kV2c has a standard AMI interface that allows the capability to transmit all metering data available at the meter through the AMI communication network. See the attached table for a complete listing of AMI technologies that are currently offered as a factory integrated solution into the kV2c meter family.

## Features & Benefits

- AMR/AMI Plug and Play designed to accommodate: RF, PLC, Cellular (GPRS/CDMA), Ethernet (See attached table for currently offered factory integrated solutions)
- Complete range of S-base and A-base forms
- 4-quadrant industrial or substation measures
- Powerful functional upgrades provide 4-channel 64 kb, 20-channel 192 kB, or 20-channel 384 kB recording for voltage, current, energy, apparent power, reactive power, distortion power, power factor, THD, TDD, DPF.

phase AC instrumentation (amps, volts, and frequency)

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