# Utility metering redefined

## > PowerLogic ION8650

Revenue and power quality meters
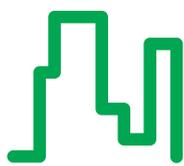
Utilities    Buildings    Industry

**Schneider Electric**

"We considered the ION8600 to be the market's best revenue and power quality meter, but the ION8650 clearly surpasses it: simpler options, faster communications, and more memory for power quality and revenue logging. And it worked flawlessly alongside the older generation in all our systems testing." Shane Woods, Idaho Power

# The new benchmark for smart grid utility metering



The PowerLogic™ ION8650 meter is the world's most advanced socket-based energy and power quality meter. It offers unparalleled versatility, reliability, and total performance.

Bidirectional, four-quadrant metering and industry-leading accuracy make it the only choice to monitor network inter-ties, substations, and service entrances. Our meter enables utilities to manage complex energy supply contracts that include commitments to power quality. Exceptional connectivity enables the meter to be integrated with both StruxureWare™ Power Monitoring Expert software or virtually any other energy management and SCADA software.

The PowerLogic ION8650 embodies everything we have learned as the leading global supplier of advanced revenue meters. Rethought and re-engineered from the ground up, it has the versatility and robustness that today's utilities demand. From leading-edge performance intended to quickly maximize your return on investment, through power quality compliance monitoring that helps increase electrical network reliability, to an adaptable, modular architecture that's ready to solve your future challenges, the PowerLogic ION8650 has it all.

# Reliability and versatility beyond expectations



> **>**
>
> Provides vital operational information

The PowerLogic ION8650 meets the critical demands of grid revenue, power quality, and substation automation applications in one, durable device.

### Utility grid revenue metering

Use the meter for billing at key grid interchange points on transformers and large industrial loads. It securely shares billing data, interfaces with SCADA systems to enhance real-time electrical network reliability, enables energy savings through real-time load shedding, monitors and controls capacitor banks, helps augment predictive maintenance, and facilitates automating remote power systems.

### Power quality

Verify power quality contract compliance to IEC 61000-4-30 Class A, EN 50160 Ed. 4, and other key compliance standards. Isolate and analyze the source of power quality problems with simultaneous capture of subcycle disturbance transients on all voltage and current channels. Configure it for custom power quality applications or recommendations such as IEEE 519 and IEE 1159.

### Substation automation

An integral component of your substation automation strategy, the PowerLogic ION8650 provides vital operational information. Extensive I/O combined with onboard intelligence and an array of communication choices gives you access to real-time and historic equipment status data from remote and local substations. Use the facts to improve reliability, optimize capital investment decisions, and increase operational and labor efficiency.

# Extensive measurements, unbeatable accuracy

Today, utilities need the highest precision metering possible at inter-tie and bulk power interfaces to ensure maximum revenue. Singularily unique amongst revenue meters, the PowerLogic ION8650 offers you uniform accuracy over a wide current range spanning .01 A to 20 A.

With its single current range, you stock one meter for all your measurement applications whether they are small loads such as offline generators or an electrical network running at full capacity.

The world's most accurate socket meter

| Parameter | Accuracy (% reading) |
|---|---|
| Voltage (line-line) (line-neutral): per phase, total, min/max, unbalance, phase reversal | 0.1% |
| Current: per phase, total, neutral, min/max, unbalance phase reversal, demand | 0.1% |
| Power: kW, kvar, kVA, per phase, total, demand | 0.1% |
| Energy: kWh, kvarh, kVAh, bidirectional, net, total, volt-hours, and amp-hours | 0.1%, twice the accuracy of IEC 62053-22/23 (0,2S) and ANSI C12.20 Class 0.2 |
| Power factor: per phase, total | 0.1% |
| Frequency V1, V2, V3 (47 – 63 Hz): per phase, total | ±0.001 Hz |

## High-accuracy measurements

The meter provides high-accuracy (1-second), high-speed (½-cycle) true RMS 3-phase and total measurements with twice the accuracy specified by current IEC and ANSI Class 0.2 standards for key power and energy parameters in preparation for the new ANSI class 0.1 standard. However the ION8650 performs better than 0.05% accuracy under normal conditions.



Conditions
Voltage: 3Ø-120 V L-N
Power factor: 0.8
Temperature: 15 °C

Applied current (A)

— = % error    — = Spec line
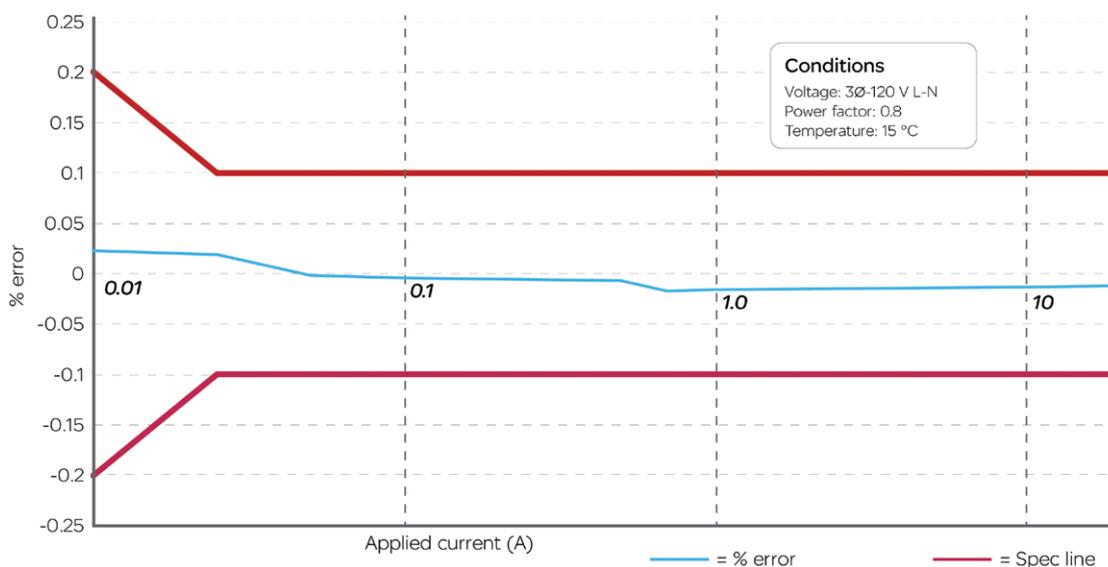
## Transformer/line loss compensation

Automatically measure, compensate, and correct for transformer or line losses when the meter is physically separated from the billing point.

# Flexible communications, secure data, easy alarms
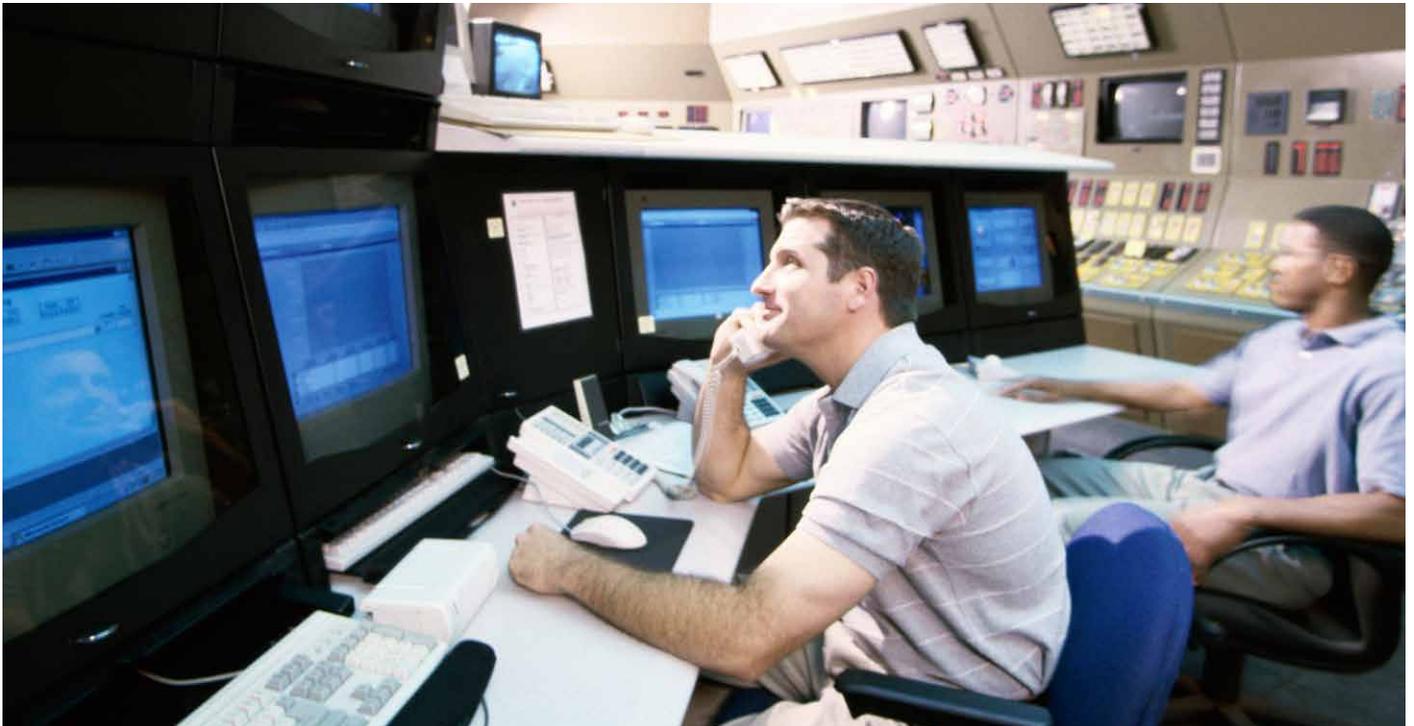


**IEC 61850**

Utilities need secure, cost-effective, targeted information to optimize their business operations. They also need open, standardized protocols to lower implementation costs, safeguard their capital investments, and facilitate interoperability between devices and networks.

The PowerLogic ION8650 offers all that and more, with multiport, multiprotocol access to a wide variety of the most common communication standards for simultaneous data sharing with utility systems and customers. The PowerLogic ION8650 is a smart grid enabler that easily integrates with existing systems and has the flexibility you need to meet future needs.

### Complete communications: Ethernet (fiber) – serial – modem – infrared
Simple, flexible communications reduce connection costs. Concurrent Ethernet, serial, and modem ports with a variety of protocols such as ION, DLMS, IEC 61850 Ed. 2, DNP 3.0, Modbus RTU, Modbus TCP, Modbus Master (serial, TCP), and MV-90 ensure comprehensive interoperability.

### Internet connectivity
An onboard Web server provides access to real-time values and power quality data, and an FTP server now provides COMTRADE fault records and IEC 61850 configuration. You can exchange information using XML to integrate with custom reporting, spreadsheet, database, and other applications. Gateway functionality lets you log and view data from downstream devices.

**With so many sophisticated features in just one device, the ION8650 gives us the information we need to grow our competitive advantage**

## Multiuser, multilevel security

Control and customize access to sensitive data for up to 50 users. Password protection, hardware revenue locking, session-based event logging of user account access, and antitamper seal protection enhance meter security.

## Cybersecurity enhancements

> Password management

> Assign communication admin rights to a select user

> Security events logged by user

> Prevention measures to ensure no loss of security logs

> Support of syslog for external security log management

> Firmware validation

> Ability to disable ports not in use

> User configurable Ethernet protocol ports

## Data and event logging for any condition

Depending on the meter you chose, standard, non-volatile onboard memory is available in 32 MB, 64 MB, and 128 MB capacities. Data is prioritized and stored onboard to eliminate data loss if communication is interrupted. Data recorders are preconfigured for revenue, losses, historic data, harmonics, waveforms, power system data, sags/swells, transients, and event parameters. In addition, custom logging of any parameter is easy to configure with PowerLogic ION Setup.

## Multiple tariffs and time-of-use calculations

A 20-year calendar, automatic leap year, seasonal adjustments, and clock synchronization, combined with five daily profiles per season and four rate periods per daily profile ensure complete accommodation of specific billing requirements.

## Alarming and control made easy

The meter automatically provides high-priority alarm notifications or scheduled system status updates. Sixty-five setpoints configurable for 1-second or ½-cycle operation can trigger on any parameter or condition. Activate audible and visible alarms, data logging, waveform recording, relays, and other control and reset functions.

**>**

Offers secure, cost-effective, targeted information

**\***

Integrates with utility SCADA, Itron MV-90, and building management systems

# Your 24/7 power quality specialist



Unlike other ANSI revenue meters in the market today, each PowerLogic ION8650 is a flexible power quality system. Reduce equipment damage and system downtime with out-of-the-box support for key power quality applications or use its flexibility to create your own custom application. Depending on the model, the ION8650 can calculate and display simple harmonics up to fully certified power quality IEC 61000-4-30 Class A measurements that support international quality of supply standards like EN 50160 Edition 4.

## Power quality applications

With the PowerLogic ION8650, you can detect, record, and report the specifics of:

> Voltage or current imbalances and loss, frequency/power factor variations, over- and undervoltages

> Sag/swell magnitude and duration, plus sub-disturbances that may occur during a sag/swell event

> Disturbance direction detection determines the source of a disturbance by indicating whether it originated upstream or downstream of the meter

> Harmonics, individual up to the 63rd, K factor, total harmonic distortion, plus voltage and current magnitude, phase and inter-harmonics in accordance with IEC 61000-4-7 up to the 50th harmonic with the A model

> Transient capture for Type 1 disturbances at 1024 samples per cycle with resolution to 17 µs at 60 Hz and 20 µs at 50 Hz with the A model

> Waveform capture via two recorders with selectable resolution enables simultaneous transient capture and sag/swell fault recording on the A model

# Designed to meet your workflow

The PowerLogic ION8650 is designed and built to the most exacting standards. The user-focused design means fewer options to stock, and simpler repair and maintenance. Easy to retrofit, it integrates seamlessly with our previous generation revenue meters and their configuration frameworks.

## Front panel

The bright, easy-to-read, backlit LCD screen with adjustable contrast is easy to see whether viewing system data or configuring the meter. An ANSI Type II optical serial port facilitates infrared communication with the device. Two LEDs are preconfigured for energy pulsing. The meter supports Kilo/MegaWatt value scaling for high energy metering points.

## Simplified mounting and installation

The meter is available in socket or switchboard form factors that easily let you upgrade obsolete equipment with dramatically reduced installation costs. A switchable volts mode accessed through the front panel gives you all the flexibility of multiple form factor choices without the procurement and stocking complexities:

> 2 socket types: one for 9S/29S/36S, one for 35S
> 1 switchboard type to cover 9/29/35/36 modes

### Circuit and control power connections

The meter has three voltage and three current inputs compatible with 4-wire Wye, 4-wire Delta, 3-wire Wye, 3-wire Delta, and direct Delta systems. Direct connect ANSI socket mount 9S, 29S, and 36S systems up to 277 V AC line-to-neutral, or a 35S system up to 480 V AC line-to-line. Power the meter by the voltage source being monitored or from an auxiliary power pigtail.

## Expand your I/O capabilities!

Onboard meter I/O includes two onboard options:

1. Four Form C digital outputs and three Form A digital inputs
2. Four Form C digital outputs, one Form A digital output, and one Form A digital input

Optional I/O expander provides eight digital inputs, four Form A digital outputs and four Form C digital outputs, or four analogue outputs in place of the four Form A digital outputs (requires external power supply in order to use analogue outputs).

**Our most robust socket meter ever**

**Find power quality problems and fix them**

# General specifications



| Description | Specification |
|---|---|
| Operating range | -40 °C to +85 °C (no formation of ice) (-40 °F to 185 °F) |
| Display operating range | -40 °C to 70 °C (-40 °F to 158 °F) |
| Storage range | -40 °C to +85 °C (-40 °F to 185 °F) |
| Relative humidity range | 5% to 95% non-condensing |
| Safety/construction | ANSI C12.20-2010 American National Standard for Electricity Meters and IEC 62052-11-2003 |
| Emissions | FCC Part 15 Subpart B, CISPR 22 Radiated/Conducted Emissions (Class B) |
| Utility approvals | California ISO, ERCOT, and New York State; Industry Canada; EGR Code of Practice 4 for New Zealand; Certified by Comision Federal de Electricidad and LAPEM in Mexico* |

* Contact factory for approval certificate availability

# Features and options

| Feature sets | A | B | C |
|---|:---:|:---:|:---:|
| **Metering** | | | |
| Power, energy, and demand | ■ | ■ | ■ |
| **Power quality** | | | |
| Sag/swell with direction detection, harmonics monitoring | ■ | ■ | ■ |
| Harmonics: individual, even, odd, up to | 63rd | 63rd | 31st |
| Harmonics: magnitude, phase, and inter-harmonics | 50th | 40th | - |
| IEC 61000-4-30 Class A/S | A | S | |
| Symmetrical components: zero, positive, negative | ■ | ■ | ■ |
| Transient detection, microseconds (50 Hz/60 Hz) | 20/17 | - | - |
| **Logging and recording** | | | |
| Onboard memory | 128 MB | 64 MB | 34 MB |
| Min/max logging for any parameter | ■ | ■ | ■ |
| Timestamp resolution in seconds | 0.001 | 0.001 | 0.001 |
| GPS time synchronization | ■ | ■ | ■ |
| **Communications and I/O** | | | |
| RS-232/485; RS-485; Optical; IRIG-B | ■ | ■ | ■ |
| Ethernet and internal modem or cell modem (optional) | ■ | ■ | ■ |
| DLMS & DNP 3.0 via serial, modem, Ethernet, Optical ports (if present) | ■ | ■ | ■ |
| Modbus TCP Master/Slave (Ethernet port) | ■ / ■ | ■ / ■ | ■ / ■ |
| Modbus RTU Master (serial ports)/Slave (all ports) | ■ / ■ | ■ / ■ | ■ / ■ |
| Gateway functionality, onboard Web server | ■ | ■ | ■ |
| RS-232/485; RS-485; Ethernet; Optical; IRIG-B | ■ | ■ | ■ |
| 4 Form C outputs/3 Form A inputs | opt. | opt. | opt. |
| 4 Form C outputs/1 Form A output/1 Form A input | opt. | opt. | opt. |
| External digital status inputs/counter/solid state outputs | opt. | opt. | opt. |
| **Setpoints, alarming, and control** | | | |
| Setpoints, number/minimum response time | 65/½ cycle | 65/½ cycle | 65/1 sec |
| Math, logic, trig, log, linearisation formulas | ■ | ■ | ■ |
| Call-out on single and multicondition alarms | ■ | ■ | ■ |
| **Revenue metering** | | | |
| MV-90 on serial, modem, Ethernet ports (if present) | ■ | ■ | ■ |
| Multiyear scheduling: hourly activity profiles | ■ | ■ | ■ |
| Transformer/line loss compensation/ITC | ■ / ■ | ■ / ■ | ■ / ■ |

**Make the most of your energy**[SM]

Schneider Electric Industries SAS

Head Office
35 rue Joseph Monier
92500 Rueil Malmaison Cedex- France
Tel.: +33 (0)1 41 29 70 00
www.schneider-electric.com

Schneider Electric™