Gain energy insight and control with PowerLogic™
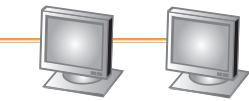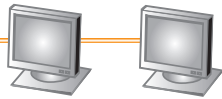
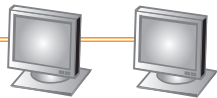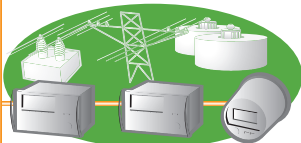## PowerLogic ION7550/ION7650

power and energy meters

Financial management including accounting and billing
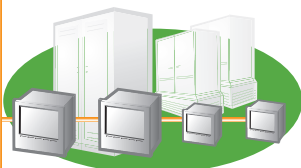
Facility and energy management

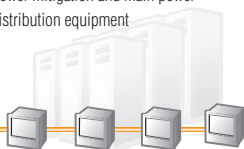Operations management includnig engineering, planning and maintenance

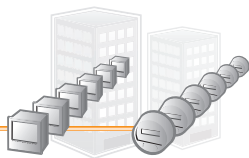Power generation, transmission and distribution
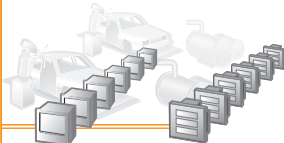
Service entrances and onsite generation

Power mitigation and main power distribution equipment

PDUs and data servers

Tenants, departments or subcontractors

Processes, lines, machines or equipment

Typical uses within a PowerLogic power and energy management system

Features

High visibility, multilingual, IEC/IEEE configurable display

Choice of displays, including a large, backlit LCD integral display or a separately mounted color touchscreen display. The displays provide multiple simultaneous real-time and timestamped historical parameters as well as graphical trends and histograms. User-configurable IEC or IEEE notations. 12/24 hour clock support in multiple date/time formats. English, French, and Spanish languages.

High accuracy standards

Meets stringent IEC and ANSI measurement accuracy standards such as IEC 62053-22 Class 0.2S, ANSI C12.20 0.2 Class 10 & 20.

Digital fault recording

Simultaneously capture voltage and current channels for sub-cycle disturbance transients, as well as multi-cycle sags, swells and outages: 1024 samples/cycle waveform recording, 20/17 µs transient capture (50/60 Hz).

Power quality analysis and compliance monitoring

A choice of THD metering, individual current and voltage harmonics readings, waveform capture, EN50160 and IEC 61000-4-30 class A ed. 2 (ION7650 only) power quality compliance evaluation, and voltage and current disturbance (sag/swell) detection. COMTRADE format waveform records are now available only for meters with the Ethernet port option.

Complete communications

Gateway functionality simplifies communications architecture and reduces leased line or connection costs. Concurrent, independent ports communicate with protocols such as ION, DNP 3.0, IEC 61850, Modbus RTU, Modbus TCP, Modbus Master. Ethernet port allows the following concurrent connections: 24 Modbus, 8 generic (ION / DNP / Modbus), 4 IEC 61850 dedicated client, 1 FTP and 1 SNMP. Dial-out capability when memory is near full. Data push capability through SMTP (email).

Patented ION technology

Provides a modular, flexible architecture that offers extensive user programmability. Uniquely addresses complex monitoring and control applications. Adapts to changing needs, avoiding obsolescence.

Disturbance direction detection

Determine the location of a disturbance more quickly and accurately by determining the direction of the disturbance relative to the meter. Analysis results are captured in the event log, along with a timestamp and confidence level indicating level of certainty.

Trending and forecasting

Forecast values such as demand to better control demand charges and billing rates. View results via the meter's web pages. Analyse trends to support proactive maintenance schedules.

Transformer/line loss compensation

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

Mounting options

Multiple mounting options to suite your installation, from traditional panel-door mounting a meter with integrated display to mounting a TRAN unit inside the panel and utilizing the remote display in the panel door.
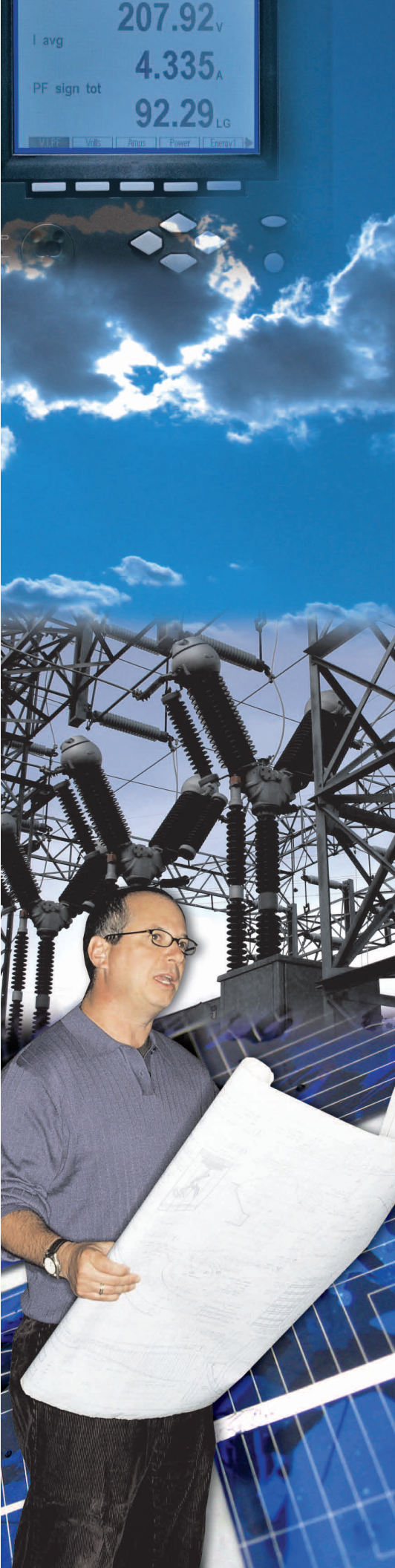
Intelligent metering and control devices

Used at key distribution points and sensitive loads, the Schneider Electric PowerLogic ION7550 and ION7650 meters offer unmatched functionality including advanced power quality analysis coupled with revenue accuracy, multiple communications options, web compatibility, and control capabilities.

Integrate these meters with our StruxureWare Power Monitoring software or share operations data with existing SCADA systems through multiple communication channels and protocols.

Typical applications

### For infrastructure, industrials and buildings

☐ Energy savings

  ☐ Measure efficiency, reveal opportunities and verify savings

  ☐ Reduce peak demand surcharges

  ☐ Reduce power factor penalties

  ☐ Strengthen rate negotiation with energy suppliers

  ☐ Enable participation in load curtailment programs (e.g. demand response)

  ☐ Identify billing discrepancies

  ☐ Leverage existing infrastructure capacity and avoid over-building

  ☐ Support proactive maintenance to prolong asset life

☐ Energy availability and reliability

  ☐ Validate that power quality complies with the energy contract

  ☐ Verify the reliable operation of equipment

  ☐ Improve response to power quality-related problems

For electric utilities

☐ Energy availability and reliability

  ☐ Improve T&D network reliability

  ☐ Enhance substation automation to reduce field service time

  ☐ Maximise the use of existing infrastructure

☐ Revenue metering and power quality

  ☐ Install new high-accuracy metering at all interchange points

  ☐ Improve or verify metering accuracy at existing interchange points

  ☐ Verify compliance with new power quality standards

  ☐ Analyse and isolate the source of power quality problems
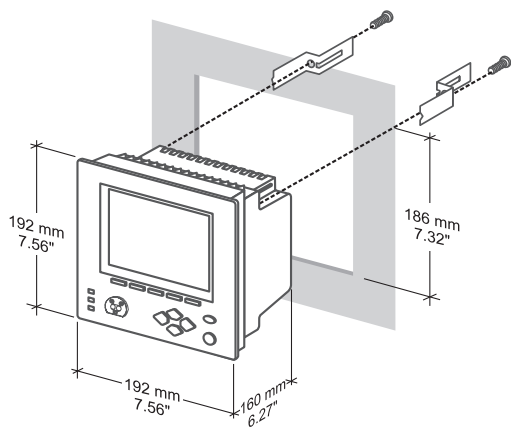
Meter installation showing rear mounting clips
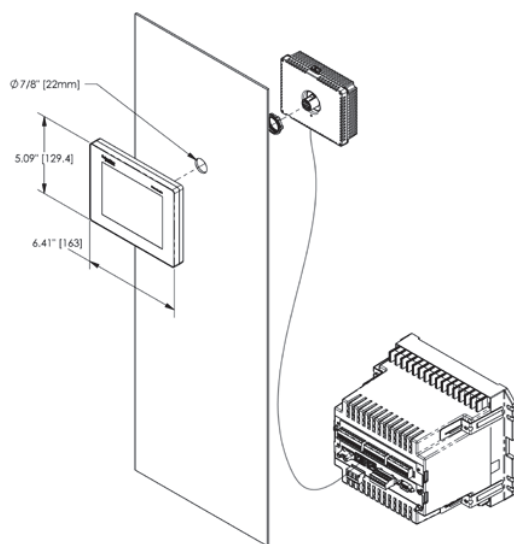
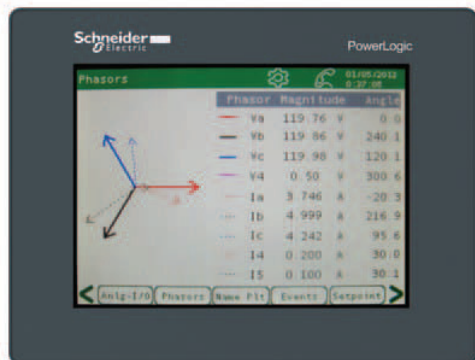Remote display installation in panel door

Installation

Circuit and control power connections include 4-wire Wye, 3-wire Wye, 3-wire Delta, Direct Delta and single phase systems. Voltage inputs include 3 phase, one reference (neutral), and one auxiliary. Three current phase inputs are provided, as well as two auxiliary inputs for neutral and ground current measurement.

Input(s)	Specifications
Voltage inputs	
Nominal full scale:	347 direct V ac line-to-neutral, 600 V ac direct line-to-line, rms
Overload	1500 V ac rms continuous
Input impedance	5 MΩ per phase (phase-Vref)
Fault capture	1200 Vpeak
Current inputs	
Nominal current	5 A, 10 A, and/or 20 A (1 A, 2 A, 5 A optional current range)
Max voltage	600 V rms (CAT III IEC 61010-1)
Withstand	2500 V ac, 60 Hz for 1 minute
Load/burden	0.05 VA per phase (at 5 A standard)
	0.015 VA per phase (at 1 A optional)
Impedance	0.002 Ω per phase (phase-Vref)
	0.015 Ω (optional current range)
Control power	
Operating range	Standard: 85 to 240 V ac (+/-10%), 47 to 63 Hz; 110 to 300 V dc (+/-10%); burden: typical 15 VA, max 35 VA
	Optional: low voltage dc power supply; rated inputs: 20 to 60 V dc (+/- 10%); burden: typical 12 VA, max 18 VA
Optional meter current probe inputs	
Nominal input	1 V rms
Overload	5.5 V (CAT I IEC 61010-1)
Impedance	220 kΩ max.
Current probe options	Meter supplied with current probe inputs configured for use with standard 0-1 V ac current probes. Probes sold separately. Accuracy depends on probe specs
	Meter supplied with current probe inputs and 3 calibrated Universal Technic 10A clamp-on CTs, meeting IEC 61036 accuracy

PowerLogic colour-touchscreen remote display

Front panel & remote display

Use for display and configuration purposes. Both the integrated LCD display and colour touchscreen remote display allow quick, secure access to basic meter configuration screens for numeric and time-stamped values, frequency spectrum (harmonics), phasor display, trend logs, and name plate data.

Each display is capable of automatically scrolling through display screens that present at-a-glance volts, amps, power, energy and demand values. Screens are easily customised to suit user requirements. The alphanumeric text displays are capable of supporting international labels such as OBIS and VDEW. Multilingual operation can be user-configured for English, French, Spanish or Russian[1]. Set parameter measurements via front panel to comply with regional preferences. Modbus Master feature allows display of real-time parameters of any downstream modbus devices.
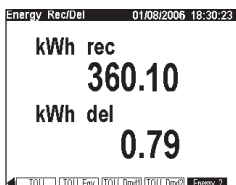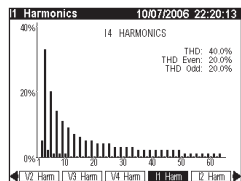
[1] Russian only available on the integrated display.
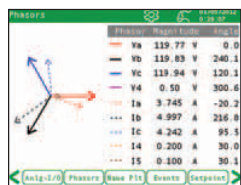
Phasor display (remote touchscreen)

Energy received/delivered display

Harmonic current display

Trend display (remote touchscreen)

# Power and energy measurements

High-accuracy 4-quadrant energy metering in accordance with IEC 62053-22 class 0,2S for both 3- and 2-element systems. Real, bidirectional, reactive, and apparent values. Fully programmable integrating period (1, 5, 10, 15, 30, 60 minutes or other).

Supports block, rolling block, and predicted demand calculations such as: kW, kvar and kVA demand, min/max; Volts and Amps demand, min/max; Cumulative demand; Demand on any instantaneous measurement.

Parameter	Accuracy 1 (%reading)
Voltage (line-line, line-neutral): per phase, min/max, unbalance	0.1%
Frequency: present, min/max	±0.005 Hz
Current (I1, I2, I3)	0.1%
Current (I4, I5)	0.4%
Power: real (kW), reactive (kvar), apparent (kVA), per-phase, total Power demand: kW, kvar, kVA	IEC 62053-22 class 0,2S [2]
Energy: real (kWh), reactive (kvarh), apparent (kVAh), rec/del	IEC 62053-22 class 0,2S [2]
Power Factor (at unity PF)	0.2%

[1] Refer to User's Manual for valid measurement ranges
[2] Refer to Compliance section. Not applicable for NICT meters, contact factory for measurement specifications
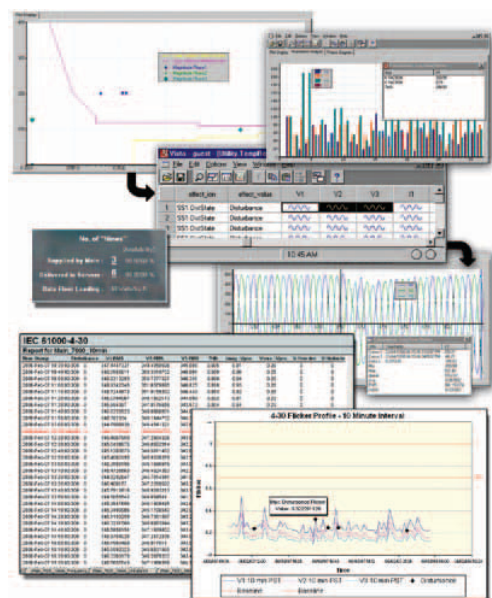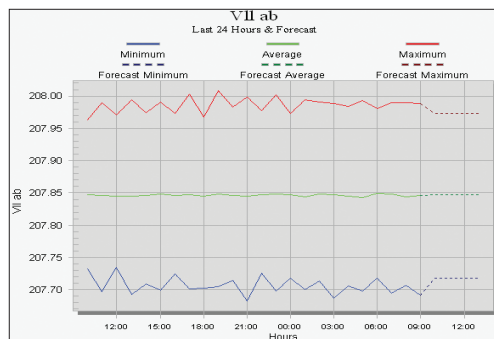

Example screen from PowerLogic ION Enterprise software showing continuous, wide-area monitoring, data capture and reporting for power quality and reliability conditions.

Power quality

Power quality compliance monitoring for international quality-of-supply standards plus specific data for localized and custom compliance agreements and network connection requirements.

☐ Harmonics (all models): individual harmonics up to the 63rd, K factor and total harmonics distortion (THD).

☐ Sag/Swell (all models): voltage waveforms for sags and swells (i.e. ITI/CBEMA Type 2 and Type 3 disturbances); report on each disturbance's magnitude and duration. Detect sub-disturbances during a sag/swell event.

☐ Disturbance direction detection (all models): analyse disturbance information to determine the direction of the disturbance relative to the meter. Results are provided in the event log, along with timestamp and the level of certainty of disturbance direction.

☐ EN50160 (ION7650 with EN50160 ordering option only): monitor compliance with EN50160 parameters.

☐ IEC 61000-4-30 Class A ed. 2 (ION7650 only): monitor compliance of relevant parameters such as power frequency, magnitude of supply voltage, flicker, supply voltage sags and swells, transients and voltage interruptions. Create compliance reports using PowerLogic ION Enterprise software.

☐ Transient (ION7650 only): voltage waveforms of transient activity (i.e., ITI/CBEMA Type 1 disturbances).

☐ COMTRADE waveform format: records are available directly from the meter via the FTP server (meters with Ethernet port option only)

VII ab
Last 24 Hours & Forecast

Minimum | Average | Maximum
Forecast Minimum | Forecast Average | Forecast Maximum

Trending and forecasting, as viewed from PowerLogic ION7650 web page.

	ION7550		ION7650	
	500 events	500 events	500 events	500 Events
Data[A]	1.5 years	3.1 years	1.3 years	2.9 years
Waveforms	180[B]	180[B]	360[C]	360[C]

A: 16 parameters recorded every 15 minutes
B: 30 waveforms on 6 channels at the maximum sampling rate
C: 30 waveforms on 12 channels with any selectable format (for example, 6 channels are 512 samples per cycle for 4 cycles, and 6 channels are 32 samples per cycle for 54 cycles)
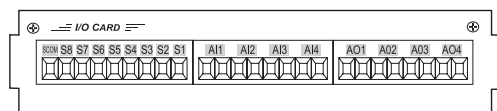
Top view of optional I/O card installed, showing connectors for digital inputs, analog inputs and analog outputs.

Data and event logging

Ships with a comprehensive data-logging configuration. Data is prioritized and stored onboard in nonvolatile memory to eliminate data gaps in the event of outages or server downtime. Retrieved data is stored in an ODBC-compliant database when using PowerLogic ION Enterprise. Trending and forecasting capabilities track specified quantities over time and forecast the value of future quantities. View trending and forecasting data through the meter's web pages. Logging capacity is available in 5 MB or 10 MB configurations. Default depth and interval of logging is set at the factory and depends upon onboard memory size.

☐ Revenue log: configured for use with UTS MV-90 billing software. Logs kWh delivered interval, kWh received interval, kvarh delivered interval, kVARh received interval values.

☐ Historic logs: record standard power system quantities, such as phase current, phase voltage and power factor.

☐ Report Generator log: configured to provide power system data for PowerLogic ION Enterprise software.

☐ Event log

☐ Trend display logs

Multiple tariffs and time-of-use (TOU) calculations

20-year calendar with automatic leap-year and seasonal time adjustments and clock synchronization over communications channel or GPS. TOU is configured four seasons, five daily profiles per season, four tariff periods per daily profile. Automatic mid-season rate change. Active, reactive, and apparent energy and demand; automatic recording of maximum (peak) demand during each tariff period.

Inputs and outputs

All models provide digital inputs as well as Form C (mechanical relays) and Form A (solid state relays) digital outputs. Optional digital and analog I/O is also available.

Digital output relays respond to internal alarms, external digital input status changes, or commands over communications. Use digital inputs to trigger alarms or logging, synchronize to a demand pulse or control conditional energy accumulation.
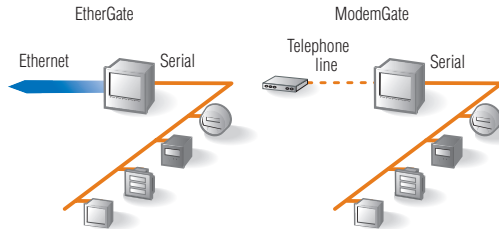
Type	Input / output	Specifications
Electro-mechanical relays	3 Form C relays: R1 - R3 Form C contacts: NO, K, NC	250 V ac / 30 V dc, max. voltage: 380 V ac / 125 V dc. Turn-on time: 15 ms max; Turn-off time: 5 ms max. Update rate: 1/2-cycle or 1 second
Solid state relays	4 Form A digital outputs: D1-D4[1]	Maximum voltage: 30 V dc; maximum current: 80 mA; isolation: optical; update rate: 1/2-cycle or 1 second
Analog (option)	4 inputs: AI1 to AI4	Signal type: dc current; range: 0 to 20 mA (scalable 4 to 20), or 0 to 1 mA; accuracy: +/- 0.3% of full scale; update rate: 1 second
	4 outputs: AO1 to AO4	Signal type: dc current; range: 0 to 20 mA (scalable 4 to 20) or -1 to 1 mA (scalable 0 to 1); update rate: ½ cycle or 1 second
Digital	8 inputs: S1 - S8	Self-excited (using SCOM output), dry contact sensing, no external voltage required. Min pulse width: 1 ms; max pulse rate: 20 pulses/sec. Timing resolution: 1 ms; update rate: ½ cycle (after timing resolution); isolation: 300 V peak; max rated voltage 120 V dc (external excitation)
	8 inputs (option): DI1 - DI8	Self excited (internal 30 V dc supply); dry contact sensing, or with external excitation 1.3 to 0.1 mm2 (16 to 28 AWG); min pulse width: 20 ms; max pulse rate: 25 pulses per second; update rate: ½ cycle (after timing resolution)

Communications

Multiple communication ports that operate simultaneously allow the meters to be used as part of a power and energy management system and to interface with other automation systems. Upload waveforms, alarms, billing data, and more to software for viewing and analysis.

Port	Specifications
Serial RS-232/RS-485 port (COM 1)	Protocols include ION, Modbus RTU, Modbus Master, DNP 3.0, GPS, EtherGate, ModemGate. Data rates: 300 to 115,200 bps. Duplex: Full (RS-232), Half (RS-485). Max length RS-232: 15.2 m (50 ft), RS-485: 1219 m (4000 ft) total for entire bus.
Serial RS-485 port (COM 2)	Protocols include ION, Modbus RTU, Modbus Master, DNP 3.0, GPS, EtherGate, ModemGate. Max length 1219 m (4000 ft) total for entire bus. Data rates: 300 to 115,200 bps. Duplex: Half
Internal modem (COM 3)	Data rates: 300 bps to 56 kbps (V.3.4, V.32 bis, V.32, V.22 bis, V.22 A/B, V.23, V.21, Bell 212A, Bell 103). Supports automatic data rate detection. RJ-11 interface. Approvals: FCC P68 (USA), Industry Canada CS-03. Also approved for use in: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK.
ANSI C12.18 type II optical port (COM 4)	Protocols include ION, DNP 3.0, Modbus RTU. Data rates: 1200 to 19,200 bps. Duplex: half.
Ethernet port	Protocols: TCP/IP, DNP TCP, ION, IEC 61850, Modbus TCP, Modbus RTU, SMTP, EtherGate. SNMP Interface: IEEE 802.3u-1995 and IEEE 802.3x-1997, ISO/IEC 8802-31993 (Ethernet).
	10BASE-T, 100BASE-TX: connectors: RJ-45, cabling: Category 5 or 6 unshielded twisted pair, max. length 100 meters (328 feet). Isolation: Transformer isolated to 1500 volts RMS. Data rates: 10/100 Mbps. Duplex: full/half.
	100BASE-FX (fibre): connectors: SC; cabling: 62.5/125 or 50/125 micrometer multimode fibre optic. Max. length 2000 m (6562 ft) full duplex, 400 m (1312 ft) half duplex. Data rates: 100 Mbps.

Software integration

Integrate within PowerLogic facility-level or enterprise-wide power and energy management systems. Real-time data and data logs stored onboard can be automatically retrieved on a scheduled basis for analysis at the system level. Compatible with StruxureWare Power Monitoring software and PowerLogic ION Setup. Modbus compatibility and register-based logged data supports integration and data access by building automation, SCADA and other third-party systems. Add value to your SCADA system by ntegrating high-accuracy readings using the IEC 61850 protocol.

Special features

Flash-based firmware allows upgrades via communications without removing the meter from the site.
Simply download the latest firmware from www.schneider-electric.com.com.

General specifications

Description	Specifications
Safety/construction	IEC 1010-1 (EN61010-1); CSA C22.2 No 1010-1; UL 61010B-1 Electromagnetic Immunity; IEEE C.37-90.1-1989;EN50082-2
Dielectric withstand	2500 VAC RMS at 60 Hz for 60 s
Installation category	III (2000m above sea level)
Electromagnetic compatibility	IEC 61000-4-2 (EN61000-4-2/IEC 8012); IEC 61000-4-3 (EN61000-4-3/IEC 801-3) Radiated EM Field Immunity
	IEC 61000-4-4 (EN61000-4-4/IEC 801-4) Electric Fast Transient; IEC 61000-4-5 (EN61000-4-5/IEC 801-5) Surge Immunity
	IEC 61000-4-6 (EN61000-4-6/IEC 801-6) Conducted Immunity; IEC 61000-3-2 (EN61000-3-2); IEC 61000-3-3 (EN61000-3-3)
	FCC Part 15 Subpart B, Class A Digital Device; EN55011 (CISPR 11); EN55022 (CISPR 22); EN61000-6-4 (EN50081-2)
Environmental conditions	Operating temperature: -20° C to +70° C (-4° F to 158° F), no formation of ice
	Low Voltage DC Power Supply: -20° C to 50° C (-4° F 122° F)
	Storage: -40° C to +85° C (-40° F to 185° F)
	Humidity: 5% to 95% non-condensing

Features	ION7550	ION7650
Metering		
Power, energy and demand	■	■
Power quality		
Sag/swell, harmonics monitoring	■	■
Harmonics: individual, even, odd, up to	63rd	63rd
Harmonics: magnitude, phase and inter-harmonics		50th
Symmetrical components: zero, positive, negative	■	■
Recording compliant with IEC 61000-4-30 Class A ed. 2		■
IEC61000-4-15 flicker		■
EN50160 compliance checking		■
Transient detection, microseconds (20µs for 50Hz, 17µs for 60Hz)		20/17
Sampling rate, maximum samples per cycle	256	1024
Disturbance direction detection	■	■
Logging and recording		
Memory standard/optional	5 MB/10 MB	5 MB/10 MB
Min/max, historical, waveform logging	■	■
Timestamp resolution in seconds	0.001	0.001
Historical trend information via front panel display	■	■
GPS time synchronization	■	■
Communications and I/O		
RS-232/485; RS-485; Ethernet; Optical	■	■
Internal modem	1	1
3-port DNP 3.0 via serial, modem, Ethernet, I/R ports	■	■
Modbus RTU slave/master; Modbus TCP	■	■
IEC 61850	■	■
EtherGate, ModemGate, MeterM@il, WebMeter	■	■
Analog inputs/outputs (optional)	4/4	4/4
Digital status inputs/outputs	16/4	16/4
Relay outputs (standard)	3	3
Setpoints, alarming, and control		
Setpoints, number/minimum response time	65/$^{1/2}$-cycle	65/$^{1/2}$-cycle
Math, logic, trig, log, linearization formulas	■	■
Call-out on single & multi-condition alarms	■	■

DIGITAL POWER METER 20SJ

PSL. CLASS A
IEC 61000-4-30 Edition 1.
230V 50/60 Hz

ISO 9001
QMI-SAI Global
File# 002188

Please contact your local sales representative for ordering information.

Visit www.schneider-electric.com for more information on other PowerLogic products, applications and system solutions.

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