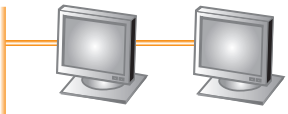
Gain energy insight and control with PowerLogic™

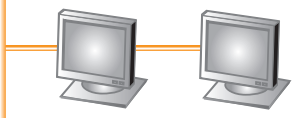
PowerLogic ION8600

energy and power quality meter

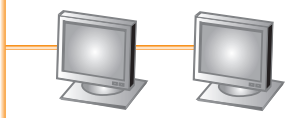
Schneider Electric



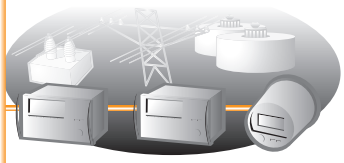
Financial management including accounting and billing



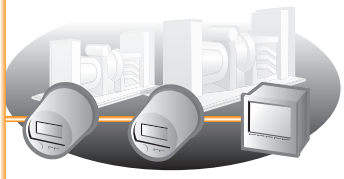
Facility and energy management



Operations management including engineering, planning and maintenance

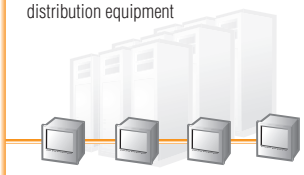


Power generation, transmission and distribution

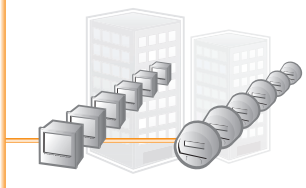


Service entrances and onsite generation

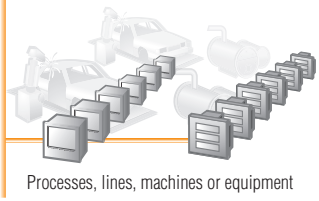
Power mitigation and main power distribution equipment



PDUs and data servers



Tenants, departments or subcontractors



Processes, lines, machines or equipment

Integrated network comprising corporate intranet, Internet, serial, dial- up or wireless connections

Typical uses within a PowerLogic power and energy management system

Features

Multiple socket and switchboard form factors

Meter is available in socket or switchboard form factors. The FT21 switchboard case option provides all the benefits of the socket meters in a compact, switchboard mount, draw-out configuration. A quick disconnect system enables removal of the meter electronics in one easy action without having to manually disconnect wires, including I/O wiring.

High accuracy measurement

Meets stringent ANSI C12.20 Class 0.2 and IEC 62053-22 Class 0,2S measurement accuracy standards. One second loss calculation and error correction capabilities establish system losses and correct for measurement errors in real time.

Power quality compliance monitoring

Measure compliance to the following international quality-of-supply standards:

- EN50160, IEEE 519, IEEE 1159, ITI (CBEMA)

Trust the quality of the results because compliance calculations are based on the following international measurement standards:

- IEC 61000-4-7, IEC 61000-4-15

Power quality analysis

Digital fault-recording capabilities simultaneously capture voltage and current channels for sub-cycle disturbance transients as well as multi-cycle sags/dips, swells and outages.

Complete communications: Fibre - Ethernet - Serial - Modem

Gateway functionality simplifies communications architecture and reduces leased line or connection costs. Concurrent, independent ports communicate with a variety of protocols such as ION, DNP 3.0, Modbus RTU, Modbus TCP, Modbus Master (serial, TCP) and MV-90.

Transformer/line loss compensation

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

Multi-user, multi-level security

Control and customise access to sensitive data for up to 16 users. Password protection and anti-tamper seal protection enhance meter security. Advanced security functions for automatic detection, recording and annunciation of:

- PT or CT phase loss due to transformer wiring tampering or transformer failure
- PT or CT phase reversal tampering or installation error
- Peak demand register resets
- Meter power up/down

Patented ION™ technology

Modular, flexible architecture that offers extensive user programmability. Uniquely addresses complex monitoring and control applications. Adapts to changing needs and new applications.

Intelligent metering and control device

Providing high accuracy metering with a wide range of capabilities, the PowerLogic ION8600 meter is the most advanced socket-based energy and power quality meter. Used to monitor network inter-ties, substations, and service entrances, the PowerLogic ION8600 meter is ideal for applications that need to accurately measure energy bidirectionally in all four quadrants.

These meters give utilities the tools to manage complex energy supply contracts that include commitments to power quality. Integrate them with PowerLogic ION Enterprise™ software, or other energy management and SCADA systems, through multiple communication channels and protocols.

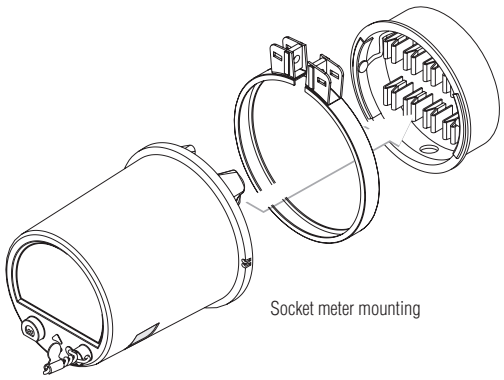
Typical applications

For infrastructure, industrials and buildings

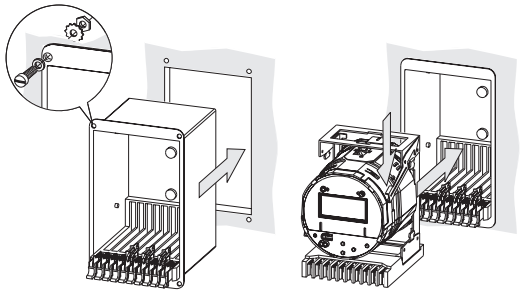
- Energy savings
  - Measure efficiency, reveal opportunities and verify savings
  - Strengthen rate negotiation with energy suppliers
  - Enable participation in load curtailment programs (e.g. demand response)
  - Identify billing discrepancies
- Energy availability and reliability
  - Validate that power quality complies with the energy contract
  - Improve response to power quality-related problems

For electric utilities

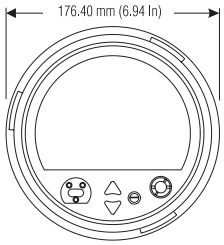
- Revenue metering and power quality
  - Install high-accuracy metering at all interchange points
  - Improve or verify metering accuracy at existing interchange points
  - Help customers manage costs using value-added billing data
  - Enable customer participation in load reduction programs
  - Verify compliance with new power quality standards
  - Analyse and isolate the source of power quality problems
- Energy availability and reliability
  - Improve T&D network reliability
  - Enhance substation automation to reduce field service time
  - Maximise the use of existing infrastructure



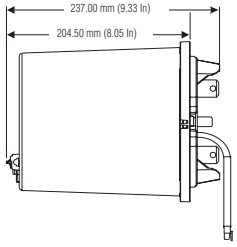
Socket meter mounting



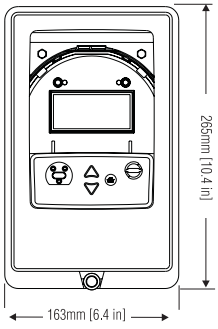
Switchboard meter mounting



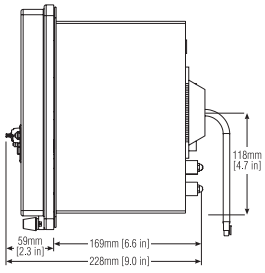
Socket meter (front view)



Socket meter (side view)



Switchboard meter (front view)



Switchboard meter (side view)

Installation

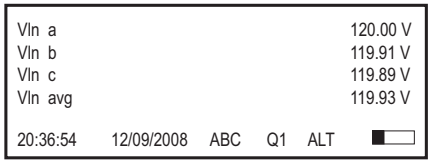
Mounting options

Meter is available in socket or switchboard form factors. Socket meters fit S-Base meter sockets and A-to-S Base adapters; supported Form factors include 9S, 35S, 36S, 39S, and 76S. Switchboard meters eliminate need for shorting blocks; they may be ordered with an optional breakout panel that provides easy access to on-board I/O and communications connections.

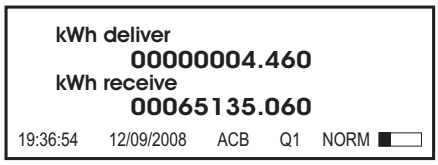
Circuit and control power connections

Meter has 3 voltage and 3 current inputs (optional 4th current input) compatible with 4-wire Wye, 3-wire Wye, 3-wire Delta, and single-phase systems. Direct connect ANSI socket mount 9S, 39S, 36S and 76S systems up to 277 V ac line-to-neutral, or a 35S system up to 480 V ac line-to-line. Meter can be powered by the voltage source being monitored or from an auxiliary power pigtail.

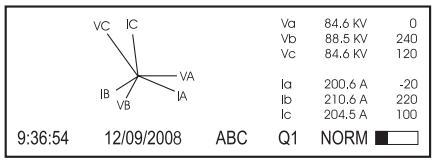
Input	Specification
Voltage: Va, Vb, Vc, Vref (9S/39S) Vab, Vcb, Vref (35S) Va, Vc, Vref (36S/76S)	Form 9S/36S/39S/76S steady state: Standard 57-277 (±15%) V L-N rms; Form 9S/36S/39S/76S overload: Standard power supply 120-277 (± 20%) V L-N rms, Low Voltage power supply 57.7-69.3 (± 20%) V L-N rms; Form 35S steady state: 120-480 (±15%) V L-L rms; Form 35S overload: 120-480 (±20%) V L-L rms; Dielectric withstand: 2500 V rms, 60 Hz for 1 min. (ANSI C12.1-1995/C12.16-1991/C12.20-1998); Surge withstand: 6kV peak (1.2/50 µs) voltage surge L-L and L-GND (IEC 255-4) ANSI/IEEE C37.90.1-1989 SWC and Fast Transient Common and transverse modes. ANSI C62.41; Impedance: 5M Ω/phase (phase-Vref)
Current: Standard (IEC 5 A & 10 A; ANSI current class 10 & 20)	Accuracy range 0.005 A to 20 A autoranging; Rated nominals: 5 A and/or 10 A; Starting current: 0.005 A rms; Fault capture: 50 A (instantaneous) peak; Overload: 500 A rms for 1 second, non-recurring; Dielectric withstand: 2500 V ac, 60 Hz for 1 minute; Burden (switchboard): 0.20 VA per phase (at 5 A); Burden (socket): 0.05 VA per phase (at 5 A); Impedance: 0.002 Ω/phase (phase-Vref)
Current: Optional (IEC 1 A to 10 A; ANSI current class 2 &10)	Accuracy range 0.001 A to 10 A autoranging; Rated nominals: 1 A, 2 A an 5 A; Starting current: 0.001 A rms; Fault capture: 24 A (instantaneous) peak; Overload: 200 A rms for 1 second, non-recurring; Dielectric withstand: 2500 V ac, 60 Hz for 1 minute; Burden: 0.015 VA per phase (at 1 A); Impedance: 0.015 Ω
Control power: Standard power supply	Rated inputs: 120-277 V ac; Type: 3-phase powered from voltage sensing inputs; Burden: max 4 W, 6.6 VA/phase; Form 9S/39S, 36S/76S: 120-277 V L-N rms (-15%/+20%) 47-63 Hz; Form 35S: 120-480 V L-N rms (-15%/+20%) 47-63 Hz; Dielectric withstand: 2500 V ac rms, 60 Hz for 1 min.; Ride-through: min100 ms (6 cycles at 60 Hz at 96 V ac), 200 ms (12 cycles at 60 Hz at 120 V ac), 800 ms (48 cycles at 60 Hz at 240 V ac); Surge withstand: 6 kV/0.5 kA peak (100 kHz Ring Wave) ANSI C62.41 6 kV/3 kA peak (1.2/50-8/20 us) voltage surge L-L and L-GND ANSI C62.41
Control power: Standard low-voltage power supply	Rated inputs: 57-70 V ac; Type: 3-Phase supply, drawing off voltage inputs; Burden: Typical: 3 W, 5 VA/phase, 3-Phase operation Max: 4 W, 6.6 VA/phase, 3-phase operation; Form 9S/36S/39S/76S: 57-70 (-15%/+20%) V L-N rms, 47-63 Hz; Form 35S: unavailable; Dielectric withstand: 2500 V ac rms, 60 Hz for 1 min.; Ride-through: min 100 ms or 6 cycles 60 Hz at 46 V ac; Surge withstand: 6 kV/0.5 kA peak (100 kHz Ring Wave) — ANSI C62.41, 6 kV/3 kA peak (1.2/50-8/20 µs) voltage surge L-L and L-GND ANSI C62.41
Control power: Auxiliary power cable assembly	Rated inputs: 65-120 V ac (± 15%) L-N rms, 47-63 Hz or 80-160 V dc (± 20%); Type: 1-Phase supply, powered through external cable with grounded U-Plug; Burden: Typ. 10 VA, max 20 VA; Dielectric withstand: 2500 V ac rms, 60 Hz for 1 min.; Ride-through: min. 100 ms 6 cycles 60 Hz at 46 V ac; Surge withstand: 6 kV/0.5 kA peak (100 kHz Ring Wave) ANSI C62.41 6 kV/3 kA peak (1.2/50-8/20 us) voltage surge L-L and L-GND ANSI C62.41
Control power: Auxiliary power cable assembly	Rated inputs: 160-277 V ac (±20%) L-N rms, 47-63 Hz or 200-350 V dc (± 20%); Type: 1-Phase supply, powered through external cable with grounded U-Plug; Burden: typ. 10 VA, max 20 VA; Dielectric withstand: 2500 V ac rms, 60 Hz for 1 min.; Ride-through: min 100 ms 6 cycles, 60 Hz at 96 V ac; Surge withstand: 6 kV/0.5 kA peak (100 kHz Ring Wave) ANSI C62.41 6 kV/3 kA peak (1.2/50-8/20 µs) voltage surge L-L and L-GND ANSI C62.41



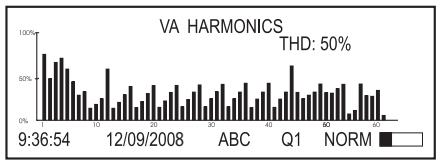
Example alphanumeric display



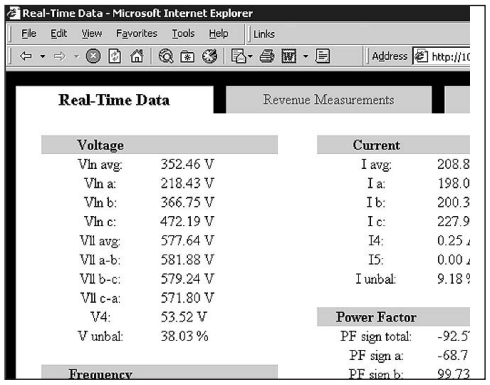
Example alphanumeric display



Example vector diagram display



Example harmonics histogram display



Built-in web server provides browser access to extensive real-time data

Front panel

View system data or configure meter settings. The bright, easy-to-read, backlit LCD screen with adjustable contrast provides easy viewing in poor lighting conditions. Multiple programmable screens display all metered data including numeric values, timestamped values, harmonics histograms, phasor diagrams and name plate data.

Navigation buttons move between display screens and aid basic setup procedures. Protected (sealable) buttons and switches provide access for advanced meter configuration, such as meter resets. An ANSI Type II optical serial port facilitates infrared communication with the device. Two LED pulse indicators with corresponding infrared pulsers are preconfigured for energy pulsing.

Power and energy measurements

High-accuracy (1-second), high-speed (1/2-cycle) true RMS 3-phase operational measurements for each phase (per phase) and all phases (total).

Parameter	Accuracy 1 (% reading)
Voltage (line-line) (line-neutral): per phase, total, min/max, unbalance, phase reversal	0,1 %
Current (I1, I2, I3, I4): per phase, total, neutral (39S, 76S), min/max, unbalance phase reversal Current demand[2]: present, min/max, predicted	0,1 %
Power: real (kW),reactive (kvar), apparent (kVA), per phase, total Power demand[2]: present, min/max, predicted	0,2 %
Energy: real (kWh), reactive (kvarh), apparent (kVAh), bidirectional, net, total, volt-hours, amp-hours and KQ-hours	ANSI C12.20 class 0,2 IEC 62053-22/23 (0,2S)[1]
Power factor: per phase, total	0,5 %
Frequency V1,V2,V3 (47-63 Hz): per phase, total	0,005 Hz
Crest factor current channels	1 %[3]

1 - Energy metering accurate to IEC 62053-22/23 0,2S; ANSI C12.20-1998 American National Standard for Electricity Meters 0.2 and 0.5 Accuracy Classes, for current Classes 2, 10 and 20.
2 - Selectable block, sliding, or thermal (exponential) demand calculations
3 - Fundamental >= 5 % nominal

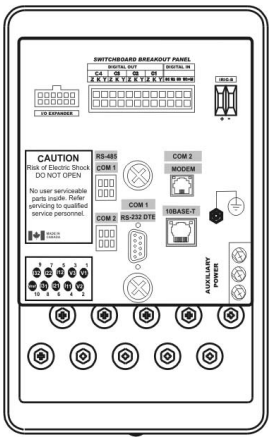
Power quality

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

Analyse problems and avoid interruptions. Detect, record and report the specifics of voltage or current imbalances and loss, frequency/power factor variations, over- and under-voltages.

- Sags/swells (all models): Monitor 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.
- Harmonics (all models): Individual harmonics up to the 63rd, K factor and Total Harmonics Distortion (THD).
- Harmonics (ION8600A): Voltage and current magnitude, phase and inter-harmonics in accordance with IEC 61000-4-7 (up to the 40th).
- Transient capture (ION8600A): Monitor voltage waveforms for transient activity (i.e. ITI (CBEMA) Type 1 disturbances) to 65 µs at 60 Hz (78 µs at 50 Hz).
- Waveform capture (ION8600A): Selectable waveform recording resolution from 16 samples/cycle to 256 samples/cycle (800 Hz to 51 kHz). Back-to-back waveform recording allows for extended captures.
- EN50160, IEEE 519 and IEEE 1159 (ION8600A): Monitor compliance with parameters for these international quality-of-supply standards.

Optional I/O Expander



Optional switchboard breakout panel

Digital and analogue inputs and outputs

Onboard meter I/O includes four Form C digital outputs and three Form A digital inputs for a variety of applications, such as energy pulsing, control, energy counting, status monitoring, and analogue interface to SCADA.

Optional I/O Expander

The I/O Expander equips an ION meter with 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. The I/O Expander also provides a convenient location for the meter's RS-232 and RS-485 communications wiring. Meter operation remains unaffected during installation and configuration of the I/O Expander.

Input / output	Specification
Digital inputs: (S1 - S8)	Excitation: SCOM self-excited, dry contact sensing, no external voltage required; Minimum pulse width: 20 ms; Maximum input transition rate: 50 transitions/sec.; Scan time: 20 ms; Timing resolution: 1 ms with 2 ms accuracy; Isolation: 1000 V rms, 60 Hz 1 minute to meter; 3 additional internal inputs available through optional on-board I/O
Solid state outputs: (C-1, C-2, C-3, C-4)	Max load voltage: 130 V ac / 200 V dc; Max load current: 100 mA; On resistance: 30 Ω (typical), 50 Ω (max); Off resistance: 400 M Ω (min); Isolation: 3750 V RMS, 60 Hz for 1 minute to meter, 1000 V RMS, 60 Hz for 1 minute (between outputs); Update rate: 20 ms; Max output transition rate: 50 transitions/s; 4 additional internal Form C outputs available through optional I/O Expander (A-1, A-2, A-3, A-4), (Form A) supported through I/O Expander
Analogue outputs	4 analogue outputs supported through I/O Expander; Output range: 0 to 20 mA (scaleable from 4 to 20 mA) or -1 to +1 mA (scaleable from 0 to 1 mA); Max. load: 500 Ω (0 to 20 mA), 10 K Ω (-1 to +1mA); Isolation: 3750 V RMS, 60 Hz for 1 minute to meter 2000 V RMS, 60 Hz for 1 minute; Accuracy: +/- 0.3% (% of Reading) at 23° C; Accuracy drift: 100 ppm/° K; Update rate: 1 second

	Feature Set A	Feature Set B	Feature Set C
Memory	10 MB	4 MB	2 MB
Event	500 Events	500 Events	500 Events
Data	1yr[1] 4yrs[2] 280 days[1] 3 yrs[2]	0.5 yr[1] 2 yrs[2]	85 days[1] 340 days[2]
Waveforms	6[3] 6[3] 24[4] 24[4]	-	-

1 - 16 parameters recorded every 15 minutes
2 - 16 parameters recorded hourly
3 - on each of 6 channels at 256 samples per cycle for 14 cycles
4 - on each of 6 channels at 16 samples per cycle for 96 cycles

Data and event logging

Ships with a comprehensive data-logging configuration. Data is prioritised and stored onboard in non-volatile memory to eliminate data gaps in the event of outages or server downtime. Dial-out capability when memory is near full; data push capability through SMTP (email). Retrieved data is stored in an ODBC-compliant database when using PowerLogic ION Enterprise software. Logging capacity is available in 2 MB, 4 MB and 10 MB configurations.

Meter has data recorders for revenue, losses, historic data, harmonics, waveforms, power system data, sags/swells, transients, and event parameters.

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

20-year calendar with automatic leap-year and seasonal adjustments and clock synchronisation over communications channel or GPS supports active, reactive, and apparent energy and demand. TOU configured for 4 seasons, 5 daily profiles per season, and 4 rate periods per daily profile. Automatic mid-season rate change. Automatic recording of maximum (peak) demand during each tariff period.

IRIG-B time synchronisation option

IRIG-B is the industry standard for GPS time synchronisation. IRIG-B applications include power quality monitoring and sequence of events recording, highly accurate timestamping for revenue billing (1 ms), and system stability monitoring.

Alarm and control

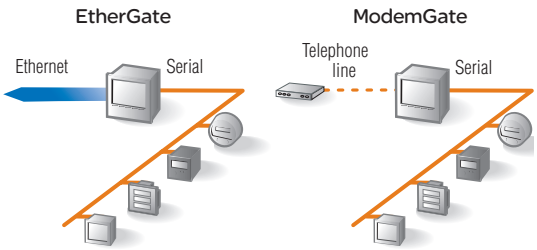
Each meter has 65 setpoints configurable for 1-second or ½ -cycle operation. Setpoint on any parameter or condition. Use them to trigger audible and visible alarms, data logging, waveform recording, relays, and other control and reset functions.

EtherGate and ModemGate

The meters can provide gateway functionality depending on communication options.

EtherGate: provides access via Modbus TCP through the meter's Ethernet port to devices communicating via Modbus connected to the meter's serial ports.

ModemGate: provides access from the telephone network to devices connected to the meter's serial ports.



Internet connectivity

Exchange information using XML to integrate with custom reporting, spreadsheet, database, and other applications.

WebMeter: an on-board web server, provides access to real-time values and PQ data through any web-enabled device and even supports basic meter configuration tasks.

MeterM@il: automatically emails user-configured, high-priority alarm notifications or scheduled system-status update messages to anyone, anywhere within the facility or around the world.

Communications

The meters offer multi-port access that provides secure, simultaneous data sharing with utility systems and customers directly at the hardware level using a choice of communication standards and protocols.

Port	Specification
RS-232 / RS-485 (COM 1)	Data rates: 300 – 115,200 bps (RS-485 limited to 57,600 bps); Isolation: Optical; Duplex: Full (RS-232), Half (RS-485); Protocols: ION, Modbus RTU, Modbus Master,DNP 3.0, GPS, EtherGate, ModemGate
RS-485 (COM 2)[1]	Data rates: 300 – 57,600 bps; Isolation: Optical; Duplex: Half; Protocols: ION, Modbus RTU, Modbus Master, DNP 3.0, GPS, EtherGate, ModemGate
Internal modem (COM 2)[2]	Data rate: 300 bps - 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), automatic data rate detection is supported; Error correction: V.42 LAPM, MNP 2-4, MNP 10; Data compression: V.42 bis/MNP 5; Interface: RJ11 (tip and ring); Approvals[3]: FCC P68 (USA), Industry Canada CS-03
ANSI Type 2 optical (COM 3)	Data rates: 1200 - 19,200 bps; Duplex: Half; Protocols: ION, DNP 3.0, Modbus RTU
Ethernet (10BASE-T)	Interface: IEEE 802.3-1993, ISO/IEC 8802-31993 (Ethernet) 10BASE-T; Data rates:10 Mbps, half duplex; Connectors: RJ45; Cabling: Unshielded twisted-pair cable, 0.5 mm (24 AWG) max length 100 metres (109 yards); Isolation: Transformer isolated; min isolation voltage 1500 V ac /2250 V dc; Protocols: Telnet, ION, Modbus TCP, DNP TCP, Modbus Master
Ethernet (10BASE-FL)	Interface: IEEE 802.3-1993, ISO/IEC 8802-31993 (Ethernet) 10BASE-FL (optional); Data rates:10 Mbps, half duplex; Connectors: ST; Cabling: Fiber optic cable, 62.5/125 µm nominal, wavelength 820 nm max length 2000 metres (2,187 yards); Isoloation: Optical; Protocols: Telnet, ION, Modbus TCP, DNP TCP, Modbus Master

1 - If the modem is present, COM 2 serial port is unavailable.
2 - In Feature Set C, if Ethernet and modem options are chosen, no serial port is available.
3 - Also approved for use in: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK

Itron software support

The meters are fully compatible with Itron software platforms including MV-90, MVP, MVRS, MVLT and MVCOMM, and offer a direct Ethernet connection to MV-90.

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 PowerLogic ION Enterprise software.

Modbus compatibility and register-based logged data supports integration and data access by building automation, SCADA and other third-party systems.

Special features

Downloadable firmware: update your meters with the latest features by simply downloading them from www.powerlogic.com.

General specifications

Description	Specification
Operating range	-40° C to +85° C (no formation of ice) (-40° F to 185° F)
Display operating range	-20° C to 60° C (-4° F 140° F)
Storage range	-40° C to +85° C (-40° F to 185° F)
Relative humidity range	5% to 95% non-condensing
Safety/construction	ANSI C12.20-1998 American National Standard for Electricity Meters & IEC 62052-11
Immunity	ESD: IEC61000-4-2 (EN61000-4-2/IEC801-2); Radiated EM Field: IEC61000-4-3 (EN61000-4-3/IEC801-3); Electric Fast Transient: IEC61000-4-4 (EN61000-4-4/IEC801-4); Surge: IEC61000-4-5 (EN61000-4-5/IEC801-5); Conducted: IEC61000-4-6 (EN61000-4-6/IEC801-6); Damped oscillatory waves: IEC61000-4-12 (EN61000-4-12/IEC801-12); Surge: ANSI C62.41; ANSI/IEEE C.37-90.1-1989 Standard surge withstand capability tests for protective relays and relay systems
Emissions	FCC Part 15 Subpart B, CISPR 22 Radiated/Conducted Emissions (Class B)
Utility approvals	California ISO, ERCOT, and New York State; Industry Canada (AE-0924); MARIA Code of Practice 4 for New Zealand; Certified by Comision Federal de Electricidad and LAPEM in Mexico

Feature sets	A	B	C
Metering			
Power, energy & demand	■	■	■
Power quality			
Sag/Swell, harmonics monitoring	■	■	■
Harmonics: individual, even, odd, up to	63rd	63rd	31st
Harmonics: magnitude, phase & inter-harmonics	40th	-	-
IEC 61000-4-15 (Flicker)	■	-	-
Symmetrical components: zero, positive, negative	■	■	■
Transient detection, microseconds (50 Hz / 60 Hz)	78 / 65	-	-
Sampling rate, maximum samples per cycle	256		
Frequency accuracy	0.005 Hz		
Logging and recording			
Memory standard/optional	10 MB	4 MB	2 MB
Min/max logging for any parameter	■	■	■
Timestamp resolution in seconds	0.001		
GPS time synchronisation	■	■	■
Communications and I/O			
RS-232/485; RS-485; Ethernet; Optical; IRIG-B	■	■	■
Internal modem	1		
3-port DNP 3.0 via serial, modem, Ethernet, Optical ports	■	■	■
Modbus TCP Master / Slave (Ethernet port)	■/■	■/■	-/■
Modbus RTU Master (serial ports) / Slave (all ports)	■/■	■/■	-/■
EtherGate, ModemGate, MeterM@il, WebMeter	■	■	■
Internal KYZ outputs / Form A inputs	4 / 3		
Ext. digital status inputs/counter/solid state outputs	8 / 8		
Setpoints, alarming, and control			
Setpoints, number / minimum response time	65/1/2 cycle	65/1/2 cycle	65/1 sec
Math, logic, trig, log, linearisation formulas	■	■	■
Call-out on single & multi-condition alarms	■	■	■
Revenue metering			
MV-90 on serial, modem, Ethernet ports (if present)	■	■	■
Multi-year scheduling: hourly activity profiles	■	■	■
Transformer/line loss compensation/ITC	■/■	■/■	■/■

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Prithvi Raj, Frost & Sullivan research analyst

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Visit **www.powerlogic.com** for more information on other PowerLogic products, applications and system solutions.

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