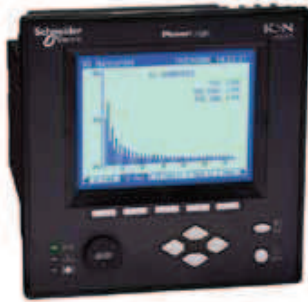


ION7550 / ION7650

Functions and characteristics



PowerLogic™ ION7650

Used at key distribution points and sensitive loads, 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. Customise metering or analysis functions at your work station, without hard wiring. Just link drag-and-drop icons or select default settings. Integrate the meters with StruxureWare Power Monitoring software or share data with SCADA systems via multiple communication channels and protocols.

Applications

- Reduce energy costs.
- Increase equipment utilisation.
- Comply with environmental and regulatory requirements.
- Improve power quality and reliability.
- Improve customer satisfaction and retention.
- Monitor and control equipment.
- Integrated utility metering.
- Allocate or sub-bill energy costs to departments, processes or tenants.

Main characteristics

Anticipate, diagnose and verify to increase efficiency

Reveal energy inefficiencies or waste and optimise equipment operation to increase efficiency. Isolate reliability risks, diagnose power-related equipment issues and verify reliable operation.

Summarise power quality, set targets, measure and verify results

Consolidate all the power quality characteristics into a single trendable index. Benchmark power quality and reliability and compare against standards, or compare facilities or processes.

Easy to use, multilingual, IEC/IEEE configureable display

Bright LCD display with adjustable contrast. Screen-based menu system to configure meter settings including IEC or IEEE notations. Multilingual support for English, French, Spanish and Russian. 12/24 hour clock support in multiple formats.

Modbus Master functionality

Read information from downstream Modbus devices and view it via the front panel or store in memory until you upload to the system level.

IEC 61850 protocol

Increase interoperability and decrease engineering time using standard protocol.

Gateway functionality

Access through the meter's Ethernet port (EtherGate) or telephone network (ModemGate) to Modbus communicating devices connected to meter serial ports.

Detect and capture transients as short as 20µs at 50Hz (17µs at 60 Hz)

Identify problems due to short disturbances, e.g. switching of capacitors, etc.

Power quality compliance monitoring

Monitor compliance with international quality-of-supply standards (IEC 61000-4-30 class A ed. 2⁽¹⁾, EN50160⁽¹⁾, IEC 61000-4-7⁽¹⁾, IEC 61000-4-15⁽¹⁾, IEEE 519, IEEE 1159, and CBEMA/ITIC). Evaluate flicker based on IEC 61000-4-15⁽¹⁾ and IEEE 1453⁽¹⁾.

Detect waveshape changes

Detection of phase switching phenomena (for example during the transfer of a high-speed static switch) not detected by classical threshold-based alarms.

Record ultra-fast electrical parameters every 100 ms or every cycle

Preventive maintenance: acquisition of a motor startup curve, etc.

Trend curves and short-term forecasting

Rapid trending and forecasting of upcoming values for better decision making.

Disturbance direction detection

Determine disturbance location and direction relative to the meter. Results captured in the event log, along with a timestamp and certainty level.

Alarm setpoint learning

The meter analyses the circuit and recommends alarm setpoints to minimise nuisance or missed alarms.

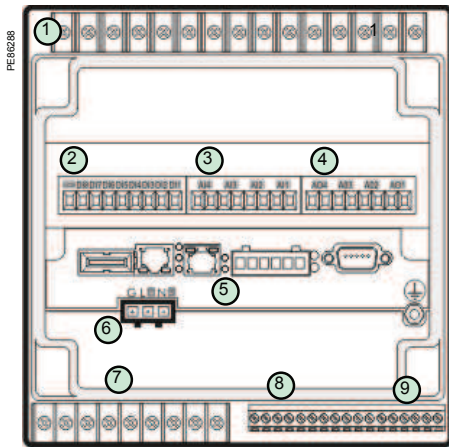
Notify alarms via email

High-priority alarms sent directly to the user's PC. Instant notification of power quality events by email.⁽¹⁾

Part numbers

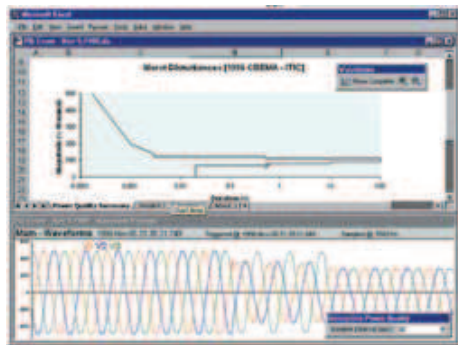
| ION7550 / ION7650 | |
|-------------------------------|----------|
| ION7550 | M7550 |
| ION7650 | M7650 |
| Remote display | M765RD |
| Remote display w/power supply | M765RDPS |

(1) ION7650 only



PowerLogic™ ION7550 / ION7650 rear view.

- 1 Current/voltage inputs
- 2 Digital inputs
- 3 Analogue inputs
- 4 Analogue outputs
- 5 Communications card
- 6 Power supply
- 7 Form C digital outputs
- 8 Digital inputs
- 9 Form A digital outputs



Disturbance waveform capture and power quality report

| Selection guide | | ION7550 | ION7650 |
|---|-------------------------|---------------|----------------------|
| General | | | |
| Use on LV and HV systems | | ■ | ■ |
| Current accuracy (1A to 5A) | | 0.1 % reading | 0.1 % reading |
| Voltage accuracy (57V to 288V) | | 0.1 % reading | 0.1 % reading |
| Energy accuracy | | 0.2 % | 0.2 % |
| Nbr of samples/cycle or sample frequency | | 256 | 1024 |
| Instantaneous rms values | | | |
| Current, voltage, frequency | | ■ | ■ |
| Active, reactive, apparent power | Total and per phase | ■ | ■ |
| Power factor | Total and per phase | ■ | ■ |
| Current measurement range (autoranging) | | 0.01 - 20A | 0.01 - 20A |
| Energy values | | | |
| Active, reactive, apparent energy | | ■ | ■ |
| Settable accumulation modes | | ■ | ■ |
| Demand values | | | |
| Current | Present and max. values | ■ | ■ |
| Active, reactive, apparent power | Present and max. values | ■ | ■ |
| Predicted active, reactive, apparent power | | ■ | ■ |
| Synchronisation of the measurement window | | ■ | ■ |
| Setting of calculation mode | Block, sliding | ■ | ■ |
| Power quality measurements | | | |
| Harmonic distortion | Current and voltage | ■ | ■ |
| Individual harmonics | Via front panel | 63 | 63 |
| | Via ION Enterprise | 127 | 511 |
| Waveform capture | | ■ | ■ |
| Detection of voltage swells and sags | | ■ | ■ |
| Detection and capture of transients | | - | 20 µs ⁽¹⁾ |
| EN50160 flicker | | - | ■ |
| Fast acquisition of 100 ms or 20 ms data | | ■ | ■ |
| EN50160 compliance checking | | - | ■ |
| Programmable (logic and math functions) | | ■ | ■ |
| Data recording | | | |
| Min/max of instantaneous values | | ■ | ■ |
| Data logs | | ■ | ■ |
| Event logs | | ■ | ■ |
| Trending/forecasting | | ■ | ■ |
| SER (Sequence of event recording) | | ■ | ■ |
| Time stamping | | ■ | ■ |
| GPS synchronisation (1 ms) | | ■ | ■ |
| Memory (in Mbytes) | | 10 | 10 |
| Display and I/O | | | |
| Front panel display | | ■ | ■ |
| Optional colour touchscreen remote display | | ■ | ■ |
| Wiring self-test | | ■ | ■ |
| Pulse output | | 1 | 1 |
| Digital or analogue inputs(max) | | 20 | 20 |
| Digital or analogue outputs (max, including pulse output) | | 12 | 12 |
| Communication | | | |
| RS 485 port | | 1 | 1 |
| RS 485 / RS 232 port | | 1 | 1 |
| Optical port | | 1 | 1 |
| Modbus protocol | | ■ | ■ |
| IEC 61850 protocol | | ■ | ■ |
| Ethernet port (Modbus/TCP/IP protocol, IEC 61850 ⁽²⁾) | | 1 | 1 |
| Ethernet gateway (EtherGate) | | 1 | 1 |
| Alarms (optional automatic alarm setting) | | ■ | ■ |
| Alarm notification via email | | ■ | ■ |
| HTML web page server (WebMeter) | | ■ | ■ |
| Internal modem | | 1 | 1 |
| Modem gateway (ModemGate) | | ■ | ■ |
| DNP 3.0 through serial, modem, and I/R ports | | ■ | ■ |

(1) For 50 Hz line frequency; 17µs for 60 Hz line frequency.

ION7550 / ION7650

Functions and characteristics (cont.)



PowerLogic ION7650

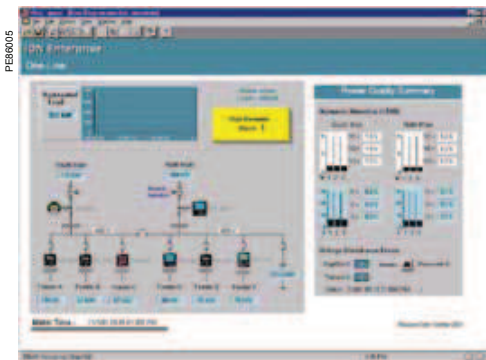
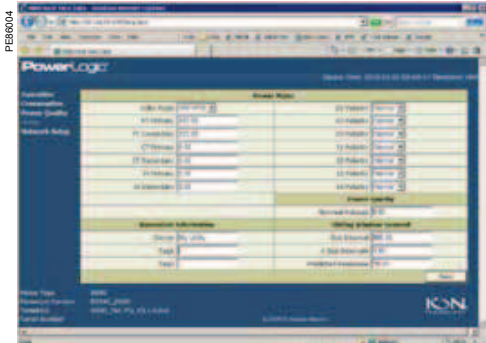
| Electrical characteristics | | |
|---|------------------------------|---|
| Type of measurement | | True rms to 1024 samples per cycle (ION7650) |
| Measurement accuracy | Current and voltage | ±0.01% of reading + ±0.025% of full scale |
| | Power | ±0.075% of reading + ±0.025% of full scale |
| | Frequency | ±0.005Hz |
| | Power factor | ±0.002 from 0.5 leading to 0.5 lagging |
| | Energy: | IEC62053-22 0,2S, 1A and 5A |
| Data update rate | | 1/2 cycle or 1 second |
| Input-voltage characteristics | Measurement range | Autoranging 57V through 347V LN / 600V LL |
| | Impedance | 5 M Ω /phase (phase - Vref) |
| | Frequency measurement range | 42 to 69Hz |
| Input-current characteristics | Rated nominal current | 1A, 2A, 5A, 10A |
| | Measurement range | 0.005 - 20 A autoranging (standard range) 0.001 - 10 A autoranging (optional range) |
| | Permissible overload | 500 A rms for 1 s, non-recurring (5A) 50 A rms for 1s, non-recurring (1A) |
| | Impedance | 0.002 Ω per phase (5A) 0.015 Ω per phase (1A) |
| | Burden | 0.05 VA per phase (5 A) 0.015 VA per phase (1 A) |
| Power supply | AC | 85-240 V AC ±10% (47-63 Hz) |
| | DC | 110-300 V DC ±10% |
| | DC low voltage (optional) | 20-60 V DC ±10% |
| | Ride-through time | 100 ms (6 cycles at 60 Hz) min. |
| | Burden | Standard: typical 20 VA, max 45 VA Low voltage DC: typical 15 VA, max 20 VA |
| Power supply for remote display | | 24 VDC, burden 6. |
| Input/outputs ⁽¹⁾ (includes Event Priority) | Standard | 8 digital inputs (120 V DC) 3 relay outputs (250 V AC / 30 V DC) 4 digital outputs (solid state) |
| | Optional | 8 additional digital inputs 4 analogue outputs, and/or 4 analogue inputs |
| Mechanical characteristics | | |
| Weight | | 1.9 kg |
| IP degree of protection (IEC 60529) | | Integrated display, front: IP 50; back: IP 30 Transducer unit (no display): IP 30; remote display: IP65 |
| Dimensions | Standard model | 192 x 192 x 159 mm |
| | TRAN model | 235.5 x 216.3 x 133.1 mm |
| Environmental conditions | | |
| Operating temperature | Standard power supply | -20 to +70 °C |
| | Low voltage DC supply | -20 to +50 °C |
| | Integral display range | -20 to +60 °C |
| | Remote display range | 0 to +50 °C |
| Storage temperature | Display, TRAN | -40 to +85 °C |
| | Remote display | -20 to +60 °C |
| Humidity rating | | 5 - 95% non-condensing, remote display 0 - 85% |
| Installation category | | III (2000m above sea level) |
| Dielectric withstand | | As per EN 61010-1, IEC 62051-22A ⁽²⁾ |
| Electromagnetic compatibility | | |
| Electrostatic discharge | | IEC 61000-4-2 |
| Immunity to radiated fields | | IEC 61000-4-3 |
| Immunity to fast transients | | IEC 61000-4-4 |
| Immunity to surges | | IEC 61000-4-5 |
| Conducted and radiated emissions | | CISPR 22 |
| Safety | | |
| Europe | | IEC 61010-1 |
| Communication | | |
| RS 232/485 port ⁽¹⁾ | | Up to 115,200 bauds (57,600 bauds for RS 485), ION, DNP 3.0, Modbus, GPS, EtherGate, ModemGate, Modbus Master |
| RS 485 port ⁽¹⁾ | | Up to 57,600 bauds, ION, DNP 3.0, Modbus, GPS, EtherGate, ModemGate, Modbus Master |
| Infrared port ⁽¹⁾ | | ANSI type 2, up to 19,200 bauds, ION, Modbus, DNP 3.0 |
| Ethernet port | | 10Base-T/100Base-TX, RJ45 connector, 100 m |
| Fibre-optic Ethernet link (8 simultaneous connections supported) | | 100 Base FX, SC duplex connector, 1300 nm, FO multimode with gradient index 62.5/125 μ m or 50/125 μ m, 2000 m link |

⁽¹⁾ Consult the ION7550 / ION7650 installation guide for complete specifications.

⁽²⁾ IEC 62051-22B with serial ports only.

ION7550 / ION7650

Functions and characteristics (cont.)



Example showing instantaneous values and alarm.

Communication (cont.)

| | |
|-------------------------|--|
| Protocol | ION, Modbus, TCP/IP, DNP 3.0, Telnet, IEC 61850 ⁽²⁾ |
| EtherGate | Communicates directly with up to 62 slave devices via available serial ports |
| ModemGate | Communicates directly with up to 31 slave devices |
| Ethernet port | 10Base-T/100Base-TX, RJ45 connector, 100 m link |
| Supported web protocols | SNMP, SMTP, FTP |
| WebMeter | 5 customisable pages, new page creation capabilities, HTML/XML compatible |

Firmware characteristics

| | |
|---------------------------------|--|
| High-speed data recording | Down to 5ms interval burst recording, stores detailed characteristics of disturbances or outages. Trigger recording by a user-defined setpoint, or from external equipment. |
| Harmonic distortion | Up to 63 rd harmonic (511 th for ION7650 via ION Enterprise software) for all voltage and current inputs |
| Sag/swell detection | Analyse severity/potential impact of sags and swells: magnitude and duration data suitable for plotting on voltage tolerance curves per phase triggers for waveform recording, control |
| 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. |
| Instantaneous | High accuracy (1s) or high-speed (1/2 cycle) measurements, including true rms per phase / total for: voltage and current active power (kW) and reactive power (kvar) apparent power (kVA) power factor and frequency voltage and current unbalance phase reversal |
| Load profiling | Channel assignments (800 channels via 50 data recorders) configurable for any measurable parameter, including historical trend recording of energy, demand, voltage, current, power quality, or any measured parameter. Trigger recorders based on time interval, calendar schedule, alarm/event condition, or manually. |
| Trend curves | Access historical data at the front panel. Display, trend and continuously update historical data with date and timestamps for up to four parameters simultaneously. |
| Waveform captures | Simultaneous capture of all voltage and current channels sub-cycle disturbance capture maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10Mbytes memory) 256 samples/cycle (ION7550) 512 samples/cycle standard, 1024 samples/cycle optional (ION7650) COMTRADE waveform format available direct from the meter (Ethernet port option only) |
| Alarms | Threshold alarms: adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm user-defined priority levels boolean combination of alarms is possible using the operators NAND, OR, NOR and XOR |
| Advanced security | Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations on user privileges |
| Transformer correction | Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs) |
| Memory | 5 to 10 Mbytes (specified at time of order) |
| Firmware update | Update via the communication ports |

Display characteristics

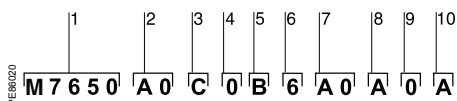
| | |
|------------------------------|------------------------------------|
| Integrated display | Back lit LCD, configurable screens |
| Remote display | Colour TFT, configurable screens |
| Integrated display languages | English, French, Spanish, Russian |
| Remote display languages | English, French, Spanish |
| Notations | IEC, IEEE |

(1) All the communication ports may be used simultaneously.

(2) Only available with 5MB memory meters.

ION7550 / ION7650

Functions and characteristics (cont.)



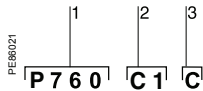
Example ION7650 product part number.

- 1 Model.
- 2 Form factor.
- 3 Current Inputs.
- 4 Voltage Inputs.
- 5 Power supply.
- 6 System frequency.
- 7 Communications.
- 8 Inputs/outputs.
- 9 Security.
- 10 Special order.

| Part numbers | | |
|--------------------|------|---|
| Item | Code | Description |
| 1 Model | | Advanced meter with wide-range voltage inputs (57-347V line-neutral or 100-600V line-line), transient detection, data and waveform recording, IEC 61000-4-30 Class A & EN50160. Supports ION, IEC 61850 (only for meters with 5MB memory and Ethernet comm card) Modbus-RTU, and DNP 3.0. |
| | | Advanced meter with wide-range voltage inputs (57-347V line-neutral or 100-600V line-line), sag/swell detection, data and waveform recording. Supports ION, IEC 61850 (only for meters with 5MB memory and Ethernet comm card) Modbus-RTU, and DNP 3.0. |
| 2 Form Factor | A0 | Integrated display with front optical port, 5 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550). |
| | A1 | <i>ION7650 only.</i> Integrated display with front optical port, 5 MB logging memory, and 1024 samples/cycle resolution. |
| | B0 | Integrated display with front optical port, 10 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550). |
| | B1 | <i>ION7650 only.</i> Integrated display with front optical port, 10 MB logging memory, and 1024 samples/cycle resolution. |
| | T0 | Transducer (no display) version, with 5 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550). |
| | T1 | <i>ION7650 only.</i> Transducer (no display) version, with 5 MB logging memory, and 1024 samples/cycle resolution. |
| | U0 | Transducer (no display) version, with 10 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550). |
| | U1 | <i>ION7650 only.</i> Transducer (no display) version, with 10 MB logging memory, and 1024 samples/cycle resolution. |
| 3 Current Inputs | C | 5 Amp nominal, 20 Amp full scale current input |
| | E | 1 Amp nominal, 10 Amp full scale current input |
| | F | Current Probe Inputs (for 0-1 VAC current probes; sold |
| | G | Current Probe Inputs with three Universal Technic 10A clamp on CTs; meets IEC 1036 accuracy |
| 4 Voltage Inputs | 0 | 57 to 347 VAC line-to-neutral / 100 to 600 VAC line-to-line |
| 5 Power Supply | B | Standard power supply (85-240 VAC, ±10%/47-63 Hz / 110-300 VDC, ±10%) |
| | C | Low voltage DC power supply (20-60 VDC) |
| 6 System Frequency | 5 | Calibrated for 50 Hz systems |
| | 6 | Calibrated for 60 Hz systems |
| 7 Communications | A0 | Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Integrated display models include 1 ANSI Type 2 optical port. |
| | C1 | Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45), 56k universal internal modem (RJ11). Ethernet and modem gateway functions each use a serial communications |
| | D7 | Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45) and 100BaseFX Ethernet Fiber, 56k universal internal modem (RJ11). Ethernet/modem gateway uses serial port. |
| | E0 | Standard communications plus 10Base-T/100Base-TX (RJ45). Ethernet gateway function uses a serial communications port. |
| | F1 | Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45) and 100Base-FX (SC male Fiber Optic connection). Ethernet gateway function uses a serial port. |
| | M1 | Standard communications plus 56k universal internal modem (RJ11). Modem gateway function uses a serial port. |
| 8 I/O | A | Standard I/O (8 digital ins, 3 Form C relays, 4 Form A solid-state |
| | E | Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analogue inputs) |
| | K | Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analogue outputs) |
| | N | Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analogue inputs and four 0 to 20 mA outputs) |
| | P | Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 1 analogue inputs and four -1 to 1 mA analogue outputs) |
| 9 Security | 0 | Password protected, no hardware lock |
| | 1 | Password protected, hardware lockable (enabled/disabled via jumper on comm card) |
| | 6 | Password protected with security lock enabled, terminal cover and UK OFGEM labels |

ION7550 / ION7650

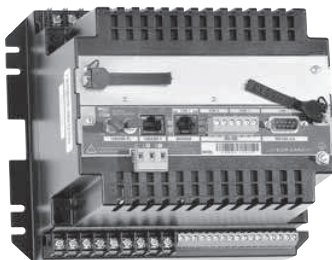
Functions and characteristics (cont.)



Example order code. Use this group of codes when ordering the PowerLogic™ ION7550/7650 communications or I/O cards.

- 1 Communications or I/O card.
- 2 Type
- 3 Special order.

PE68019



Part numbers (cont'd)

| Item | Code | Description |
|------------------|------|---|
| 10 Other options | A | None |
| | C | Tropicalisation treatment applied |
| | E | ION7650 only. EN50160 compliance monitoring, IEC61000-4-30 Class A measurements |
| | F | ION7650 only. EN50160 compliance monitoring, with tropicalisation treatment, IEC61000-4-30 Class A measurements |

Communications Card ⁽¹⁾

| Item | Code | Description |
|-----------------|-------|---|
| 1 Comm card | P765C | ION7550 / ION7650 communication card for field retrofit installations |
| 2 Type | A0 | Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Front optical port support for meters with integrated display. |
| | C1 | Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45), 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Ethernet and modem gateway functions each use a serial communications port. IEC 61850 protocol (depending on firmware version). |
| | D7 | Standard communications plus 10Base-T/100Base-TX Ethernet, 100BaseFX Ethernet Fiber, 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Ethernet and modem gateway functions each use a serial communications port. IEC 61850 protocol (depending on firmware version). |
| | E0 | Standard communications plus 10Base-T/100Base-TX Ethernet. Ethernet gateway function uses a serial communications port. IEC 61850 protocol (depending on firmware version). |
| | F1 | Standard communications plus 10Base-T/100Base-TX Ethernet, 100BaseFX Ethernet Fiber (SC male Fiber Optic connection). Ethernet gateway function uses a serial communications port. IEC 61850 protocol (depending on firmware version). |
| | M1 | Standard communications plus 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Modem gateway function uses a serial communications port. |
| 3 Special order | A | None |
| | C | Tropicalization treatment applied |

Input/Output expansion card

| Item | Code | Description |
|---------------|-------|--|
| I/O card | P760A | Expansion I/O for field retrofit installations. |
| Type | D | Expansion I/O card with eight digital inputs, four 0 to 1 mA analogue inputs |
| | E | Expansion I/O card with eight digital inputs, four 0 to 20 mA analogue inputs |
| | H | Expansion I/O card with eight digital inputs, four -1 to 1 mA analogue outputs |
| | K | Expansion I/O card with eight digital inputs, four 0 to 20 mA analogue outputs |
| | N | Expansion I/O card with eight digital inputs, four 0 to 20 mA analogue inputs & four 0 to 20 mA outputs |
| | P | Expansion I/O card with eight digital inputs, four 0 to 1 analogue inputs and four -1 to 1 mA analogue outputs |
| Special Order | A | None |
| | C | Tropicalization treatment applied |

ION7550 / ION7650 related items

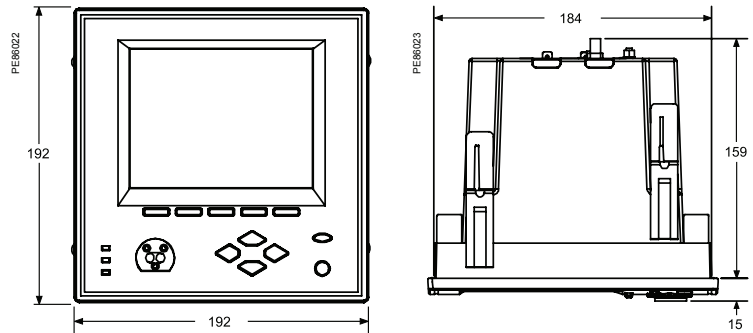
| Code | Description |
|------------------|--|
| ADPT-37XX-7500 | Adapter plate to fit meter into a 3710 or 3720 ACM panel cutout |
| TERMCVR-7500 | Terminal strip cover for the ION7550 or ION7650 |
| M1UB10A1V-10A | 10 A / 1 VAC Universal Technic Clamp On Current Probe |
| M765RD | Colour touchscreen remote display |
| M765RDPS | Remote display kit, includes M765RD, 24 VDC power supply, 4 metre Ethernet cable |
| P32UEP813-1000A | 1000 A / 1 VAC Universal Technic Clamp On Current Probe |
| P32UEP815-3000A | 3000 A / 1 VAC Universal Technic Clamp On Current Probe |
| SCT0750-005-5A | 5 A / 0.333 VAC Magnelabs Split Core Current Probe |
| SCT1250-300-300A | 300 A / 0.333 VAC Magnelabs Split Core Current Probe |

(1) Firmware version 350 or higher required.

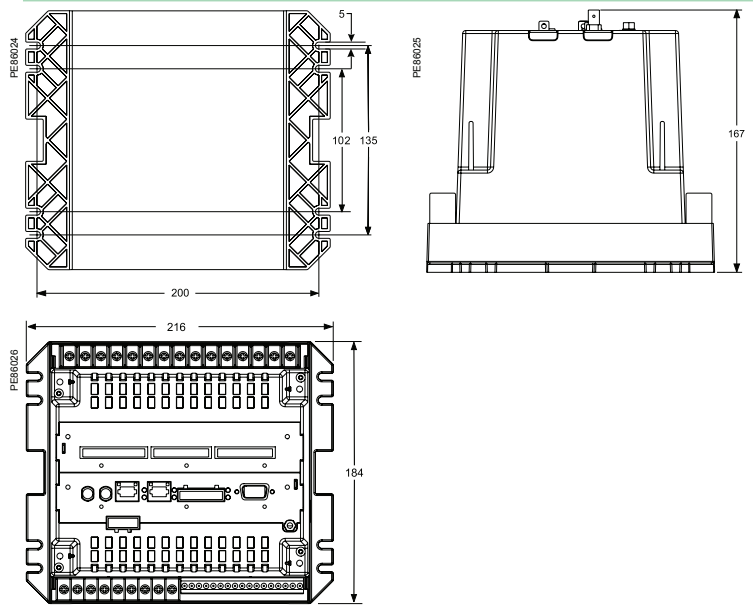
ION7550 / ION7650

Dimensions and connection

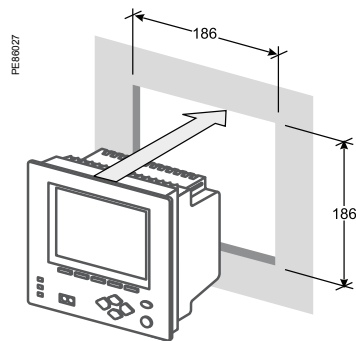
ION7550/ION7650 dimensions



ION7550 / ION7650 TRAN dimensions



Front-panel mounting



ION7550 and ION7650 meter can have integrated or remote display. The meter with integrated display is designed to fit DIN standard 192 cutout (186 mm by 186 mm). The remote display is intalled through a circular cutout (22.5 mm diameter) at the panel door. It has a front and a back module, and communicates with the meter via serial (RS485) or Ethernet.

ION8650

Functions and characteristics

PB107500



PowerLogic ION8650 socket meter

Used to monitor electric energy provider networks, service entrances and substations, PowerLogic ION8650 meters are ideal for independent power producers, micro-grid and co-generation 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 management software or other energy management and SCADA systems through multiple communication channels and protocols, including Itron MV-90, Modbus, DNP, IEC 61850.

Applications

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

Main characteristics

ANSI Class 0.2 and IEC 62053-22/23 Class 0,2S 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, EN50160, IEC 61000-4-7, IEC 61000-4-15, IEEE 1159, IEEE 519).

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, DNP 3.0 and IEC 61850.

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.

Time synchronization

DLMS/COSEM, GPS, IRIG-B, etc.

Disturbance direction detection

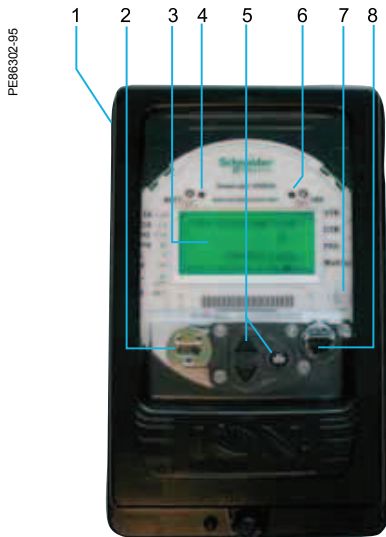
(ION8650 models A and B)

Part numbers

| ION8650 meters | |
|----------------|--------|
| ION8650A | M8650A |
| ION8650B | M8650B |
| ION8650C | M8650C |

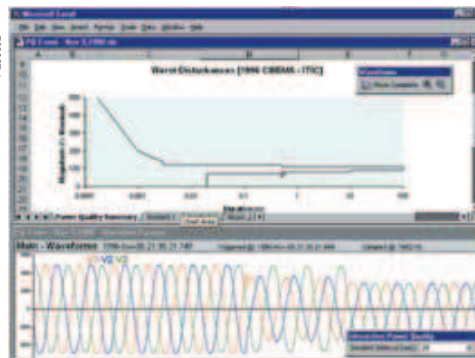
ION8650

Functions and characteristics (cont.)



PowerLogic ION8650 socket meter.

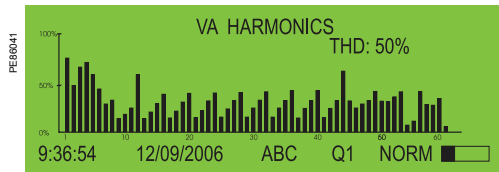
- 1 Terminals
- 2 Optical port
- 3 Main display status bar
- 4 Watt LED
- 5 Navigation, ALT/Enter buttons
- 6 VAR LED
- 7 Nameplate label
- 8 Demand reset switch



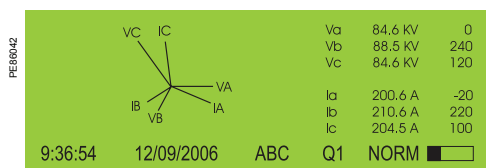
Disturbance waveform capture and power quality report

| Selection guide | | ION8650 A | ION8650 B | ION8650 C |
|--|--|-----------|-----------|------------------|
| General | | | | |
| Use on LV, MV and HV systems | | ■ | ■ | ■ |
| Current accuracy | | 0.1 % | 0.1 % | 0.1 % |
| Voltage accuracy | | 0.1 % | 0.1 % | 0.1 % |
| Power accuracy | | 0.1 % | 0.1 % | 0.1 % |
| Samples/cycle | | 1024 | 1024 | 1024 |
| Instantaneous values | | | | |
| Current, voltage, frequency | | ■ | ■ | ■ |
| Active, reactive, apparent power Total & per phase | | ■ | ■ | ■ |
| Power factor Total & per phase | | ■ | ■ | ■ |
| Current measurement range | | 0 - 20A | 0 - 20A | 0 - 20A |
| Energy values | | | | |
| Active, reactive, apparent energy | | ■ | ■ | ■ |
| Settable accumulation modes | | ■ | ■ | ■ |
| Demand values | | | | |
| Current Present & max. values | | ■ | ■ | ■ |
| Active, reactive, apparent power Present & max. values | | ■ | ■ | ■ |
| Predicted active, reactive, apparent power | | ■ | ■ | ■ |
| Synchronisation of the measurement window | | ■ | ■ | ■ |
| Demand modes: Block (sliding), thermal (exponential) | | ■ | ■ | ■ |
| Power quality measurements | | | | |
| Harmonic distortion Current & voltage | | ■ | ■ | ■ |
| Individual harmonics Via front panel | | 63 | 63 | 31 |
| Waveform / transient capture | | ■ / ■ | - / ■ | - / - |
| Harmonics: magnitude, phase, and interharmonics | | 50 | 40 | - |
| Detection of voltage sags and swells | | ■ | ■ | ■ |
| IEC 61000-4-30 class A/S | | A | S | - |
| IEC 61000-4-15 (Flicker) | | ■ | ■ | - |
| High speed data recording (down to 10 ms) | | ■ | ■ | - |
| EN50160 compliance reporting | | ■ | ■ | - |
| Programmable (logic and math functions) | | ■ | ■ | ■ |
| Data recording | | | | |
| Onboard Memory (in Mbytes) | | 128 | 64 | 32 |
| Revenue logs | | ■ | ■ | ■ |
| Event logs | | ■ | ■ | ■ |
| Historical logs | | ■ | ■ | ■ |
| Harmonics logs | | ■ | ■ | ■ |
| Sag/swell logs | | ■ | ■ | ■ |
| Transient logs | | ■ | - | - |
| Time stamping to 1 ms | | ■ | ■ | ■ |
| GPS synchronisation (IRIG-B standard) | | ■ | ■ | ■ |
| Display and I/O | | | | |
| Front panel display | | ■ | ■ | ■ |
| Wiring self-test (requires PowerLogic ION Setup) | | ■ | ■ | ■ |
| Pulse output (front panel LED) | | 2 | 2 | 2 |
| Digital or analogue inputs ⁽¹⁾ (max) | | 11 | 11 | 11 |
| Digital or analogue outputs ⁽¹⁾ (max, including pulse output) | | 16 | 16 | 16 |
| Communication | | | | |
| Infrared port | | 1 | 1 | 1 |
| RS 485 / RS 232 port | | 1 | 1 | 1 ⁽³⁾ |
| RS 485 port | | 1 | 1 | 1 ⁽³⁾ |
| Ethernet port (Modbus/TCP/IP protocol) with gateway | | 1 | 1 | 1 ⁽³⁾ |
| Internal modem with gateway (ModemGate) | | 1 | 1 | 1 ⁽³⁾ |
| HTML web page server | | ■ | ■ | ■ |
| IRIG-B port (unmodulated IRIG B00x time format) | | 1 | 1 | 1 |
| Modbus TCP Master / Slave (Ethernet port) | | ■ / ■ | ■ / ■ | - / ■ |
| Modbus RTU Master / Slave (Serial ports) | | ■ / ■ | ■ / ■ | - / ■ |
| DNP 3.0 through serial, modem, and I/R ports | | ■ | ■ | ■ |

(1) With optional I/O Expander.
 (2) For 9S, and 36S only. For 35S system up to 480V line-to-line.
 (3) C model limited to IR + 2 other ports at one time. Ports can be enabled/disabled by user.



PowerLogic ION8650 front panel harmonic display.



ION8650 front panel phasor display and table.

Electrical characteristics

| | | |
|-----------------------------------|--|---|
| Type of measurement | True rms 1024 samples per cycle | |
| Measurement accuracy | Current and voltage | 0.1 % Reading |
| | Power | 0.1% |
| | Frequency | ±0.001 Hz |
| | Power factor | 0.1% |
| | Energy | 0.1%, twice as accurate as ANSI Class 0.2 and IEC 62053-22/23 (0,2S) |
| Data update rate | 0.5 cycle or 1 second (depending on value) | |
| Input-voltage characteristics (1) | Nominal voltage | 57V to 277V LN rms 100V to 480V LL rms (35S) |
| | Maximum voltage | 347 V LN rms, 600 V LL rms (9S) |
| | Impedance | 5 MΩ /phase (phase-Vref/Ground) |
| | Inputs | V1, V2, V3, VREF |
| Input-current characteristics | Rated nominal/current class | 1A, 2A, 5A and/or 10A (Class 1/2/10/20) |
| | Accuracy range | 0.01 - 20 A (standard range) |
| | Measurement range | 0.001 - 24 A |
| | Permissible overload | 500A rms for 1 second, non-recurring |
| | Burden per phase | Socket: Typical: 3 W, 8 VA/phase, 3-phase operation; Maximum: 4 W, 11 VA/phase, 3-phase operation Switchboard: 0.05VA at 1A (0.05 Ω max) |
| Power supply | Standard power supply, blade powered | 120-277 V LN RMS (-15%/+20%) 47-63 Hz or 120-480 V LL RMS (-15%/+20%) 47-63 Hz (35S) |
| | Auxiliary powered low voltage | AC: 65-120 (+/- 15%) V LN RMS, 47-63 Hz DC: 80-160 (+/- 20%) VDC |
| | Auxiliary powered high voltage | AC: 160-277 (+/- 20%) V LN RMS, 47-63 Hz DC: 200-300 (+/- 20%) VDC |
| | Ride-through time, (Standard power supply) | Socket: min guaranteed: 6 cycles at nominal frequency (minimum 50 Hz), at 120 V L-N rms (208 V L-L rms) 3-phase operation Switchboard: min guaranteed: 6 cycles at nominal frequency (minimum 50 Hz), at 120 V L-N rms (208 V L-L rms) 3-phase operation |
| Input/outputs | Digital outputs (Form C) | 4 Solid state relays (130 V AC/ 200 V DC) 50 mA AC/DC |
| | Digital outputs (Form A) | 4 Solid state relays (via optional I/O Expander) |
| | Digital inputs | 4 Solid state inputs (via optional I/O Expander) |

Mechanical characteristics

| | | |
|-------------------------|-------------|-----------------------|
| Weight | 7.0 kg | |
| IP degree of protection | Socket | Front IP65, back IP51 |
| | Switchboard | Front IP50, back IP30 |
| Dimensions | Socket | 178 x 237 mm |
| | Switchboard | 285 x 228 x 163 mm |

Environmental conditions

| | |
|-------------------------|-----------------------------|
| Operating temperature | -40°C to +85°C |
| Display operating range | -20°C to +60°C |
| Storage temperature | -40°C to +85°C |
| Humidity rating | 5 to 95 % RH non-condensing |
| Pollution degree | 2 |
| Installation category | Cat III |
| Dielectric withstand | 2.5kV |

Electromagnetic compatibility

| | |
|-----------------------------------|--------------------|
| Electrostatic discharge | IEC 61000-4-2 |
| Immunity to radiated fields | IEC 61000-4-3 |
| Immunity to fast transients | IEC 61000-4-4 |
| Immunity to surge | IEC 61000-4-5 |
| Immunity conducted | IEC61000-4-6 |
| Damped oscillatory waves immunity | IEC61000-4-12 |
| Conducted and radiated emissions | CISPR 22 (class B) |

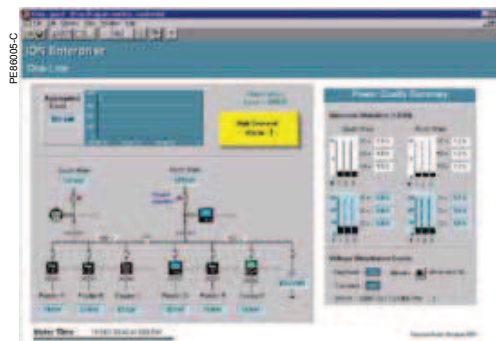
Safety

| | |
|---------------|--------------------|
| Europe | As per IEC62052-11 |
| North America | As per ANSI C12.1 |

(1) Specifications are limited by the operating range of the power supply if a non-aux power supply is used.



Example embedded webserver page (WebMeter) showing realtime values.



Communication

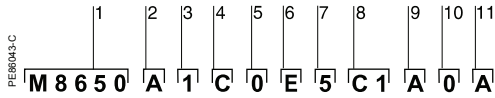
| | |
|--|---|
| RS 232 / RS 485 port (COM1) | User-selectable RS 232 or RS 485. 300 - 115,200 bauds (RS485 limited to 57,600 bps); protocols: ION, Modbus/RTU/Mastering, DNP 3.0, GPSTRUETIME/DATUM. Support for DLMS/COSEM time synchronization. |
| Internal modem port (COM2) | 300-57,600 bps |
| ANSI 12.18 Type II optical port (COM3) | Up to 19200 bps |
| RS 485 port (COM4) | Up to 57,600 bauds, Modbus, direct connection to a PC or modem |
| Ethernet port | 10/100 BaseT, RJ45 connector, protocols: DNP, ION, Modbus/TCP/Mastering, IEC 61850 |
| EtherGate | Up to 31 slave devices via serial ports |
| ModemGate | Up to 31 slave devices |

Firmware characteristics

| | |
|---------------------------------|--|
| High-speed data recording | Up to 1/2-cycle interval burst recording, stores detailed characteristics of disturbances or outages. Trigger recording by a user-defined setpoint, or from external equipment. |
| Harmonic distortion | Up to 63rd harmonic for all voltage and current inputs |
| Dip/swell detection | Analyse severity/potential impact of sags and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording or control operations |
| Disturbance direction detection | - Available in ION8650 models A and B |
| Instantaneous | High accuracy measurements with 1s or 1/2 cycle update rate for: - voltage and current - active power (kW) and reactive power (kVAR) - apparent power (kVA) - power factor and frequency - voltage and current unbalance - phase reversal |
| Load profiling | Channel assignments are user configurable: - 800 channels via 50 data recorders (feature set A), - 720 channels via 45 data recorders (feature set B), - 80 channels via 5 data recorders (feature set C). Configure for historical trend recording of energy, demand, voltage, current, power quality, other measured parameter. Recorders can trigger on time interval basis, calendar schedule, alarm/event condition, manually. |
| Waveform captures | Simultaneous capture of all voltage and current channels - sub-cycle disturbance capture (16 to 1024 samples/ cycle) |
| Alarms | Threshold alarms: - adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm - user-defined priority levels - boolean combination of alarms |
| Advanced security | Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations based on user privileges. |
| Transformer correction | Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs) |
| Memory | 128 Mbytes (A), 64 Mbytes (B), 32 Mbytes (C) |
| Firmware update | Update via the communication ports |

Display characteristics

| | |
|-----------|--------------------------|
| Type | FSTN transreflective LCD |
| Backlight | LED |
| Languages | English |



Example product part number.

- 1 Model.
- 2 Feature set.
- 3 Form factor.
- 4 Current Inputs.
- 5 Voltage inputs.
- 6 Power supply.
- 7 System frequency.
- 8 Communications.
- 9 Input/output options.
- 10 Security.
- 11 Special order options.



switchboard case

Part Numbers

| Item | Code | Description |
|--------------------|-------|--|
| 1 Model | M8650 | Schneider Electric energy and power quality meter. |
| 2 Feature Set | A | 128MB Memory Class A power quality analysis, waveforms and transient capture with 1024 samples/cycle. |
| | B | 64MB memory, energy meter Class S EN50160 power quality monitoring. |
| | C | 32MB memory, basic tariff/energy metering (4 data recorders, 64 channels). |
| 3 Form Factor (1) | 0 | Form 9S/29S/36S Base, 57-277 VLN (autoranging) 3-Element, 4-Wire / 2 1/2-Element, 4-Wire |
| | 1 | Form 35S Base - 120-480 VLL (autoranging) 2-Element, 3-Wire |
| | 4 | Form 9/29/35/36S FT21 Switchboard (meter + case) with break out panel |
| | 7 | Form 9/29/35/36S FT21 Switchboard (meter + case) with break out cable |
| 4 Current Inputs | C | 1, 2 or 5 Amp nominal, 20 Amp full scale (24 Amp fault capture, start at 0.001 A) |
| 5 Voltage Inputs | 0 | Standard (see Form Factor above) |
| 6 Power Supply | E | Form 9/29/35/36S, (socket) and Form 9, 36 (FT21 switchboard): 120-277 VAC. Form 35S (socket) and Form 35 (FT21 switchboard): 120-480 VAC. Powered from the meter's voltage connections. |
| | H | Auxiliary Power Pigtail: 65-120 VAC or 80-160 VDC (power from external source) |
| | J | Auxiliary Power Pigtail: 160-277 VAC or 200-300 VDC (power from external source) |
| 7 System Frequency | 5 | Calibrated for 50 Hz systems. |
| | 6 | Calibrated for 60 Hz systems. |
| 8 Communications | A 0 | Infrared optical port, RS 232/RS 485 port, RS 485 port |
| | C 7 | Infrared optical port, Ethernet (10 BaseT), RS 232/485 port, RS 485 port (note: in addition to infrared optical port, Feature Set C can use any two ports (configurable)), 56k universal internal modem (RJ11) |
| | E 0 | Infrared optical port, RS 485 port (note this port is not available with feature set C) Ethernet (10BaseT), RS 232/485 port, |
| | E 1 | Infrared optical port, Ethernet (10 BaseT), RS 232/485 port, RS 485 port (note: in addition to infrared optical port, Feature Set C can use any two ports (configurable)) |
| 9 Onboard I/O | M 1 | Infrared optical port, RS 232/485 port, RS 485 port (note: in addition to infrared optical port, Feature Set C can use any two ports (configurable)), 56k universal internal modem (RJ11). |
| | A | None. |
| 10 Security | B | 4 Form C digital outputs, 3 Form A digital inputs. |
| | C | 4 Form C digital outputs, 1 Form A digital output, 1 digital input. |
| | 0 | Password protected, no security lock |
| 11 Special Order | 1 | Password protected with security lock enabled (requires removal of outer cover to configure billing parameters) |
| | 3 | RMICAN (Measurement Canada approved) |
| | 4 | RMICAN-SEAL (Measurement Canada approved, and factory sealed)** |
| | A | None |

(1) Specifications are limited by the operating range of the power supply if a non-aux power supply is used.

ION8650

Functions and characteristics (cont.)

1 2 3
P 8 5 0 E A 2
 Example order code. Use this group of codes when ordering the I/O Expander.
 1 Digital / Analogue I/O.
 2 I/O option.
 3 Cable option.



Part numbers (cont.)

I/O Expander

| | | |
|----------------------|--------------|---|
| Digital/Analogue I/O | P850E | Schneider Electric I/O Expander for ION8600 meters: Inputs and Outputs for energy pulsing, control, energy counting, status monitoring, and analogue interface to SCADA. |
| I/O option | A | External I/O box with 8 digital inputs and 8 digital outputs (4 Form A, 4 Form C) |
| | B | External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analogue outputs (0 to 20mA) |
| | C | External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analogue outputs (-1mA to 1mA) |
| | D | External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analogue outputs (two -1 to 1 mA, and two 0 to 20 mA outputs) |
| Cable option | 0 | No cable - cables for the I/O box are not ordered as a separate part number. Refer to part numbers: CBL-8X00IOE5FT, CBL-8X00IOE15FT and CBL-8XX0-BOP-IOBOX under Connector cables, below. |

A-base adapters

| | |
|--------------------------|------------------------------|
| A-BASE-ADAPTER-9 | Form 9S to Form 9A adapter |
| A-BASE-ADAPTER-35 | Form 35S to Form 35A adapter |

Optical communication interface

| | |
|----------------------|---------------------------------|
| OPTICAL-PROBE | Optical communication interface |
|----------------------|---------------------------------|

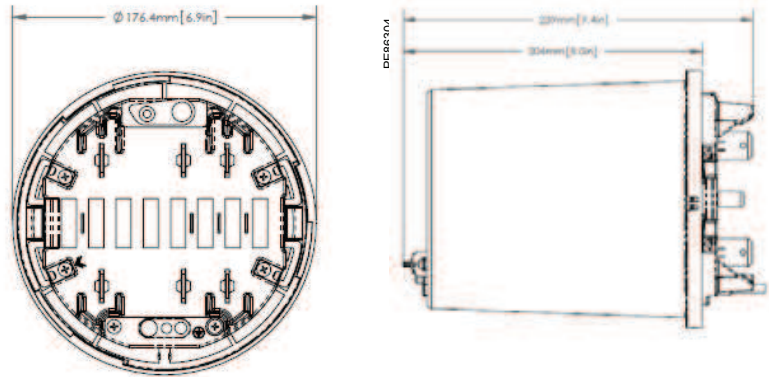
Connector cables

| | |
|---------------------------|--|
| CBL-8X00BRKOUT | 5' extension cable, mates with 24-pin male Molex connector from the meter to the 24-pin Molex connector on the I/O expander box (not for use with breakout panel E8, F8 & G8 form factors) |
| CBL-8X00IOE5FT | 15' extension cable, mates with 24-pin male Molex connector from the meter to the 24-pin Molex connector on the I/O expander box (not for use with breakout panel E8, F8 & G8 form factors) |
| CBL-8X00IOE15FT | 15' extension cable, mates with 24-pin male Molex connector from the meter to the 24-pin female Molex connector on the I/O Expander box (not for use with breakout panel E8, F8 & G8 form factors) |
| CBL-8XX0-BOP-IOBOX | 6' connector cable, 24-pin male to 14-pin male Molex connector for connecting an ION8000Series meter with breakout panel to an I/O Expander Box |

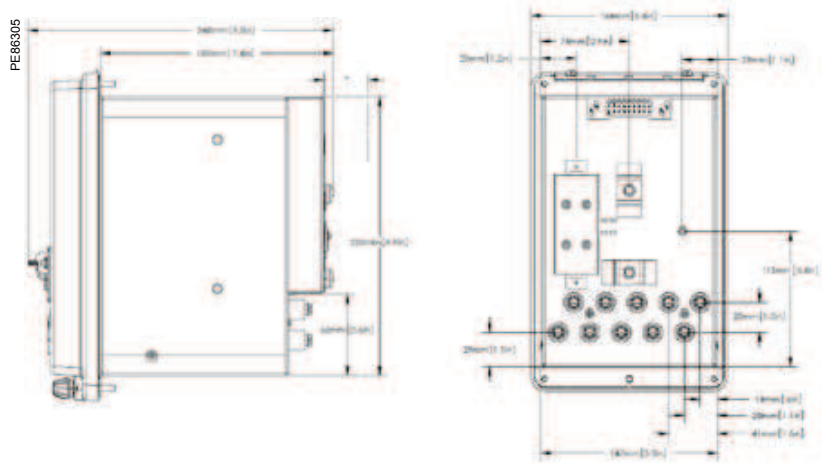
ION8650

Dimensions and connections

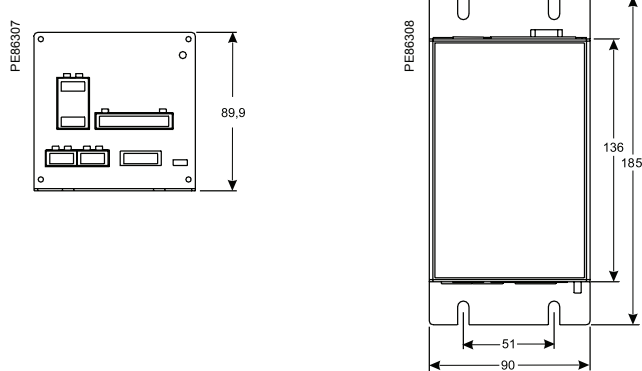
ION8650 socket dimensions



ION8650 switchboard dimensions



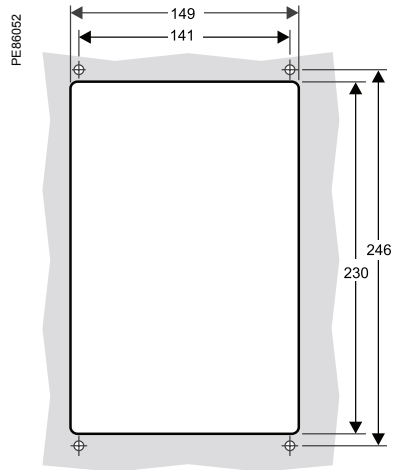
I/O Expander dimensions



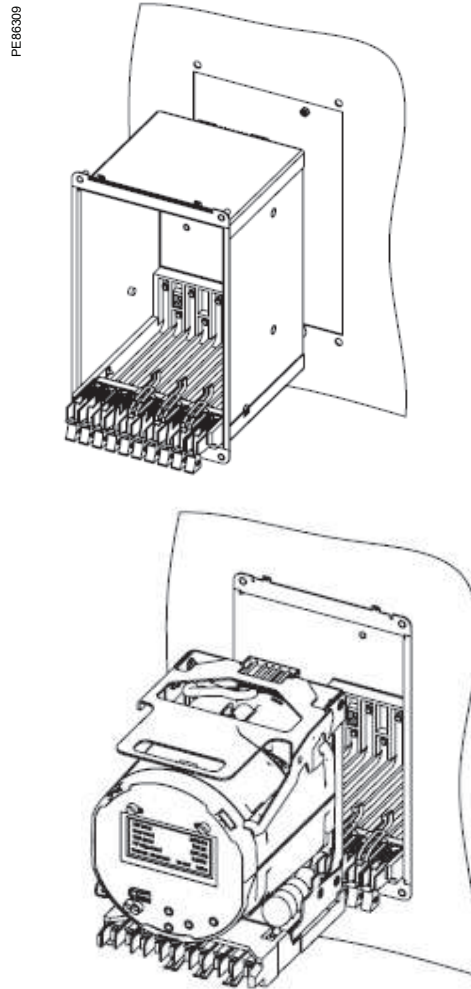
ION8650

Dimensions and connections (cont.)

ION8650 suggested switchboard mounting dimensions



ION8650 switchboard mounting



ION8800

Functions and characteristics

PLS86176



PowerLogic™ ION8800 meter

Providing high accuracy and a wide range of features for transmission and distribution metering, the PowerLogic ION8800 advanced revenue and power quality meter has the flexibility to change along with your needs. The meter provides the tools necessary to:

- manage energy procurement and supply contracts
- perform network capacity planning and stability analysis'
- monitor power quality compliance, supply agreements, and regulatory requirements.

Integrate the PowerLogic ION8800 meter with your existing wholesale settlement system, use StruxureWare Power Monitoring (PowerLogic ION Enterprise™) software, or share operations data with SCADA systems through multiple communication channels and protocols.

Applications

Transmission and distribution metering.
Settlements, customer billing, cost allocation.
Extensive power quality monitoring and analysis.
Contract optimisation and compliance verification.

Main characteristics

IEC 19-inch rack mount design to DIN 43862 standard

Use Essalec connectors with common measurement and energy pulsing pin-out to easily retrofit into existing systems.

Accurate metering

Interconnection points on medium, high, and ultra-high voltage networks are in compliance with IEC 62053-22/23 Class 0,2S.

Power quality compliance monitoring

Monitor compliance with international quality-of-supply standards (IEC 61000-4-30 Class A/S, EN50160, IEC 61000-4-7, IEC 61000-4-15, IEEE 1159, IEEE 519, IEC 61000-4-30 (edition 2) Class A/S).

Power quality summary

Consolidate power quality characteristics into easily viewable reports indices.

Digital fault recording

Capture voltage and current channels simultaneously for sub-cycle disturbances.

Complete communications

Use the IEC1107 optical port or the optional communications module that supports concurrent Ethernet, serial, and modem communications.

Multiple tariffs and time-of-use

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

Alarms and I/O functions

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

Alarm notification via email

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

Software integration

Easily integrate the meter with StruxureWare Power Monitoring (ION Enterprise) or other utility software; MV-90, Pacis and third-party SCADA packages.

Transformer/line loss compensation

Compensate for system losses in real time directly in the meter.

Instrument transformer correction

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

Part numbers⁽¹⁾

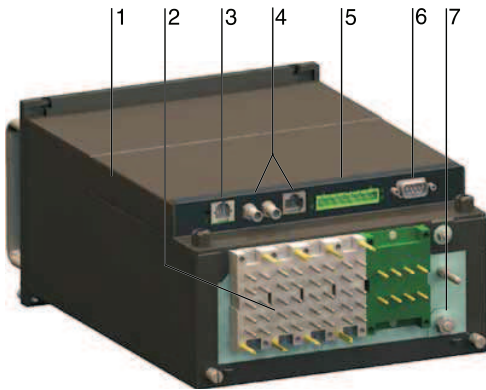
| PowerLogic ION8800 meters | |
|---------------------------|--------|
| PowerLogic ION8800A | M8800A |
| PowerLogic ION8800B | M8800B |
| PowerLogic ION8800C | M8800C |

⁽¹⁾Representative part numbers only. See page 9 for complete part number descriptions.

ION8800

Functions and characteristics (cont.)

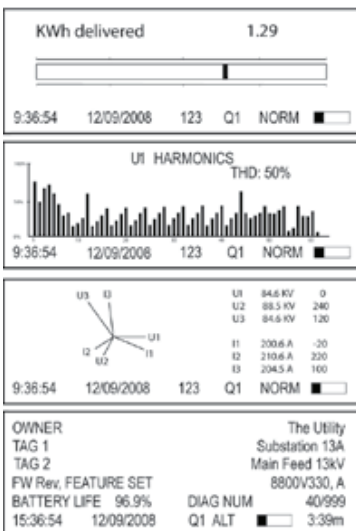
PE88001



PowerLogic ION8800 meter

- 1 Optional communications module.
- 2 Essalec connectors.
- 3 Internal modem.
- 4 Optional Ethernet communications.
- 5 Selectable RS 485 serial port.
- 6 Selectable RS 232 or RS 485 serial port.
- 7 Ground terminal.

PE88025



Display screen examples: KWh disk simulator, voltage harmonics histogram, phasor diagram, and name plate 1.

| Selection guide | ION8800A ION8800B | ION8800C |
|--|---------------------------------------|-------------------|
| General | | |
| Use on LV, MV and HV systems | ■ | ■ |
| Current accuracy | 0.1 % | 0.1 % |
| Voltage accuracy | 0.1 % | 0.1 % |
| Power accuracy | 0.2 % | 0.2 % |
| Samples/cycle | 1024 | 1024 |
| Instantaneous rms values | | |
| Current, voltage, frequency (Class 0,2S) | ■ | ■ |
| Active, reactive, apparent power Total and per phase | ■ | ■ |
| Power factor Total and per phase | ■ | ■ |
| Current measurement range | 0.001 - 10A | 0.001 - 10A |
| Current measurement range | 0.001 - 10A | 0.001 - 10A |
| Energy values | | |
| Active, reactive, apparent energy | ■ | ■ |
| Settable accumulation modes | ■ | ■ |
| Demand values | | |
| Current | ■ | ■ |
| Active, reactive, apparent | ■ | ■ |
| Predicted active, reactive, apparent | ■ | ■ |
| Demand modes (block, sliding, thermal, predicted) | ■ | ■ |
| Power quality measurements | | |
| Detection of voltage dips (sags) and swells | 10 ms | 10 ms |
| Symmetrical components: zero, positive, negative | ■ | - |
| Transient detection, microseconds (50 Hz) | 20 ⁽¹⁾ | 20 ⁽¹⁾ |
| Harmonics: individual, even, odd, total up to | 63 rd | 63 rd |
| Harmonics: magnitude, phase and inter-harmonics | 50 th | 40 th |
| EN 50160 compliance | ■ | ■ |
| IEC 61000-4-30 class A | ■ | ■ |
| IEC 61000-4-30 class S | ■ ⁽²⁾ | ■ |
| IEC 61000-4-15 (Flicker) | ■ | - |
| Configurable for IEEE 519 - 1992, IEEE1159-1995 | ■ ⁽¹⁾ | - |
| Programmable (logic and math functions) | ■ | ■ |
| Data recording | | |
| Min/max logging for any parameter | ■ | ■ |
| Historical logs Maximum # of records | 800 ⁽¹⁾ 640 ⁽²⁾ | 32 |
| Waveform logs Maximum # of records | 96 ⁽¹⁾ | - |
| Timestamp resolution in seconds | 0.001 | 0.001 |
| Setpoints, minimum response time | ½ cycle | ½ cycle |
| Number of setpoints | 65 | 65 |
| GPS time synchronisation (IRIG-B) | ■ | ■ |
| Could add transient logs. COMTRADE fault records. | ■ | ■ |
| User configurable log memory | 10 Mbytes | 10 Mbytes |
| Display and I/O | | |
| Front panel display | ■ | ■ |
| Active/reactive energy pulser, LED and IEC 1107 style port | ■ | ■ |
| Digital pulse outputs, optional Solid state Form A | 8 | 8 |
| Digital pulse outputs Solid state Form C | 4 | 4 |
| Alarm relay output Form C | 1 | 1 |
| Digital inputs (optional) | 3 | 3 |
| Communications | | |
| RS 232/485 port | 1 | 1 |
| RS 485 port | 1 | 1 |
| Ethernet port | 1 | 1 |
| IEC 1107 optical port | 1 | 1 |
| Internal modem | 1 | 1 |
| 3-port DNP 3.0 through serial, modem, Ethernet and I/R ports | ■ | ■ |
| Modbus RTU master / slave (serial, modem and I/R ports) | ■ / ■ | - / ■ |
| Modbus TCP master / slave (via Ethernet port) | ■ / ■ | - / ■ |
| Data transfer between Ethernet and RS 485 (EtherGate) | ■ | ■ |
| Data transfer between internal modem, RS 485 (ModemGate) | ■ | ■ |
| Alarms, single or multi-condition | ■ | ■ |
| Alarm notification & logged data via email | ■ | ■ |
| Embedded web server (WebMeter) | ■ | ■ |

(1) ION8800A only.
(2) ION8800B only.

ION8800

Functions and characteristics (cont.)

PE88003

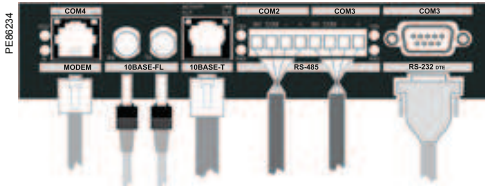


PowerLogic ION8800 with optional communications module.

| Electrical characteristics | | | |
|--------------------------------------|--|--|----------------------------------|
| Type of measurement | True rms 1024 samples per cycle | | |
| Measurement accuracy | Current and voltage | 0.1 % | |
| | Power | 0.2 % | |
| | Frequency | ±0.005 Hz | |
| | Power factor | 0.1% | |
| | Energy | IEC 62053-22/23 Class 0.2 S | |
| Data update rate | ½ cycle or 1 second | | |
| Input-voltage characteristics | Inputs | U1, U2, U3, Uref | |
| | Measurement range | 57-288 LN VAC rms (99-500 LL VAC rms) | |
| | Dielectric withstand | 3320 VAC rms | |
| | Impedance | 5 MΩ /phase (phase-Uref/Ground) | |
| input-current characteristics | Rated nominals | 5 A, 1 A, 2 A | |
| | Permissible overload | 200A rms for 0.5s, non-recurring (IEC 62053-22) | |
| | Impedance | 10 mΩ /phase | |
| | Burden | 0.01 VA per phase (1A), 0.25 VA per phase (5A) | |
| | Power supply | AC | 85 - 240 VAC (+/- 10%), 47-63 Hz |
| DC | | 110 - 270 VDC (+/- 10%) | |
| Burden | | Typical (without comm module): | 13 VA, 8 W |
| | | Typical (with comm module): | 19 VA, 12 W |
| | | Max (without comm module): | 24 VA, 10 W |
| | | Max (with comm module): | 32 VA, 14 W |
| Ride-through time | Typical: 0.5 s to 5 s depending on configuration Min: 120 ms (6 cycles @ 50 Hz) | | |
| Dielectric withstand | 2000 VAC | | |
| Input/outputs | Mechanical alarm relay | 1 Form C digital output (250 V AC / 125 V DC, 1 AAC / 0.1 A DC max) | |
| | Digital outputs (Form C) | 4 Solid state relay outputs (210 V AC / 250 V DC) 100 mAAC/DC | |
| | Digital outputs (Form A) | 8 Solid state relay outputs (210 V AC / 250 V DC) 100 mAAC/DC | |
| | Digital inputs | 3 Solid state digital inputs (low-voltage inputs 15 to 75 V AC/DC; high-voltage inputs 75 to 280 V AC/DC; 3 mA max.) | |
| | Pulse rate | 20 Hz maximum | |
| Mechanical characteristics | | | |
| Weight | 6.0 kg (6.5 kg with optional communications module) | | |
| IP degree of protection (IEC 60529) | IP51 | | |
| Dimensions | 202.1 x 261.51 x 132.2 mm | | |
| Environmental conditions | | | |
| Mounting location | Indoor | | |
| Maximum altitude | 2000 m above sea level | | |
| Limit range of operation | -25°C to +70°C | | |
| Specified operating temperature | -10°C to +45°C (as per 62052-11) | | |
| Display operating range | -10°C to +60°C | | |
| Storage temperature | -25°C to +70°C | | |
| Humidity rating | 5 to 95 % RH non-condensing | | |
| Pollution degree | 2 | | |
| Installation category | Power supply (II) Metering inputs (III) | | |
| Electromagnetic compatibility | | | |
| Electrostatic discharge | IEC 61000-4-2 | | |
| Immunity to radiated fields | IEC 61000-4-3 | | |
| Immunity to fast transients | IEC 61000-4-4 | | |
| Immunity to surge waves | IEC 61000-4-5 | | |
| Conducted immunity | IEC 61000-4-6 | | |
| Damped oscillatory waves immunity | IEC 61000-4-12 | | |
| Conducted and radiated emissions | CISPR 22 (class B) | | |
| Safety | | | |
| Europe | As per IEC 62052-11 | | |
| International | As per IEC 60950 | | |
| Utility approval | | | |
| EGR, GOST, ESKOM, NMI | | | |

ION8800

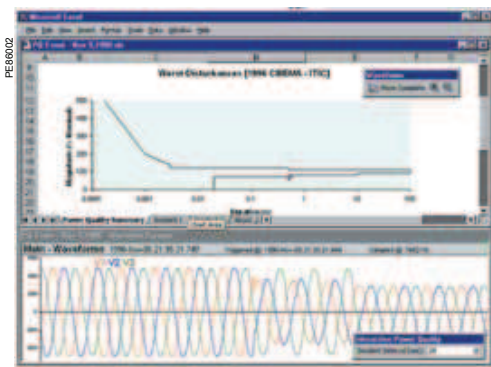
Functions and characteristics (cont.)



Ports on the optional communications module.



Example embedded webserver page (WebMeter) showing real-time values.

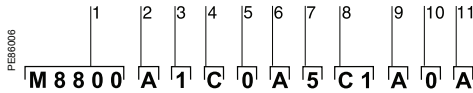


Sample power quality report.

| Communication | |
|---|---|
| IEC 1107 optical port | 2/4 wires, up to 19200 bauds |
| RS 485 port | Up to 57600 bauds, direct connection to a PC or modem, protocols: ION, Modbus RTU, Modbus Master, DNP 3.0, GPSTRUEIME/DATUM, DLMS |
| Communications module (optional) | |
| RS 232/485 port | 300 - 115,200 bauds (RS 485 limited to 57,600 bauds); protocols: same as RS 485 port |
| Internal modem port | 300 bauds - 56000 bauds, RJ11 connector |
| Ethernet port (supports up to 4 simultaneous connections) | 10 BaseT, RJ45 connector, 100 m link; protocols: DNP TCP, ION, Modbus TCP, Modbus Master, IEC 61850 (in 5MB meters only) supports FTP + COMTRDE. |
| Fiber-optic Ethernet link | 10 Base FL, ST connector, 1300 nm, FO multimode with gradient index 62.5/125 µm or 50/125 µm, 2000 m link; protocols: same as Ethernet port |
| EtherGate | Communicates directly with up to 62 slave devices via available serial ports |
| ModemGate | Communicates directly with up to 31 slave devices |
| Firmware characteristics | |
| High-speed data recording | Up to ½-cycle interval burst recording, stores detailed characteristics of disturbances or outages Trigger recording by a user-defined setpoint, or from external equipment. |
| Harmonic distortion | Up to 63 rd harmonic for all voltage and current inputs |
| Dip/swell detection | Analyse severity/potential impact of sags and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording or control operations |
| Instantaneous | High accuracy measurements with 1s or 1/2 cycle update rate for: - voltage and current - active power (kW) and reactive power (kvar) - apparent power (kVA) - power factor and frequency - voltage and current unbalance - phase reversal |
| Load profiling | Channel assignments (800 channels via 50 data recorders) are configurable for any measureable parameter, including historical trend recording of energy, demand, voltage, current, power quality, or any measured parameter Trigger recorders based on time interval, calendar schedule, alarm/event condition, or manually. |
| Modbus Master | Master up to 32 slave devices per serial channel and store their data at programmable intervals. Use this data to aggregate and sum energy values and perform complex totalization. |
| Waveform captures | Simultaneous capture of all voltage and current channels - sub-cycle disturbance capture - maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10 Mbytes memory) - 1024 samples/cycle |
| Alarms | Threshold alarms: - adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm - user-defined priority levels - boolean combination of alarms possible |
| Advanced security | Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations based on user privileges. Supports protocol lockout and meter access even logging. |
| Transformer correction | Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs) |
| Memory | 5 - 10 Mbytes (specified at time of order) |
| Firmware update | Update via the communication ports |
| Display characteristics | |
| Type | FSTN transreflective LCD |
| Backlight | LED |
| Languages | English |

ION8800

Functions and characteristics (cont.)



Example product part number.

- 1 Model.
- 2 Feature set.
- 3 Memory / form factor.
- 4 Current Inputs.
- 5 Voltage inputs.
- 6 Power supply.
- 7 System frequency.
- 8 Communications.
- 9 Onboard inputs/outputs.
- 10 Security.
- 11 Special order.

Part Numbers

| Item | Code | Description |
|---|-------|---|
| 1 Model | M8800 | ION8800 IEC/DIN 43862 19" rack mount energy and power quality meter. |
| 2 Feature Set | A | Class A power quality analysis, waveforms and transient capture with 1024 samples/cycle. |
| | B | Energy meter Class S EN50160 power quality monitoring. |
| | C | Basic tariff/energy revenue meter with sag/swell monitoring. |
| 3 Memory/Form Factor | 1 | 10 MB logging memory, Essailec connectors. |
| | 2 | 5 MB logging memory, Essailec connectors, with IEC61850 protocol |
| 4 Current Inputs | C | (I1-I3): Configured for 5 A nominal, 10 A full scale, 14 A fault capture, 0.001 A starting current. |
| | E | (I1-I3): Configured for 1 A nominal, 10 A full scale, 14 A fault capture, 0.001 A starting current. |
| 5 Voltage Inputs | 0 | (V1-V3): Autoranging (57-288 VAC L-N or 99-500 VAC L-L) |
| 6 Power Supply | B | Single phase power supply: 85-240 VAC ±10% (47-63 Hz) or 110-270 VDC. |
| 7 System Frequency | 5 | Calibrated for 50 Hz systems. |
| | 6 | Calibrated for 60 Hz systems. |
| 8 Communications module (field serviceable) | Z0 | No communications module - meter includes Base Onboard I/O and comms (see below for details). |
| | A0 | Standard communications: 1 RS 232/RS 485 port, 1 RS 485 port (COM2) ⁽¹⁾ . |
| | C1 | Standard communications plus 10Base-T Ethernet (RJ45), 56 k universal internal modem (RJ11). |
| | D1 | Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber, 56 k universal internal modem (RJ11). |
| | E0 | Standard communications plus 10Base-T Ethernet (RJ45). |
| | F0 | Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL (ST male Fiber Optic connection). |
| | M1 | Standard communications plus 56k universal internal modem (RJ11). |
| 9 Onboard I/O and communications (not field serviceable, part of base unit) | A | Base option AND 8 Form A digital outputs ⁽²⁾ , 1 RS-485 (COM2) port ⁽¹⁾ . |
| | B | Base Option AND 8 Form A digital outputs ⁽²⁾ , 3 digital inputs (20-56 VDC/AC). |
| | C | Base Option AND 8 Form A digital outputs ⁽²⁾ , 3 digital inputs (80-280 VDC/AC). |
| | D | Base Option AND 1 IRIG-B time sync port ⁽²⁾ , 1 RS-485 port (COM2), 3 digital inputs (20-56 V DC/AC) ⁽¹⁾ . |
| | E | Base Option AND 1 IRIG-B time sync port ⁽²⁾ , 1 RS-485 port (COM2), 3 digital inputs (80-280 V DC/AC) ⁽¹⁾ . |
| 10 Security | 0 | Password protected, no security lock. |
| | 1 | Password protected with security lock enabled. |
| 11 Special Order | A | None. |
| | C | Tropicalisation treatment applied. |

Related products

| | |
|-------------------|---|
| RACK-8800-RAW | IEC/DIN 34862 19" Rack with female mating voltage/current and I/O blocks unassembled. |
| IEC-OPTICAL-PROBE | Optional IEC 1107 compliant Optical Probe for use with ION8800 meters. |
| BATT-REPLACE-8XXX | Replacement batteries for the ION8600 or ION8800, quantity 10. |
| ION-SETUP | Free configuration software for the ION8800. Ships on a CD. |

(1) Channel COM2 is available on the port at the back of the meter OR on the Comm Module (if installed). You must select which connectors your communications wiring is connected to during meter setup.

(2) All Onboard I/O and Comms (Base Option) options include: 4 Form C solid-state digital outputs, 1 Form C mechanical relay output, one IEC 1107 optical communications port, two IEC 1107 style optical pulsing ports.