ION9000 Series
Technical Data Sheet

The PowerLogic™ ION9000 is your 24/7 power quality expert, providing information, not just data.

With a comprehensive, industry-leading Power Quality Instrument (PQI) performance designation according to IEC 62586-1/-2, the PowerLogic ION9000 is third-party certified ANSI C12.20 Class 0.1 and IEC 62053-22 Class 0.1S accurate, the most accurate power meter available today. Lab-verified power quality and safety ensure reliable, precision performance that is perfect for supply- or demand-side applications. Its patented Disturbance Direction Detection also helps you pinpoint the source of power quality issues faster. Capable of sampling at 10 MHz per cycle (@ 60-Hz) during a high-speed event, the ION9000T captures extremely fast voltage events that are missed by most other power meters, enabling advanced diagnostics and high-resolution event associations for fast, conclusive diagnosis and resolution to transient voltages.

Highly customizable and modular, the ION9000’s field programmability can adapt to satisfy any solution, protecting your investment now and in the future. All designed to align with your comprehensive grid cybersecurity policies and backed by Schneider Electric’s global services and support.

Applications

Ideal for critical power and large energy users who cannot afford to be shut down, the ION9000T has High-Speed Transient Capture (HSTC) to detect and record transient events that exceed the voltage withstand of sensitive equipment.
The market solution for

Markets that benefit from a solution that includes PowerLogic ION9000 series meters:
• Data centers
• Healthcare facilities
• Semiconductor
• Pharmaceutical & chemical
• Energy industries
• Mining, Minerals, & Metals
• Renewable energy interconnects
• Medium voltage distribution & energy automation

Benefits
• Makes understanding power quality simple which helps operations personnel avoid downtime and increase productivity and equipment life
• Makes energy and power quality data immediately actionable and relevant to operational and sustainability goals

Competitive advantages
• Modular, flexible, patented ION™ programmable technology
• Utility grade energy accuracy
• Patented Disturbance Direction Detection
• Third-party, lab-verified compliance with latest PQ standards
• Onboard pass/fail PQ characterization and assessment according to EN50160 and IEEE519
• Cybersecurity event logging, Syslog protocol, HTTPS, and full control of each communication port
• High-speed impulsive and oscillatory transient detection

Power management solutions

Schneider Electric provides innovative power management solutions to increase your energy efficiency and cost savings. Maximize electrical network reliability and availability, and optimize electrical asset performance.

Conformity of standards
• ANSI C12.20
• ANSI C37.90.1
• IEC 61000-4-15
• IEC 61000-4-20
• IEC 61000-4-30
• IEC 61010-1
• IEC 61326-1
• IEC 61557-12
• IEC 61850
• ANSI C12.20
• ANSI C37.90.1
• IEC 62052-11
• IEC 62052-31
• IEC 62053-22
• IEC 62053-23
• IEC 62053-24
• IEC 62586
• UL 61010-1
Main characteristics

- PQ compliance reporting and basic PQ analysis:
  - Monitors and logs parameters according to IEC 61000-4-30 Class A international PQ standards (test methods as per IEC 62586-2).
  - High resolution waveform capture: triggered manually or by event. Captured waveforms available directly from the meter via FTP in a COMTRADE format, and viewable in the meter's web interface.
  - Generates onboard PQ compliance reports accessible via onboard web pages:
    - Pass/fail report for IEEE 519 for voltage and current harmonic limits.
    - ITIC (CBEMA) and SEMI curves, with alarm categorization to support further analyses.
    - NEMA Motor Derating curve.
  - Harmonic analysis:
    - THD and TDD per phase, min/max, custom alarming.
    - Individual harmonic magnitudes and angles on voltage and current, up to the 63rd harmonic.
  - Disturbance detection and capture: sag/swell on any current and voltage channel, alarm on disturbance event, waveform capture with per-event information.
  - Patented Disturbance Direction Detection: provides indication of the captured disturbance occurring upstream or downstream of the meter; timestamped results provided in the event log, with degree of certainty of disturbance direction.
  - Transient capture of events 20 microseconds or longer in duration on any voltage channel with waveform capture and per-event information.
  - PowerLogic ION9000T also provides High-Speed Transient Capture (HSTC) of voltage events 100 nanoseconds or longer in duration and up to 10,000 V in magnitude on voltage channels, with an alarm on the event, high-speed and disturbance waveform captures as well as per-event statistics on each transient.

- Metering precision:
  - IEC 61557-12 PMD/SD/K70/0.2 and PMD/SS/K70/0.2 3000m (Performance Measuring and Monitoring devices (PMD)).
  - Class 0.1S accuracy IEC 62053-22, ANSI C12.20 Class 0.1 (active energy).
  - Industry leading Class 0.5S accuracy for reactive energy (IEC 62053-24).
  - Cycle-by-cycle RMS measurements updated every ½ cycle.
  - Full ‘multi-utility’ WAGES metering support.
  - Net metering.
  - Anti-tamper protection seals and hardware metrology lock.

- Cybersecurity:
  - Security events logging with Syslog protocol support.
  - HTTPS and SFTP secure protocols.
  - Ability to enable or disable any communication port and any protocol per port.
  - Anti-tamper protection seals and hardware metrology lock.
  - User accounts with strong passwords.
• Used with Schneider Electric’s advanced software tools, provides detailed PQ reporting across entire network:
  – EN 50160 compliance report.
  – IEEE 519 harmonic compliance report.
  – IEC 61000-4-30 report.
  – Power quality compliance summary.
  – Energy reports for consumption analysis and cost management.
  – WAGES dashboards and reports.
  – Display of waveforms and PQ data from all connected meters.
  – Onboard web-based waveform viewer.
  – EcoStruxure Power Events Analysis, including alarm management, sequence of events, and root cause analysis.

• Data and event logging:
  – Onboard data and event logging.
  – 2 GB of standard non-volatile memory.
  – No data gaps due to network outages or server downtime.
  – Min/max log for standard values.
  – 100 user-definable data logs, recording up to 16 parameters at a 1/2 cycle or other user definable interval.
  – Continuous logging or snapshot, triggered by setpoint and stopped after defined duration.
  – Trend energy, demand and other measured parameters.
  – Forecasting via web pages: average, minimum and maximum for the next four hours and next four days.
  – Advanced time-of-use capability.
  – Security/event log: alarm conditions, metering configuration changes, power outages, firmware download, and user login/logout with timestamp.

• Alarming and control:
  – 50+ definable alarms to log critical event data, trigger waveform recording, or perform control function.
  – Trigger on any condition, with 1/2-cycle and 1-second response time.
  – Combine alarms using Boolean logic enabling customization of alarms.
  – Alarm notification via email.
  – In conjunction with Schneider Electric’s EcoStruxure software, alarms, software alarms, and alarm frequency are categorized and trended enabling sequence of events and root cause analyses.

Usability
• Auto-discovery using DPWS (Device Profile Web Services).
• DHCP for automatic IP address configuration.
• Full function web server enables simple web commissioning.
• Free setup wizard simplifies meter configuration.
• Front panel:
  – Easy to read color graphic display.
  – Simple and intuitive menu navigation with multiple language interface and support.
• Remote and DIN rail mounting options.
• Remote display option.
• Pluggable connectors.
Flexible remote communications:
- Multiple simultaneously operating communication ports and protocols allow interfacing with other automation systems, e.g., waveforms, alarms, billing data, etc. Data can be uploaded for viewing/analysis while other systems access real-time information.
- Supports: Modbus, ION, DNP3, DLMS/COSEM, SNMP, and IEC 61850.
- Dual port Ethernet: 2x 10/100BASE-TX; supports IPV4 and IPV6; daisy-chaining capability removes need for additional switches.
- Create redundant network loop using Rapid Spanning Tree Protocol (RSTP) and managed Ethernet switches.
- Secure web interface with HTTPS and TLS 1.2 with support for user-provided certificates.
- Customize TCP/IP port numbers and enable/disable individual ports.
- RS-485 2-wire connection, up to 115,200 baud.
- Ethernet to serial gateway with Modbus Master functionality, connecting to 31 unit loads of downstream serial Modbus devices. Also supports Modbus Mastering over TCP/IP (Ethernet) network.
- Full function web server with factory and customizable pages to access real-time and PQ compliance data.
- Push historical data via email.
- Advanced network security: Up to 50 configurable user accounts.

Time synchronization via:
- Precision network time protocol (PTP) based on IEEE 1588 / IEC 61588.
- GPS clock (RS-485) or IRIG-B (digital input) to ±1 millisecond.
- Network Time Protocol (NTP/SNTP).
- Automatic time synchronization available through Schneider Electric software server.

Adaptability
- ION™ frameworks are customizable, scalable applications with object-oriented programming that compartmentalizes functions, and increases flexibility and adaptability.
- Applications include: access and aggregate data from Modbus devices on serial port or across the network (Modbus TCP/IP), logging and/or processing data by totaling, unit conversion or other calculations, applying complex logic for alarming or control operations, data visualization via web pages.

Standard meter I/O
- 8 digital status/counter inputs with ±1 millisecond timestamp.
- 4 solid state digital outputs (Form A) for energy pulsing, interfacing with other systems or control.
- 2 Form C relay outputs for control applications.

Modular I/O options
- Optional expansion modules.
- Up to 4 modules per meter.

Option modules include:
- Digital module:
  - 6 digital status/counter inputs.
  - 2 Form C relay outputs, 250 V AC, 8 A.
- Analog module:
  - 4 analog inputs (4-20 mA, 0-30 V).
  - 2 analog outputs (4-20 mA, 0-10 V) for interfacing with building management sensors and systems.
# Feature guide

## General
- Use on LV, MV, and HV systems
- Current accuracy: 0.1 % reading
- Voltage accuracy: 0.1 % reading
- Active energy accuracy: 0.1 Class
- Number of samples/cycle or sample frequency: 1024
- High-Speed Transient Capture: 10 MHz (200 k for 50 Hz; 167 k for 60 Hz)

## Instantaneous rms values
- Current, voltage, frequency
- Active, reactive, apparent power: Total and per phase
- Power factor: Total and per phase

## 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
- Synchronization of the measurement window
- Setting of calculation mode: Block, sliding

## Power Quality measurements
- Harmonic distortion: Current and voltage
  - Individual harmonics: via front panel and web page: 63
  - via EcoStruxure™ software: 511
- Waveform capture
- Detection of voltage swells and sags
- Fast acquisition: 1/2 cycle data
- EN 50160 compliance checking
- Customizable data outputs (using logic and math functions)
- IEEE 519 compliance checking

## Data recording
- Min/max of instantaneous values
- Data logs
- Event logs
- Trending/forecasting
- SER (Sequence of event recording)
- Time stamping
- PTP, IRIG-B, and GPS time synchronization (± 1ms)
- Memory: 2000 MB

## Display and I/O
- Front panel display, 2 options: 96 mm & 192 mm
- Pulse output: 2
- Digital or analog inputs (max): 32 digital, 16 analog
- Digital or analog outputs (max, including pulse output): 4 digital, 10 relay, 8 analog

## Communication
- RS-485 port(s): 2
- Ethernet port(s): 2x 10/100BASE-TX, RJ45 connector, CAT5/5e/6/6a cable
- Serial port protocols (Modbus, ION, DNP3, DLMS/COSEM)
- Ethernet port protocols (Modbus, ION, DNP3, DLMS/COSEM, IEC 61850)
- Ethernet gateway
- Alarm notification via email
- HTTP/HTTPS web server with waveform viewer
- SNMP with custom MIB and traps for alarms
- SMTP email
- PTP and NTP time synchronization
- SFTP file transfer
# ION9000 series

## Technical specifications

### Electrical characteristics

<table>
<thead>
<tr>
<th>Type of measurement</th>
<th>True rms to 1,024 samples per cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement accuracy</strong></td>
<td></td>
</tr>
<tr>
<td>Current &amp; voltage</td>
<td>Class 0.1 as per IEC 61557-12</td>
</tr>
<tr>
<td>Active Power</td>
<td>Class 0.1 as per IEC 61557-12</td>
</tr>
<tr>
<td>Power factor</td>
<td>Class 0.5 as per IEC 61557-12</td>
</tr>
<tr>
<td>Frequency</td>
<td>Class 0.02 as per IEC 61557-12</td>
</tr>
<tr>
<td>Active energy</td>
<td>Class 0.1S IEC 62053-22</td>
</tr>
<tr>
<td>Reactive Energy</td>
<td>Class 0.5S IEC 62053-24</td>
</tr>
</tbody>
</table>

### Display refresh rate

- HMI display updated once per second; data refresh rate 1/2 cycle or 1 second

### Input-voltage characteristics

| Specified accuracy voltage   | 57 - 400 V L-N / 100 - 690 V L-L |
| Impedance                    | 5 MΩ per phase                   |
| Specified accuracy frequency | 42 to 69 Hz (50/60 Hz nominal)   |
| Limit range of operation frequency | 20 to 450 Hz |

### Input-current characteristics

| Rated nominal current        | 1 A (0.1S), 5 A (0.1S), current class 2, 10, 20 A (0.1 ANSI) |
| Specified accuracy range     | Starting Current: 1 mA (no accuracy) Accurate Range: 10 mA - 20 A |
| Permissible overload         | 500 A rms for 1.0s |
| Impedance                    | 0.0003 Ω per phase |
| Burden                       | 0.01 VA max at 5 A |

### Power supply

**AC/DC**

| 90-480 V AC ±10 % (50/60 Hz ±10 %) 90-120 V AC ±10 % (400 Hz) |
| 110-480 V DC ±15 % |

**Ride-through time** (Values for meters with no optional accessories)

- 100 ms (5 cycles at 50/60 Hz) typ., 120 V AC
- 400 ms (20 cycles at 50/60 Hz) typ., 240 V AC
- 1,200 ms (60 cycles at 50/60 Hz) typ., 480 V AC

**Burden**

- Typical: 16.5 W / 38 VA at 480 V (50/60 Hz)
- Fully optioned: max. 40 W / 80 VA at 480 V (50/60 Hz)

### Input/outputs

**Meter base Only**

- 8 digital inputs (30 V AC/60 V DC)
- 4 Form A (KY) solid state digital output (30 V AC/60 V DC, 75 mA)
- 2 Form C relays (8 A at 250 V AC, 5 A at 24 V DC)

**Optional**

- Digital - 6 digital inputs (30 V AC / 60 V DC) wetted + 2 Form C relay outputs (250 V AC, 8 A)
- Analog - 4 analog inputs (4-20 mA, 0-30 V DC) + 2 analog outputs (4-20 mA, 0-10 V DC)

### Mechanical characteristics

| Weight                          | DIN rail mount meter 1.5 kg |
| I/O modules                     | 0.140 kg                  |
| Touchscreen display             | 0.300 kg                  |
| IP degree of protection         | IP 65, UL type 12         |
| Panel mount and touchscreen display, front. | IP 30. Panel mount rear, DIN rail mount, I/O modules |
| Excellent quality              | ISO 9001 and ISO 14000 certified manufacturing |
| Dimensions                     | Panel mount               |
| DIN rail mount meter            | 160 x 160 x 135.3 mm     |
| Color remote display            | 197 x 175 x 27.5 mm touchscreen |
| Panel mount display             | 96 x 96 x 27 mm pushbutton |
| I/O modules                     | 90.5 x 90.5 x 22 mm      |
| Touchscreen display(s)          | 192 mm and 96 mm          |
**ION9000 series**

<table>
<thead>
<tr>
<th>Environmental conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
</tr>
<tr>
<td>Remote Display Unit</td>
</tr>
<tr>
<td>Storage temperature</td>
</tr>
<tr>
<td>Humidity rating</td>
</tr>
<tr>
<td>Installation category</td>
</tr>
<tr>
<td>Operating altitude (maximum)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electromagnetic compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC standards</td>
</tr>
<tr>
<td>Immunity to electrostatic discharge</td>
</tr>
<tr>
<td>Immunity to radiated fields</td>
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<tr>
<td>Immunity to fast transients</td>
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<tr>
<td>Immunity to surges</td>
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<tr>
<td>Immunity to conducted disturbances</td>
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<tr>
<td>Immunity to power frequency magnetic fields</td>
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<tr>
<td>Immunity to conducted disturbances, 2-150kHz</td>
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<tr>
<td>Immunity to voltage dips &amp; interruptions</td>
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<tr>
<td>Immunity to ring waves</td>
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<tr>
<td>Conducted and radiated emissions</td>
</tr>
<tr>
<td>Surge withstand Capability (SWC)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet to serial line gateway</td>
</tr>
<tr>
<td>Web server</td>
</tr>
<tr>
<td>Serial port RS-485</td>
</tr>
<tr>
<td>Ethernet port(s)</td>
</tr>
<tr>
<td>Protocol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Firmware characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-speed data recording</td>
</tr>
<tr>
<td>Harmonic distortion</td>
</tr>
<tr>
<td>Sag/swell detection</td>
</tr>
<tr>
<td>Disturbance direction detection</td>
</tr>
<tr>
<td>Detection and capture of transients</td>
</tr>
<tr>
<td>High-Speed Transient Capture</td>
</tr>
<tr>
<td>Instantaneous</td>
</tr>
<tr>
<td>Load profiling</td>
</tr>
<tr>
<td>Trend curves</td>
</tr>
<tr>
<td>Waveform captures</td>
</tr>
<tr>
<td>High-Speed Transient Waveform captures</td>
</tr>
</tbody>
</table>
## ION9000 series

### Firmware characteristics (cont.)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms</td>
<td>Threshold alarms, adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm, user-defined or automatic alarm threshold settings, user-defined priority levels (optional automatic alarm setting).</td>
</tr>
<tr>
<td>Advanced Time of Use (TOU)</td>
<td>4 seasons, 5 different day types: weekend, weekday, and holiday, up to 4 tariffs per day type.</td>
</tr>
<tr>
<td>Advanced network security</td>
<td>Up to 50 users with unique access rights. Perform resets, time sync, or meter configurations based on user privileges.</td>
</tr>
<tr>
<td>Memory</td>
<td>2,000 MB.</td>
</tr>
<tr>
<td>Firmware update</td>
<td>Update via the communication ports.</td>
</tr>
</tbody>
</table>

### Display characteristics

<table>
<thead>
<tr>
<th>Display Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 mm pushbutton display</td>
<td>320 x 240 (1/4 VGA) color LCD, configurable screens, 5 buttons and 2 LED indicators (alarm and meter status).</td>
</tr>
<tr>
<td>192 mm touchscreen display</td>
<td>800 x 480 pixels, 177.8 mm (7&quot;) Color LCD, +/- 85 degree view angle, sunlight readable, dual capacitive touch, usable when wet or through Class 0 lineman gloves, impact resistant to 5 joules, IP65 rating.</td>
</tr>
<tr>
<td>Languages</td>
<td>English, French, Spanish, Russian, Portuguese, German, Italian, Chinese.</td>
</tr>
<tr>
<td>Notations</td>
<td>IEC, IEEE.</td>
</tr>
</tbody>
</table>

### The HMI menu includes

- Alarms: Active alarms, historic alarms (50+ alarms).
- Basic reading: Voltage, current, frequency, power summary.
- Power: Power summary, demand, power factor.
- Energy: Energy total, delivered, received.
- Events: Timestamped verbose event log.
- Power Quality: EN 50160, IEEE 519, harmonics, phasor diagrams.
- Inputs/Outputs: Digital inputs, digital outputs, relay outputs, analog inputs, analog outputs.
- Nameplate: Model, serial and FW version.
- Custom screens: Build your own metrics.

### ION9000 Commercial reference numbers

<table>
<thead>
<tr>
<th>Commercial reference number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>METSEION92030</td>
<td>ION9000 meter, DIN mount, no display, HW kit.</td>
</tr>
<tr>
<td>METSEION92040</td>
<td>ION9000 meter, DIN mount, 192 mm display, B2B adapter, HW kit.</td>
</tr>
<tr>
<td>METSEION95030</td>
<td>ION9000T HSTC meter, DIN mount, no display, hardware kit.</td>
</tr>
<tr>
<td>METSEION95040</td>
<td>ION9000T HSTC meter, DIN mount, 192 mm display, B2B adapter, hardware kit.</td>
</tr>
<tr>
<td>METSEPM89RD96</td>
<td>Remote display, color LCD, 96 x 96 mm.</td>
</tr>
<tr>
<td>METSERD192</td>
<td>Remote display, color touchscreen, 192 x 192 mm.</td>
</tr>
<tr>
<td>METSEPM89M2600</td>
<td>I/O module, 2 relay outputs, 6 digital inputs.</td>
</tr>
<tr>
<td>METSEPM89M0024</td>
<td>I/O module, 2 analog outputs, 4 analog inputs.</td>
</tr>
<tr>
<td>METSE9HWK</td>
<td>ION9000 meter hardware kit – plugs, terminal guards, spare grounding screw, DIN clips.</td>
</tr>
<tr>
<td>METSERD192HWK</td>
<td>RD192 remote display hardware kit.</td>
</tr>
<tr>
<td>METSE9USBK</td>
<td>ION9000 USB cover hardware kit.</td>
</tr>
</tbody>
</table>

Contact your Schneider Electric representative for complete ordering information.
ION9000 series

ION9000 meter dimensions

ION9000 mounting template

ION9000 back-to-back (B2B) dimensions

ION9000 192 mm display dimensions

ION9000 96 mm display dimensions

Please refer to ION9000 Series Meter Installation Sheet for accurate and complete information on the installation of this product.
ION9000 series

ION9000 meter DIN rail dimensions

ION7x50 mounting adapter dimensions

ION9000 meter click installation