

Schneider Electric

ION7550/ION7650

Technical Datasheet





ION7550 remote display

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, mounted integrally, or remote mounted color, touchscreen display. Screen-based menu system to configure meter settings including IEC or IEEE notations. Multilingual support for English, French and Spanish. 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*, EN50160*, IEC 61000-4-7*, IEC 61000-4-15⁽¹⁾, IEEE 519, IEEE 1159, and CBEMA/ITIC). Evaluate flicker based on IEC 61000-4-15⁽¹⁾ and IEEE 1453*.

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 direction relative to the meter (upstream or downstream of the meter). Results captured in the event log, along with a timestamp and certainty level.

Setpoint learning

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

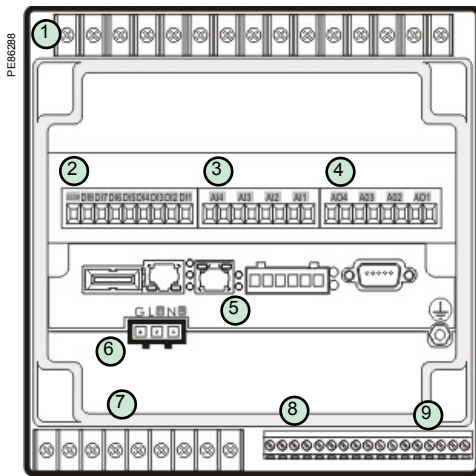
Notify alarms via email

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

* ION7650 only

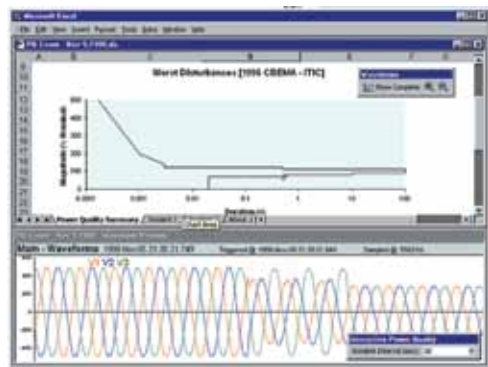
ION7550 / ION7650

Functions and characteristics (cont.)



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 (1 A to 5 A)		0.1 % reading	0.1 % reading
Voltage accuracy (57 V to 288 V)		0.1 % reading	0.1 % reading
Energy accuracy		0.2 %	0.2 %
Number 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 A to 20 A	0.01 A to 20 A
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 StruxureWare	127	511
Waveform capture		■	■
Detection of voltage swells and sags		■	■
Detection and capture of transients		-	20 μs*
Flicker		-	■
Fast acquisition of 100 ms or 20 ms data		■	■
EN 50160 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		10 MB	10 MB
Display and I/O			
Front panel 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)		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		■	■

* For 50 Hz line frequency; 17μs for 60 Hz line frequency.

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Functions and characteristics (cont.)

PE86126



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	± 0.005 Hz
	Power factor	± 0.002 from 0.5 leading to 0.5 lagging
	Energy:	IEC 62053-22 0.2S, 1 A and 5 A
Data update rate	1/2 cycle or 1 second	
Input-voltage characteristics	Measurement range	Autoranging 57 V through 347 V L-N / 600 V L-L
	Impedance	5 M/phase (phase - Vref)
	Frequency measurement range	42 Hz to 69 Hz
Input-current characteristics	Rated nominal current	1 A, 2 A, 5 A, 10 A
	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 (5 A) 50 A rms for 1 s, non-recurring (1 A)
	Impedance	0.002 per phase (5 A) 0.015 per phase (1 A)
	Burden	0.05 VA per phase (5 A) 0.015 VA per phase (1 A)
	Power supply	AC
	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
Input/outputs*	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	
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
	Display operating range	-20 to 60 °C
Storage temperature	Display, TRAN	-40 to 85 °C
Humidity rating	5 % to 95 % non-condensing	
Installation category	III 2000 m above sea level	
Dielectric withstand	As per EN 61010-1, IEC 62051-22A**	

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

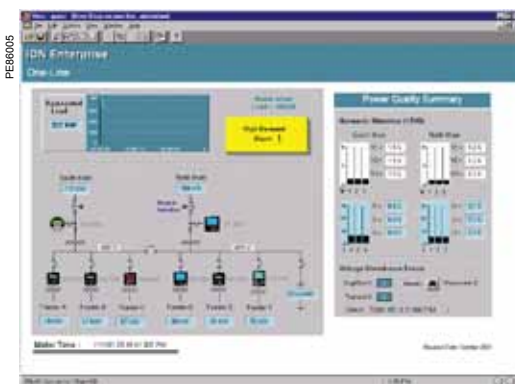
Europe	IEC 61010-1	
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Communication

RS-232/RS-485 port *	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 (328 ft) link	
Fibre-optic Ethernet link	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	

* Consult the ION7550 / ION7650 Installation Guide for complete specifications.

** IEC 62051-22B with serial ports only.



Example showing instantaneous values and alarm.

Communication* (cont.)

Protocol	ION, Modbus, TCP/IP, DNP 3.0, Telnet, IEC 61850
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
WebMeter	5 customisable pages, new page creation capabilities, HTML/XML compatible

Firmware characteristics

High-speed data recording	Down to 5 ms 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
Sag/swell detection	Analyse severity/potential impact of sags and swells: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - sub-cycle disturbance capture - maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10 MB 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: <ul style="list-style-type: none"> - 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 MB to 10 MB (specified at time of order)
Firmware update	Update via the communication ports

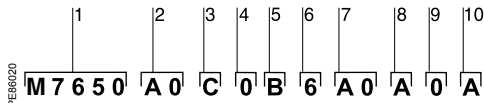
Display characteristics

Integrated display	Backlit LCD, configurable screens
Remote display	Colour touchscreen LCD, configurable screens
Languages	English, French, Spanish
Notations	IEC, IEEE

* All the communication ports may be used simultaneously.

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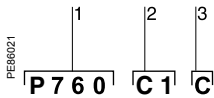
Functions and characteristics (cont.)



Example ION7650 product part number.

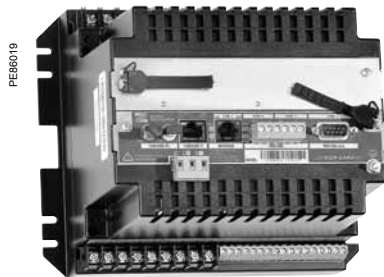
- 1 Model.
- 2 Form factor.
- 3 Current Inputs.
- 4 Voltage Inputs.
- 5 Power supply.
- 6 System frequency.
- 7 Communications.
- 8 Inputs/outputs.
- 9 Security.
- 10 Special order.

Part numbers		
Item	Code	Description
1	M7650	Advanced meter with wide-range voltage inputs (57-347 V L-N or 100-600 V L-L), transient detection, data and waveform recording, IEC 61000-4-30 Class A & EN 50160. Supports ION, IEC 61850 (only for meters with Ethernet comm card) Modbus-RTU, and DNP 3.0.
	M7550	Advanced meter with wide-range voltage inputs (57-347 V L-N or 100-600 V L-L), sag/swell detection, data and waveform recording. Supports ION, IEC 61850 (only with Ethernet comm card) Modbus-RTU, and DNP 3.0.
2	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	C
E		1 A nominal, 10 A full scale current input
F		Current Probe Inputs (for 0-1 V AC current probes; sold separately)
G		Current Probe Inputs with three Universal Technic 10 A clamp on CTs; meets IEC 1036 accuracy
4	0	57 to 347 V AC L-N / 100 to 600 V AC L-L
5	B	Standard power supply (85-240 V AC, ±10 %/47-63 Hz / 110-300 V DC, ±10 %)
	C	Low voltage DC power supply (20-60 V DC)
6	5	Calibrated for 50 Hz systems
	6	Calibrated for 60 Hz systems
7	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), 56 k universal internal modem (RJ11). Ethernet and modem gateway functions each use a serial communications port.
	D7	Standard communications plus 10BASE-T/100BASE-TX Ethernet (RJ45) and 100BASE-FX Ethernet Fiber, 56 k 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 56 k universal internal modem (RJ11). Modem gateway function uses a serial port.
8	A	Standard I/O (8 digital ins, 3 Form C relays, 4 Form A solid-state out)
	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	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



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.



PowerLogic™ ION7550 TRAN

Part numbers (cont'd)

Item	Code	Description
10 Other options	A	None
	C	Tropicalisation treatment applied
	E	ION7650 only. EN 50160 compliance monitoring, IEC 61000-4-30 Class A measurements
	F	ION7650 only. EN 50160 compliance monitoring, with tropicalisation treatment, IEC 61000-4-30 Class A measurements

Communications Card *

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, 100BASE-FX 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 110BASE-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, 100BASE-FX 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 56 k 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.
	E	Expansion I/O card with eight digital inputs, four 0 to 20 mA analogue inputs
	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
Special Order	P	Expansion I/O card with eight digital inputs, four 0 to 1 analogue inputs and four -1 to 1 mA analogue outputs
	A	None
	C	Tropicalization treatment applied

ION7550 / ION7650

Functions and characteristics (cont.)

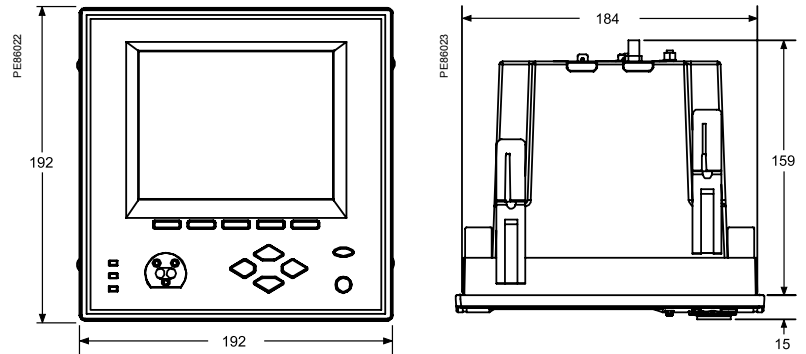
Commercial reference numbers	
ION7550 / ION7650	Commercial ref. no.
ION7550	M7550
ION7650	M7650
Remote display	M765RD
Remote display w/power supply	M765RDPS
SE-7650-I/10M/1024-5A-P24-50-ETH-EN PML 7650 Power Meter	M7650B1C0C5E0A0E
7650-I/10M/512S-5A-P240-60-ETH-ET PML 7650 Power Meter	M7650B0C0B6E0A0F
7650-I/5M/512S-1A-P240-60-ETH-EN50160 MG 7650 Power Meter	M7650A0E0B6E0A0E
7650-I/10M/1024-5A-P240-50-ETH-20MAI PML 7650 Power Meter	M7650A1C0B5E0E0A
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7650-I/5M/512S-5A-P240-60-FIBER PML 7650 Power Meter	P7650A0C0B6F1A0A
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7650-I/5M/512S-5A-P240-50-FIBER-EN PML 7650 Power Meter	M7650A0C0B6F1A0E
7650-I/5M/512S-5A-P240-60-ETH-20MA-IN PML 7650 Power Meter	P7650A0C0B6E0E0A
7650-I/10M/1024-5A-P240-60-FBR-1MAF-EN PML 7650 Power Meter	P7650B1C0B6F1P0E
7650-I/10M/512-5A-P240-60-FBRMDM PML 7600 Power Meter	P7650B0C0B6D7A0A
7650-I/10M/1024-5A-P240-50-EMDM 7650 Power Meter	P7650B1C0B5C1A0A
7650-I/5M/512S-5A-P240-60-FBRMDM PML 7650 Power Meter	P7650A0C0B6D7A0A
7650-I/5M/512S-5A-P240-60-EMDM-20MAF PML 7650 Power Meter	P7650A0C0B6D7N0A
7650-I/5M/512S-5A-P240-60-EMDM PML 7650 Power Meter	P7650A0C0B6C1A0A
7550-I/5M/512S-5A-P240-60-ETH-TR PML 7550 Power Meter	M7550A0C0B6E0A0C
7550-I/5M/512S-5A-P240-60-ETH-20MAI PML 7550 Power Meter	P7550A0C0B6E0E0A
7550-I/10M/512S-5A-P240-60-ETH-20MAI PML 7550 Power Meter	P7550B0C0B6E0E0A
7550-I/10M/512S-1A-P240-60-ETH-TROP PML 7550 Power Meter	M7550B0E0B6E0A0C
7550-I/5M/512S-5A-P240-60-MDM PML 7550 Power Meter	P7550A0C0B6M1A0A
ION7550 / ION7650 related items	
Description	Commercial ref. no.
Adapter plate to fit meter into a 3710 or 3720 ACM panel cutout	ADPT-37XX-7500
Terminal strip cover for the ION7550 or ION7650	TERMCVR-7500
10 A / 1 V AC Universal Technic Clamp On Current Probe	M1UB10A1V-10A
1000 A / 1 V AC Universal Technic Clamp On Current Probe	P32UEP813-1000A
3000 A / 1 V AC Universal Technic Clamp On Current Probe	P32UEP815-3000A
5 A / 0.333 V AC Magnelabs Split Core Current Probe	SCT0750-005-5A
300 A / 0.333 V AC Magnelabs Split Core Current Probe	SCT1250-300-300A

* Firmware version 350 or higher required.

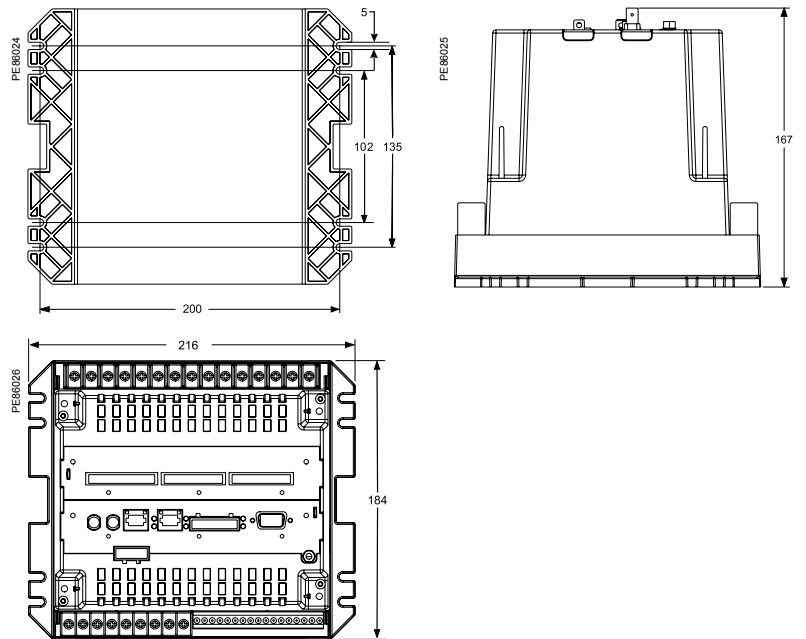
ION7550 / ION7650

Dimensions and connection

ION7550/ION7650 dimensions

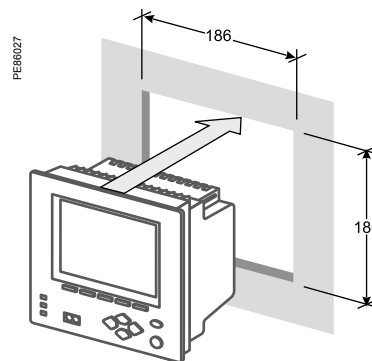


ION7550 / ION7650 TRAN dimensions



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 installed through a circular cutout (22.5 mm diameter) at the panel door and it has a front and a back module that is connected to the meter mounted in a DIN rail at the back.



See appropriate Install Guide for this product.

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RCS Nanterre 954 503 439
Capital social 896 313 776
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**ION7550 & ION7650 Power Meter
PLSED306011EN**

As standards, specifications and designs develop from time to time, please ask for confirmation of the information given in this document.

Design: Schneider Electric
Photos: Schneider Electric

Over 75 % of Schneider Electric products
have been awarded the Green Premium ecolabel



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