

ION7550 / ION7650 Functions and characteristics (cont.)

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PowerLogic ION7650

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Electrical cha	racteristics			
Type of measurer	nent	True rms to 1024 samples per cycle (ION7650)		
Measurement	Current and voltage	±0.01 % of reading + ±0.025 % of full scale		
accuracy	Power	± 0.075 % of reading $\pm \pm 0.025$ % of full scale		
	Frequency	±0.005 Hz		
	Power factor	±0.002 from 0.5 leading to 0.5 lagging		
	Eneray:	IEC62053-22 0.2S. 1 A and 5 A		
Data update rate		1/2 cycle or 1 second		
Input-voltage	Measurement range	Autoranging 57V through 347V LN / 600V LL		
characteristics	Impedance	5 MO/phase (phase - \/ref)		
	Frequency measurement	42 to 69Hz		
Input-current	Rated nominal current	1A. 2A. 5A. 10A		
characteristics	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 1s, non-recurring (1 A)		
	Impedance	0.002Ω per phase (5 A) 0.015Ω per phase (1 A)		
	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		
Input/outputs ⁽¹⁾	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 analog outputs, and/or 4 analog inputs		
Mechanical c	haracteristics			
Weight		1.9 kg		
IP degree of prote	ection (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		
Environmenta	al conditions			
Operating	Standard power supply	-20 to +70°C		
temperature	Low voltage DC supply	-20 to +50°C		
	Display operating range	-20 to +60°C		
Storage	Display, TRAN	-40 to +85°C		
temperature				
Humidity rating		5 to 95 % non-condensing		
Installation catego	ory	III (2000 m above sea level)		
Dielectric withsta		AS per EN 61010-1, IEC 62051-22A ⁽²⁾		
Electromagneti	c compatibility			
Electrostatic discl	narge	IEC 61000-4-2		
Immunity to radia	ted fields	IEC 61000-4-3		
immunity to fast ti	ransients	IEC 61000-4-4		
immunity to surge	es	IEC 61000-4-5		
Conducted and ra	adiated emissions	UISPR 22		
Safety		Less		
Europe		IEC 61010-1		
Communicatio	on	La constante de		
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 link		
Fibre-optic Etherr	net link	100 Base FX, SC duplex connector, 1300 nm, FO multimode with gradient index 62.5/125 μm or 50/125 $\mu m,$ 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.)

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Communication (cont.)

Protocol

ION, Modbus, TCP/IP, DNP 3.0, Telnet, IEC 61850(2)



Example WebMeter page showing realtime values.

EtherGate	Communicates directly with up to 62 slave devices via
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 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)
Memory Firmware update	5 to 10 Mbytes (specified at time of order) Update via the communication ports
Memory Firmware update Display characteristics	5 to 10 Mbytes (specified at time of order) Update via the communication ports
Memory Firmware update Display characteristics Integrated display	5 to 10 Mbytes (specified at time of order) Update via the communication ports Back lit LCD, configurable screens
Memory Firmware update Display characteristics Integrated display Languages	5 to 10 Mbytes (specified at time of order) Update via the communication ports Back lit LCD, configurable screens English, French, Spanish, Russian

(2) Only available with 5 MB memory meters.

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Example showing instantaneous values and alarm.

ION7550 / ION7650 Functions and characteristics (cont.)

		Part numbers		
1 2 3 4 5 6 7 8 9 10		Item	Code	Description
M 7 6 5 0 A 0 C 0 B 6 A 0 A 0 A Example ION7650 product part number.	1	Model	M7650	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.
 Model. Form factor. Current Inputs. Voltage Inputs. 			M7550	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.
5 Power supply.6 System frequency.7 Communications.	2	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).
8 Inputs/outputs.9 Security.			A1	ION7650 only. Integrated display with front optical port, 5 MB logging memory, and 1024 samples/cycle resolution.
10 Special order.			B0	Integrated display with front optical port, 10 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/ cycle (ION7550).
			B1	ION7650 only. Integrated display with front optical port, 10 MB logging memory, and 1024 samples/cycle resolution.
			Т0	Transducer (no display) version, with 5 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550).
			T1	ION7650 only. Transducer (no display) version, with 5 MB logging memory, and 1024 samples/cycle resolution.
			UO	Transducer (no display) version, with 10 MB logging memory, and 512 samples/cycle resolution (ION7650) or 256 samples/cycle (ION7550).
			U1	ION7650 only. Transducer (no display) version, with 10 MB logging memory, and 1024 samples/cycle resolution.
	3	Current Inputs	С	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 V AC current probes; sold separately)
			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	В	Standard power supply (85-240 V AC, ±10 %/47-63 Hz / 110-300 V DC, ±10 %)
			С	Low voltage DC power supply (20-60 V DC)
	6	System Frequency	5	Calibrated for 50 Hz systems
			6	Calibrated for 60 Hz systems
	7	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.
			CT.	(RJ45), 56k 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 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	3 1/0	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 &
			К	four 0 to 20 mA analog inputs). Standard I/O plus Expansion I/O card (8 additional digital inputs &
			N	four 0 to 20 mA analog outputs). Standard I/O plus Expansion I/O card (8 additional digital inputs &
			P	four 0 to 20 mA analog inputs and four 0 to 20 mA outputs).
	0	9 Security	0	four 0 to 1 analog inputs and four -1 to 1 mA analog outputs).
	9	9 Security	1	Password protected, no naroware lock.
			1	jumper on comm card).
			6	Password protected with security lock enabled, terminal cover and

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ION7650 / ION7550 Functions and characteristics (cont.)

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Part numbers (cont'd)



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.

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2 Type3 Special order.

	Item	Code	Description
10 O	Other options	А	None
		С	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
	Communication	s Card (1)
	Item	Code	Description
1	Comm card	P765C	ION7550 / ION7650 communication card for field retrofit installations
2	Туре	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
		С	Tropicalization treatment applied

1		I
input/Outpu	it expansion	card

Item	Code	Description	
I/O card	P760A	Expansion I/O for field retrofit installations.	
Туре	D	Expansion I/O card with eight digital inputs, four 0 to 1 mA analog inputs	
	E	Expansion I/O card with eight digital inputs, four 0 to 20 mA analog inputs	
	Н	Expansion I/O card with eight digital inputs, four -1 to 1 mA analog outputs	
	К	Expansion I/O card with eight digital inputs, four 0 to 20 mA analog outputs	
	N	Expansion I/O card with eight digital inputs, four 0 to 20 mA analog inputs & four 0 to 20 mA outputs	
	Р	Expansion I/O card with eight digital inputs, four 0 to 1 analog inputs and four -1 to 1 mA analog outputs	
Special Order	А	None	
	С	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 V AC Universal Technic Clamp On Current Probe	
P32UEP813-1000 A	1000 A / 1 V AC Universal Technic Clamp On Current Probe	
P32UEP815-3000 A	3000 A / 1 V AC Universal Technic Clamp On Current Probe	
SCT0750-005-5 A	5 A / 0.333 V AC Magnelabs Split Core Current Probe	
SCT1250-300-300 A	300 A / 0.333 V AC Magnelabs Split Core Current Probe	
(1) Firmwore version 250 or higher required		

(1) Firmware version 350 or higher required.

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ION7550/ION7650

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Installation and connection



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 and it has a front and a back module that is connected to the meter mounted in a DIN rail at the back.



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ION7550/ION7650

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Installation and connection (cont.)



N L1 L2 L3 Fuse for N/- required if FR6020 neutral is ungrounded Protection (3 A) ζ Power supply L/+ N/- 😌 Q V1 . IProtectior V2 (\mathbf{I}) (2 A) V3 T V4 Connect G terminal Vref to ground for AC power source 111 112 121 Shorting 122 block 131 132 141 -l4 optional 142 151 152 Ŧ

Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

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ION7550 / ION7650

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Installation and connection (cont.)

Form C digital outputs: mechanical relays R1 - R3



Note: Mechanical relays should always be protected by external fuses

Form A digital outputs: solid state relays D1 - D4



Note: D4 output is factory-configured to pulse once every 1.8 Wh for Class 20 meters, or once every 0.18Wh for Class 2 meters (for calibration testing purposes).

Digital inputs: S1 - S8





Note: External Supply = 130 V DC max

Digital inputs: DI1 - DI8 (option)





Note: External Supply = 50 V DC max

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ION7550/ION7650

Installation and connection (cont.)

Analog inputs: Al1 to Al4 (option)

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Note: do not connect the analog inputs of the I/O card to the analog outputs on the same I/O card.

Analog outputs: AO1 to AO4 (option)



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Note: do not connect the analog inputs of the I/O card to the analog outputs on the same I/O card.

PB105412

PB105414

ION7550/ION7650 remote display (optional)





(1) Steel sheet (2) Glass fiber reinforced plastics (minimum GF30)

NOTE: Without the tee option, the rotating torque that can be supported by the display module is 2.5 Nm (22.12 in-lb).





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 and it has a front and a back module that is connected to the meter mounted in a DIN rail at the back.

ION8600 Functions and characteristics



PowerLogic ION8600 socket meter

Used to monitor electric energy provider networks, service entrances and substations, PowerLogic ION8600 meters are ideal for independent power producers and cogeneration 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 Monitoring (ION Enterprise[™]) operations software or other energy management and SCADA systems through multiple communication channels and protocols, including MV-90, Modbus and DNP.

Applications

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Tariff 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

Main characteristics

ANSI C12.20 Class 0.2, IEC 62053-22/23 Class 0,2S metering

For interconnection points on medium, high, and ultra-high voltage networks in compliance with IEC 62053-22/23 Class 0.2S, IEE 519

Power quality compliance monitoring

Monitor compliance with international quality-of-supply standards (EN50160, IEC61000-4-7, IEC61000-4-15, CBEMA/ITIC)

Digital fault recording

Simultaneous capture of voltage and current channels for sub-cycle disturbances

Complete communications

Multi-port, multi-protocol access serial ports, infrared data port, internal modem, Itron software support, optional IRIG-B port; supports concurrent Ethernet, serial, and modem communications

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 I/O functions

A total of 65 setpoints are configurable for 1-second or $\frac{1}{2}$ - cycle operation.

Power quality summary

Consolidation of all the power quality characteristics into a single trendable index

Integrate with software

Easily integrate with StruxureWare Power Monitoring (ION Enterprise) operations software or other energy management systems; MV-90, DNP, Modbus, UTS, Pacis and third-party SCADA packages

Transformer/line loss compensation

Determine technical system losses in real time

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

Part numbers

ION8600 meters		
ION8600A	M8600A	
ION8600B	M8600B	
ION8600C	M8600C	

See page 111 for complete part number descriptions.

Options See page 112.

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ION8600

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Functions and characteristics (cont.)



PowerLogic ION8600 socket meter.

- 1 Blades
- 2 Optical port
- 3 Main display status bar
- 4 Watt LED

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- 5 Navigation, ALT/Enter buttons6 VAR LED
- 7 Form factor label
- 8 Demand reset switch



Disturbance waveform capture and power quality report

Selection guide			
Selection guide			10N8600C
		ION8600B	
General		_	_
Use on LV, MV and HV systems		■ 0.1.0/	0.1.0/
		0.1%	0.1%
Power accuracy		0.1%	0.1%
Samples/cycle		256	256
Instantanoous rms valuos		230	230
Current voltage frequency (Class (125)		
Active reactive apparent power	Total and ner phase	-	-
Power factor	Total and per phase		
Current measurement range		0.001 - 20 A	0.001 - 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	nt window	•	•
Demand modes: Block (sliding), the	rmal (exponential)	•	•
Power quality measurement	S		
Harmonic distortion	Current and voltage		
Individual harmonics	Via front panel	63	31
Waveform / transient capture	· · ·	(¹)	-
Harmonics: magnitude, phase and i	nterharmonics		
Detection of voltage sags and swell	S	(¹⁾	
IEC 61000-4-30 Class A/S			
IEC 61000-4-15 (Flicker)		(¹)	-
High speed data recording (down to	10 ms)	•	-
EN50160 compliance reporting		(1)	-
Programmable (logic and math func	tions)	•	•
Data recording			
Onboard memory (in Mbytes)		10 ⁽¹⁾ , 4 ⁽²⁾	2
Revenue logs			•
Event logs		-	-
Historical logs		-	-
Harmonics logs		-	-
Transient logs		-	-
Time stamping to 1 ms		-	-
GPS synchronisation (IPIG-B stand	ard)	-	-
Display and I/O	aru)	-	-
Front panel display			
Wiring self-test		-	-
Pulse output (front nanel LED)		2	2
Digital or analogue inputs ^{(3) (max)}		11	11
Digital or analogue outputs ⁽³⁾ (max	including pulse output)	16	16
Communication	inolaanig paloo oatpat/	10	10
RS 485 / RS 232 port		1	1
RS 485 port		1	1
Infrared port		1	1
Ethernet port (Modbus/TCP/IP prote	ocol) with gateway	1	1
HTML web page server Meterm@ail	(email alarms & datalogs)	•	•
Internal modem with gateway (Mod	emGate)	1	1
IRIG-B port (unmodulated IRIG BOD	x time format)	1	1
Modbus TCP Master / Slave (Ethern	net port)	■/■	-/
Modbus RTU Master / Slave (Serial	ports)	■/■	-/
DNP 3.0 through serial, modem, and			
(1) Feature set 'A' only.			
(∠) ⊢eature set 'B' only. (3) With ontional I/O Expander			
(4) For 9S, 36S only. For 35S system	m up to 480V line-to-line.		

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ION8600

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Functions and characteristics (cont.)



PowerLogic ION8600 front panel harmonic display.

Electrical cha	racteristics	
Type of measurer	ment	True rms up to the 63 rd harmonic Up to 256 samples per cycle Up to 5 kHz for transient events
Measurement	Current and voltage	0.2 %
accuracy	Power	0.2 %
	Frequency	±0.005 Hz
	Power factor	0.2 %
	Energy	IEC 62053-22/23 (0.2S)
Data update rate		1/2 cycle or 1 second (depending on value)
Input-voltage	Measured voltage	57 V to 277 V autoranging (9S)
characteristics		120 V to 480 V autoranging (35S)
	Overload	120 - 277 (+/-20 %) VLN RMS, 6 hours max ¹ (standard); 57.7 - 69.3 (+/- 20 %) VLN rms, 6 hours max ¹ (low voltage); 120 - 480 (+/- 20 %) VLL rms, 6 hours max ¹ (35S)
	Impedance	$5 \text{M}\Omega$ /phase (phase-Uref/Ground)
	Inputs	V1, V2, V3, VREF
Input-current	Rated nominal/current	5 A and/or 10 A (Standard, class 10/20)
characteristics	class	1 A, 2 A and 5 A (Optional, class 1/10)
	Measurement range	0.05 - 20 A autoranging (5A nominal) 0.01 - 10 A autoranging (1A nominal)
	Permissible overload	500 A rms for 1 second, non-recurring (standard) 200 A rms for 1 second, non-recurring (optional)
	Impedance	$0.002 \ \Omega$ per phase (Standard IEC 5 A and 10 A) $0.015 \ \Omega$ per phase (Optional IEC 1 A to 10 A)
	Burden	
Power supply	Standard power supply	120-277 VLN RMS (-15 %/+20 %) 47-63 Hz or 120-480 VLN RMS (-15 %/+20 %) 47-63 Hz (35S)
	Low voltage power supply, blade powered	57-70 (-15 %/+20 %) VLN RMS, 47-63 Hz (35S unavailable)
	Auxiliary powered, low voltage	AC: 65-120 (+/- 15 %) VLN RMS, 47-63 Hz DC: 80-160 (+/- 20 %) V DC
	Auxiliary powered, high voltage	AC: 160-277 (+/- 20 %) VLN RMS, 47-63 Hz DC: 200-350 (+/- 20 %) V DC
	Ride-through time, (Standard power supply)	Min 100 ms (6 cycles at 60 Hz at 96 V AC), 200 ms (12 cycles at 60 Hz at 120 V AC), 800 ms (48 cycles at 60 Hz at 240 V AC)
	Ride-through time, 57-70 V AC (Low voltage supply)	Min 100 ms or 6 cycles 60 Hz at 46 V AC
Input/outputs	Digital outputs (Form C)	4 Solid state relays (130 V AC/ 200 V DC) 100 mAAC/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 c	haracteristics	
Weight		7.0 kg
IP degree of	Socket	Front IP65, back IP51
protection	Switchboard	Front IP50, back IP30
Dimensions	Socket	178 x 237 mm
	Switchboard	285 x 228 x 163 mm
Environment	al conditions	
Operating temper	rature	-40°C to +85°C
Display operating	range	-20°C to +60°C
Storage temperat	ture	-40°C to +85°C
Humidity rating		5 to 95 % RH non-condensing
Pollution degree		2
Installation catego	ory	Cat III
Dielectric withstand		2.5 kV, 50 Hz, 1 min
Electromagneti	c compatibility	
Electrostatic disc	harge	IEC 61000-4-2
Immunity to radia	ted fields	IEC 61000-4-3
Immunity to fast t	ransients	IEC 61000-4-4
Immunity to surge	9	IEC 61000-4-5
Immunity conduc	ted	IEC61000-4-6
Damped oscillato	rv waves immunity	IEC61000-4-12
Conducted and ra	adjated 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	e of the power supply if a non-aux power supply is used

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ION8600 front panel phasor display and table.

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ION8600

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Functions and characteristics (cont.)



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 bps (RS485 limited to 57,600 bps); protocols: ION, Modbus/RTU, DNP 3.0, GPSTRUETIME/ DATUM.
Internal modem port (COM2)	300 bps-56k bps
ANSI 12.18 Type II optical port (COM3)	Up to 19200 bauds
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
EtherGate	Up to 31 slave devices via serial portsat 10Mbytes/sec.
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
Sag/swell detection	Analyse severity/potential impact of dips and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording or I/O operations
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 are user configurable: - 800 channels via 50 data recorders (feature set A), - 320 channels via 20 data recorders (feature set B), - 32 channels via two 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 256 samples/ cycle) - maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10Mbytes memory)
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 privileges.
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	10 Mbytes (A), 4 Mbytes (B), 2 Mbytes (C)
Firmware update	Update via communication ports
Display characteristics	
Туре	FSTN transreflective LCD
Backlight	LED
Languages	English

 Peeter A
 Feeder B
 Feeder C
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(1) All the communication ports may be used simultaneously.

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ION8600

Functions and characteristics (cont.)



ION8600

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Functions and characteristics (cont.)

Part numbers (cont.)

I/O Expander				
Digital/Analog I/O	P850E	Schneider Electric I/O Expander for ION8600 meters: Inputs and Outputs for energy pulsing, control, energy counting, status monitoring, and analog 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)		
	В	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (0 to 20 mA)		
	С	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (-1 mA to 1 mA)		
	D	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog 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 no 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 adapter	rs			
A-BASE-ADAPTER-9		Form 9S to Form 9A adapter		
A-BASE-ADAPTER-35		Form 35S to Form 35 A adapter		
Optical commu	unication	interface		
OPTICAL-PROBE		Optical communication interface		
Connector cab	les			
CBL-8X00BRKOUT		Breakout Cable: 24-pin female Molex connector to one DB9 female connector for RS 232, and 2 sets of twisted pair wires for two RS 485 port connections		
CBL-8X00IOE5FT		5' 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-8X00IOE15F	Т	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 ION8600 meter with breakout panel to an I/O Expander Box		

- Example order code. Use this group of codes when ordering the I/O Expander.
- 1 Digital / Analog I/O.
- 2 I/O option.
- 3 Cable option.



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ION8600

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Installation and connections



ION8600 switchboard dimensions



I/O Expander dimensions





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Installation and connections (cont.)

ION8600 suggested switchboard mounting dimensions



ION8600 switchboard mounting



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ION8600 Installation and connection (cont.)



Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.



Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

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ION8650 Functions and characteristics

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PowerLogic ION8650 socket meter

Used to monitor electric energy provider networks, service entrances and substations, PowerLogic ION8650 meters are ideal for independent power producers and cogeneration 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 Monitoring (ION Enterprise™) operations 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

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.



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Part numbers

ION8650 meters	
ION8650A	M8650A
ION8650B	M8650B
ION8650C	M8650C

See page 120 for complete part number descriptions.

Options

See page 121.

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ION8650

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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

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- 7 Nameplate label
- 8 Demand reset switch



Disturbance waveform capture and power quality report

Selection guide		ION8650	ION8650	ION865
Generation guide		Δ	B	C
General				
		0.1%	0.1%	0.1%
Voltage accuracy		0.1%	0.1%	0.1%
		0.1%	0.1%	0.1%
Samples/cycle		1024	1024	1024
		1024	1024	1024
Active reactive apparent power	Total & ner phase	-	-	-
Power factor	Total & per phase	-	-	-
	Total a per priase	0 - 20 4	0-204	0-204
Energy values		0 2011	0 2011	0 2077
Active reactive apparent energy				
Settable accumulation modes				
Demand values				
Current	Present & max values			
Active reactive apparent newer	Present & max. Values	-	-	-
Predicted active, apparent power	nt nowor	-	-	-
Fredicied active, reactive, appare		-	-	-
Synchronisation of the measurem		-	-	-
Demand modes. Block (sliding), in	termar (exponentiar)	-	-	-
Power quality measuremen		-	-	-
Harmonic distortion	Current & voltage	•	•	
Individual harmonics	Via front panel	63	63	31
Waveform / transient capture			-/	-/-
Harmonics: magnitude, phase, an	d interharmonics	50	40	-
Detection of voltage sags and swe	ells	•		
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 fui	nctions)	•	•	-
Data recording				1
Onboard Memory (in Mbytes)		128	64	32
Revenue logs		-	-	-
Event logs		-	-	-
Historical logs		-	-	-
Harmonics logs		-	-	-
Sag/swell logs		-	•	-
Iransient logs		-	-	-
Time stamping to 1 ms		-	-	-
GPS synchronisation (IRIG-B star	ndard)	•	•	•
Display and I/O		-	_	
Front panel display		•	•	•
Wiring self-test (requires PowerLo	gic 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, in	cluding 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 pro	otocol) with gateway	1	1	1 ⁽³⁾
Internal modem with gateway (Mo	demGate)	1	1	1 ⁽³⁾
HTML web page server				
IRIG-B port (unmodulated IRIG BO	00x time format)	1	1	1
Modbus TCP Master / Slave (Ethe	ernet port)	■/■	■/■	-/
Modbus RTU Master / Slave (Seri	al ports)	■/■	■/■	-/ 🔳
DNP 3.0 through serial, modem, a	ind I/R ports	•	-	-

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

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ION8650

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Functions and characteristics (cont.)



PowerLogic ION8650 front panel harmonic display.

Electrical cha	ractoristics			
Type of measurer	nent	True rms 1024 samples per cycle		
Maggurament Current and voltage				
accuracy	Dowor			
,	Forei	+0.001 Hz		
	Prequency Dowor factor	10.001 HZ		
	Forev			
	спегду	IEC 62053-22/23 (0.2S)		
Data update rate		0.5 cycle or 1 second (depending on value)		
Input-voltage	Nominal voltage	57 V to 277 VLN rms		
characteristics (1)		100 V to 480 VLL rms (35S)		
	Maximum voltage	347 VLN rms, 600 VLL rms (9S)		
	Impedance	$5 M\Omega$ /phase (phase-Vref/Ground)		
	Inputs	V1, V2, V3, VREF		
Input-current characteristics	Rated nominal/current class	1 A, 2 A, 5 A and/or 10 A (Class 1/2/10/20)		
	Accuracy range	0.01 - 20 A (standard range)		
	Measurement range	0.001 - 24 A		
	Permissible overload	500 A rms for 1 second, non-recurring		
	Burden ner nhase	Socket: Typical: 3 W/ 8 VA/nhase 3-nhase		
	Burden per phase	operation; Maximum: 4 W, 11 VA/phase, 3-phase operation Switchboard: 0.05 VA at 1 A (0.05 Ω max)		
Power supply	Standard power supply, blade powered	120-277 VLN RMS (-15 %/+20 %) 47-63 Hz or 120-480 VLL RMS (-15 %/+20 %) 47-63 Hz (35S)		
	Auxiliary powered low voltage	AC: 65-120 (+/- 15 %) VLN RMS, 47-63 Hz DC: 80-160 (+/- 20 %) V DC		
	Auxiliary powered high voltage	AC: 160-277 (+/- 20 %) VLN RMS, 47-63 Hz DC: 200-300 (+/- 20 %) V DC		
	Ride-through time, (Standard power supply)	Socket: min guaranteed: 6 cycles at nominal frequency (minimun 50 Hz), at 120 V L-N rms (208 V L-L rms) 3-phase operation Switchboard: min guaranteed: 6 cycles at nominal frequency (minimun 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 cl	haracteristics	1		
Weight		7 0 kg		
IP degree of	Socket	Front IP65, back IP51		
protection	Switchboard	Front IP50, back IP30		
Dimensions	Socket	178 x 237 mm		
	Switchboard	285 x 228 x 163 mm		
Environmenta	al conditions	1		
Operating temper	ature	-40°C to +85°C		
Display operating	range	-20°C to +60°C		
Storage temperat		-40°C to +85°C		
Humidity rating	uic	5 to 95 % RH non-condensing		
Pollution degree		2		
Installation catego				
Dielectric withsta	ad	25 kV		
Electromagneti	c compatibility	2.5 KV		
Electrostatic disch		JEC 61000-4-2		
Electrostatic discharge		IEC 61000-4-2		
Immunity to radiated fields		IEC 61000-4-5		
Immunity to fast transients		IEC 61000-4-4		
Immunity to surge	, lod	IEC61000-4-5		
Damped oppillate		IEC61000-4-0		
Conducted and re	ny waves infiniturity			
Safety				
Salety		As per IE 062052 11		
North America		As per ANSI 012.1		

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

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ION8650 front panel phasor display and table.



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ION8650

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Functions and characteristics (cont.)

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PowerLa	ogic'			
Operation			Power Neter	
Consumption	Volts Mode	4W-WYE ·	U1 Polarit	y Normal 💌
Setup	PT Primary	120.00	U2 Polarit	y Normal 💌
Network Setup	PT Secondary	120.00	U3 Polarit	v Normal 💌
	CT Primary	5.00	I1 Polarit	v Normal 💌
	CT Secondary	5.00	I2 Polarit	y Normal 💌
	14 Primary	5.00	13 Polarit	v Normal 💌
	14 Secondary	5.00	I4 Polarit	y Normal 💌
			Powe	r Quality
			Nominal Voltage	e 0.00
	Nameplate	Information	Sliding Wit	ndow Demand
	Owner	My Utility	Sub Interva	1 900.00
	Tag1		# Sub Interval	s 1.00
	Tag2		Predicted Response	a 70.00
				Save
4eter Type Firmware Version	8800 80046 8800			ICAN
lemplate Serial Number	8800_FAC-PQ_V3.1.0.0.0			
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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.
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
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), - 64 channels via 4 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 priviledges.
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	
Туре	FSTN transreflective LCD
Backlight	LED
Languages	English



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ION8650

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Functions and characteristics (cont.)



Example product part number.

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

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10 Security.11 Special order options.



PowerLogic ION8650 meter with switchboard case

D	Part Numbore				
14-		Code	Description		
116	Madal	Loue	Description		
1	Footuro Sot	N18050	Schneider Electric energy and power quality meter.		
2	Fealure Set	A	transient capture with 1024 samples/cycle.		
		В	64MB memory, energy meter Class S EN50160 power quality monitoring.		
		С	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		
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 V AC. Form 35S (socket) and Form 35 (FT21 switchboard): 120-480 V AC. Powered from the meter's voltage connections.		
		н	Auxiliary Power Pigtail: 65-120 V AC or 80-160 V DC (power from external source)		
		J	Auxiliary Power Pigtail: 160-277 V AC or 200-300 V DC (power from external source)		
7	System Frequency	5	Calibrated for 50 Hz systems.		
		6	Calibrated for 60 Hz systems.		
8	Communications	A0	Infrared optical port, RS 232/RS 485 port, RS 485 port		
		C 1	Infrared optical port. RS 232/485 port (note this port is not available with feature set C), Ethernet (10BaseT), 56 k universal internal modem (RJ11),		
		С7	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)), 56 k universal internal modem (RJ11)		
		E0	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))		
	_	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)), 56 k universal internal modem (RJ11).		
9	Onboard I/O	А	None.		
		В	4 Form C digital outputs, 3 Form A digital inputs.		
		С	4 Form C digital outputs, 1 Form A digital output, 1 digital input.		
10	Security	0	Password protected, no security lock		
		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)**		
11	Special Order	А	None		

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

ION8650

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Functions and characteristics (cont.)

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Example order code. Use this group of codes when ordering the I/O Expander.

- 1 Digital / Analog I/O.
- 2 I/O option.3 Cable option.

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Part number	rs (cont	.)	
I/O Expander			
Digital/Analog I/O	P850E	Schneider Electric I/O Expander for ION8600 meters: Inputs and Outputs for energy pulsing, control, energy counting, status monitoring, and analog interface to SCADA.	
I/O option	Α	External I/O box with 8 digital inputs and 8 digital outputs (4 Form A, 4 Form C)	
	В	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (0 to 20 mA)	
	С	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (-1 mA to 1 mA)	
	D	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog 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 no 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 adapter	s		
A-BASE-ADAPTE	R-9	Form 9S to Form 9A adapter	
A-BASE-ADAPTER-35		Form 35S to Form 35 A adapter	
Optical commu	nication	interface	
OPTICAL-PROBE		Optical communication interface	
Connector cab	les		
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	



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ION8650

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Installation and connections

ION8650 socket dimensions





ION8650 switchboard dimensions



I/O Expander dimensions





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ION8650

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Installation and connections (cont.)

ION8650 suggested switchboard mounting dimensions



ION8650 switchboard mounting





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ION8650

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Installation and connection (cont.)



Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.



Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

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ION8800

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Functions and characteristics



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 Essailec 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).

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 129 for complete part number descriptions.

ION8800

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Functions and characteristics (cont.)



PowerLogic ION8800 meter

- 1 Optional communications module.
- 2 Essailec 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.



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

Selection guide	ION8800A	ION8800C
	ION8800B	
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	I	-
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 - 10 A	0.001 - 10 A
Current measurement range	0.001 - 10 A	0.001 - 10 A
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	¹ / ₂ cycle	¹ ⁄ ₂ cycle
Number of setpoints	65	65
GPS time synchronisation (IRIG-B)	-	
Could add transient logs. COM I RADE fault records.		
User configurable log memory	10 Mbytes	10 Mbytes
Display and I/O	I	-
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
	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)		-/
Noopus I CP 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.

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ION8800 Functions and characteristics (cont.)



PowerLogic ION8800 with optional communications module.

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Electrical cha	racteristics				
Type of measurer	nent	True rms			
3F		1024 samples per cycle			
Measurement	Current and voltage	0.1 %			
accuracy	Power	0.2 %			
	Frequency	±0.005 Hz			
	Power factor	0.1%			
	Energy	IEC 62053-22/23 Class 0.2 S			
Data update rate		1/2 cycle or 1 second			
Input-voltage	Inputs	U1, U2, U3, Uref			
characteristics	Measurement range	57-288 LN V AC rms (99-500 LL V AC rms)			
	Dielectic withstand	3320 V AC rms			
	Impedance	5 M Ω /phase (phase-Uref/Ground)			
Input-current	Rated nominals	5A, 1A, 2A			
characteristics	Permissible overload	200 A rms for 0.5 s, non-recurring (IEC 62053-22)			
	Impedance	10 mΩ /phase			
	Burden	0.01 VA per phase (1 A), 0.25 VA per phase (5 A)			
Power supply	AC	85 - 240 V AC (+/- 10 %), 47-63 Hz			
	DC	110 - 270 V DC (+/- 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 V AC			
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 cl	haracteristics				
Weight		6.0 kg (6.5 kg with optional communications module)			
IP degree of prote	ection (IEC 60529)	IP51			
Dimensions		202.1 x 261.51 x 132.2 mm			
Environmenta	al conditions				
Mounting location		Indoor			
Maximum altitude		2000 m above sea level			
Limit range of ope	eration	-25°C to +70°C			
Specified operatin	ng temperature	-10°C to +45°C (as per 62052-11)			
Display operating	range				
Storage temperat	ure	-25°C t0 +70°C			
		ว เบ รว % KH non-condensing			
Pollution degree		Z			
Electrom		Power supply (II) Metering inputs (III)			
Electrostatic disch		JEC 61000-4-2			
	tarye	IEC 61000-4-2			
Immunity to fact tr	ansients	IEC 61000-4-4			
Immunity to surge	WAVAS	IEC 61000-4-5			
Conducted immu	nitv	IEC 61000-4-6			
Damped oscillato	ry waves immunity	IEC 61000-4-12			
Conducted and ra	idiated emissions	CISPR 22 (class B)			
Safety					
Europe		As per IEC 62052-11			
International		As per IEC 60950			
Utility approv	al				
EGR, GOST, ESK	(OM, NMI				





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ION8800

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Functions and characteristics (cont.)



Ports on the optional communications module.

A PowerLog	ji: 10N 8800						
Harlin Garin Sgeare D Tolorrenasigan	Schneider DElectric		PowerLogic	ION88	300		
	-		Monitoring Control	Diagnost	k: Maintenance	Setup	
eration	Operation						
wer Quality	Voltage		Current		Power		
	Uln avg	120.00 V	I avg	4.33 A	kW total	1.44 kW	
	Uin 1	120.03 V	11	3.75 A	kW 1	0.42 kW	
	Uin 2	119.99 V	12	5.00 A	kW 2	0.55 kW	
	Uin 3	119.98 V	13	4.25 A	kw 3	0.46 kW	
	Ull avg	207.84 V	14	0.20 A	kVA total	1.56 kVA	
	UII 1-2	207.89 V	I unbal	15.36 %	kVA 1	0.45 KVA	
	UII 2-3	207.83 V			kVA 2	0.60 KVA	
		Ull 3-1	207.80 V	Power Fac	tor	kva 3	0.51 kVA
	U unbal	0.02 %	PF sign total	-92.25 %	kvar total	0.60 kvar	
			PF sign 1	-94.02 %	kvar 1	0.15 kvar	
	Freq	iency	PF sign 2	-91.99 %	kvar 2	0.24 kvar	
	Freq	60.00 Hz	PF sign 3	-90.98 %	kvar 3	0.21 kvar	

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Example embedded webserver page (WebMeter) showing realtime values.

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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, GPSTRUETIME/DATUM, DLMS			
Communications module (optiona	al)			
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	10 BaseT, RJ45 connector, 100 m link; protocols: DNF TCP, ION, Modbus TCP, Modbus Master, IEC 61850			
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 priviledges.			
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				
Туре	FSTN transreflective LCD			
Backlight	LED			
Languages	English			

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ION8800

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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.

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11 Special order.

Ρ	art 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.			
		В	Energy meter Class S EN50160 power quality monitoring.			
		С	Basic tariff/energy revenue meter with sag/swell monitoring.			
3	Memory/Form	1	10 MB logging memory, Essailec connectors.			
	Factor	2	5 MB logging memory, Essailec connectors, with IEC61850 protocol			
4	Current Inputs	С	(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 V AC L-N or 99-500 V AC L-L)			
6	Power Supply	В	Single phase power supply: 85-240 V AC ±10 % (47-63 Hz) or 110-270 V DC.			
7	System	5	Calibrated for 50 Hz systems.			
	Frequency	6	Calibrated for 60 Hz systems.			
8	Communications module (field	20	No communications module - meter includes Base Onboard I/O and comms (see below for details).			
	serviceable)	A0	standard communications: 1 RS 232/RS 485 port, 1 RS 485 port (COM2) ⁽⁷⁾ .			
		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⁾ .			
		В	Base Option AND 8 Form A digital outputs ⁽²⁾ , 3 digital inputs (20-56 V DC/AC).			
		С	Base Option AND 8 Form A digital outputs ⁽²⁾ , 3 digital inputs (80-280 V DC/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) ⁽⁷⁾ .			
		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	А	None.			
-	C		Tropicalisation treatment applied.			
R	elated products		IEC/DIN 24962 40" Deels with formals matting with any large			
			and I/O blocks unassembled.			
IEC-OPTICAL-PROBE		E	Optional IEC 1107 compliant Optical Probe for use with ION8800 meters.			
BATT-REPLACE-8XXX		Х	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.

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ION8800

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Functions and characteristics (cont.)



Optional ION8800 communications module.

Part Numbers (cont.)					
ION8800 communications module for field retrofit installations					
Item	Code	Description			
P880C	A0	Standard communications: 1 RS-232/RS-485 port, 1 RS-485 port (COM2) ⁽⁷⁾ .			
	C1	Standard communications plus 10Base-T Ethernet (RJ45), 56 universal internal modem (RJ11).			
	D1	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber, 56k universal internal modem (RJ11).			
	E0	Standard communications plus 10Base-T Ethernet (RJ45).			
	F0	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber (ST male Fiber optic connection).			
	M1	Standard communications plus 56k universal internal modem (RJ11).			
Special Order	А	None.			
	С	Tropicalisation treatment applied.			

(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.

Note: The part number above should conform to the following format: P880C A0 A.

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ION8800

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Installation and connections

ION8800 dimensions

ION8800 Essailec rack dimensions



Rack mounting the ION8800



ION8800 communication module dimensions



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ION8800

Installation and connection (cont.)



Connection representation only. See product installation guide for complete wiring and communication connection details.

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ION8800 Installation and connection (cont.)



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Item	Meter port	Essailec pin	Description	
Current measurement inputs	111	A01	standard	
	112	A1	standard	
	121	A02	standard	
	122	A2	standard	
	131	A03	standard	
	132	A3	standard	
	141	A04	optional	
	142	A4	optional	
Voltage measurement inputs	Vref	B0	standard	
0	V1	V1 B1 s		
	V2	B2	standard	
	V3	B3	standard	
Digital inputs	DI-SCOM	B5	standard: common	
0	DI1	B6	standard	
	DI2	B7	standard	
	DI3	B8	standard	
Power supply inputs (AC/DC)	Power supply N/-	B4	Power supply neutral (-)	
	Power supply L/+	B9	Power supply line (+)	
Form C solid-state relays	DO1 & DO2 K	C0	standard; common	
	DO1	C1	standard; NO	
	DO1	C2	standard; NC	
	DO2	C3	standard; NO	
	DO2	C4	standard; NC	
	DO3 & DO4 K	C5	standard; common	
	DO3	C6	standard; NO	
	DO3	C7	standard; NC	
	DO4	C8	standard; NO	
	DO4	C9	standard; NC	
Form C mechanical relay	Alarm K	D0	standard; common	
	Alarm	D1	standard; NO	
	Alarm	D2	standard; NC	
	-	D3	Unused	
RS 485 com	RS 485 Shield	D5	RS 485 shield	
	RS 485 +	D6	RS 485 +	
	RS 485 -	D7	RS 485 -	
	-	D8	Unused	
IRIG-B clock synchronization	IRIG-B input	D4	optional; clock synch	
input ⁽¹⁾	common		Input Common	
	IRIG-B Input	Da	optional; clock synch input	

(1) Option not currently available.

Essailec representation only. See product installation guide for complete Essailec rack wiring and communication connection details.





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Communications

Communication interfaces and associated services

Switchboard-data acquisition and monitoring make it possible to anticipate events. In this way, they reduce customer costs in terms of operation, maintenance and investment.

Serial link

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With communication technology, it is no longer necessary to be physically present at the site to access information. Data is transmitted by networks.

In all architectures, the communication interface serves as the link between the installation devices and the PC running the operating software. It provides the physical link and protocol adaptation. Adaptation is required because the communication systems used by the PC (Modbus via RS232 and/or Ethernet) are generally not those used by the installation devices (e.g. the Modbus protocol via RS485).

Dedicated application software prepares the information for analysis under the best possible conditions.



Modbus communication architecture.

In addition, an EGX100 in serial port slave mode allows a serial Modbus master device to access information from other devices across a Modbus TCP/IP network.



Modbus communication across Ethernet network

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Communication interfaces and associated services (cont.)

Ethernet link

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Using modern Web technologies, the operator can access information from monitoring and protection devices using any PC connected to the network, with all the required security.

The Ethernet EGX100 gateway or the EGX300 integrated gateway-servers provide connectivity between Modbus RS485 and Ethernet Modbus TCP/IP.



Ethernet communication architecture.

The services available with these technologies considerably simplify the creation, maintenance and operation of these supervision systems.

The application software is now standardised: the web interface into the system does not require custom web pages to be created. It is personalised by simply identifying the components in your installation and can be used as easily as any internet application.

The first step in this approach is the EGX300 integrated gateway-server with HTML pages. Power management software (ION Enterprise, System Manager or PowerView), running on a PC, provide broader coverage for more specific needs.

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