PowerLogic[™] ION8650 series Technical Datasheet

Providing high accuracy and a wide range of features for transmission and distribution metering, the PowerLogic[™] ION8650 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

Applications

PB107500

- Transmission and distribution metering
- Revenue metering
- Extensive power quality monitoring and analysis
- Power quality compliance monitoring
- Digital fault recording
- Instrument transformer correction





ION8650

The solution for

Markets that can benefit from a solution that includes PowerLogic™ ION8650 series meters:

- Transmission networks
- Distribution network

Benefits

- Reduce operations costs
- Improve power quality
- Improve continuity of service

Competitive advantages

- Be integrated into existing wholesale settlement system
- Be able to use Power Monitoring Expert software for data analysis or share operation data with SCADA systems through multiple communication channels and protocols
- Transformer/line loss compensation
- Instrument transformer correction

Power management solutions

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

Conformity of standards

IEC 62053-22/23 • IEC 61000-4-4

.

•

•

•

• IEC 61000-4-30

•

- EN 50160
- IEC 61000-4-7
- IEC 61000-4-15 •
- IEEE 1159
- IEEE 519IEC 61000-4-2
- IEC 60950
- IEC 61000-4-3
- ANSI C12.20

CISPR 22

IEC 61000-4-5

IEC 61000-4-6

IEC 61000-4-12

IEC 62052-11

IEC 61000-4-3

2 Life Is On Schneider



PowerLogic™ ION8650 socket meter

Main characteristics

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 EcoStruxure[™] Power Monitoring operations software or other energy management and SCADA systems through multiple communication channels and protocols, including Itron MV-90, Modbus, DNP, DLMS, IEC 61850 Ed. 3.

Applications

- Revenue metering
- Cogeneration 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
- Outage Notification

Main characteristics

- ANSI Class 0.1 and IEC 62053-22 Class 0.2 S metering
 - For interconnection points on medium, high, and ultra-high voltage networks; twice as accurate as current IEC and meets ANSI Class 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 Ed. 3 Class A/S, EN 50160 Ed. 4, IEC 61000-4-7, IEC 61000-4-15, IEEE 1159, IEEE 519). Also detects disturbance direction.
- 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, DLMS, DNP 3.0 and IEC 61850 Ed. 2. Cell modem option using LTE.
- 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.
- Cyber security enhancements
 - Assign communication admin rights to selected user; prevention measures ensure no loss of security logs; support syslog for external security.

Feature selection

Commercial reference number	ION8650 meters
M8650A	ION8650A
M8650B	ION8650B
M8650C	ION8650C



PowerLogic™ ION8650 switchboard meter.

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



Disturbance waveform capture and power quality report

Selection guide

General Image: Control of Control control control cont con			ION8650 A	ION8650 B	ION8650 C
Current accuracy 0.1 % 0.2 %	General				
Voltage accuracy 0.1 % 0.1 % 0.1 % 0.1 % Power accuracy 0.1 % 0.1 % 0.1 % 0.1 % Samples/cycle 1024 1024 1024 1024 Instantaneous values 0.1 % 0.1 % 0.1 % 0.1 % Current voltage, frequency • • • • Active, reactive, apparent energy • • • • Settable accurw, apparent energy • • • • Settable accurw, apparent power 1084 • • • • Demand values • • • • • • • Synchronisation of the measurement window • • • • • • Harmonic: Block (sliding), thermal (exponential) •	Use on LV, MV and HV systems				
Note accuracy 0.1 % 0.1 % 0.1 % 0.1 % Power accuracy 0.1 % 0.1 % 0.1 % 0.1 % Samples/cycle 1024 1024 1024 1024 Current, voltage, frequency • • • • Active, reactive, apparent power Total & per phase • • • Current measurement range 0.4 - 20 A 0.A - 20 A 0.A - 20 A 0.A - 20 A Statable accurw, apparent energy • • • • • Statable accurw, apparent power Present & max values • • • • Current apparent power •	Current accuracy		0.1 %	0.1 %	0.1 %
Samples/cycle 1024 1024 1024 1024 Instantaneous values Instantaneous values Instantaneous values Instantaneous values Instantaneous values Instantaneous values Current, voltage, frequency Instantaneous values Instantaneous values Instantaneous values Instantaneous values Power factor Total & per phase Instantaneous values Instantaneous values Instantaneous values Active, reactive, apparent energy Instantaneous values Instantaneous values Instantaneous values Instantaneous values Current Present & max values Instantaneous values Instantaneous values Instantaneous values Instantaneous values Current values Instantaneous values Instantaneous values Instantaneous values Instantaneous values Current values Values Instantaneous values Instantaneous values Instantaneous values Predicted active, reactive, apparent power Present & max values Instantaneous values Instantaneous values Demand values Values values Instantaneous values Instantaneous values Instantaneous values	Voltage accuracy				
Instantaneous values ● ● ● Current, voltage, frequency ● ● ● Active, reactive, apparent power Total & per phase ● ● Power factor Total & per phase ● ● Active, reactive, apparent energy ● ● ● Settable accumulation modes ● ● ● Demand values ● ● ● Current Present & max values ● ● Active, reactive, apparent power ● ● ● Predicted active, reactive, apparent power ● ● ● Synchronisation of the measurement window ● ● ● Demand modes: Block (sliding), thermal (exponentia) ● ● ● Marmonic distortion Current & voltage ● ● ● Individual harmonics: Ma finite/harmonics 50 40 ● ● IeC 61000-4:30 class A / S A S ● ● ● IeG 61000-4:30 class A / S A S ● ● ● IeG 61000-4:30 cla	Power accuracy		0.1 %	0.1 %	0.1 %
Current, voltage, frequency Active, reactive, apparent power Total & per phase OA - 20 A OA - 20 A	Samples/cycle		1024	1024	1024
Active, reactive, apparent power Total & per phase Total & per phase Current measurement range OA - 20 A OA - 20 A OA - 20 A Devent Present & max values Current Present & max values Current & voltage Current & voltage sags and swells Current Gono-4-16 (Flicker) Current (current & voltage sags and swells Current Gono-4-16 (Flicker) Current (current & voltage sags and swells Current (current & voltage sags and swells Current (current & voltage sags and swells Current (current gond the measurement vincoms) Current (current gond thunctions)	Instantaneous values				
Power factor Total & per phase Image: Total & per phase </td <td>Current, voltage, frequency</td> <td></td> <td></td> <td></td> <td></td>	Current, voltage, frequency				
Current measurement range 0 A - 20 A Active, reactive, apparent energy • • • • Settable accumulation modes • • • • Current Present & max values • • • • Current on discussion of the measurement window •	Active, reactive, apparent power	Total & per phase			
Energy values Active, reactive, apparent energy Settable accumulation modes Demand values Current Present & max values Active, reactive, apparent power Predicted active, reactive, apparent power Synchronisation of the measurement window Demand modes: Block (sliding), thermal (exponential) Power quality measurements Harmonic distortion Current & voltage Individual harmonics Via front panel Maveform / transient capture //either Harmonic distortion Current & voltage EC 6 1000-4-130 class A / S A EV 50160 compliance reporting Image Programmable (logic and math functions) Image Data recording Image Onboard Memory (In Mbytes) 128 Sag/swell logs Image Transient logs Image Harmonics logs Image Sag/swell logs Image Transient logs Image	Power factor	Total & per phase			
Active, reactive, apparent energy Settable accumulation modes Current Present & max values Current & current & current Current & current & voltage Current & current & voltage Current & voltage & voltage Current & voltage Current & voltage Current & voltage & voltage	Current measurement range		0 A - 20 A	0 A - 20 A	0 A - 20 A
Settable accumulation modes ■ ■ Current Present & max values ■ Current Present & max values ■ Active, reactive, apparent power ■ ■ Synchronisation of the measurement window ■ ■ Demand modes: Block (sliding), thermal (exponential) ■ ■ Power quality measurements ■ ■ Harmonic distortion Current & voltage ■ ■ Individual harmonics Via front panel 63 63 31 Waveform / transient capture I/I -//I -//- Harmonic si magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ■ ■ ■ EC 61000-4-15 (Flicker) ■ ■ - High speed data recording ■ - - Orboard Memory (in Mbytes) ■ ■ = Revenue logs ■ ■ ■ Event logs ■ ■ ■ Historical logs ■ ■ ■ GPS synchronisation (IRIG-B stand	Energy values				
Demand values Present & max values Image: Current image: Constraint of the measurement window Image: Constraint of the measurement window <thimage: constraint="" measurement="" of="" th="" the="" window<=""></thimage:>	Active, reactive, apparent energy	<i>,</i>			
Current Present & max values Image: Constraint of the measurement power Predicted active, reactive, apparent power Image: Constraint of the measurement window Image: Constraint of the measurement window Demand modes: Block (sliding), thermal (exponential) Image: Constraint of the measurement window Image: Constraint of the measurement window Harmonic distortion Current & voltage Image: Constraint of the measurement window Image: Constraint of the measurement window Harmonic distortion Current & voltage Image: Constraint of the measurement window Image: Constraint of the measurement window Harmonic distortion Current & voltage Image: Constraint of the measurement window Image: Constraint of the measurement window Harmonic distortion Current & voltage Image: Constraint of the measurement window Image: Constraint of the measurement window Detection of voltage sags and swells Image: Constraint of the measurement	Settable accumulation modes				
Active, reactive, apparent power Predicted active, reactive, apparent power Image: Comparent power Synchronisation of the measurement window Image: Comparent power Image: Comparent power Synchronisation of the measurement window Image: Comparent power Image: Comparent power Demand modes: Block (sliding), thermal (exponential) Image: Comparent power Image: Comparent power Harmonic distortion Current & voltage Image: Comparent power Image: Comparent power Marmonic distortion Current & voltage Image: Comparent power Image: Comparent power Marmonic distortion Current & voltage Image: Comparent power Image: Comparent power Marmonic distortion Current & voltage Image: Comparent power Image: Comparent power Marmonics distortion Current & voltage Image: Comparent power Image: Comparent power Marmonics image: Comparent power Image: Comparent power Image: Comparent power Image: Comparent power Marmonics image: Comparence power Image: Comparent power Image: Comparent power Image: Comparent power Marmonics image: Comparence power Image: Comparent power Image: Comparent power Image: Comparent power Image: Comparent power <	Demand values				
Predicted active, reactive, apparent power Synchronisation of the measurement window Demand modes: Block (sliding), thermal (exponential) Power quality measurements Harmonic distortion Current & voltage A Demand modes: Block (sliding), thermal (exponential) Harmonic distortion Current & voltage A A A Marmonic distortion Current & voltage A Markoff Via front panel 63 63 31 Detection of voltage sags and swells A B C C 61000-4-15 (Flicker) A C C 1000-4-15 (Flicker) C C Data recording C C 1 C 2 C 4<td>Current</td><td>Present & max values</td><td></td><td></td><td></td>	Current	Present & max values			
Synchronisation of the measurement window ■ Demand modes: Block (sliding), thermal (exponential) ■ Power quality measurements ■ Harmonic distortion Current & voltage ■ Individual harmonics Via front panel 63 63 31 Waveform / transient capture ● / ● - / ■ - / ■ - / ■ Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ■	Active, reactive, apparent power	Present & max values			
Demand modes: Block (sliding), thermal (exponential) ● Harmonic distortion Current & voltage ● Individual harmonics Via front panel 63 63 31 Waveform / transient capture ● / ● / - / ● - / ● - / ● Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ● ● ● ● EC 61000-4-30 class A / S A S - - High speed data recording (down to 10 ms) ● ● - - Programmable (logic and math functions) ● ● - - Data recording ● ● ● ● - Onboard Memory (in Mbytes) 128 64 32 ● ● Harmonics logs ● </td <td>Predicted active, reactive, appare</td> <td>ent power</td> <td></td> <td></td> <td></td>	Predicted active, reactive, appare	ent power			
Power quality measurements Harmonic distortion Current & voltage ■ Individual harmonics Via front panel 63 63 31 Waveform / transient capture ● /● - /● - /● - /● Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ■ ■ ■ IEC 61000-4-30 class A / S A S - EC 61000-4-15 (Flicker) ■ ■ - High speed data recording (down to 10 ms) ■ ■ - Programmable (logic and math functions) ■ ■ - Data recording ■ ■ ■ ■ Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ ■ ■ Harmonics logs ■ ■ ■ ■ ■ ■ SaySwell logs ■ ■ ■ ■ ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ ■ ■ ■ <t< td=""><td>Synchronisation of the measurem</td><td>nent window</td><td></td><td></td><td></td></t<>	Synchronisation of the measurem	nent window			
Harmonic distortion Current & voltage ■ ■ Individual harmonics Via front panel 63 63 31 Waveform / transient capture ■ / ● - / ● - / ● - / ● Harmonics: magnitude, phase, and interharmonics 50 40 - - Detection of voltage sags and swells ■	Demand modes: Block (sliding),	thermal (exponential)			
Individual harmonics Via front panel 63 63 31 Waveform / transient capture // -// -// -// Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells • • • • IEC 61000-4-30 class A / S A S - •	Power quality measurements				
Waveform / transient capture I I	Harmonic distortion	Current & voltage			
Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ■ ■ ■ IEC 61000-4-30 class A / S A S - IEC 61000-4-15 (Flicker) ■ - - High speed data recording (down to 10 ms) ■ - - EN 50160 compliance reporting ■ - - Programmable (logic and math functions) ■ ■ - Data recording ■ ■ ■ - Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ Event logs ■ ■ ■ ■ ■ ■ ■ Historical logs ■ <t< td=""><td>Individual harmonics</td><td>Via front panel</td><td>63</td><td>63</td><td>31</td></t<>	Individual harmonics	Via front panel	63	63	31
Harmonics: magnitude, phase, and interharmonics 50 40 - Detection of voltage sags and swells ■ ■ IEC 61000-4-30 class A / S A S - High speed data recording (down to 10 ms) ■ - - High speed data recording (down to 10 ms) ■ ■ - Data recording ■ ■ ■ ■ Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ ■ Event logs ■ ■ ■ ■ Harmonics logs ■ ■ ■ ■ Sag/swell logs ■ ■ ■ ■ Transient logs ■ ■ ■ ■ Viring self-test (requires PowerLogict™ ION Setup) ■ ■ ■ Pulse output (front panel LED) 2 2 2 2 Digital or analog outputs* (max) 11 11 1 1 Digital or analog outputs* (max) 11 1 1 1 1 Pulse output (front panel LED)	Waveform / transient capture			-/	-/-
IEC 61000-4-30 class A / S A S - IEC 61000-4-15 (Flicker) ■ - - High speed data recording (down to 10 ms) ■ - - EN 50160 compliance reporting ■ - - Programmable (logic and math functions) ■ ■ - Data recording ■ ■ ■ ■ Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ ■ Event logs ■ ■ ■ ■ Historical logs ■ ■ ■ ■ Harmonics logs ■ ■ ■ ■ Sag/swell logs ■ ■ ■ ■ Transient logs ■ ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ ■ Display and I/O ■ ■ ■ ■ ■ Front panel display ■ ■ ■ ■ ■ ■ Uiring self-test (requires PowerLogic™ ION Setup) <td< td=""><td>Harmonics: magnitude, phase, a</td><td>nd interharmonics</td><td></td><td></td><td>-</td></td<>	Harmonics: magnitude, phase, a	nd interharmonics			-
IEC 61000-4-15 (Flicker) Image: Control of the system	Detection of voltage sags and sw	vells			
High speed data recording (down to 10 ms) ■ ■ EN 50160 compliance reporting ■ ■ Programmable (logic and math functions) ■ ■ Data recording ■ ■ Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ Event logs ■ ■ ■ Historical logs ■ ■ ■ Harmonics logs ■ ■ ■ Sag/swell logs ■ ■ ■ Transient logs ■ ■ ■ Time stamping to 1 ms ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ Display and I/O ■ ■ ■ Front panel display ■ ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) including pulse output) 16 16 16 Communication ■ ■ ■ ■	IEC 61000-4-30 class A / S		А	S	-
EN 50160 compliance reporting ● ● Programmable (logic and math functions) ● ● Data recording ● ● Onboard Memory (in Mbytes) 128 64 32 Revenue logs ● ● ● Event logs ● ● ● Historical logs ● ● ● Harmonics logs ● ● ● Sag/swell logs ● ● ● Transient logs ● ● ● Display and I/O ● ● ● Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max, including pulse output) 16 16 Communication ● ● ● Infrared port 1 1 1 1**** Rest port (Modbus/TCP/IP protocol) with gateway	IEC 61000-4-15 (Flicker)				-
Programmable (logic and math functions) ■ ■ Data recording Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ ■ Event logs ■ ■ ■ ■ Historical logs ■ ■ ■ ■ Harmonics logs ■ ■ ■ ■ Sag/swell logs ■ ■ ■ ■ Transient logs ■ ■ ■ ■ Display and I/O ■ ■ ■ ■ ■ Pulse output (front panel LED) 2 2 2 □	High speed data recording (dow	n to 10 ms)			-
Data recording Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ Event logs ■ ■ ■ Historical logs ■ ■ ■ Harmonics logs ■ ■ ■ Sag/swell logs ■ ■ ■ Transient logs ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ Display and I/O ■ ■ ■ Front panel display ■ ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ ■ Pulse output (front panel LED) 2 2 2 2 Digital or analog outputs* (max) 11 11 11 11 Digital or analog outputs* (max) 11 11 11 11 RS-485 port 1 1 1 1	EN 50160 compliance reporting				-
Onboard Memory (in Mbytes) 128 64 32 Revenue logs ■ ■ ■ Event logs ■ ■ ■ Historical logs ■ ■ ■ Harmonics logs ■ ■ ■ Sag/swell logs ■ ■ ■ Transient logs ■ ■ ■ Time stamping to 1 ms ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ Display and I/O ■ ■ ■ ■ Front panel display ■ ■ ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ ■ Pulse output (front panel LED) 2 2 2 2 Digital or analog outputs* (max) 11 11 11 11 Digital or analog outputs* (max) 11 11 11 11 Infrared port 1 1 1 1 1 Infrared port 1 1 1 1**** RS-485 port 1 1	Programmable (logic and math fu	unctions)			
Revenue logs Image: Constraint of the second s	Data recording				
Event logs ● ● Historical logs ● ● Harmonics logs ● ● Sag/swell logs ● ● Transient logs ● ● Time stamping to 1 ms ● ● GPS synchronisation (IRIG-B standard) ● ● Display and I/O ● ● Front panel display ● ● Wiring self-test (requires PowerLogic™ ION Setup) ● ● Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max, including pulse output) 16 16 16 Communication Infrared port 1 1 1**** Infrared port 1 1 1 1**** RS-485 / RS-232 port 1 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● / ●	Onboard Memory (in Mbytes)		128	64	32
Historical logs ■ ■ Harmonics logs ■ ■ Sag/swell logs ■ ■ Transient logs ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ Display and I/O ■ ■ Front panel display ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 Communication ■ ■ ■ Infrared port 1 1 1 1**** RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Internal modem with gateway (ModemGate) <td>Revenue logs</td> <td></td> <td></td> <td></td> <td></td>	Revenue logs				
Harmonics logs ● ● Sag/swell logs ● ● Transient logs ● ● Time stamping to 1 ms ● ● GPS synchronisation (IRIG-B standard) ● ● Display and I/O ● ● Front panel display ● ● Wiring self-test (requires PowerLogic™ ION Setup) ● ● Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication Infrared port 1 1 1 1*** RS-485 port 1 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) /● ● ● DNP 3.0 through serial, modem, and I/R ports ● ● ●	Event logs				
Sag/swell logs ■ ■ ■ Transient logs ■ - - Time stamping to 1 ms ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ Display and I/O ■ ■ ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication ■ ■ ■ ■ Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 **** Internet port (Modbus/TCP/IP protocol) with gateway 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1 INGL-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● <td>Historical logs</td> <td></td> <td></td> <td></td> <td></td>	Historical logs				
Transient logs ■ - - Time stamping to 1 ms ■ ■ ■ GPS synchronisation (IRIG-B standard) ■ ■ ■ Display and I/O ■ ■ ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1*** RS-485 port 1 1 1 1*** Internet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** INTML web page server ■ ■ ■ ■ IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 1 Modbus TCP Master / Slave (Ethern	Harmonics logs				
Time stamping to 1 ms ● ● GPS synchronisation (IRIG-B standard) ● ● Display and I/O ● ● Front panel display ● ● Wiring self-test (requires PowerLogic™ ION Setup) ● ● Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1*** RS-485 port 1 1 1 1*** Internet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● ./● ./● DNP 3.0 through serial, modem, and I/R ports ● ● ● Cell mod	Sag/swell logs				
GPS synchronisation (IRIG-B standard) ■ ■ Display and I/O Front panel display ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Internet port (Modbus/TCP/IP protocol) with gateway 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** INTML web page server ■ ■ ■ IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) //● -//● . ● DNP 3.0 through serial, modem, and I/R ports ■ ■ ● ●	Transient logs			-	-
Display and I/O Front panel display Wiring self-test (requires PowerLogic™ ION Setup) Pulse output (front panel LED) 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 Infrared port 1 RS-485 / RS-232 port 1 1 1 RS-485 port 1 1 1 RS-485 port 1 Internet port (Modbus/TCP/IP protocol) with gateway 1 Internal modem with gateway (ModemGate) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 IRIG-B port (unmodulated IRIG B00x time format) 1 INdbus TCP Master / Slave (Serial ports) //● DNP 3.0 through serial, modem, and I/R ports ● Cell modem option (LTE) ● ● DLMS COSEM through serial, Ethernet and optical ● ●	Time stamping to 1 ms				
Front panel display ■ ■ Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ Pulse output (front panel LED) 2 2 Digital or analog inputs* (max) 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1**** RS-485 / RS-232 port 1 1 1 1**** Infrared port 1 1 1 1**** RS-485 port 1 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) //● -/● ● ● DNP 3.0 through serial, modem, and I/R ports ● ● ● ● Cell modem option (LTE) ● ● ● ● ● DLMS COSEM through		ndard)	•		
Wiring self-test (requires PowerLogic™ ION Setup) ■ ■ Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 11 Digital or analog outputs* (max) 11 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) //● -/● ● DNP 3.0 through serial, modem, and I/R ports ● ● ● Cell modem option (LTE) ● ● ● ●	Display and I/O				
Pulse output (front panel LED) 2 2 2 Digital or analog inputs* (max) 11 11 11 11 Digital or analog outputs* (max) 11 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● -/ ● . DNP 3.0 through serial, modem, and I/R ports ● ● ● Cell modem option (LTE) ● ● ● ● DLMS CO					
Digital or analog inputs* (max) 1 11 11 11 Digital or analog outputs* (max, including pulse output) 16 16 16 Digital or analog outputs* (max, including pulse output) 16 16 16 Communication 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** INTERL web page server		ogic™ ION Setup)			
Digital or analog outputs* (max, including pulse output) 16 16 16 Infrared port 1 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1**** RS-485 port 1 1 1 1**** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1**** Internal modem with gateway (ModemGate) 1 1 1**** INTERAL Web page server IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) Modbus TCP Master / Slave (Ethernet port) Modbus RTU Master / Slave (Serial ports) DNP 3.0 through serial, modem, and I/R ports DLMS COSEM through serial, Ethernet and optical ports for all variants	,		2	2	2
Communication 1 1 1 Infrared port 1 1 1 1 RS-485 / RS-232 port 1 1 1 1*** RS-485 port 1 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server • • • IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) • / • - / • • Modbus RTU Master / Slave (Serial ports) • / • • / • • DNP 3.0 through serial, modem, and I/R ports • • • • Cell modem option (LTE) • • • • • DLMS COSEM through serial, Ethernet and optical ports for all variants • • • •			11	11	11
Infrared port 1 1 1 RS-485 / RS-232 port 1 1 1 RS-485 port 1 1 1 1*** RS-485 port 1 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server • • • IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) • / • - / • • Modbus RTU Master / Slave (Serial ports) • / • - / • • DNP 3.0 through serial, modem, and I/R ports • • • Cell modem option (LTE) • • • • DLMS COSEM through serial, Ethernet and optical ports for all variants • • •		cluding pulse output)	16	16	16
RS-485 / RS-232 port 1 1 1 RS-485 port 1 1 1 1*** RS-485 port 1 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server Image: Server Image: Server Image: Server IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / Image: Server Image: Server Image: Server Modbus TCP Master / Slave (Serial ports) / Image: Server Image: Server Image: Server Image: Server DNP 3.0 through serial, modem, and I/R ports Image: Server Image: Server Image: Server Image: Server DLMS COSEM through serial, Ethernet and optical ports for all variants Image: Server Image: Server Image: Server Image: Server	Communication				
RS-485 port 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1 IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● / ● - / ● Modbus RTU Master / Slave (Serial ports) ● / ● - / ● ● DNP 3.0 through serial, modem, and I/R ports ● ● ● Cell modem option (LTE) ● ● ● DLMS COSEM through serial, Ethernet and optical ports for all variants ● ●	Infrared port		1	1	1
RS-485 port 1 1 1 1*** Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server • • • IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) • / • • / • - / • Modbus RTU Master / Slave (Serial ports) • / • • / • - / • DNP 3.0 through serial, modem, and I/R ports • • • Cell modem option (LTE) • • • • DLMS COSEM through serial, Ethernet and optical ports for all variants • • •	RS-485 / RS-232 port		1	1	1***
Ethernet port (Modbus/TCP/IP protocol) with gateway 1 1 1*** Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server • • • IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) • / • • / • - / • Modbus RTU Master / Slave (Serial ports) • / • • / • - / • DNP 3.0 through serial, modem, and I/R ports • • • Cell modem option (LTE) • • • • DLMS COSEM through serial, Ethernet and optical ports for all variants • • •	RS-485 port				1***
Internal modem with gateway (ModemGate) 1 1 1*** HTML web page server Image: Comparison of the server Image: Comparison of the server Image: Comparison of the server IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 1 Modbus TCP Master / Slave (Ethernet port) / Image: Comparison of the server Image: Comparison of the	Ethernet port (Modbus/TCP/IP pr	otocol) with gateway			1***
HTML web page server Image: Constraint of the server o	Internal modem with gateway (Me	odemGate)			
IRIG-B port (unmodulated IRIG B00x time format) 1 1 1 Modbus TCP Master / Slave (Ethernet port) / ● / ● - / ● Modbus RTU Master / Slave (Serial ports) ● / ● - / ● - / ● DNP 3.0 through serial, modem, and I/R ports ● ● ● Cell modem option (LTE) ● ● ● DLMS COSEM through serial, Ethernet and optical ports for all variants ● ●					
Modbus TCP Master / Slave (Ethernet port) / / / / / / / / / / / / / / / / / / /	IRIG-B port (unmodulated IRIG B	00x time format)	1	1	1
Modbus RTU Master / Slave (Serial ports) Image: Amplitude of the serial of the series of the ser			1		
DNP 3.0 through serial, modem, and I/R ports • • Cell modem option (LTE) • • DLMS COSEM through serial, Ethernet and optical ports for all variants • •	Modbus RTU Master / Slave (Seri	al ports)			
DLMS COSEM through serial, Ethernet and optical ports for all variants	DNP 3.0 through serial, modem,	and I/R ports			
ports for all variants	Cell modem option (LTE)				
ports for all variants		nernet and optical	-	P	_
* With optional I/O Expander.			-	-	

** For 9S, and 36S only. For 35S system up to 480 V L-L.

*** C model limited to IR + 2 other ports at one time. Ports can be enabled/disabled by user.



PowerLogic™ ION8650 front panel harmonic display

× ×	555	84.6 KV 88.5 KV 84.6 KV	* 50 50 50
	000	200.6 A 210.6 A 204.6 A	450 200
9:36:54 10/09/2019 A	BC Q1	NORM	

PowerLogic™ ION8650 front panel phasor display and table

Type of measurementCurrent and voltage1% ReadingPower0.1% ReadingPower factor0.1% ReadingPower factor0.1% Note as accurate at ANSI Class 0.2Power factor0.1% Note as accurate at ANSI Class 0.2Data updata rate0.5 (Sci Class 2.2 Class 0.2 Sci Class 2.2 Sci	Electrical characteristics			
Power 0.1 % Heasurement Prequency 0.001 Hz Power facior 0.1 % Energy Dis % bree as accurate as ANRI class 0.2 IEC 62053-23 (Read two) class 2 Data update mate 0.5 cycle or 1 second (depending on value) Or the present mate 0.5 cycle or 1 second (depending on value) Input-voltage (characteristic) Maximum voltage 347 V L-N rms (080 V L-L rms (085) Input-current characteristic) Maximum voltage 347 V L-N rms (080 V L-L rms (085) Input-current characteristic) Maximum voltage 0.01 - 20 A (standard range) Measurement range 0.001 - 24 A Permissible overload Measurement range 0.001 - 24 A Permissible overload Socket Current Class 271020 Input-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A (51 S m A 20 M 20 A 20 A 20 A 20 A 20 A 20 A 20	Type of measuren	nent	True rms 1024 samples per cycle	
Power 0.1 % Heasurement Prequency 0.001 Hz Power facior 0.1 % Energy Dis % bree as accurate as ANRI class 0.2 IEC 62053-23 (Read two) class 2 Data update mate 0.5 cycle or 1 second (depending on value) Or the present mate 0.5 cycle or 1 second (depending on value) Input-voltage (characteristic) Maximum voltage 347 V L-N rms (080 V L-L rms (085) Input-current characteristic) Maximum voltage 347 V L-N rms (080 V L-L rms (085) Input-current characteristic) Maximum voltage 0.01 - 20 A (standard range) Measurement range 0.001 - 24 A Permissible overload Measurement range 0.001 - 24 A Permissible overload Socket Current Class 271020 Input-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 1 A (50 millOhms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A per phase at 5 A (2 millOmms max) Four-Current burden 0.050 A (51 S m A 20 M 20 A 20 A 20 A 20 A 20 A 20 A 20		Current and voltage	0.1 % Reading	
accuracy Power factor 0.1 % Prog 0.1 % Notice as accurates an ANSI Class 0.2 Data update rate 0.5 cycle or 1 second (depending on value) Input-voltage Nominal voltage 0.5 cycle or 1 second (depending on value) Input-voltage Nominal voltage 347 V L-N ms Input-voltage Maximum voltage 347 V L-N ms Input-voltage Maximum voltage 347 V L-N ms Input-softage Stavity Ova 277 V L-N ms 300 V I oldy V L-I ms (ds) Input-softage Faced nominal/current (lass 1/2/10/20) 200 A ms for 1 second, non-rocurring Input-softage Rated nominal/current (lass 2/10/20) Accurrent (lass 2/10/20) 200 A ms for 1 second, non-rocurring Burden per phase Standard prover 120-277 V L-N RMS (-15 %/+20 %) 47-63 Hz cs 205 (-15 %) VLB RMS 47-63 Hz Availary powered Accies 1/20 / L-15 %) VLB RMS 47-63 Hz 200 A ms/s 74-20 %) VLE Rede-through time, Stable over supply Standard powered law voltage Accies 1/20 / L-15 %) VLB RMS 47-63 Hz Appl ov/powered Accies 1/20 / L-15 %) VLB RMS 47-63 Hz 200 / L-15 % VLB RMS 47-63 Hz Appl ov/powered Standar		Power	0.1 %	
Prover factor 0.1% Energy 0.1%, bic bic as accurate as ANSI Class 0.2 (EC 62053.22 Class 0.28) Data update rate 0.5 cycle or 1 second (depending on value) Moninal valtage 57 Vio 277 VL-N ms 50 cycle or 1 second (depending on value) Moninal valtage 57 Vio 277 VL-N ms 50 cycle or 1 second (depending on value) Maximum valtage 347 VL-N ms, 600 VL-L ms (68) Imput-current class 347 VL-N ms, 600 VL-L ms (69) Maximum valtage 347 VL-N ms, 600 VL-L ms (60) Accuracy range 0.01 - 20 A (standard range) Measurement area 0.01 - 24 A Permissible overload 500 A ms for 1 second, non-recurring Marden power 500 A ms for 1 second, non-recurring Burden per phase Standard power Standard power 102-277 VL-L RMS (51 SW-20 SW AF 34 Hz or supply, blade Apality powerd 26: 65-120 (+-1 58 S) (VL RMS 47-63 Hz for value) Awality powerd 26: 66-120 (+-1 58 S) (VL RMS 47-63 Hz for value) Awality powerd 26: 67-120 (+-1 58 S) (VL RMS 47-63 Hz for value) Awality powerd 26: 66-120 (+-2 0S S) (VL RMS 47-63 Hz for value) Awality powerd 26: 67-120 (+-1 58 S) (VL RMS 47-63 Hz fo		-		
Energy EEC 6203-32 (Seas 0.25)	accuracy	Power factor	0.1 %	
Nominal voltage S7 Vio 277 VL-N rms S Input-voltage characteristics* Maximum voltage 347 VL-N rms. 600 VL-L rms (85) Imputs V1, V2, V3, VREF 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) Accuracy range 0.01 - 24 A Permissible overload 500 A rms for 1 second, non-recurring Socket Current Class 2/10/20 Imput-Current Didem. 0.05% per phase at 5 A (2 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Imput-Current Didem. 0.05% per phase at 1 A (50 millOhms max) Socket Time guaranteed: 6 cycles at nominal frequency (minnun Schell phacondmax) Imput-Current Didem. 0.05% per phase at 1 A (5		Energy	IEC 62053-22 Class 0.2S	
Input-voltage Ioto V to 480 V L L rms (6S) Input-soltage 347 V L N rms, 600 V L L rms (9S) Inputs 17, V2, V3, VREF Inputs 11, V2, V3, VREF Inputs 14, 2 A, 5 A and/or 10 A (Class 1/2/10/20) Current class 60.01 - 20 A (standard range) Input-current Measurement range 0.001 - 24 A Persisble overload 500 A rms for 1 second, non-recurring Burden per phase Stondard power 100 V L RMS (-15 %-20 %) 476 B Hz or Stondard power 120-477 VL A RMS (-15 %-20 %) 476 B Hz or 120-480 VL RMS (-15 %-20 %) 476 B Hz or Power supply Stondard power Accide 277 (-Fz 20 %) VDC Next or Applicing powered Accide 277 (-Fz 20 %) VDC Next or Applicing powered Accide 10 (-Fz 20 %) VDC Next or Applicing powered Accide 10 (-Fz 20 %) VDC Next or Stondard power Accide 10 (-Fz 20 %) VDC Next or Applicing powered Accide 10 (-Fz 20 %) VDC Next or Applicing powered Accide 10 (-Fz 20 %) VDC Next or Stondard power Stondard Power Nex	Data update rate		0.5 cycle or 1 second (depending on value)	
Input-voltage characteristics* Maximum voltage 347 V L-N rms, 600 V L-L rms (9S) Inputs 1/1, V2, V3, VREF Rated nominal 1A, 2A, 5A and/or 10 A (Class 1/2/10/20) Accuracy range 0.01 - 20 A (standard range) Accuracy range 0.01 - 20 A (standard range) Measurement range 0.001 - 24 A Permissible overlaad 500 A rms for 1 second, non-recurring Socket Current Class 2/1020 Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Input-Current burden: 0.05% Aper phase at 5 A (2 milliOhms max) Socket Turing uzmanteed: 6 cycles at nominal frequency (minimum 5 \frequency (2 milliOhms for 4 milliOhms max) Input-Current burden: 0.05% AP (2 milliOhms for 4 m		Nominal voltage		
Impute and address Jown (prase (inservice) (Solid)(2) Inputs V1, V2, V3, V3, VREF Rated nominal/ (characteristics) 14, 2, 4, 5, A and/or 10 A (Class 1/2/10/20) Accuracy mage 0.01 - 20 A (standard range) Measurement range 0.001 - 24 A Permissible overload Stocket Current Class (2000) (max) (Current Diass) (2000) (Stocket Current Diass) (2000) (Stocket Diass) (20	Input-voltage	Maximum voltage		
Input-current characteristics 14, 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 per phase 500 A rms for 1 second, non-recurring Standard power Standard power Standard power 120/277 VL-N RMS (-15 %/-20 %) 47.63 Hz or Supply, Ibdo VL-L RMS (-15 %/-20 %) 47.63 Hz or 120/2077 VL-N RMS (-15 %/-20 %) 47.63 Hz or Standard power 120/2077 VL-N RMS (-15 %/-20 %) 47.63 Hz or Supply, Ibdo VL-L RMS (-15 %/-20 %) 47.63 Hz or 120/200 %) 47.63 Hz or Auxiliary powered DC: 60/207 (+1/-20 %) VL-N RMS, 47-63 Hz Involvioutputs** Rde-through time, (Standard power Socket: min guaranteed: 6 cycles at nominal frequency (minimus Switchboard: min guaranteed: 6 cycles at nominal frequency Input/outputs** Digital inputs Socket: min guaranteed: 6 cycles at nominal frequency Input/outputs** Digital inputs upto 3 Self-excited, dry contact sensing inputs Medating Power Socket Front IPS0, back IPS1 Digital inputs upto 3 Self-excited, dry contact sensing inputs Medating Power <td< td=""><td>characteristics*</td><td>Impedance</td><td>5 MW /phase (phase-Vref/Ground)</td></td<>	characteristics*	Impedance	5 MW /phase (phase-Vref/Ground)	
eurent class FA, 2 A, 9 A rubbit FOA (Class 102/1020) Accuracy range 0.01 - 20 A (standard range) Measurement range 0.001 - 20 A (standard range) Measurement range 0.001 - 20 A (standard range) Burden per phase Socket Current Class 2/10/20 Input/Current Duffont Class 2/10/20 Input/Current 2/10/20		Inputs	V1, V2, V3, VREF	
Input-current characteristics 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 per phase Socket Current Class 2/10/20 input-Current Uses 2/10/20			1A, 2 A, 5 A and/or 10 A (Class 1/2/10/20)	
Input-current characteristics Permissible overload SOD A rms for 1 second, non-recurring Permissible overload SOD A rms for 1 second, non-recurring Secket Current Class 2/10/20 Final Current Class			0.01 - 20 A (standard range)	
Input-current characteristics Permissible overload SOD A rms for 1 second, non-recurring Permissible overload SOD A rms for 1 second, non-recurring Secket Current Class 2/10/20 Final Current Class				
Instrume of the second seco				
Sindard power 120-277 VL-N RMS (+15 %/+20 %) 47-63 Hz or supply) blade powered Auxiliary powered hyb voltage C6-120 (+1-5 %) VL-N RMS, 47-63 Hz DC: 80-160 (+7-20 %) VL-N RMS, 47-63 Hz DC: 80-160 (+7-20 %) VL-N RMS, 47-63 Hz DC: 200-300 (+7-20 %) VL-N RMS, 47-63 Hz DC: 200-200 (minimun 50 Hz), at 120 VL-N rms (208 VL-L rms) 3-phase operation 50 Hz), at 120 VL-N rms (208 VL-L rms) 3-phase operation 50 Hz), at 120 VL-N rms (208 VL-L rms) 3-phase operation 50 Hz), at 120 VL-N rms (208 VL-L rms) 3-phase operation 70 Hz			Socket Current Class 2/10/20 Input-Current burden: 0.05VA per phase at 5 A (2 milliOhms max) Switchboard Current Class 2/10/20 Input-Current burden: 0.05VA per phase at 1 A (50 milliOhms	
powered Texhol VEL Kind V		supply, blade	120-277 V L-N RMS (-15 %/+20 %) 47-63 Hz or	
Inversion of the second sec		powered	, , , ,	
Power supply Ingh voliage DC: 200-300 (+/- 20 %) V DC Power supply 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 Burden Standard Power Supply: Typical: 8 W total, 7 Vkphase Max: 15 W total, 20 Vkphase Input/outputs** Digital outputs Standard Power Supply: Typical: 8 W total, 7 Vkphase Max: 15 W 20 VA Input/outputs** Digital outputs 4 (Form C) Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Weight 7.0 kg To kg IP degree of protection Socket Front IP65, back IP51 Switchboard Front IP65, back IP51 Switchboard Front IP50, back IP30 Diperating range -40 °C to 85 °C Display operating range -40 °C to 85 °C Standard rower Supply So kot Pollution degree 2 Installation category C at III Display operating range 40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Polution degree 2 Installation category C at III Die		low voltage	DC: 80-160 (+/- 20 %) VDC	
Power supply Ride-through time, (Standard power supply) 50 H2, at 120 V L-N rms (208 V L-L rms) 3-phase operation Switchboard 6 cycles at nominal frequency (minimu n50 H2), at 120 V L-N rms (208 V L-L rms) 3-phase operation Burden Standard Power Supply: Typical: 8 W total, 7 Wyphase Max: 15 W total, 7 Wyphase Max: 15 W total, 7 Wyphase Max: 15 W 20 VA Input/outputs** Digital outputs 4 (Form C) Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Mechanical characteristics Upto 3 Self-excited, dry contact sensing inputs Mechanical characteristics 7.0 kg Weight 7.0 kg IP degree of protection Socket Switchboard Front IP50, back IP51 Switchboard Front IP50, back IP30 Diperating temperature -40 °C to 85 °C Display operating range -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV Electrostatic discharge IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to radiated missions CISPR 22 (class B) Sately		high voltage	DC: 200-300 (+/- 20 %) V DC	
Burden Typical: 8 W total, 20 WA/phase Max: 15 W total, 20 WA/phase Input/outputs** Digital outputs Auxiliary Power Supply: Typical: 7 W, 14 VA Max: 15 W, 20 VA Input/outputs** Digital outputs 4 (Form C) Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Mexitarian Typical: 7 W, 14 VA Max: 15 W total, 20 WA/phase Mexitarian Value VA Value VA Mexitarian Value VA Value VA Mexitarian Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Value VA Mexitarian Value VA Value VA Mexitarian Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Mexitarian Value VA Value VA Mexitarian Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Mexitarian Solid State relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Mexitarian Socket Front IP65, back IP51 Mixetiarian Socket IP51 Socket IP30 Mixetiarian Socket IP30 Socket IP30 Diperating temperature -40 °C to 85 °C Solid Soce Inmunity rating	Power supply	(Standard power	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	
Input/outputs** Digital outputs 4 (Form C) Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output Input/outputs** Digital inputs upto 3 Self-excited, dry contact sensing inputs Mechanical characteristics Weight 7.0 kg IP degree of protection Socket Front IP65, back IP51 Switchboard Front IP65, back IP30 Brending Socket 178 x 237 mm Switchboard Z85 x 228 x 163 mm Environmental co-titions Operating temperature -40 °C to 85 °C Display operating range -40 °C to 85 °C Storage temperature -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstart IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to surger IEC 61000-4-12 Immunity to surger IEC 61000-4-16 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) <td></td> <td>Burden</td> <td>Typical: 8 W total, 7 VÁ/phase Max: 15 W total, 20 VA/phase</td>		Burden	Typical: 8 W total, 7 VÁ/phase Max: 15 W total, 20 VA/phase	
Input/outputs**Digital outputsDC, 1 (Form A) outputDigital inputsupto 3 Self-excited, dry contact sensing inputsMechanical characetristicsWeight7.0 kgIP degree of protectionSocketFront IP65, back IP51SwitchboardFront IP50, back IP30DimensionsSocket178 x 237 mmSwitchboard285 x 228 x 163 mmEnvironmental conditionsOperating temperature-40 °C to 85 °COperating temperature-40 °C to 85 °CDisplay operating range40 °C to 70 °CStorage temperature-40 °C to 85 °CHumidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand25 kVElectromagnetic CompatibilityElectrosatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to surgeIEC 61000-4-5Immunity to surgeIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and rationed emissionsCISPR 22 (class B)SafetyEuropeAs per IEC 62052-11			Max: 15 W, 20 VA	
Digital inputsupto 3 Self-excited, dry contact sensing inputsMechanical characteristicsWeight7.0 kgIP degree of protectionSocketFront IP65, back IP51SwitchboardFront IP50, back IP30DimensionsSocket178 x 237 mmBinensionsSocket285 x 228 x 163 mmConvented convertions40 °C to 85 °COperating temperature40 °C to 85 °COperating range40 °C to 85 °CStorage temperature5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstandIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to surgerIEC 61000-4-5Immunity to surgerIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and ratured emissionsCISPR 22 (class B)SatelyEucropeAs per IEC 62052-11	Input/outputs**	Digital outputs	4 (Form C) Solid state relays (130 V AC/ 200 V DC) 50 mA AC/ DC, 1 (Form A) output	
Weight 7.0 kg IP degree of protection Socket Front IP65, back IP51 Switchboard Front IP50, back IP30 Dimensions Socket 178 x 237 mm Dimensions Socket 285 x 228 x 163 mm Content of the second secon	Inputoupato	Digital inputs	upto 3 Self-excited, dry contact sensing inputs	
IP degree of protection Socket Front IP65, back IP51 Switchboard Front IP50, back IP30 Dimensions Socket 178 x 237 mm Switchboard 285 x 228 x 163 mm Environmental conditions Operating temperature -40 °C to 85 °C Display operating range -40 °C to 70 °C Storage temperature -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV Electromagnetic compatibility IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to surge IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe	Mechanical chara	cteristics		
Protection Switchboard Front IP50, back IP30 Dimensions Socket 178 x 237 mm Switchboard 285 x 228 x 163 mm Environmental conditions 200 °C to 85 °C Operating temperature -40 °C to 85 °C Display operating range -40 °C to 70 °C Storage temperature -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV Electronagnetic compatibility IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to fast transients IEC 61000-4-6 Immunity conducted IEC 61000-4-12 Immunity conducted emissions CISPR 22 (class B) Safety Europe	Weight		7.0 kg	
Switchboard Holit IP30, back IP30 Dimensions Socket 178 x 237 mm Switchboard 285 x 228 x 163 mm Environmental conditions 285 x 228 x 163 mm Operating temperature -40 °C to 85 °C Display operating range -40 °C to 70 °C Storage temperature -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV Electromagnetic compatibility IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to fast trajents IEC 61000-4-6 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and raited emissions CISPR 22 (class B) Safety Europe As per IEC 62052-11		Socket	Front IP65, back IP51	
DimensionsSwitchboard285 x 228 x 163 mmEnvironmental conditionsOperating temperature-40 °C to 85 °CDisplay operating range-40 °C to 70 °CStorage temperature-40 °C to 85 °CHumidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to tradiated fieldsIEC 61000-4-3Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11	protection	Switchboard	Front IP50, back IP30	
Privionmental conditionsOperating temperature-40 °C to 85 °CDisplay operating range-40 °C to 70 °CStorage temperature-40 °C to 85 °CHumidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityElectrostatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to surgeIEC 61000-4-5Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11	Dimensions	Socket	178 x 237 mm	
Operating temperature-40 °C to 85 °CDisplay operating range-40 °C to 70 °CStorage temperature-40 °C to 85 °CHumidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityElectrostatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to surgeIEC 61000-4-5Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11			285 x 228 x 163 mm	
Display operating range-40 °C to 70 °CStorage temperature-40 °C to 85 °CHumidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityElectrostatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to surgeIEC 61000-4-5Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11				
Storage temperature -40 °C to 85 °C Humidity rating 5 % to 95 % RH non-condensing Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV 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 conducted IEC 61000-4-5 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe				
Humidity rating5 % to 95 % RH non-condensingPollution degree2Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityElectrostatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to fast transientsIEC 61000-4-4Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11		-		
Pollution degree 2 Installation category Cat III Dielectric withstand 2.5 kV 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 conducted IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe As per IEC 62052-11	<u> </u>	Jre		
Installation categoryCat IIIDielectric withstand2.5 kVElectromagnetic compatibilityElectrostatic dischargeIEC 61000-4-2Immunity to radiated fieldsIEC 61000-4-3Immunity to fast transientsIEC 61000-4-4Immunity conductedIEC 61000-4-5Immunity conductedIEC 61000-4-6Damped oscillatory waves immunityIEC 61000-4-12Conducted and radiated emissionsCISPR 22 (class B)SafetyEuropeEuropeAs per IEC 62052-11			*	
Dielectric withstand 2.5 kV Electromagnetic compatibility Electrostatic discharge IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to fast transients IEC 61000-4-4 Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe				
Electromagnetic compatibility Electrostatic discharge IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to fast transients IEC 61000-4-4 Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe		· · · · · · · · · · · · · · · · · · ·		
Electrostatic discharge IEC 61000-4-2 Immunity to radiated fields IEC 61000-4-3 Immunity to fast transients IEC 61000-4-4 Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe				
Immunity to radiated fields IEC 61000-4-3 Immunity to fast transients IEC 61000-4-4 Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe As per IEC 62052-11			IEC 61000-4-2	
Immunity to fast transients IEC 61000-4-4 Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe As per IEC 62052-11				
Immunity to surge IEC 61000-4-5 Immunity conducted IEC 61000-4-6 Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Safety Europe As per IEC 62052-11				
Damped oscillatory waves immunity IEC 61000-4-12 Conducted and radiated emissions CISPR 22 (class B) Safety Europe As per IEC 62052-11			IEC 61000-4-5	
Conducted and radiated emissions CISPR 22 (class B) Safety Safety Europe As per IEC 62052-11	Immunity conduct	ed	IEC 61000-4-6	
Safety Europe As per IEC 62052-11	Damped oscillator	ry waves immunity	IEC 61000-4-12	
Europe As per IEC 62052-11	Conducted and ra	diated emissions	CISPR 22 (class B)	
	Safety			
North America As per ANSI C12.1	Europe		As per IEC 62052-11	
	North America		As per ANSI C12.1	

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

** More input and output selections available via optional I/O expander.



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 baud (RS-485 limited to 57,600 bps); protocols: ION, Modbus/RTU/Mastering, DLMS, DNP 3.0, GPSTRUETIME/DATUM.
Internal modem port (COM2)	300-57,600 bps
Cell modem option (CDMA/LTE)	CDMA2000 1xRTT / EV-DO Rev A (backwards compatible t EVDO Rev. 0 and CDMA 1x networks) 800/1900 MHz. MTSMC-LVW3 / LTE FDD Cat 1, 3GPP release 9 compliant, 4G: 1900 (B2) / 700 (B13) / AWS 1700 (B4)
ANSI 12.18 Type II optical port (COM3)	Up to 57,600 bps
RS-485 port (COM4)	Up to 57,600 baud, Modbus, direct connection to a PC or modem
Ethernet port	10/100BASE-T, RJ45 connector, protocols: DNP, ION, Modbus/TCP/Mastering, IEC 61850 Ed. 2 or 100BASE-FX multimode, male ST connectors, DLMS
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 o voltage tolerance curves
	 per phase triggers for waveform recording or control operations
	rate for: - voltage and current - active power (kW) and reactive power (kVAR) - apparent power (kVA) - power factor and frequency - voltage and current unbalance - phase reversal
Load profiling	Channel assignments are user configurable: - 800 channels via 50 data recorders (feature set A) - 720 channels via 45 data recorders (feature set B) - 80 channels via 5 data recorders (feature set C). Configure for historical trend recording of energy, demand, voltage, current, power quality, other measured parameters 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 50 users with unique access rights. Perform resets, time syncs, or meter configurations based on user privileges.
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	128 MB (A), 64 MB (B), 32 MB (C)
Firmware update	Update via the communication ports
Display characteristics	
Туре	FSTN transreflective LCD
Backlight	LED
Languages	English



Example product part number.

- Model.
 Feature set.
- 3 4 Form factor. Current Inputs.
- 5 Voltage inputs.

- Voltage inputs.
 Power supply.
 System frequency.
 Communications.
 Input/output options.
 Security.
 Special order options.



PowerLogic™ ION8650 meter with switchboard case

		Code	Description
1	Model	M8650	Schneider Electric energy and power quality meter.
2	Feature Set	A	128 MB Memory Class A power quality analysis, waveform and transient capture with 1024 samples/cycle.
		В	64 MB memory, energy meter Class S EN 50160 Ed. 4 power quality monitoring.
		С	32 MB memory, basic tariff/energy metering (5 data recorders, 80 channels).
3	Form Factor (1)	0	Form 9S/29S/36S Base, 57-277 V L-N (autoranging) 3-Element, 4-Wire / 2 1/2-Element, 4-Wire
		1	Form 35S Base - 120-480 V L-L (autoranging) 2-Elemen 3-Wire
		4	Form 9/29/35/36S FT21 Switchboard (meter + case) with break out panel
		7	Form 9/29/35/36S FT21 Switchboard (meter + case) with break out cable
4	Current Inputs	С	1, 2 or 5 A nominal, 20 A full scale (24 A fault capture, start at 0.001 A)
5	Voltage Inputs	0	Standard (see Form Factor above)
6	Power Supply*	E	Form 9/29/35/36S, (socket) and Form 9, 36 (FT21 switchboard): 120-277 V AC. Form 35S (socket) and For 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)
		К	Auxiliary Power Pigtail: 65-120 V AC, 80-160 V DC (pow from external source), Universal Socket Style
		L	Auxiliary Power Pigtail: 160-277 V AC, 200-350 V DC (power from external source), Universal Socket Style
7	System	5	Calibrated for 50 Hz systems.
	Frequency	6	Calibrated for 60 Hz systems.
8	Communications	C 7	Infrared optical port, Ethernet (10/100BASE-T), 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)
		E 1	Infrared optical port, Ethernet (10/100BASE-T), RS 232/485 port, RS-485 port (note: in addition to infrared optical port, Feature Set C can use any two ports (configurable))
		F1	Infrared Optical port, Ethernet (100BASE-FX multi-mode with male ST connectors (available on socket meters on Forms 0 & 1 above. I/O card not available if this option i ordered.) RS-232/485 port, RS-485 port (Note: in addition to Infrared Optical port Feature Set C can use any two ports (configurable))
		S 1	Infrared optical port, Ethernet (10 BASE-T), RS-232/485 port, RS-485 port (note: in addition to infrared optical port, Feature Set C can use any two ports (configurable Verizon 4G LTE cell modem.
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 digit input.
10	Security	0	Password protected no security lock.
		1	Password protected with security lock enabled
		3	RMICAN (Measurement Canada approved)
		4	RMICAN-SEAL (Measurement Canada approved, and factory sealed)
		7	Password protected, no security lock (US only)
		8	Password protected with security lock enabled (US only
11	Special Order	А	None
	1		1

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

Version: 1.0 - 03/01/2024 PLSED310027EN



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

- Digital / Analog I/O.
 I/O option.
 Cable option.



Commercial reference 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	0	No cable - cables for the I/O box are no ordered as a separate part number. Refer to commercial reference numbers: CBL-8X00IOE5FT, CBL-8X00IOE15FT and CBL-8XX0-BOP-IOBOX under Connector cables, below.
Comm. ref. no.	A-base a	adapters
A-BASE-ADAPTER-9	Form 9S t	o Form 9A adapter
A-BASE-ADAPTER-35	Form 250	
	F0111 355	to Form 35A adapter
		to Form 35A adapter communication interface
OPTICAL-PROBE	Optical o	· · · · · · · · · · · · · · · · · · ·
OPTICAL-PROBE	Optical of Optical of	communication interface
OPTICAL-PROBE CBL-8X00BRKOUT	Optical co Optical co Connect 5 ft Break female co	communication interface ommunication interface
	Optical of Optical co Connect 5 ft Break female co RS 485 po 5 ft extens	communication interface ommunication interface or cables out Cable: 24-pin female Molex connector to one DB9 innector for RS 232, and 2 sets of twisted pair wires for two
CBL-8X00BRKOUT	Optical of Optical co Optical co Connect 5 ft Break female co RS 485 p 5 ft extens the meter 15 ft extens	communication interface ommunication interface or cables out Cable: 24-pin female Molex connector to one DB9 innector for RS 232, and 2 sets of twisted pair wires for two ort connections sion cable, mates with 24-pin male Molex connector from

ION8650 socket dimensions





ION8650 switchboard dimensions





I/O Expander dimensions





9

ION8650 suggested switchboard mounting dimensions



ION8650 switchboard mounting





PE86310

10

Please see appropriate Installation Guide for these products for further details.



www.se.com

Schneider Electric Industries SAS 35, Rue Joseph Monier CS 30323 92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439 Capital social 928 298 512 € www.se.com

December 2023 PowerLogic™ ION8650 series PLSED310027EN

© 2023 - Schneider Electric. All rights reserved. All trademarks are owned by Schneider Electric Industries SAS or its affiliated companies. As standards, specifications and designs develop from time to time, please ask for confirmation of the information given in this document.

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

