

PowerLogic power-monitoring units

# ION8800

Technical data sheet

2007



# ION8800

## Functions and characteristics



PowerLogic® ION8800.

Providing high accuracy and a wide range of features for transmission and distribution metering, the ION8800 is the world's most advanced power and energy meter with the flexibility to change along with your needs.

The ION8800 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 meter with your existing wholesale settlement system, use ION Enterprise®, or share operations data with SCADA systems through multiple communication channels and protocols.

### Applications

- Transmission and distribution metering.
- IEC 62053-22 Class 0,2S accuracy for settlements and customer billing.
- Extensive power quality monitoring and analysis.
- Digital fault recording.
- Contract optimisation and compliance verification.
- Instrument transformer correction.
- Transformer/line loss compensation.

### Main characteristics

#### IEC 19-inch rack mount design to DIN 43862 standard

Essailec connectors with common measurement and energy pulsing pin-out for easy retrofit into existing systems

#### Accurate metering

For interconnection points on medium, high, and ultra-high voltage networks in compliance with IEC 62053-22 Class 0,2S

#### Power quality compliance monitoring

Monitor compliance with international quality-of-supply standards (IEC 61000-4-30 class A, EN 50160, IEC 61000-4-7, IEC 61000-4-15, CBEMA/ITIC)

#### Digital fault recording

Simultaneous capture of voltage and current channels for sub-cycle disturbance transients

#### Complete communications

IEC1107 optical port, optional communications module supports concurrent Ethernet (10BaseFL or 10BaseT), 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 control functions

Total of 24 setpoints for single/multi-condition alarms and control functions; 1 second response

#### Power quality summary

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

#### Integrate with software

Easily integrate with ION Enterprise or other energy management systems; MV90, UTS

#### 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

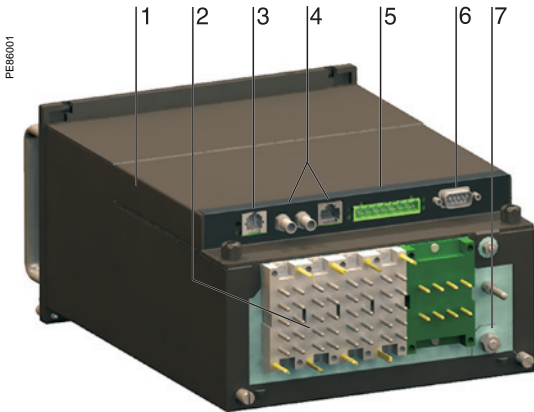
High-priority alarms, data logs sent directly to the user's PC. Instant notification of power quality events by email

### Part numbers<sup>(1)</sup>

#### PowerLogic® ION8800 meters

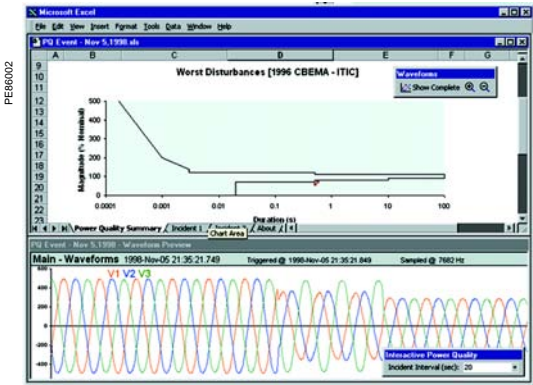
PowerLogic® ION8800A	<b>M8800A</b>
PowerLogic® ION8800B	<b>M8800B</b>
PowerLogic® ION8800C	<b>M8800C</b>

<sup>(1)</sup>Representative part numbers only. See page 6 for complete part number descriptions.



PowerLogic® ION8800

- 1 Optional communications module.
- 2 Essalec connectors.
- 3 Internal modem.
- 4 Optional 10BaseT or 10BaseFL communications.
- 5 Selectable RS 485 serial port.
- 6 Selectable RS 232 or RS 485 serial port.
- 7 Ground terminal.



Sample power quality report.

Selection guide	ION8800A	ION8800C
<b>General</b>		
Use on LV and HV systems	■	■
Current accuracy (1A to 5A)	0.1 % reading	0.1 % reading
Voltage accuracy (57V to 288V)	0.1 % reading	0.1 % reading
Energy and power accuracy	0.2 %	0.2 %
Nbr of samples/cycle or sample frequency	1024	1024
<b>Instantaneous rms values</b>		
Current, voltage, frequency	■	■
Active, reactive, apparent power	■	■
Power factor	■	■
Current measurement range (low-current option)	0.001 - 10A	0.001 - 10A
Current measurement range (high-current option)	0.005 - 10A	0.005 - 10A
<b>Energy values</b>		
Active, reactive, apparent energy	■	■
Settable accumulation modes	■	■
<b>Demand values</b>		
Current	■	■
Active, reactive, apparent	■	■
Predicted active, reactive, apparent	■	■
Setting of calculation mode (block, sliding, thermal, predicted)	■	■
<b>Power quality measurements</b>		
Detection of voltage sags and swells	■	■
Symmetrical components: zero, positive, negative	■	-
Transient detection, microseconds <sup>(1)</sup>	20 <sup>(2)</sup>	-
Harmonics: individual, even, odd, total up to	63 <sup>rd</sup>	63 <sup>rd</sup>
Harmonics: magnitude, phase and inter-harmonics	50 <sup>th</sup>	-
Flicker (IEC 61000-4-15)	■	-
Configurable for IEEE 519 - 1992, IEE159, SEMI	■	-
Programmable (logic and math functions)	■	■
<b>Data recording</b>		
Min/max logging for any parameter	■	■
Historical logs	maximum # of cycles	800 <sup>(2)</sup> 640 <sup>(3)</sup>
Waveform logs	maximum # of cycles	96 <sup>(2)</sup>
Timestamp resolution in seconds	0.001	0.001
Setpoints, minimum response time	½ cycle	½ cycle
Number of setpoints	65	65
GPS time synchronisation	■	■
Memory expandable up to	10 Mbytes	10 Mbytes
<b>Display and I/O</b>		
Front panel display	■	■
Active/reactive Energy Pulser, LED and IEC 61107 style port	■	■
Digital pulse outputs, optional	Solid state Form A	8
Digital pulse outputs	Solid state Form C	4
Alarm relay output	Form C	1
Digital inputs (optional)	3	3
<b>Communications</b>		
RS 232/485 port	1	1
RS 485 port	1	1
Ethernet port	1	1
IEC61107 optical port	1	1
Internal modem	1	1
3-port DNP 3.0 through serial, modem, Ethernet and I/R ports	■	■
Modbus RTU slave on serial, modem and I/R ports	■	■
Modbus RTU master on serial, modem and I/R ports	■	■
Modbus TCP through Ethernet	■	-
Data transfer between Ethernet and RS 485 (EtherGate)	■	■
Data transfer between internal modem, RS 485 (ModemGate)	■	■
Alarms, single or multi-condition	■	■
Alarm notification via email (MeterM@ail)	■	■
Logged data via e-mail (MeterM@il)	■	■
Embedded web server (WebMeter)	■	■

(1) For 50 Hz line frequency.

(2) ION8800A only.

(3) ION8800B only.

# ION8800

## Functions and characteristics (cont.)

PE66003



PowerLogic ION8800 with optional communications module.

### Electrical characteristics

Type of measurement		True rms Up to 1024 samples per cycle
Measurement accuracy	Current and voltage	0.1 % reading
	Power	IEC 62053-22 (0,2 S)
	Frequency	±0.005 Hz
	Power factor	0.5%
	Energy	IEC 62053-22 (0,2 S)
Data update rate		½ cycle or 1 second (depending on value)
Input-voltage characteristics	Measured voltage	Autoranging 57 - 288V LN (500 LL) inputs
	Measurement range	57-288V LN AC rms (99-500V LL AC rms)
	Impedance	5 MΩ /phase (phase-Uref/Ground)
	Inputs	U1, U2, U3, UREF
Input-current characteristics	Rated nominals	5 A, 1 A, 2 A
	CT primary/secondary ratings	1 to 999 999 999
	PT primary/secondary ratings	1 to 999 999 999
	Permissible overload	200A rms for 0.5s, non-recurring (IEC 62053-22)
	Impedance	10 mΩ /phase
	Load	0.01 VA per phase at 1A, 0.25 VA per phase at 5 A
Power supply	AC	85 - 240 VAC (+/- 10%), 47-63 Hz
	DC	110 - 270 VDC (+/- 10%)
	Burden	12VA, 7W (Typical, without comm module) 20VA, 9W (Max, without comm module)
	Ride-through time	Typical: 0.5 s to 5 s depending on configuration Min: 120 ms (6 cycles @ 50 Hz)
Input/outputs	Mechanical alarm relay	1 Form C digital output (250 V AC / 125 V DC, 1 A AC / 0.1 A DC max)
	Digital outputs (Form C)	4 Solid state relay outputs (210 V AC / 250 V DC) 100 mA AC/DC
	Digital outputs (Form A)	8 Solid state relay outputs (210 V AC / 250 V DC) 100 mA AC/DC
	Digital inputs	3 Solid state digital inputs (low-voltage inputs 15 to 75 V AC/DC; high-voltage inputs 75 to 280 V AC/DC; 3 mA max.)
	Pulse rate	20 Hz maximum

### Mechanical characteristics

Weight	6.0 kg (6.5 kg with optional communications module)
IP degree of protection (IEC 60529)	IP51
Dimensions	202.1 x 261.51 x 132.2 mm

### Environmental conditions

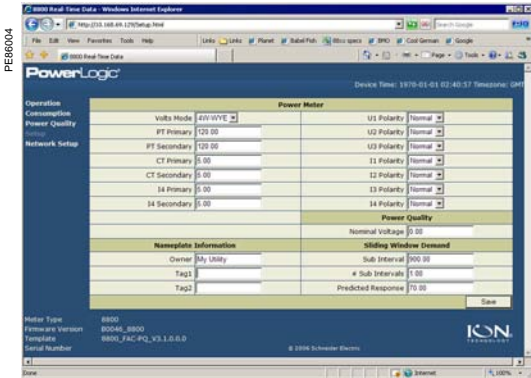
Operating temperature	-25 °C to +55 °C
Display operating range	-10 °C to +60 °C
Storage temperature	-25 °C to +70 °C
Humidity rating	5 to 95 % RH non-condensing
Pollution degree	2
Installation category	III (up to 2000m above sea level)
Dielectric withstand	2 kVAC, 50 Hz, 1 min

### Electromagnetic compatibility

Electrostatic discharge	IEC 61000-4-2
Immunity to radiated fields	IEC 61000-4-3
Immunity to fast transients	IEC 61000-4-4
Immunity to surge waves	IEC 61000-4-5
Conducted immunity	IEC 61000-4-6 (IEC 801-6)
Damped oscillatory waves immunity	IEC 61000-4-12 (IEC 801-12)
Conducted and radiated emissions	CISPR 22 (class B)

### Safety

Europe	As per IEC 62052-11
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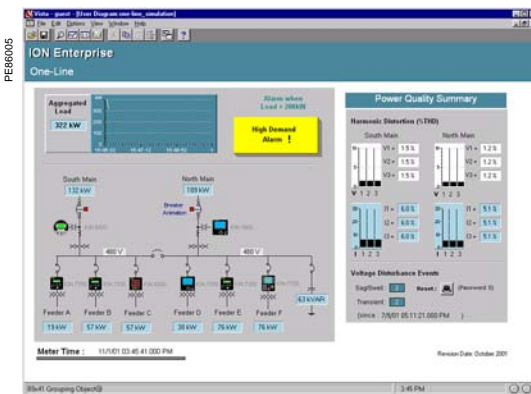
Example embedded webservice page (WebMeter) showing realtime values.

### Communication

IEC 61107 optical port	2/4 wires, up to 19200 bauds
RS 485 port	Up to 57600 bauds, Modbus, direct connection to a PC or modem
<b>Communications module (optional)</b>	
RS 232/485 port	300 - 115,200 bauds (RS 485 limited to 57,600 bauds), ION 2.0, Modbus/RTU, DNP 3.00, GPSTRUETIME/DATUM, DLMS protocols
Internal modem port	300 bauds - 56000 bauds
Ethernet port	10 BaseTX, RJ45 connector, 100 m link
Fiber-optic Ethernet link	100 Base FL, LC duplex connector, 1300 nm, FO multimode with gradient index 62.5/125 µm or 50/125 µm, 2000 m link
Protocol	TCP/IP, Telnet, ION 2.0, Modbus RTU
EtherGate	Communicates directly with up to 62 slave devices via available serial ports
ModemGate	Communicates directly with up to 31 slave devices
Embedded web server (WebMeter)	5 customisable pages, new page creation capabilities, HTML/XML compatible

### 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 <sup>rd</sup> harmonic 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 or control operations
Instantaneous	High accuracy (1s) or high-speed (½ 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) 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 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 based on user privileges.
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	5 -10 Mbytes (specified at time of order)
Firmware update	Update via the communication ports



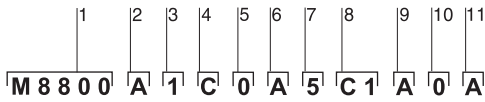
### Display characteristics

Type	FSTN transreflective LCD
Backlight	LED
Languages	English

# ION8800

## Functions and characteristics

PE88006



Example product part number.

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

PE88007



Optional ION8800 communications module.

### Part Numbers

Item	Code	Description
1 Model	M8800	ION8800 IEC/DIN 43862 19" rack mount series meter with integrated display. V1-V3 wide-range voltage inputs (57-288 VAC L-N or 99-500 VAC L-L). I1-I3 current inputs with additional I4. Supports ION, Modbus-RTU, DNP 3.0 and DLMS protocols. English and French documentation ships with every meter. For onboard I/O see comments below.
2 Feature Set	A	Feature Set B + power quality analysis (waveforms and transient capture with 1024 samples/cycle resolution).
	B	Feature Set C plus EN50160 compliant power quality monitoring.
	C	Basic Tariff/Energy revenue meter.
3 Memory/Form Factor	1	10 MB logging memory, Essailec connectors.
	2	5 MB logging memory, Essailec connectors.
4 Current Inputs	C	(I1-I3): Configured for 5 A nominal, 10 A full scale, 14 A fault capture, 0.005 A starting current.
	E	(I1-I3): Configured for 1 A nominal, 10 A full scale, 14 A fault capture, 0.001 A starting current.
5 Voltage Inputs	0	(V1-V3): Autoranging (57-288 VAC L-N or 99-500 VAC L-L)
6 Power Supply	A	Single phase power supply: 85-240 VAC ±10% (47-63 Hz) or 110-300 VDC.
7 System Frequency	5	Calibrated for 50 Hz systems.
	6	Calibrated for 60 Hz systems.
8 Communications module (field serviceable)	Z0	No communications module - meter includes Base Onboard I/O and comms (see below for details).
	880C	ION8800 communications module for field retrofit installations
	A0	Standard communications: 1 RS 232/RS 485 port, 1 RS 485 port (COM2) <sup>(1)</sup> .
	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).
9 Onboard I/O and communications (not field serviceable, part of base unit)	A	Base option AND 8 Form A digital outputs <sup>(2)</sup> , 1 RS 485 (COM2) port <sup>(1)</sup> .
	B	Base Option AND 8 Form A digital outputs <sup>(2)</sup> , 3 digital inputs (20-56 VDC/AC).
	C	Base Option AND 8 Form A digital outputs <sup>(2)</sup> , 3 digital inputs (80-280 VDC/AC).
10 Security	0	Password protected, no security lock.
	1	Password protected with security lock enabled.
11 Special Order	A	None.
	C	Tropicalisation treatment applied.

### Related products

RACK-8800-RAW	IEC/DIN 34862 19" Rack with female mating voltage/current and I/O blocks unassembled.
IEC-OPTICAL-PROBE	Optional IEC 61107 compliant Optical Probe for use with ION8800 meters.
BATT-REPLACE-8XXX	Replacement batteries for the ION8600 or ION8800, quantity 10.
ION-SETUP	Free configuration software for the ION8800. Ships on a CD.

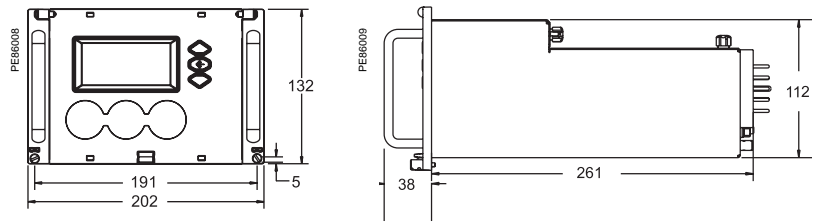
<sup>(1)</sup> Channel COM2 is available on the port at the back of the meter OR on the Comm Module (if installed). You must select which connectors your communications wiring is connected to during meter setup.

<sup>(2)</sup> 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.

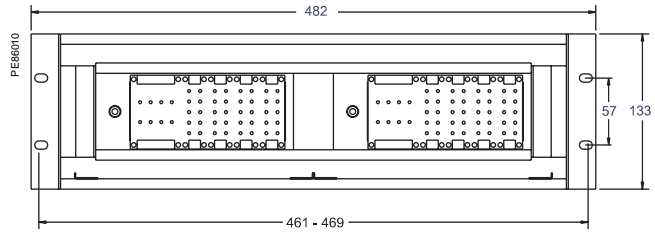
# ION8800

## Installation and connections

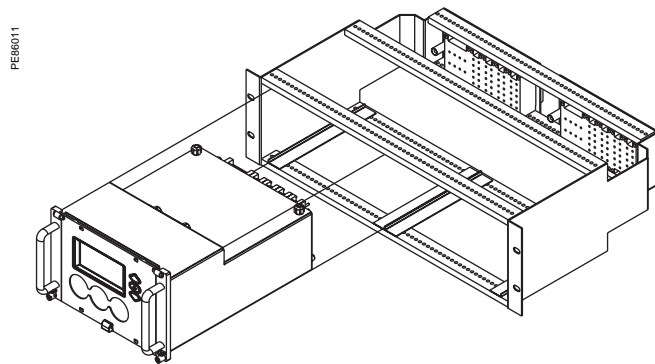
### ION8800 dimensions



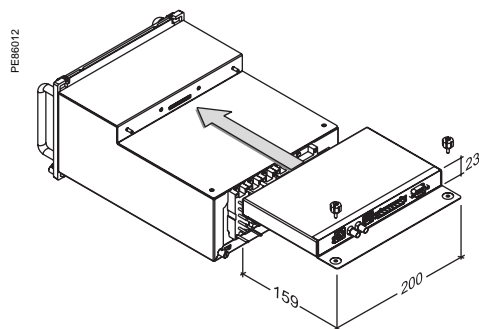
### ION8800 Essailec rack dimensions



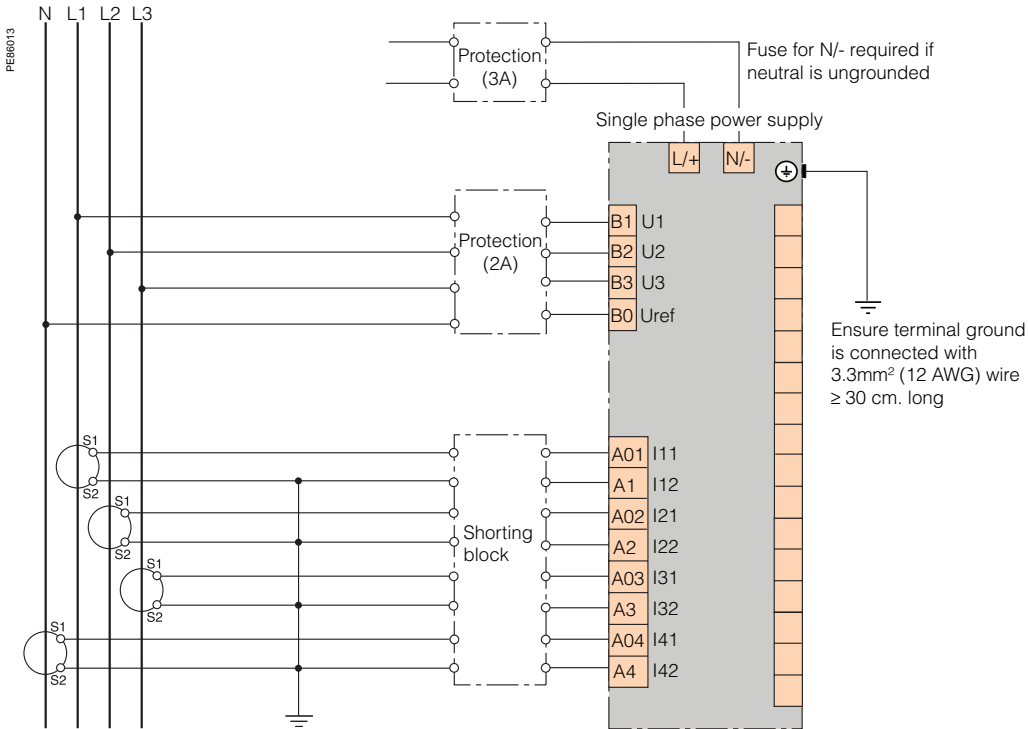
### Rack mounting the ION8800



### ION8800 communication module dimensions

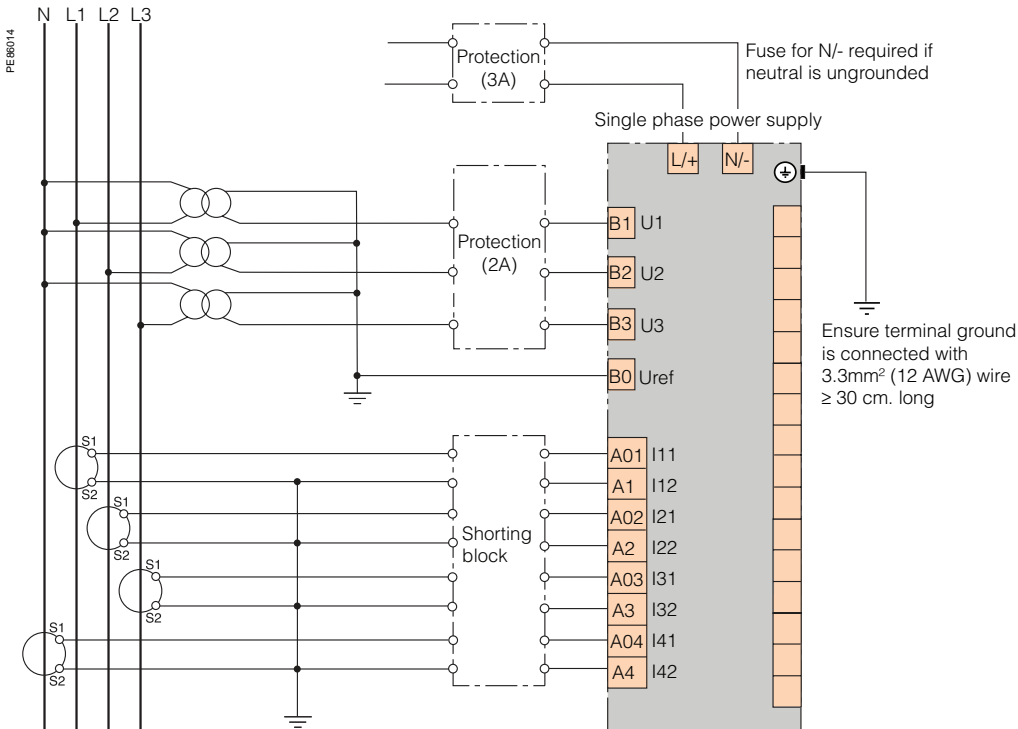


### 4-wire 3 element direct connection

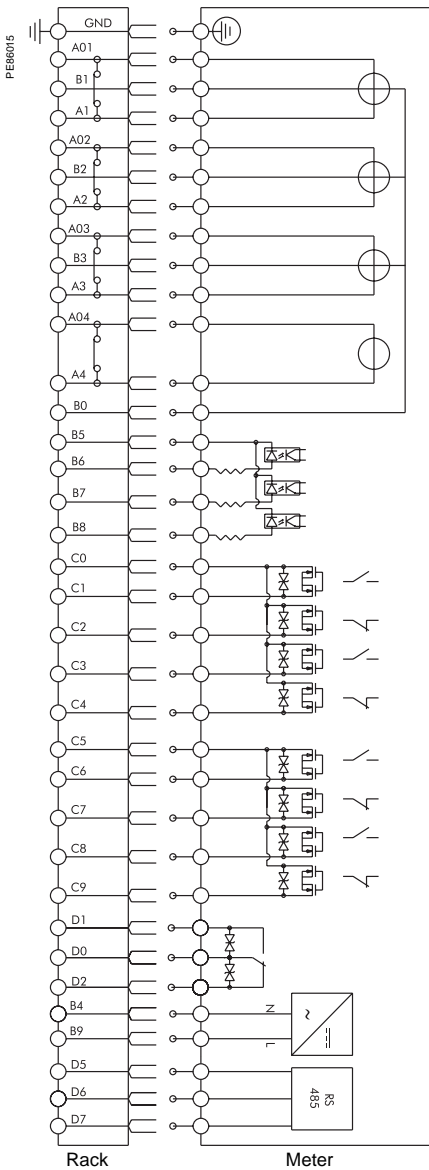


Connection representation only. See product installation guide for complete wiring and communication connection details.

### 4-wire 3 element 3 PT connection



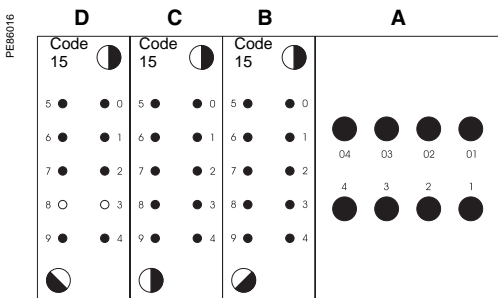
Connection representation only. See product installation guide for complete wiring and communication connection details.



Item	Meter port	Essailec pin	Description
Current measurement inputs	I11	A01	standard
	I12	A1	standard
	I21	A02	standard
	I22	A2	standard
	I31	A03	standard
	I32	A3	standard
	I41	A04	optional
	I42	A4	optional
Voltage measurement inputs	Vref	B0	standard
	V1	B1	standard
	V2	B2	standard
	V3	B3	standard
Digital inputs	DI-SCOM	B5	standard; common
	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 input <sup>(1)</sup>	IRIG-B input common	D4	optional; clock synch input Common
	IRIG-B input	D9	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.



# Notes

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# Notes

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