

PowerLogic power-monitoring units

ION7550/ION7650



Technical data sheet

2007

ION7550 / ION7650

Functions and characteristics



PowerLogic ION 7650.

Used at key distribution points and sensitive loads, ION7550 and ION7650 meters offer unmatched functionality including advanced power quality analysis coupled with revenue accuracy, multiple communications options, web compatibility, and control capabilities. Integrate these meters with our PowerLogic® ION Enterprise software or share operations data with existing SCADA systems through multiple communication channels and protocols.

Applications

- Reduce energy costs.
- Increase equipment utilisation.
- Comply with environmental and regulatory requirements.
- Improve power quality and reliability.
- Improve customer satisfaction and retention.
- Monitor and control equipment.
- Integrated utility metering.
- Instrument transformer correction.

Main characteristics

Increase efficiency

Reveal energy inefficiencies or waste and optimise equipment operation to increase efficiency.

Allocate costs

Allocate or sub-bill energy costs to departments, processes or tenants.

Summarise power quality

Consolidate all the power quality characteristics into a single trendable index.

Anticipate, diagnose and verify

Isolate reliability risks, diagnose power-related equipment issues and verify reliable operation.

Set targets, measure and verify results

Benchmark power quality and reliability and compare against standards, or compare facilities or processes.

Easy to operate

Screen-based menu system to configure meter settings. Bright LCD display with adjustable contrast.

Integrate with software

Easily integrated with PowerLogic or other energy management systems, including Itron MV-90.

Detect and capture short transients as short as 20µs at 50Hz (17µs at 60 Hz)

Identify problems due to short disturbances, e.g. switching of capacitors, etc.

Evaluate flicker based on IEC 61000-4-15 and IEEE 1453

Measure rapid variations in voltage.

Verify electrical quality compliance with EN 50160

Fast standardised check on the quality of the electricity supplied.

Detect major waveform changes

Detection of phase switching phenomena (for example during the transfer of a high-speed static switch) not detected by classical threshold-based alarms.

Record ultra-fast electrical parameters every 100 ms or every cycle

Preventive maintenance: acquisition of a motor startup curve, etc.

Trend curves and short-term forecasting

Rapid trending and forecasting of upcoming values for better decision making.

Set automatic alarms

Alarm setpoint learning feature for optimum threshold settings.

Up to 10 Mbytes of memory

For archiving of data and waveforms.

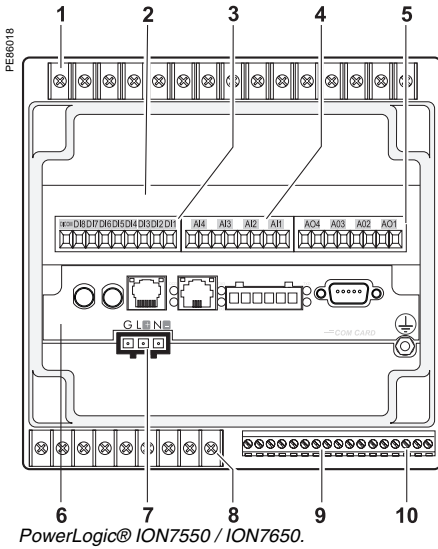
Notify alarms via email

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

Part numbers

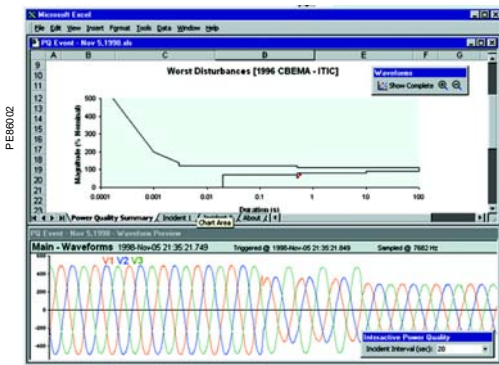
ION7550 / ION7650	
ION7550	M7550
ION7650	M7650

See page 6 for order code explanations.



PowerLogic® ION7550 / ION7650.

- 1 Current/voltage inputs.
- 2 I/O expansion card.
- 3 Digital inputs.
- 4 Analog inputs.
- 5 Analog outputs.
- 6 Communications card.
- 7 Power supply.
- 8 Form C digital outputs.
- 9 Digital inputs.
- 10 Form A digital outputs.



Disturbance waveform capture and power quality report

Selection guide		ION7550	ION7650
General			
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 accuracy		0.2 %	0.2 %
Nbr of samples/cycle or sample frequency		256	1024
Instantaneous rms values			
Current, voltage, frequency		■	■
Active, reactive, apparent power		Total and per phase	
Power factor		Total and per phase	
Current measurement range extended to 500 A for 1 second ⁽²⁾		■	■
Energy values			
Active, reactive, apparent energy		■	■
Settable accumulation modes		■	■
Demand values			
Current		Present and max. values	
Active, reactive, apparent power		Present and max. values	
Predicted active, reactive, apparent power		■	■
Synchronisation of the measurement window		■	■
Setting of calculation mode		Block, sliding	
Power quality measurements			
Harmonic distortion		Current and voltage	
Individual harmonics		Via front panel	
		63	63
		Via ION Enterprise	
		127	511
Waveform capture		■	■
Detection of voltage swells and sags		■	■
Adaptive waveform capture (up to 64 s)		■	■
Detection and capture of transients		20 µs ¹	20 µs ¹
Flicker		-	■
Fast acquisition of 100 ms or 20 ms data		■	■
EN50160 compliance checking		■	■
Programmable (logic and math functions)		■	■
Data recording			
Min/max of instantaneous values		■	■
Data logs		■	■
Event logs		■	■
Trending/forecasting		■	■
SER (Sequence of event recording)		■	■
Time stamping		■	■
GPS synchronisation (1 ms)		■	■
Memory (in Mbytes)		10	10
Display and I/O			
Front panel display		■	■
Wiring self-test		■	■
Pulse output		1	1
Digital or analogue inputs(max)		24	24
Digital or analogue outputs (max, including pulse output)		30	30
Communication			
RS 485 port		1	1
RS 485 / RS 232 port		1	1
Optical port		1	1
Modbus protocol		■	■
Ethernet port (Modbus/TCP/IP protocol)		1	1
Ethernet gateway (EtherGate)		1	1
Alarms (optional automatic alarm setting)		■	■
Alarm notification via email (Meterm@il)		■	■
HTML web page server (WebMeter)		■	■
Internal modem		1	1
Modem gateway (ModemGate)		■	■
DNP 3.0 through serial, modem, and I/R ports		■	■

(1) For 50 Hz line frequency; 17µs for 60 Hz line frequency.

(2) Standard current range only. 50 A for optional current range.



PowerLogic ION7550

Electrical characteristics

Type of measurement	True rms up to 1024 samples per cycle	
Measurement accuracy	Current and voltage	$\pm 0.01\%$ of reading + $\pm 0.025\%$ of full scale
	Power	$\pm 0.075\%$ of reading + $\pm 0.025\%$ of full scale
	Frequency	$\pm 0.005\text{Hz}$
	Power factor	± 0.002 from 0.5 leading to 0.5 lagging
	Energy:	IEC62053-22 0,2S, 1A and 5A
Data update rate	1/2 cycle or 1 second	
Input-voltage characteristics	Measured voltage	Autoranging 57V through 347V LN / 600V LL
	Measurement range	85 to 240VAC and 110 to 330VDC
	Impedance	5 M Ω /phase (phase - Vref)
	Frequency measurement range	47 to 63Hz
Input-current characteristics	Rated nominal current	1A, 2A, 5A, 10A
	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 (at 5A) 50 A rms for 1s, non-recurring (at 1A)
	Impedance	0.002 Ω per phase (5A)
0.015 Ω per phase (1A)		
Burden	0.05 VA per phase (at 5 A)	
	0.015 VA per phase (at 1 A)	
Power supply	AC	85-240 V AC $\pm 10\%$ (47-63 Hz)
	DC	110-300 V DC $\pm 10\%$
	DC low voltage (optional)	20-60 V DC $\pm 10\%$
	Ride-through time	100 ms (6 cycles at 60 Hz) min. at 120 V DC
	Burden	Standard: typical 15 VA, max 35 VA Low voltage DC: typical 12 VA, max 18 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 characteristics

Weight	1.9 kg	
IP degree of protection (IEC 60529)	IP52	
Dimensions	Standard model	192 x 192 x 159 mm
	TRAN model	235.5 x 216.3 x 133.1 mm

Environmental conditions

Operating temperature	Standard power supply	-20 to +70°C
	Low voltage DC supply	-20 to +50°C
	Display operating range	-20 to +70°C
Storage temperature	Display, TRAN	-40 to +85°C
Humidity rating	5 to 95% non-condensing	
Installation category	III (2000m above sea level)	
Dielectric withstand	As per EN 61010-1, IEC 62051-22A ⁽²⁾	

Electromagnetic compatibility

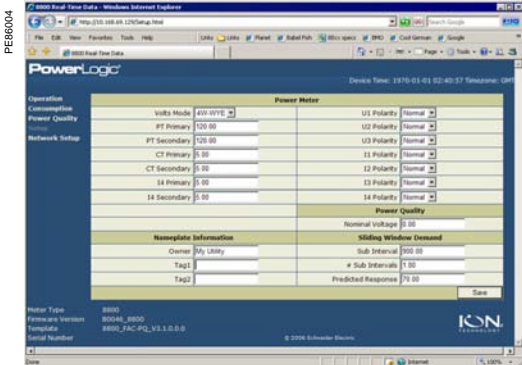
Electrostatic discharge	IEC 61000-4-2	
Immunity to radiated fields	IEC 61000-4-3	
Immunity to fast transients	IEC 61000-4-4	
Immunity to surges	IEC 61000-4-5	
Conducted and radiated emissions	CISPR 22	

Safety

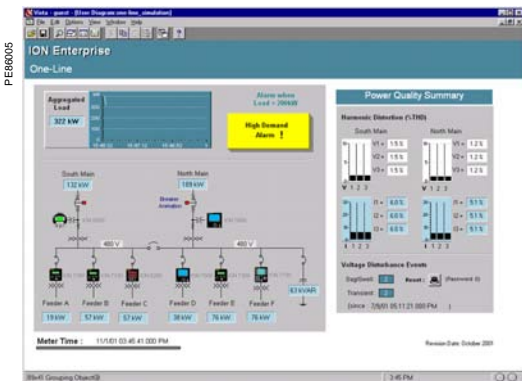
Europe	IEC 61010-1	
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(1) Consult the ION7550 / ION7650 installation guide for complete specifications.

(2) IEC 62051-22B with serial ports only.



Example WebMeter page showing realtime values.



Example showing instantaneous values and alarm.

Communication

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	10 BaseT, RJ45 connector, 100 m link
Fibre-optic Ethernet link	10 Base FL, LC duplex connector, 1300 nm, FO multimode with gradient index 62.5/125 µm or 50/125 µm, 2000 m link
Protocol	ION, Modbus, TCP/IP, DNP 3.0, Telnet
EtherGate	Communicates directly with up to 62 slave devices via available serial ports
ModemGate	Communicates directly with up to 31 slave devices
WebMeter	5 customisable pages, new page creation capabilities, HTML/XML compatible

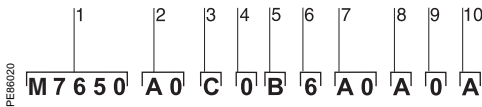
Firmware characteristics

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 or control 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 (800 channels via 50 data recorders) are 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)
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 to 10 Mbytes (specified at time of order)
Firmware update	Update via the communication ports

Display characteristics

Integrated display	Back lit LCD, configurable screens
Languages	English

⁽¹⁾ All the communication ports may be used simultaneously.



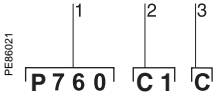
Example ION7650 product part number.

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

Part numbers

Item	Code	Description
1 Model	M7650	Advanced meter with wide-range voltage inputs (57-347V line-neutral or 100-600V line-line), transient detection, data and waveform recording. Supports ION, Modbus-RTU, and DNP 3.0.
	M7550	Advanced meter with wide-range voltage inputs (57-347V line-neutral or 100-600V line-line), sag/swell detection, data and waveform recording, and 256 samples/cycle resolution.
2 Form Factor	A0	Integrated display with front optical port, 5 MB logging memory, and 512 samples/cycle resolution.
	A1	<i>ION7650 only.</i> Integrated display with front optical port, 5 MB logging memory, and 1024 samples/cycle resolution.
	B0	Integrated display with front optical port, 10 MB logging memory, and 512 samples/cycle resolution.
	B1	<i>ION7650 only.</i> Integrated display with front optical port, 10 MB logging memory, and 1024 samples/cycle resolution.
	T0	Transducer (no display) version, with 5 MB logging memory, and 512 samples/cycle resolution.
	T1	<i>ION7650 only.</i> Transducer (no display) version, with 5 MB logging memory, and 1024 samples/cycle resolution.
	U0	Transducer (no display) version, with 10 MB logging memory, and 512 samples/cycle resolution.
	U1	<i>ION7650 only.</i> Transducer (no display) version, with 10 MB logging memory, and 1024 samples/cycle resolution.
	3 Current Inputs	C
E		1 Amp nominal, 10 Amp full scale current input
F		Current Probe Inputs (for use with 0-1 VAC current probes; probes sold separately)
G		Current Probe Inputs with three Universal Technic 10A clamp on CTs; meets IEC 1036 accuracy
4 Voltage Inputs		0
5 Power Supply	B	Standard power supply (85-240 VAC, ±10%/47-63 Hz / 110-330 VDC, ±10%)
	C	Low voltage DC power supply (20-60 VDC)
6 System Frequency	5	Calibrated for 50 Hz systems
	6	Calibrated for 60 Hz systems
7 Communications	A0	Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Integrated display models also include 1 ANSI Type 2 optical communications port.
	C1	Standard communications plus 10Base-T Ethernet (RJ45), 33.6k universal internal modem (RJ11). Ethernet and modem gateway functions each use a serial communications port.
	D1	Standard communications plus 10Base-T Ethernet (RJ45) and 10BaseFL Ethernet fibre, 33.6k universal internal modem (RJ11). Ethernet and modem gateway functions each use a serial communications port.
	E0	Standard communications plus 10Base-T Ethernet (RJ45). Ethernet gateway function uses a serial communications port.
	F0	Standard communications plus 10Base-T Ethernet (RJ45) and 10Base-FL (ST male fibre optic connection). Ethernet gateway function uses a serial communications port.
	M1	Standard communications plus 33.6k universal internal modem (RJ11). Modem gateway function uses a serial communications port.
8 I/O	A	Standard I/O (8 digital inputs, 3 Form C relays, 4 Form A solid-state outputs)
	D	Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 1 mA analog inputs)
	E	Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analog inputs)
	H	Standard I/O plus Expansion I/O card (8 additional digital inputs & four -1 to 1 mA analog outputs)
	K	Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analog outputs)
	N	Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 20 mA analog inputs and four 0 to 20 mA outputs)
	P	Standard I/O plus Expansion I/O card (8 additional digital inputs & four 0 to 1 analog inputs and four -1 to 1 mA analog outputs)
9 Security	0	Password protected, no hardware lock
	1	Password protected and hardware lockable (lock enabled/disabled via jumper on comm card)
10 Special Order	A	None
	C	Tropicalisation treatment applied.
	E	EN50160 compliance monitoring, no tropicalisation treatment
	F	EN50160 compliance monitoring, with tropicalisation treatment

Part numbers (cont'd)



Example order code. Use this group of codes when ordering the ION7550/7650 communications or I/O cards.

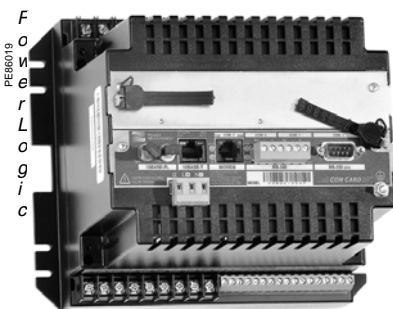
- 1 Communications or I/O card.
- 2 Type
- 3 Special order.

Communications Card

Item	Code	Description
1 Comm card	P760C	ION7550 / ION7650 communication card for field retrofit installations
2 Type	A0	Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Front optical port support for meters with integrated display.
	C1	Standard communications plus 10Base-T Ethernet (RJ45), 33.6k 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.
	D1	Standard communications plus 10Base-T Ethernet, 10BaseFL Ethernet fibre, 33.6k 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.
	E0	Standard communications plus 10Base-T Ethernet. Ethernet gateway function uses a serial communications port.
	F0	Standard communications plus 10Base-T Ethernet, 10BaseFL Ethernet fibre. Ethernet gateway function uses a serial communications port.
	M1	Standard communications plus 33.6k universal internal modem (RJ11; the modem port is shared with the front optical port). Modem gateway function uses a serial communications port.
3 Special order	A	None
	C	Tropicalization treatment applied

Input/Output expansion card

Item	Code	Description
I/O card	P760A	Expansion I/O for field retrofit installations.
Type	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
	H	Expansion I/O card with eight digital inputs, four -1 to 1 mA analog outputs
	K	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
	P	Expansion I/O card with eight digital inputs, four 0 to 1 analog inputs and four -1 to 1 mA analog outputs
Special Order	A	None
	C	Tropicalization treatment applied



ION7550 TRAN

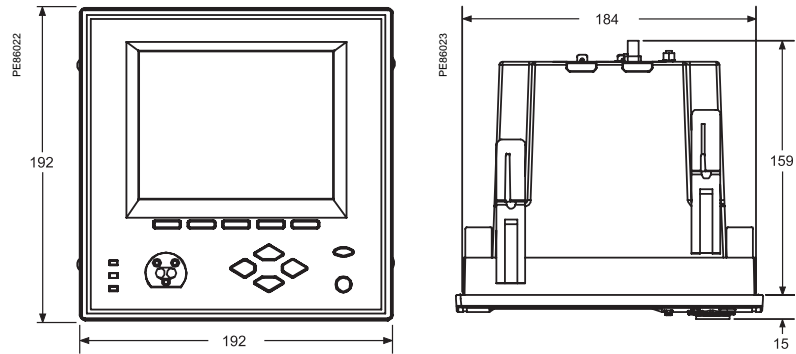
Transducer unit (TRAN)

Item	Code	Description
ION7550 TRAN	T0	ION7550 TRAN (no display), 5MB memory
	U0	ION7550 TRAN (no display), 10MB memory
ION7650 TRAN	T0	ION7650 TRAN (no display), 5MB memory
	T1	ION7650 TRAN (no display), 10MB memory, 1024 samples/cycle
	U0	ION7650 TRAN (no display), 10MB memory
	U1	ION7650 TRAN (no display), 10MB memory, 1024 samples/cycle

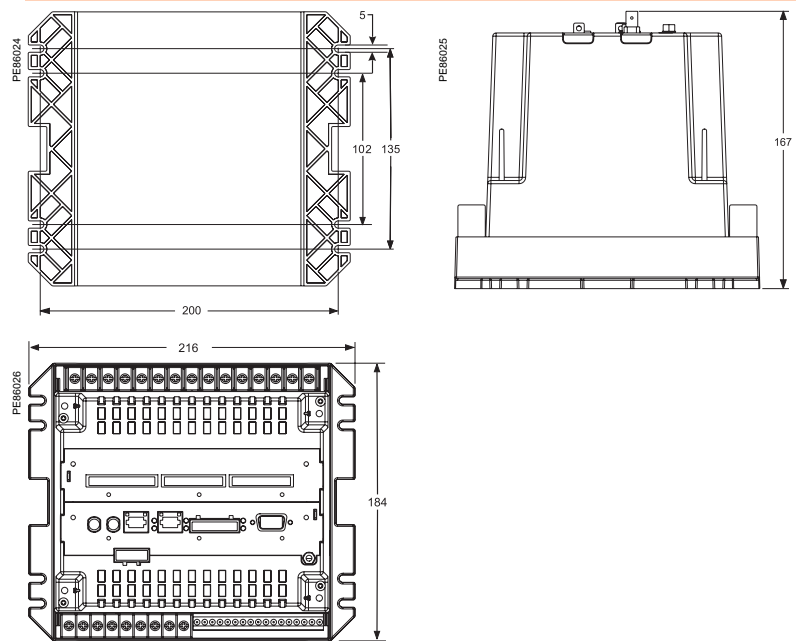
Terminal covers

Item	Code	Description
Terminal covers	TERM CVR-7500	Two covers: one for the strip containing the relays and digital inputs (lower), and another for the strip containing the phase current and voltage inputs (upper).

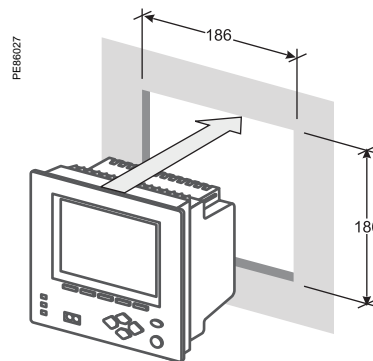
ION7550/ION7650 dimensions



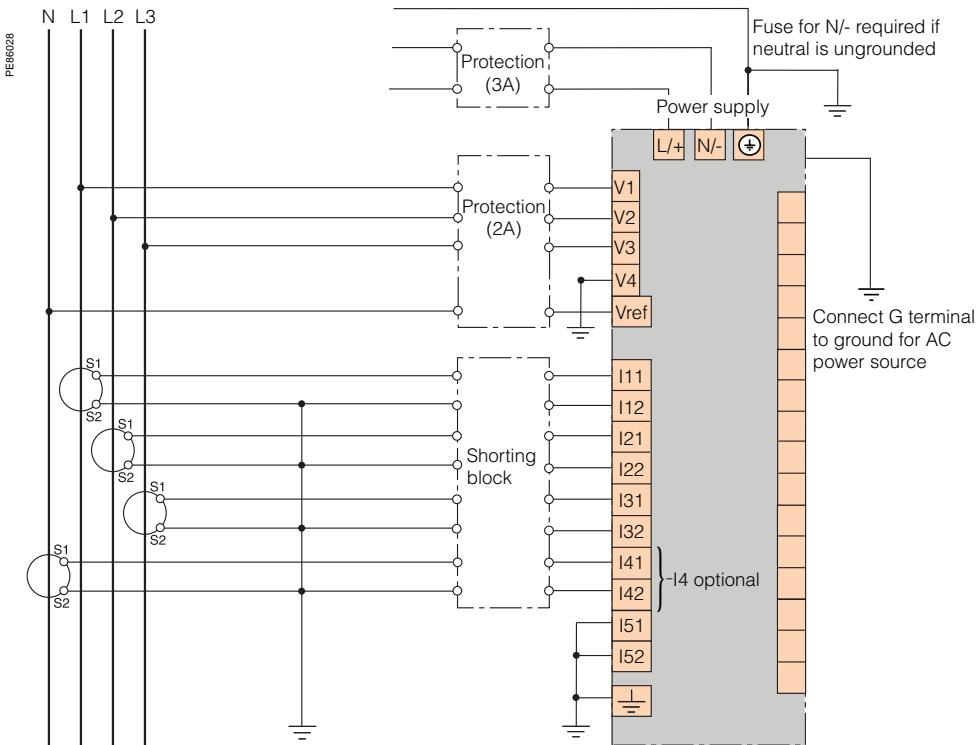
ION7550 / ION7650 TRAN dimensions



Front-panel mounting

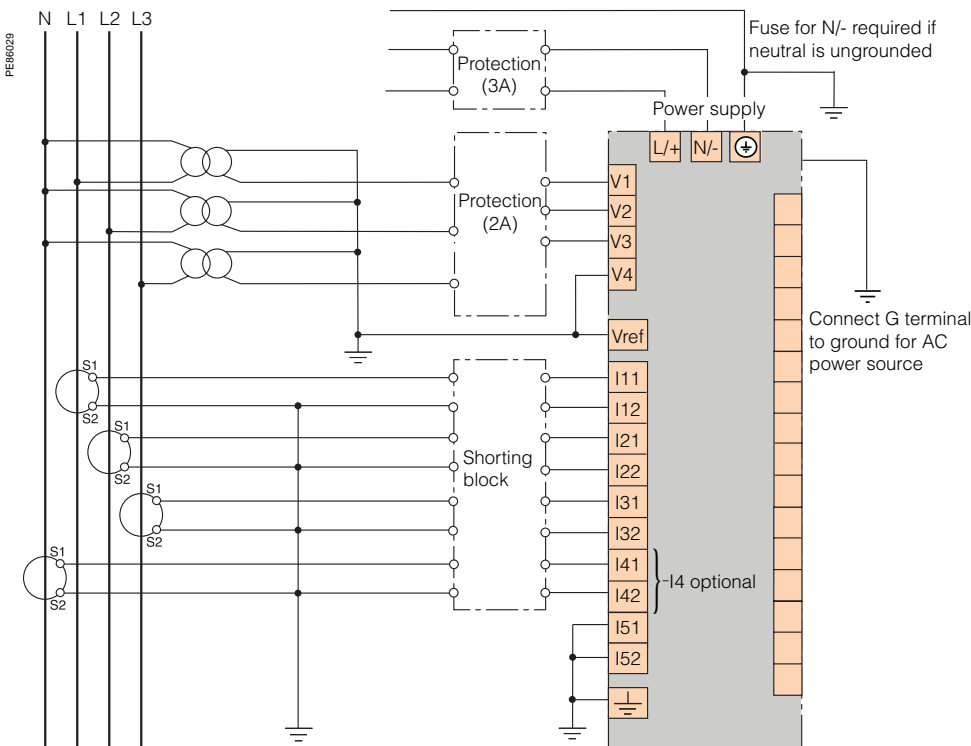


4-wire direct connections



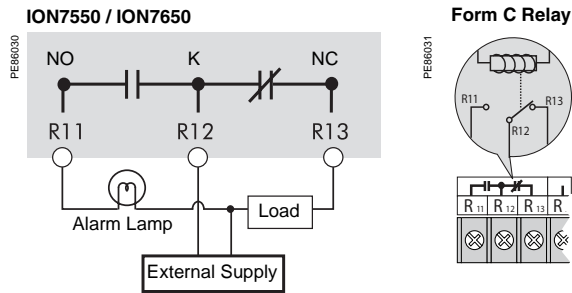
Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

4-wire 3 element connection with 4 CTs and 3 PT



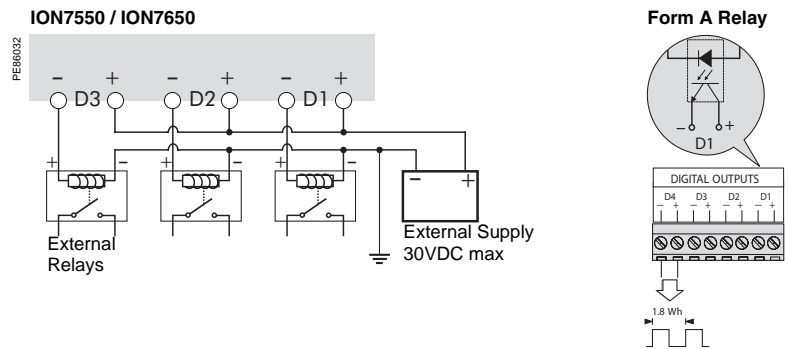
Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

Form C digital outputs: mechanical relays R1 - R3



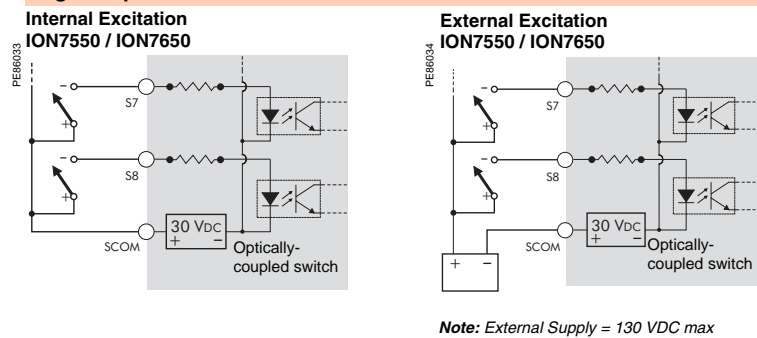
Note: Mechanical relays should always be protected by external fuses

Form A digital outputs: solid state relays D1 - D4

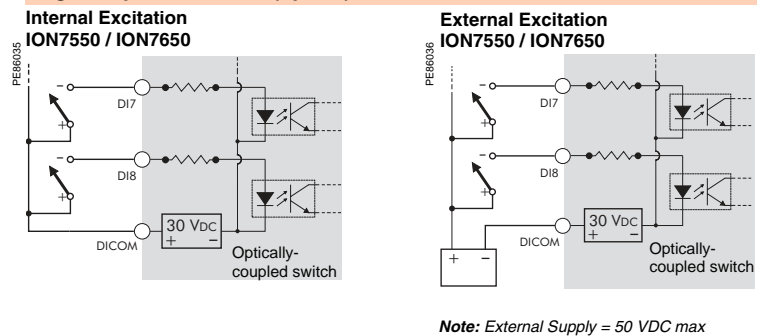


Note: D4 output is factory-configured to pulse once every 1.8 Wh for Class 20 meters, or once every 0.18Wh for Class 2 meters (for calibration testing purposes).

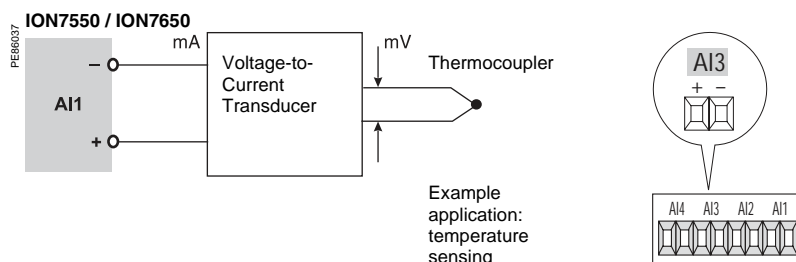
Digital inputs: S1 - S8



Digital inputs: DI1 - DI8 (option)

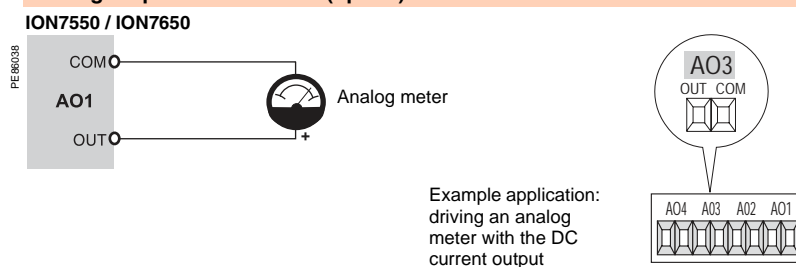


Analog inputs: AI1 to AI4 (option)



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)



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

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