Electrical network management

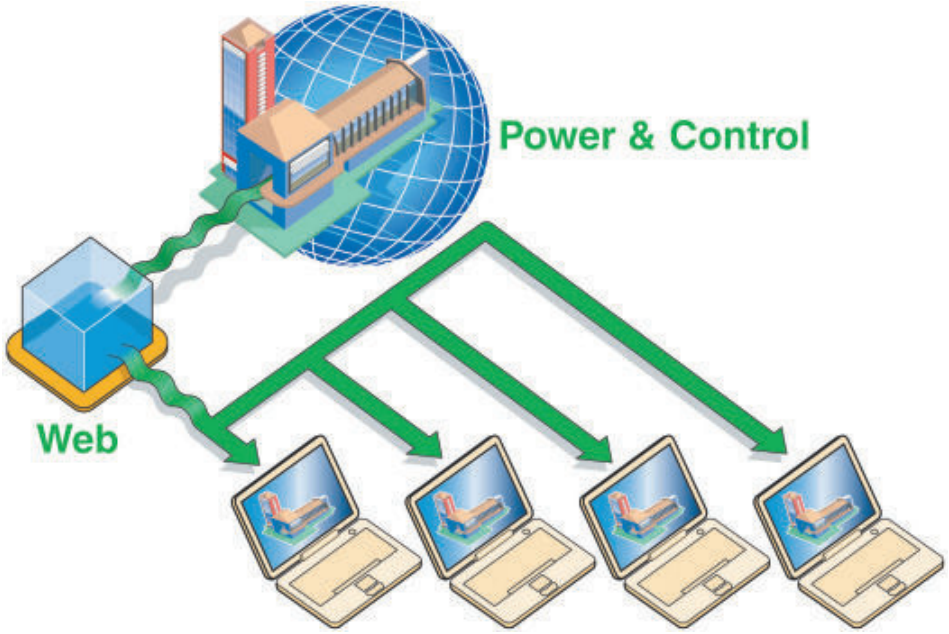
PowerLogic System

Energy management, revenue metering and power quality monitoring

Catalogue
2009

Schneider Electric

PowerLogic System is…



PowerLogic System helps you control the ***cost, quality and reliability*** of electric power.

With PowerLogic System, you can determine where extra capacity exists, identify over-loaded equipment and balance loads on substations, switchboards and other power equipment. By optimising your electrical system, you extend the life of your installation.

Introduced more than ten years ago, PowerLogic System has proven its cost-effectiveness and continues to help customers improve their productivity and profitability every day.

PowerLogic System makes full use of Web-enabled technology. In this way, our commercial and industrial power distribution expertise spans from single buildings to geographically dispersed enterprise systems.

With PowerLogic System, Schneider Electric gives you the best of the New Electric World, where and when you need it.

General contents

Why use PowerLogic System?

Get all the information you need to manage your electrical installation

Today, cost management and improved continuity of service can boost your competitiveness. For this, you need more information concerning the operation of your electrical installation: consumption data, load curves, disturbances, harmonic pollution, available power, etc.

PowerLogic System brings you all this information. Information you can count on, where and when you need it.

E68978

Public buildings

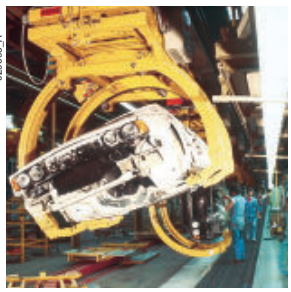
87921_A

Hospitals

09095

Semiconductor manufacturers

029693_A



Automobile industry

PowerLogic System, the metering and monitoring solution suited to the widest variety of applications.

PowerLogic System, the metering and monitoring solution

PowerLogic System offers a complete, consistent power metering and monitoring solution for optimal management of your electrical installation.

A complete solution

- covering all electrical installation management needs, from simple current metering right through to remote monitoring of power quality
- backed by the most complete range of metering/monitoring devices and power-monitoring software on the market
- suited to the widest variety of applications in both industrial and service sectors.

A consistent solution

- integrating all low and medium voltage metering, monitoring and protection devices
- offering communication software and gateways pre-configured for easy integration of Schneider Electric devices.

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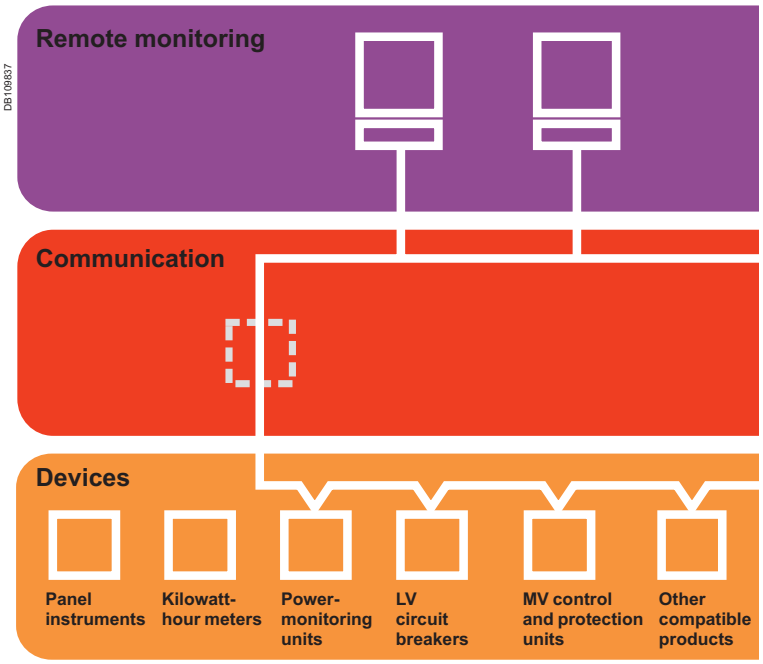


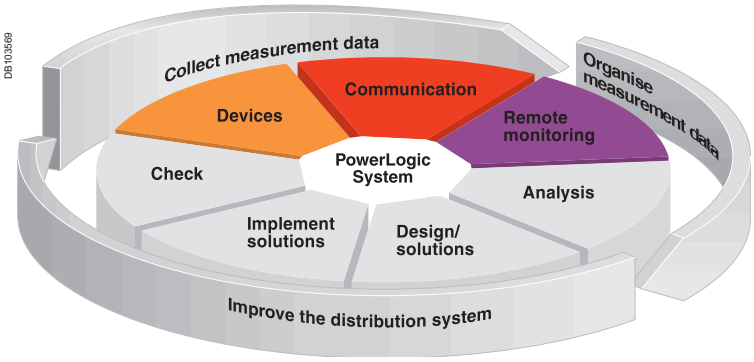
A PowerLogic System solution integrates

- PowerLogic range products:
  - metering and monitoring devices, both communicating and non-communicating
  - communication interfaces
  - power-monitoring software
- Masterpact and Compact circuit breakers equipped with Micrologic control units
- Sepam and Vigirex protection relays
- any other Modbus-comptabile device.

Why use PowerLogic System? (cont.)

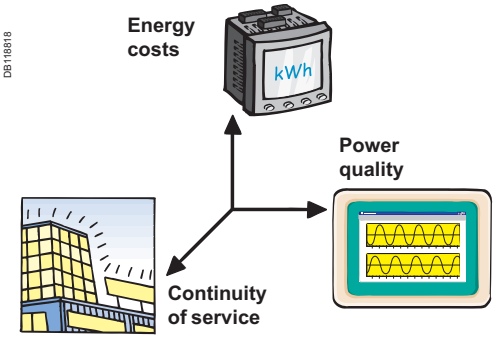
PowerLogic System, the key to improving your electrical distribution system

PowerLogic System serves 3 functions:
- collection of measurement data
- organisation and transmission of measurement data to facilitate analysis by the different departments concerned: production, maintenance, accounting, site management
- checking of the results obtained after implementing electrical distribution system improvement solutions.



With PowerLogic System, you control your electrical installation

PowerLogic System helps you



Reduce energy costs

Get a clearer view of your consumption
- identification of major consumers and allocation of costs
- management of consumption peaks and optimisation of your utility contract.

Improve continuity of service

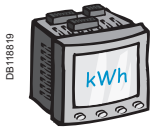
Use the full capacity or your installation
- analysis of the electrical distribution system
- diagnosis of failures.

Improve power quality

Increase power-system reliability and optimise your operating costs
- monitoring of harmonics
- lower maintenance costs
- reduced production losses, etc.

Why use PowerLogic System?
Benefits and applications

Reduce energy costs



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PowerLogic System helps you reduce power consumption and the cost of the energy you use through sub-billing and electrical contract optimisation.

Sub-billing and cost allocation to reduce consumption

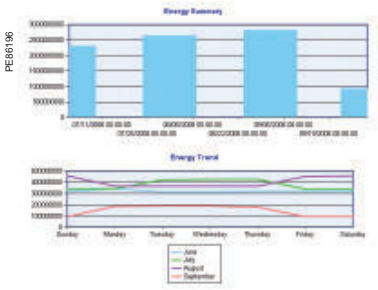
Metering of energy consumption to:
- identify major consumers
- allocate costs
- make users aware of expenditures.

Optimisation of power contract and load curves to reduce energy costs

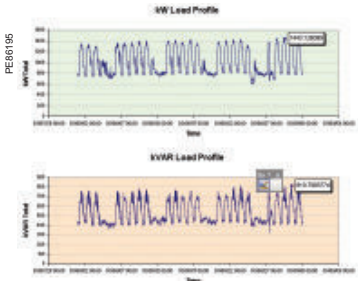
Recording of energy consumption and load curves to:
- optimise the power contract
- aggregate multi-site costs and negotiate global contracts
- identify spare capacity for electrical installation extensions
- manage peaks and avoid penalties:
  - improve power factor by power factor correction solutions
  - avoid subscribed-power overruns by automatic load-shedding.

Monitoring of other utilities

Count pulses received from other utility meters (water, gas, steam, etc.) for global, centralised utility management.


PE86196

Energy summaries



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Trend curves

Improve continuity of service


DB103347

Electricity is vital to site operation.
However, the phenomena that cause faults are not always easy to understand.
PowerLogic System gives a better understanding of the electrical distribution system and offers tools for analysis.
It lets you manage the system in real time and thereby increase reliability.

Real time monitoring of your electrical installation

Panel instrumentation

For local display of measurement data and checks on installation operation.

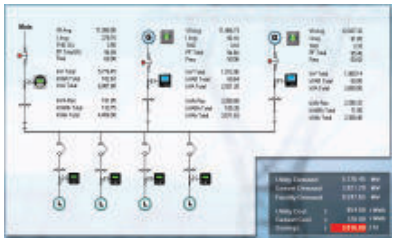
Remote monitoring

Monitoring of the electrical installation to get the right information to the right person at the right time:
- switchgear status and measurements for the facility manager
- alarms and events for the maintenance department
- cost allocation for the accounting department, etc.

Open, flexible communication system allowing intervention by an external expert when required.

Easy access to information via Web technologies

With the EGX300 integrated gateway-server, you can now access all the information you need wherever you are and whenever you want via a standard browser like Internet Explorer©.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Real time monitoring of your electrical installation

Why use PowerLogic System?
Benefits and applications (cont.)

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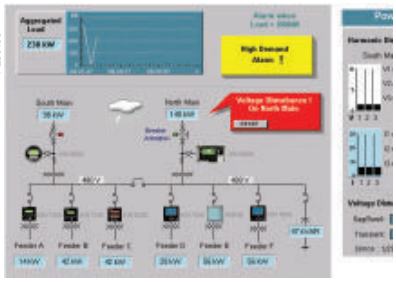

Alarm notification

Preventive and corrective maintenance

Preventive maintenance
Detection of problems in advance based on key parameters, to avoid equipment failures and downtime.

Corrective maintenance
Clear, complete information for the facility manager regarding fault circumstances in order to get power restored as quickly as possible:
- local or remote alarms (e.g. by telephone or pager)
- fault locating, overall vision, summary tables, etc.

Detailed information for experts in charge of analysing the causes of faults and designing solutions to improve the electrical distribution system:
- event and alarm logs
- waveform capture, etc.

Improve power quality

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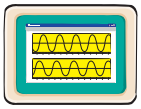
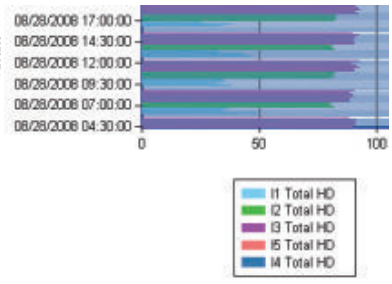


Power quality has a direct impact on operating costs:
- direct costs: over-consumption due to increased power losses
- indirect costs:
  - production losses: process malfunctions, unnecessary tripping
  - equipment costs: shorter service life, lower efficiency, oversized equipment.

PowerLogic System lets you assess the quality of your power, identify the causes of any problems and check the effectiveness of remedial measures.

Four main functions are used to check power quality:
- monitoring of harmonics
- detection of voltage sags and swells
- detection of transients
- EN 50160 electricity supply compliance checking.

PE86200



Trending of harmonics

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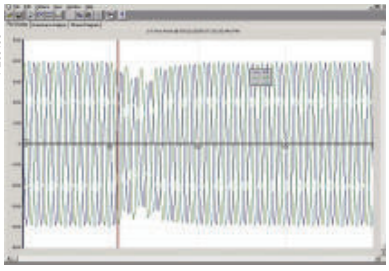

Disturbance capture

Measurement of total harmonic distortion and individual harmonic content
- identify sources of harmonic distortion and separate them from sensitive loads
- determine causes of malfunctions
- derate power devices (transformers, cables, etc.)
- implement filtering solutions.

Detection and waveform capture of voltage sags and swells
Determine the origin of production losses or shutdowns.

Detection and waveform capture of transients
Determine the causes of malfunctions and breakdowns.

EN 50160 electricity supply compliance checking
To assess the quality of distributed power according to the European standard EN 50160 and check that the distributor complies with the standard.

Panorama of the PowerLogic range

Current transformers

CT
current transformer

Installation

- insulated cable, diameter 21 to 35 mm, trough transformer
- busbar through transformer
- cable connections

Characteristics

- transformation ratio: 40/5 A to 6000/5 A
- accuracy: class 0.5 to 3
- maximum rated operational voltage: 720 V AC
- tropicalised

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Panel instruments

Name	AMP / VLT	AMP / VLT	
Function	ammeter, voltmeter	ammeter, voltmeter	

Applications

Sub-billing and cost allocation

Energy consumption			
Consumption for different time periods			
Consumption of other utilities			
Optimisation of power contract and load curves			

Installation monitoring

Panel instrumentation	I / U	I / U	
Remote monitoring			
Advanced remote monitoring			

Power quality analysis

Monitoring of harmonics (THD)			
Analysis of individual harmonic content			
Detection of voltage sags and swells			
EN 50160 compliance checking			

Characteristics

Measurement accuracy	class 1.5	± 0.5 % ± 1 digit	
Installation	DIN rail 4 x 18 mm modules	DIN rail 2 x 18 mm modules	
Voltage measurement	VLT : 500 V AC direct or external VT	VLT : 600 V AC direct or external VT	
Current measurement	AMP : 30 A direct or external CT	AMP : 10 A direct or external CT	
Communication ports			
Inputs / Outputs			
Memory capacity			

page 21

page 22

Panorama of the PowerLogic range (cont.)

Kilowatt-hour meters

	AMP / VLT	FRE	CH / CI	EN40 / ME
	ammeter, voltmeter	frequency meter	hour counter pulse counter	kilowatt-hour meters
	I / U	F	hours /pulses	E
	class 1.5	± 0.5 % ± 1 digit		class 1
	flush mounted 72 x 72 mm 96 x 96 mm	DIN rail 2 x 18 mm modules	CI, CH: DIN rail 2 x 18 mm modules CH: flush mount	DIN rail 1.2 or 4 x 18 mm modules
	VLT : 500 V AC direct or external VT	400 V AC direct		400 V AC direct
	AMP : external CT			40 to 63 A direct or external CT
	page 23	page 22	page 27	page 31

Panorama of the PowerLogic range (cont.)

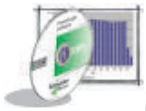
	Basic energy metering		*Mid-range metering*	
				
Name	**PM9 / PM9P / PM9C**	**PM200/PM200P/PM210**	**PM700 / PM700P/PM710/ PM750**	
Function	power meter IEC 61557-12 PMD/S-/K55/1	power meter IEC 61557-12 PMD/S-/K55/1	power meter IEC 61557-12 PMD/S-/K55/1 IEC 61557-12 PMD/S-/K55/0.5 (PM750 only)	
Applications				
Sub-billing and cost allocation				
Energy consumption				
Consumption for different time periods				
Consumption of other utilities				
Optimisation of power contract and load curves				
Installation monitoring				
Panel instrumentation	**I, U, F, P, Q, S, PF, E (Power demand and maximum demand)**	**I, U, F, P, Q, S, PF, E (Power and current demand)**	**I, U, F, P, Q, S, PF, E (demand, minimum and maximum values)**	
Remote monitoring		**PM210 only**	**PM710 and PM750. PM750 includes alarms**	
Advanced remote monitoring				
Power quality analysis				
Monitoring of harmonics (THD))				
Analysis of individual harmonic content				
Detection of voltage sags and swells				
EN 50160 compliance checking				
Characteristics				
Measurement accuracy	class 1 (active energy)	class 1 (active energy)	class 1 (active energy) class 0.5 S (PM750 only)	
Installation	DIN rail 4 x 18 mm modules	flush mount and DIN rail 96 x 96 mm	flush mount and DIN rail 96 x 96 mm	
Voltage measurement	450 V AC direct or external VT	480 V AC direct or external VT	480 V AC direct or external VT	
Current measurement	external CT	external CT	external CT	
Communication ports	1	1 (PM210 only)	1 (PM710 and PM750 only)	
Inputs / Outputs	1 O	2 O (PM200P only)	2 O (PM700P only) 2 I / 1 O (PM750 only)	
Memory capacity				
	page 40	**page 46**	**page 52**	

Panorama of the PowerLogic range (cont.)

Advanced energy metering

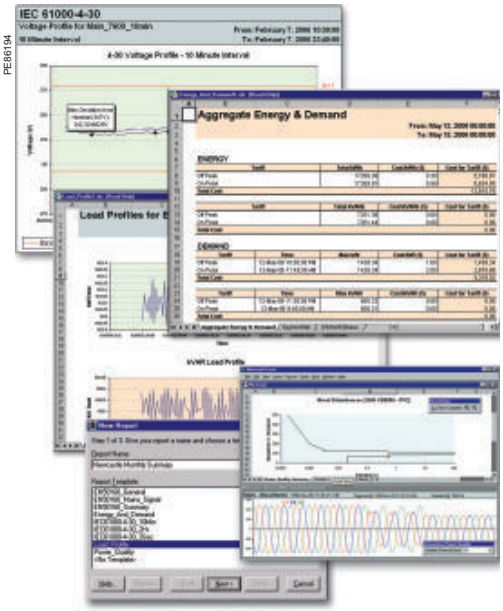
	PM810	PM820/ PM850	PM870	ION7550	ION7650	ION8600 A	ION8600 B	ION8600 C	ION8800 A	ION8800 B	ION8800 C
	power meter IEC 61557-12 PMD/S-/K70/0.5			power meter		power meter			power meter		
	with PM810 LOG										
	clock/cal. (PM810 LOG)	time-stamped alarms... and data logs									
				I, U, F, P, Q, S, PF, E (demand, minimum and maximum values)							
	with PM810 LOG										
		PM850 only									
	class 0.5S (active energy)	class 0.5S (active energy)	class 0.5S (active energy)	class 0.2S (active energy)		class 0.2S (active energy)			class 0.2S (active energy)		
	flush mount and DIN rail 96 x 96 mm	flush mount and DIN rail 96 x 96 mm	flush mount and DIN rail 96 x 96 mm	DIN 192 standard cutout (186 x 186 mm)		ANSI socket mount 9S, 35S, 36S, 39S and 76S; FT21 switchboard case			DIN 43862 rack		
	600 V AC direct or external VT	600 V AC direct or external VT	600 V AC direct or external VT	347 V L - N AC 600 V L - L AC		277 V L-N AC (9S, 39S, 36S and 76S); 480 V L-L AC (35S)			288 V L-N AC (500 V L-L AC)		
	external CT	external CT	external CT	external CT		external CT			external CT		
	1	1	1	5		5			5		
	16 I/O	16 I/O	16 I/O	32 I/O		25 I/O			16 I/O		
	80 kbytes with PM810 LOG	80 / 800 kbytes	800 kbytes	up to 10 MB		10 MB	5 MB	2 MB	up to 10 MB		
	page 60			page 74		page 84			page 93		

Panorama of the PowerLogic range (cont.)

	Communications			*Monitoring software*		
						
Name	**EGX100**	**EGX300**	**ION7550RTU**	**PowerView**	**SMS**	**ION Enterprise**
Function	Ethernet gateway	Integrated gateway-server	Ethernet gateway-server + onboard I/O	Power monitoring software	Power management software	Power management software
Applications						
Ethernet communication						
RS485 / Ethernet gateway	■	■	■			
Devices supported	PM9C, PM710, PM750, PM800 series, CM3000 series, CM4000 series, Sepam, Micrologic	PM9, all PM200, PM700, PM800 series, all CM3000, CM4000 series, ION8800, ION8600, ION7550/7650, Sepam,Micrologic, Compact NSX	ION8800, ION8600, ION7550/7650, ION6200, Modbus devices	PM9C, PM200, PM710, PM750, PM800 series, ION6200, Micrologic, Compact NSX	PM9C, PM710, PM750, PM800 series, all CM3000, CM4000 series, Sepam, Micrologic	ION8800, ION8600, ION7550/7650, PM800 series, ION7300 series, PM710, PM750, ION6200, PM210, all CM3000, CM4000 series, BCPM, Sepam, Micrologic, Compact NSX
Web server with standard HTML pages		■	■		■	■
Web server with custom HTML pages		■			■	■
Remote monitoring						
Real time data		■	■	■	■	■
Historical data		■		■	■	■
Automatic notification			■		■	■
Alarm and event logs					■	■
Waveform display					■	■
Custom animated graphics					■	■
Manual reports				■	■	■
Automatic reports					■	■
Characteristics						
Ethernet ports Modbus TCP/IP protocol	10/100 Base TX port	10/100 Base TX port	10/100 Base TX port			
RS485 (2-wire / 4-wire) ports Modbus protocol	1	1	1			
Number of devices connected directly	32	64	64			
RS232 configuration ports	1		1			
Miscellaneous			modem port I/O (24 I/30 O max)			
Installation	DIN rail	DIN rail	DIN 192 cutout (186 x 186 mm)			
	page 104		page 108	page 120	page 124	page 128

General information on power-monitoring software

Software, a tool serving site operation.
A site can be compared to a living organism.
The power system manager has no control over the changes that affect this organism, but must ensure that it continues to receive the energy it requires.
Similar to a doctor, the power system manager must carry out preventive measures and diagnose and remedy any problems that occur. The goal is to maintain the site in a healthy state, without generating any secondary effects.
Software enables managers to diagnose the causes of most problems encountered on electrical systems.



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More and more devices are capable of communicating.
The number of available measurements is also on the rise, creating the need for a tool to successfully manage all the information..

The main purpose of software is to simplify complex sites so that they can be managed by humans:
- make the site and its operation intelligible
- make the power system tangible and visible.

The role of software

All measurements at a single location
All measured values may be accessed via a PC.

Organisation and use of measurements
Before they may be used, certain measurements must be organised, processed or integrated in special tools.

Device setup
Simple devices may be set up on their front panels.
For devices with advanced functions, local setup is often difficult and even impossible for some functions.
Software greatly facilitates device setup.

Automatic tasks
Software can execute tasks automatically, triggered by:
- a date
- an event
- an alarm.

These tasks may concern devices (reset, start of a particular function) or system users (transmission of an e-mail, etc.).

Manual commands
Power-monitoring software can also be used to control devices (e.g. open or close a circuit breaker).
Certain control/monitoring functions (automatic action on electrical-distribution system) are carried out by PLCs integrated in the PowerLogic System architecture.

Access via the Web
Information must be adapted to user needs and then made available to them.
Software can handle the adaptation by preparing custom reports.
These reports can then be accessed by any PC on the site using a standard Web browser.

Software and architecture
Software must be capable of meeting a large number of needs:
- single-user or multi-user operation
- data organisation according to user profiles
- adaptation to different site topologies
- data exchange with other systems
- etc.

This set of constraints means that a single product is not sufficient; a range of software products is required.

Examples of architectures

PowerLogic System can be used in a number of different architectures depending on the layout of the site. It also offers different user profiles simultaneously.

Example 1

- installation in a small building or isolated equipment room
- one or more metering/monitoring units connected to a simple PC (directly or via modem)
- for electrical installation monitoring by the maintenance department.

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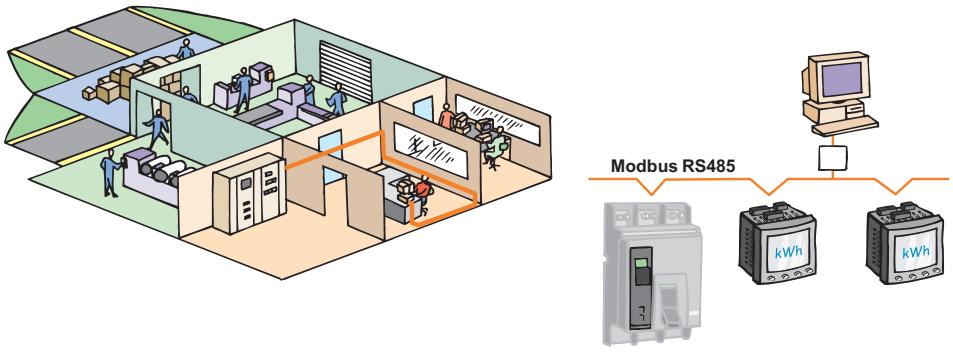

Example 2

- installation in a building with a number of users interconnected by a local Intranet
- connection of metering/monitoring units to EGX gateways for integration in the company Ethernet network
- for shared management of the electrical installation by different departments:
  - simple monitoring, with no dedicated software, using a Web browser,
  - complete power-monitoring using ION Enterprise, System Manager or PowerView softwares.

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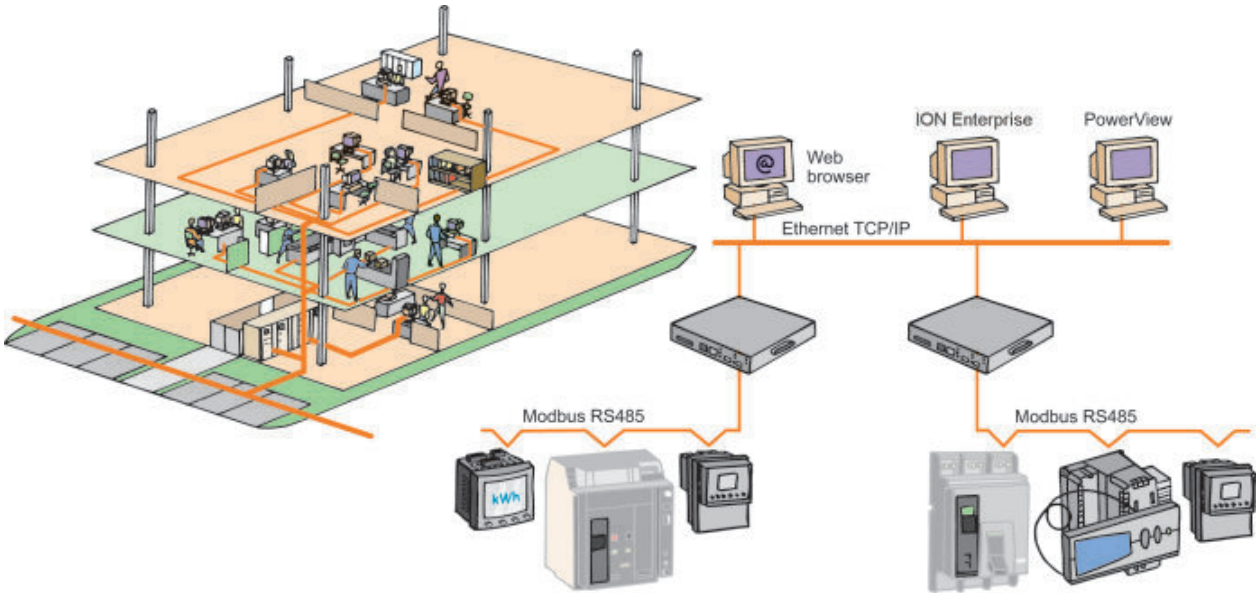

Examples of architectures (cont.)

Example 3

- installation in a number of buildings linked by a company Intranet
- connection of metering/monitoring units to EGX Web servers for integration in the company Ethernet network
- all sectors of the company connected to the Intranet have direct access to essential data on the electrical installation via their Web browser.

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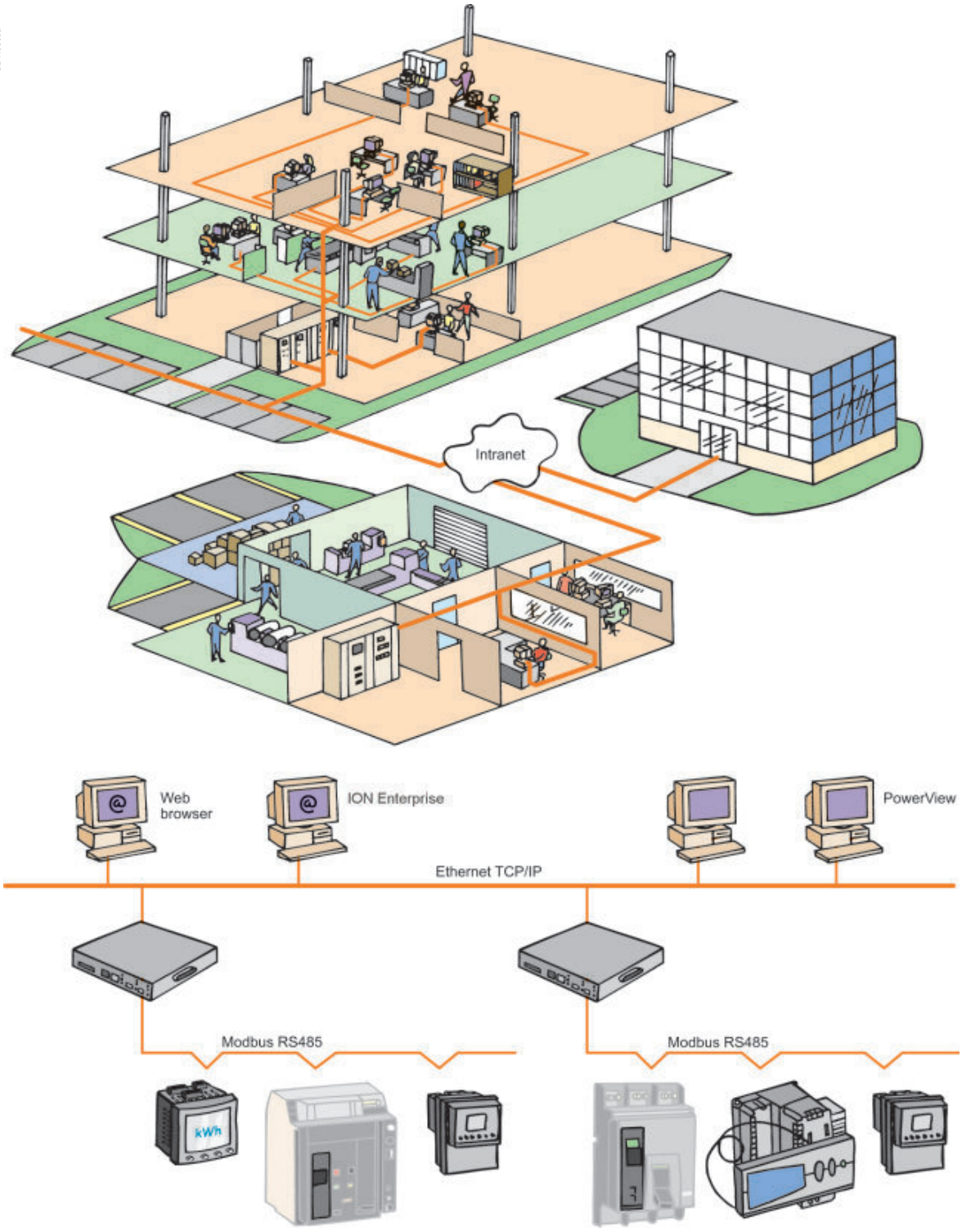


Index of catalogue numbers

Index of catalogue numbers (cont.)

CT current transformers

16453.

16462.

16542.

16453 + 16550.

Sealable cover.

Function

The Ip/5A ratio current transformers deliver at the secondary a current of 0 to 5 A that is proportional to the current measured at the primary. They are available in two major families:

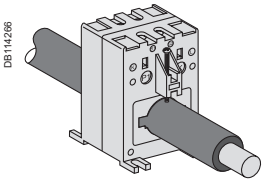
- cable current transformers
- bar current transformers.

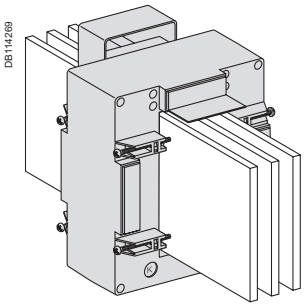
This allows them to be used in combination with measurement instruments: ammeters, kilowatt-hour meters, measurement units, control relays, etc.

Common technical data

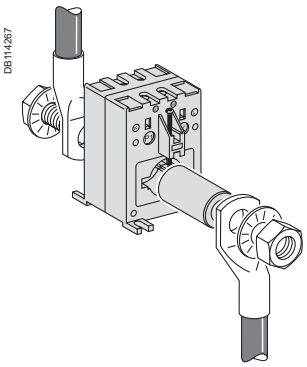
- Secondary current: 5 A
- Max. voltage rating Ue: 720 V
- Frequency: 50/60 Hz
- Safety factor (sf):
  - 40 to 4,000 A : sf ⩽ 5
  - 5,000 to 6,000 A : sf ⩽ 10.
- Degree of protection: IP20
- Operating temperature: tropicalised range, -25 °C to +60 °C, relative humidity > 95 %
- Compliance with standards: IEC 60044-1 and VDE 0414
- Secondary connection (as per model):
  - by terminals for lug
  - by tunnel terminals
  - by screws.

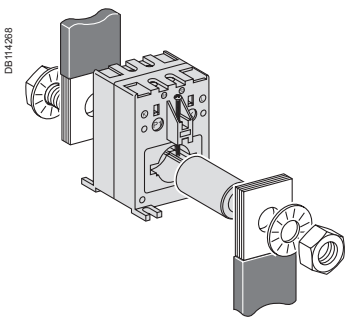
Connection





CT with let-through primary.





CT with primary connection by screw and nut.
Use of cylinder 16550 or 16551.

The three references 16482, 16483 and 16534 have a double connection output at the secondary: twice S1 and twice S2. The terminals are in parallel, as there is only one secondary winding.
The unused secondary outputs must not be connected.

CT current transformers (cont.)

Catalogue numbers

Rating Ip/5 A	Power (VA) Accuracy class: 0.5	1	3	Insulated cable: maximum diameter [1] (mm)	maximum cross-section [1] (mm^2)	Dimension opening for bars	Weight (g)	Cat. no. Tropicalised CT	Cylinder [2]	Sealable cover
40 A	-	-	1	21	120	-	200	**16500**	**16550** [3]	built-in
50 A	-	1.25	1.5	21	120	-	200	**16451**	**16550**	built-in
75 A	-	1.5	2.5	21	120	-	200	**16452**	**16550**	built-in
100 A	2	2.5	3.5	21	120	-	200	**16453**	**16550**	built-in
125 A	2.5	3.5	4	21	120	-	200	**16454**	**16550**	built-in
150 A	3	4	5	21	120	-	200	**16455**	**16550**	built-in
	1.5	5.5	6.5	22	150	30 x 10	270	**16459**	**16551** [4]	**16552**
200 A	4	5.5	6	21	120	-	200	**16456**	**16550**	built-in
	4	7	8.5	22	150	30 x 10	270	**16460**	**16551**	**16552**
	-	2	5	-	-	65 x 32	600	**16476**	**-**	built-in
250 A	6	9	11	22	150	30 x 10	270	**16461**	**16551**	**16552**
	2.5	5	8	35	240	40 x 10	430	**16468**	**-**	**16553**
	1	4	6	-	-	65 x 32	600	**16477**	**-**	built-in
300 A	7.5	11	13.5	22	150	30 x 10	270	**16462**	**16551**	**16552**
	4	8	12	35	240	40 x 10	430	**16469**	**-**	**16553**
	1.5	6	7	-	-	65 x 32	600	**16478**	**-**	built-in
400 A	10.5	15	18	22	150	30 x 10	270	**16463**	**16551**	**16552**
	8	12	15	35	240	40 x 10	430	**16470**	**-**	**16553**
	4	8	10	-	-	65 x 32	600	**16479**	**-**	built-in
500 A	12	18	22	22	150	30 x 10	270	**16464**	**16551**	**16552**
	10	12	15	35	240	40 x 10	430	**16471**	**-**	**16553**
	2	4	6	-	-	64 x 11 51 x 31	500	**16473**	**-**	built-in
	8	10	12	-	-	65 x 32	600	**16480**	**-**	built-in
600 A	14.5	21.5	26	22	150	30 x 10	270	**16465**	**16551**	**16552**
	4	6	8	-	-	64 x 11 51 x 31	500	**16474**	**-**	built-in
	8	12	15	-	-	65 x 32	600	**16481**	**-**	built-in
800 A	12	15	20	-	-	65 x 32	600	**16482**	**-**	built-in
1000 A	15	20	25	-	-	65 x 32	600	**16483**	**-**	built-in
1250 A	15	20	25	-	-	65 x 32	600	**16534**	**-**	built-in
	12	15	20	-	-	84 x 34	700	**16537**	**-**	built-in
	8	12	-	-	-	127 x 38	1500	**16540**	**-**	built-in
1500 A	20	25	30	-	-	65 x 32	600	**16535**	**-**	built-in
	15	20	25	-	-	84 x 34	700	**16538**	**-**	built-in
	10	15	-	-	-	127 x 38	1000	**16541**	**-**	built-in
2000 A	15	20	-	-	-	127 x 38	1000	**16542**	**-**	built-in
2500 A	20	25	-	-	-	127 x 38	1000	**16543**	**-**	built-in
	30	50	60	-	-	127 x 52	1300	**16545**	**-**	built-in
3000 A	25	30	-	-	-	127 x 38	1000	**16544**	**-**	built-in
	40	60	60	-	-	127 x 52	1300	**16546**	**-**	built-in
4000 A	50	60	60	-	-	127 x 52	1300	**16547**	**-**	built-in
5000 A	60	120	-	-	-	165 x 55	5000	**16548**	**-**	built-in
6000 A	70	120	-	-	-	165 x 55	5000	**16549**	**-**	built-in

(1) *Cable(s) that can be routed through the CT*
(2) *For CT with primary connection by screw and nut.*
(3) *Cylinder with inner dia. 8.5 mm, L = 32 mm*
(4) *Cylinder with inner dia. 12.5 mm, L = 62 mm*

Fastening mode

CT cat. no.	Adapter for DIN rail	Mounting plate	Insulated locking screw
16451...16456	■	■	-
16459...16471	■	■	■
16473 and 16474	-	■	■
16476...16483	-	-	■
16500	■	■	-
16534...16549	-	-	■

CT current transformers (cont.)

Choosing a current transformer

Choice of a CT depends on 2 criteria:
- the Ip/5 A ratio
- the installation type.

The Ip/5 A ratio

We recommend that you choose the ratio immediately higher than the maximum measured current (In).
Example: In = 1103 A; ratio chosen = 1250/5.
For small ratings from 40/5 to 75/5 and for an application with digital devices, we recommend that you choose a higher rating, for example 100/5.
This is because small ratings are less accurate and the 40 A measurement, for example, will be more accurate with a 100/5 CT than with a 40/5 CT.

The installation type

Choice of a CT model depends on the installation type:
- insulated cables
- mounting on bars.

Important precaution

Never open the secondary circuit of a current transformer when the primary circuit is energised.
Prior to working on the secondary circuit, the secondary terminals of the current transformer must be short-circuited.

Determining the accuracy class of a CT

The accuracy class depends on the apparent power (VA) of the transformer and on consumption of the complete measurement system.
The latter allows for consumption of all the devices and the connecting cables.
For a given accuracy class, consumption of the measurement system must not exceed apparent power (VA) of the CT transformer.

Copper cable cross-section (mm^2)	Power in VA per doubled meter at 20 °C
1	**1**
1.5	**0.685**
2.5	**0.41**
4	**0.254**
6	**0.169**
10	**0.0975**
16	**0.062**

For each temperature variation per 10 °C bracket, the power drawn up by the cables increases by 4 %.

Schneider Electric device	Consumption of the current input in VA
Ammeter 72 x 72 / 96 x 96	**1.1**
Analog ammeter	**1.1**
Digital ammeter	**0.3**
PM700, PM800, CM3000, CM4000	**0.15**
ME4zrt	**0.05**
PM9	**0.55**

Example: consumption of a measurement system at 20 °C

PM9		0.55 VA
4 meters of 2.5 mm^2 doubled wires	+	1.64 VA
i.e. a measurement system consumption	=	**2.19 VA**

Based on the result, the CT accuracy class is determined (see previous page):
- class 3 for a 75/5 ratio CT
- class 1 for a 100/5 ratio CT
- class 0.5 for a 125/5 ratio CT.

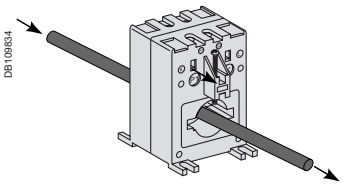
CT current transformers (cont.)

Specific case of the motor starter

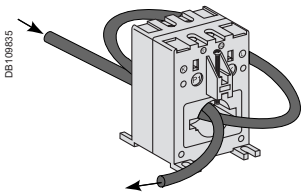
To measure motor starter current, you must choose a CT with primary current Ip = Id/2 (Id = motor starting current).

Practical advice

Use a current transformer to measure a nominal current of 50 A.



50/5 A CT: Imax = 50 A

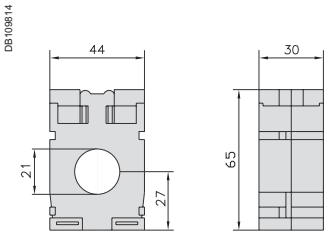


100/5 A CT, 2 cable openings: Imax = 50 A

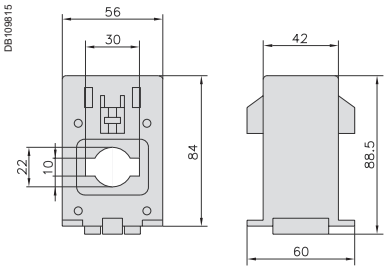
To divide by 2 the nominal current of a transformer, you only need to pass the current to be measured twice through this transformer.

Dimensions

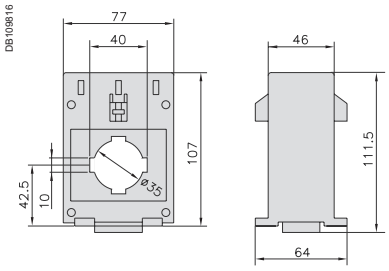
CT current transformers



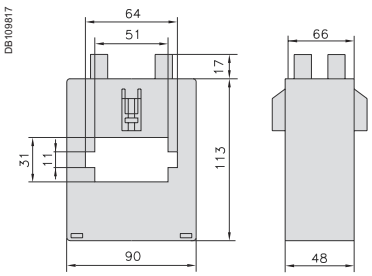
Cat. no. 16500, 16451 to 16456



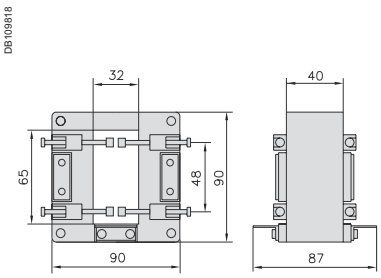
Cat. no. 16459 to 16465



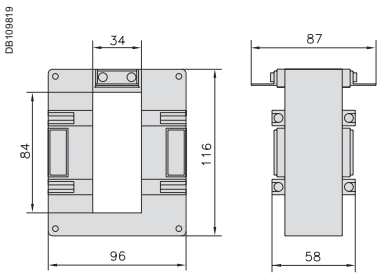
Cat. no. 16468 to 16471



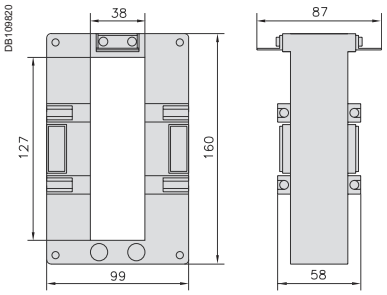
Cat. no. 16473 and 16474



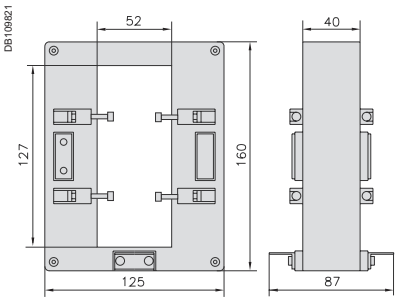
Cat. no. 16534 to 16535, 16476 to 16483



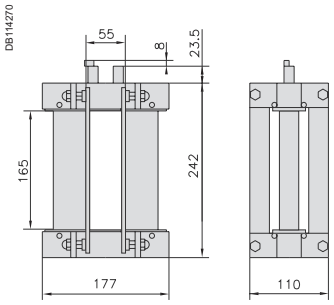
Cat. no. 16537 and 16538



Cat. no. 16540 to 16544

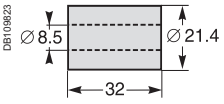


Cat. no. 16545 to 16547



Cat. no. 16548 and 16549

Cylinders



Cat. no. 16550

Cat. no. 16551

DIN rail analog ammeters and voltmeters

AMP.

VLT.

Function

AMP

Ammeters measure the current flowing through an electric circuit in amps.

VLT

Voltmeters measure the potential (voltage) difference of an electric circuit in volts.

Common technical data

- Accuracy: class 1.5.
- Complies with standards IEC 60051-1, IEC 61010-1 and IEC 61000-4.
- Ferromagnetic device.
- Pseudo-linear scale over 90°.
- Ammeters (except catalogue number 16029):
  - connection on CT, ratio In/5, to be ordered separately
  - interchangeable dials.
- Temperature:
  - operating temperature: -25 °C to +55 °C.
  - reference temperature: 23 °C.
- Influence of temperature on accuracy: ±0.03 % / °C.
- Utilisation frequency: 50/60 Hz.
- Consumption:
  - AMP: 1.1 VA
  - VLT catalogue number 15060: 2.5 VA
  - VLT catalogue number 16061: 3.5 VA.
- Permanent overload:
  - AMP: 1.2 In
  - VLT: 1.2 Un.
- Maximum overload for 5 s:
  - AMP: 10 In
  - VLT: 2 Un.
- Connection: tunnel terminals for 1.5 to 6 mm^2 rigid cables.

Catalogue numbers

Type	Scale	Connection with CT	Width in mod. of 9 mm	Cat. no.
AMP with direct connection				
	0-30 A	no	8	**16029**
AMP with connection on CT				
Basic device (delivered without dial)		X/5	8	**16030**
Dial	0-5 A			**16031**
	0-50 A	50/5		**16032**
	0-75 A	75/5		**16033**
	0-100 A	100/5		**16034**
	0-150 A	150/5		**16035**
	0-200 A	200/5		**16036**
	0-250 A	250/5		**16037**
	0-300 A	300/5		**16038**
	0-400 A	400/5		**16039**
	0-500 A	500/5		**16040**
	0-600 A	600/5		**16041**
	0-800 A	800/5		**16042**
	0-1000 A	1000/5		**16043**
	0-1500 A	1500/5		**16044**
	0-2000 A	2000/5		**16045**
VLT				
	0-300 V		8	**16060**
	0-500 V		8	**16061**

DIN rail digital ammeters, voltmeter and frequency meter

AMP.

VLT.

FRE.

Function

AMP
Ammeters measure in amps the current flowing through an electric circuit.

VLT
Voltmeters measure in volts the potential (voltage) difference of an electric circuit.

FRE
The frequency meter measures in hertz the frequency of an electric circuit from 20 to 600 V AC.

Common technical data

- Supply voltage: 230 V.
- Operating frequency: 50/60 Hz.
- Display by red LED: 3 digits, h = 8 mm.
- Accuracy at full-scale : 0.5 % ±1 digit.
- Consumption: max. 5 VA or rated 2.5 VA.
- Degree of protection:
  - IP40 on front face
  - IP20 at terminal level.
- Connection: tunnel terminals for 2.5 mm^2 cables.

Specific data

10 A direct reading ammeter
- Minimum value measured: 4 % of rating.
- Measurement input consumption: 1 VA.

Multi-rating ammeter
- Ratings:
  - in direct reading: 5 A
  - by CT (not supplied) configurable on the front face of the ammeter: 10, 15, 20, 25, 40, 50, 60, 100, 150, 200, 250, 400, 500, 600, 800, 1000, 1500, 2000, 2500, 4000, 5000 A.
- Minimum value measured: 4 % of rating.
- Measurement input consumption: 0.55 VA.

Voltmeter
- Direct measurement: 0...600 V.
- Input impedance: 2 MΩ.
- Minimum value measured: 4 % of rating.

Frequency meter
- Minimum value measured: 20 Hz.
- Maximum value measured: 100 Hz.
- Full-scale display: 99.9 Hz.

Compliance with standards
- Safety: IEC/EN 61010-1.
- EMC electromagnetic compatibility: IEC/EN 65081-1 and IEC/EN 65082-2.

Catalogue numbers

Type	Scale	Connection with CT	Width in mod. of 9 mm	Cat. no.
Direct reading AMP				
	0-10 A	No	4	**15202**
Multi-rating AMP				
	0-5000 A	As per rating	4	**15209**
VLT				
	0-600 V		4	**15201**
FRE				
	20-100 Hz		4	**15208**

72 x 72 analog ammeters and voltmeter

AMP for standard feeder.

AMP for motor feeder.

VLT.

Function

The 72 x 72 measurement devices are designed for flush-mounted installation on doors, wicket doors and front plates of enclosures and cubicles.

AMP

The ammeters measure in amps the current flowing through an electrical circuit.

VLT

The voltmeter measure in volts the potential difference (voltage) of an electrical circuit.

Common technical data

- Accuracy: class 1.5.
- Compliance with standard IEC 60051-1, IEC 61010-1 and IEC 61000-4.
- Ferromagnetic device.
- Scale length: 62 mm over 90°.
- Mounting in enclosure or in cubicle.
- Degree of protection: IP52.
- Maximum operating position: 30° / vertical.
- Temperature:
  - operation: -25 °C to +50 °C
  - reference: 23 °C.
- Influence of temperature on accuracy: ±0.003 % / °C.
- Utilisation frequency: 50/60 Hz.

AMP specific technical data

- Needs a In/5 CT to be ordered separately.
- Interchangeable dials to be ordered separately.
- Consumption: 1.1 VA.
- Permanent overload: 1.2 In.
- Maximum overload for 5 s: 10 In.

VLT specific technical data

- Consumption: 3 VA.
- Permanent overload: 1.2 Un.
- Maximum overload for 5 s: 2 Un.

Catalogue numbers

Type	Scale	Connection on CT	Cat. no.
AMP for standard feeder			
Basic device (delivered without dial)		X/5	**16004**
1.3 In dial	0-50 A	50/5	**16009**
	0-100 A	100/5	**16010**
	0-200 A	200/5	**16011**
	0-400 A	400/5	**16012**
	0-600 A	600/5	**16013**
	0-1000 A	1000/5	**16014**
	0-1250 A	1250/5	**16015**
	0-1500 A	1500/5	**16016**
	0-2000 A	2000/5	**16019**
AMP for motor feeder			
Basic device (delivered without dial)		X/5	**16003**
3 In dial	0-30-90 A	30/5	**16006**
	0-75-225 A	75/5	**16007**
	0-200-600 A	200/5	**16008**
VLT			
	0-500 V		**16005**

96 x 96 analog ammeters and voltmeter

AMP for standard feeder.

AMP for motor feeder.

VLT.

Function

The 96 x 96 measurement devices are designed for flush-mounted installation on doors, wicket doors and front plates of enclosures and cubicles.

AMP

The ammeters measure in amps the current flowing through an electrical circuit.

VLT

The voltmeter measure in volts the potential difference (voltage) of an electrical circuit.

Common technical data

- Accuracy: class 1.5.
- Compliance with standard IEC 60051-1, IEC 61010-1 and IEC 61000-4.
- Ferromagnetic device.
- Scale length: 80 mm over 90°.
- Mounting in enclosure or in cubicle.
- Degree of protection: IP52.
- Maximum operating position: 30° / vertical.
- Temperature:
  - operation: -25 °C to +50 °C
  - reference: 23 °C.
- Influence of temperature on accuracy: ±0.003 % / °C.
- Utilisation frequency: 50/60 Hz.

AMP specific technical data

- Needs a In/5 CT to be ordered separately.
- Interchangeable dials to be ordered separately.
- Consumption: 1.1 VA.
- Permanent overload: 1.2 In.
- Maximum overload for 5 s: 10 In.

VLT specific technical data

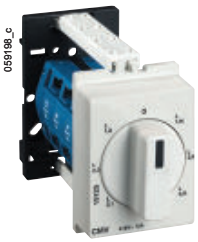
- Consumption: 3 VA.
- Permanent overload: 1.2 Un.
- Maximum overload for 5 s: 2 Un.

Catalogue numbers

Type	Scale	Connection on CT	Cat. no.
AMP for standard feeder			
Basic device (delivered without dial)		X/5	**16074**
1.3 In dial	0-50 A	50/5	**16079**
	0-100 A	100/5	**16080**
	0-200 A	200/5	**16081**
	0-400 A	400/5	**16082**
	0-600 A	600/5	**16083**
	0-1000 A	1000/5	**16084**
	0-1250 A	1250/5	**16085**
	0-1500 A	1500/5	**16086**
	0-2000 A	2000/5	**16087**
	0-2500 A	2500/5	**16088**
	0-3000 A	3000/5	**16089**
	0-4000 A	4000/5	**16090**
	0-5000 A	5000/5	**16091**
	0-6000 A	6000/5	**16092**
AMP for motor feeder			
Basic device (delivered without dial)		X/5	**16073**
3 In dial	0-30-90 A	30/5	**16076**
	0-75-225 A	75/5	**16077**
	0-200-600 A	200/5	**16078**
VLT			
	0-500 V		**16075**

DIN rail CMA and CMV selector switches

CMA.



CMV.

Function

CMA

This 4-position ammeter selector switch uses a single ammeter (using current transformers) for successive measurement of the currents of a three-phase circuit.

CMV

This 7-position voltmeter selector switch uses a single voltmeter for successive measurement of voltages (phase-to-phase and phase-to-neutral) of a three-phase circuit.

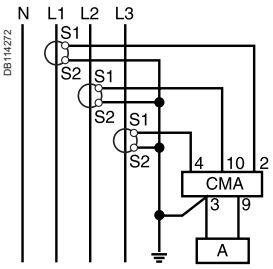
Common technical data

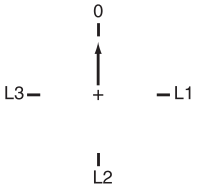
- Rotary handle.
- Maximum operating voltage: 440 V, 50/60 Hz.
- Nominal thermal current: 10 A.
- Operating temperature: -20 °C to +55 °C.
- Storage temperature: -25 °C to +80 °C.
- Mechanical durability (AC21A-3 x 440 V): 2 000 000 operations.
- Degree of protection:
  - IP66 on front face
  - IP20 at terminal level.
- Electrical durability: 1 000 000 operations.
- Connection: jumper terminals with captive screws, for cables up to 1.5 mm^2.
- Complies with standards: IEC/EN 60947-3.

Catalogue numbers

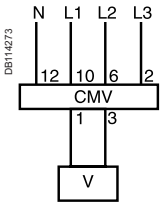
Type	Rating (A)	Voltage (V AC)	Width in mod. of 9 mm	Cat. no.
CMA	10	415	4	**15126**
CMV	10	415	4	**15125**

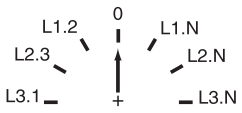
Connection





CMA.





CMV.

48 x 48 CMA and CMV selector switches

CMA.

CMV.

Function

The 48 x 48 selector switches are designed for flush-mounted installation on doors, wicket doors and front plates of enclosures and cubicles.

CMA

The ammeter selector switch uses a single ammeter (by means of current transformers) for successive measurement of the currents of a three-phase circuit.

CMV

The voltmeter selector switch uses a single voltmeter for successive measurement of the voltages (phase-to-phase and phase-to-neutral) of a three-phase circuit.

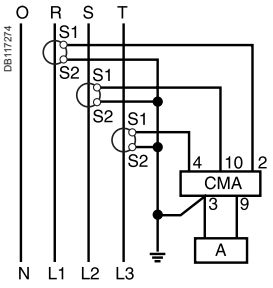
Common technical data

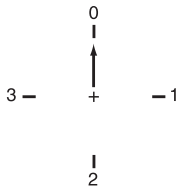
- ■ Durability:
  - □ electrical: 100 000 operations
  - □ mechanical: 2 000 000 operations.
- ■ AgNi contact.
- ■ Operating temperature: -25 °C to +50 °C.
- ■ Compliance with standards IEC/EN 60947-3.
- ■ Degree of protection:
  - □ IP65 on front face
  - □ IP20 at terminal level.

Catalogue numbers

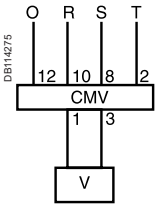
Type	Rating (A)	Voltage (V)	Number of positions	Cat. no.
CMA	20		4	**16017**
CMV		500	7	**16018**

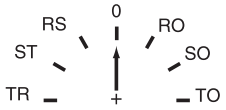
Connection





CMA.





CMV.

Reading 3 phase-to-earth voltages + 3 phase-to-phase voltages.

***Note**: when connecting do not remove the pre-cabling.*

CH hour counters

CH "DIN".

CH "48 x 48".

Function

Electromechanical counter that counts the operating hours of a machine or piece of electrical equipment. Giving a precise indication of operating time, the counter is used to decide when to carry out preventive maintenance.

Common technical data

- Electromechanical display.
- Maximum display: 99999.99 hours.
- Display accuracy: 0.01 %.
- Without reset.
- Storage temperature: -25 °C to +85 °C.
- Connection: tunnel terminals for 2.5 mm^2 cable.

Specific technical data

CH "DIN"

- Consumption: 0.15 VA.
- Operating temperature: -10 °C to +70 °C.
- Mounting on DIN rail.

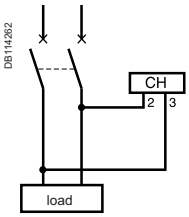
CH "48 x 48"

- Consumption:
  - 15607: 0.25 VA
  - 15608: 0.15 VA
  - 15609: 0.02 VA to 12 V and 0.3 VA to 36 V.
- Operating temperature: -20 °C to + 70 °C.
- Degree of protection: IP65 on front face.
- Mounting on front face of monitoring switchboards.

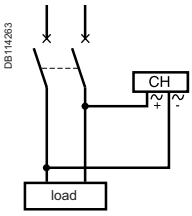
Catalogue numbers

Type	Voltage (V)	Width in mod. of 9 mm	Cat. no.
CH "DIN"	230 V AC ± 10%/50 Hz	4	**15440**
CH "48 x 48"	24 V AC ± 10%/50 Hz		**15607**
	230 V AC ± 10%/50 Hz		**15608**
	12 to 36 V DC		**15609**

Connection



CH "DIN".



CH "48 x 48".

CI impulse counter

Function

Electromechanical counter designed to count impulses emitted by: kilowatt hour meters, temperature overrun detectors, people meters, speed meters, etc.

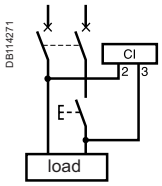
Common technical data

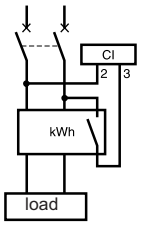
- Supply and metering voltage: 230 V AC ± 10%, 50/60 Hz.
- Consumption: 0.15 VA.
- Maximum display: 9 999 999 impulses.
- Without reset.
- Metering data:
  - minimum impulse time: 50 ms
  - minimum time between 2 impulses: 50 ms.
- Storage temperature: -25 °C to +85 °C.
- Operating temperature: -10 °C to +70 °C.
- Connection: tunnel terminals for 2.5 mm^2 cable.

Catalogue number

Type	Width in mod. of 9 mm	Cat. no.
CI	4	**15443**

Connection

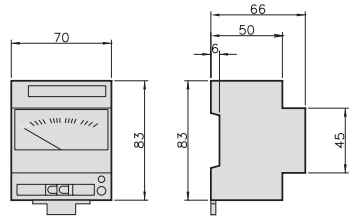




Dimensions

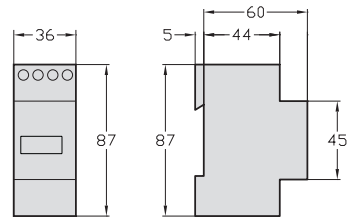
Analog ammeters and voltmeters

DB103473



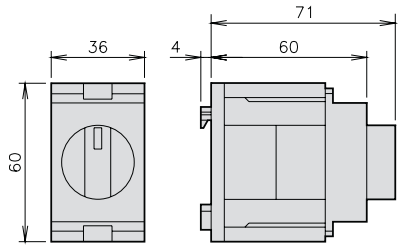
Digital ammeters, voltmeter and frequency meter

DB103474



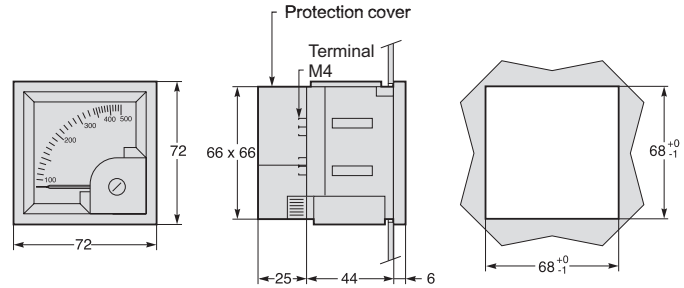
CMA and CMV selector switches

DB103475



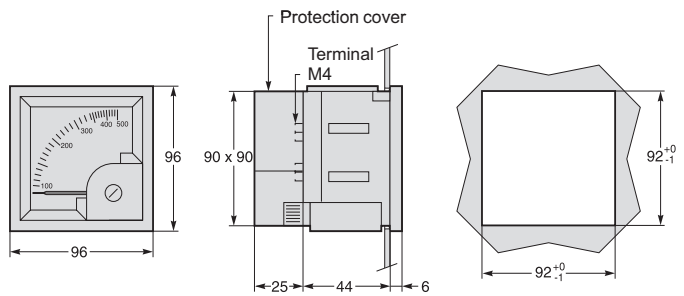
72 x 72 analog ammeters and voltmeter

DB103476



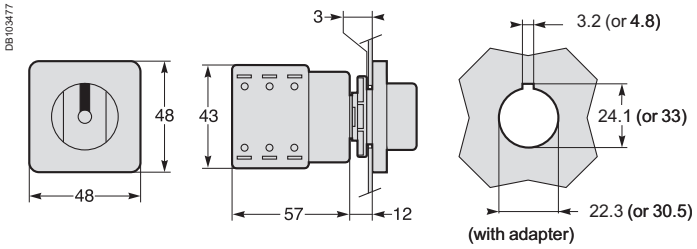
96 x 96 analog ammeters and voltmeter

DB103481

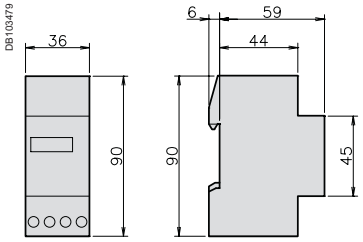


Dimensions (cont.)

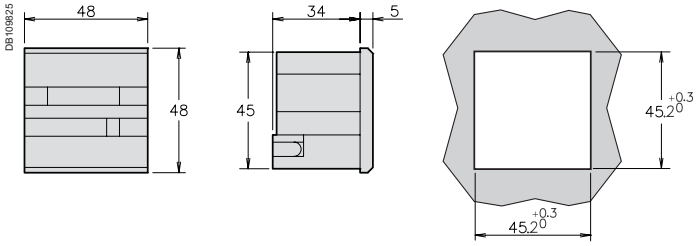
48 x 48 CMA and CMV selector switches



CI impulse counter and CH hour counter



48 x 48 CH hour counters



Kilowatt-hour meters


PB103992-35

EN'clic.


PB103993-35

EN40.


PB103994-35

EN40p.


PB103457_SE-35

ME1zr.


PB103459_SE-35

ME3zr.


PB103462_SE-35

ME4zrt.

Function

Digital kilowatt-hour meters designed for sub-metering of active energy (rms) consumed by a single-phase or three-phase electric circuit with or without distributed neutral.

EN'clic
40 A DuoLine single-phase kilowatt-hour meter.

EN40
40 A single-phase kilowatt-hour meter.

EN40p
40 A single-phase kilowatt-hour meter with remote transfer of metering impulses (static output).

ME1
Single-phase kilowatt-hour meter.

ME1z
Single-phase kilowatt-hour meter with partial meter.

ME1zr
Single-phase kilowatt-hour meter with partial meter and remote transfer of metering impulses (relay output).

ME3
Three-phase kilowatt-hour meter without neutral.

ME3zr
Three-phase kilowatt-hour meter without neutral, with partial meter and remote transfer of metering impulses (relay output).

ME4
Three-phase + neutral kilowatt-hour meter.

ME4zr
Three-phase + neutral kilowatt-hour meter with partial meter and remote transfer of metering impulses (relay output).

ME4zrt
Three-phase kilowatt-hour meter with or without neutral associated with external CTs (not supplied), with partial meter and remote transfer of metering impulses (relay output).

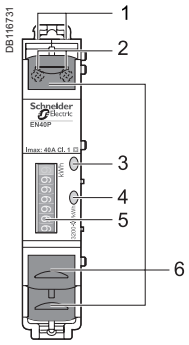
Catalogue numbers

Type	Rating (A)	Voltage (V AC)	Tolérance (V AC)	Width in mod. of 9 mm	Cat. no.
Single-phase circuit (1L + N)					
EN'clic	40	230	±20	2	**15237**
EN40	40	230	±20	2	**15238**
EN40p	40	230	±20	2	**15239**
ME1	63	230	±20	4	**17065**
ME1z	63	230	±20	4	**17066**
ME1zr	63	230	±20	4	**17067**
Three-phase circuit (3L)					
ME3	63	3 x 400-3 x 230	±20	8	**17075**
ME3zr	63	3 x 400-3 x 230	±20	8	**17076**
ME4zrt	40...6000	3 x 400-3 x 230	±20	8	**17072**
Three-phase + neutral circuit (3L + N)					
ME4	63	3 x 230/400	±20	8	**17070**
ME4zr	63	3 x 230/400	±20	8	**17071**
ME4zrt	40...6000	3 x 230/400	±20	8	**17072**

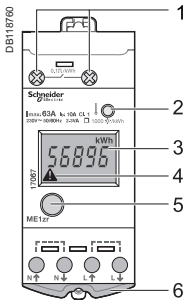
Main technical data

	ME	EN'clic / EN40 / EN40p
Accuracy class	1	1
Frequency	48/62 Hz	48/62 Hz
Consumption	2.5 VA	< 10 VA
Operating temperature	-25°C to +55°C	-25°C to +55°C -25°C to +65°C (32 A)
Connection by tunnel terminals	Top terminals: 6 mm²	Top terminals: 4 mm²
	Bottom terminals: 16 mm²	Bottom terminals: 10 mm²
Compliance with standard	IEC 61557-12 : - PMD/DD/K55/1 - PMD/SD/K55/1 (ME4zrt)	IEC 62053-21 / IEC 61557-12 : - PMD/DD/K55/1
	IEC 62053-21 (accuracy)	Pending MID approval
Sealable screw shield	Except ME4zrt	Yes

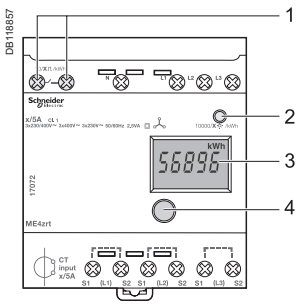
Kilowatt-hour meters (cont.)



EN40p.



MEzr.



ME4zrt.

Description

EN'clic, EN40, EN40p

1 Allow the comb busbar to pass.
2 Remote transfer pulse output (EN40p).
3 Green power-on indicator light.
4 Yellow metering indicator light (flashing).
5 Display unit.
6 Seal.

ME1, ME1z, ME1zr

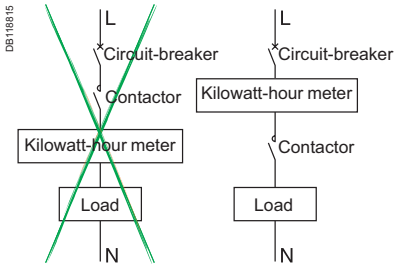
1 Pulse output for remote transfer (ME1zr).
2 Flashing meter indicator.
3 Total or partial meter display (ME1z, ME1zr).
4 Wiring error indicator.
5 Push-button: total or partial meter display, reset partial meter (ME1z, ME1zr).
6 Sealing connection.

ME3, ME3zr, ME4, ME4zr, ME4zrt

1 Pulse output for remote transfer (ME3zr, ME4zr, ME4zrt).
2 Flashing meter indicator.
3 Total or partial meter display (ME3zr, ME4zr, ME4zrt) and CT rating display (ME4zrt).
4 Push-button: total or partial meter display (ME3zr, ME4zr, ME4zrt), reset partial meter, display or selection of CT rating (ME4zrt).

Installation

- The front panel of the product is IP40 and its housing is IP20.
- Its installation must be appropriate to the operating conditions.
- The protection must not be less than IP65 for outdoor use.



Example: meter on a load switching

Use with a contactor

A measurement instrument is normally continually supplied.
For a non-continuous supply (load switching), we recommend that you place the breaking device downstream from the measurement instrument to limit disturbances on the module inputs.
These disturbances, particularly on inductive loads, may result in early ageing of the device.
You must also place the measurement instrument at a distance from the breaking device to limit the risk of disturbance.

Kilowatt-hour meters (cont.)

Specific technical data

EN'clic, EN40, EN40p, ME1, ME1z and ME1zr specific technical data						
	EN'clic	**EN40**	**EN40p**	**ME1**	**ME1z**	**ME1zr**
Direct measurement	Up to 40 A			Up to 63 A		
Metering and activity indicator light (yellow)	3,200 flashes per kWh			1,000 flashes per kWh		
Wiring error indicator	Yes					
Total meter (max. capacity) on one phase	999 999.9 kWh			999.99 MWh		
Total meter display	In kWh with 7 significant digits			In kWh or MWh with 5 significant digits. No decimal point in kWh; 2 digits after the decimal point in MWh		
Partial meter (max. capacity) on one phase with RESET	-			-	99.99 MWh	
Partial meter display	-			-	In kWh or MWh with 4 significant digits. No decimal point in kWh; 2 digits after the decimal point in MWh	
Remote transfer	-		By static output: - ELV insulation voltage: 4 kV, 50 Hz - 20 mA/35 V DC max. - 100 impulses of 120 ms per kWh	-	-	By NO impulse contact: - ELV insulation voltage: 4 kV, 50 Hz - 18 mA/24 V DC, 100 mA/230 V AC - 1 impulse of 200 ms (contact closing) per kWh

ME3 and ME3zr specific technical data		
	ME3	**ME3zr**
Direct measurement	Up to 63 A	
Metering and activity indicator light (yellow)	100 flashes per kWh	
Total meter (max. capacity) on one phase	999.99 MWh	
Total meter display	In kWh or MWh with 5 significant digits. No decimal point in kWh; 2 digits after the decimal point in MWh	
Partial meter (max. capacity) on one phase with RESET	-	99.99 MWh
Partial meter display	-	In kWh or MWh with 4 significant digits. 1 digit after the decimal point in kWh
Remote transfer	-	By NO impulse contact: - ELV insulation voltage: 4 kV, 50 Hz - 18 mA/24 V DC, 100 mA/230 V AC - 1 impulse of 200 ms (contact closing) every 10 kWh

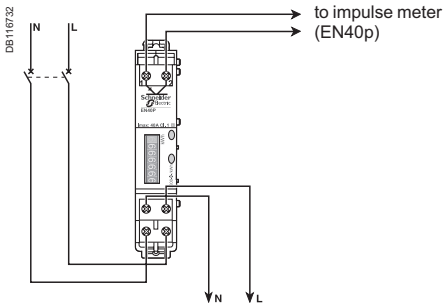
ME4, ME4zr and ME4zrt specific technical data			
	ME4	**ME4zr**	**ME4zrt**
Direct measurement	Up to 63 A		-
Measurement by CT	-		Ratio of 40/5 to 6,000/5 (configurable)
CT ratings choice	-		see page 16
Consumption of each measurement input	-		0.05 to 5 A
Metering and activity indicator light (yellow)	100 flashes per kWh		10,000/x flashes per kWh (1) (x = CT rating)
Total meter (max. capacity) on all 3 phases	999.99 MWh		Where CT ⩽ 150 A : 999.99 MWh Where CT > 150 A : 9,999.9 MWh
Total meter display	In kWh or MWh with 5 significant digits. No decimal point in kWh; 2 digits after the decimal point in MWh		
Partial meter (max. capacity) on all 3 phases with RESET	-	99.99 MWh	Where CT ⩽ 150 A : 99.99 MWh Where CT > 150 A : 999.99 MWh
Partial meter display	-	In kWh or MWh with 4 significant digits. 1 digit after the decimal point in kWh	
Remote transfer	-	By NO impulse contact: - ELV insulation voltage: 4 kV, 50 Hz - 18 mA/24 V DC, 100 mA/230 V AC - 1 impulse of 200 ms (contact closing) every 10 kWh	By NO impulse contact: - ELV insulation voltage: 4 kV, 50 Hz - 18 mA/24 V DC, 100 mA/230 V AC - 10/x impulse of 200 ms (contact closing) per kWh = x/10 kWh per impulse (2) (x = CT rating)

***(1)** example: 500/5 CT = 10,000/500 flashes per kWh = 20 flashes per kWh*
***(2)** example: 500/5 CT = 500/10 kWh per impulse = 50 kWh per impulse*

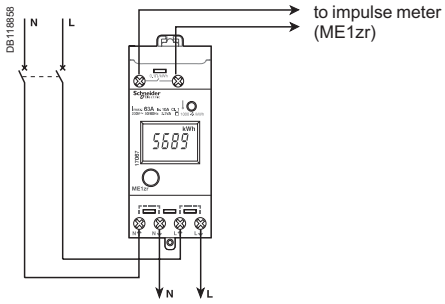
Kilowatt-hour meters (cont.)

Connection

Single-phase circuit

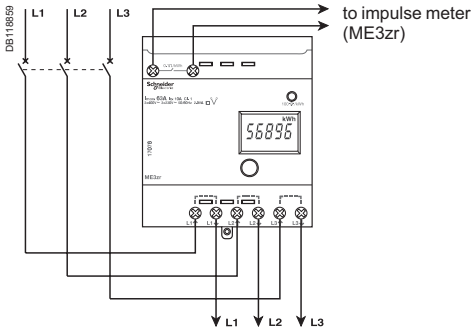


EN'clic / EN40 / EN40p.

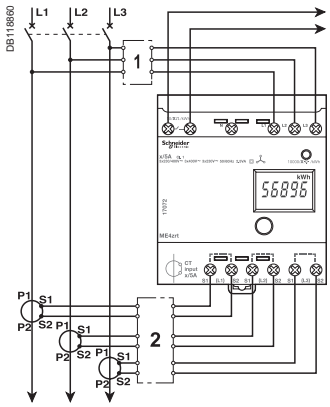


ME1 / ME1zr.

Three-phase circuit



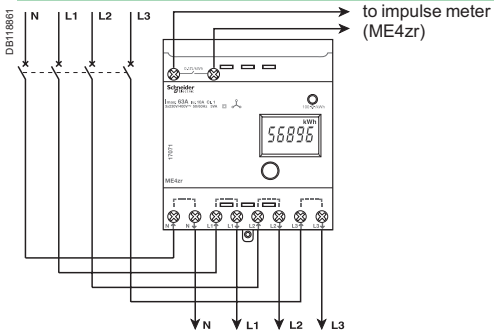
ME3 / ME3zr.



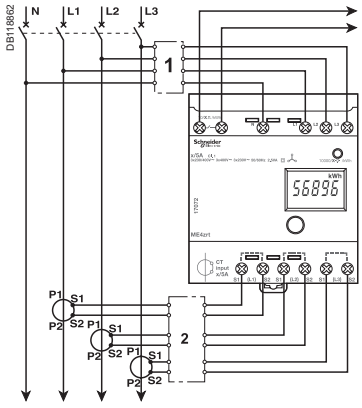
1 Protection (to be adapted to suit the short-circuit current at the connection point).
2 Shorting switch unit.

ME4zrt.

Three-phase + neutral circuit



ME4 / ME4zr.

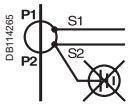


1 Protection (to be adapted to suit the short-circuit current at the connection point).
2 Shorting switch unit.

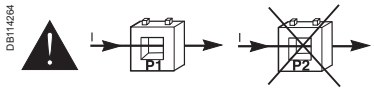
ME4zrt.

Caution

■ Do not earth the CT secondary (S2).

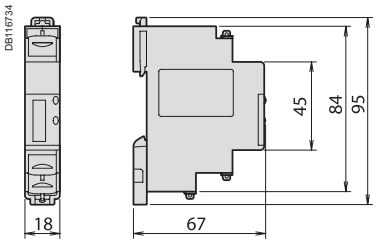


■ You must comply with the routing direction of power cables in the current transformer primary. Cables enter in "P1" and leave in "P2" to the loads.

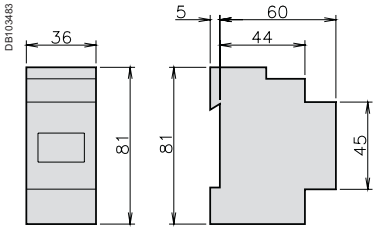


Dimensions

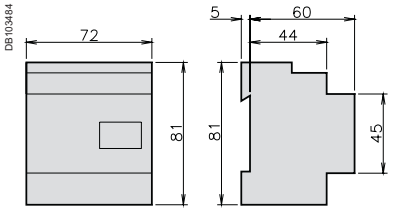
EN'clic, EN40 and EN40p kilowatt-hour meters



ME1, ME1z and ME1zr kilowatt-hour meters



ME3, ME3zr, ME4, ME4zr, ME4zrt kilowatt-hour meters



Product selection according to measurement functions

	Power Meter											
												
	PM9/PM9P/ PM9C	PM200	PM200P	PM210	PM700	PM700P	PM710	PM750	PM810	PM820	PM850	PM870
General selection criteria												
Installation	On DIN rail	Flush or DIN rail mount			Flush or DIN rail mount				Flush or DIN rail mount			
Use on LV distribution systems	■	■	■	■	■	■	■	■	■	■	■	■
Use on LV and HV distribution systems	-	■	■	■	■	■	■	■	■	■	■	■
Current / voltage accuracy	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.4 % Current 0.3 % Voltage	0.1 %	0.1 %	0.1 %	0.1 %
Power / active energy accuracy	1 %	Class 1 % IEC 62053-21			1 %	1 %	1 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %
Instantaneous rms values												
Current ■ Phases	■	■	■	■	■	■	■	■	■	■	■	■
■ Neutral	■	-	-	-	■	■	■	■	■	■	■	■
■ Extended Measurement range	-	-	-	-	-	-	-	-	-	-	-	-
3 - Phase Voltage	■	■	■	■	■	■	■	■	■	■	■	■
Voltage per phase	■	-	-	-	■	■	■	■	■	■	■	■
Frequency	■	■	■	■	■	■	■	■	■	■	■	■
Total power ■ Active	■	signed	signed	signed	signed	signed	signed	signed	■	■	■	■
■ Reactive	■	signed	signed	signed	signed	signed	signed	signed	■	■	■	■
■ Apparent	■	■	■	■	■	■	■	■	■	■	■	■
Power per phase ■ Active	■	-	-	-	signed	signed	signed	signed	■	■	■	■
■ Reactive	■	-	-	-	signed	signed	signed	signed	■	■	■	■
■ Apparent	-	-	-	-	■	■	■	■	■	■	■	■
Power factor ■ Total	■	signed	signed	signed	signed	signed	signed	signed	■	■	■	■
■ Per phase	-	-	-	-	-	-	-	-	■	■	■	■
Energy values												
Active energy	■	signed	signed	signed	signed	signed	signed	signed	In/Out	In/Out	In/Out	In/Out
Reactive energy	■	signed	signed	signed	signed	signed	signed	signed	In/Out	In/Out	In/Out	In/Out
Apparent energy	-	■	■	■	■	■	■	■	■	■	■	■
User-set accumulation mode	-	-	-	-	-	-	-	-	■	■	■	■
Demand values												
Current - Present and maximum values	-	Thermal	Thermal	Thermal	Thermal	Thermal	Thermal	Thermal	■	■	■	■
Total active power - Present and maximum values	■ (3)	■	■	■	■	■	■	■	■	■	■	■
Total reactive power - Present and maximum values	■ (3)	■	■	■	■	■	■	■	■	■	■	■
Total apparent power - Present and maximum values	■ (3)	■	■	■	■	■	■	■	■	■	■	■
Total predicted demand - kW, kVAR, kVA	-	-	-	-	-	-	-	-	■	■	■	■
Synchronisation of calculation window	-	-	-	-	-	-	-	■	■	■	■	■
User-set calculation mode	-	■	■	■	■	■	■	■	■	■	■	■
Other measurements												
Hour counter	■	-	-	-	■	■	■	■	■	■	■	■

(1) Measurement sensors included.
(2) Not available with Digipact communication card.
(3) Active power or reactive power or apparent power.

Product selection according to measurement functions (cont.)

	ION7550	ION7650	ION8600 A	ION8600 B	ION8600 C	ION8800 A	ION8800 B	ION8800 C	Micrologic for Compact NSX A	Micrologic for Compact NSX E	Micrologic control units for low voltage circuit-breakers A	Micrologic control units for low voltage circuit-breakers P	Micrologic control units for low voltage circuit-breakers H
													
	DIN 192 standard cutout (186 x 186 mm)		ANSI socket, mount 9S, 35S, 36S, 39S and 76S; FT21switchboard case			DIN 43862 rack			Integrated in the circuit breaker		Integrated in the circuit breaker		
	■	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	-	-	-	-	-
	0.1 % reading	0.1 % reading	0,1 % reading	0,1 % reading	0,1 % reading	0,1 % reading	0,1 % reading	0,1 % reading	Current 1% (1) Voltage 0.5%(1)	Current 1% (1) Voltage 0.5%(1)	1.5% (1)	1.5% (1)	1.5% (1)
	0.20 %	0.20 %	0.20 %	0.20 %	0.20 %	0.20 %	0.20 %	0.20 %	-	2.0 %(1)	-	2.0% (1)	2.0% (1)
	■	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	-	-	-	-	-	-	-	-	■	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-		
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■	■
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	-	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	■	■	■	■	■	■	■	■	-	■	-	■ (2)	■ (2)
	-	-	-	-	-	-	-	-	-	■	-	-	-

Separate catalogue

Product selection according to measurement functions (cont.)

		Power Meter											
													
		PM9/ PM9P/ PM9C	**PM200**	**PM200P**	**PM210**	**PM700**	**PM700P**	**PM710**	**PM750**	**PM810**	**PM820**	**PM850**	**PM870**
Power quality measurement													
Interharmonics		-	-	-	-	-	-	-	-	-	-	-	-
Total harmonic distortion	Voltage	-	-	-	-	■	■	■	■	■	■	■	■
	Current	-	-	-	-	■	■	■	■	■	■	■	■
Individual harmonic content (current and voltage)		-	-	-	-	-	-	-	-	31 (1)	31	63	63
Waveform capture		-	-	-	-	-	-	-	-	-	-	■	■ (2)
Detection of voltage sags and swelles		-	-	-	-	-	-	-	-	-	-	-	■
Programmable (logic and mathematical functions)		-	-	-	-	-	-	-	-	-	-	-	-
Detection and capture of transients		-	-	-	-	-	-	-	-	-	-	-	-
Flicker		-	-	-	-	-	-	-	-	-	-	-	-
EN 50160 compliance checking		-	-	-	-	-	-	-	-	-	-	■ (4)	■ (4)
True rms measurement Maximum harmonic number		15	15	15	15	15	15	15	15	63	63	63	63
Sampling rate Points per cycle		-	32	32	32	32	32	32	32	128	128	128	128
Data recording													
Min/Max of instantaneous values		-	-	-	-	■	■	■	■	■	■	■	■
Data logging		-	-	-	-	-	-	-	-	2 (1)	2	4	4
Event logging		-	-	-	-	-	-	-	-	■ (1)	■	■	■
Trend curves		-	-	-	-	-	-	-	-	-	-	■	■
Alarms		-	-	-	-	-	-	-	■	■	■	■	■
Alarm notification via email		-	-	-	-	-	-	-	-	Optional with PM8ECC Card			
Sequence of Events Recording		-	-	-	-	-	-	-	-	-	-	-	
Date and time stamping		-	-	-	-	-	-	-	-	■ (1)	■	■	■
GPS time synchronisation		-	-	-	-	-	-	-	-	-	-	-	■
Storage capacity		-	-	-	-	-	-	-	-	80 kB (1)	80 kB	800 kB	800 kB
Display, sensors, inputs/ outputs													
Front-panel display		■	■	■	■	■	■	■	■	■	■	■	■
Built-in current and voltage sensors		-	-	-	-	-	-	-	-	-	-	-	-
Digital or analogue inputs (max. number)		-	-	-	-	-	-	-	2 digit	13 digit. / 4 analog.			
Pulse outputs		1 (PM9P)	-	2	-	-	2	-	1	1	1	1	1
Digital or analogue outputs (max. number including pulse outputs)		1 (PM9P)	-	2 digit	-	-	2 digit	-	1 digit	5 digit. / 4 analog.			
Direct voltage connections without external VT		450 V	277 V L-N 480 V L-L			277 V L-N 480 V L-L	277 V L-N 480 V L-L	277 V L-N 480 V L-L	277 V L-N 480 V L-L	347 V L-N 600 V L-L	347 V L-N 600 V L-L	347 V L-N 600 V L-L	347 V L-N 600 V L-L
Power supply													
AC/DC version	AC	230 V	100 to 415 V 50 Hz - 60 Hz			100 to 415 V 50 Hz - 60 Hz				115 to 415 V (+/- 10%) 45-67 Hz or 350 to 450 Hz			
	DC	-	125 to 250 V (+/- 20%)			125 to 250 V (+/- 20%)				125 to 250 V (+/- 20%)			
DC version			-	-	-	-	-	-	-	-	-	-	-
Communication													
RS 485 port		■ (PM9C)	-	-	■	-	-	■	■	2- wire (on board) 4- wire (with remote display or PM8ECC)			
Infra-red port		-	-	-	-	-	-	-	-	-	-	-	-
RS 232 port		-	-	-	-	-	-	-	-	With remote display			
Modbus (M), Digipact (D) protocol		M	-	-	M	-	-	M	M	M	M	M	M
Ethernet port (Modbus/TCP/IP protocol)		-	-	-	-	-	-	-	-	Option	Option	Option	Option
HTML Web-page server		-	-	-	-	-	-	-	-	Option	Option	Option	Option
Ethernet gateway for other products on an RS 485 link		-	-	-	-	-	-	-	-	Option	Option	Option	Option

(1) With PM810LOG.
(2) Configurable.
(3) Not available with Digipact communication card.
(4) Except for interharmonics, signalling voltage, flicker and transients.
(5) Maximum only.
(6) Self-powered.

Product selection according to measurement functions (cont.)

	ION7550	ION7650	ION8600 A	ION8600 B	ION8600 C	ION8800 A	ION8800 B	ION8800 C	Micrologic for Compact NSX A	Micrologic for Compact NSX E	Micrologic control units for low voltage circuit-breakers A	Micrologic control units for low voltage circuit-breakers P	Micrologic control units for low voltage circuit-breakers H
													
	-	■	■	-	-	■	■	-	-	-	-	-	-
	■	■	■	■	■	■	■	■	-	■	-	-	■
	■	■	■	■	■	■	■	■	-	■	-	-	■
	■	■	■	■	■	■	■	■	-	-	-	-	■ (3)
	-	■	■	-	-	■	-	-	-	-	-	-	■ (3)
	■	■	■	■	■	■	■	■	-	-	-	-	-
	■	■	■	■	■	■	■	■	-	-	-	-	-
	-	20 µs	78 µs	-	-	20 µs	-	-	-	-	-	-	-
	-	■	■	-	-	■	■	-	-	-	-	-	-
	-	■	■	-	-	■	■	-	-	-	-	-	-
	63	63	63	63	31	63	63	63	15	15	12	31	31
	256	256	256	256	256	1024	1024	1024	39	39	24	64	64
	■	■	■	■	■	■	■	■	■	■	■ (5)	■ (3)	■ (3)
	■	■	■	■	■	■	■	■	-	■	-	-	-
	■	■	■	■	■	■	■	■	-	■	-	■ (3)	■ (3)
	■	■	- (7)	- (7)	- (7)	- (7)	- (7)	- (7)	-	-	-	-	-
	■	■	■	■	■	■	■	■	■	■	-	■	■
	■	■	■	■	■	■	■	■	-	-	-	-	-
	■ (8)	■ (8)	■ (8)	■ (8)	■ (8)	■ (8)	■ (8)	■ (8)	-	-	-	-	-
	■	■	■	■	■	■	■	■	■	■	-	■	■
	■	■	■	■	■	■	■	■	-	-	-	-	
	Up to 10 MB		10 MB	5 MB	2 MB	Up to 10 MB			-	-	-	-	-
	■	■	■	■	■	■	■	■	■	■	■	■	■
	-	-	-	-	-	-	-	-	■	■	■	■	■
	20	20	11	11	11	3	3	3	-	-	-	-	-
	1	1	2	2	2	1	1	1	-	-	-	-	-
	12	12	14	14	14	13	13	13	2	2	6	6	6
	347 V L-N 600 V L-L		277 V L-N (9S, 39S, 36S and 76S) 480 V L-L (35S)			288 V L-N 500 V L-L			-	400 V L-N 690 V L-L	690 V	690 V	690 V
	85 to 240 V		120 to 227 V, 120 to 480 V (35S) / 57 to 70 V / 65 to 120 V / 160 to 277 V			85 to 240 V (+/- 10%) 47-63 Hz			-	-	(6)	(6)	(6)
	110 to 300 V		80 to 160 V / 200 to 350 V			110 to 270 V (+/- 10%)			-	-	(6)	(6)	(6)
	-	-	-	-	-	-	-	-	24 V	24 V	(6)	(6)	(6)
	■	■	■	■	■	Option	Option	Option	-	-	Option	Option	Option
	■	■	■	■	■	■	■	■	-	-	-	-	-
	■	■	■	■	■	Option	Option	Option	-	-	-	-	-
	M	M	M	M	M	M	M	M	M (9)	M (9)	M, D	M, D	M, D
	Option	Option	Option	Option	Option	Option	Option	Option	-	-	-	-	-
	Option	Option	Option	Option	Option	Option	Option	Option	-	-	-	-	-
	Option	Option	Option	Option	Option	Option	Option	Option	-	-	-	-	-

Separate catalogue

(7) The ION8600 and ION8800 do trending with software but not from the meter's front panel.
(8) Sequence of Events Recording is a manual process in ION meters. It is not the meters interacting with Software X as with the CMs.
(9) Through IFM module.

Power Meter Series PM9
Functions and characteristics

Power Meter Series PM9.

The PowerLogic Power Meter Series PM9 offers the basic measurement capabilities required to monitor an electrical installation in a 4-module case (18 mm modules).

They can be used to monitor 2-, 3- and 4-wire low-voltage systems and connect to external current transformers. With the large backlit display, you can monitor all three phases at the same time.

Three versions are available for one supply voltage (220 to 240 V AC):
- PM9 for basic measurements
- PM9P for basic measurements with pulse output
- PM9C for basic measurements with Modbus RS485 output.

Applications
Panel instrumentation.
Sub-billing / cost allocation.
Remote monitoring of an electrical installation.

Characteristics
Only 72 mm wide (four 18 mm modules)
Compact design for optimised installation.

Large backlit display
Simultaneous monitoring of all three phases.

Demand power
Monitoring of subscribed-power overruns.

Compliance with standards
Complies with IEC 61557-12 PMD/S-/K55/1 standard for Power Meter.
IEC 62053-21 class 1 accuracy for active energy for sub-billing and cost-allocation applications.

Part numbers

Type	Voltage	Width in 9 mm modules	Part no.
Power Meter PM9	220 to 240 V AC	8	**15199**
Power Meter PM9P	220 to 240 V AC	8	**15197**
Power Meter PM9C	220 to 240 V AC	8	**15198**

Power Meter Series PM9
Functions and characteristics (cont.)

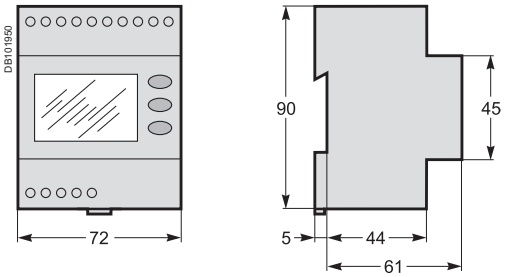
Selection guide		PM9	PM9P	PM9C
General				
Use on LV systems only	1P + N, 3P, 3P + N	■	■	■
Current and voltage accuracy		0.5 %	0.5 %	0.5 %
Energy and power accuracy		1 %	1 %	1 %
Direct voltage connection		450 V	450 V	450 V
Instantaneous rms values				
Current	3 phases and neutral	■	■	■
Voltage	Phase-to-neutral and phase-to-phase	■	■	■
Frequency		■	■	■
Active and reactive power	Total and per phase	■	■	■
Apparent power	Total	■	■	■
Power factor	Total	■	■	■
Energy values				
Active energy		■	■	■
Partial active energy		■	■	■
Reactive energy		■	■	■
Demand values				
Active, reactive, apparent power	Present and max. values	■	■	■
Other measurements				
Hour counter		■	■	■
Display and I/O				
Backlit LCD display		■	■	■
Pulse output		-	1	-
Communication				
RS485 port		-	-	■
Modbus protocol		-	-	■

Power Meter Series PM9
Functions and characteristics (cont.)

Electrical characteristics		
Type of measurement		On single-phase (1P + N) or three-phase (3P, 3P + N) AC systems
Measurement accuracy	Current and voltage	0.5 % of reading
	Power	1 % of reading from pf 0.8 leading to 0.5 lagging
	Frequency	0.2 Hz
	Power factor	2 % from 0.8 leading to 0.5 lagging
	Active energy	Class 1 as defined by IEC 62053-21 and IEC 61557-12
	Reactive energy	Class 2 as defined by IEC 62053-23 and IEC 61557-12
Input-voltage characteristics	Measured voltage	50 to 450 V AC (direct) and up to 1000 V AC (with external VT)
	Permissible overload	1.15 Un
	Frequency measurement range	45 to 65 Hz
Input-current characteristics	CT ratings	Adjustable from 5 to 10000 A
	Secondary	5 A
	Metering over-range	15 mA to 6 A
	Permissible overload	6 A continuous 20 A 10 s 50 A 1 s
	Load	0.55 VA
	Input current	Not isolated
Control Power	AC	220 to 240 V AC (±10 %), < 5 VA
Pulse output (PM9P)		Static output, 350 V AC/DC max., 130 mA max. at 25 °C, derating 1 mA/°C above 25 °C, 5 kV insulation
Mechanical characteristics		
Weight		0.3 kg
IP degree of protection		IP52 (front display)
Dimensions		72 x 90 x 66 (mm)
Connection		Tunnel terminals, 1 x 4 mm^2
Environmental conditions		
Operating temperature		-5 °C to +55 °C
Pollution degree		2
Installation category		III for distribution systems up to 260/450 V
Electromagnetic compatibility	Electrostatic discharge	Level III (IEC 61000-4-2)
	Immunity to radiated fields	Level III (IEC 61000-4-3)
	Immunity to fast transients	Level IV (IEC 61000-4-4)
	Immunity to impulse waves	Level IV (IEC 61000-4-5)
	Conducted and radiated emissions	Class B (CISPR11)
Safety		
		CE
Communication		
RS485 port (PM9C) remote reading		2-wire, 9600 or 19200 bauds, Modbus RTU, ELSV circuit, 6 kV impulse withstand (double insulation)
Standards compliance		
IEC 61557-12		PMD/SD/K55/1 PMD/SS/K55/1

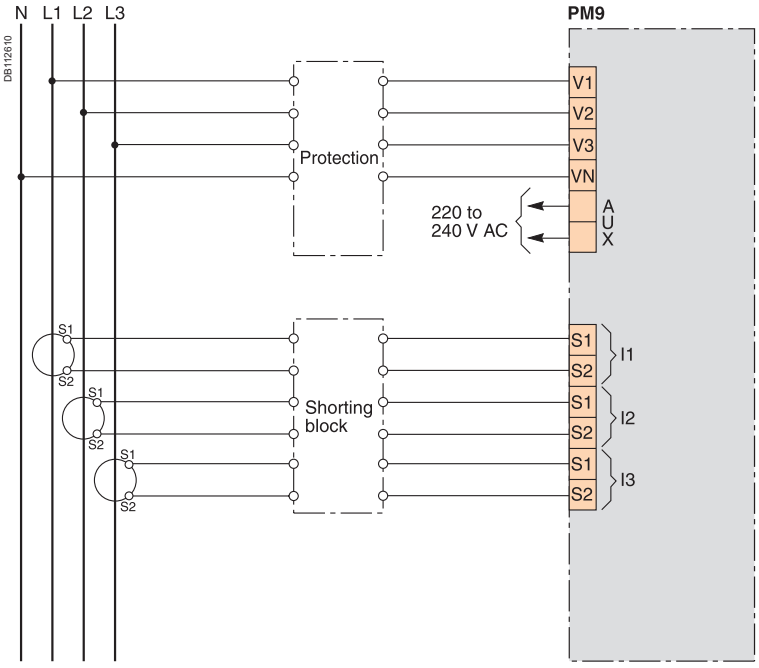
Power Meter Series PM9
Installation and connection

Dimensions



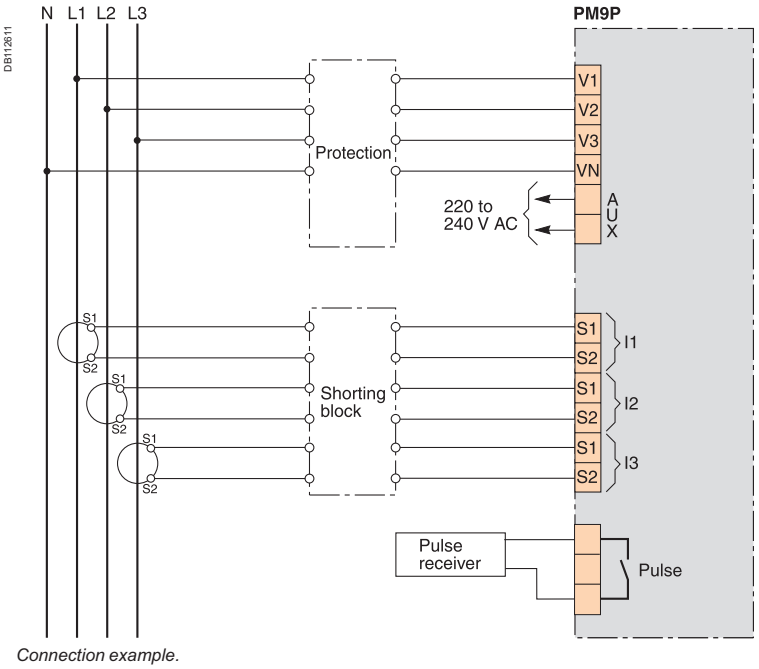
Power Meter Series PM9
Installation and connection (cont.)

PM9/4-wire connection with 3 CTs



Connection example.

PM9P/4-wire connection with 3 CTs

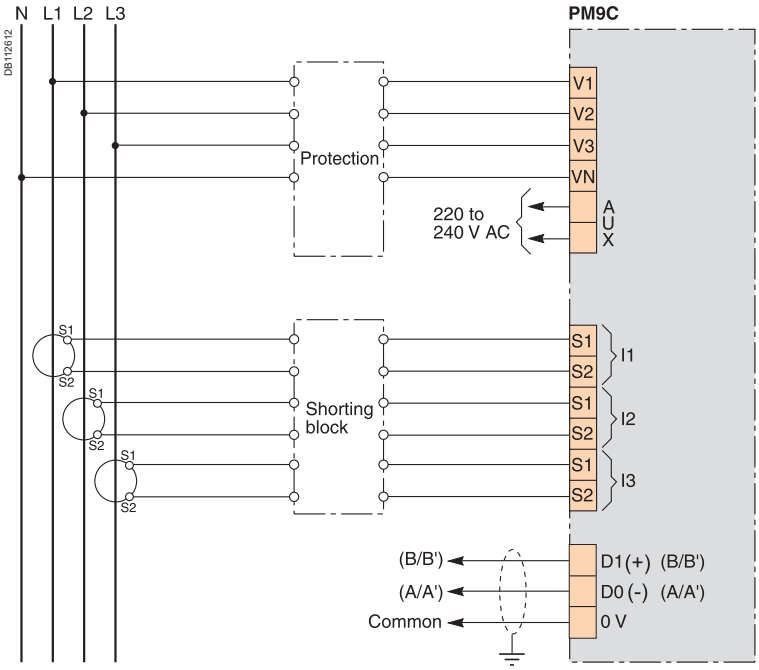


Connection example.

***Note:** other types of connection are possible. See product documentation.*

Power Meter Series PM9
Installation and connection (cont.)

PM9C/4-wire connection with 3 CTs



Connection example.

Note: *other types of connection are possible. See product documentation.*

Power Meter Series PM200
Functions and characteristics

PE86156

The PowerLogic PM200 series power meter is an easy-to-use, cost effective meter that offers the basic measurement capabilities required to monitor an electrical installation. The compact 96 x 96 mm meter simultaneously monitors all three phases of voltage and current. Energy and demand readings provide the information needed to measure and control energy costs.

The meter includes an easy-to-read, anti-glare, back-lit LCD display. It features an intuitive interface with context-based navigational menus. Summary screens and bar charts provide system status at a glance. The default screen displays real energy and per-phase current values. The energy summary screen displays total real, reactive, and apparent energy. The power demand summary screen displays real, reactive, and apparent demand. The current demand summary screen provides the per-phase and peak values needed to understand circuit performance and loading.

The PowerLogic PM200 series power meter is available in three versions:
- PM200, basic version
- PM200P, basic version plus two pulse outputs for energy metering
- PM210, basic version plus an RS485 port for Modbus communication.

Applications
OEM applications.
Panel instrumentation.
Applications with space restrictions.
Remote monitoring of an electrical installation.
Sub-billing / cost allocation / utility billing verification.
Cost constrained applications.

Characteristics
Compact
With a mounting depth of only 50 mm, the PM200 series is the perfect space saver.

Large, easy-to-read display
Summary screens for current, voltage, energy and demand on an anti-glare, green back-light display.

Bar charts
Graphical representation of system loading and Outputs (PM200P) provide system status at a glance.

Easy to operate
Intuitive navigation with context-based menus for easy use.

Modbus communications and digital outputs
The PM210 provides standard Modbus communications. The PM200P provides two integrated digital outputs.

IEC 62053-21 Class 1 for real energy
Accurate measurement for sub-billing and cost allocation.

IEC 61557-12 performance standards
Meets IEC 61557-12 PMD/S-/K55/1 requirements for combined Performance Measuring and monitoring Devices (PMD).

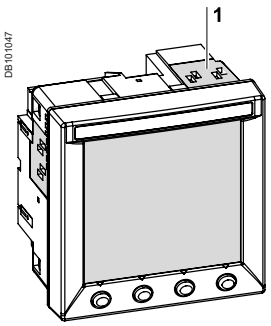
Direct connection for metering voltage inputs
No external PTs needed for voltages up to 480 V AC (L-L).

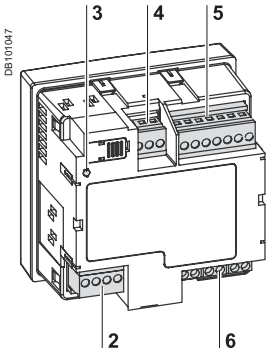
Easy to install
Uses only two clips. No tools needed.

Part numbers

Description	Schneider Electric
Power Meter with Integrated Display	
Power Meter PM200 with basic readings, demand, and summary screens	**PM200MG**
Same as PM200 plus two digital outputs	**PM200PMG**
Same as PM200 plus an RS485 communication port	**PM210MG**
Parts and accessories	
DIN-rail Mounting Kit	**PM72DINRAILKIT**
Set of connectors	**PM7AND2HWKIT**

Power Meter Series PM200
Functions and characteristics (cont.)





PM200 series power meter.
1 *Mounting slots.*
2 *RS485 communications (PM210) or 2 pulse outputs (PM200P).*
3 *Heartbeat LED.*
4 *Power supply.*
5 *Voltage inputs.*
6 *Current inputs.*

Meter selection guide		PM200	PM200P	PM210
General				
Use from LV to HV power systems		■	■	■
Current and voltage accuracy		0.5 %	0.5 %	0.5 %
Active and reactive power accuracy		1 %	1 %	1 %
Active energy accuracy		1 %	1 %	1 %
Reactive energy accuracy		2 %	2 %	2 %
Sampling rate (samples/cycle)		32	32	32
Instantaneous rms values				
Current	Per-phase	■	■	■
Voltage	Ph-Ph and Ph-N	■	■	■
Frequency		■	■	■
Active and reactive power ; and apparent power	Total	signed (1)	signed (1)	signed (1)
Power factor	Total	signed (2)	signed (2)	signed (2)
Energy values				
Active, reactive, apparent energy	Total	signed (1)	signed (1)	signed (1)
Demand values				
Current (thermal calculation mode only)	Present and max. values	■	■	■
Active, reactive, apparent power	Present and max. values	■	■	■
Setting of power demand calculation mode	Sliding, fixed, rolling block	■	■	■
Inputs and outputs				
Digital pulse output		-	2(3)	-
Display and outputs				
Green backlit LCD display		■	■	■
IEC or IEEE menu mode		■	■	■
Communication				
RS485 (one port)		-	-	2-wire
Modbus protocol		-	-	■

(1) *Real and reactive power and energy. The power meter includes net values only.*
(2) *See register 4048. Negative sign "-" indicates lag. PM210 only.*
(3) kWh and kVARh pulse output mode only.

Power Meter Series PM200
Functions and characteristics (cont.)

PB100710

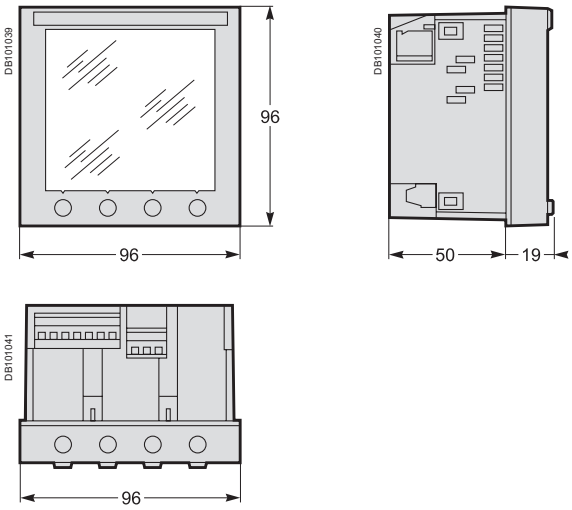
Rear view of PowerLogic PM200 series meter.

Electrical characteristics			
Type of measurement			True rms up to the 15th harmonic on single, two or three-phase (3P, 3P + N) AC systems 32 samples per cycle
Measurement accuracy	Current		± 0.5% from 1 A to 6 A
	Voltage		± 0.5% from 50 V to 277 V
	Power factor		± 0.031, from 1A to 6A and from -0.5 to +0.5
	Power		± 1%
	Frequency		± 0.02 Hz from 45 to 65 Hz
	Active energy		IEC 62053-21 Class 1
	Reactive energy		IEC 62053-23 Class 2
Data update rate			1 s
Input-voltage	Measured voltage		10 to 480 V AC (direct Ph-Ph) 10 to 277 V AC (direct Ph-N) 0 to 1.6 MV AC (with external VT)
	Metering over-range		1.2 Un
	Impedance		2 MΩ (Ph-Ph) / 1 MΩ (Ph-N)
	Frequency range		45 to 65 Hz
Input-current	CT ratings	Primary	Adjustable from 5 A to 32767 A
		Secondary	5 A or 1 A starting at 10 mA
	Measurement input range		5 mA to 6 A
	Permissible overload		15 A continuous 50 A for 10 seconds per hour 120 A for 1 second per hour
	Impedance		< 0.12 Ω
	Load		< 0.15 VA
Control power	AC		100 to 415 ± 10 % V AC, 5 VA; 50 to 60 Hz
	DC		125 to 250 ± 20 % V DC, 3 W
	Ride-through time		100 ms at 120 V AC
Output	Pulse outputs	(PM200P)	Static output 240 ± 10 % V AC, 100 mA max. at 25 °C, (derate 0.56 mA per °C above 25°C), 2.41 kV rms isolation, 30 Ω on-resistance at 100 mA
Mechanical characteristics			
Weight			0.37 kg
IP degree of protection (IEC 60529)			Designed to IP52 front display, IP30 meter body
Dimensions			96 x 96 x 69 mm (meter with display) 96 x 96 x 50 mm (mounting depth)
Environmental characteristics			
Operating temperature	Meter		- 5 °C to + 60 °C
	Display		- 10 °C to + 50 °C
Storage temperature	Meter + display		- 40 °C to + 85 °C
Humidity rating			5 to 95 % RH at 50 °C (non-condensing)
Pollution degree			2
Metering category (voltage inputs and control power)			CAT III, for distribution systems up to 277 V Ph-N / 480 V AC Ph-Ph
Dielectric withstand			EN 61010, UL508 Double insulated front panel display
Altitude			3000 m
Electromagnetic compatibility			
Electrostatic discharge			Level III (IEC 61000-4-2)
Immunity to radiated fields			Level III (IEC 61000-4-3)
Immunity to fast transients			Level III (IEC 61000-4-4)
Immunity to impulsive waves			Level III (IEC 61000-4-5)
Conducted immunity			Level III (IEC 61000-4-6)
Immunity to magnetic fields			Level III (IEC 61000-4-8)
Immunity to voltage dips			Level III (IEC 61000-4-11)
Conducted and radiated emissions			CE commercial environment/FCC part 15 class B EN 55011
Harmonics			IEC 61000-3-2
Flicker emissions			IEC 61000-3-3
Safety			
Europe			CE as per IEC 61010-1
U.S. and Canada			UL508
Communication			
RS485 port (PM210)			2-wire, up to 19200 bauds, Modbus RTU, SELV circuit, 6 kV impulse (double insulation)
Display characteristics			
Dimensions 73 x 69 mm			Back-lit green LCD (6 lines total, 4 concurrent values)

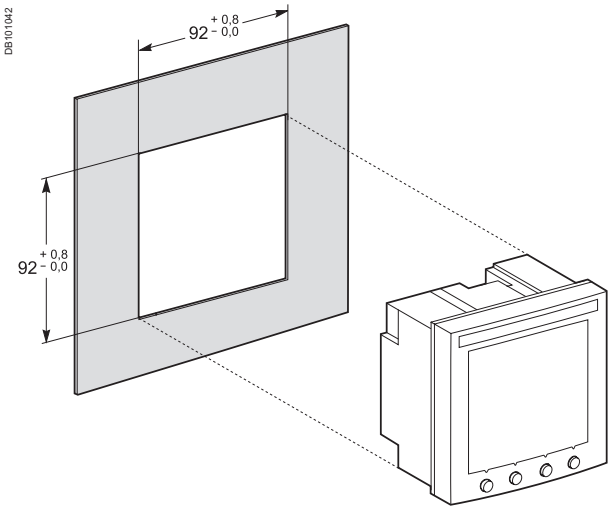
(1) Lower limit of measurement range depends upon PT ratio.

Power Meter Series 200
Installation and connection

Dimensions

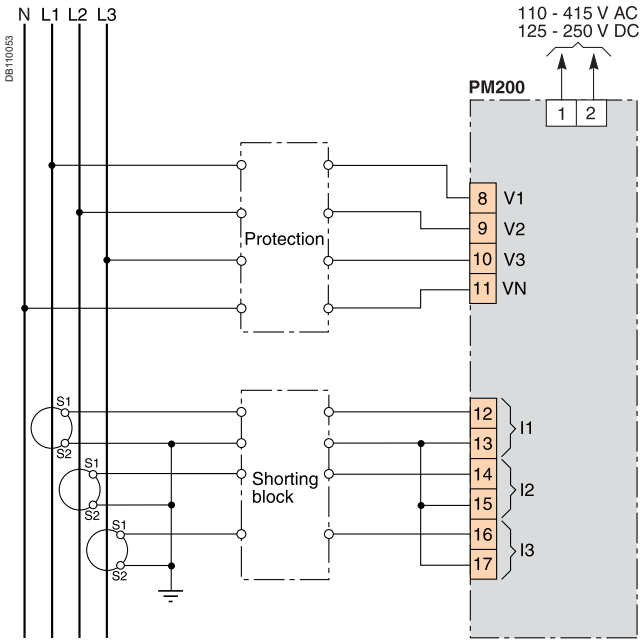


Front-panel mounting



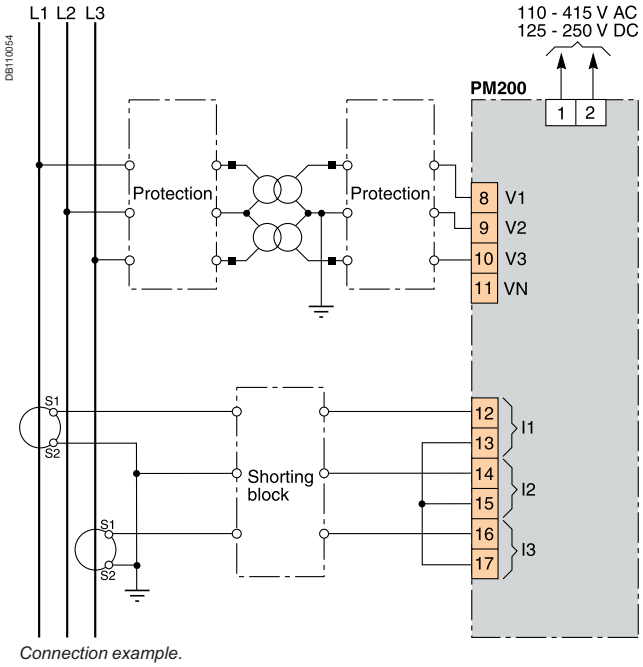
Power Meter Series 200
Installation and connection (cont.)

4-wire connection with 3 CTs and no PT



Connection example.

3-wire connection with 2 CTs and 2 PTs



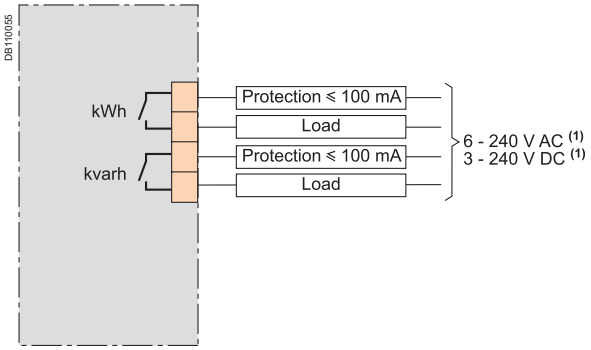
Connection example.

Note: Other types of connection are possible. See product documentation.

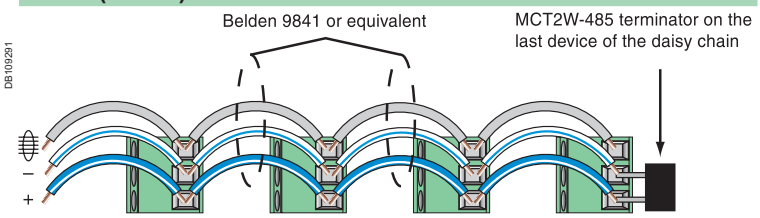
Power Meter Series 200
Installation and connection (cont.)

PM200P : pulse outputs connection

PM200P



Meter (2-wire)



Power Meter 200 or other POWERLOGIC 2-wire compatible devices

Belden 9841 wire colors: blue with white stripe (+), white with blue stripe (–), and silver (shield)

Power Meter Series PM700
Functions and characteristics

PE86157

PowerLogic PM700.

The PowerLogic PM700 series power meter offers all the measurement capabilities required to monitor an electrical installation in a single 96 x 96 mm unit extending only 50 mm behind the mounting surface.

With its large display, you can monitor all three phases and neutral at the same time. The anti-glare display features large 11 mm high characters and powerful backlighting for easy reading even in extreme lighting conditions and viewing angles.

The PowerLogic PM700 series meters are available in four versions:
- PM700, basic metering with THD and min/max readings
- PM700P, same functions as the PM700, plus two solid-state pulse outputs for energy metering
- PM710, same functions as the PM700, plus one RS 485 port for Modbus communication
- PM750, same functions as the PM710, plus two digital inputs, one digital output and alarms.

Applications
Panel instrumentation.
Sub-billing and cost allocation.
Remote monitoring of an electrical installation.
Harmonic monitoring (THD).
Alarming with under/over conditions and I/O status (PM750).

Characteristics
Requires only 50 mm behind mounting surface
The Power Meter Series 700 can be mounted on switchboard doors to maximise free space for electrical devices.

Large back lit display with integrated bar charts
Displays 4 measurements at a time for fast readings.

Intuitive use
Easy navigation using context-sensitive menus.

Power and current demand, THD and min/max reading in basic version
A high-performance solution for trouble-free monitoring of your electrical installation.

Active energy class IEC 62053-22 class 0.5S (PM750) and IEC 62053-21 class 1 (PM700, PM700P, PM710)
Suitable for sub-billing and cost-allocation applications.

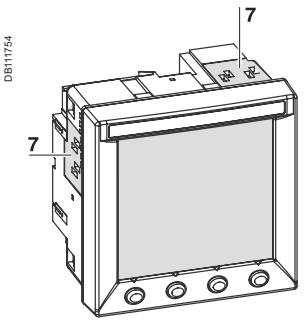
Performance measuring and monitoring devices
Meet IEC 61557-12 PMD/S-/K55/0.5 (PM750) and IEC 61557-12 PMD/S-/K55/1 (PM700, PM700P, PM710) that specifies requirements for combined **P**erformance **M**easuring and monitoring **D**evices (PMD).

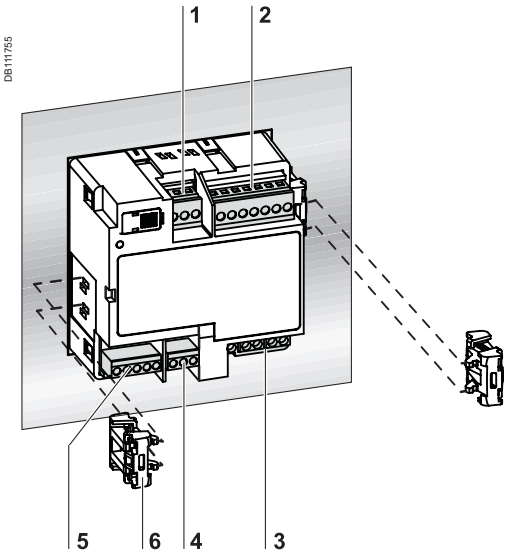
Innovative Power Meter
RS 485 communications, alarming and digital I/O in a single Power Meter (PM750).

Part numbers

Power Meter	Schneider Electric brand
PM700 Power Meter - with basic readings including THD and Min/Max	**PM700MG**
PM700P Power Meter - same as PM700 plus two pulse outputs	**PM700PMG**
PM710 Power Meter - same as PM700 plus RS 485 port	**PM710MG**
PM750 Power Meter - same as PM700 plus RS 485 port, 2 Digital inputs and 1 Digital output, and alarms	**PM750MG**
Parts and accessories	
DIN-rail Mounting Kit	**PM72DINRAILKIT**
Set of connectors replacement (PM700, PM700P, PM710)	**PM7AND2HWKIT**
Set of connectors replacement (PM750 only)	**PM750HWKIT**

Power Meter Series PM700
Functions and characteristics (cont.)





Power Meter 750.
1 Control power.
2 Voltage inputs.
3 Current inputs.
4 RS 485 port.
5 Digital input/output.
6 Mounting clips.
7 Mounting slot.

Selection guide		PM700	PM700P	PM710	PM750
General					
Use on LV and HV systems		■	■	■	■
Current accuracy		0.5 %	0.5 %	0.5 %	0.4 %
Voltage accuracy		0.5 %	0.5 %	0.5 %	0.3 %
Active energy accuracy		1.0 %	1.0 %	1.0 %	0.5 %
Active and reactive power accuracy		1.0 %	1.0 %	1.0 %	0.5 %
Reactive energy accuracy		2 %	2 %	2 %	2 %
Sampling rate (samples/cycle)		32	32	32	32
Instantaneous rms values					
Current	Total, Phases and neutral	■	■	■	■
Voltage	Total, Ph-Ph and Ph-N	■	■	■	■
Frequency		■	■	■	■
Real and reactive power; and apparent power (1)	Total and per phase	signed	signed	signed	signed
Power factor	Total	signed	signed	signed (2)	signed (2)
Energy values					
Active and reactive energy; and apparent energy (1)		signed	signed	signed	signed
Demand values					
Current Thermal calculation mode only	Present and max.	■	■	■	■
Active, reactive, apparent power	Present and max.	■	■	■	■
Setting of power demand calculation mode	Sliding, fixed and rolling block	■	■	■	■
Other measurements					
Hour counter		■	■	■	■
Power quality measurements					
Harmonic distortion	Current and voltage	■	■	■	■
Data recording					
Min/max of instantaneous values		■	■	■	■
Alarms		-	-	-	■ (3)
Display and I/O					
Backlit LCD display		■	■	■	■
Digital inputs		-	-	-	2 (4)
Digital outputs		-	2 (5)	-	1 (6)
Communication					
RS 485 port		-	-	■	■
Modbus protocol		-	-	■	■

(1) *Real and reactive power and energy. The power meter includes net values only.*
(2) *See register 4048. Negative sign "-" indicates lag.*
(3) *15 user-configurable under and over conditions and in combination with digital inputs or output status.*
(4) *2 operation modes are available: normal or input demand synchronisation.*
(5) *kWh and kVARh pulse output mode only.*
(6) *3 operation modes are available: external, alarm or kWh pulse output.*

Power Meter Series PM700
Functions and characteristics (cont.)

PB102030-

Rear view of Power Meter Series 700 (PM750).

Electrical characteristics			
Type of measurement			True rms up to the 15th harmonic on three-phase (3P, 3P + N) two-phase and single-phase AC systems 32 samples per cycle
Measurement accuracy	Current		± 0.5% from 1A to 6 A (PM700, PM700P, PM710) ± 0.4% from 1A to 6 A (PM750)
	Voltage		± 0.5% from 50V to 277V (PM700, PM700P, PM710) ± 0.3% from 50V to 277V (PM750)
	Power Factor		± 0.031, from 1A to 6A and from -0.5 to +0.5(1) ± 0.034, from 1A to 6A and from -0.5 to +0.5 (2)
	Power		± 1% (PM700, PM700P, PM710) ± 0.5% (PM750)
	Frequency		± 0.02 Hz from 45 to 65 Hz
	Active Energy		Class 1 as defined by IEC 62053-21 (1) Class 0.5S as defined by IEC 62053-22 (2)
	Reactive Energy		Class 2 as defined by IEC 62053-23
Data update rate			1 s
Input-voltage characteristics	Measured voltage		10 to 480 V AC (direct Ph-Ph) 10 to 277 V AC (direct Ph-N) up to 1.6 MV AC (with external VT) the lower limit of the measurement range depends on the PT ratio
	Metering over-range		1.2 Un
	Impedance		2 MΩ (Ph-Ph) / 1 MΩ (Ph-N)
	Frequency range		45 to 65 Hz
Input-current characteristics	CT ratings	Primary	Adjustable from 1 A to 32767 A
		Secondary	1 A or 5 A
	Measurement input range		5 mA to 6 A
	Permissible overload		15 A continuous, 50 A for 10 seconds per hour, 120 A for 1 second per hour
	Impedance		< 0.12 Ω
	Load		< 0.15 VA
Power supply	AC		100 to 415 ±10 % V AC, 5 VA; 50-60 Hz
	DC		125 to 250 ±20 % V DC, 3 W
	Ride-through time		100 ms at 120 V AC
Input	Digital inputs (PM750)		12 to 36 V DC, 24 V DC nominal, 12 kΩ impedance, 2.5 kV rms isolation, max. frequency 25 Hz, response time 10 ms
Output	Pulse outputs (PM700P)		3 to 240 V DC or 6 to 240 V AC, 100 mA at 25 °C, derate 0.56 mA per °C above 25 °C, 2.41 kV rms isolation, 30 Ω on-resistance at 100 mA
	Digital or pulse output (PM750)		8 to 36 V DC, 24 V DC nominal at 25 °C, 3.0 kV rms isolation, 28 Ω on-resistance at 100 mA
Mechanical characteristics			
Weight			0.37 kg
IP degree of protection (IEC 60529)			IP52 front display, IP30 meter body
Dimensions			96 x 96 x 69 mm (meter with display) 96 x 96 x 50 mm (behind mounting surface)
Environmental conditions			
Operating temperature	Meter		-5 °C to +60 °C
	Display		-10 °C to +50 °C
Storage temp.	Meter + display		-40 °C to +85 °C
Humidity rating			5 to 95 % RH at 50 °C (non-condensing)
Pollution degree			2
Metering category			III, for distribution systems up to 277/480 V AC
Dielectric withstand			As per EN 61010, UL508 - Double insulated front panel display
Altitude			3000 m max.
Electromagnetic compatibility			
Electrostatic discharge			Level III (IEC 61000-4-2)
Immunity to radiated fields			Level III (IEC 61000-4-3)
Immunity to fast transients			Level III (IEC 61000-4-4)
Immunity to impulse waves			Level III (IEC 61000-4-5)
Conducted immunity			Level III (IEC 61000-4-6)
Immunity to magnetic fields			Level III (IEC 61000-4-8)
Immunity to voltage dips			Level III (IEC 61000-4-11)
Conducted and radiated emissions			CE commercial environment/FCC part 15 class B EN 55011
Harmonics emissions			IEC 61000-3-2
Flicker emissions			IEC 61000-3-3

(1) *PM700, PM700P, PM710.*
(2) *PM750.*

Power Meter Series PM700
Functions and characteristics (cont.)

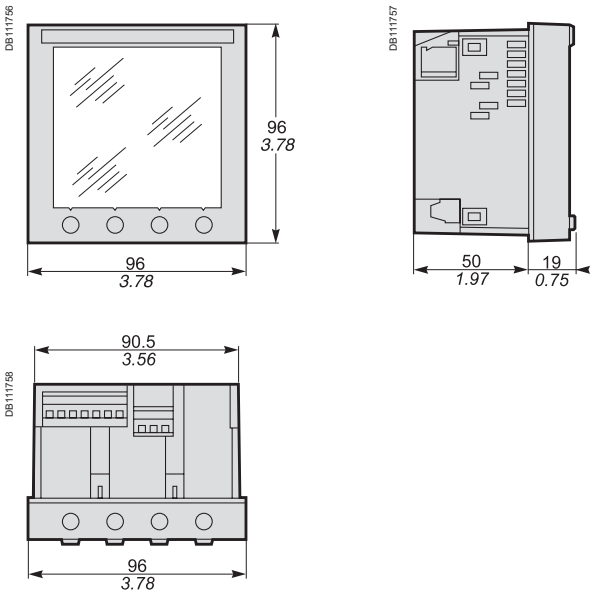
Safety	
Europe	CE, as per IEC 61010-1 ⧈ (1)
U.S. and Canada	UL508
Communication	
RS 485 port (PM710 and PM750)	2-wire, up to 19200 bauds, Modbus RTU (double insulation)
Display characteristics	
Dimensions 73 x 69 mm	Back-lit green LCD (6 lines total, 4 concurrent values)
Firmware characteristics	
Min./max.	Worst min. and max. with phase indication for voltages, currents and THD. Min. and max. values for power factor, power (P, Q, S) and frequency

(1) *Protected throughout by double insulation .*

Power Meter Series 700
Installation and connection

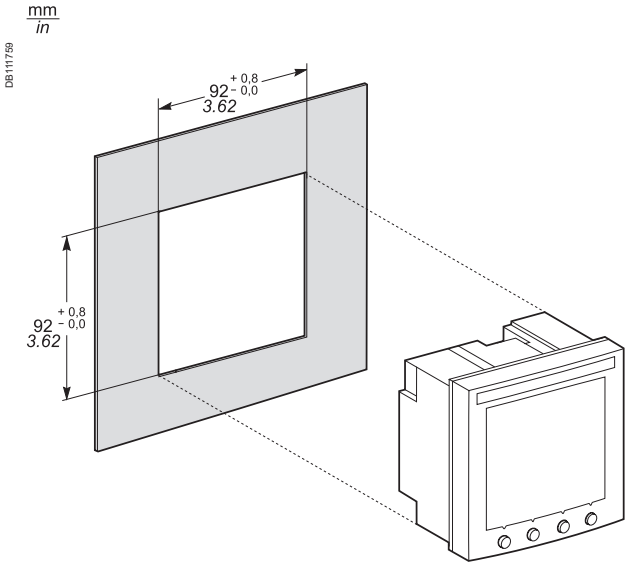
Dimensions

mm
in



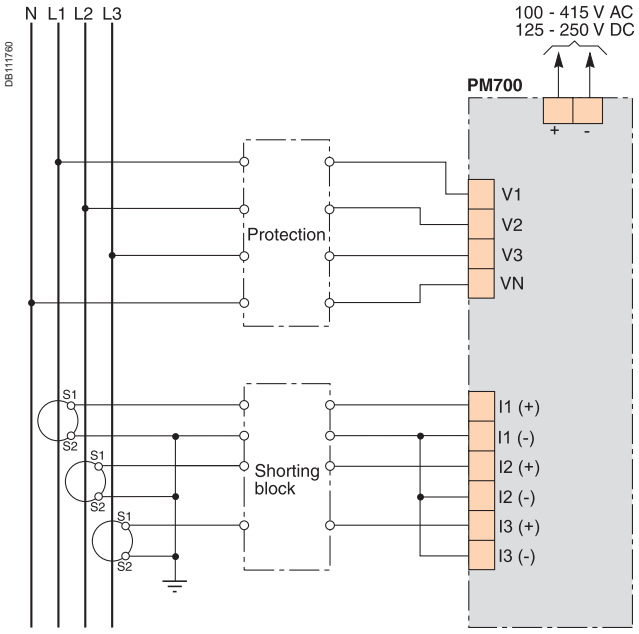
Front-panel mounting

mm
in



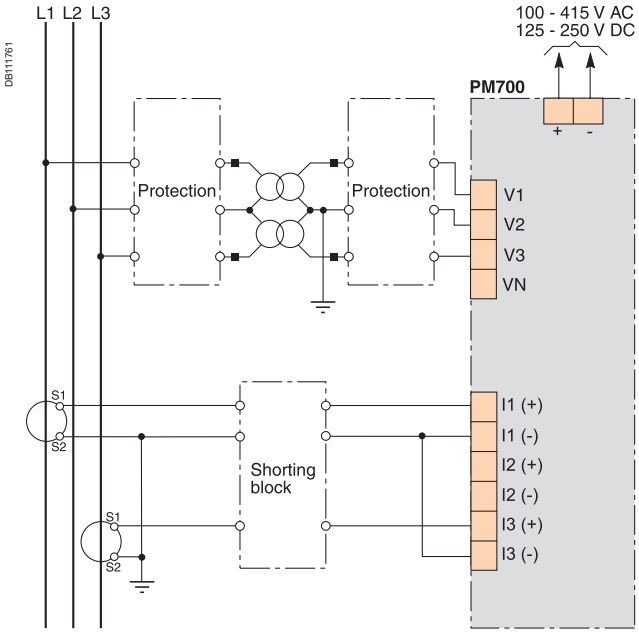
Power Meter Series 700
Installation and connection (cont.)

4-wire connection with 3 CTs and no PT



Connection example.

3-wire connection with 2 CTs and 2 PTs



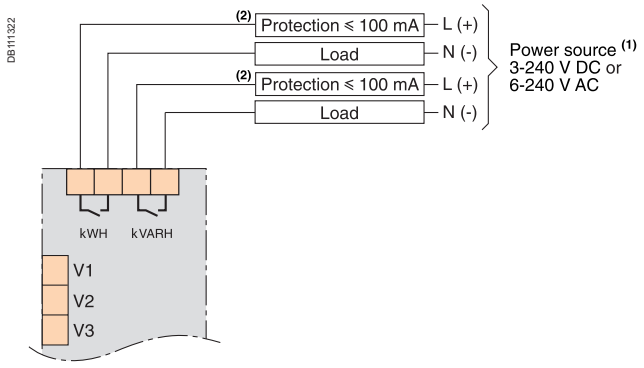
Connection example.

***Note:** other types of connection are possible. See product documentation.*

Power Meter Series 700
Installation and connection (cont.)

PM700P pulse output capabilities

There are two solid-state KY outputs. One is dedicated to kWH and the other to kVARH.
Pulse Output: KY is a solid state pulse output rated for 240 V AC/DC max.

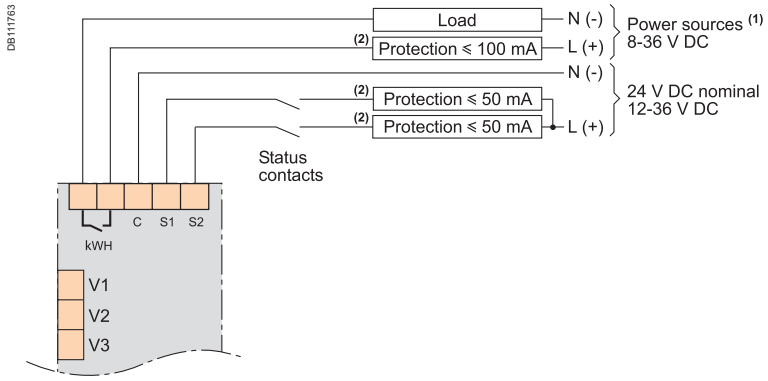


PM700P

(1) The power source should not be a safety extra low voltage (SELV) circuit. Pulse outputs are not SELV rated.
(2) Overcurrent protective device (not supplied). This device must be rated for short circuits at the connection point.

PM750 input/output capabilities

The PM750 has two digital inputs and one digital output. The digital inputs have two operating modes: Normal and Demand Sync.
The digital output has three operating modes: External Control (default), Alarm and kWh Pulse mode. When configured in Alarm mode, the digital output can be controlled by the meter in response to an alarm condition.

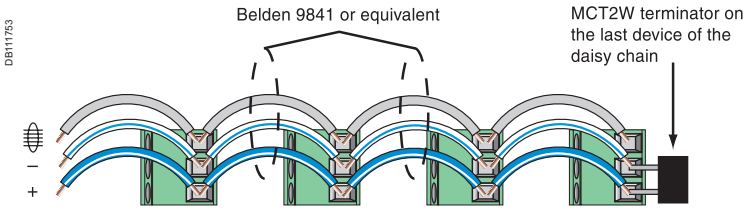


PM750

(1) The power source should not be a safety extra low voltage (SELV) circuit. Pulse outputs are not SELV rated.
(2) Overcurrent protective device (not supplied). This device must be rated for short circuits at the connection point.

Power Meter Series 700
Installation and connection (cont.)

Communications (PM710 and PM750)
2-wire daisy-chain connection of devices (RS 485)



Belden 9841 wire colors: blue with white stripe (+), white with blue stripe (–), and silver (shield).

Power Meter Series 800
Functions and characteristics

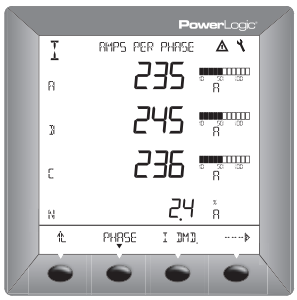
PE86134

Front view of Power Meter Series 800 meter with integrated display.

PB101823-50

Rear view of Power Meter Series 800 meter.

DB111799



Power Meter PM800 Series meter display screen showing bar graphs.

The PowerLogic Power Meter Series 800 offers many high-performance capabilities needed to meter and monitor an electrical installation in a compact 96 x 96 mm unit. All models include an easy-to-read display that presents measurements for all three phases and neutral at the same time, an RS-485 Modbus communication port, one digital input, one KY-type digital output, total harmonic distortion (THD) metering, and alarming on critical conditions. Four models offer an incremental choice of custom logging and power quality analysis capabilities. Expand any model with field-installable option modules that offer a choice of additional digital inputs and outputs, analog inputs and outputs, and Ethernet port.

Applications

- Panel instrumentation
- Sub-billing, cost allocation and energy management
- Remote monitoring of an electrical installation
- Power quality analysis
- Utility bill verification, utility contract optimization and load preservation.

Characteristics

Easy to install
Mounts using two clips, with no tools required. Direct connect the voltage inputs, with no need for potential transformers (PTs) up to 600 VAC.

Easy to operate
Intuitive navigation with self-guided, language-selectable menus.

System status at a glance
Large, anti-glare display with back-light provides summary screens with multiple values. Bar charts graphically represent system loading and I/O.

Custom alarming with time stamping
Over 50 alarm conditions, including over or under conditions, digital input changes, phase unbalance and more. The models PM850 and PM870 offer boolean logic that can be used to combine up to four alarms.

Power quality analysis
The PM800 series offers an incremental range of features for troubleshooting and preventing power quality related problems. All models offer THD metering. The PM810 with PM810LOG option and PM820 offer individual current and voltage harmonics readings. The PM850 and PM870 offer waveform capture (PM870 is configurable) and power quality compliance evaluation to the international EN50160 standard. The PM870 offers voltage and current disturbance (sag/swell) detection.

Extensive on-board memory
All models offer billing (energy and demand), maintenance, alarm and customizable data logs, all stored in non-volatile memory (PM810 requires PM810LOG option).

IEC 62053-22 class 0.5S accuracy for active energy
Accurate energy measurement for sub-billing and cost allocation.

IEC 61557-12 performance standard
Meets IEC 61557-12 PMD/S-/K70/0.5 requirements for combined Performance Measuring and monitoring Devices (PMD).

Trend curves and short-term forecasting
The models PM850 and PM870 offer trend logging and forecasting of energy and demand readings to help compare load characteristics and manage energy costs.

Expandable I/O capabilities
Use the on-board or optional digital inputs for pulse counting, status/position monitoring, demand synchronization or control (gating) of the conditional energy metering. Use the on-board or optional digital outputs for equipment control or interfacing, controllable by internal alarms or externally through digital input status. Use the optional analog inputs and outputs for equipment monitoring or interfacing.

Metering of other utilities (WAGES)
All models offer five channels for demand metering of water, air, gas, electricity or steam utilities (WAGES) through the pulse counting capabilities of the digital inputs. Pulses from multiple inputs can be summed through a single channel.

Modular and upgradeable
All models offer easy-to-install option modules (memory, I/O and communications) and downloadable firmware for enhanced meter capabilities.

Remote display
The optional remote display can be mounted as far as 10 m from the metering unit. The adapter includes an additional 2- or 4-wire RS-485/RS-232 communication port.

Power Meter Series 800
Functions and characteristics (cont.)

PB101814-36

Power Meter Series 800 without display.

PE86134

Power Meter Series 800 with integrated display.

PB101822-68

Power Meter Series 800 with remote display.

PE86135

Remote display adapter with display and cable.

PB101819-32

Remote display adaptor alone.

Part Numbers

Description	
Power Meter without display	
Use the base meter unit without display to comply with voltage limitations for local regulations when door mounting is not possible, or when meter voltage exceeds regulations, or when local display is not required. When the meter is used without a display, configuration of the communications port is limited to the default (address 1, 9600 baud, parity even). Requires software to read data.	
PM810 power meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging (with PM810LOG)	**PM810UMG**
PM820 power meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging	**PM820UMG**
PM850 power meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, waveform capture	**PM850UMG**
PM870 power meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, configurable waveform capture and disturbance detection	**PM870UMG**
Power Meter with integrated display	
Use the meter with integrated display for panel mounting when door space is available and when voltage usage is within the local regulation limits.	
PM810 power meter with integrated display,	**PM810MG**
PM820 power meter with integrated display	**PM820MG**
PM850 power meter with integrated display	**PM850MG**
PM870 power meter with integrated display	**PM870MG**
Power Meter with remote display	
Conveniently packaged kit consist of a base meter (810, 820, 850 or 870) with a remote display, remote display adapter, and remote display cable 3 m (9.ft 10 inches).	
PM810 power meter with remote display	**PM810RDMG**
PM820 power meter with remote display	**PM820RDMG**
PM850 power meter with remote display	**PM850RDMG**
PM870 power meter with remote display	**PM870RDMG**
Parts and accessories	
Remote display adapter with remote display and a 3 m (9 ft 10 inch) cable Use this combination of remote display, adapter, and 3 m cable to equip a base meter unit for use with a remote display. In addition, the display can be carried from meter to meter, enabling you to purchase one display for multiple meters. Each base unit meter must be equipped with a remote display adapter (PM8RDA).	**PM8RDMG**
Remote display adapter alone When added to the front of the base unit (PM8xxU), the adapter brings two additional communication ports: one for the remote display and one 4-wire/2-wire RS 485/RS 232.	**PM8RDA**

Part number list continued on next page.

Power Meter Series 800
Functions and characteristics (cont.)

DB119011

Power Meter PM870 with ECC module (bottom view showing connectors and configuration switches).

DB119012

ECC module (front view)

DB119013

ECC module (side view showing LED indicators).

PB101821G-34

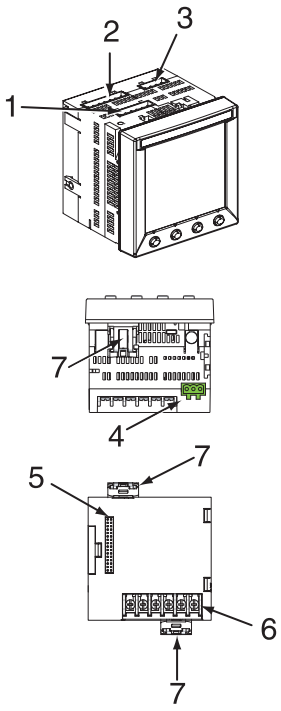
PM8M26 module.

PB101824-50

Power Meter PM800 with PM8M22 and PM8M26 modules.

Part Numbers - continued	
Description	
Optional modules	
Ethernet communication module provides a 10/100BaseTx UTP port, an RS-485 Modbus serial master port, Ethernet-to-serial line gateway functionality, and an embedded web server that is fully compliant with Transparent Ready - Level 1 (TRe1) systems.	**PM8ECC**
2 digital outputs (relays), 2 digital inputs	**PM8M22**
2 digital outputs (relays), 6 digital inputs	**PM8M26**
2 digital outputs (relays), 2 digital inputs, 2 analog outputs, 2 analog inputs	**PM8M2222**
PM810 optional logging module for on-board data recording, uses a non-volatile, battery-backed internal clock	**PM810LOG**
RJ11 Extender kit to mount RJ11 jack in panel door (for use with PM800, CM3000, and CM4000 series meters)	**RJ11EXT**
Cable for remote display adapter 1.25 m (4 ft)	**CAB4**
Cable for remote display adapter 3 m (9 ft 10 inch)	**CAB12**
Cable for remote display adapter 9.14 m (30 ft)	**CAB30**

Power Meter Series 800
Functions and characteristics (cont.)



Power Meter Series 800 connectors.
1. Control power.
2. Voltage inputs.
3. Digital input/output.
4. RS 485 port.
5. Option module connector.
6. Current inputs.
7. Mounting clips.

Selection guide		PM810	PM820	PM850	PM870
General					
Use on LV and HV systems		■	■	■	■
Current and voltage accuracy		0.1 %	0.1 %	0.1 %	0.1 %
Active energy accuracy		0.5 %	0.5 %	0.5 %	0.5 %
Number of samples per cycle		128	128	128	128
Instantaneous rms values					
Current, voltage, frequency		■	■	■	■
Active, reactive, apparent power	Total and per phase	■	■	■	■
Power factor	Total and per phase	■	■	■	■
Energy values					
Active, reactive, apparent energy		■	■	■	■
Configurable accumulation mode		■	■	■	■
Demand values					
Current	Present and max.	■	■	■	■
Active, reactive, apparent power	Present and max.	■	■	■	■
Predicted active, reactive, apparent power		■	■	■	■
Synchronisation of the measurement window		■	■	■	■
Demand calculation mode	Block, sliding, thermal	■	■	■	■
Other measurements					
Hour counter		■	■	■	■
Power quality measurements					
Harmonic distortion	Current and voltage	■	■	■	■
Individual harmonics	Current and voltage	31 (1)	31	63	63
Waveform capture		-	-	■	■ (2)
Sag and swell detection		-	-	-	■
Data recording					
Min/max of instantaneous values		■	■	■	■
Data logs		2 (1)	2	4	4
Event logs		-	■	■	■
Trending / forecasting		-	-	■	■
Alarms		■	■	■	■
Time stamping		■ (1)	■	■	■
Display and I/O					
White backlit LCD display		■	■	■	■
Multilingual: (Other languages available)		■	■	■	■
Digital input		1	1	1	1
Digital output (KY)		1	1	1	1
Input metering capability (number of channels)		5	5	5	5
Communication					
RS 485 port		2-wire	2-wire	2-wire	2-wire
Modbus protocol		■	■	■	■
RS 232/RS 485, 2- or 4-wire Modbus RTU/ASCII (with addition of PM8RDA module)		■	■	■	■

(1) **With PM810LOG, battery-backed internal clock and 80 kB memory.** ***(2)*** **Configurable.**

Option modules selection guide

The PM800 can be fitted with 2 optional modules, unless otherwise indicated (3)

PM8ECC module

10/100BaseTx UTP port, RS-485 Modbus serial master port, Ethernet to serial line gateway, embedded web server

PM8M22 module

2 digital outputs (relays)
2 digital inputs

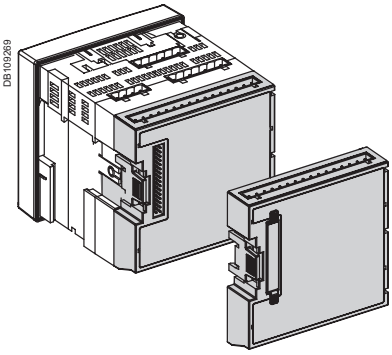
PM8M26 module

2 digital outputs (relays)
6 digital inputs
This module includes a 24 V DC power supply that can be used to power the digital inputs

PM8M2222 module

2 digital outputs (relays)
2 digital inputs
2 analog outputs 4-20 mA
2 analog inputs 0-5 V or 4-20 mA

(3) **When using two PM8M2222 the temperature should not exceed 25 °C.**



Power Meter PM800 Series with I/O module.

Power Meter Series 800
Functions and characteristics (cont.)

Electrical characteristics

Type of measurement			63rd harmonic, 128 samples per cycle
Measurement accuracy	Current		0.325 % from 1 A to 10 A
	Voltage		0.375 % from 50 V to 277 V
	Power Factor		0.1 % from 1 A to 10 A
	Power		0.2 %
	Frequency		± 0.02 % from 45 to 67 Hz
	Active Energy		IEC 62053-22 Class 0.5S
	Reactive Energy		IEC 62053-23 Class 2
Data update rate			1 s
Input-voltage characteristics	Measured voltage		0 to 600 V AC (direct L-L) 0 to 347 V AC (direct L-N) up to 3.2 MV AC (with external VT)
	Metering over-range		1.5 Un
	Impedance		5 MΩ
	Frequency measurement range		45 to 67 Hz and 350 to 450 Hz
Input-current characteristics	CT ratings	Primary	Adjustable from 5 A to 32767 A
		Secondary	1 A or 5 A
	Measurement input range		5 mA to 10 A
	Permissible overload		15 A continuous 50 A for 10 seconds per hour 500 A for 1 second per hour
	Impedance		< 0.1 Ω
	Load		< 0.15 VA
Control Power	AC		115 to 415 ±10 % V AC, 15 VA with options
	DC		125 to 250 ±20 % V DC, 10 W with options
	Ride-through time		45 ms at 120 V AC
Onboard input/ output	Digital output (KY)		6 to 220 ±10 % V AC or 3 to 250 ±10 % V DC, 100 mA max. at 25 °C, 1350 V rms isolation
	Digital input		20 to 150 V AC/DC (±10 %) < 5 mA max. burden
Options			
PM8M22	Digital outputs (relay)		6 to 240 V AC or 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		19 to 30 V DC, 5 mA max. at 24 V DC
PM8M26	Digital outputs (relay)		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		20 to 150 V AC/DC, 2 mA max.
	24 V internal supply		20 - 34 V DC, 10 mA max. (feeds 6 digital inputs)
PM8M2222	Digital outputs (relay)		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		20 to 150 V AC/DC, 2 mA max.
	Analog outputs		4 to 20 mA dc into 600 ohms maximum
	Analog inputs		Adjustable from 0 to 5 V DC or 4-20 mA
Switching frequency	PM8M22	Input/output	1 Hz, 50 % duty cycle (500 ms ON/OFF)
	PM8M26 and PM8M2222	Input	25 Hz, 50 % duty cycle (20 ms ON/OFF)
		Output	1 Hz, 50 % duty cycle (500 ms ON/OFF)
Mechanical endurance (digital outputs)			15 million operations
Electrical endurance (digital outputs)			250000 commutations at 2 A / 250 V AC

Mechanical characteristics

Weight (meter with integrated display)		0.6 kg
IP degree of protection (IEC 60529)		IP52 front display, IP30 meter body
Dimensions	Without options	96 x 96 x 70 mm (mounting surface)
	With 1 option	96 x 96 x 90 mm (mounting surface)

Environmental conditions

Operating temperature	Meter	-25 °C to +70 °C (1)
	Display	-10 °C to +50 °C
Storage temp.	Meter + display	-40 °C to +85 °C
Humidity rating		5 to 95 % RH at 40 °C (non-condensing)
Pollution degree		2
Installation category		III, for distribution systems up to 347 V L-N / 600 V AC L-L
Dielectric withstand		As per EN 61010, UL508
Altitude		3000 m max.

***(1)* 65 °C if control power is above 305 V AC.**

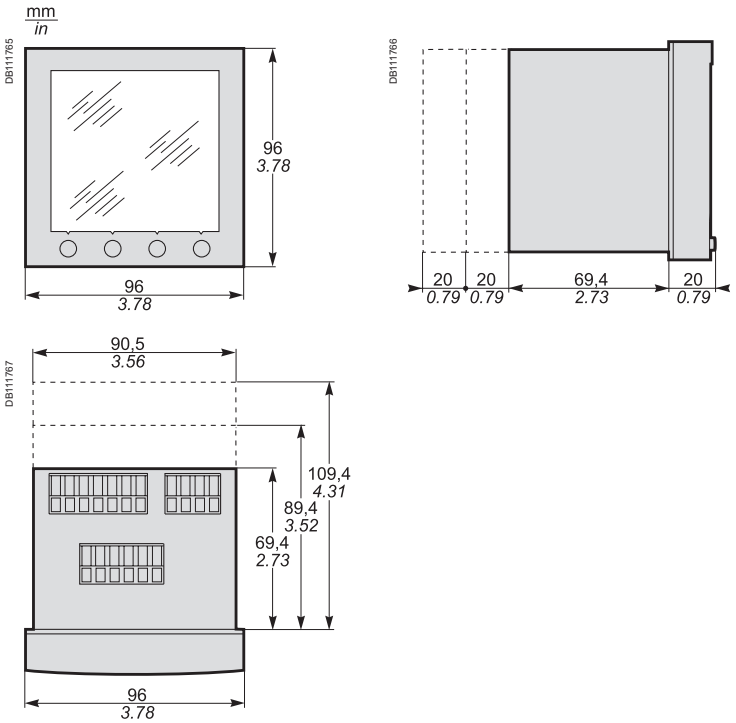
Power Meter Series 800
Functions and characteristics (cont.)

Electromagnetic compatibility		
Electrostatic discharge	Level III (IEC 61000-4-2)	
Immunity to radiated fields	Level III (IEC 61000-4-3)	
Immunity to fast transients	Level III (IEC 61000-4-4)	
Immunity to impulse waves	Level III (IEC 61000-4-5)	
Conducted immunity	Level III (IEC 61000-4-6)	
Immunity to magnetic fields	Level III (IEC 61000-4-8)	
Immunity to voltage dips	Level III (IEC 61000-4-11)	
Conducted and radiated emissions	CE industrial environment/FCC part 15 class A EN 55011	
Harmonics emissions	IEC 61000-3-2	
Flicker emissions	IEC 61000-3-3	
Safety		
Europe	CE, as per IEC 61010-1 ⧈ (1)	
U.S. and Canada	UL508	
Onboard communications		
RS 485 port	2-wire, up to 38400 baud, Modbus	
Model-dependent characteristics		
Data Logs	PM810 with PM810LOG, PM820, PM850 and PM870: - 1 billing log - 1 customizable log PM850 and PM870 only: 2 additional custom logs	
Min./max.	Worst min. and max. with phase indication for Voltages, Currents, Voltage unbalance, and THD. Min. and max. values for power factor (True and Displacement), power (P, Q, S) and frequency	
One event log	Time stamping to 1 second	
Trend curves (PM850 and PM870 only)	Four trend curves: 1 minute, 1 hour, 1 day and 1 month. Min./max./avg. values recorded for eight parameters: - every second for one minute for the 1-minute curve - every minute for one hour for the 1-hour curve - every hour for one day for the 1-day curve - every day for one month for the 1-month curve	
Hour counter	Load running time in days, hours and minutes	
Energy per interval	Up to three user-defined intervals per day Available for all models (the PM810 requires the PM810LOG module)	
Forecasting (PM850 and PM870 only)	Forecasting of the values for the trended parameters for the next four hours and next four days	
PM850 waveform capture	Triggered manually or by alarm, 3-cycle, 128 samples/cycle on 6 user configurable channels	
PM870 enhanced waveform capture	From 185 cycles on 1 channel at 16 samples per cycle up to 3 cycles on 6 channels at 128 samples per cycle	
Alarms	Adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm Historical and active alarm screens with time stamping Response time: 1 second Boolean combination of four alarms is possible using the operators NAND, OR, NOR and XOR on PM850 and PM870 Digital alarms: status change of digital inputs	
Memory available for logging and waveform capture (2)	80 kbytes in PM810 with PM810LOG and PM820 800 kbytes in PM850 and PM870	
Firmware update	Update via the communication ports File download available free from powerlogic.com website	
Bar graphs	Graphical representation of system performance	
Display characteristics		
Languages	Contact Schneider Electric representative for additional languages	
Display screen	Back-lit white LCD (6 lines total, 4 concurrent values)	
Dimensions	Display screen viewable area	73 x 69 mm
	Integrated display Overall	96 x 96 mm
	Depth meter + display	69.4 mm + 17.8 mm
	Remote display Overall	96 x 96 x 40 mm
Weight	Meter with remote display adapter	0.81 kg
	Remote display	0.23 kg

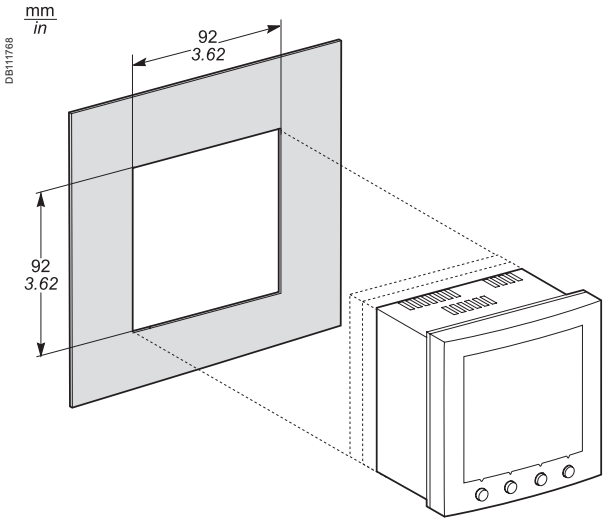
***(1)* Protected throughout by double insulation.**
***(2)* Waveform capture with PM850 and PM870 only.**

Power Meter Series 800
Installation and connection

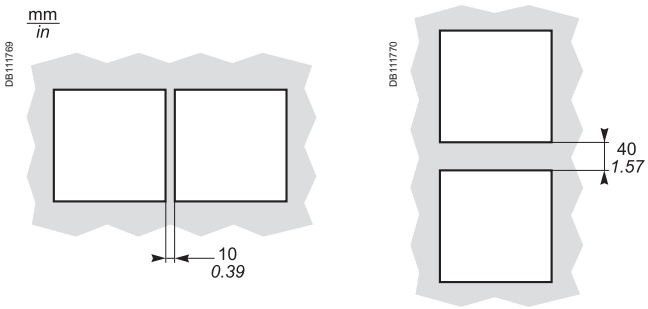
Power meter with integrated display
Dimensions



Front-panel mounting (meter with integrated display)



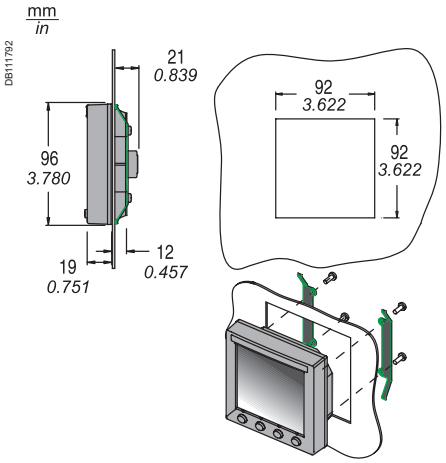
Spacing between units



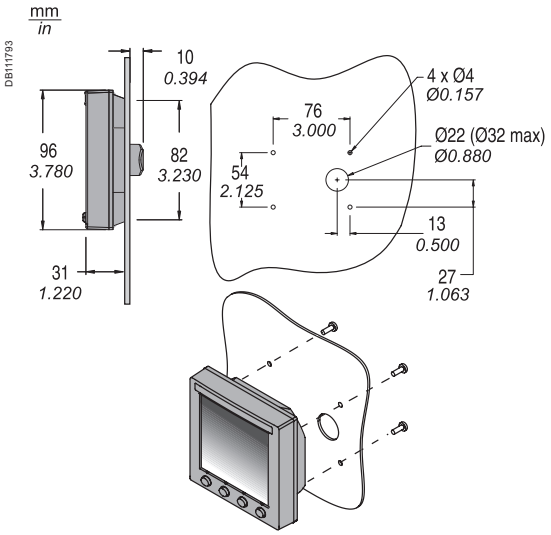
Power Meter Series 800
Installation and connection (cont.)

Remote display door mounting

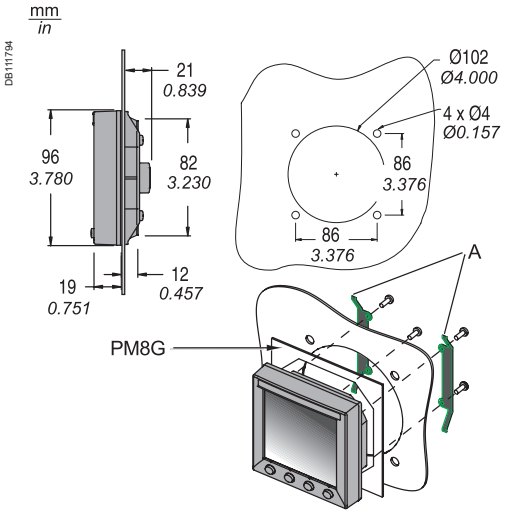
Flush mounting



Surface mount

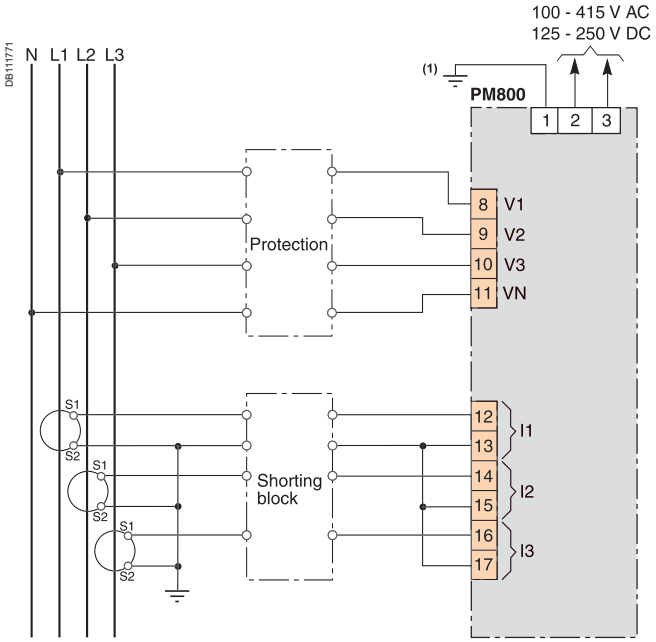


Mounting in a Ø102 cutout (replace analogue device: ammeter, voltmeter, etc.)



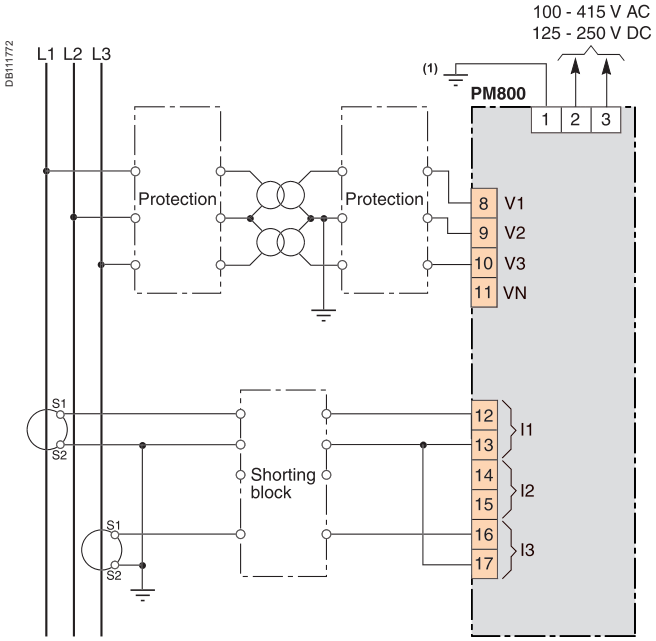
Power Meter Series 800
Installation and connection (cont.)

4-wire connection with 3 CTs and no PT



Connection example.

3-wire connection with 2 CTs and 2 PTs



Connection example.

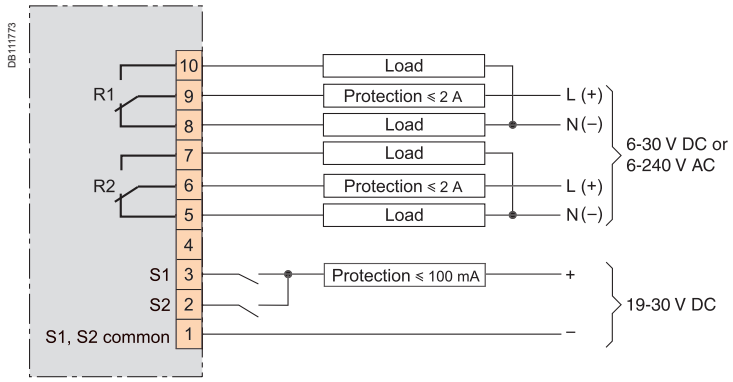
(1) Functional earth terminal.

Note: *other types of connection are possible. See product documentation.*

Power Meter Series 800
Installation and connection (cont.)

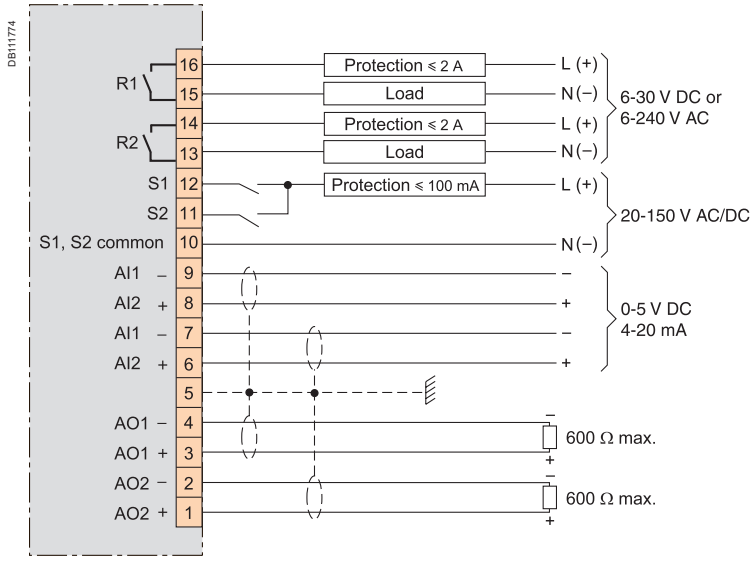
PM8M22 module

PM8M22



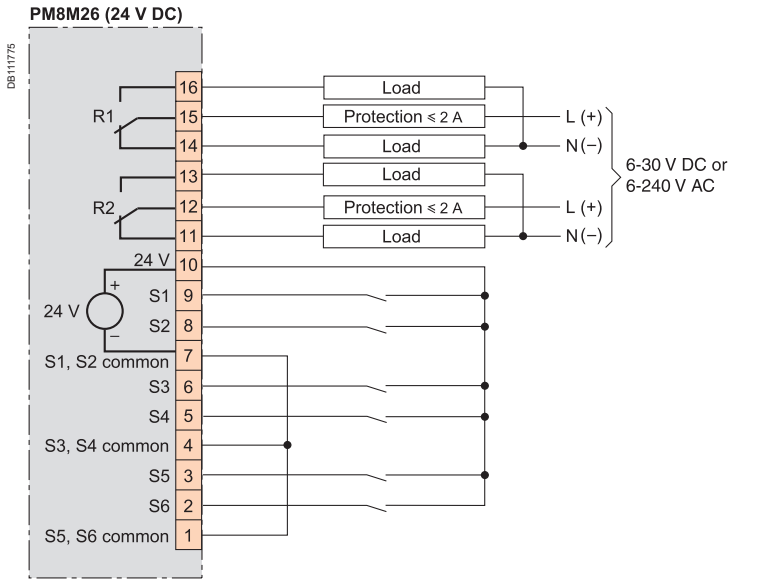
PM8M2222 module

PM8M2222

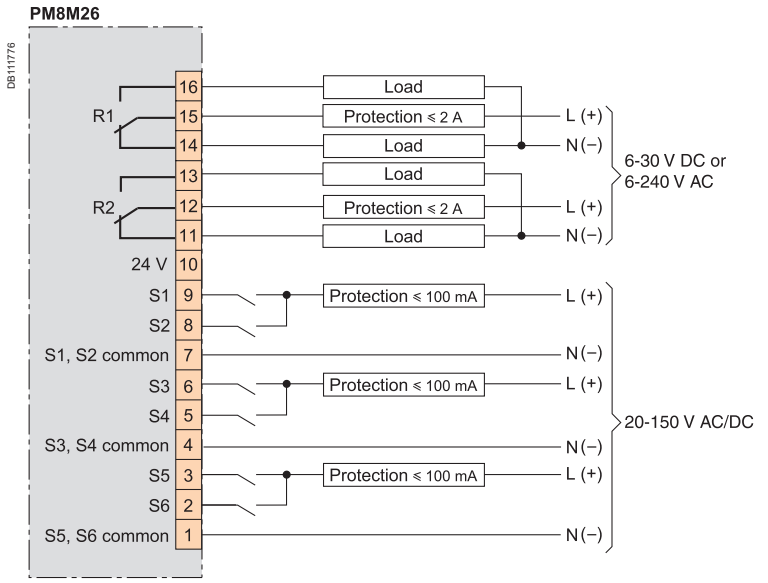


Power Meter Series 800
Installation and connection (cont.)

PM8M26 module internal 24 V DC power supply

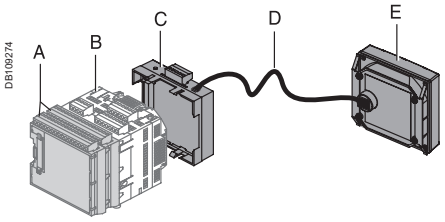


PM8M26 module external power supply



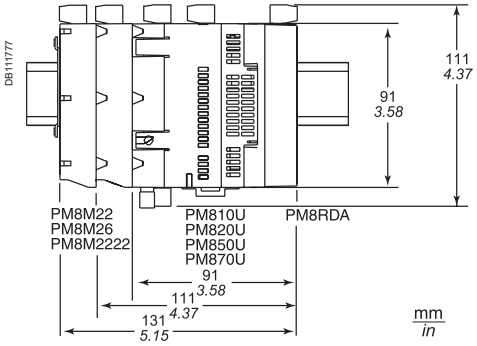
Power Meter Series 800
Installation and connection (cont.)

Remote display kit

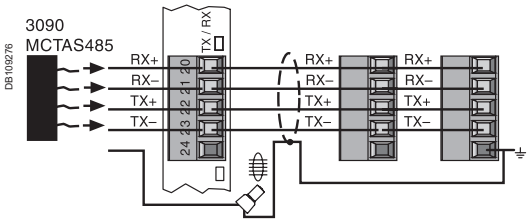


A. I/O modules
B. Power meter 800 series (base unit)
C. Remote display adapter
D. CAB12 cable
E. Remote display (rear view)

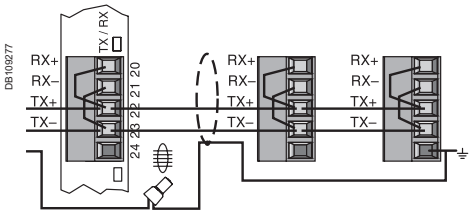
Dimension (meter with I/O and remote display adapter)



4-wire connection (RS 485) of remote display adapter



2-wire connection (RS 485) of remote display adapter



Power Meter Series 800
Installation and connection (cont.)

RS-485 wiring color codes

2-wire connections

Belden 9841 cable:
- (+) blue, white stripe
- (–) white, blue stripe
- (shield)

4-wire connections

Belden 9843 cable:
- (TX+) blue, white stripe
- (TX–) white, blue stripe
- (RX+) orange, white stripe
- (RX–) white, orange stripe
- (SG) green, white stripe
- (unused) white, green stripe
- (shield)

Belden 9842 cable:
- (TX+) blue, white stripe
- (TX–) white, blue stripe
- (RX+) orange, white stripe
- (RX–) white, orange stripe
- (shield)

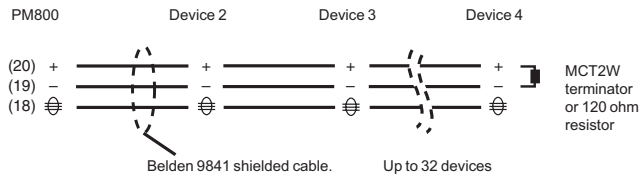
Belden 8723 cable:
- (TX+) green
- (TX–) white
- (RX+) red
- (RX–) black
- (shield)

Surge protection

For surge protection, it is recommend that the PM8ECC signal ground wire be connected directly to an external earth ground at a single point.

PM800 meter unit RS-485 port 2-wire daisy-chain connection

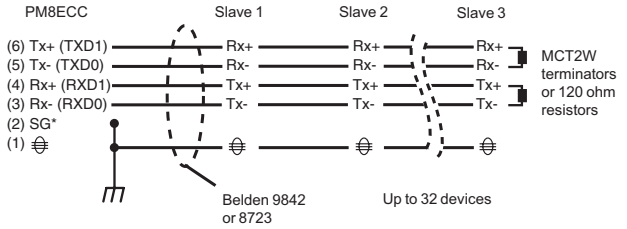
PE86121



Power Meter Series 800
Installation and connection (cont.)

PM8ECC module RS-485 port connections for 4-wire devices that do not support separate signal ground and shield wire

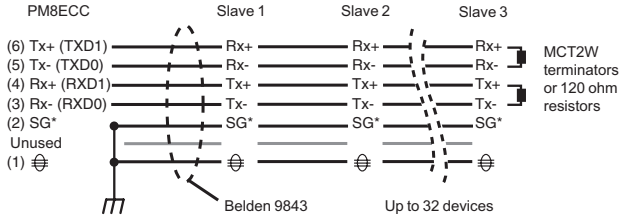
PLSD110343



Note: SG is signal ground.

PM8ECC module RS-485 port connections for 4-wire devices that support separate signal ground and shield wire

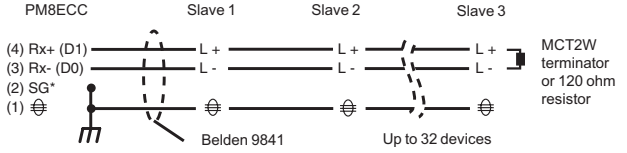
PLSD110351



Note: SG is signal ground.

PM8ECC module RS-485 port connections for 2-wire devices that do not support separate signal ground and shield wire

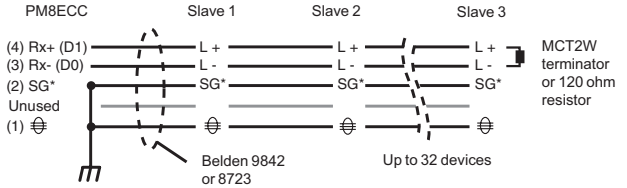
PLSD110344



Note: SG is signal ground.

PM8ECC module RS-485 port connections for 2-wire devices that support separate signal ground and shield wire

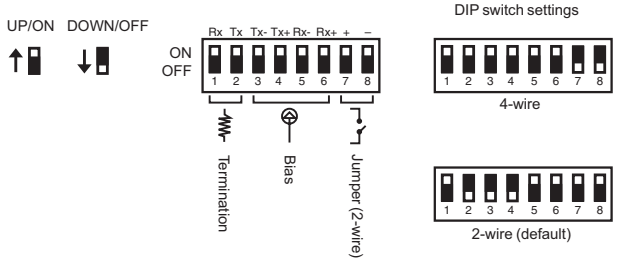
PLSD110352



Note: SG is signal ground.

PM8ECC module RS-485 port biasing and termination

PLSD110345



ION7550 / ION7650
Functions and characteristics

PE86126

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

Main characteristics

Anticipate, diagnose and verify to increase efficiency
Reveal energy inefficiencies or waste and optimise equipment operation to increase efficiency. Isolate reliability risks, diagnose power-related equipment issues and verify reliable operation.

Summarise power quality, set targets, measure and verify results
Consolidate all the power quality characteristics into a single trendable index. Benchmark power quality and reliability and compare against standards, or compare facilities or processes.

Easy to use, multilingual, IEC/IEEE configureable display
Bright LCD display with adjustable contrast. Screen-based menu system to configure meter settings including IEC or IEEE notations. Multilingual support for English, French, Spanish and Russian. 12/24 hour clock support in multiple formats.

Modbus Master functionality
Read information from downstream Modbus devices and view it via the front panel or store in memory until you upload to the system level.

Gateway functionality
Access through the meter's Ethernet port (EtherGate) or telephone network (ModemGate) to Modbus communicating devices connected to meter serial ports.

Detect and capture short transients as short as 20µs at 50Hz (17µs at 60 Hz)
Identify problems due to short disturbances, e.g. switching of capacitors, etc.

Power quality compliance monitoring
Monitor compliance with international quality-of-supply standards (IEC 61000-4-30 class A[1], EN50160[1], IEC 61000-4-7, IEC 61000-4-15, IEEE 519, IEEE 1159, and CBEMA/ITIC). Evaluate flicker based on IEC 61000-4-15 and IEEE 1453.

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.

Disturbance direction detection
Determine disturbance location and direction relative to the meter. Results captured in the event log, along with a timestamp and certainty level.

Instrument transformer correction
Save money and improve accuracy by correcting for less accurate transformers.

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

[1] ION7650 only

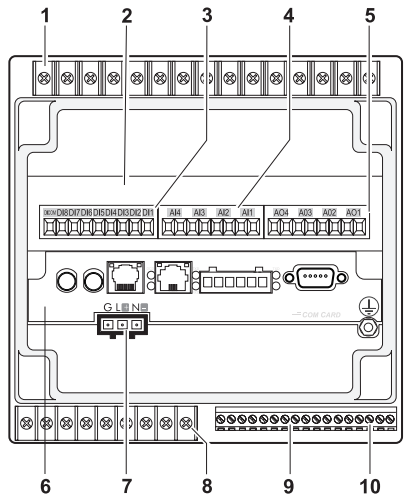
Part numbers

ION7550 / ION7650	
ION7550	**M7550**
ION7650	**M7650**

See page 78 for order code explanations.

ION7550 / ION7650
Functions and characteristics (cont.)

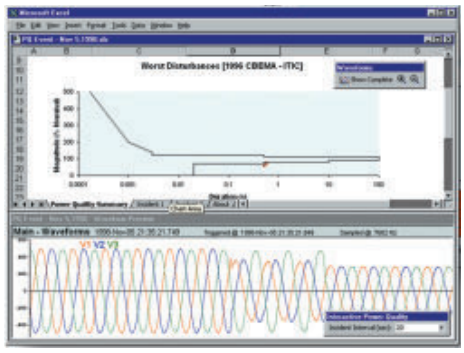
PE86018



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.*

PE86002



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 (autoranging)		0.01 - 20A	0.01 - 20A
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		■	■
Detection and capture of transients		-	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)		20	20
Digital or analogue outputs (max, including pulse output)		12	12
Communication			
RS 485 port		1	1
RS 485 / RS 232 port		1	1
Optical port		1	1
Modbus protocol		■	■
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.*

ION7550 / ION7650
Functions and characteristics (cont.)

PE86126

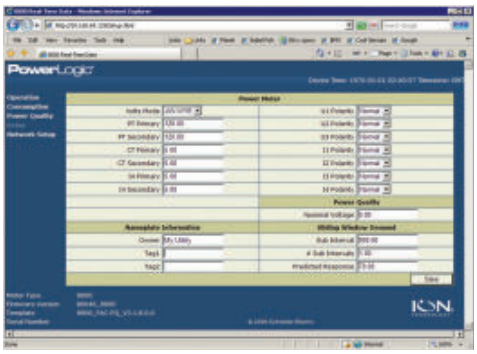
PowerLogic ION7650

Electrical characteristics		
Type of measurement		True rms to 1024 samples per cycle (ION7650)
Measurement accuracy	Current and voltage	±0.01% of reading + ±0.025% of full scale
	Power	±0.075% of reading + ±0.025% of full scale
	Frequency	±0.005Hz
	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 MΩ/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) 200 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 ±10% (47-63 Hz)
	DC	110-300 V DC ±10%
	DC low voltage (optional)	20-60 V DC ±10%
	Ride-through time	100 ms (6 cycles at 60 Hz) min. 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)		Integrated display, front: IP 50; back: IP 30 Transducer unit (no display): IP 30
Dimensions	Standard model	192 x 192 x 159 mm
	TRAN model	235.5 x 216.3 x 133.1 mm
Environmental conditions		
Operating temperature	Standard power supply	-20 to +70ºC
	Low voltage DC supply	-20 to +50ºC
	Display operating range	-20 to +70ºC
Storage temperature	Display, TRAN	-40 to +85ºC
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

(1) *Consult the ION7550 / ION7650 installation guide for complete specifications.*
(2) *IEC 62051-22B with serial ports only.*

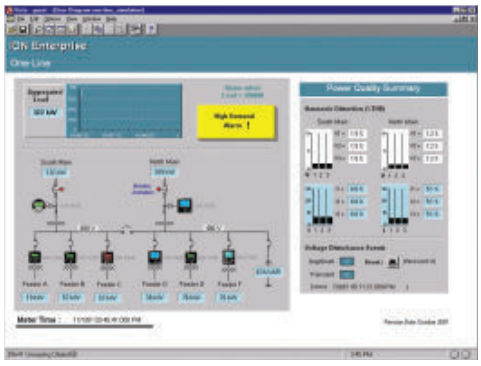
ION7550 / ION7650
Functions and characteristics (cont.)

PE86004



Example WebMeter page showing realtime values.

PE86005

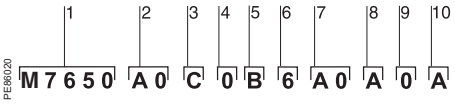


Example showing instantaneous values and alarm.

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	10Base-T/100Base-TX, RJ45 connector, 100 m link
Fibre-optic Ethernet link	100 Base FX, 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 63rd harmonic (511th for ION7650 via ION Enterprise software) for all voltage and current inputs
Sag/swell detection	Analyse severity/potential impact of sags and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording, control
Disturbance direction detection	Determine the location of a disturbance more quickly and accurately by determining the direction of the disturbance relative to the meter. Analysis results are captured in the event log, along with a timestamp and confidence level indicating level of certainty.
Instantaneous	High accuracy (1s) or high-speed (1/2 cycle) measurements, including true rms per phase / total for: - voltage and current - active power (kW) and reactive power (kvar) - apparent power (kVA) - power factor and frequency - voltage and current unbalance - phase reversal
Load profiling	Channel assignments (800 channels via 50 data recorders) configurable for any measurable parameter, including historical trend recording of energy, demand, voltage, current, power quality, or any measured parameter. Trigger recorders based on time interval, calendar schedule, alarm/event condition, or manually.
Trend curves	Access historical data at the front panel. Display, trend and continuously update historical data with date and timestamps for up to four parameters simultaneously.
Waveform captures	Simultaneous capture of all voltage and current channels - sub-cycle disturbance capture - maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10Mbytes memory) - 256 samples/cycle (ION7550) - 512 samples/cycle standard, 1024 samples/cycle optional (ION7650)
Alarms	Threshold alarms: - adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm - user-defined priority levels - boolean combination of alarms is possible using the operators NAND, OR, NOR and XOR
Advanced security	Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations on user privileges
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	5 to 10 Mbytes (specified at time of order)
Firmware update	Update via the communication ports
Display characteristics	
Integrated display	Back lit LCD, configurable screens
Languages	English, French, Spanish, Russian
Notations	IEC, IEEE

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

ION7550 / ION7650
Functions and characteristics (cont.)



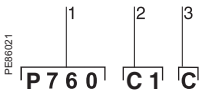
Example ION7650 product part number.

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

Part numbers

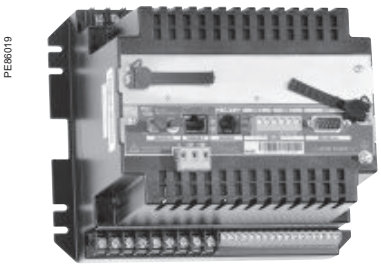
	Item	Code	Description
1	Model	M7650	Advanced m eter with wide-range voltage inputs (57-347V line-neutral or 100-600V line-line), transient detection, data and waveform recording. Supports ION, Modbus-RTU, and DNP 3.0.
		M7550	Advanced meter with wide-range voltage inputs (57-347V line-neutral or 100-600V 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	*ION7650 only.* 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	*ION7650 only.* 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	*ION7650 only.* 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	*ION7650 only.* Transducer (no display) version, with 10 MB logging memory, and 1024 samples/cycle resolution.
3	Current Inputs	C	5 Amp nominal, 20 Amp full scale current input
		E	1 Amp nominal, 10 Amp full scale current input
		F	Current Probe Inputs (for 0-1 VAC current probes; sold separately)
		G	Current Probe Inputs with three Universal Technic 10A clamp on CTs; meets IEC 1036 accuracy
4	Voltage Inputs	0	57 to 347 VAC line-to-neutral / 100 to 600 VAC line-to-line
5	Power Supply	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 include 1 ANSI Type 2 optical port.
		C1	Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45), 56k universal internal modem (RJ11). Ethernet and modem gateway functions each use a serial communications port.
		D7	Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45) and 100BaseFX Ethernet Fiber, 56k universal internal modem (RJ11). Ethernet/modem gateway uses serial port.
		E0	Standard communications plus 10Base-T/100Base-TX (RJ45). Ethernet gateway function uses a serial communications port.
		F1	Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45) and 100Base-FX (SC male Fiber Optic connection). Ethernet gateway function uses a serial port.
		M1	Standard communications plus 56k universal internal modem (RJ11). Modem gateway function uses a serial port.
8	I/O	A	Standard I/O (8 digital ins, 3 Form C relays, 4 Form A solid-state out)
		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, hardware lockable (enabled/disabled via jumper on comm card)
		6	Password protected with security lock enabled, terminal cover and UK OFGEM labels

ION7650 / ION7550
Functions and characteristics (cont.)



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.*



PowerLogic ION7550 TRAN

Part numbers (cont'd)

	Item	Code	Description
10	Special Order	A	None
		C	Tropicalisation treatment applied
		E	ION7650 only. EN50160 compliance monitoring, no tropicalisation treatment
		F	ION7650 only. EN50160 compliance monitoring, with tropicalisation treatment

Communications Card (1)

	Item	Code	Description
1	Comm card	P765C	ION7550 / ION7650 communication card for field retrofit installations
2	Type	A0	Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Front optical port support for meters with integrated display.
		C1	Standard communications plus 10Base-T/100Base-TX Ethernet (RJ45), 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Ethernet and modem gateway functions each use a serial communications port.
		D7	Standard communications plus 10Base-T/100Base-TX Ethernet, 100BaseFX Ethernet Fiber, 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Ethernet and modem gateway functions each use a serial communications port.
		E0	Standard communications plus 10Base-T/100Base-TX Ethernet. Ethernet gateway function uses a serial communications port.
		F1	Standard communications plus 10Base-T/100Base-TX Ethernet, 100BaseFX Ethernet Fiber (SC male Fiber Optic connection). Ethernet gateway function uses a serial communications port.
		M1	Standard communications plus 56k universal internal modem (RJ11; the modem port is shared with the front optical port). Modem gateway function uses a serial communications port.
3	Special order	A	None
		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

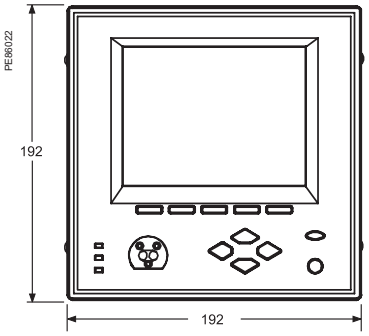
ION7550 / ION7650 related items

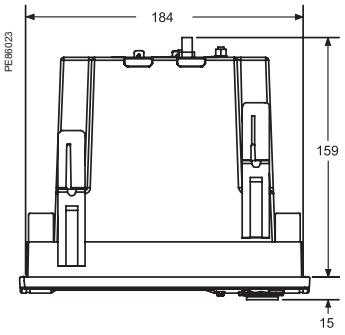
Code	Description
ADPT-37XX-7500	Adapter plate to fit meter into a 3710 or 3720 ACM panel cutout
TERMCVR-7500	Terminal strip cover for the ION7550 or ION7650
M1UB10A1V-10A	10 A / 1 VAC Universal Technic Clamp On Current Probe
P32UEP813-1000A	1000 A / 1 VAC Universal Technic Clamp On Current Probe
P32UEP815-3000A	3000 A / 1 VAC Universal Technic Clamp On Current Probe
SCT0750-005-5A	5 A / 0.333 VAC Magnelabs Split Core Current Probe
SCT1250-300-300A	300 A / 0.333 VAC Magnelabs Split Core Current Probe

(1) *Firmware version 350 or higher required.*

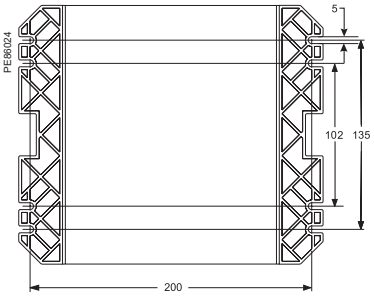
ION7550 / ION7650
Installation and connection

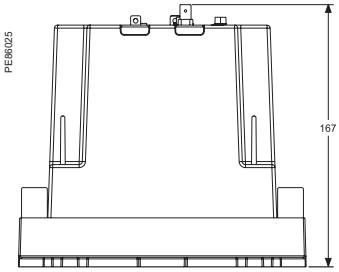
ION7550/ION7650 dimensions

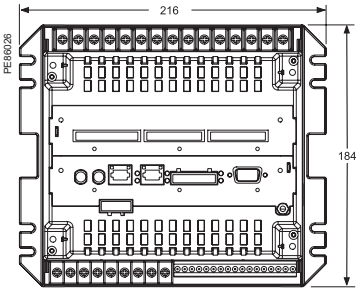




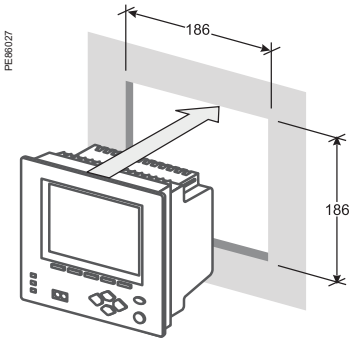
ION7550 / ION7650 TRAN dimensions





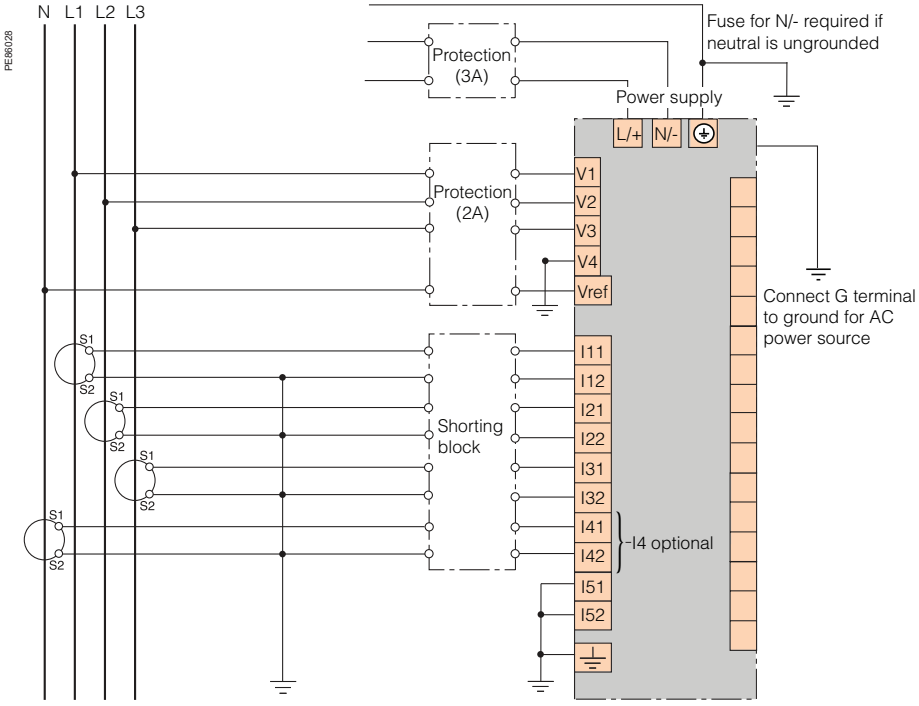


Front-panel mounting



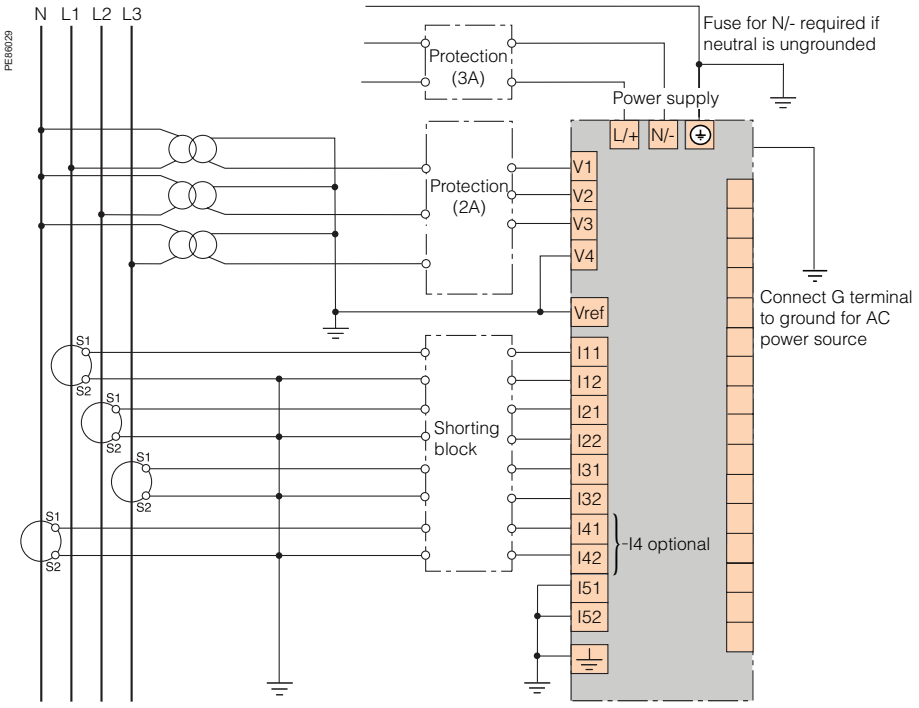
ION7550 / ION7650
Installation and connection (cont.)

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

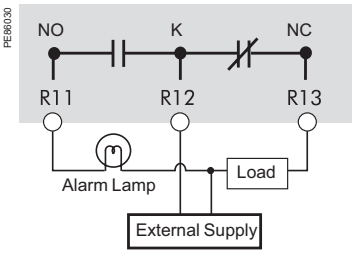


Connection representation only. Other types of connection are possible. See product installation guide for complete wiring and communication connection details.

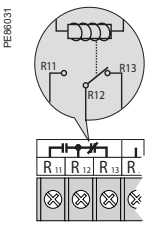
ION7550 / ION7650
Installation and connection (cont.)

Form C digital outputs: mechanical relays R1 - R3

ION7550 / ION7650



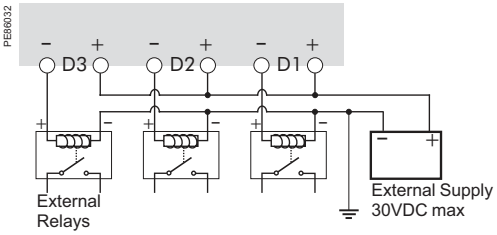
Form C Relay



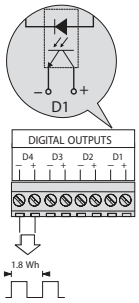
Note: *Mechanical relays should always be protected by external fuses*

Form A digital outputs: solid state relays D1 - D4

ION7550 / ION7650



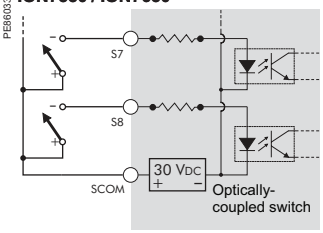
Form A Relay



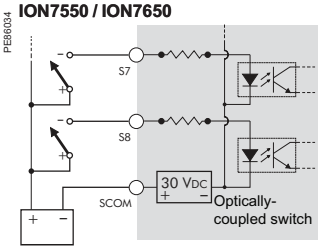
Note: *D4 output is factory-configured to pulse once every 1.8 Wh for Class 20 meters, or once every 0.18Wh for Class 2 meters (for calibration testing purposes).*

Digital inputs: S1 - S8

Internal Excitation
ION7550 / ION7650



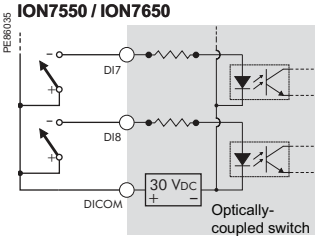
External Excitation
ION7550 / ION7650



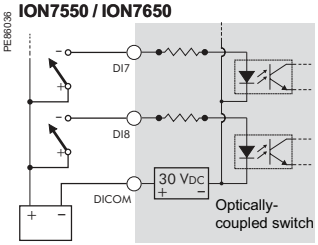
Note: *External Supply = 130 VDC max*

Digital inputs: DI1 - DI8 (option)

Internal Excitation
ION7550 / ION7650



External Excitation
ION7550 / ION7650

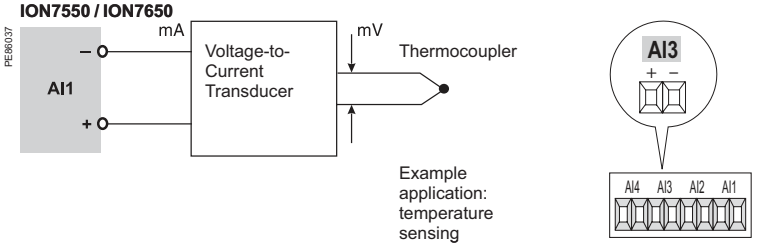


Note: *External Supply = 50 VDC max*

ION7550 / ION7650
Installation and connection (cont.)

Analog inputs: AI1 to AI4 (option)

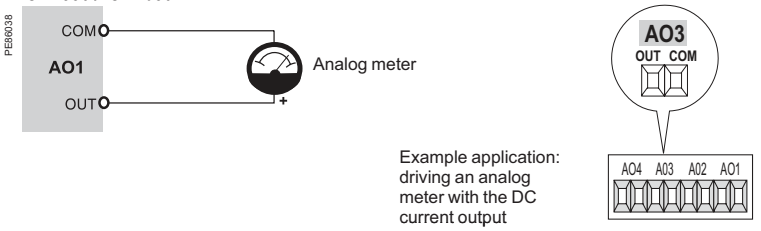
ION7550 / ION7650



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)

ION7550 / ION7650



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

ION8600
Functions and characteristics

PE86175

PowerLogic ION8600 socket meter

Used to monitor electric energy provider networks, service entrances and substations, PowerLogic™ ION8600 meters are ideal for independent power producers and cogeneration applications that need to accurately measure energy bi-directionally in both generation and stand-by modes. These meters give utilities the tools to manage complex energy supply contracts that include commitments to power quality. Integrate them with our ION Enterprise™ operations software or other energy management and SCADA systems through multiple communication channels and protocols, including MV-90.

Applications

Tariff metering
Co-generation and IPP monitoring
Compliance monitoring
Power quality analysis
Demand and power factor control
Load curtailment
Equipment monitoring and control
Energy pulsing and totalisation
Instrument transformer correction

Main characteristics

IEC 62053-22/23 Class 0,2S metering
For interconnection points on medium, high, and ultra-high voltage networks in compliance with IEC 62053-22/23 Class 0.2S

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

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

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

Multiple tariffs and time-of-use
Apply tariffs, seasonal rate schedules to measure energy and demand values for time periods with specific billing requirements

Multiple setpoints for alarm and control functions
A total of 65 setpoints are configurable for 1-second or ½ - cycle operation.

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

Integrate with software
Easily integrate with ION Enterprise operations software or other energy management systems; MV90, DNP, Modbus

Transformer/line loss compensation
Determine technical system losses in real time

Instrument transformer correction
Save money and improve accuracy by correcting for less accurate transformers

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

Part numbers

ION8600 meters	
ION8600A	**M8600A**
ION8600B	**M8600B**
ION8600C	**M8600C**

See page 88 for complete part number descriptions.

Options

See page 89.

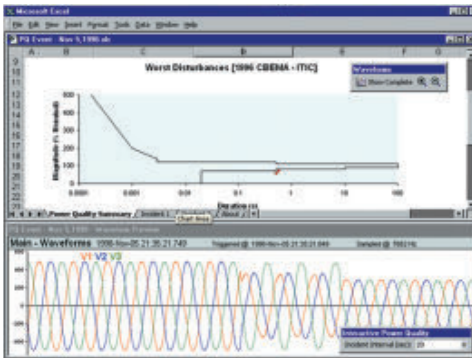
ION8600
Functions and characteristics (cont.)

PE86174

PowerLogic ION8600 socket meter.

1 *Blades*
2 *Optical port*
3 *Main display status bar*
4 *Watt LED*
5 *Navigation, ALT/Enter buttons*
6 *VAR LED*
7 *Form factor label*
8 *Demand reset switch*

PE86002

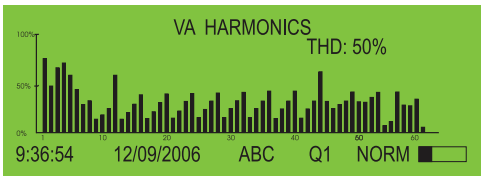


Disturbance waveform capture and power quality report

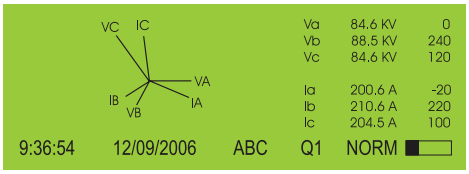
Selection guide		ION8600A ION8600B	ION8600C
General			
Use on LV and HV systems		■	■
Current accuracy		0.1 % reading	0.1 % reading
Voltage accuracy		0.1 % reading	0.1 % reading
Power accuracy		0.2 %	0.2 %
Nbr of samples/cycle or sample frequency		256	256
Instantaneous rms values			
Current, voltage, frequency (Class 0,2S)		■	■
Active, reactive, apparent power	Total and per phase	■	■
Power factor	Total and per phase	■	■
Current measurement range (autoranging)		0.01 - 20A	0.01 - 20A
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		■	■
Demand modes: Block (sliding), thermal (exponential)		■	■
Power quality measurements			
Harmonic distortion	Current and voltage	■	■
Individual harmonics	Via front panel	63	31
	Via ION Enterprise	127	127
Waveform capture		■(1)	■
Detection of voltage swells and dips		■	■
Adaptive waveform capture		■	■
Detection and capture of transients		■(1)	-
Flicker		■(1)	-
High speed data recording (down to 10 ms)		■	-
EN50160 compliance checking		■	■
Programmable (logic and math functions)		■	■
Data recording			
Min/max of instantaneous values		■	■
Data logs		■	■
Event logs		■	■
Trending/forecasting		■	■
Alarms (optional automatic alarm setting)		■	■
Alarm notification via email (Meterm@il)		■	■
SER (Sequence of event recording)		■	■
Time stamping		■	■
GPS synchronisation		■	■
Memory (in Mbytes)		10 (1), 5 (2)	2
Display and I/O			
Front panel display		■	■
Wiring self-test		■	■
Pulse output (front panel LED)		2	2
Digital or analogue inputs(3) (max)		11	11
Digital or analogue outputs(3) (max, including pulse output)		16	16
Direct connection voltage		277V(4)	277V(4)
Communication			
RS 485 / RS 232 port		1	1
RS 485 port		1	1
Infrared port		1	1
Ethernet port (Modbus/TCP/IP protocol) with gateway		1	1
HTML web page server (WebMeter)		■	■
Internal modem with gateway (ModemGate)		1	1
IRIG-B port		1	1
Modbus TCP Master / Slave (Ethernet port)		■ / ■	- / ■
Modbus RTU Master / Slave (Serial ports)		■ / ■	- / ■
DNP 3.0 through serial, modem, and I/R ports		■	■

(1) *Feature set 'A' only.*
(2) *Feature set 'B' only.*
(3) *With optional I/O Expander.*
(4) *For 9S, 39S, 36S, and 76S only. For 35S system up to 480V line-to-line.*

ION8600
Functions and characteristics (cont.)



PowerLogic ION8600 front panel harmonic display.

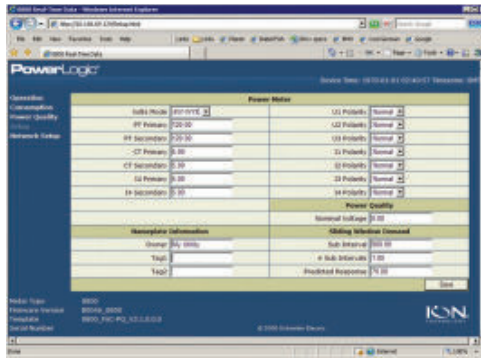


ION8600 front panel phasor display and table.

Electrical characteristics		
Type of measurement		True rms up to the 63rd harmonic Up to 256 samples per cycle Up to 51 kHz for transient events
Measurement accuracy	Current and voltage	0.1 % Reading
	Power	0,2%
	Frequency	±0.005 Hz
	Power factor	0.5%
	Energy	IEC 62053-22/23 (0,2S)
Data update rate		0.5 cycle or 1 second (depending on value)
Input-voltage characteristics	Measured voltage	57V to 277V autoranging (9S) 120V to 480V autoranging (35S)
	Impedance	5 MΩ /phase (phase-Uref/Ground)
	Inputs	V1, V2, V3, VREF
Input-current characteristics	Rated nominal/current class	5 A and/or 10 A (Standard, class 10/20) 1 A, 2 A and 5 A (Optional, class 1/10)
	Measurement range	0.005 - 20 A autoranging (standard range) 0.001 - 10 A autoranging (optional range)
	Permissible overload	500A rms for 1 second, non-recurring (standard) 200A rms for 1 second, non-recurring (optional)
	Impedance	0.002 Ω per phase (Standard IEC 5 A and 10 A) 0.015 Ω per phase (Optional IEC 1 A to 10 A)
	Burden	Low current switchboard: 0.025VA per phase at 1A; Standard switchboard - 0.20VA per phase at 5A; All socket mounts - 0.05VA per phase at 5A
Power supply	Standard power supply, 120-277 VAC	120-277 VLN RMS (-15%/+20%) 47-63 Hz or 120-480 VLN RMS (-15%/+20%) 47-63 Hz (35S)
	Standard (low voltage) power supply, 57-70 VAC	57-70 (-15%/+20%) VLN RMS, 47-63 Hz 35S unavailable
	Auxiliary power cable assembly, 65-120 VAC	AC: 65-120 (+/- 15%) VLN RMS, 47-63 Hz DC: 80-160 (+/- 20%) VDC
	Auxiliary power cable assembly, 160-277 VAC	AC: 160-277 (+/- 20%) VLN RMS, 47-63 Hz DC: 200-350 (+/- 20%) VDC
	Ride-through time, 120-277 VAC (Standard power supply)	Min 100 ms (6 cycles at 60 Hz at 96 VAC), 200 ms (12 cycles at 60 Hz at 120 VAC), 800 ms (48 cycles at 60 Hz at 240 VAC)
	Ride-through time, 57-70 VAC (Standard low voltage power supply)	Min 100 ms or 6 cycles 60 Hz at 46 VAC
Input/outputs	Digital outputs (Form C)	4 Solid state relay outputs (130 V AC/ 200 V DC) 100 mA AC/DC
	Digital outputs (Form A)	4 Solid state relay outputs (with optional I/O Expander)
	Digital inputs	4 Solid state digital inputs (supported through optional I/O Expander)
Mechanical characteristics		
Weight		7.0 kg
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		-20°C to +60°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		2.5kV, 50Hz, 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		IEC 61000-4-5
Immunity conducted		IEC61000-4-6
Damped oscillatory waves immunity		IEC61000-4-12
Conducted and radiated emissions		CISPR 22 (class B)
Safety		
Europe		As per IEC62052-11
North America		As per ANSI C12.1

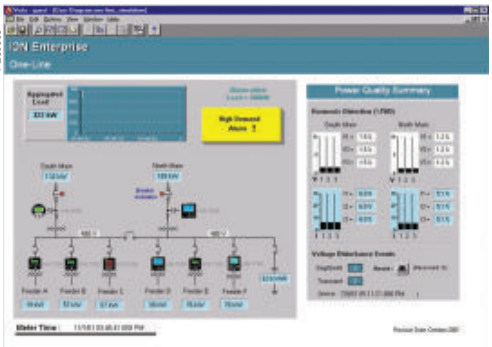
ION8600
Functions and characteristics (cont.)

PE86004



Example embedded webserver page (WebMeter) showing realtime values.

PE86005

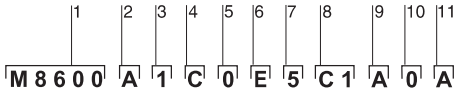


Communication	
ANSI 12.18 Type II optical port	Up to 19200 bauds
RS 485 port	Up to 57600 bauds, Modbus, direct connection to a PC or modem
RS 232 / RS 485 port	300 - 115,200 bauds (RS485 limited to 57,600 bps); protocols: ION, Modbus/RTU, DNP 3.0, GPSTRUETIME/ DATUM
Internal modem port	300 bps-56k bps (automatic detection supported)
Ethernet port	10/100 BaseTX, RJ45 connector, 100 m link, protocols: DNP TCP, ION, Modbus TCP, Modbus Master
Fiber-optic Ethernet link	100 Base FX, LC duplex connector, 1300 nm, FO multimode with gradient index 62.5/125 µm or 50/125 µm, 2000 m link, protocols (same as Ethernet port)
EtherGate	Up to 31 slave devices via serial portsat 10Mbytes/sec.
ModemGate	Up to 31 slave devices
Embedded web server (WebMeter)	4 standard pages, up to 5 customisable pages
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. Can log data only during critical event to conserve memory
Harmonic distortion	Up to 127th harmonic for all voltage and current inputs (feature set A, via ION Enterprise operations software)
Dip/swell detection	Analyse severity/potential impact of dips and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording or 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 are user configurable: - 800 channels via 50 data recorders (feature set A), - 320 channels via 20 data recorders (feature set B), - 32 channels via two data recorders (feature set C). Configure for historical trend recording of energy, demand, voltage, current, power quality, other measured parameter. Recorders can trigger on time interval basis, calendar schedule, alarm/event condition, manually.
Waveform captures	Simultaneous capture of all voltage and current channels - sub-cycle disturbance capture (16 to 256 samples/ cycle) - maximum cycles is 214,000 (16 samples/cycle x 96 cycles, 10Mbytes memory)
Alarms	Threshold alarms: - adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm - user-defined priority levels - boolean combination of alarms possible
Advanced security	Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations based on user priviledges.
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	2 Mbytes (C), 4 Mbytes (B), 10 Mbytes (A)
Firmware update	Update via the communication ports
Display characteristics	
Type	FSTN transreflective LCD
Backlight	LED
Languages	English

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

ION8600
Functions and characteristics (cont.)

PE86043



Example product part number.

1 *Model.*
2 *Feature set.*
3 *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.*

PE86132

PowerLogic ION8600 meter with switchboard case

Part Numbers

Item		Code	Description
1	Model	M8600	Schneider Electric advanced tariff meter.
2	Feature Set	A	10MB memory, 50 data recorders (800 channels), waveform recorders and transient detection.
		B	4MB memory, 20 data recorders (320 channels), Modbus mastering.
		C	2MB memory, 2 data recorders (32 channels), dip/swell detection
3	Form Factor	0	Form 9S Base: 57-277 V (autoranging) 3-Element, 4-Wire
		1	Form 35S Base: 120-480 V (autoranging) 2-Element, 3-Wire
		2	Form 36S Base: 57-277 V (autoranging) 2 1/2-Element, 4-Wire
		3	Form 39S with neutral current input (15 Terminal Base): 57-277 V (autoranging) 3-Element, 4-Wire
		N	Form 76S with neutral current input (15 Terminal Base): 57-277 V (autoranging) 2 1/2-Element, 4-Wire
		4	Form 9 FT21 Switchboard (meter + case) with breakouts
		5	Form 35 FT21 Switchboard (meter + case) with breakouts
		6	Form 36 FT21 Switchboard (meter + case) with breakouts
		7	Form 9 FT21 Switchboard (meter + case) with breakouts
		8	Form 35 FT21 Switchboard (meter + case) with breakouts
		9	Form 36 FT21 Switchboard (meter + case) with breakouts
4	Current Inputs	C	5 Amp nominal, 20 Amp full scale (50 Amp fault capture, start at 0.005A, accurate from 0.05 - 20A rms)
		E	1 Amp nominal, 10 Amp full scale (24 Amp fault capture, start at 0.001A, accurate from 0.01 - 20A rms)
5	Voltage Inputs	0	Standard (see Form Factor above)
6	Power Supply	E	Form 9S, 36S, 39S, 76S (socket) and Form 9, 36 (FT21 switchboard): 120-277 VAC. Form 35S (socket) and Form 35 (FT21 switchboard): 120-480 VAC. Powered from the meter's voltage connections.
		G	Form 9S, 36S (socket) and Form 9, 36 (FT21 switchboard): 57-70 VAC. Powered from the meter's voltage connections. NOT AVAILABLE on Form 35S and Form 35 - you must select the auxiliary power pigtail.
		H	Auxiliary Power Pigtail: 65-120 VAC or 80-160 VDC (power from external source)
		J	Auxiliary Power Pigtail: 160-277 VAC or 200-350 VDC (power from external source)
7	System Frequency	5	Calibrated for 50 Hz systems.
		6	Calibrated for 60 Hz systems.
8	Communications	A0	RS 232/RS 485 port, RS 485 port, infrared port.
		C1	Ethernet (10BaseT), 56k universal internal modem (RJ11), infrared optical port. RS 232/485 port (note this port is not available with feature set C).
		C2	Same as C1, but with RJ31 connector for the modem.
		E0	Ethernet (10BaseT), RS 232/485 port, infrared optical port, RS 485 port (note this port is not available with feature set C).
		F0	Ethernet (10BaseFL), RS 232/485 port, infrared optical port, RS 485 port (note this port is not available with feature set C) This option is not available with FT21 switchboard form factors (form factor options 4 through 9).
		M1	5 samples/cycle 56k universal internal modem (RJ11), RS 232/485 port, infrared optical port, RS 485 port (note this port is not available with feature set C).
9	Onboard I/O	A	None.
		B	4 Form C (KYZ) digital outputs and 3 Form A digital inputs.
10	Security	0	Password protected, no security lock*
		1	Password protected with security lock enabled (requires removal of outer cover to configure billing parameters)
		3	RMICAN (Measurement Canada approved)
		4	RMICAN-SEAL (Measurement Canada approved, and factory sealed)**
11	Special Order	A	None
		B	IRIG-B GPS time synchronisation port
		K	Customer supplied template (frameworks) installed at the factory.**
		L	Customer supplied template (frameworks) and IRIG-B GPS time synchronisation port.**

** NOT AVAILABLE in Canada*
*** For Special Order "K" and "L", you must also order the part number CUST-TEMP-SETUP (see ION8600 Related Items section). When the template (framework) is received, the factory will issue a 5-digit code that will be appended to the ION8600 part number.*

ION8600
Functions and characteristics (cont.)

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

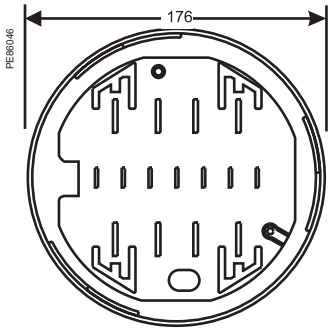
1 *Digital / Analog I/O.*
2 *I/O option.*
3 *Cable option.*

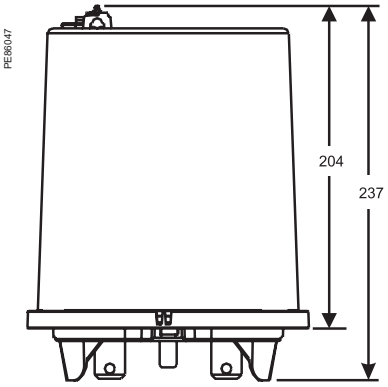
Part numbers (cont.)

I/O Expander		
Digital/Analog I/O	**P850E**	Schneider Electric I/O Expander for ION8600 meters: Inputs and Outputs for energy pulsing, control, energy counting, status monitoring, and analog interface to SCADA.
I/O option	**A**	External I/O box with 8 digital inputs and 8 digital outputs (4 Form A, 4 Form C)
	B	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (0 to 20mA)
	C	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (-1mA to 1mA)
	D	External I/O box with 8 digital inputs and 4 digital outputs (4 Form C) and 4 analog outputs (two -1 to 1 mA, and two 0 to 20 mA outputs)
Cable option	**0**	No cable
	1	5ft extension cable, 24-pin male to 24-pin female Molex connector (not for use with breakout panel E8, F8 & G8 form factors)
	2	15ft extension cable, 24-pin male to 24-pin female Molex connector (not for use with breakout panel E8, F8 & G8 form factors)
	3	6ft connector cable, 24-pin male to 14-pin male Molex connector (for breakout panel E8, F8 & G8 form factors)
A-base adapters		
A-BASE-ADAPTER-9		Form 9S to Form 9A adapter
A-BASE-ADAPTER-35		Form 35S to Form 35A adapter
A-BASE-ADAPTER-39		Form 39S to Form 39A adapter
A-BASE-ADAPTER-76		Form 76S to Form 76A adapter
Optical communication interface		
OPTICAL-PROBE		Optical communication interface
Connector cables		
CBL-8X00BRKOUT		5ft Breakout Cable: 24-pin female Molex connector to one DB9 female connector for RS 232, and 2 sets of twisted pair wires for two RS 485 port connections
CBL-8X00IOE5FT		5ft extension cable, mates with 24-pin male Molex connector from the meter to the 24-pin female Molex connector on the I/O Expander box (not for use with breakout panel E8, F8 & G8 form factors)
CBL-8X00IOE15FT		15ft extension cable, mates with 24-pin male Molex connector from the meter to the 24-pin female Molex connector on the I/O Expander box (not for use with breakout panel E8, F8 & G8 form factors)
CBL-8XX0-BOP-IOBOX		6ft connector cable, 24-pin male to 14-pin male Molex connector for connecting an ION8600 meter with breakout panel to an I/O Expander Box

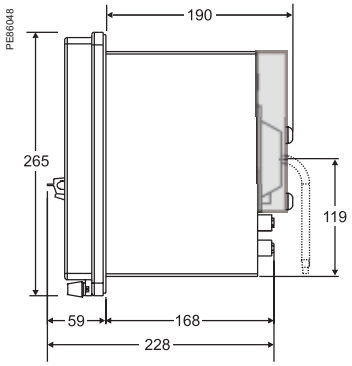
ION8600
Installation and connections

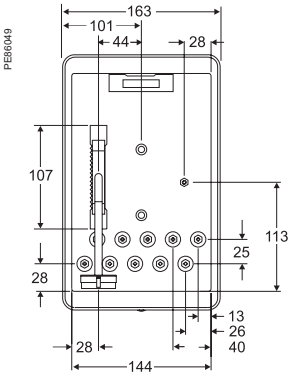
ION8600 socket dimensions



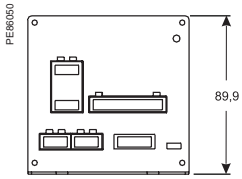


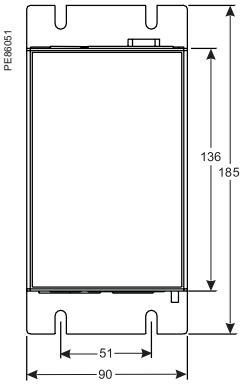
ION8600 switchboard dimensions





I/O Expander dimensions

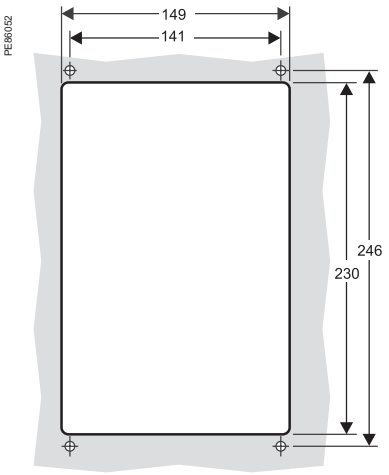




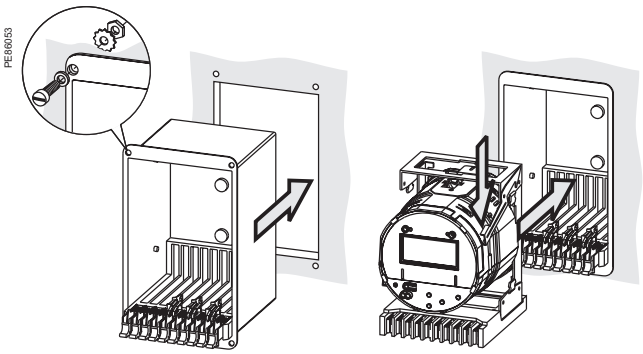
ION8600

Installation and connections (cont.)

ION8600 suggested switchboard mounting dimensions



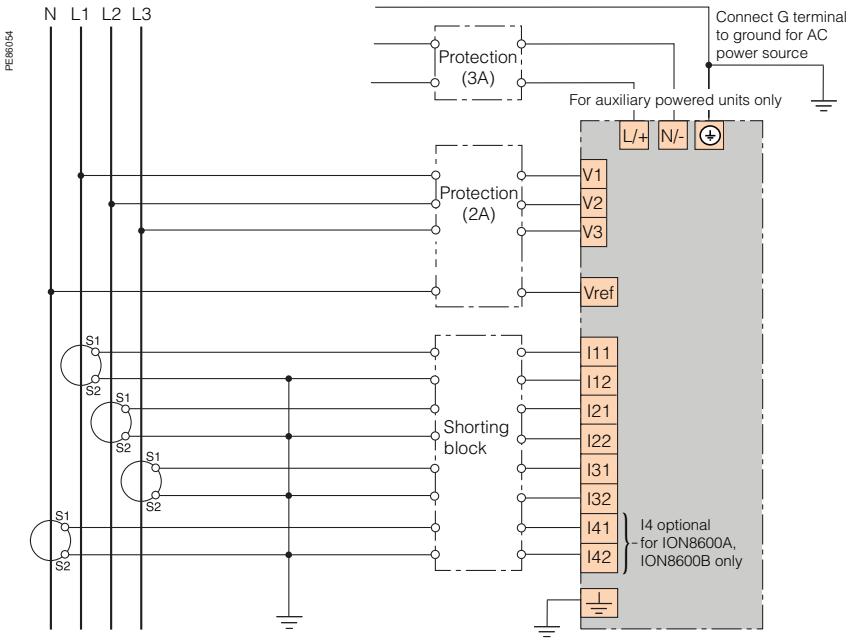
ION8600 switchboard mounting



ION8600

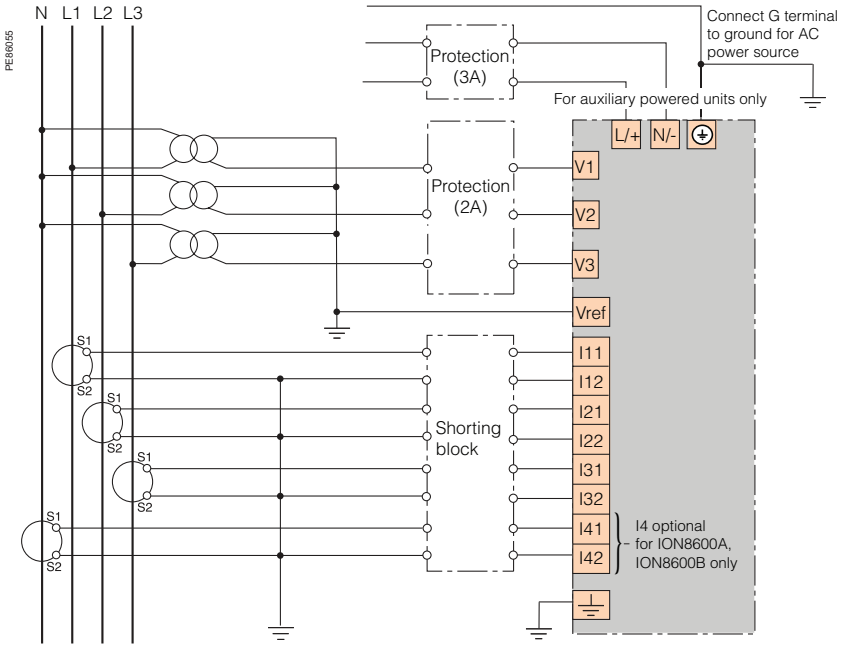
Installation and connection (cont.)

4-Wire 3 element direct connection



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

4-Wire 3 element, 3 PT connection



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

ION8800
Functions and characteristics

PE86176

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 62053-22/23 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 62053-22/23 Class 0,2S

Power quality compliance monitoring
Monitor compliance with internationl 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 65 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

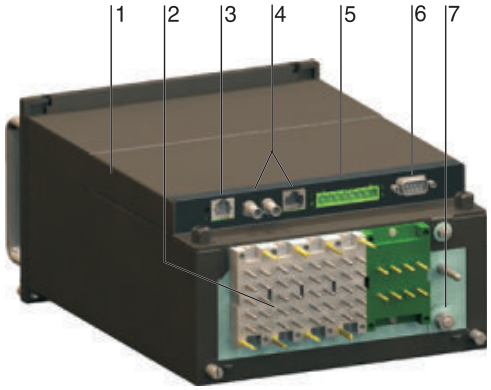
Part numbers(1)

PowerLogic ION8800 meters	
PowerLogic ION8800A	**M8800A**
PowerLogic ION8800B	**M8800B**
PowerLogic ION8800C	**M8800C**

(1)Representative part numbers only. See page 97 for complete part number descriptions.

ION8800
Functions and characteristics (cont.)

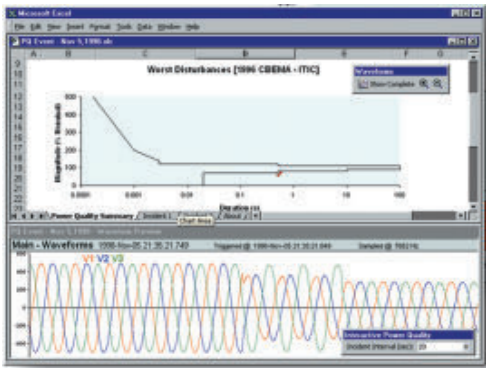
PE86001



PowerLogic ION8800

1 *Optional communications module.*
2 *Essailec 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.*

PE86002



Sample power quality report.

Selection guide		ION8800A ION8800B	ION8800C
General			
Use on MV 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
Power accuracy		0.2 %	0.2 %
Nbr of samples/cycle or sample frequency		1024	1024
Instantaneous rms values			
Current, voltage, frequency (Class 0,2S)		■	■
Active, reactive, apparent power	Total and per phase	■	■
Power factor	Total and per phase	■	■
Current measurement range (low-current option)		0.001 - 10A	0.001 - 10A
Current measurement range (high-current option)		0.005 - 10A	0.005 - 10A
Energy values			
Active, reactive, apparent energy		■	■
Settable accumulation modes		■	■
Demand values			
Current		■	■
Active, reactive, apparent		■	■
Predicted active, reactive, apparent		■	■
Setting of calculation mode (block, sliding, thermal, predicted)		■	■
Power quality measurements			
Detection of voltage sags and swells		■	■
Symmetrical components: zero, positive, negative		■	-
Transient detection, microseconds *(1)*		20 *(2)*	-
Harmonics: individual, even, odd, total up to		63rd	63rd
Harmonics: magnitude, phase and inter-harmonics		50th	-
Flicker (IEC 61000-4-15)		■	-
Configurable for IEEE 519 - 1992, IEE159, SEMI		■	-
Programmable (logic and math functions)		■	■
Data recording			
Min/max logging for any parameter		■	■
Historical logs	Maximum # of cycles	800 *(2)* 640 *(3)*	32
Waveform logs	Maximum # of cycles	96 *(2)*	-
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
Display and I/O			
Front panel display		■	■
Active/reactive Energy Pulser, LED and IEC 1107 style port		■	■
Digital pulse outputs, optional	Solid state Form A	8	8
Digital pulse outputs	Solid state Form C	4	4
Alarm relay output	Form C	1	1
Digital inputs (optional)		3	3
Communications			
RS 232/485 port		1	1
RS 485 port		1	1
Ethernet port		1	1
IEC 1107 optical port		1	1
Internal modem		1	1
3-port DNP 3.0 through serial, modem, Ethernet and I/R ports		■	■
Modbus RTU master / slave (serial, modem and I/R ports)		■ / ■	- / ■
Modbus TCP master / slave (via Ethernet port)		■ / ■	- / ■
Data transfer between Ethernet and RS 485 (EtherGate)		■	■
Data transfer between internal modem, RS 485 (ModemGate)		■	■
Alarms, single or multi-condition		■	■
Alarm notification 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.)

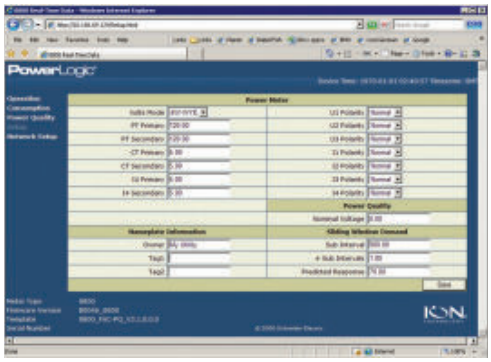
PE86003

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	0,2%
	Frequency	±0.005 Hz
	Power factor	0.5%
	Energy	IEC 62053-22/23 Class 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	57-288VLN AC rms (99-500VLL AC rms)
	Impedance	5 MΩ /phase (phase-Uref/Ground)
	Inputs	V1, V2, V3, Vref
Input-current characteristics	Rated nominals	5 A, 1 A, 2 A
	Permissible overload	200A rms for 0.5s, non-recurring (IEC 62053-22)
	Impedance	10 mΩ /phase
	Burden	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	Typical (without comm module): 13 VA, 8 W Typical (with comm module): 19 VA, 12 W Max (without comm module): 24 VA, 10 W Max (with comm module): 32 VA, 14 W
	Ride-through time	Typical: 0.5 s to 5 s depending on configuration Min: 120 ms (6 cycles @ 50 Hz)
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
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
Damped oscillatory waves immunity		IEC 61000-4-12
Conducted and radiated emissions		CISPR 22 (class B)
Safety		
Europe		As per IEC 62052-11

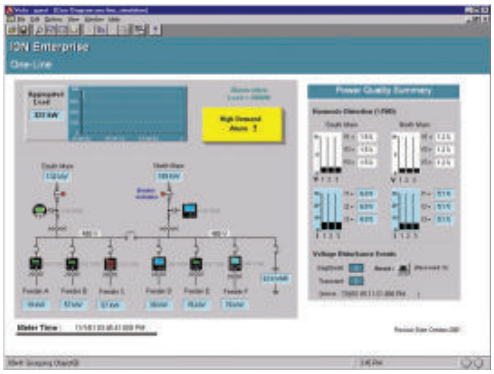
ION8800
Functions and characteristics (cont.)

PE86004



Example embedded webserver page (WebMeter) showing realtime values.

PE86005



Communication	
IEC 1107 optical port	2/4 wires, up to 19200 bauds
RS 485 port	Up to 57600 bauds, Modbus, direct connection to a PC or modem
Communications module (optional)	
RS 232/485 port	300 - 115,200 bauds (RS 485 limited to 57,600 bauds); protocols: ION, Modbus RTU, Modbus Master, DNP 3.0, GPSTRUETIME/DATUM, DLMS
Internal modem port	300 bauds - 56000 bauds
Ethernet port	10 BaseTX, RJ45 connector, 100 m link; protocols: DNP TCP, ION, Modbus TCP, Modbus Master
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; protocols: same as Ethernet port
EtherGate	Communicates directly with up to 62 slave devices via available serial ports
ModemGate	Communicates directly with up to 31 slave devices
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 63rd harmonic for all voltage and current inputs
Dip/swell detection	Analyse severity/potential impact of sags and swells: - magnitude and duration data suitable for plotting on voltage tolerance curves - per phase triggers for waveform recording or control operations
Instantaneous	High accuracy (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 possible
Advanced security	Up to 16 users with unique access rights. Perform resets, time syncs, or meter configurations based on user priviledges.
Transformer correction	Correct for phase / magnitude inaccuracies in current transformers (CTs), potential transformers (PTs)
Memory	5 -10 Mbytes (specified at time of order)
Firmware update	Update via the communication ports
Display characteristics	
Type	FSTN transreflective LCD
Backlight	LED
Languages	English

ION8800

Functions and characteristics (cont.)

Example product part number.

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

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 with sag/swell monitoring.
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	B	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).
	A0	Standard communications: 1 RS 232/RS 485 port, 1 RS 485 port (COM2) (1).
	C1	Standard communications plus 10Base-T Ethernet (RJ45), 56 k universal internal modem (RJ11).
	D1	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber, 56 k universal internal modem (RJ11).
	E0	Standard communications plus 10Base-T Ethernet (RJ45).
	F0	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL (ST male Fiber Optic connection).
	M1	Standard communications plus 56k universal internal modem (RJ11).
9 Onboard I/O and communications (not field serviceable, part of base unit)	A	Base option AND 8 Form A digital outputs (2), 1 RS-485 (COM2) port (1).
	B	Base Option AND 8 Form A digital outputs (2), 3 digital inputs (20-56 VDC/AC).
	C	Base Option AND 8 Form A digital outputs (2), 3 digital inputs (80-280 VDC/AC).
	D	Base Option AND 1 IRIG-B time sync port (2), 1 RS-485 port (COM2), 3 digital inputs (20-56 V DC/AC) (1).
	E	Base Option AND 1 IRIG-B time sync port (2), 1 RS-485 port (COM2), 3 digital inputs (80-280 V DC/AC) (1).
10 Security	0	Password protected, no security lock.
	1	Password protected with security lock enabled.
11 Special Order	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 1107 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.

(1) *Channel COM2 is available on the port at the back of the meter OR on the Comm Module (if installed). You must select which connectors your communications wiring is connected to during meter setup.*
(2) *All Onboard I/O and Comms (Base Option) options include: 4 Form C solid-state digital outputs, 1 Form C mechanical relay output, one IEC 1107 optical communications port, two IEC 1107 style optical pulsing ports.*

ION8800
Functions and characteristics (cont.)

PE86007

Optional ION8800 communications module.

Part Numbers (cont.)

ION8800 communications module for field retrofit installations

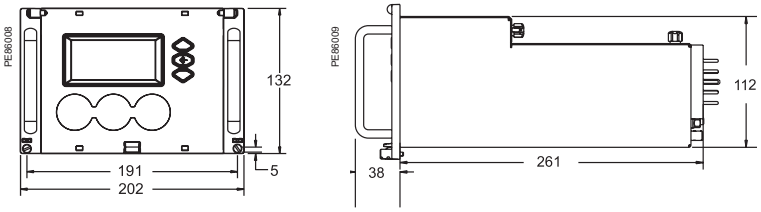
Item	Code	Description
P880C	A0	Standard communications: 1 RS-232/RS-485 port, 1 RS-485 port (COM2)(1).
	C1	Standard communications plus 10Base-T Ethernet (RJ45), 56k universal internal modem (RJ11).
	D1	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber, 56k universal internal modem (RJ11).
	E0	Standard communications plus 10Base-T Ethernet (RJ45).
	F0	Standard communications plus 10Base-T Ethernet (RJ45) / 10Base-FL Ethernet Fiber (ST male Fiber optic connection).
	M1	Standard communications plus 56k universal internal modem (RJ11).
Special Order	A	None.
	C	Tropicalisation treatment applied.

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

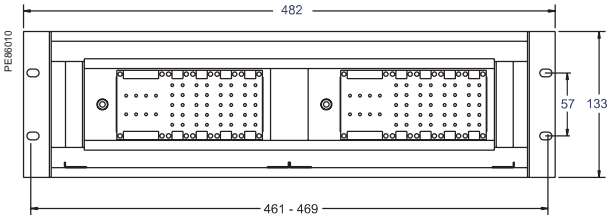
Note: *The part number above should conform to the following format: P880C A0 A.*

ION8800
Installation and connections

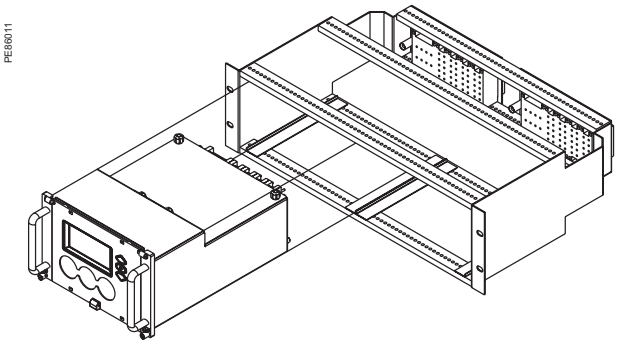
ION8800 dimensions



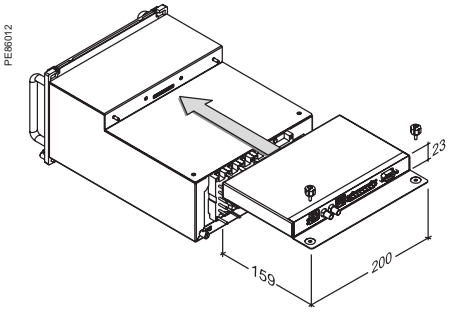
ION8800 Essailec rack dimensions



Rack mounting the ION8800

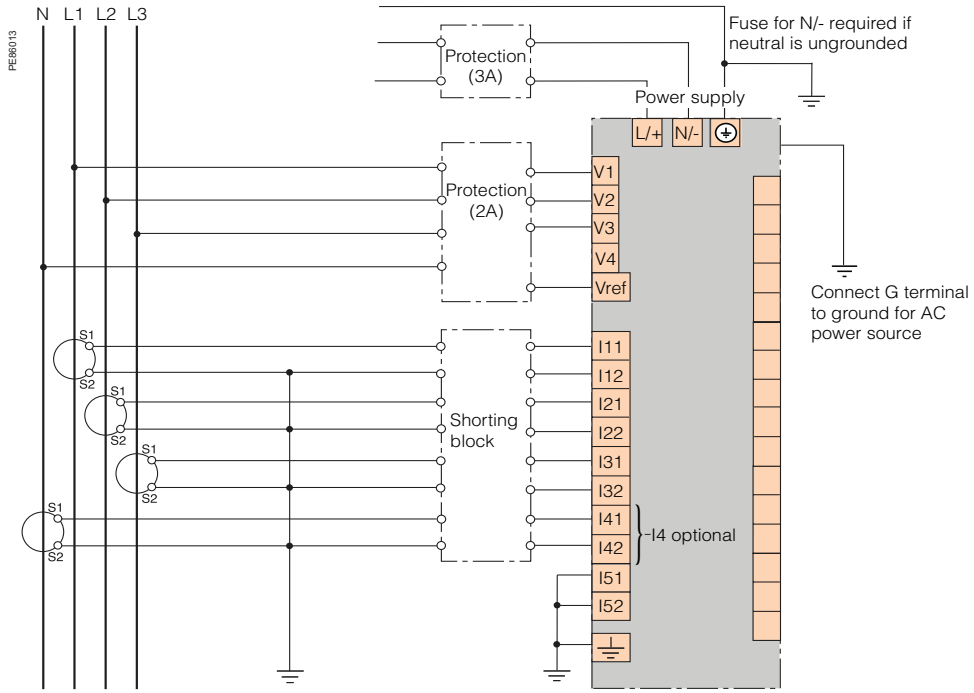


ION8800 communication module dimensions



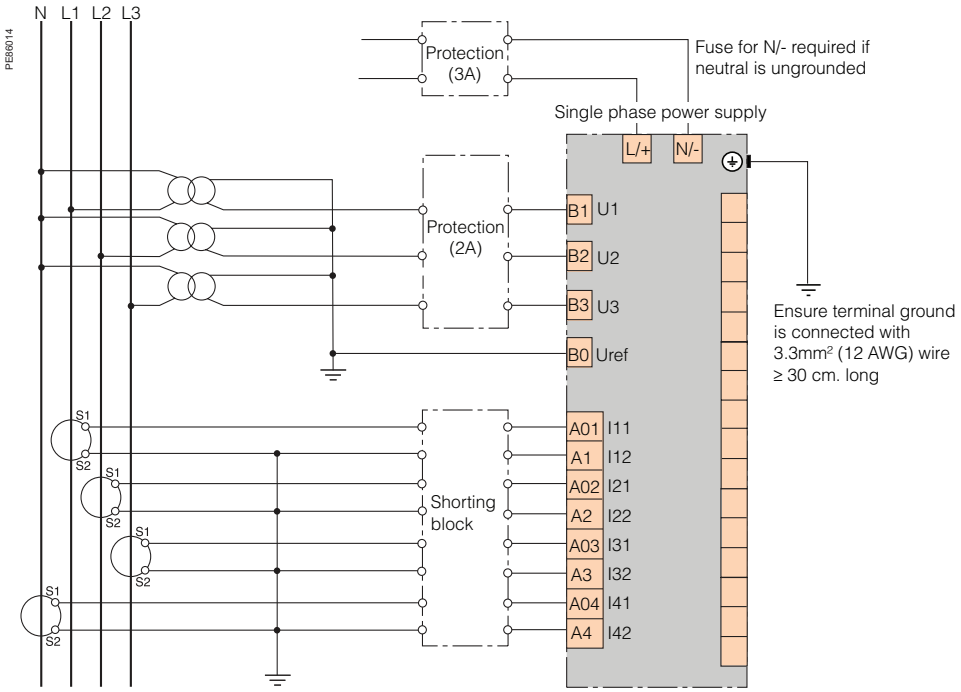
ION8800
Installation and connection (cont.)

4-wire 3 element direct connection



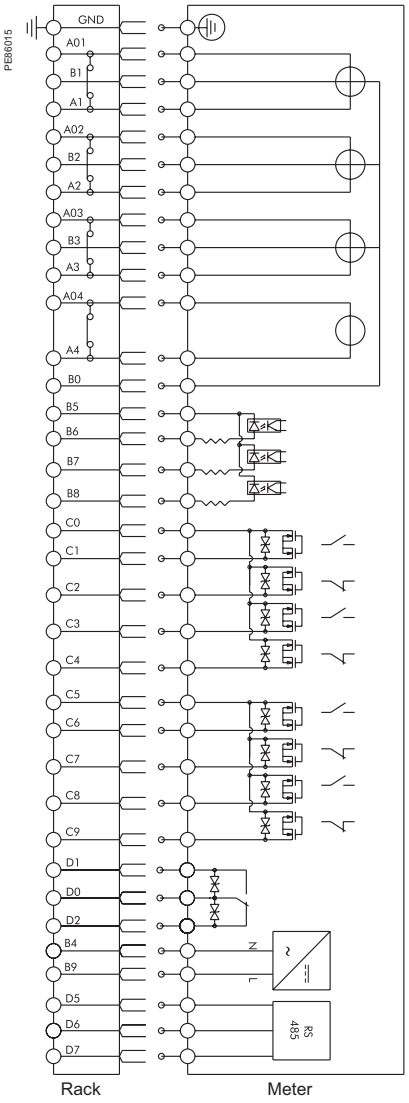
Connection representation only. See product installation guide for complete wiring and communication connection details.

4-wire 3 element 3 PT connection



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

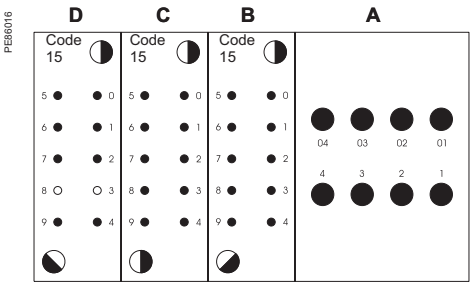
ION8800
Installation and connection (cont.)



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 [1]	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.



Communication interfaces and associated services

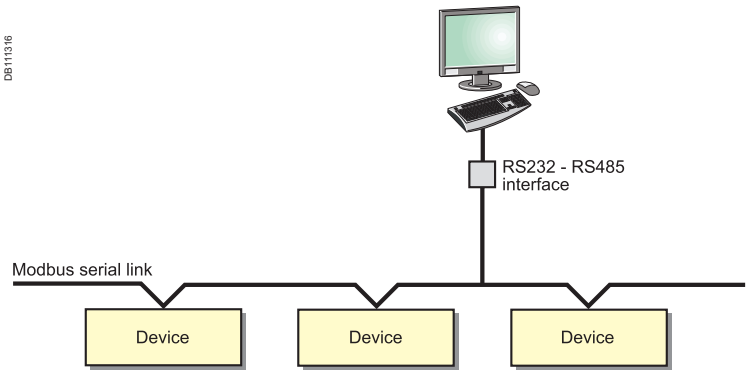
Switchboard-data acquisition and monitoring make it possible to anticipate events. In this way, they reduce customer costs in terms of operation, maintenance and investment.

Serial link

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

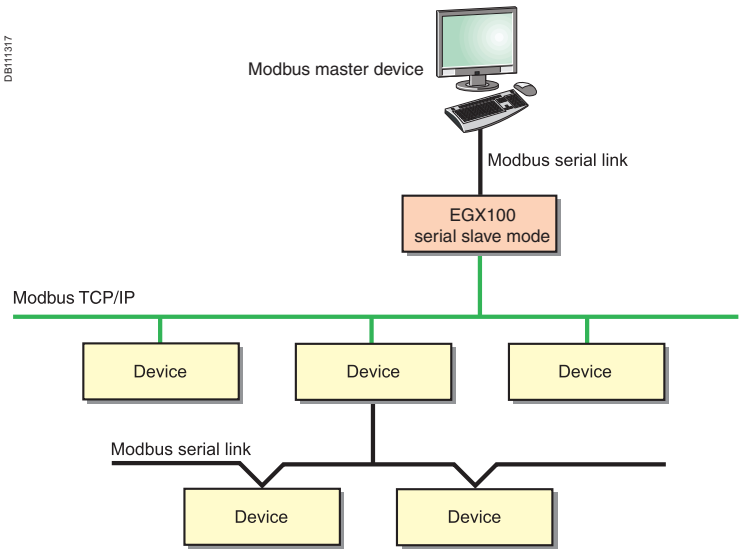
In all architectures, the communication interface serves as the link between the installation devices and the PC running the operating software. It provides the physical link and protocol adaptation. Adaptation is required because the communication systems used by the PC (Modbus via RS232 and/or Ethernet)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

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



Modbus communication architecture.

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



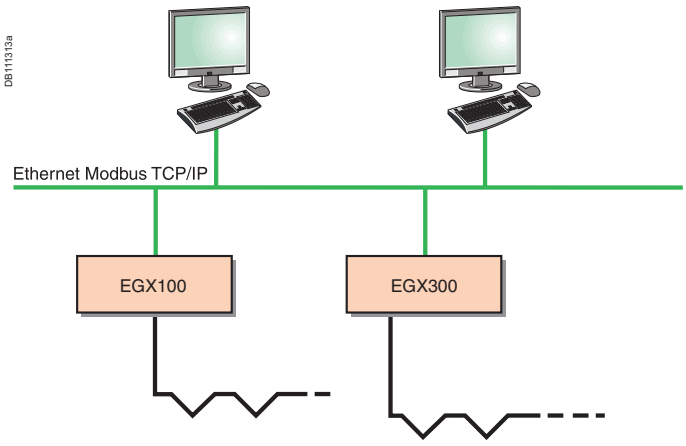
Modbus communication across Ethernet network

Communication interfaces and associated services (cont.)

Ethernet link

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

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



Ethernet communication architecture.

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

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

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

PowerLogic EGX100
Ethernet gateway

PE86138

PowerLogic EGX100

Function

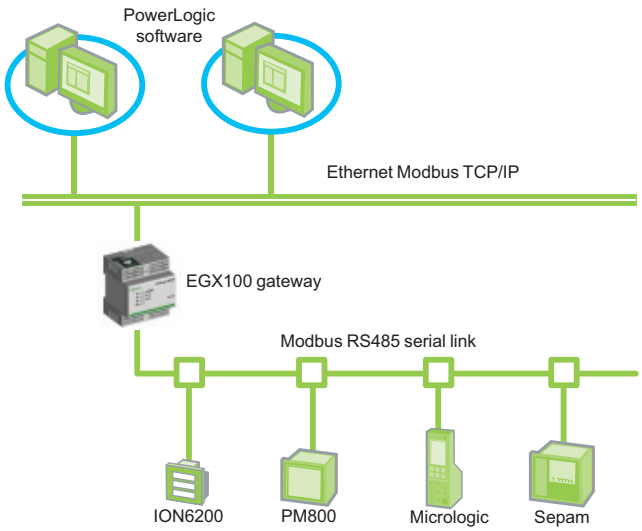
The EGX100 serves as an Ethernet gateway for PowerLogic system devices and for any other communicating devices utilising the Modbus protocol. The EGX100 gateway offers complete access to status and measurement information provided by the connected devices via PowerLogic software installed on a PC.

PowerLogic software compatibility

PowerLogic software is recommeded as a user interface because they provide access to all status and measurement information. They also prepare summary reports. The EGX100 is compatible with:

- PowerLogic ION EEM enterprise enery management software
- PowerLogic ION Enterprise power management software
- PowerLogic System Manager power management software
- PowerLogic PowerView power monitoring software

Architecture



Setup

Setup via an Ethernet network

Once connected to an Ethernet network, the EGX100 gateway can be accessed by a standard internet browser via its IP address to:

- specify the IP address, subnet mask and gateway address of the EGX gateway
- configure the serial port parameters (baud rate, parity, protocol, mode, physical interface and timeout value)
- create user accounts
- create or update the list of the connected products with their Modbus or PowerLogic communication parameters
- configure IP filtering to control access to serial devices
- access Ethernet and serial port diagnostic data
- update the firmware
- specify the user language

Setup via a serial connection

Serial setup is carried out using a PC connected to the EGX100 via an RS232 link. This setup:

- specifies the IP address, subnet mask and gateway address of teh EGX gateway
- specifies the language used for the setup session

Part numbers

Powerlogic EGX100	
EGX100	**EGX100MG**

PowerLogic EGX100
Ethernet gateway

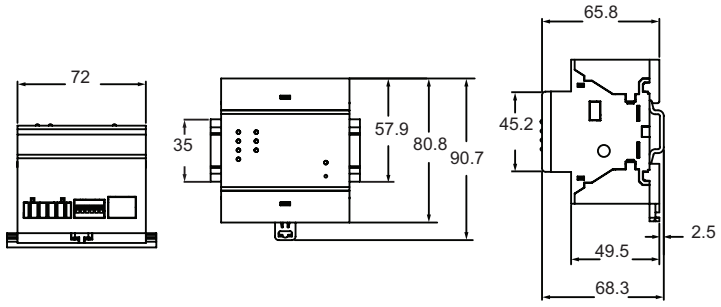
PE86138

PowerLogic EGX100

Characteristics	
	EGX100
Weight	170g
Dimensions (HxWxD)	91 x 72 x 68 mm
Mounting	Din rail
Power-over-Ethernet (PoE)	Class 3
Power supply	24 Vdc if not using PoE
Operating temperature	-25 to 70ºC
Humidity rating	5 to 95% relative humidity (without condensation) at +55ºC
Regulatory/standards compliance for electromagenetic interference	
Emissions (radiated and conducted)	EN55022/EN55011/FCC class A
Immunity for industrial environments:	EN 61000-6-2
- electrostatic discharge	EN 61000-4-2
- radiated RF	EN 61000-4-3
- electrical fast transients	EN 61000-4-4
- surge	EN 61000-4-5
- conducted RF	EN 61000-4-6
- power frequency magnetic field	EN 61000-4-8
Regulatory/standards compliance for safety	
International (CB scheme)	IEC 60950
USA	UL508/UL60950
Canada	cUL (complies with CSA C22.2, no. 60950)
Europe	EN 60950
Australia/New Zealand	AS/NZS25 60950
Serial ports	
Number of ports	1
Types of ports	RS232 or RS485 (2-wire or 4-wire), depending on settings
Protocol	Modbus RTU/ASCII, PowerLogic (SY/MAX), Jbus
Maximum baud rate	38400 or 57600 baud depending on settings
Maximum number of directly connected devices	32
Ethernet port	
Number of ports	1
Types of ports	One 10/100 base TX (802.3af) port
Protocol	HTTP, Modbus TCP/IP, FTP, SNMP (MIB II), SNTP, SMTP
Baud rate	10/100 MB

Installation

Din rail mounting



PowerLogic EGX300
Integrated gateway-server

PE86181

PowerLogic EGX300

Function

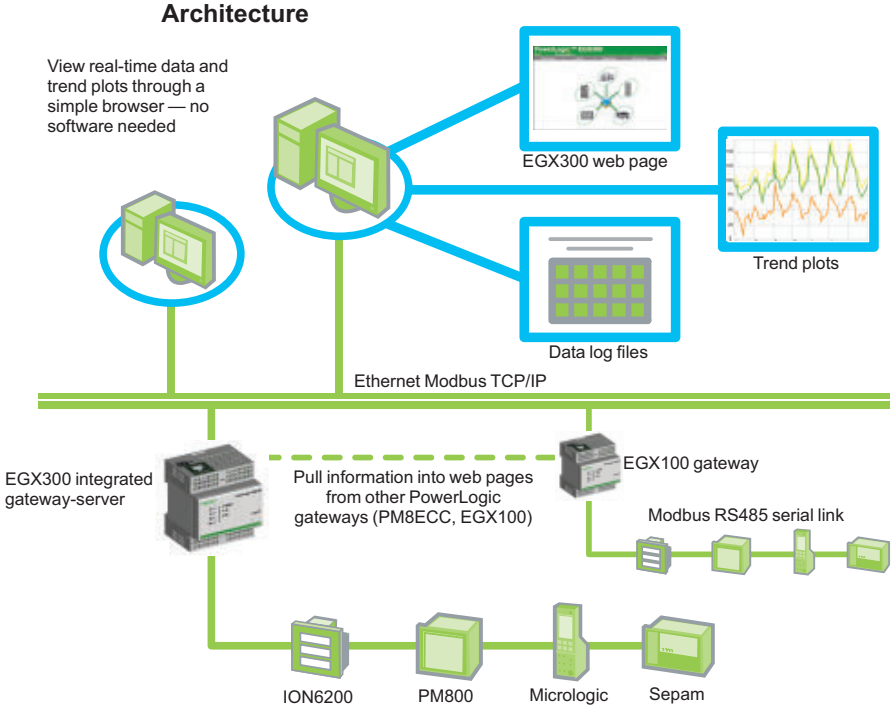
The EGX300 integrated gateway-server uses only a simple web browser and Ethernet network to access, log and display real-time data and trend plots from up to 64 PowerLogic system devices, including other gateway devices on the same network. The EGX300 embedded web page function and 512 Mb of onboard memory allow users to create pages for viewing data from their electrical system and store third-party web pages and documents such as instruction bulletins or equipment and system diagrams.

PowerLogic software compatibility

Combine the EGX300 with PowerLogic software for extensive analysis and additional functionality. The EGX300 is compatible with:

- PowerLogic ION EEM enterprise energy management software
- PowerLogic ION Enterprise power management software
- PowerLogic System Manager power management software
- PowerLogic PowerView power monitoring software

Architecture



Features

- View real-time and historical information from multiple locations via any Microsoft-compatible web browser
- Automatically detect networked devices for easy setup
- Automatically email or FTP selected logged data to your PC for additional analysis
- Select the logging intervals and topics you want logged
- Ensures data and system security through password protection and controlled network access to individual web pages
- Simplifies installation by receiving control power through the Ethernet cable utilising Power-over-Ethernet and offers the option to utilise 24 Vdc control power

Part numbers

Powerlogic EGX300	
EGX300	**EGX300**

PowerLogic EGX300
Integrated gateway-server

PE86181

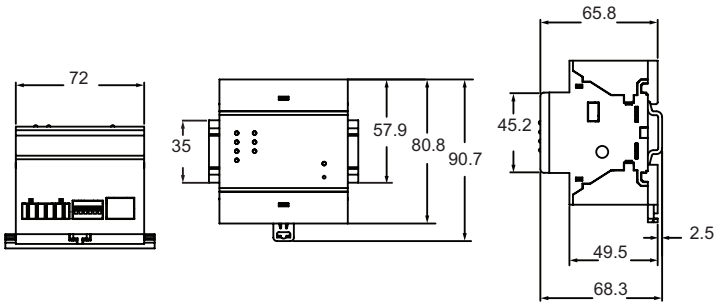
PowerLogic EGX300

Characteristics

	EGX300
Weight	170g
Dimensions (HxWxD)	91 x 72 x 68 mm
Mounting	Din rail
Power-over-Ethernet (PoE)	Class 3
Power supply	24 Vdc if not using PoE
Operating temperature	-25 to 70ºC
Humidity rating	5 to 95% relative humidity (without condensation) at +55ºC
Regulatory/standards compliance for electromagenetic interference	
Emissions (radiated and conducted)	EN55022/EN55011/FCC class A
Immunity for industrial environments:	EN 61000-6-2
- electrostatic discharge	EN 61000-4-2
- radiated RF	EN 61000-4-3
- electrical fast transients	EN 61000-4-4
- surge	EN 61000-4-5
- conducted RF	EN 61000-4-6
- power frequency magnetic field	EN 61000-4-8
Regulatory/standards compliance for safety	
International (CB scheme)	IEC 60950
USA	UL508/UL60950
Canada	cUL (complies with CSA C22.2, no. 60950)
Europe	EN 60950
Australia/New Zealand	AS/NZS 60950
Serial ports	
Number of ports	1
Types of ports	RS232 or RS485 (2-wire or 4-wire), depending on settings
Protocol	Modbus RTU/ASCII, PowerLogic (SY/MAX), Jbus
Maximum baud rate	57600
Maximum number of connected devices	64
Ethernet port	
Number of ports	1
Types of ports	One 10/100 base TX (802.3af) port
Protocol	HTTP, Modbus TCP/IP, FTP, SNMP (MIB II), SNTP, SMTP
Baud rate	10/100 Mb
Web server	
Memory for custom HTML pages	512 Mb

Installation

Din rail mounting



ION7550RTU
Functions and characteristics

PE86117

PowerLogic ION7550RTU.

The PowerLogic ION7550RTU (remote terminal unit) is an intelligent web-enabled device ideal for combined utilities metering of water, air, gas, electricity and steam (WAGES). When combined with PowerLogic software, the ION7550RTU offers a seamless, end-to-end WAGES metering solution. Featuring a large, high-visibility display and overall versatility of the PowerLogic system, the ION7550RTU provides extensive analog and digital I/O choices and is a cost-effective dedicated WAGES solution when compared to a traditional meter. The device automatically collects, scales and logs readings from a large number of connected meters or transducers and delivers information to one or more head-end systems through a unique combination of integrated Ethernet, modem or serial gateways. As part of a complete enterprise energy management solution, the ION7550RTU can be integrated with PowerLogic ION Enterprise software, or other SCADA, information and automation systems.

Applications

WAGES metering.
Data concentration through multi-port, multi-protocol communications.
Equipment status monitoring and control.
Programmable setpoints for out-of-limit triggers or alarm conditions.
Integrated utility metering with advanced programmable math functions.

Main characteristics

Increase efficiency
Reduce waste and optimise equipment operation to increase efficiency.

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 enterprises, including SCADA systems.

Transducer and equipment condition monitoring
Versatile communications, extensive I/O points, clock synchronization, event logging and sequence of events recording capabilities for transducer and equipment condition and status monitoring at utility substations.

Set automatic alarms
Alarm setpoint learning feature for optimum threshold settings.

Up to 10 Mbytes of memory
For archiving of data and waveforms.

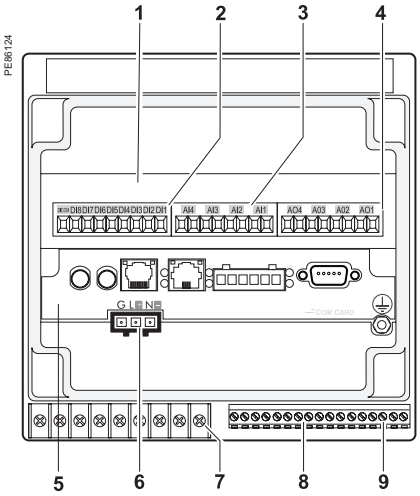
Notify alarms via email
High-priority alarms sent directly to the user's PC. Instant notification of power quality events by email.

Part numbers

ION7550RTU	
ION7550	**M7550**

See page 112 for order code explanations.

ION7550RTU
Functions and characteristics (cont.)



PowerLogic® ION7550RTU.

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

Selection guide	ION7550RTU
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
Display and I/O	
Front panel display	■
Pulse output	1
Digital or analogue inputs(max)	24
Digital or analogue outputs (max, including pulse output)	30
Communication	
RS 485 port	1
RS 485 / RS 232 port	1
Optical port	1
Modbus protocol	■
Ethernet port (Modbus/TCP/IP protocol)	1
Ethernet gateway (EtherGate)	1
Alarms (optional automatic alarm setting	■
Alarm notification via email (Meterm@il)	■
HTML web page server (WebMeter)	■
Internal modem	1
Modem gateway (ModemGate)	■
DNP 3.0 through serial, modem, and I/R ports	■

ION7550RTU
Functions and characteristics (cont.)

PE86117

PowerLogic ION7550RTU.

Electrical characteristics		
Data update rate		1/2 cycle or 1 second
Power supply	AC	85-240 V AC ±10% (47-63 Hz)
	DC	110-300 V DC ±10%
	DC low voltage (optional)	20-60 V DC ±10%
	Ride-through time	100 ms (6 cycles at 60 Hz) min. 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 +70ºC
	Low voltage DC supply	-20 to +50ºC
	Display operating range	-20 to +70ºC
Storage temperature	Display, TRAN	-40 to +85ºC
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

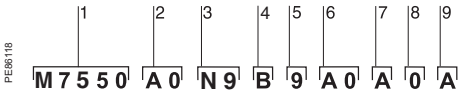
(1) Consult the ION7550 / ION7650 installation guide for complete specifications.
(2) IEC 62051-22B with serial ports only.

ION7550RTU
Functions and characteristics (cont.)

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 115,200 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	10BaseT, 100BaseTX. RJ45 connector, 10/100 m link
Fibre-optic Ethernet link	100Base FX, SC 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.
Load profiling	Channel assignments (800 channels via 50 data recorders) are configurable for any measurable 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.
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
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.

ION7550RTU
Functions and characteristics (cont.)

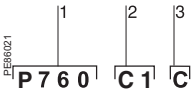


Sample ION7550RTU part number.

Part numbers

	Item	Code	Description
1	Model	7550	ION7550 device
2	Form Factor	A0	Integrated display with front optical port, 5 MB logging memory, and 512 samples/cycle resolution.
		B0	Integrated display with front optical port, 10 MB logging memory, and 512 samples/cycle resolution.
		T0	Transducer (no display) version, with 5 MB logging memory.
		U0	Transducer (no display) version, with 10 MB logging memory.
3	RTU option	N9	RTU option
4	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)
5	Internal use	9	This field for internal use only
6	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/100BASE-TX Ethernet (RJ-45), 56k universal internal modem (RJ-11). Ethernet, modem gateway functions each use a serial port.
		D7	Standard comms plus 10BASE-T/100BASE-TX Ethernet (RJ-45) and 100BASE-FX Ethernet Fiber, 56k universal internal modem (RJ-11). Ethernet and modem gateway functions each use a serial communications port.
		E0	Standard communications plus 10BASE-T/100BASE-TX Ethernet (RJ-45). Ethernet gateway function uses serial port.
		F1	Standard communications plus 10BASE-T/100BASE-TX Ethernet (RJ-45) and 100BASE-FX (SC fiber optic connection). Ethernet gateway uses a serial port.
		M1	Standard communications plus 56k universal internal modem (RJ-11). Modem gateway uses serial communications port.
7	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)
8	Security	0	Password protected, no hardware lock
9	Special Order	A	None
		C	Tropicalisation treatment applied

ION7550RTU
Functions and characteristics (cont.)



Example order code. Use this group of codes when ordering the PowerLogic ION7550RTU communication or I/O card.

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

	Communications Card		
	Item	**Code**	**Description**
1	Comm card	P765C	ION7550RTU communication card for field retrofit installations
2	Type	A0	Standard communications (1 RS-232/RS-485 port, 1 RS-485 port). Front optical port support for meters with integrated display.
		C1	Standard communications plus 10BASE-T/100BASE-TX Ethernet (RJ-45), 56k universal internal modem (RJ-11; the modem port is shared with the front optical port). Ethernet and modem gateway functions each use a serial communications port.
		D7	Standard communications plus 10BASE-T/100BASE-TX Ethernet, 100BASE-FX Ethernet Fiber, 56k universal internal modem (RJ-11; 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/100BASE-TX Ethernet. Ethernet gateway function uses a serial communications port.
		F1	Standard communications plus 10BASE-T/100BASE-TX Ethernet, 100BASE-FX Ethernet Fiber (SC fiber optic connection). Ethernet gateway function uses a serial communications port.
		M1	Standard communications plus 56k universal internal modem (RJ-11; 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

ION7550RTU
Functions and characteristics (cont.)

Part numbers (cont'd)

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

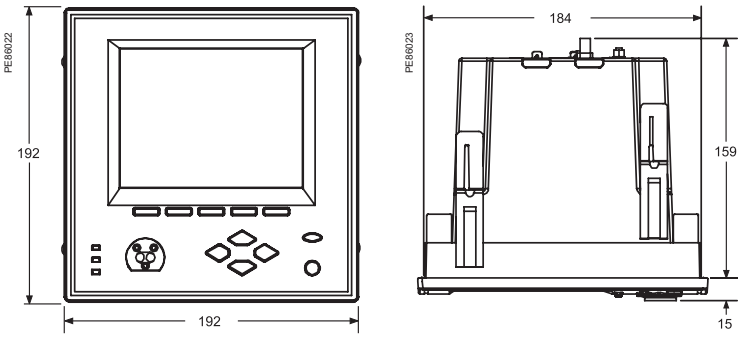
OpenDAC rack, controllers, power supply	
70LRCK16-48	OpenDAC rack. Holds up to 8 OpenLine modules to provide up to 16 I/O points. Requires communications controller
72-MOD-4000	OpenDAC OpenDAC RS-485 serial module. Communications controller for use in a Modbus RTU network. Supports up to 2 70LRCK16-48 OpenDAC racks
72-ETH-T000	OpenDAC Ethernet network module for use on an Modbus/TCP Ethernet network. Supports up to 2 OpenDAC racks
PS-240-15W	85-264VAC/110-370VDC 15 Watt power supply. Required for applying power to the racks and controllers

OpenLine digital I/O modules	
70L-IAC	digital input, 120VAC
70L-IACA	digital input, 220VAC
70L-IDC	digital input, 3-32VDC
70L-IDCB	digital input, fast switching
70L-IDCNP	digital input, 15-32VAC/10-32VDC
70L-IDC5S	dry contact closure-sensing DC input
70L-ISW	input test module
70L-OAC	digital output, 120VAC
70L-OACL	digital output, 120VAC inductive loads
70L-OACA	digital output, 220VAC
70L-OACAL	digital output, 220VAC inductive loads
70L-ODC	digital output, 3-60VDC fast
70L-ODCA	digital output, 4-200 VDC
70L-ODCB	digital output, fast switching
70L-ODC5R	digital output, dry contact

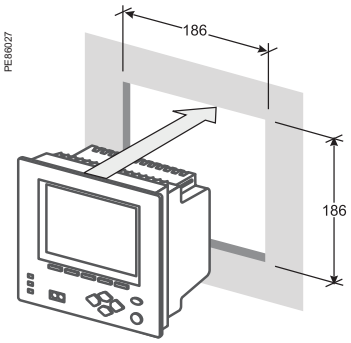
OpenLine analog I/O modules	
73L-II020	analog input, current, 0-20mA
73L-II420	analog input, current, 4-20mA
73L-ITCJ	analog input, temperature, J-type TC
73L-ITCK	analog input, temperature, K-type TC
73L-ITCT	analog input, temperature, T-type TC
73L-ITR100	analog input, temperature, RTD
73L-ITR3100	analog input, temperature, 3wire RTD
73L-ITR4100	analog input, temperature, 4wire RTD
73L-IV1	analog input, voltage, 0-1VDC
73L-IV10	analog input, voltage, 0-10VDC
73L-IV10B	analog input, voltage, -10 to 10VDC
73L-IV100M	analog input, voltage, 0-100VDC
73L-IV5	analog input, voltage, 0-5VDC
73L-IV5B	analog input, voltage, -5 to 5VDC
73L-IV50M	analog input, voltage, 0-50mV
73L-OI020	analog output, current, 0-20mA
73L-OI420	analog output, current, 4-20mA
73L-OV10	analog output, voltage, 0-10VDC
73L-OV10B	analog output, voltage, -10 to 10VDC
73L-OV5	analog output, voltage, 0-5VDC
73L-OV5B	analog output, voltage, -5 to 5VDC

ION7550 RTU
Installation and connection

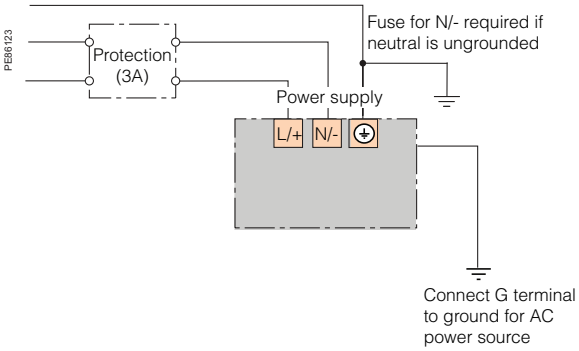
ION7550RTU dimensions



Front-panel mounting



Power supply

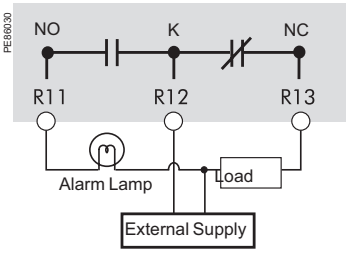


Note: *the current and voltage terminal strip (I52, I51, I42, I41, I32, I31, I22, I21, I12, I11, V4, V3, V2, V1, Vref) is not present on the RTU.*

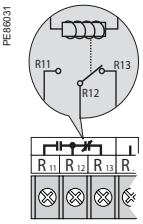
ION7550 RTU
Installation and connection (cont.)

Form C digital outputs: mechanical relays R1 - R3

ION7550RTU



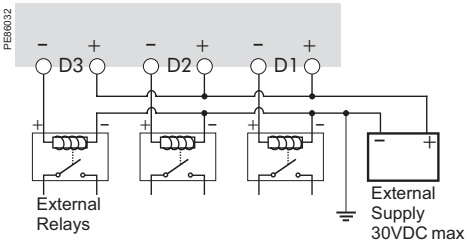
Form C Relay



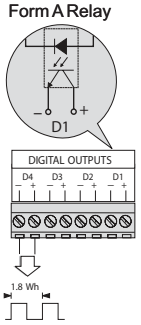
Note: Mechanical relays should always be protected by external fuses

Form A digital outputs: solid state relays D1 - D4

ION7550RTU



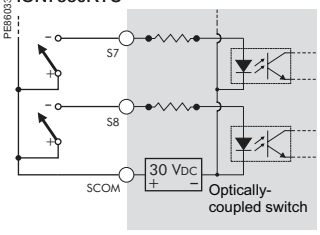
Form A Relay



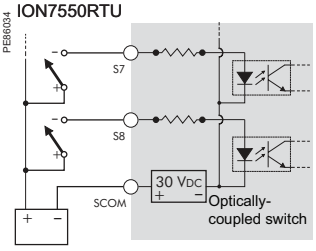
Note: D4 output is factory-configured to pulse once every 1.8 Wh for Class 20 meters, or once every 0.18Wh for Class 2 meters (for calibration testing purposes).

Digital inputs: S1 - S8

Internal Excitation
ION7550RTU



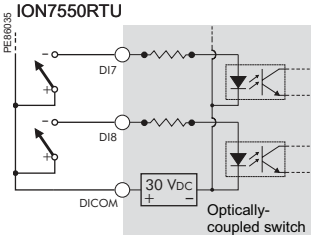
External Excitation
ION7550RTU



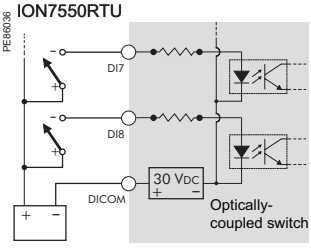
Note: External Supply = 130 VDC max

Digital inputs: DI1 - DI8 (option)

Internal Excitation
ION7550RTU



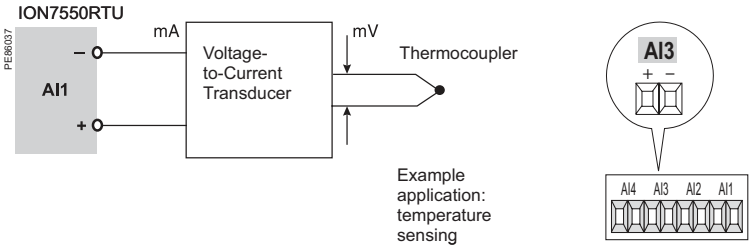
External Excitation
ION7550RTU



Note: External Supply = 50 VDC max

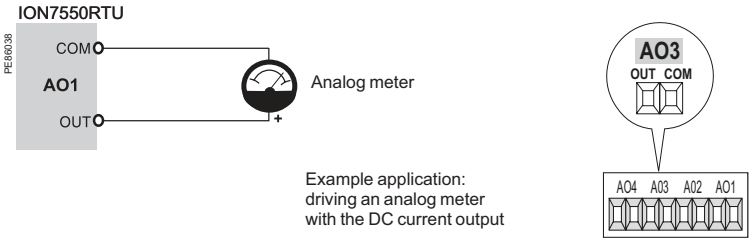
ION7550 RTU
Installation and connection (cont.)

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)



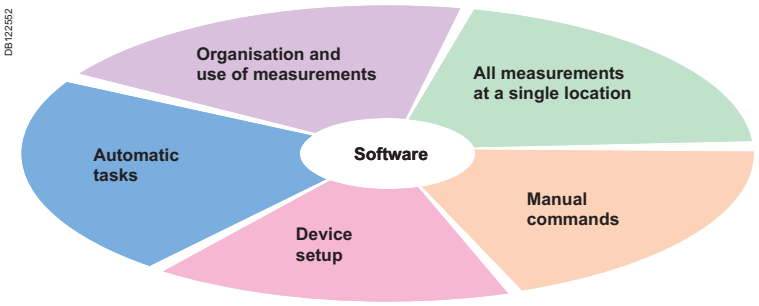
Note: do not connect the analog inputs of the I/O card to the analog outputs on the same I/O card.

General information on power-monitoring software

Software, a tool serving site operation.
A site can be compared to a living organism.
The power system manager has no control over the changes that affect this organism, but must ensure that it continues to receive the energy it requires.
Similar to a doctor, the power system manager must carry out preventive measures and diagnose and remedy any problems that occur. The goal is to maintain the site in a healthy state, without generating any secondary effects.
Software enables managers to diagnose the causes of most problems encountered on electrical systems.

More and more devices are capable of communicating.
The number of available measurements is also on the rise, creating the need for a tool to successfully manage all the information.
The main purpose of software is to simplify complex sites so that they can be managed by humans:
- make the site and its operation intelligible
- make the power system tangible and visible.

The role of software



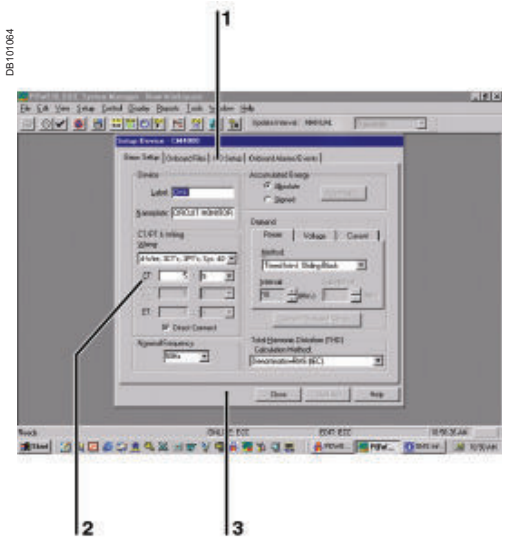
All measurements at a single location

All measured values may be accessed via a PC.

Organisation and use of measurements

Before they may be used, certain measurements must be organised, processed or integrated in special tools.

Examples
- organisation:
  - organisation in tables
  - visual presentation (bar charts, meters)
  - etc.
- processing:
  - classing of events from different devices in chronological order
  - etc.
- tools:
  - display in curve form (selection of intervals, magnifying glass, changes in presentation, etc.).



Circuit Monitor setup.

1 *Tabs for access to advanced-function settings.*
2 *CT and VT settings.*
3 *Setup screen for Circuit Monitor basic settings.*

Device setup

Simple devices may be set up on their front panels.
For devices with advanced functions, local setup is often difficult and even impossible for some functions.
Software greatly facilitates device setup.

General information on power-monitoring software (cont.)

Automatic tasks

Software can execute tasks automatically, triggered by:
- a date
- an event
- an alarm.

These tasks may concern devices (reset, start of a particular function) or system users (transmission of an e-mail, etc.).

Manual commands

Power-monitoring software can also be used to control devices (e.g. open or close a circuit breaker).
Certain control/monitoring functions (automatic action on electrical-distribution system) are carried out by PLCs integrated in the PowerLogic System architecture.

Access via the Web

Information must be adapted to user needs and then made available to them.
Software can handle the adaptation by preparing custom reports.
These reports can then be accessed by any PC on the site using a standard Web browser.

Software and architecture

Software must be capable of meeting a large number of needs:
- single-user or multi-user operation
- data organisation according to user profiles
- adaptation to different site topologies
- data exchange with other systems
- etc.

This set of constraints means that a single product is not sufficient; a range of software products is required.

PowerView

PE86106-c

PowerLogic™ PowerView™.

PowerLogic™ PowerView™ v2.0 is an easy-to-use, entry-range power monitoring solution ideally suited for small system applications. The software polls the network for compatible PowerLogic devices, simplifying system and device configuration. Connection and data logging begins automatically at factory preset intervals, settings which are easily changed by the user. PowerView allows users to track real-time power conditions and perform remote monitoring of electrical equipment or installations at key distribution points across an electrical network.

Use logged values to reveal energy waste, unused capacity and historical trends. The software's Report Builder includes time of use configurations, allowing the user to create reports with energy and demand values for time periods with specific billing requirements. Power costs can be allocated to departments or processes. Generated reports publish in Microsoft Excel for easy data access and custom reporting. PowerView is a cost-effective power monitoring solution and a key first step towards a comprehensive energy intelligence strategy.

PowerView is compatible with the following devices:
PM9C, PM710, PM750, PM800 series and Enercept meters, as well as circuit breaker trip units Micrologic A, P, H, and Compact NSX A and E.

See page 123 for details of actual parameters logged.

Applications

■ Power consumption monitoring: use historical data for trend information; plan expansion based on actual usage; avoid over-design and use an electrical system to its full capacity.
■ Cost allocation: track power-related costs for building, process, or tool; create time-of-use energy profiles.
■ Equipment monitoring: monitor electrical equipment or installations at key distribution points across the network; monitor for pending problems or scheduled maintenance.
■ Strategic planning: use logged values of current, voltage, power, power factor, energy, demand power, demand current to develop strategies to avoid interruptions.
■ Preventative maintenance: proactively manage the power system; base maintenance schedule on actual operating history.

Functions

■ PowerView offers a wide range of functions:
■ Automated data acquisition from compatible devices
■ Real time viewing of data
■ Historical tabular data into Microsoft Excel
■ Historical trending
■ Reporting
■ TCP/IP, serial communications
■ Pre-defined meter onboard data log retrieval
■ Microsoft SQL2005 Express-Advanced data warehouse
■ Backup/restore database management.

Part numbers

PowerView software [1]	
English	**PLVDEVKITENG**
French	**PLVDEVKITFRA**
Spanish	**PLVDEVKITESP**

[1] These are the internal part numbers Schneider Electric country organizations should use when ordering PowerView.

PowerView (cont.)

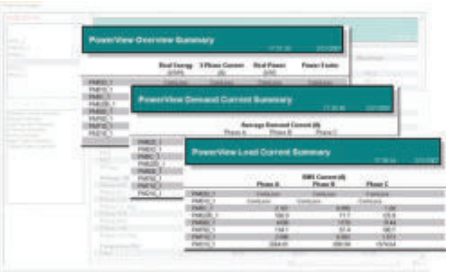
PE86192-c

Automatically detect and add up to 32 compatible PowerLogic devices.

Automatic device acquisition and data integration

■ PowerLogic PowerView uses industry-standard Modbus TCP/IP and RS-485 (2 wire or 4 wire) protocols to interface with devices.
■ Easy-to-use device setup component polls the network and detects supported devices; select up to 32 devices to add to the system – or manually add/delete device connections.
■ Onboard meter or PC-based historical logging (depending upon device capabilities) begins automatically at default or user-defined intervals.
■ Microsoft SQL2005 Express-Advanced database with backup/restore capabilities for reliable database management.

PE86109-c



Desktop access to power system information from any department, building or region. Graphical views of relevant, actionable information.

Real-time monitoring

■ Real Time Display shows data from devices monitoring key distribution points in the electrical system. Measured quantities include current, voltage, power, power factor, energy, demand power, demand current, and total harmonic distortion (THD).
■ Display real-time power and energy measurements and historical trends.
■ View data by single device or view and compare real time data from multiple devices.
■ Real-time summary views:
□ Demand current – view the amount of electricity consumed over time.
□ Energy – view measured kilowatt-hours for sub-billing or comparison purposes.
□ Load current – measure the current required to supply load demands.
□ Overview – view the real energy (kWH), 3-phase current (A), real power (kW) and power factor of connected devices.
□ Power – measure the rate energy is drawn from electrical system (watts).
□ Input status summary – check the input status of I/O-capable devices.
□ Output status summary – check the output status of I/O-capable devices.

PowerView (cont.)

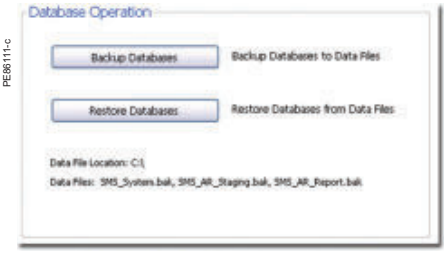
PE86110-c

Support load studies or expansion planning, optimize equipment use by maximizing capacity or balancing loads. Reveal critical trends, expensive processes or energy waste.

Reporting

■ Use Report Builder to build and generate reports in a few clicks.
■ Standard reports include:
□ General measurement – trend patterns for electrical energy usage, power demand or any other logged parameter. These reports include the referenced data points of the trend. Leverage these values in Excel to create detailed reports, enable further analysis and reveal true business conditions.
□ Energies by day; energies by hour – analyze measured kilowatt-hours for cost allocation or comparison purposes.
□ THD quantities – measure, analyze and compare total harmonic distortion
□ Time of Use (TOU) – define up to 3 TOU schedules each with 10 periods for energy accumulation; supports weekends, special days, holidays.
■ Report Builder publishes the reports in Microsoft Excel.

PE86111-c



PowerView includes robust Microsoft SQL2005 Express-Advanced database management.

Database management

■ Microsoft SQL2005 Express-Advanced database management includes:
■ Database backups
■ Database restores
■ Historical database management
■ Maintained below 2.9GB in size.

Computer requirements

■ 5 GB Hard Drive free space.
■ 512M RAM Memory.
■ 800MHz Pentium 3 class (or equivalent).

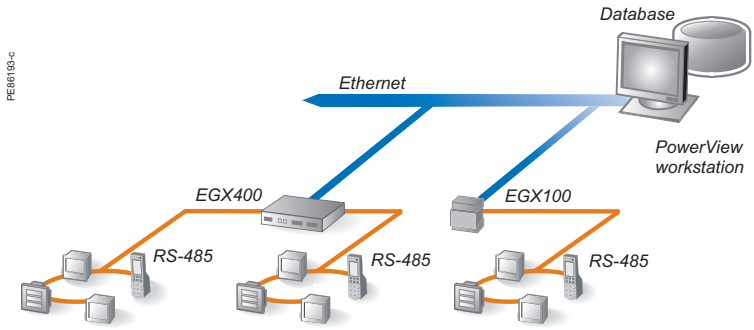
Microsoft Windows operating systems supported

■ MS Windows 2000 Workstation Edition SP4.
■ MS Windows XP Professional Edition SP2.
■ MS Vista.

Microsoft Office required

PowerLogic PowerView requires one of the following versions of MS Office installed on each workstation running PowerView:
■ Office 2000
■ Office XP
■ Office 2003
■ Office 2007

PowerView (cont.)

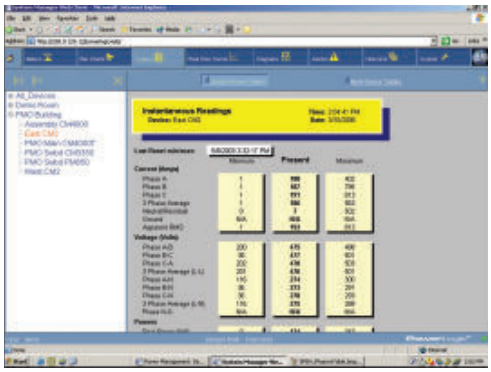


Compatible meters and trip units

Parameters	PM9C	PM200	Micrologic A, P, H	PM500	ION6200	PM750 PM710	PM800 series	Enercept	Compact NSX
Phase current (A, B, C)	■	■	■	■	■	■	■	■	■
Phase voltage (AN, BN, CN)	■	■	■	■	■	■	■	■	■
Line voltage (AB, BC, CA)	■	■	■	■	■	■	■	■	■
Power factor total	■	■	■	■	■	■	■	■	■
Real energy (kWh)	■	■	■	■		■	■	■	■
Reactive energy (kVARh)	■	■	■	■		■	■		■
Real power total (kVAR)	■	■	■	■	■	■	■	■	■
Apparent power total (kVA)	■	■	■	■	■	■	■		■
Demand real power total (kWd)	■	■	■	■	■	■	■		■
Demand reactive power total (kVARd)		■	■	■	■	■	■		■
Demand apparent power total (kVAd)		■	■	■	■	■	■		■
Demand current (A, B, C)		■	■	■	■	■	■		■
Neutral current	■			■	■	■	■		■
Apparent energy (kVAh)		■	■	■	■	■	■		■
THD phase voltage (AN, BN, CN)				■	■	■	■		■
THD current (A, B, C)				■	■	■	■		■

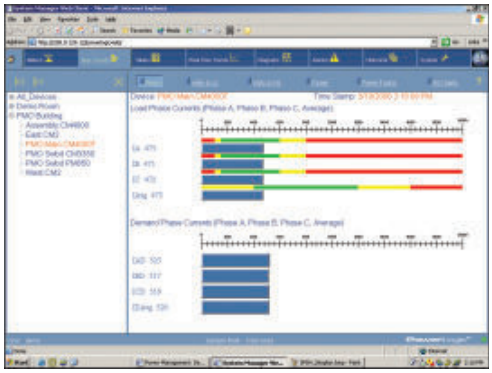
System Manager Software

DB119014



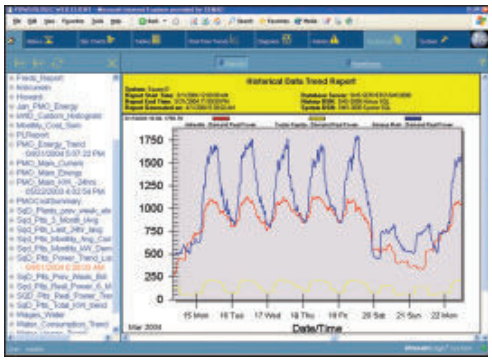
Tables: instantaneous readings.

DB119015



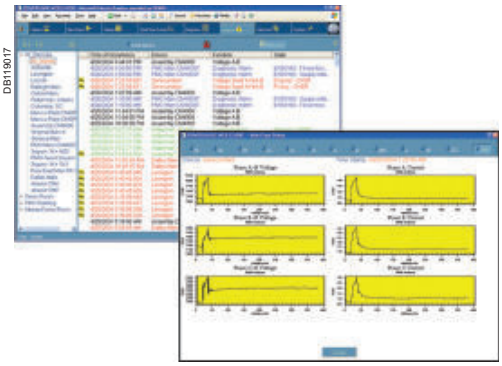
Bar charts: load phase currents.

DB119016



Historical: data trend report.

DB119017



Alarms.

PowerLogic® System Manager Software (SMS) is a full featured, web-enabled product family. With standard intuitive views, SMS ensures a consistent power and utility monitoring experience. Upon installation, the system is online and ready to display and record monitored information in a wide variety of predefined views, including over 50 real-time tables, analog meters and bar charts, an alarm log with waveform links, pre-engineered power quality and utility cost reports, and more. You can also tailor SMS to meet your own needs, with customised screens, trends and reports that are automatically incorporated into the tabbed navigational user interface.

- Simultaneous remote connections from any browser-equipped computer on your network - no client software required
- Intuitive tabbed interface for quick system navigation
- Real-time data and report sharing with secure access to information
- Remote alarm notification to email, pagers, and other remote devices
- Distributed monitoring and automatic data collection to eliminate nuisance data gaps
- Open system architecture with industry standard protocols and support for a plethora of intelligent monitoring devices.

System Manager Software Product Family

The System Manager software product family is comprised of three, full-featured software applications designed to meet the power monitoring needs of small-systems, with fewer than sixteen devices, to large, enterprise systems with hundreds of devices.

System Manager DL (SMSDL)

- Web-enabled product for small systems
- One browser connection (upgradeable to 6) for local or remote data display
- 16 device limit (upgradeabe to 32)
- 4 Gigabyte SQL Express database
- Information Manager reports.

System Manager Standard (SMSSE)

- Intermediate level product for intermediate systems (typically 64 or fewer devices)
- One browser connection (upgradeable to 6) for local or remote data display
- Unlimited devices
- 4 Gigabyte SQL Express database
- Information Manager reports.

System Manager Professional (SMSPE)

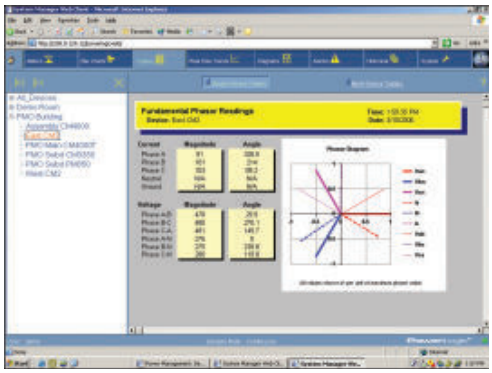
- Enterprise level product for large systems
- 10 simultaneous browser connections
- Local and remote system and device setup
- Unlimited devices
- SMS Advanced Reports for web-based viewing and creation of reports
- SQL Server 2005 database (no size constraint).

Part numbers

Core Software Products	
System Manager DL 4.2 (16 device support; 1 browser client; 4 Gbytes data storage)	**SMSDL**
System Manager standard 4.2 (no device limit; 1 browser client; 4 Gbytes data storage)	**SMSSE**
System Manager Professional 4.2 (no device limit; 10 browser clients; unlimited data storage)	**SMSPE**
Add-on Products	
OPC server application for SMS 4.2	**SMSOPC**
Extension Products	
Adds five additional web client connections to SMSDL, SMSSE and SMSPE	**SMSWebXTR**
Extends SMSDL device limit to 32	**SMSDL32U**
Upgrade SMSDL to SMSSE	**SMSDL2SE**

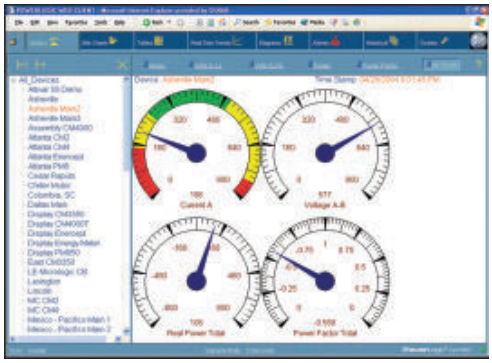
System Manager Software (cont.)

DB119018



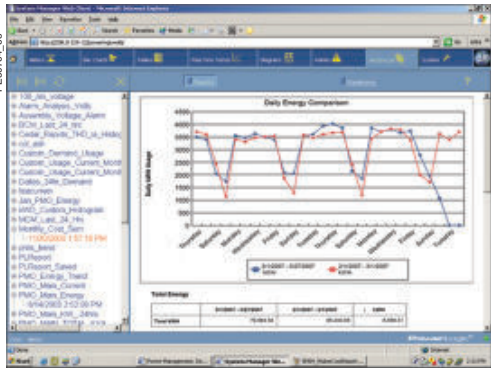
Tables: fundamental phasor readings.

DB119019



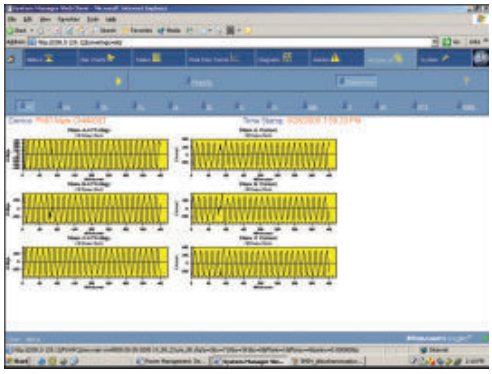
Meters: analog meters.

PE50764_68



Historical: electrical cost summary.

DB119020



Historical: disturbance capture.

Functions

SMS offers a wide range of functions:

- ■ simple pre-configured functions:
  - □ data tables and real-time trending charts
  - □ meters and bar charts
  - □ historical logging and trending
  - □ display of waveforms
  - □ harmonic analysis
  - □ event logging
  - □ min/max resetting
  - □ control
  - □ device setup
- ■ advanced functions that the users can customise:
  - □ user-defined tables and reports
  - □ setup of automatic tasks
  - □ graphic interface customised

Data tables, meters and bar charts

SMS can supply a wide range of measurements in real time via tables, bar charts or meters.
SMS is pre-configured to accept and display the data supplied by the devices.
Users can also create their own customised tables and run-time trends.
Simply select one or more devices, the desired measurements, and the table is created automatically.

Historical logging and trending

SMS automatically saves the data from the devices to a central data base.
The data can be retrieved, displayed or printed as tables, trend curves or reports.

Waveform display and harmonic analysis

The data is presented in graphs.
The current and voltage waveforms may be viewed simultaneously or individually, and can be printed.
If the waveform capture is over four cycles, it is possible to display the percentage of each harmonic order and the total harmonic distortion (THD).

Event logging

SMS logs all events including alarms.
Events may be of any type, from power outages to configuration changes.
All user action on the system is recorded and can be displayed, printed or deleted at all times.
For each event, the following fields are displayed on the screen:

- ■ device
- ■ date and time
- ■ type of event
- ■ user name.

This make it possible to recover all the necessary information for system diagnostics.

SMS can be used to link alarms to digital and analog inputs in addition to those that can be set up directly on certain devices.
User-set values can be used as alarm conditions.
The alarm parameters can be set with a number of security levels.
Each level corresponds to audio and visible indications, a password and actions.
Each level can be set up with different sounds, colours, actions, etc.

Management of user rights

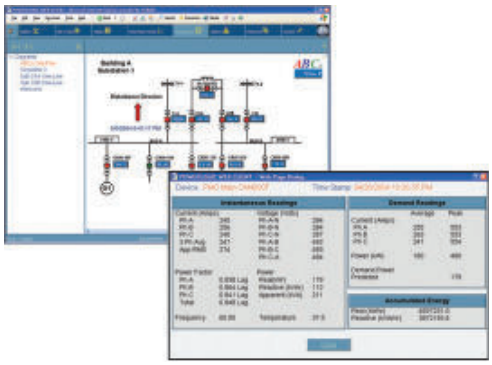
SMS can handle an unlimited number of users, each with their own name and password.
In addition, SMS manages different levels of user rights to restrict access to strategic functions.

Control

SMS can be used to control devices (e.g. opening and closing of circuit breakers).
To avoid accidental and unauthorised use, only users with appropriate rights can access this function.
SMS can also be used to reset min/max values stored in the devices.

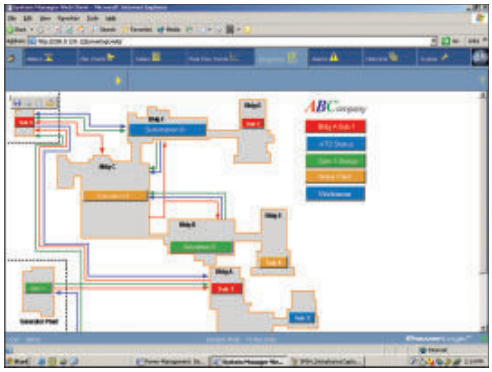
System Manager Software (cont.)

DB119021



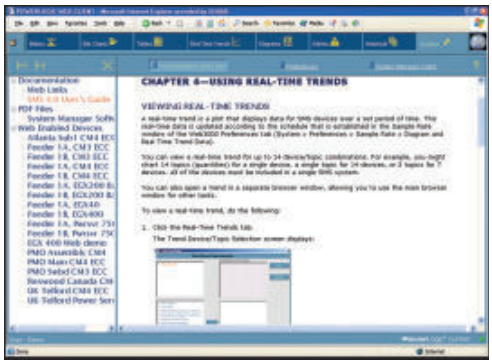
Diagrams: single-line diagram and device summary.

DB119022



Diagrams: building diagram.

DB119023



System: documentation and links.

Creation of custom reports with SMSDL, SMSSE and SMSPE
SMS can be used to create reports from all types of data, including real-time values.
SMS can use standard or user-customised report formats.

Creation of Advanced Reports with SMSPE
Advanced Reports supports multitude of standard output formats including Adobe, Word, Excel, Crystal Reports and HTML.
From a remote computer, run, schedule, edit, export, e-mail and manage historical reports via the PowerLogic Web interface.
Use the easy wizard for report creation and access on-demand report templates.
Advanced Reports auto-builds queries to the Microsoft SQL Server database, so no database experience is required.
Quickly access specific energy efficiency reports, pre-defined energy analysis reports and reports by shift, per circuit reports, multiple location reports, time of use reports or cost summary reports.

Automatic tasks
The available tasks include launching programs, resetting devices, sending e-mail, data acquisition and waveform capture.
A task may be launched when an alarm is detected or at a precise time set by the user.

Animated graphics
The GFX interactive graphics component offers a wide range of presentations, including single-line diagrams, electrical switchboards and site and building diagrams.
GFX offers complete customisation functions for these graphic presentations.

Organisation in groups
The devices can be organised in groups which makes it possible to select them according to function or the organisation of the electrical-distribution system.
This function makes it possible to logically structure the devices and data, e.g. by building, by voltage level, by function, etc.

Device setup, example of a Circuit Monitor
Simple devices may be set up on their front panel.
For devices with advanced functions, local setup is difficult and even impossible for some functions.
Software greatly facilitates device setup.

OPC option
SMS integrates data from building automation and other systems via the OPC options.

Help system
SMS comprises a complete, on-line help system that takes into account the screen where help is needed.
The help is divided into chapters that may be printed. Most of the configuration dialog boxes include a help button offering direct access to the information on the concerned dialog.

System Manager Software (cont.)

Selection guide

Products features	SMSDL	SMSSE	SMSPE
Devices			
System Support: PowerLogic and Modbus™/ Modbus TCP compatible devices	■	■	■
Number of device conections	16 (up to 32 with SMSDL32U)	Virtually unlimited	Virtually unlimited
System and device setup: PowerLogic metering and monitoring devices	Local	Local	Local and remote
Data acquisition			
Database	SQL Express	SQL Express	SQL Server
Data storage limit	4 Gbytes	4 Gbytes	Unlimited
Automatic onboard file upload	■	■	■
Web-Enabled Monitoring			
Pre-defined meters, tables and bar chart real time displays	■	■	■
Real time trend, trending/forecasting and power quality pass//fail analysis	■	■	■
Historical trending and pre-defined reports	■	■	■
Alarm notification with disturbance direction detection	■	■	■
Waveform capture analysis-transient detection, disturbance, FFT, RMS	■	■	■
Viewing and emailing pre-defined and user-defined reports	■	■	■
Report creation and scheduling	Local	Local	Local and remote
Control outputs	Local	Local	Local and remote
Interactive graphics	■	■	■
Advanced reports	-	-	■
Add-on products			
Extension of SMSDL to 32 devices connections (with SMSDL32U)	Add-on	-	-
Extra Web client: five additional connections (with WEBXTR)	Add-on	Add-on	-
OPC server for SMS 4.2 (with SMSOPC)	Add-on	Add-on	Add-on
Upgrade SMSDL to SMSSE (with SMSDL2SE)	Add-on	-	-
Web-enabled			
Secure login to protect information misuse	■	■	■
No training required, browser interface - provides access information remotely through any computer with network access	■	■	■
Full featured viewing capabilities with simultaneous browser connections	1 (up to 6 with WEBXTR)	1 (up to 6 with WEBXTR)	10 (1)

(1) Licensed for 10 browser connections. Additional licenses can be purchased. SMSPE has been tested for 30 simultaneous browser connections.

ION Enterprise®
Functions and characteristics

PE86096

PowerLogic® ION Enterprise®.

PowerLogic ION Enterprise software is a complete power management solution for utility, industrial or commercial operations. Engineering and management personnel can cut energy-related costs, avoid downtime, and optimise equipment operations by using the information provided by PowerLogic ION Enterprise software. PowerLogic ION Enterprise also enables tracking of real-time power conditions, analysis of power quality and reliability, and quick response to alarms to avoid critical situations. The software forms a layer of energy intelligence across your facility, campus, service area, or your entire enterprise, acting as a unified interface to all electrical and piped utilities.

Typical applications

PowerLogic ION Enterprise software has many applications:
- Enterprise-wide energy consumption management.
- Cost allocation and bill estimation.
- Demand and power factor control.
- Load studies and circuit optimisation.
- Preventive maintenance.
- Equipment monitoring and control.
- Power quality and reliability analysis.

Software architecture

Data presentment

PowerLogic ION Enterprise offers enterprise-wide, multi-user data and control access through a local server interface, a thin-client web browser, or terminal services with tiered security.

Functional components

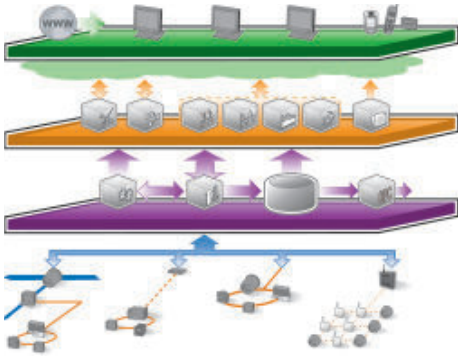
The functional components of the PowerLogic ION Enterprise software can reside on the main server or on one or more workstations.

- Management Console
  - Use this component to configure your PowerLogic ION Enterprise network, including communication paths, devices and logical groups.
- Designer
  - Designer allows you to customise the modular functionality of your ION devices and Virtual Processors.
- Vista
  - Offers real-time displays of measurements and status indicators; power quality analysis; historical trending; alarms; and manual control.
- Reporter
  - Produces predefined or custom reports and offers support for third-party reporting tools.

Data acquisition and management

- Virtual Processor
  - The Virtual Processor performs multi-site aggregation; coordinated control; complex calculations and alarming; and logging for non-recording devices (e.g. interval kWh).
- Site Server
  - Continuous or scheduled retrieval of data from up to hundreds of remote devices over Internet, Ethernet, telephone, serial, wireless, or satellite connections.
- SQL ODBC-compliant databases
  - SQL Server 2005 SP2 (Standard Edition, Express Edition). Log device data, system data and events with accurate meter synchronisation (+ 16 ms or +1 ms using GPS) for precise event timestamping, power quality analysis and revenue billing. This data is accessible using industry-standard database tools and you can add distributed databases and servers for load balancing.
- OPC DA (client), OPC DA Server (optional), and PQDIF Exporter (optional)
  - Supports data import/export with compliant devices and systems.

PE86097



Functional components of ION Enterprise.

ION Enterprise®
Functions and Characteristics (cont.)

PE86098

Connect to meters, sensors, controllers, web services and other systems. Extract values from spreadsheets to combine with dynamic power and energy calculations.

Functions

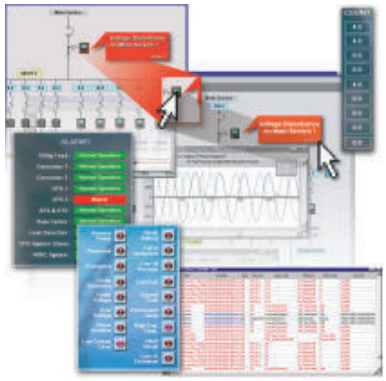
PowerLogic ION Enterprise offers a wide range of functions:

- Data acquisition and integration.
- Alarms and events.
- Manual and automated control.
- Real-time monitoring.
- Reporting.
- Trend analysis.
- Power quality analysis.
- Patented ION® technology.

Data acquisition and integration

Integrate metering of electricity and other consumed services such as gas, steam, air, and water. Native, out-of-the-box support for all PowerLogic ION series, PowerLogic PM800 series, PM750, PM710 and PM210 power and energy meters as well as PowerLogic CM3250, CM3350, CM4000, CM4250, CM4000T, circuit monitors, Micrologic Compact NSX Type A and Type E breakers, MicroLogic A, P and H circuit breaker control units, and the PowerLogic BCPM, branch circuit power meter. Also supports legacy ACM series meters. Enables access to meter data, control of on-board relays and digital outputs, remote configuration and firmware upgrading. Interface with third-party meters, transducers, PLCs, RTUs and power distribution or mitigation equipment. Quickly add and configure direct communications with remote devices over Modbus RTU or Modbus TCP protocols using easy-to-use device templates. Scalable platform enables remote devices and user clients to be added as needs grow while maintaining your original investment. Integrate with other energy management or automation systems (e.g. SCADA, BAC, DCS, ERP) through ODBC, XML, OPC, email, FTP, CSV and PQDIF compliance; integrate with web services through XML.

PE86099



Respond to a notification, then click an on-screen indicator to retrieve the time, location, and nature of the event. Click again to study waveforms, tolerance curves or a report.

Alarms and events

PowerLogic ION Enterprise software allows you to receive alerts to outages or impending problems that could lead to equipment stress, failures, or downtime. You can configure alarms to trigger on power quality events, power thresholds, or equipment conditions. Meter-based alarms can be immediately pushed to the software without waiting for system polls and can be annunciated through operator workstations, pagers, email, cell phones or PDAs using messages customised for the task. The software logs complete information on an event, including related coincident conditions, all with accurate timestamps. You can schedule maintenance based on operating history, events, and alarms.

PE86125

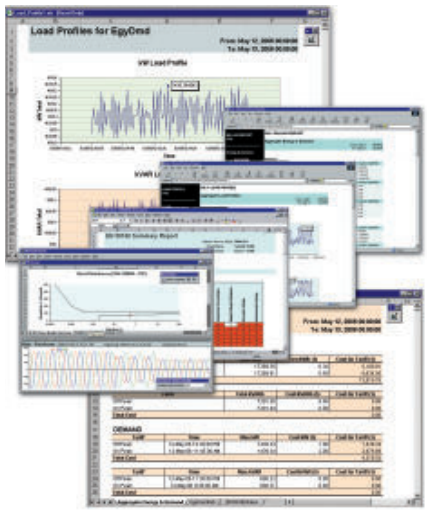
Control loads, generation, and power quality mitigation equipment across your enterprise or service area. Optimise switching with the latest status and base loading data.

Manual and automated control

Perform fast, manual control operations by clicking on-screen trigger buttons, and operate remote breakers, relays, and other power distribution and mitigation equipment. The Virtual Processor gathers data from multiple devices and incorporates process variables, as well as initiates automatic, coordinated control actions if predefined thresholds are exceeded. PowerLogic ION Enterprise software supports a wide range of applications. It allows you to manage distributed generation assets, as well as to shed loads or start up peak-shaving generators in response to interruptible rates, real-time pricing, or to avoid setting a new peak demand. You can gain control over capacitor banks to correct power factor, and improve energy efficiency and avoid penalties. The software also allows you to start fans to prevent transformer overheating if total harmonic distortion is too high.

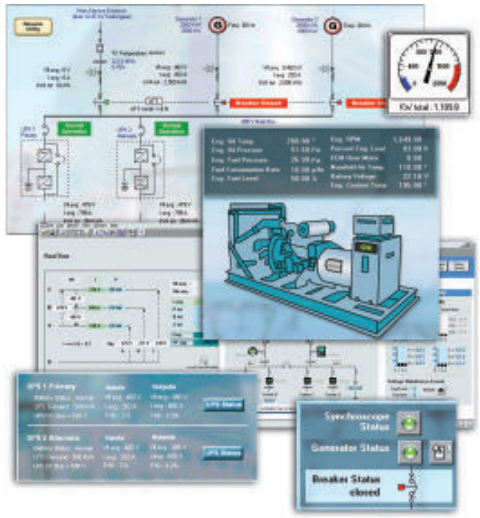
ION Enterprise®
Functions and characteristics (cont.)

PE86101



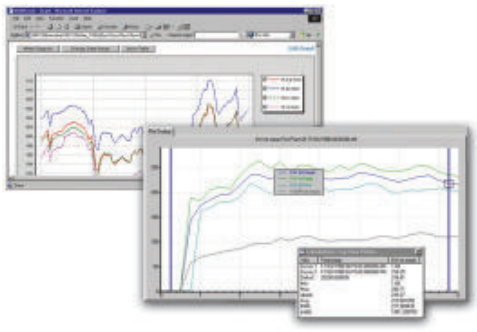
Desktop access to power system information from any department, building or region. Graphical views of relevant, actionable information customised for each user.

PE86102



Allocate costs, consolidate billing or negotiate contract volume pricing. Assure compliance with PQ standards and verify the results of operational improvements.

PE86103



Support load studies or expansion planning, optimise equipment use by maximising capacity or balancing loads. Reveal critical trends, expensive processes or energy waste.

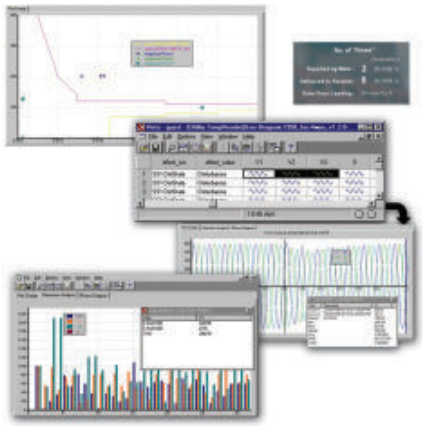
Real-time monitoring
View, from any local or globally located workstation, key distribution points across one or more facilities or substations. Display real-time power and energy measurements, historical trends and data logs, alarm conditions, equipment status (on/off, temperature, pressure, etc.), control triggers, and analysis tools. Use the Virtual Processor to perform sophisticated data computations, then display and log derived values. Select pre-configured diagrams or easily create customised views comprising digital readouts, dials, bar or trend graphs, one-line or elevation diagrams, maps, photos, and animation. Set up hyper-links between diagrams, then use easy point-and-click navigation to reveal deeper layers of detail. Group relevant measurements, indicators and controls into a library of convenient views, and easily extract and analyse selected ranges of information from the database using a query wizard.

Reporting
Reports can be generated manually, on schedule or event-driven. Distribute automatically as email or HTML. Generate reports through Microsoft Excel™ using a fast and convenient report wizard interface. Standard reports include: aggregate energy and demand reports, which combine multiple feeds and costs for each tariff period over requested intervals, matched to utility billing structures, with multi-year scheduling and time-of-use activity profiles; aggregate load profile reports, which show system-wide usage patterns over the specified date range, including timestamps and peak usage; IEC 61000-4-30 and EN50160 compliance reports, with pass/fail indicators to help you quickly assess system power quality levels, including flicker; and power quality analysis reports, which show disturbance waveforms, voltage tolerance curves, and harmonic histograms.

Trend analysis
Use PowerLogic ION Enterprise software to generate one or more trend graph overlays for interpretation of data using simple visual analyses. Perform trending on any measured parameter: voltage, current, power factor, demand, predicted demand, energy, harmonics, temperature, etc., and create usage profiles to reveal demand peaks, dangerous trends or unused capacity. Graph aggregate load profiles from multiple metering points or compare related parameters from across your enterprise. Track system-wide energy-related costs for each building, feeder, process, or tool.

ION Enterprise®
Functions and characteristics (cont.)

PE86104



Minimise equipment damage and downtime by pinpointing the source of disturbances, verifying the effect of system upgrades, and validating compliance with power quality standards.

Power quality analysis

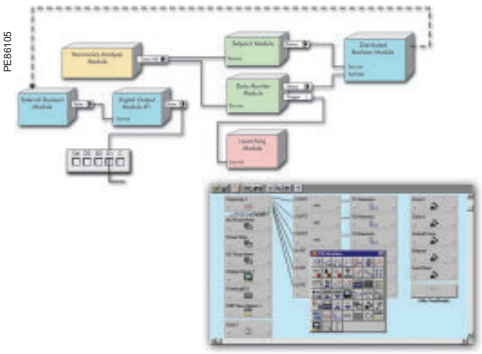
PowerLogic ION Enterprise software allows continuous, wide-area monitoring and data capture for power quality and reliability conditions. IEC 61000-4-30 and EN50160 compliance reporting verifies power quality performance to international standards and allows you to quickly review power quality indices as numeric charts or graphic profiles (requires PowerLogic ION7650 meters or other devices that support compliance monitoring). Display harmonic histograms, odd/even harmonics, THD, K-factor, crest factor, phasor diagrams, and symmetrical components. Plot waveforms of up to many seconds in duration, with overlays that correlate phase-to-phase relationships between voltages, currents, and cascading failures. Plot sags, swells, short duration transients and other disturbance events on industry-standard voltage tolerance curves, including ITIC (CBEMA) and SEMI. For any event, you can display a list of associated time-stamped incidents, then click on any incident to see more detailed information. PowerLogic ION Enterprise supports a wide range of applications:

- Diagnosis and isolation of the cause of power quality-related equipment or process problems
- Proactive assessment of current power quality conditions and trends
- Identification of equipment vulnerabilities and verify reliable operation of power distribution and mitigation equipment
- Benchmarking of power quality performance and comparison of service areas, facilities, or processes
- Setting of a performance baseline and verification of the results of system changes or equipment upgrades

Patented ION® technology

PowerLogic ION Enterprise software and a variety of PowerLogic ION metering products feature the unique ION architecture. The modular, flexible architecture offers extensive customisation of functionality using a simple “building block” approach. The technology uniquely addresses advanced monitoring and control applications and adapts to changing needs, avoiding obsolescence.

PE86105



Use drag-and-drop icons to quickly create customised ION metering, logging, or control functionality within your software or hardware.

Part numbers

New systems and add-ons	**IONE56-BASE**	PowerLogic ION Enterprise base software
	IONE56-DL(1)	PowerLogic ION Enterprise device licence(1)
	IONE56-CL(2)	PowerLogic ION Enterprise client licence
Options	**IONE-SQL-2005**	Integrated SQL Server 2005 Option – Server Licence for 1 CPU
	IONE-SQL-2005-CPU	Additional CPU License for Integrated SQL Server 2005
	IONE-OPC-V1	OPC server version 1.0
	IONE-PQDIF-V1	PQDIF Exporter version 1.0
Upgrades from PowerLogic ION Enterprise 5.0	**IONE56-UPGRADE**	PowerLogic ION Enterprise base upgrade
	IONE56-DLUPG	PowerLogic ION Enterprise device upgrade
	IONE56-CLUPG	PowerLogic ION Enterprise client licence upgrade
PowerLogic ION Enterprise documentation	**CD-TECHDOC**	Compact disc containing the latest version of technical documentation

(1) *A device licence (IONE56-DL) is required for each meter or device connected to your PowerLogic ION Enterprise system. Device licences have a minimum order quantity of five (5).*
(2) *A client licence is required for each workstation that is used to connect to your primary PowerLogic ION Enterprise server.*

ION Enterprise®
Functions and characteristics (cont.)

Features	Standard	Optional
Automated data acquisition from sites/devices	■	-
SQL 2005 Express Edition database	■	-
SQL 2005 Standard Edition database	-	■
Web-enabled real-time monitoring	■	-
Reporting	■	-
Trend analysis	■	-
Power quality analysis, compliance reporting	■	-
Alarms and events	■	-
Manual and automated control	■	-
OPC DA client	■	-
OPC DA server	-	■
PQDIF data export	-	■

Minimum system requirements

Please consult your local Schneider Electric representative for complete system requirements and commissioning information for PowerLogic ION Enterprise. The following are minimum requirements to support 1 to 25 meters with factory default settings.

■ *Server hardware:* CPU requirements are dependent on number of devices and clients to be supported; minimum is 2 GHz CPU, 1 GB RAM, 40 GB disk drive, CDROM drive and Ethernet port.

■ *Server software:* 32-bit only; for applications with a single primary server and single client, server can run Windows XP SP2 Professional; Windows Server 2003; Windows Vista SP1 Business, Enterprise or Ultimate edition, both limited to standalone, 25 devices, MSDE or Express.

■ *Client software requirements:* 32-bit Windows XP Professional or Windows Server 2003, Microsoft Excel 2003, Microsoft Excel 2007.

■ *Modem support:* For dial-up connections, supports any modem compatible with the WinModem standard.

Supported devices

PowerLogic power and energy meters:
- ■ ION8800
- ■ ION8600
- ■ ION7650/7550 series
- ■ PM800 series
- ■ ION7300 series
- ■ PM710, PM750
- ■ ION6200
- ■ PM210

PowerLogic circuit monitors:
- ■ CM3250, CM3350
- ■ CM4000, CM4250, CM4000T

PowerLogic branch circuit power meters:
- ■ BCPM

Circuit breaker control units
- ■ MicroLogic A, P and H devices
- ■ Micrologic Compact NSX Type A and Type E

Power Measurement power and energy meters:
- ■ ION8500/8400/8300
- ■ ION7700
- ■ ION7600/7500 series
- ■ ACM3720
- ■ ACM3710
- ■ ACM3300

Other
- ■ Modbus-compatible devices
- ■ Other devices through OPC

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RCS Nanterre 954 503 439
Capital social 896 313 776 €

http://www.schneider-electric.com
PLSED309005EN

Printed on ecological paper

Layout: SEDOC
Photos: Schneider Electric
Printing: Imprimerie du Pont de Claix/JPF - Made in France

02-2009