

# PEL 100 SERIES

Power and energy loggers, simultaneously



PEL102

PEL103

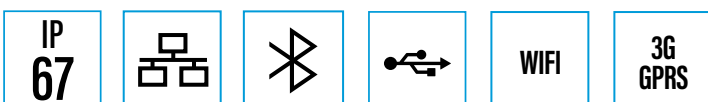
PEL104

## PEL100, the loggers for efficient consumption!

- Ideal for all types of electrical cabinets and Low Voltage installations
- Implementation without cutting off the main power supply
- Recording duration up to several months or years
- Breakdown of energy losses
- Characterization of electric motors



PEL106



Measure up



## **F**or sustainable, economical buildings, improve your energy efficiency

In the context of a worldwide approach for protection of the environment, Europe has set itself the goal of reducing consumption by approximately 30% . Today, more than 50% of energy consumption occurs in the industrial sector and buildings. Optimization of energy consumption is therefore crucial to fulfil the regulatory requirements.

The **PEL100** models are power and energy measurement loggers for all electrical installations. The measurements are made by means of current sensors and voltage inputs. They can be used to view all the electrical parameters and take advantage of the measuring, energy metering and communication functions.

They offer users all the measurements needed to carry out successful energy efficiency projects and ensure supervision of the electrical distribution system.

The **PEL100** family of energy meters makes it easy to add metering and measuring points in electrical cabinets affected by strong integration constraints. They are magnetized, so they are easy to position in any electrical cabinet without causing any difficulties once the cabinet is closed. The monitoring performed by the **PEL100s** provides the recordings to be compared with the period of reference.

## **M**onitoring and mapping of the consumption on a site

**PEL100** loggers catch every detail of the electrical consumption in a factory, workshop, building, agency, etc. They can be used simultaneously for real-time monitoring and comparative, historical consumption analysis.

## **U**se in networks & centralized consumption management

By setting up several **PEL100s** on a general electrical distribution system, for example, local authorities can control the different allocations of consumption, which is very practical for facilitating consumption management across a town district: street lighting network, lighting network for common areas, general single-phase distribution, three-phase distribution.

## **M**easuring the savings

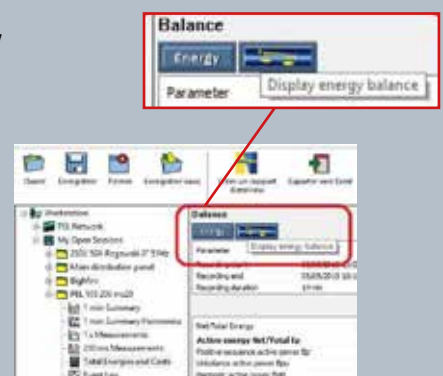
The recordings made with the **PEL100** measuring instruments are time/date-stamped. This makes it very simple to measure the gain achieved by comparing the recordings before and after modifications to an installation. The analysis of the recording made with the **PEL100s** before the modifications corresponds to the period of reference. Various operations such as maintenance or improvement of the electrical network or equipment can then be carried out. A correctly-positioned **PEL100** will help you quickly pinpoint the areas where work is required, without wasting any time. A period of monitoring will help to show whether the solutions applied are sufficient and above all to measure the savings achieved. The monitoring performed by the **PEL100s** provides the recordings to be compared with the period of reference.



## **P**EL Transfer software

The PEL Transfer software can also provide a breakdown of the types of energy and their losses. Users have access to all the elements needed to establish the priority of their operations.

- Useful energy
- Active unbalance energy
- Active harmonic energy
- Non-active energy
- Reactive energy
- Distorting energy
- Apparent energy



## Analogue measurements

The **PEL106** can be used to identify each of the dysfunctions by recording external parameters such as the pressure, temperature, torque, etc.

Via its Bluetooth wireless link, it communicates with remote L452 dataloggers. The **PEL106's** recording function can integrate up to 2 x 8 analogue channels. The analogue channels complement the voltage, current and power measurements.

### Energy consumption of a motor, transformer station, etc.

When used with remote L452 loggers, the **PEL106** records analogue measurements (external parameters, up to 2x8 channels) such as the temperature, pressure, motor torque, etc. It can also be used to analyse a temperature-affected motor, for example, or electrical transformer station.

### Renewable energy

The **PEL106's** analogue measurement function offers the possibility of linking electricity generation to a wind speed or a hydro-electric current to a flow-rate.

It meets the requirements of the applications in the renewable energies sector, such as metering the energy linked to the strength of the wind, for example.

The **PEL106** accurately measures the energy efficiency of wind turbines, which depend on the wind speed, or hydro-electric dams, which depend on the water flow-rate, etc.



## Advantages of the ANDROID application

Users can view the measurement results in real time on their ANDROID devices. The application is multilingual.

A software sensor developed by Chauvin Arnoux can be used to characterize electric motors: rotation speed, efficiency, motor torque, etc. The software sensor can be accessed with a smartphone or tablet via the PEL 100 wANDROID application.

Available for download free of charge.



|             |          |
|-------------|----------|
| Efficiency  | 55.80 %  |
| Torque      | 1.69 N m |
| Rotor speed | 1496 RPM |

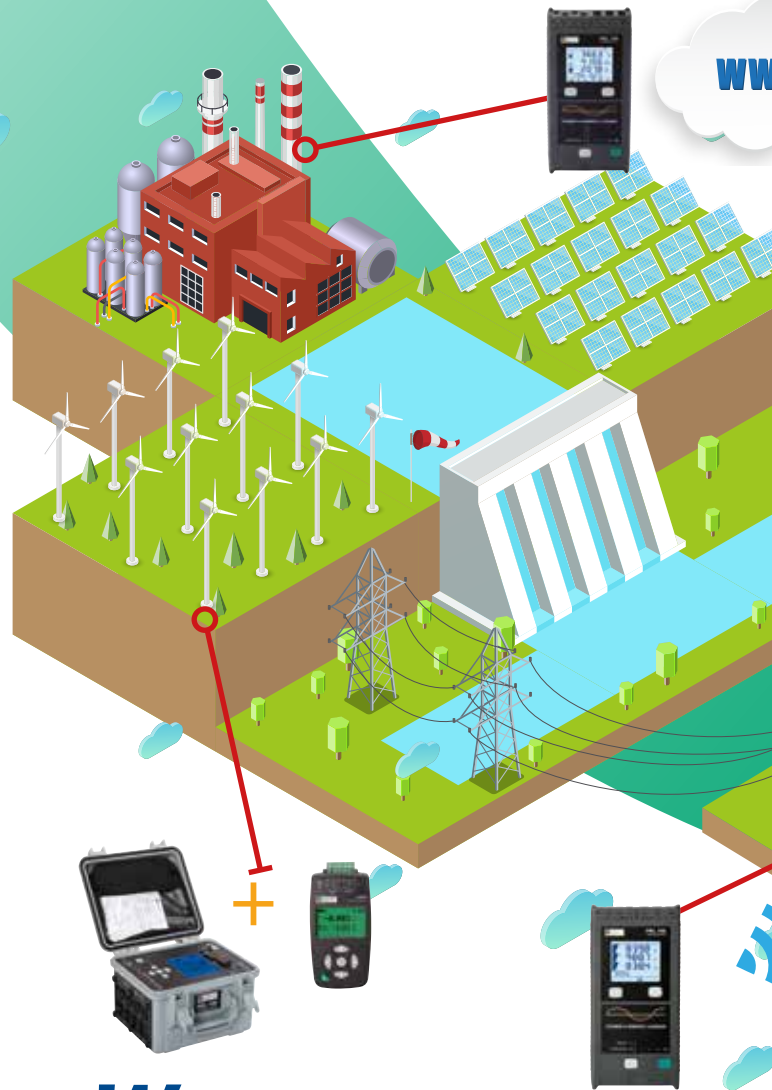
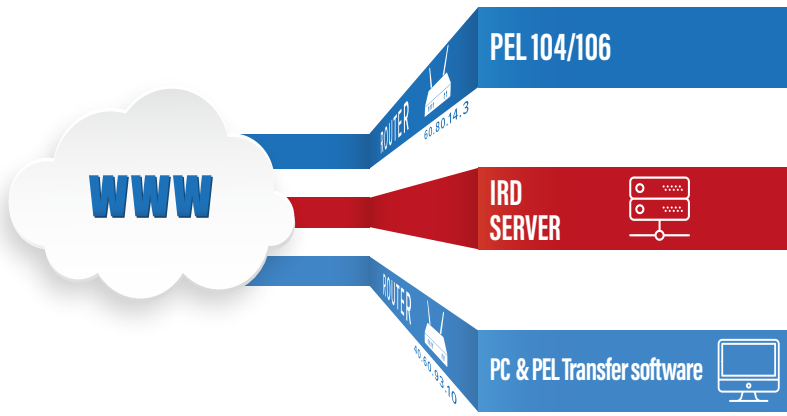


ALL THE PEL100 MODELS ARE EQUIPPED WITH MULTIPLE COMMUNICATION MODES: ETHERNET AND USB PORTS, AS V

The **PEL104** and **PEL106** also offer **Wifi** communication and **3G/GPRS**. The **3G/GPRS** mode allows users to insert a SIM card in the PEL for remote co automatically receive an email for real-time notifications.

## IRD Server

By positioning **PEL100s** on the different electrical feeders, it is possible and even simple to size the relative weight of each line in terms of overall consumption, define a load profile for the installation and thus determine the priorities for the improvements to be made. When access to the **PEL100** is complex because of the protective systems on today's IT systems, and when you're far from the logger, our solution lets you view the measurements remotely, via internet, without endangering the existing protective IT systems.



## WiFi

The **PEL104** and **PEL106** are equipped with a Wifi interface. This means they are accessible from any PC by means of the PEL Transfer software. The **PEL104** and **PEL106** can be configured as a Wifi access point operating on the 2.4 GHz radio frequency band, allowing you to monitor the measurements in real time with a PC, smartphone, tablet, ...

## GPRS

As measurement campaigns are usually spread over a period of several days or weeks, it is important to check that the measurements are proceeding correctly. With their SIM card, the **PEL104** and **PEL106** communicate remotely, saving you time because you no longer have to go from one logger to the next to check each one. This makes it easy to recover the 10-minute consumption data on an electrical feeder.



IP  
67

GPRS

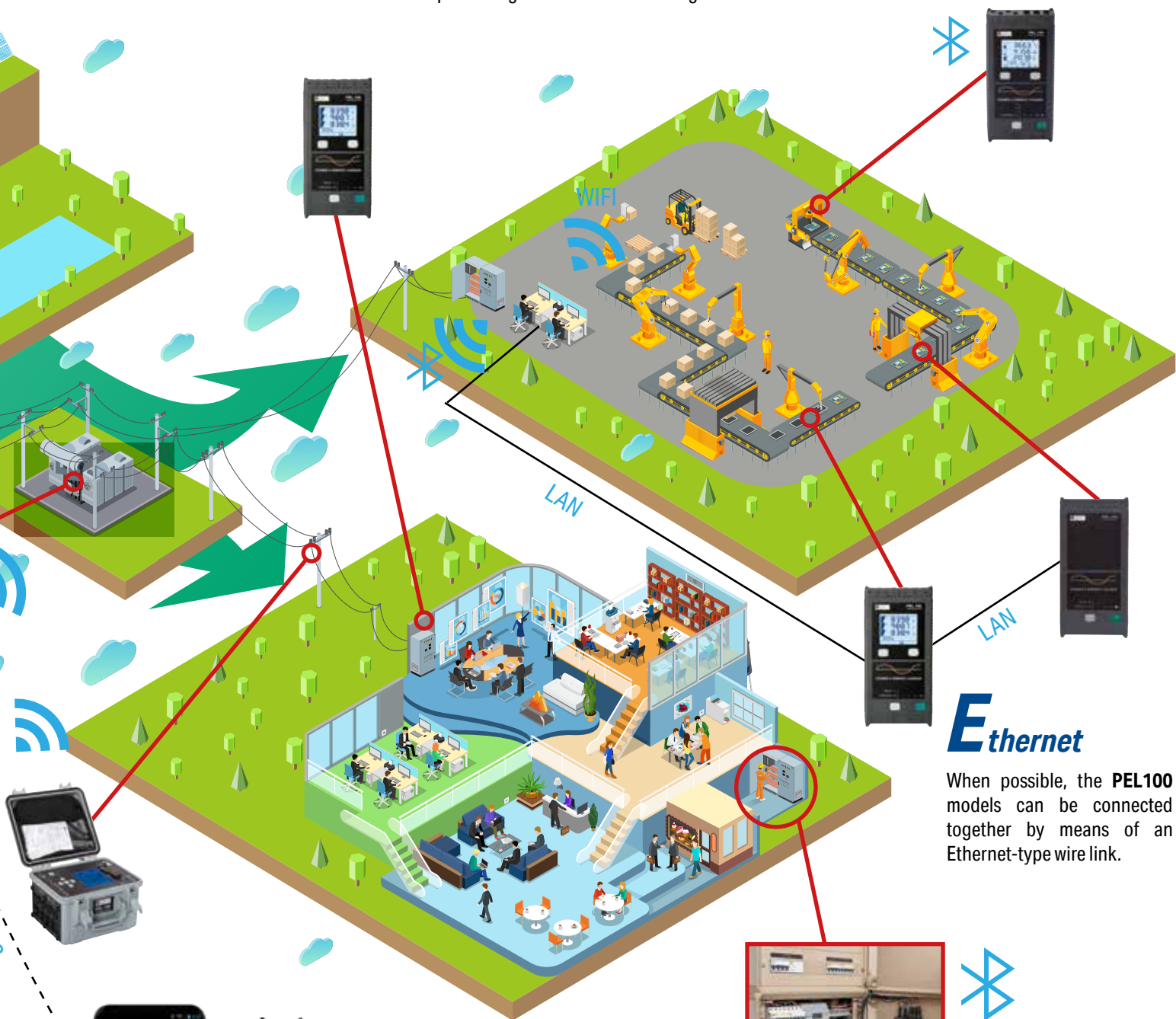
# MUNICATING

WELL AS BLUETOOTH.

connection via a **GPRS-3G** link. It is also possible to access a **PEL104** or **PEL106** via an IRD server. In this way, when an alarm is triggered, the user can

## Bluetooth

Bluetooth enables the **PEL100** models to communicate with a smartphone or gain access to the analogue channels.



## Ethernet

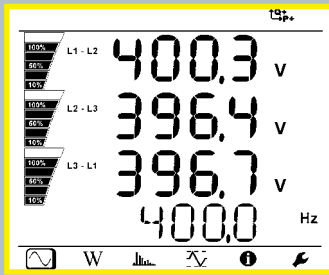
When possible, the **PEL100** models can be connected together by means of an Ethernet-type wire link.



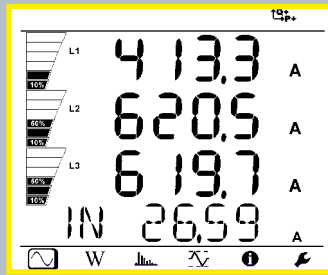
## Android

Verification of the connections and real-time display of the measurements

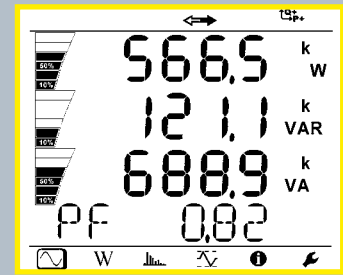




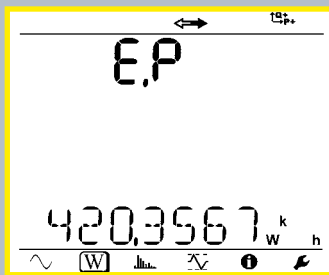
Voltage



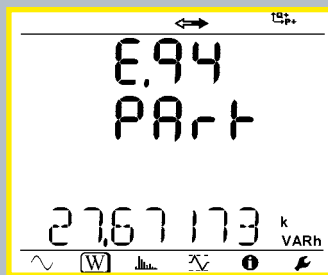
Current



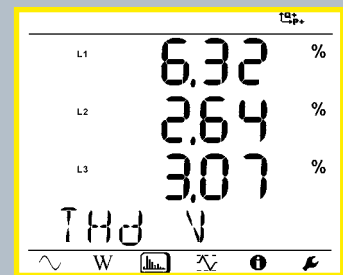
Phase



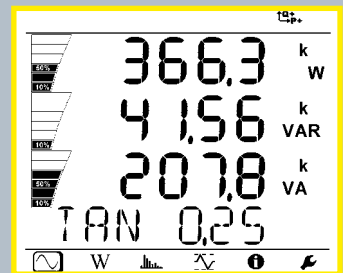
Total energy



Partial energy



THD



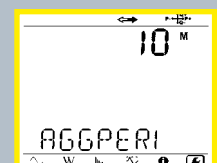
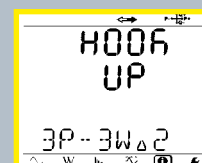
Phase

## Measurements & functions

The PEL100 power and energy loggers perform the following measurements:

- RMS and DC measurements with 128 samples/cycle – simultaneously on each phase
- AC and/or DC voltages up to 1,000 V
- Analogue measurements
- Measurements on motors
- Self-powering via the phase
- Current up to 10 kA AC or 5 kA DC (depending on the current sensor).
- The PEL100 models offer a wider measurement range by using voltage and current ratios (up to 650,000 V / 25,000 A)
- Power values from 10 W/var/VA to 10 GW/Gvar/GVA
- Energy values up to 4 EWh / 4 EVAh / 4 Evarh & total energy (4 quadrants)
- Breakdown of energy losses
- Characterization of electric motors
- Phase data:  $\cos \phi$ ,  $\tan \phi$ , power factor (PF)
- Crest factor
- THD calculation for currents and voltages
- Harmonics up to the 50th order for currents and voltages
- DC, 50 Hz, 60 Hz and 400 Hz measurements
- Recording of the measurements and calculation results on the SD card
- Automatic recognition of the type of sensors connected
- Numerous network types supported: split-phase, three-phase with or without neutral, etc.
- Communications: USB, Bluetooth, Ethernet, Wifi, GSM 3G, GPRS
- Software for data transfer, real-time communication with a PC and report generation

Configure your preferred communication mode directly in the instrument.



## PEL Transfer software

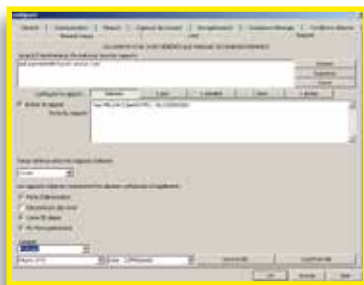
This application software lets you:

- Configure the PEL100
- Check the connections before starting to record
- Download the measurements recorded in the PEL100
- View the various measurement results and analyses

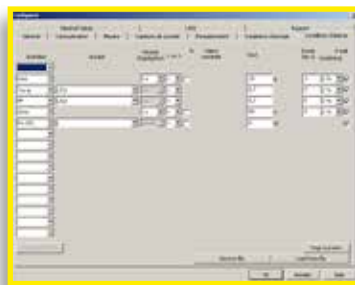
With the comprehensive DataView® processing software, it is also possible to create certified or customized reports.

In this way, DataView® helps you to generate your energy consumption reports more easily.

Our PEL Transfer software performs mathematical processing on the power measurement campaigns and automatically breaks down all the losses detected.



Configuration of alarms



Configuration of L452 loggers



Configuration of IRD Server

## Current sensors compatible with the PEL 100 models



| Model               | MN93                         | MN 93A               | MA194-250<br>MA194-350<br>MA194-1000 | E3N  | PAC93                              | A193-450                      | A193-800          | C193            | J93                                  | MA196                         | A196-610                      |
|---------------------|------------------------------|----------------------|--------------------------------------|--|------------------------------------|-------------------------------|-------------------|-----------------|--------------------------------------|-------------------------------|-------------------------------|
| Measurement range   | 500 mA to 200 Aac            | 0,005 Aac to 100 Aac | 200mA to 10kAac                      | 50 mA to 10 Aac/dc<br>100 mA to 100 Aac/dc | 1 A to 1000 Aac<br>1 A to 1300 Adc | 200 mA to 10 kAac             | 200 mA to 10 kAac | 1 A to 1000 Aac | 50 A to 3500 Aac<br>50 A to 5000 Adc | 100 mA to 10 kAac             | 100 mA to 10 kAac             |
| Clamping Ø / length | 20 mm                        | 20 mm                | Ø 250 / 350 / 1000 mm                | 11.8 mm                                    | 1 x Ø 39 mm<br>2 x Ø 25 mm         | Ø 140 mm / 450 mm             | Ø 250 mm / 800 mm | 52 mm           | 72 mm                                | Ø 100 mm / 350 mm             | Ø190mm / 610mm                |
| IEC 61010           | 600 V CAT III / 300 V CAT IV |                      | 1000V CATIII / 600V CATIV            | 600 V CAT III / 300 V CAT IV               | 600 V CAT III / 300 V CAT IV       | 1000 V CAT III / 600 V CAT IV |                   | 600 V CAT IV    | 600 V CAT III / 1000 V CAT IV        | 1000 V CAT III / 600 V CAT IV | 1000 V CAT III / 600 V CAT IV |

# SPECIFICATIONS

| Models  | PEL102   | PEL103                      | PEL104                                  | PEL106                                      |
|---|--|-----------------------------|---|---|
| Display   | None   | With triple digital display |   | With quadruple digital display              |
| Types of installations  | Single-phase, split-phase, three-phase with or without neutral, and many other specific configurations |                             |   |   |
| Number of channels  | 3 voltage inputs, 3 current inputs (calculated neutral current)  |                             |   | 4 voltage inputs, 4 current inputs          |
| <b>Measurements</b>   |  |                             |   |   |
| Network frequency   | DC, 50 Hz, 60 Hz and 400 Hz  |                             |   |   |
| Voltage (measurement ranges / best accuracy)                        | 10.00 - 1,000 Vac/dc   |                             |   |   |
| Current (depending on sensors) (measurement ranges / best accuracy) | 5 mAac to 10 kAac / 50 mAac to 1.4 kAac  |                             |   |   |
| <b>Calculated measurements</b>                                      |  |                             |   |   |
| Ratio   | Up to 650,000 V / up to 25,000 A   |                             |   |   |
| Power   | 10 W to 10 GW / 10 var to 10 Gvar / 10 VA to 10 GVA  |                             |   |   |
| Energy  | Up to 4 EWh / 4 EVAh / 4 Evarh (E = 1018)  |                             |   |   |
| Phase   | cos $\phi$ , tan $\phi$ , PF   |                             |   |   |
| Harmonics   | THD  |                             |   |   |
| <b>Additional functions</b>   |  |                             |   |   |
| Phase sequence  |  |                             |   | Yes   |
| Min / Max   |  |                             |   | Yes   |
| Mounting  | Magnet   |                             |   | Hook (option)                               |
| <b>Recording</b>  |  |                             |   |   |
| Sampling / Acquisition interval / Aggregation                       | 1 measurement/s - from 1 min to 60 min   |                             | 5 measurements/s - from 1 min to 60 min |   |
| Memory  | SD card, 8 GB (SD-HC card up to 32 GB)   |                             |   |   |
| Communication   | Ethernet, Bluetooth and USB  |                             | Ethernet, Bluetooth, USB, Wifi and GPRS |   |
| Power supply  | 110 V - 250 V (+10 %, -15 %) @ 50-60 Hz & 400 Hz   |                             |   | Power supply via the phase<br>1,000 V AC/DC |
| Safety  | IEC 61010 600 V CAT IV and 1 000 V CAT III   |                             |   | IEC 61010 1000 V CAT IV                     |
| <b>Mechanical specifications</b>                                    |  |                             |   |   |
| Dimensions  | 256 x 125 x 37 mm without sensor   |                             |   | 245 x 270 180 mm                            |
| Weight  | 900 g  | 950 g                       | 900 g                                   | <3400 g                                     |
| Casing  | IP54   |                             |   | IP67  |

## STATE AT DELIVERY:

### PEL102 or PEL103 delivered with:

1 carrying bag, 4 measurement cables (straight-banana/straight-banana 3 m long - black), 4 crocodile clips (black), 1 set of plugs (for the extremities of the cables and current sensors), 1 mains cable, 1 x 8 GB SD card, 1 USB cable, 1 SD-USB adapter, PC software (PEL Transfer), 1 user's manual (on CD), 1 safety datasheet, 1 quick start guide.

### PEL104 with:

1 carrying bag, 4 voltage cables, 4 crocodile clips, PC software (PEL Transfer), 1 set of rings/inserts, 1 x 600 V mains adapter, 1 SD card, 1 SD - USB adapter, 1 USB cable, 1 user's manual in multiple languages, 1 quick start guide.

### PEL106 with:

1 bag for the accessories, 5 x IP67 voltage cables, 5 lockable crocodile clips, 1 set of rings/inserts, PC software (PEL Transfer), 1 SD card, 1 SD - USB adapter, 1 USB cable, 1 user's manual in multiple languages, 1 quick start guide.

## ACCESSORIES:

|                                    |            |
|------------------------------------|------------|
| C193 clamp.....                    | P01120323B |
| MN93 clamp.....                    | P01120425B |
| MN93A clamp.....                   | P01120434B |
| E3N clamp.....                     | P01120043A |
| E3N adapter.....                   | P01102081  |
| PAC93 clamp.....                   | P01120079B |
| J93 clamp.....                     | P01120110  |
| AmpFlex® A193-450 mm clamp.....    | P01120556B |
| AmpFlex® A193-800 mm clamp.....    | P01120531B |
| AmpFlex® A196-610 mm clamp.....    | P01120552  |
| MiniFlex® MA194-250 mm clamp.....  | P01120593  |
| MiniFlex® MA194-350 mm clamp.....  | P01120592  |
| MiniFlex® MA194-1000 mm clamp..... | P01120594  |
| MiniFlex® MA196-350 mm clamp.....  | P01120568  |
| Cables kit (x 5) BB196.....        | P01295479  |
| Mains power cable.....             | P01295174  |
| PEL100 mains adapter.....          | P01102174  |
| Cables/clamps kit (x4).....        | P01295476  |
| Set of plugs/rings.....            | P01102080  |
| 5 A adapter.....                   | P01101959  |
| DataVIEW® software.....            | P01102095  |
| Bag no. 23.....                    | P01298078  |

## REFERENCES TO ORDER:

|                                     |           |
|-------------------------------------|-----------|
| PEL102 without current sensors..... | P01157152 |
| PEL103 without current sensors..... | P01157153 |
| PEL104 without current sensors..... | P01157154 |
| PEL106 without current sensors..... | P01157165 |

L452 logger



Mains adapter



**FRANCE**  
**Chauvin Arnoux**  
 12-16 rue Sarah Bernhardt  
 92600 Asnières-sur-Seine  
 Tel: +33 1 44 85 44 38  
 Fax: +33 1 46 27 95 59  
 export@chauvin-arnoux.fr  
 www.chauvin-arnoux.com

**UNITED KINGDOM**  
**Chauvin Arnoux Ltd**  
 Unit 1 Nelson Ct, Flagship Sq, Shaw Cross Business Pk  
 Dewsbury, West Yorkshire - WF12 7TH  
 Tel: +44 1924 460 494  
 Fax: +44 1924 455 328  
 info@chauvin-arnoux.co.uk  
 www.chauvin-arnoux.com

**Middle East**  
**Chauvin Arnoux Middle East**  
 P.O. BOX 60-154  
 1241 2020 JAL EL DIB - LEBANON  
 Tel: +961 1 890 425  
 Fax: +961 1 890 424  
 camie@chauvin-arnoux.com  
 www.chauvin-arnoux.com

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