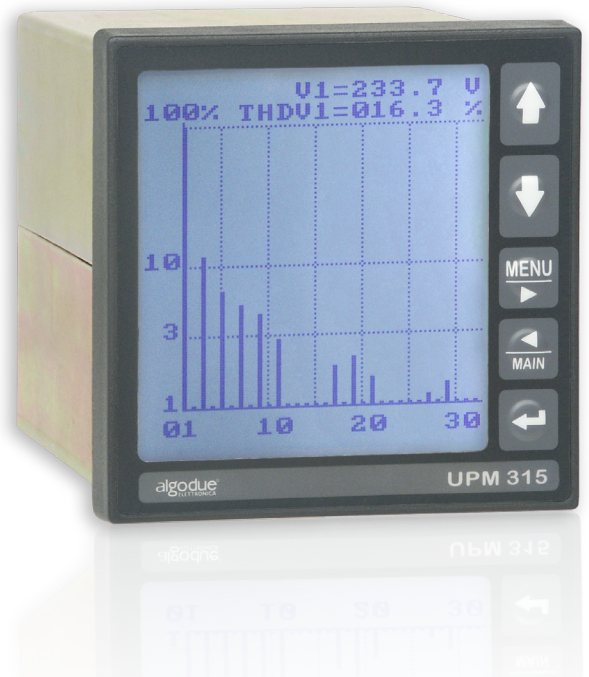


# UPM315

## DIN 96x96 LCD power meter

- DIN 96 for new or retrofit panels
- Highly sophisticated power meter providing advanced functionality features
- Large graphic LCD display with excellent visibility
- Up to two plug-in options
- THD even, odd and individual FFT harmonic analysis up to 50<sup>th</sup> order
- Power and current demand calculation
- On-board memory up to 2 MB
- Programmable Min/Avg/Max and energy data logging
- Event and alarm recording, waveform capture, waveform display, phasor diagrams, historical trending, time-of-use and more...



### » General description

UPM315 is a multifunction metering device with advanced functionality features, suitable for electrical parameters measurement and power quality analysis. It provides accurate True RMS values on graphic LCD display, or via communication port. Six or more parameters displayed simultaneously give the complete situation of the electrical line at first sight. The WINTOOL software can be downloaded for free from Algodue web site and allows to show on a PC all the measured values and to carry out settings in a faster way. UPM315 performs clear graphical functions such as: waveforms of voltage and current, harmonic spectrum, phasor diagrams and trends of measured values. A simple menu structure makes the instrument easy-to-use and allows a quick check of the instrument set-up and memory status. Five languages can be selected easily: English, German, Italian, French and Spanish. The backlit LCD display is highly efficient therefore it guarantees perfect visibility in all light conditions. UPM315 offers small size and is suitable for new installations as well as retrofit applications. The power meter fits in DIN96 square cutouts.

### » Benefits

- UPM315 provides hundreds of accurate True RMS metering values at low cost.
- It provides peak average current and power demand information. This data is essential to work out proper strategies aimed at avoiding uncontrolled power peaks and consequent penalties.
- Being ultra-compact, UPM315 is suitable for replacing conventional meters. It fits in DIN 96 cutout allowing retrofit to existing equipment.
- UPM315 offers time and cost saving on mounting, compared to many individual single-function instruments.
- Via communication port it is possible to read, set and log on a PC all the readings and download the stored data.
- The recorded data allows to generate on a PC consumption profiles, logged values trends, event and alarm reporting, cost allocation and reports as well as to identify critical values.

### » Applications

- Switchboards, gensets, motor control centers, etc.
- Power monitoring & control systems
- Individual machine load monitoring
- Demand management
- Harmonics monitoring
- Remote metering and cost allocation

### » Related Products

- MFC150
- Dedalo Software
- Wintool Software
- AO plug-in board (2 Analog Outputs)

## » Main features

### Measurements

- Single-phase and three-phase 3-wire or 4-wire unbalanced load operation.
- Direct measurement up to 600 (750) VAC.
- Programmable 1A / 5A current full scale.
- True rms metering provides accurate measurement even for distorted waveform.
- Fully bidirectional, four-quadrant readings. 10 energy counters are available, the apparent energy is splitted in four counters: import lagging, import leading, export lagging, export leading.
- Volts, Amps, Power, PF, Frequency, Energy, Min/Max values, Demand, Harmonics, etc. The full version instrument provides more than 600 measured/calculated parameters and shows on the LCD more than 35 graphical pages.
- Individual & total harmonic distortion for voltage and current up to the 50th order. The harmonic content is represented like even, odd and total.
- Advanced waveform capture function. The instrument can store, after a trigger, up to 200 waves with a resolution from 16 to 128 samples (depending on the number of waveforms). The trigger can be programmed on a digital output change, on a set point crossing or the capture can be started from the keypad. The stored waveform is downloadable through the communication port.

### Modularity

- Two slots for optional AO plug-in boards (up to no. 4 analog outputs 0-20 or 4-20 mA).
- The compact DIN96 instrument allows to fit the requirements of new installations as well as retrofit applications.

### Graphics

- The excellent graphical display performs clear graphical representations allowing an immediate comprehension of the measured parameters. The voltage and current waveforms, the harmonic spectrum and the phasor diagrams are displayed. Moreover 6 measured values can be represented as a graphical trend on the display. The scale of the trend can be selected between 15 min, 1 hour, 1 day and 1 month.

### On-board memory

- 2 MB non-volatile memory for data storage.
- Programmable start/stop time of recordings.
- Wraparound or Fill (FIFO/Stack) selectable recording mode.
- Min/Avg/Max logging every 1, 5, 10, 15, 30, 60 minutes, programmable up to 8 selectable parameters.
- Total and daily energy consumption recording. The consumption of more than 300 days is recorded.
- Time-of-Use (TOU) programmable data recording. The TOU function stores the energy consumption in different registers according the programmed time-scheme. A group of 200 registers gives the situation of the previous and current day, and of the previous and current month. This feature is designed to fit different tariff structures, according to the number of TOU included in instrument:
  - 5 TOU: it is possible to program up to 120 daily tariff schedules containing up to 5 tariffs and 15 tariff changes. Each schedule can be assigned to the days of the week and months as requested. Up to 20 holidays can be assigned to the lowest tariff. Moreover, the holiday function can be enabled or disabled. A diagnostic algorithm checks and notifies any setup overlapping.
  - 4 TOU: it is possible to program up to 10 daily tariff schedules containing up to 4 tariffs and 8 tariff changes. Each schedule can be assigned to the days of the week and months as requested. Up to 20 holidays can be assigned to the lowest tariff. A diagnostic algorithm checks and notifies any setup overlapping.
- In case of more than one electricity supplier, it is possible to start from the recorded demand values instead of the daily ones. Each value is recorded with date and time and can be exported for example, in .xls format. This allows to create a flexible map that considers the different electricity suppliers. The DMD value is the AVG value (see programmable recordings).
- Event, alarm and digital outputs ON/OFF recording. The instrument records the status change of 8 programmable set points, the digital outputs ON/OFF and the instrument supply ON/OFF. All the events are integrated by date and time reference.

### Communication

- Both RS232 and RS485 selectable by dip-switches.
- Selectable MODBUS or A2 ASCII protocol.
- Communication speed programmable up to 57600 bps.
- Optional Profibus interface.

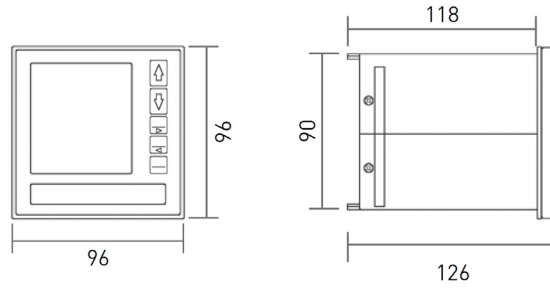
### Inputs & outputs

- Two digital outputs for energy pulsing or for alarm tripping.
- Up to 4 analog outputs 0-20 or 4-20 mA.
- On request input for Rogowski coils.

### Other

- Real time clock with battery backup.
- Calculation of capacitor bank value for PF compensation.
- No. 1 programmable user page with 6 parameters selected among measured values.
- Five alphanumeric character password to avoid unauthorized setup access.
- Downloadable firmware via serial port.

## » Technical drawing



### INSTANTANEOUS MEASUREMENTS

|                                  |   |   |
|----------------------------------|---|---|
| PHASE VOLTAGE                    | $V_{L1-N} - V_{L2-N} - V_{L3-N}$ [V]  | ● |
| LINE VOLTAGE                     | $V_{L1-L2} - V_{L2-L3} - V_{L3-L1}$ [V]   | ● |
| SYSTEM VOLTAGE                   | V [V]   | ● |
| LINE CURRENT                     | $I_{L1} - I_{L2} - I_{L3} - I_N$ [A]  | ■ |
| SYSTEM CURRENT                   | I [A]   | ■ |
| POWER FACTOR                     | $PF_{L1} - PF_{L2} - PF_{L3}$   | ● |
| SYSTEM POWER FACTOR              | PF  | ● |
| DISPLACEMENT POWER FACTOR (COSØ) | $DPF_{L1} - DPF_{L2} - DPF_{L3}$  | ● |
| APPARENT POWER                   | $S_{L1} - S_{L2} - S_{L3}$ [VA]   | ■ |
| SYSTEM APPARENT POWER            | S [VA]  | ■ |
| ACTIVE POWER                     | $P_{L1} - P_{L2} - P_{L3}$ [W]  | ■ |
| SYSTEM ACTIVE POWER              | P [W]   | ■ |
| REACTIVE POWER                   | $Q_{L1} - Q_{L2} - Q_{L3}$ [var]  | ■ |
| SYSTEM REACTIVE POWER            | Q [var]   | ■ |
| FREQUENCY                        | f [Hz]  | ● |
| DEMAND (AVERAGE VALUES)          | $I_{AVG} - 3 \times I_{L,AVG} - I_{N,AVG} - S_{AVG} - P_{AVG} - 3 \times I^2 s_{AVG}$ | ● |
| THERMAL CURRENT                  | $I^2 s_{L1} - I^2 s_{L2} - I^2 s_{L3}$ [A <sup>2</sup> s]                             | ● |
| K FACTOR                         | $K_{L1} - K_{L2} - K_{L3}$  | ● |
| VOLTAGE THD (Total)              | $THD_{L1} - THD_{L2} - THD_{L3}$ [%]  | ● |
| CURRENT THD (Total)              | $THD_{L1} - THD_{L2} - THD_{L3}$ [%]  | ● |
| VOLTAGE THD (Even, Odd)          | $THD_{L1} - THD_{L2} - THD_{L3}$ [%]  | ● |
| CURRENT THD (Even, Odd)          | $THD_{L1} - THD_{L2} - THD_{L3}$ [%]  | ● |
| FFT ANALYSIS 50 <sup>th</sup>    | [%, V, A]   | ● |
| UNBALANCE                        | V, I [%]  | ● |
| PHASE SEQUENCE                   | 123 / 132   | ● |
| REAL TIME CLOCK                  | Date, Time  | ● |

### STORED DATA

|  |   |   |
|--|---|---|
| SYSTEM ACTIVE ENERGY                   | [Wh]  | ■ |
| SYSTEM APPARENT ENERGY                 | [VAh]   | ■ |
| SYSTEM LAGGING REACTIVE ENERGY         | [varh ind]  | ■ |
| SYSTEM LEADING REACTIVE ENERGY         | [varh cap]  | ■ |
| PEAK VALUES                            | $I_{AVG} - 3 \times I_{L,AVG} - I_{N,AVG} - S_{AVG} - P_{AVG} - 3 \times I^2 s_{AVG}$ | ● |
| MIN/MAX with time reference            | 7xV, 5xI, f, 4xPF, 6xTHD  | ● |
| DAILY CONSUMPTION (more than 300 days) | [Wh, VAh, varh]   | ■ |

### PROGRAMMABLE RECORDINGS

|   |   |   |
|---|---|---|
| ALARM/EVENT LOG                             | 8 Set Points, Outputs ON/OFF, Instrument ON/OFF | ● |
| MIN/AVG/MAX VALUES                          | [max 8 parameters]                              | ● |
| Programmable every 1, 5, 10, 15, 30, 60 min |   |   |

### ADVANCED FEATURES

|   |  |   |
|---|--|---|
| TIME OF USE (TARIFF REGISTERS)              | [Wh, VAh, varh]                                    | ● |
| CALCULATION OF PF COMPENSATION              | Capacitor bank [kvar]                              | ● |
| WAVEFORM CAPTURE                            | $3 \times V_{L-N}, 3 \times I_L$ [max 128 samples] | ● |
| GRAPHICAL TRENDS                            | [max 6 parameters]                                 | ● |
| Scale of trend: 15 min/1 hour/1 day/1 month |  |   |

LEGEND  
 ● = Standard  
 ■ = Bi-directional value

## » Specifications

|                                       |   |
|---------------------------------------|---|
| <b>POWER SUPPLY</b>                   |   |
| Rated voltage:                        | 65...250 VAC / 90...250 VDC   |
|                                       | 19...60 VDC on request  |
| Consumption:                          | 5 VA max  |
| <b>VOLTAGE INPUTS</b>                 |   |
| Maximum measurable voltage:           | 600 (750) VAC max L-L   |
| Input impedance:                      | >1.3 MOhm   |
| Burden:                               | 0.15 VA max per phase   |
| Frequency:                            | 45 - 65 Hz  |
| <b>CURRENT INPUTS (TRMS)</b>          |   |
| Rated current (Ib):                   | 1 / 5 A programmable  |
| Min / max measurable current:         | 20 mA / 7A  |
| Maximum overload:                     | 10 A continuous - 100 A for 1 sec   |
| Input impedance:                      | 0.02 Ohm approximately  |
| Burden:                               | 0.5 VA max per phase  |
| Insulation voltage:                   | 150 VAC max between phases  |
| Rogowski input:                       | 200...49995 A on request  |
| <b>TYPICAL ACCURACY</b>               |   |
| Voltage:                              | ±0.1% reading ±0.03% full scale   |
| Current:                              | ±0.1% reading ±0.05% full scale   |
| Active power:                         | ±0.5% reading ±0.1% full scale (PF=1)   |
| Power factor:                         | 1% reading (0.5 inductive - 0.8 capacitive)   |
| Active energy:                        | 1% reading (0.5 inductive - 0.8 capacitive)   |
| Frequency:                            | ±0.05% reading ±2 digits from 45 to 65 Hz   |
| <b>DISPLAY AND OPERATING CONTROLS</b> |   |
| Display:                              | backlighted graphic LCD display, 160 x 144 dots   |
| Keypad:                               | 5 push-buttons  |
| <b>DATA MEMORY</b>                    |   |
| Type:                                 | on-board non-volatile FLASH, 2 MB   |
| <b>COMMUNICATION PORT</b>             |   |
| Type:                                 | 1 selectable RS232 or RS485, optoisolated   |
| Baud rate:                            | programmable from 300 to 57600 bps  |
| Protocols:                            | A2 ASCII, MODBUS  |
| <b>REAL TIME CLOCK</b>                |   |
| Type:                                 | with battery backup   |
| Accuracy:                             | ±30 ppm   |
| <b>DIGITAL OUTPUTS</b>                |   |
| Type:                                 | 2 optoisolated (50 V - 300 mADC)  |
| <b>ENVIRONMENTAL CONDITIONS</b>       |   |
| Operating temperature:                | from -15°C to +60°C   |
| Storage temperature:                  | from -25°C to +75°C   |
| Relative humidity:                    | 80% max without condensation  |
| <b>MECHANICAL CHARACTERISTICS</b>     |   |
| Material:                             | metal enclosure   |
| Protection degree:                    | IP54 (front panel); IP20 (terminals)  |
| Terminals:                            | EU standard pluggable terminals   |
| Size / weight:                        | 96 x 96 x 130 mm / 750 g  |
| <b>STANDARD COMPLIANCE</b>            |   |
| Safety:                               | 73/23/EEC and 93/68/EEC directives, EN 61010.1 safety standard  |
| EMC:                                  | 89/366/EEC directive and following modifications<br>93/31/EEC and 93/68/EEC, EN50081-2, EN50082-2, EN61326/A1 |

| ORDER CODE | POWER SUPPLY | COM PORT    | SELECTABLE COM PROTOCOL |                   | COM2 PROTOCOL | MEASUREMENTS              | MEMORY | TIME OF USE (TOU) |               | I/O |    | REMOTE MANAGEMENT            |
|------------|--------------|-------------|-------------------------|-------------------|---------------|---------------------------|--------|-------------------|---------------|-----|----|------------------------------|
|            | Auxiliary    | RS232/RS485 | A2ASCII                 | MODBUS (Sign bit) | PROFIBUS      | Harmonics, DPF, THD (V,A) | 2MB    | 5 TOU (120sch)    | 4 TOU (10sch) | DO  | AO | WINTOOL (only with A2 ASCII) |

**FOR 1/5A CTs (not included)**

|                |                         |   |   |   |   |                        |   |   |   |   |   |   |
|----------------|-------------------------|---|---|---|---|------------------------|---|---|---|---|---|---|
| 1205.0001.0001 | 65...250VAC/90...250VDC | ● | ● |   |   | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0002.0001 | 65...250VAC/90...250VDC | ● | ● |   |   | up to 50 <sup>th</sup> | ● | ● |   | ● | 2 | ● |
| 1205.0003.0001 | 65...250VAC/90...250VDC | ● | ● |   |   | up to 50 <sup>th</sup> | ● | ● |   | ● | 4 | ● |
| 1205.0004.0001 | 19...60VDC              | ● | ● |   |   | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0005.0001 | 19...60VDC              | ● | ● |   |   | up to 50 <sup>th</sup> | ● | ● |   | ● | 2 | ● |
| 1205.0006.0001 | 65...250VAC/90...250VDC | ● |   | ● |   | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0007.0001 | 65...250VAC/90...250VDC | ● |   | ● |   | up to 50 <sup>th</sup> | ● | ● |   | ● | 2 | ● |
| 1205.0008.0001 | 65...250VAC/90...250VDC | ● |   | ● |   | up to 50 <sup>th</sup> | ● | ● |   | ● | 4 | ● |
| 1205.0009.0001 | 19...60VDC              | ● |   | ● |   | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0010.0001 | 65...250VAC/90...250VDC | ● | ● |   | ● | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0011.0001 | 19...60VDC              | ● | ● |   | ● | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0012.0001 | 65...250VAC/90...250VDC | ● | ● |   |   | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0013.0001 | 65...250VAC/90...250VDC | ● | ● |   |   | up to 50 <sup>th</sup> | ● |   | ● | ● | 2 | ● |
| 1205.0014.0001 | 19...60VDC              | ● | ● |   |   | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0015.0001 | 65...250VAC/90...250VDC | ● |   | ● |   | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0016.0001 | 65...250VAC/90...250VDC | ● |   | ● |   | up to 50 <sup>th</sup> | ● |   | ● | ● | 2 | ● |
| 1205.0017.0001 | 19...60VDC              | ● |   | ● |   | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0018.0001 | 65...250VAC/90...250VDC | ● | ● |   | ● | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0019.0001 | 19...60VDC              | ● | ● |   | ● | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |

**FOR NO. 3 MFC150 ROGOWSKI COILS (not included) - Current full scale value to be specified**

|                |                         |   |   |   |  |                        |   |   |   |   |   |   |
|----------------|-------------------------|---|---|---|--|------------------------|---|---|---|---|---|---|
| 1205.0020.0001 | 65...250VAC/90...250VDC | ● | ● |   |  | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0021.0001 | 65...250VAC/90...250VDC | ● |   | ● |  | up to 50 <sup>th</sup> | ● | ● |   | ● |   | ● |
| 1205.0022.0001 | 65...250VAC/90...250VDC | ● | ● |   |  | up to 50 <sup>th</sup> | ● |   | ● | ● |   | ● |
| 1205.0023.0001 | 65...250VAC/90...250VDC | ● |   | ● |  | up to 50 <sup>th</sup> | ● |   | ● | ● | 2 | ● |

**LEGEND**

**SELECTABLE COM PROTOCOL:** A2 ASCII/MODBUS user selectable. The instrument is factory preset on the protocol checked in the table.

**DO:** 2 digital outputs for alarm or pulse emission.

**AO:** Analog outputs for real time parameter variation transmission. The output number changes according to the model (see table).

**WINTOOL:** Software for instrument remote management, downloadable for free at [www.algodue.it](http://www.algodue.it), in the Client protected area.

NOTE: Subject to change without notice



Innovative Electronic Systems

Via Passerina, 3/A - 28010 Fontaneto d'Agogna (NO) - Italy - Tel.: +39 0322 89307

sales@algodue.it - [www.algodue.com](http://www.algodue.com)

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