

UPM315

DIN 96x96 LCD power meter connectable to MFC150 Rogowski coil

- 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 50th order
- Power and current demand calculation
- On-board memory up to 2 MB
- Programmable Min/Max & 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.

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 DIN 96 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
- Power demand analysis and management
- Harmonics monitoring
- Remote metering and cost allocation

» Related Products

- MFC150
- Dedalo Software
- Wintool Software
- Communication Boards
- I/O Boards

» Main features

Measurements

- Single-phase and three-phase 3-wire or 4-wire unbalanced load operation.
- Direct measurement up to 600 (750) V_{AC}.
- 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 plug-in options boards.
- The compact DIN 96 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

- 128 kB or 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. It's possible to program up to 10 daily tariff schedules containing up to 3 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, if three tariffs are not enough it's 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). In case, UPM315 can be customized with up to 5 tariffs (only on request).
- 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 included in the basic unit. The selection is made by dip-switches accessible from outside.
- Selectable MODBUS or A2 ASCII protocol.
- Communication speed programmable up to 57600 bps.
- Optional 10/100 Ethernet, Profibus or Lonbus interfaces.
- In case of 10/100 Ethernet interface, direct communication through Ethernet / Internet network using MODBUS or A2 ASCII protocol. On-board HTML web page server using A2 ASCII protocol.

Inputs & outputs

- Up to 6 digital outputs for energy pulsing or for alarm tripping. Two digital optomos ML outputs are included in the basic unit.
- 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 characters password to avoid unauthorized setup access.
- Downloadable firmware via serial port.

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	●	
COS Ø	$DPF_{L1} - DPF_{L2} - DPF_{L3}$	○	
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)	$I_{L1} - I_{L2} - I_{L3} - I_{Lx}$ Therm- I_N - $P_{AV} - S_{AV} - I_{AV}$	●	
THERMAL CURRENT	$I_{L1} - I_{L2} - I_{L3}$ [A ² s]	□	
K FACTOR	$K_1 - K_2 - K_3$	□	
VOLTAGE & CURRENT THD (Total)	$THDV_{L1,L2,L3} - THDI_{L1,L2,L3}$ [%]	●	
VOLTAGE & CURRENT THD (Even, Odd)	$THDV_{L1,L2,L3} - THDI_{L1,L2,L3}$ [%]	□	
FFT ANALYSIS 31 st	$V_{L1-N} - V_{L2-N} - V_{L3-N} - I_{L1} - I_{L2} - I_{L3}$ [% , V, A]	○	
FFT ANALYSIS 50 th	$V_{L1-N} - V_{L2-N} - V_{L3-N} - I_{L1} - I_{L2} - I_{L3}$ [% , V, A]	□	
UNBALANCE	V, I [%]	□	
PHASE REVERSAL	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]	■	
MIN/MAX VALUES WITH TIME REFERENCE	7xV, 5xI, f, 4xPF, 6xTHD	□	
PEAK VALUES	$P_{AV} - S_{AV} - I_{AV} - I_{L1} - I_{L2} - I_{L3} - I_{L1TH} - I_{L2TH} - I_{L3TH} - I_{L4TH} - I_N$	●	
PROGRAMMABLE RECORDINGS			
DAILY CONSUMPTION (More than 300 days)	[Wh, VAh, varh]	■	
ALARM / EVENT LOG	8 Set Points, Outputs ON/OFF, Instrument ON/OFF	□	
MIN / AVG / MAX VALUES ⁽¹⁾	[⁽¹⁾]	●	
ADVANCED FEATURES			
GRAPHICAL TRENDS	Max 6 parameters [15min/1hrs/1day/1month]	□	
TIME OF USE (TARIFF REGISTERS)	[Wh, VAh, varh]	□	
WAVEFORM CAPTURE	$V_{L1-N} - V_{L2-N} - V_{L3-N} - I_{L1} - I_{L2} - I_{L3}$ [128 sample max]	□	
CALCULATION OF PF COMPENSATION	Capacitor bank [kvar]	●	

LEGEND

● = Standard

■ = Bidirectional value

○ = Optional

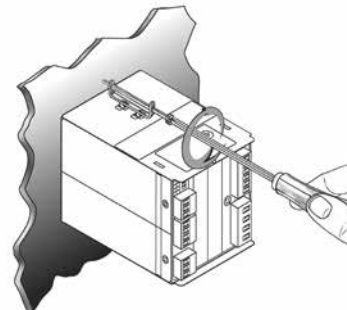
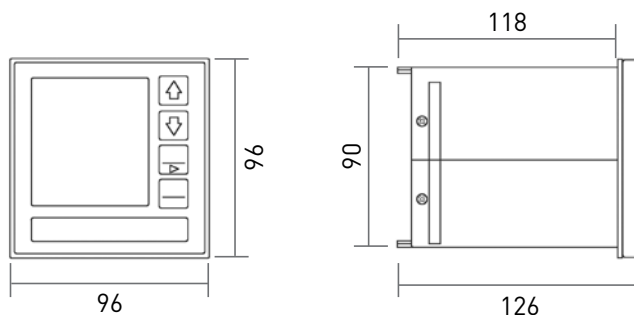
□ = ENH version

⁽¹⁾ Programmable every 1, 5, 10, 15, 30, 60 min
Maximum 8 measured parameters.

» Physical Configuration

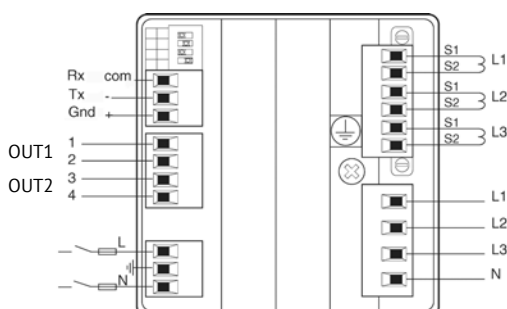
Compact DIN 96x96 instrument

Compact instrument according DIN 96 standard (92 x 92 mm cutout)



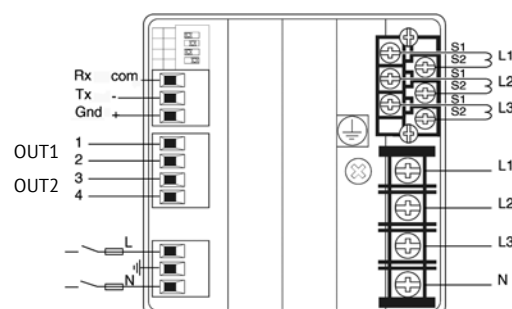
Rear connections - Standard pluggable terminals (EU)

The RS232 / RS485 programmable port and the two digital outputs are included in the basic configuration. Two slots are available for option boards.



Rear connections - Barrier terminal strips (USA)

The RS232 / RS485 programmable port and the two digital outputs are included in the basic configuration. Two slots are available for option boards.



» Specifications

POWER SUPPLY	
Rated voltage:	65÷250 V _{AC} / 90÷250 V _{DC} on request 19÷60 V _{DC}
Consumption:	5 VA max
VOLTAGE INPUTS	
Maximum measurable voltage:	600 (750) V _{AC} max L-L
Input impedance:	>1.3 MOhm
Burden:	max 0.15 VA per phase
Frequency:	45 - 65 Hz
CURRENT INPUTS	
Rated current (Ib):	1 / 5 A _{RMS} programmable
Min / max measurable current:	20 mA / 7 A _{RMS}
Maximum overload:	10 A _{RMS} continuous - 100 A _{RMS} for 1 sec.
Input impedance:	0.02 Ohm approximately
Burden:	max 0.5 VA per phase
Insulation voltage:	150 V _{AC} max between phases
Rogowski input:	200÷49995 A on request
TYPICAL ACCURACY	
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
DISPLAY AND OPERATING CONTROLS	
Display:	backlighted graphic LCD display 160 x 144 dots
Keypad:	5 push-buttons
DATA MEMORY	
Type:	on-board non-volatile FLASH, 128 kB or 2 MB
COMMUNICATION PORT	
Type:	1 selectable RS232 or RS485, optoisolated 1 available for plug-in communication boards
Baud Rate:	programmable from 300 to 57600 bps
REAL TIME CLOCK	
Type:	with battery backup
Accuracy:	± 30 ppm
DIGITAL OUTPUTS	
Type:	2 isolated optomos (50V - 300mA _{CA-CC})
ENVIRONMENTAL CONDITIONS	
Operating temperature:	from -15°C to +60°C
Storage temperature:	from -25°C to +75°C
Relative humidity:	80% max. without condensation
MECHANICAL CHARACTERISTICS	
Material:	metal enclosure
Protection degree:	IP54 (front panel); IP20 (terminals)
Terminals:	standard pluggable terminals (EU) on request barrier terminal strips (USA)
Size / weight:	96x96x130 mm / 750 gr
STANDARDS COMPLIANCE	
Safety:	73/23/EEC, 93/68/EEC directives, EN61010.1
EMC:	89/366/EEC directive and following modifications 93/31/EEC and 93/68/EEC, EN50081-2, EN50082-2, EN61326/A1

15 DIGIT ORDER CODE

UPM315

Labelling

A = Algodue
C = Custom

Language

I = Italian
U = English
D = German

Communication protocol

B = A2 ASCII
C = MODBUS
L = LONBUS
P = PROFIBUS
E = ETHERNET*
W = ETHERNET with web server*

Aux power supply

A = $65 \div 250V_{AC} / 90 \div 250V_{DC}$
R = $19 \div 60V_{DC}$

Serial port

5 = RS232/485 selectable by dip switch

Memory

1 = 128 kB basic version
6 = 2 MB ENH version (only with firmware option 4)

Firmware options

2 = Basic version
3 = Version with harmonics up to 31st + DPF
4 = ENH version with harmonics up to 50th + DPF (only with memory 6)

Time of use (TOU) - only with ENH version

X = None (only with firmware option 2 or 3)
2 = 5 time of use (120 schedules) (only with firmware opt. 4)
R = 3 time of use (10 schedules) (only with firmware opt. 4)
S = 4 time of use (10 schedules) (only with firmware opt. 4)

Digital outputs**

2 = Basic version with 2 outputs ($50V - 300mA_{AC-DC}$)
4 = Basic version + DO2-ML plug-in board
6 = Basic version + DO4-ML plug-in board

Analog outputs**

X = None
2 = AO2-0420 plug-in board (2 programmable outputs)
4 = 2 AO2-0420 plug-in boards (4 programmable outputs)

Inputs

X = None
R = Rogowski input 200÷49995A (value to be specified)

Physical configuration

A = Standard Pluggable Terminals (EU)
G = Barrier Terminal Strips (USA)

	ALR
	5

* In case of ETHERNET, default protocol is A2 ASCII.

For MODBUS protocol specify it in the order

** Max 2 slots for plug-in optional boards.

NOTE:

- Subject to change without notice

- The code made up of 15 digits including the X



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