

# UPM307

## DIN 96x96 compact LCD power meter

- Depth 60 mm only
- True RMS measurement
- More than 100 electrical parameters displayed
- Neutral current monitoring
- Fully bi-directional four quadrants readings
- High contrast graphic LCD display with a very large viewing area
- Power and current demand calculation during user-definable time period
- THD and individual FFT harmonic analysis up to 15<sup>th</sup> order
- No PTs required up to 600 (750) V<sub>AC</sub>
- Programmable CT and PT ratios
- Easy to use



### General description

UPM307 is a digital meter able to measure the electrical parameters on three-phase systems.

It provides accurate measurements even by distorted waveform. The backlit LCD display is very large and highly efficient, therefore it guarantees perfect visibility in all light conditions.

A simple menu structure makes the instrument easy to use and allows a quick check of the measured parameters.

The working parameters can be easily set up by instrument keypad.

The RS232 or RS485 serial communication port allows to transfer the three-phase electrical parameters from the instrument.

WINTOOL, free of charge software, allows to show on a PC all the measured values and to program the instrument in a fast way.

The EVU model is a version dedicated for 3 phases-2 wires-1CT wiring diagram. It allows to select the line voltage and the phase current to be connected to the instrument.

UPM307 replaces multiple analog meters as well as single function meters such as voltmeters, ammeters, wattmeters, varmeters, frequency-meters, powerfactor-meters, energy-meters, etc.

UPM307 is a compact, cost effective meter operating both as a stand-alone device or as an integral part of a more extensive energy monitoring and management network.

### Benefits

- UPM307 is the low cost solution for monitoring of all the main electrical parameters.
- 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.
- UPM307 being ultra-compact and easy to mount is suitable for replacing conventional meters. UPM307 provides powerful capabilities not offered by traditional analog meters.
- UPM307 allows time and cost saving on mounting, compared to many individual single-function instruments.
- Via communication port it is possible to read and log on a PC all the readings. The remote connection allows to generate on a PC consumption profiles, logged values trends, 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

**Main features**

**Measurements**

- Single-phase and three-phase 3-wire or 4-wire unbalanced load operation.
- True RMS metering provides accurate measurement even for distorted waveform.
- Fully bi-directional, four-quadrant readings.
- More than 100 electrical parameters measured (instantaneous, demand, peak values, energies, etc.).
- THD calculation on voltage and current.
- Optional FFT analysis up to 15th order.
- Direct measurement up to 600 (750) V<sub>AC</sub>.
- Programmable 1A / 5A current full scale.
- Programmable CT & PT ratios.
- Optional temperature indication.

**Front panel display**

- High contrast bright, easy to read, graphic LCD display with a very large viewing area of 79x44 mm.
- White LED display backlighting with 100.000 hours minimum lifetime.
- Up to four parameters displayed on the same page.

**Communication**

- RS232 or RS485 optoisolated communication port.
- MODBUS or A2 ASCII protocol.
- Communication speed programmable up to 57600 bps.
- Optional built-in Profibus, Lonbus, Ethernet interfaces.

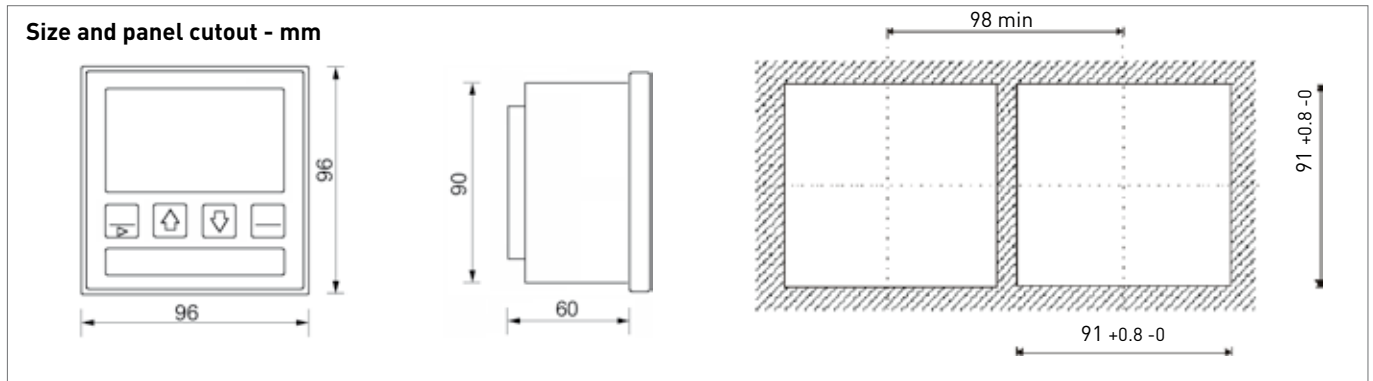
**Inputs & outputs**

- Two digital outputs for energy pulsing or for alarm tripping.
- On request input for Rogowski coils.

**Other**

- Real time waveform downloading via communication port. This function allows to represent graphically on the PC the three voltages and the three currents with 128 samples per cycle.
- Available languages: English, German, Italian, French.
- Possibility to manage the instrument by web server using Ethernet interface.

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 (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)	$3 \times I_{AVG} - S_{AVG} - P_{AVG}$	●
VOLTAGE THD	$THD_{L1} - THD_{L2} - THD_{L3}$ [%]	○
CURRENT THD	$THD_{L1} - THD_{L2} - THD_{L3}$ [%]	○
FFT ANALYSIS 15 <sup>TH</sup>	[% , V, A]	○
PHASE REVERSAL	123 / 132	●
TEMPERATURE	T [°C, °F]	○
STORED DATA		
SYSTEM ACTIVE ENERGY	[Wh]	■
SYSTEM APPARENT ENERGY	[VAh]	■
SYSTEM LAGGING REACTIVE ENERGY	[varh ind]	■
SYSTEM LEADING REACTIVE ENERGY	[varh cap]	■
PEAK VALUES	$3 \times V_{L-N} - 3 \times V_{L-L} - 3 \times I_L - 3 \times I_{AVG} - I_N - P_{AVG} - S_{AVG}$	●
● = Standard      ■ = Bi-directional value      ○ = Optional		



**Specifications**

**Power supply**

Rated voltage: 115 V<sub>AC</sub> or 230 V<sub>AC</sub> +15% -20% on request  
 65÷250 V<sub>AC</sub> / 90÷250 V<sub>DC</sub> on request  
 19÷60 V<sub>DC</sub> on request  
 Consumption: 2 VA max

**Voltage inputs**

Maximum measurable voltage: 600 (750) V<sub>AC</sub> max L-L  
 Input impedance: >1.3 MOhm  
 Burden: max 0.15 VA per phase  
 Frequency: 45 - 65 Hz

**Current inputs**

Rated current (I<sub>b</sub>): 1 / 5 A<sub>RMS</sub> programmable  
 Min / max measurable current: 20 mA / 7 A<sub>RMS</sub>  
 Maximum overload: 10A<sub>RMS</sub> continuous - 100 A<sub>RMS</sub> for 1 sec.  
 Input impedance: 0.02 Ohm approximately  
 Burden: max 0.5 VA per phase  
 Insulation voltage: 150 V<sub>AC</sub> max between phases  
 Rogowski input: 200÷49995 A on request

**Typical accuracy**

Voltage: ±0.2% reading ±0.1% full scale  
 Current: ±0.2% reading ±0.1% full scale  
 Active power: ±1% reading ±0.2% 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 ±1 digit from 45 to 65 Hz

**Display and operating controls**

Display: back-lighted graphic LCD 132x64 dots  
 Keypad: 4 push-buttons

**Communication port**

Type: RS232 or RS485 on request, optoisolated  
 Baud rate: programmable from 300 to 57600 bps  
 78 kbps fixed, in case of LONBUS  
 up to 12 Mbps, in case of PROFIBUS  
 10/100 Mbps, in case of ETHERNET on LAN side

**Real time clock**

Type: with battery backup  
 Accuracy: ± 30 ppm

**Digital outputs**

Type: 2 optoisolated (50V-100mA<sub>AC-DC</sub>)

**Environmental conditions**

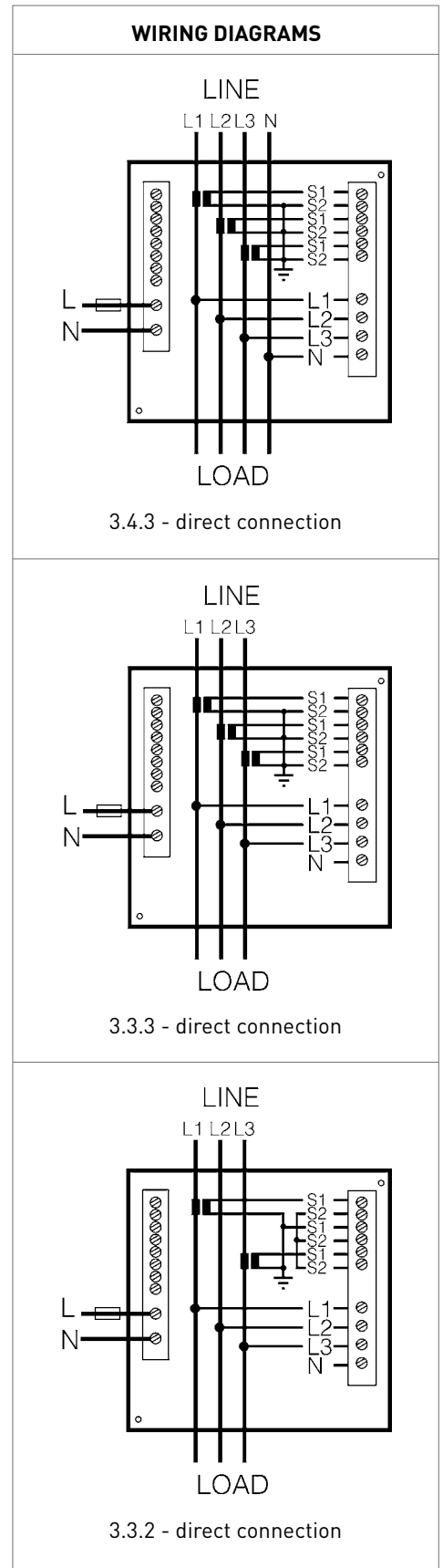
Operating temperature: from -10°C to +60°C  
 Storage temperature: from -25°C to +75°C  
 Relative humidity: 80% max. without condensation

**Mechanical characteristics**

Material: plastic enclosure  
 Protection degree: IP54 (front panel); IP20 (terminals)  
 Terminals: conductors 2.5 mm<sup>2</sup>  
 Size / weight: 96x96x60 mm or 96x96x100 mm  
 500 gr max, depending on the configuration

**Standards compliance**

Safety: 73/23/EEC and 93/68/EEC directives, EN61010.1 safety standard  
 EMC: 89/366/EEC directive and following modifications 93/31/EEC and 93/68/EEC, EN50081-2, EN50082-2, EN61326/A1



**Wiring diagrams**

UPM307 offers a very good connection versatility for measuring inputs. In addition to the standard 3 and 4-wire wiring diagrams (see on previous page), special connections are available, all of them programmable from the menu.

The additional wiring diagrams are the results of the on-field experience, focused sometime to simplify the connection, especially when the load is balanced or when an high accuracy is not requested.

**3.3.1**

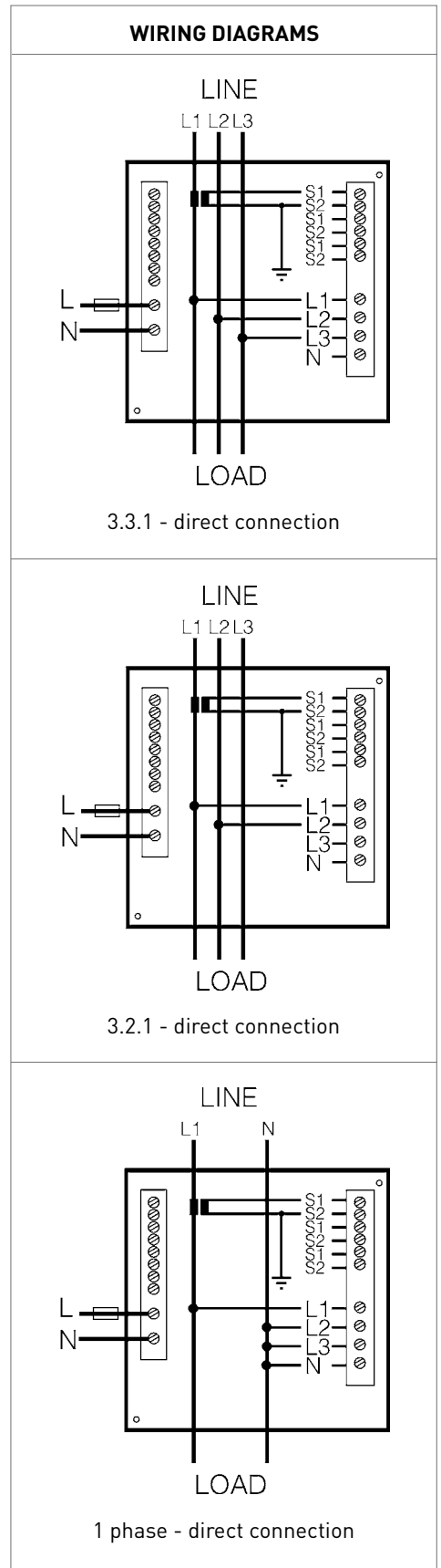
Simplified wiring diagram for balanced loads with only one current transformer. The measuring error is proportional to the current unbalance.

**3.2.1**

Simplified wiring diagram for balanced loads with only one current transformer and one voltage connection. The measuring error is proportional to the current and the voltage unbalance. Useful for time / cost saving.

**1 phase**

Single phase wiring diagram up to 400 V<sub>AC</sub>.



3.3.1 - direct connection

3.2.1 - direct connection

1 phase - direct connection

**WINTOOL - Communication and Monitoring Software**



- For Microsoft Windows environments
- User-friendly
- Real-time Data Viewing
- Quick Instruments Setup
- Parameters verification
- Available for free on the Web

**DOWNLOAD IT FROM OUR WEB SITE**

WINTOOL software enables the power meters to be connected to a PC for measured data viewing. It allows an easy and fast way to set the instrument parameters by a desktop or portable PC.

The remote monitoring is carried out through serial communication port (RS232 or RS485) or Ethernet TCP/IP / Internet connection.

It is a multilanguage software, at present the available languages are: English, German, Italian, French, Spanish, Hungarian.

It is the "free-of-charge" solution to configure and display the readings from instruments with or without display.

**Real-time data viewing**

WINTOOL displays real-time values from the instruments.

The available information includes:

- Real time values (voltage, current, power, PF, power)
- Energy consumption values (active, reactive and apparent)

**Quick instrument setup**

Because of user-friendly approach, the power meters can be configured more quickly by the WINTOOL software than by using keypad.

The software shows the hardware configuration of the connected meter.

A SEARCH function allows to automatically detect the connected meter without the need of writing the serial number.

ORDER CODE												
ALL						X		X		X		X
<p><b>UPM307</b></p> <p><b>Series</b> A = Algodue C = Custom</p> <p><b>Language</b> I = Italian U = English D = German F = French</p> <p><b>Communication protocol</b> X = None (without serial port) B = A2 ASCII C = MODBUS L = LONBUS (only with power supply C or R) P = PROFIBUS (only with power supply C or R) E = ETHERNET* (only with power supply C or R) W = ETHERNET with web server* (only with power supply C or R)</p> <p><b>Aux power supply</b> A = 115 V<sub>AC</sub> +15% -20% (60 mm instrument depth) B = 230 V<sub>AC</sub> +15% -20% (60 mm instrument depth) C = 65÷250 V<sub>AC</sub> / 90÷250 V<sub>DC</sub> (100 mm instrument depth) R = 19÷60 V<sub>DC</sub> (100 mm instrument depth)</p> <p><b>Serial port</b> X = None 2 = RS232 5 = RS485</p> <p><b>Firmware options</b> 5 = Basic version (with THD on voltage and current) 3 = Version with harmonics up to 15<sup>th</sup> + DPF 4 = EVU version (3 phases 2 wires 1 CT single wiring mode)</p>						<p><b>Inputs</b> X = None R = Rogowski input 200÷49995A (value to be specified) T = Temperature sensor<sup>†</sup></p> <p><b>Digital outputs</b> 2 = 2 NPN outputs (50V - 100mA<sub>AC-DC</sub>) 3 = 2 PNP outputs (50V - 100mA<sub>AC-DC</sub>)</p> <p>* In case of ETHERNET, default protocol is A2 ASCII. For MODBUS protocol specify it in the order.</p> <p><sup>†</sup> Temperature sensor is not available for versions with communication protocol L, P, E, W and for versions with firmware option 4.</p>						
						<p style="text-align: right;">Digital outputs - NPN type</p>						
						<p style="text-align: right;">Digital outputs - PNP type</p>						

Subject to change without notice



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