

UPM309 <1/5A CT>

DIN 96x96 multifunction three-phase meter

- DIN 96x96 ultra compact version, only 39 mm depth
- Fully bi-directional four quadrants measurements for all energies and powers
- Main electrical parameters measured and displayed for a cost-effective consumption analysis
- Version for 1 or 5A CT and for direct connection up to 6A
- Possibility to connect by PT
- Up to 8 MB for data recording (ENH version)
- Possibility to record all energy counters (ENH version)
- Up to 24 parameters selectable among real time measurements for MIN/AVG/MAX recording (ENH version)
- MODBUS RTU/ASCII communication by RS485 port or MODBUS TCP communication by Ethernet port
- Possibility to manage the instrument in remote mode by WintoolNET software or by Web interface
- 2 digital outputs, 1 digital input, 1 analog output (optional)



» General features

UPM309 is an innovative instrument for measurement and recording of the electrical parameters. It is particularly suitable for consumption analysis and control, with an excellent quality/price ratio.

UPM309 is the ideal instrument to establish the measurement points on the plant.

The instrument can communicate through the RS485 serial port by MODBUS RTU/ASCII protocol or through Ethernet port by MODBUS TCP protocol.

Furthermore, it is available the WintoolNET software for the instrument remote management. Web interface is also available in case of instrument with Ethernet port: a very useful function that gives the possibility to manage the instrument by any PC connected on the network.

» Benefits

- UPM309 provides fully and accurate information on the load in the measurement point and it allows to calculate the costs of the energy consumption.
- Data read by PC allows to generate consumption profiles, recorded values trend, alarms/events report and costs calculation as well as critical values identification.
- Available the remote firmware upgrade of the instrument.

» Applications

- Energy audit.
- Monitoring system and energy control.
- Individual machine load monitoring.
- Power peak control.
- Switchboards, gensets, motor control centers, etc.
- Remote metering and cost allocation.

» Related products

- WintoolNET

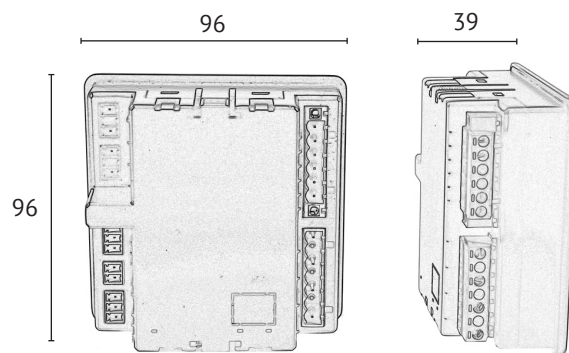
» Available configurations

| | | BASIC | ENH |
|---|--|-------|-----|
| CURRENT INPUTS | For 1/5A CT | ● | ● |
| AUXILIARY POWER SUPPLY (make one choice only) | 115 VAC ±15% (only for instrument with RS485 port) | ● | ● |
| | 230 VAC ±15% (only for instrument with RS485 port) | ● | ● |
| | 85...265 VAC / 110 VDC ±15% (only for instrument with Ethernet port) | | ● |
| COMMUNICATION PORT (make one choice only) | RS485 for MODBUS RTU/ASCII communication | ● | ● |
| | Ethernet for HTTP, MODBUS TCP communication | | ● |
| INSTRUMENT REMOTE MANAGEMENT | WintoolNET | ● | ● |
| | Web server (only for instrument with Ethernet port) | | ● |
| SIGN REPRESENTATION IN MODBUS PROTOCOL (make one choice only) | Sign bit | ● | ● |
| | 2's complement | ● | ● |
| 2 DIGITAL OUTPUTS | For alarm events or pulse emissions | ● | ● |
| ANALOG OUTPUT (only for instrument with RS485 port) | 0...20 / 4...20 mADC, programmable | | ○ |
| DIGITAL INPUT | To synchronise the DMD value calculation | ● | ● |
| DMD VALUE CALCULATION MODE | Digital input synchronisation or Fixed window | ● | |
| | Digital input synchronisation, Fixed or Sliding window | | ● |
| MEMORY | 1 MB | ● | |
| | 8 MB | | ● |
| RECORDINGS | Active and reactive power AVG values | ● | |
| | Real time params MIN/AVG/MAX values (up to 24 params programmable) | | ● |
| | Energy counters | | ● |
| WIRING MODES | Three phase, 4 wires, 3 currents (3.4.3) | ● | ● |
| | Three phase, 3 wires, 2 currents (3.3.2) | ● | ● |
| | Single phase (1ph) | ● | ● |
| THD & HARMONICS | Voltage and current THD values | ● | ● |
| | Voltage and current harmonics up to 15 th | | ● |
| APPARENT ENERGY COUNTERS (make one choice only) | Total counters | ● | ● |
| | Separated Inductive&Capacitive counters | ● | ● |

LEGEND

- = Standard
- = Optional

» Technical drawing



» Measurements & recordings

| INSTANTANEOUS VALUES | | BASIC | ENH |
|--|---|-------|-------|
| VOLTAGE | $V_{L1-N} - V_{L2-N} - V_{L3-N} - V_{L1-L2} - V_{L2-L3} - V_{L3-L1} - V_{\Sigma}$ [V] | ● | ● MAM |
| CURRENT (+/-) | $I_{L1} - I_{L2} - I_{L3} - I_N - I_{\Sigma}$ [A] | ● | ● MAM |
| ACTIVE POWER (+/-) | $P_{L1} - P_{L2} - P_{L3} - P_{\Sigma}$ [W] | ● AVG | ● MAM |
| REACTIVE POWER (+/-) | $Q_{L1} - Q_{L2} - Q_{L3} - Q_{\Sigma}$ [var] | ● AVG | ● MAM |
| APPARENT POWER (+/-) | $S_{L1} - S_{L2} - S_{L3} - S_{\Sigma}$ [VA] | ● | ● MAM |
| POWER FACTOR (ind&cap) | $PF_{L1} - PF_{L2} - PF_{L3} - PF_{\Sigma}$ | ● | ● MAM |
| DPF (+/-) | $DPF_{L1} - DPF_{L2} - DPF_{L3}$ | | ● MAM |
| TANGENT Ø (+/-) | $TAN\theta_{L1} - TAN\theta_{L2} - TAN\theta_{L3} - TAN\theta_{\Sigma}$ | ● | ● MAM |
| VOLTAGE THD | $THDV_{L1} - THDV_{L2} - THDV_{L3} - THDV_{L1-L2} - THDV_{L2-L3} - THDV_{L3-L1}$ [V] | ● | ● MAM |
| CURRENT THD | $THDA_{L1} - THDA_{L2} - THDA_{L3} - THDA_N$ [A] | ● | ● MAM |
| FREQUENCY | f [Hz] | ● | ● MAM |
| PHASE ORDER | Ph | ● | ● |
| DEMAND VALUES (DMD) | | | |
| DMD CURRENT (abs) | $I_{L1DMD} - I_{L2DMD} - I_{L3DMD} - I_{NDMD} - I_{\Sigma DMD}$ [A] | | ● |
| DMD ACTIVE POWER (imp&exp) | $P_{L1DMD} - P_{L2DMD} - P_{L3DMD} - P_{\Sigma DMD}$ [W] | ● | ● |
| BALANCE OF DMD SYSTEM ACTIVE POWER (+/-) | $P_{\Sigma DMBAL}$ [W] | | ● |
| DMD REACTIVE POWER (imp&exp) | $Q_{L1DMD} - Q_{L2DMD} - Q_{L3DMD} - Q_{\Sigma DMD}$ [var] | ● | ● |
| BALANCE OF DMD SYSTEM REACTIVE POWER (+/-) | $Q_{\Sigma DMBAL}$ [var] | | ● |
| DMD APPARENT POWER (imp&exp) | $S_{L1DMD} - S_{L2DMD} - S_{L3DMD} - S_{\Sigma DMD}$ [VA] | | ● |
| BALANCE OF DMD SYSTEM APPARENT POWER (+/-) | $S_{\Sigma DMBAL}$ [VA] | | ● |
| DMD POWER FACTOR (imp&exp) | $PF_{L1DMD} - PF_{L2DMD} - PF_{L3DMD} - PF_{\Sigma DMD}$ | | ● |
| MAX VALUES | | | |
| MAX VOLTAGE | $V_{L1-NMAX} - V_{L2-NMAX} - V_{L3-NMAX} - V_{L1-L2MAX} - V_{L2-L3MAX} - V_{L3-L1MAX} - V_{\Sigma MAX}$ [V] | ● | ● |
| MAX CURRENT (abs) | $I_{L1MAX} - I_{L2MAX} - I_{L3MAX} - I_{NMAX} - I_{\Sigma MAX}$ [A] | ● | ● |
| MAX ACTIVE POWER (imp&exp) | $P_{L1MAX} - P_{L2MAX} - P_{L3MAX} - P_{\Sigma MAX}$ [W] | | ● |
| MAX REACTIVE POWER (imp&exp) | $Q_{L1MAX} - Q_{L2MAX} - Q_{L3MAX} - Q_{\Sigma MAX}$ [var] | | ● |
| MAX APPARENT POWER (imp&exp) | $S_{L1MAX} - S_{L2MAX} - S_{L3MAX} - S_{\Sigma MAX}$ [VA] | | ● |
| MAX POWER FACTOR (imp&exp) | $PF_{L1MAX} - PF_{L2MAX} - PF_{L3MAX} - PF_{\Sigma MAX}$ | | ● |
| MAX TANGENT Ø (imp&exp) | $TAN\theta_{L1MAX} - TAN\theta_{L2MAX} - TAN\theta_{L3MAX} - TAN\theta_{\Sigma MAX}$ | | ● |
| MAX VOLTAGE THD | $THDV_{L1MAX} - THDV_{L2MAX} - THDV_{L3MAX} - THDV_{L1-L2MAX} - THDV_{L2-L3MAX} - THDV_{L3-L1MAX}$ [V] | | ● |
| MAX CURRENT THD | $THDA_{L1MAX} - THDA_{L2MAX} - THDA_{L3MAX} - THDA_{NMAX}$ [A] | | ● |
| MAX DMD CURRENT | $I_{L1MAXDMD} - I_{L2MAXDMD} - I_{L3MAXDMD} - I_{\Sigma MAXDMD}$ [A] | | ● |
| MAX DMD ACTIVE POWER (imp&exp) | $P_{L1MAXDMD} - P_{L2MAXDMD} - P_{L3MAXDMD} - P_{\Sigma MAXDMD}$ [W] | ● | ● |
| MAX DMD REACTIVE POWER (imp&exp) | $Q_{L1MAXDMD} - Q_{L2MAXDMD} - Q_{L3MAXDMD} - Q_{\Sigma MAXDMD}$ [var] | ● | ● |
| MAX DMD APPARENT POWER (imp&exp) | $S_{L1MAXDMD} - S_{L2MAXDMD} - S_{L3MAXDMD} - S_{\Sigma MAXDMD}$ [VA] | | ● |
| MIN VALUES | | | |
| MIN SYSTEM ACTIVE POWER | $P_{\Sigma MIN}$ [W] | ● | ● |
| MIN SYSTEM REACTIVE POWER | $Q_{\Sigma MIN}$ [var] | ● | ● |
| MIN SYSTEM APPARENT POWER | $S_{\Sigma MIN}$ [VA] | ● | ● |
| COUNTERS | | | |
| ACTIVE ENERGY (imp&exp) | $kWh_{L1} - kWh_{L2} - kWh_{L3} - kWh_{\Sigma}$ [Wh] | ● | ● EC |
| BALANCE OF SYSTEM ACTIVE ENERGY | $kWh_{\Sigma BAL}$ [Wh] | ● | ● EC |
| REACTIVE ENERGY (imp&exp) (ind&cap) | $kvarh_{L1} - kvarh_{L2} - kvarh_{L3} - kvarh_{\Sigma}$ [varh] | ● | ● EC |
| BALANCE OF SYSTEM REACTIVE ENERGY (ind&cap) | $kvarh_{\Sigma BAL}$ [varh] | ● | ● EC |
| APPARENT ENERGY (imp&exp) (ind&cap on request) | $kVAh_{L1} - kVAh_{L2} - kVAh_{L3} - kVAh_{\Sigma}$ [VAh] | ● | ● EC |
| BALANCE OF SYSTEM APPARENT ENERGY (ind&cap on request) | $kVAh_{\Sigma BAL}$ [VAh] | ● | ● EC |
| INSTALLATION HOUR COUNTER | HRCNTi [h] | | ● |
| MEASUREMENT HOUR COUNTER | HRCNTm [h] | | ● |
| HARMONIC ANALYSIS UP TO 15 th | | | |
| VOLTAGE HARMONICS | $V_{L1-N} - V_{L2-N} - V_{L3-N} - V_{L1-L2} - V_{L2-L3} - V_{L3-L1}$ [V] | | ● MAM |
| CURRENT HARMONICS | $I_{L1} - I_{L2} - I_{L3} - I_N$ [A] | | ● MAM |

LEGEND

● = Standard

+/- = Signed value
 imp&exp = Values splitted in imported and exported
 abs = Absolute value
 ind&cap = Values splitted in inductive and capacitive

AVG = Parameters for AVG recording (fixed)
 MAM = Parameters for MIN/AVG/MAX recording (up to 24 params programmable)
 EC = Parameters for Energy counter recording (fixed)

DMDBAL = Difference between the positive and negative demand value: [DMD+] - [DMD-]
 BAL = Difference between the imported and exported value: [imp] - [exp]

» Specifications

| POWER SUPPLY | |
|---|--|
| Voltage range (according to the model): | Instrument with RS485 port: 230 VAC ±15% 115 VAC ±15% on request |
| Safety: | Instrument with Ethernet port: 85...265 VAC / 110 VDC ±15% 300 V CAT III |
| Frequency: | 50/60 Hz |
| VOLTAGE INPUTS | |
| Maximum measurable voltage: | 600 VAC L-L |
| Safety: | 300 V CAT III |
| Minimum voltage for FFT calculation: | 20/35 VAC (multiplied by PT ratio in case of PT use) with direct connection |
| Input impedance: | >1.3 MOhm |
| Frequency: | 45 - 65 Hz |
| CURRENT INPUTS | |
| Maximum value: | 7 A |
| Starting current (I_{s1}): | 2 mA |
| CT burden: | max 0.15 VA per phase |
| Minimum current for FFT calculation: | 100 mA * CT ratio |
| TYPICAL ACCURACY | |
| Voltage: | ±0.2% reading in 10% FS...FS range (FS=Full Scale value) |
| Current: | ±0.4% reading in 5% FS...FS range |
| Power: | ±0.5% reading ±0.1% FS (PF=1) |
| Frequency: | ±0.1% reading ±1 digit in 45...65 Hz range |
| Active energy: | Class 1 according to IEC/EN 62053-21 |
| Reactive energy: | Class 2 according to IEC/EN 62053-23 |
| DISPLAY & KEYBOARD | |
| Display: | Backlighted LCD, 78x61 mm 3 rows, 4 digits + symbols |
| Keyboard: | 4 front buttons |
| COMMUNICATION PORT | |
| Type: | RS485 optoisolated or Ethernet (RJ45) |
| Protocols: | MODBUS RTU/ASCII in case of RS485 port HTTP, NTP, DHCP, MODBUS TCP in case of Ethernet port |
| Baud rate: | 300 a 57600 bps in case of RS485 port 10/100 Mbps in case of Ethernet port |
| 2 DIGITAL OUTPUTS (DO) | |
| Type: | NPN or PNP, passive optoisolated |
| Maximum values (according to IEC/EN 62053-31): | 27 VDC - 27 mA |
| Energy pulse length (only for DO in pulse mode): | 50 ±2ms ON time |
| Max output reaction time (only for DO in alarm mode): | 1 s |
| ANALOG OUTPUT (AO) | |
| Type: | Active optoisolated |
| Selectable ranges: | 0...20 / 4...20 mADC |
| Maximum load: | 500 Ω |
| DIGITAL INPUT (DI) | |
| Type: | Optoisolated |
| Voltage range: | 80 ... 265 VAC-DC |
| WIRE DIAMETER FOR TERMINALS | |
| Measuring terminals (A&V): | 2.5 mm ² / 14 AWG |
| Terminals for I/O, AUX, RS485 port: | 1.5 mm ² / 16 AWG |
| SIZE & WEIGHT | |
| LxHxP, W: | 96x96x39 mm, max 310 g |
| ENVIRONMENTAL CONDITIONS | |
| Operating temperature: | -25°C ... +55°C (3K6) |
| Storage temperature: | -25°C ... +75°C (2K3) |
| Max humidity (without condensation): | 80% |
| Sinusoidal vibration amplitude: | 50 Hz ±0.075 mm |
| Protection degree - frontal part: | IP54 (granted only in case of installation in a cabinet with at least IP54 protection degree) |
| Protection degree - terminals: | IP20 |
| Pollution degree: | 2 |
| Installation and use: | Internal |
| STANDARD COMPLIANCE (for the parts applicable for instrument) | |
| Directives: | 2006/95/EC, 2004/108/EC |
| Safety: | EN 61010-1, EN 61010-2-030, EN 61010-2-032 |
| EMC: | EN 61326-1, EN 55011, EN 61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11, EN61000-6-2 |

| ORDER CODE | VERSION | | POWER SUPPLY | COMMUNICATION PORT with SIGN BIT in Modbus | | APPARENT EN. COUNTER (VAh) | I/O | | | REMOTE MANAGEMENT | |
|------------------------------------|---------|-----|-----------------------------|--|----------|----------------------------|-----|----|----|-------------------|------------|
| | BASIC | ENH | Auxiliary | RS485 | ETHERNET | SEPARATED Ind&Cap | DI | DO | AO | WintoolNET | Web Server |
| FOR 1/5A CTs (not included) | | | | | | | | | | | |
| 1211.0001.0001 | ● | | 230VAC ±15% | ● | | ● | ● | ● | | ● | |
| 1211.0002.0001 | | ● | 230VAC ±15% | ● | | ● | ● | ● | | ● | |
| 1211.0003.0001 | | ● | 230VAC ±15% | ● | | ● | ● | ● | ● | ● | |
| 1211.0004.0001 | | ● | 85...265VAC/ 110VDC ±15% | | ● | ● | ● | ● | | ● | ● |

OPTIONS available only on request (MOQ 30 pcs), to be indicated together with the selected order code from the list above:

- 2'S COMPLEMENT for sign representation in Modbus protocol
- TOTAL apparent energy counters (Ind+Cap)
- PNP type digital outputs
- 115VAC ±15% power supply

LEGEND

- BASIC:** Reduced parameter set and functions - 1MB memory, active&reactive power AVG recording.
- ENH:** Extended parameter set and functions - 8MB memory, real time parameters MIN/AVG/MAX recording (up to 24 parameters programmable), energy counter recording.
- DI:** 1 digital input to synchronise demand value calculation.
- DO:** 2 NPN type digital outputs for alarm or pulse emission.
- AO:** 1 analog output for real time parameter variation transmission.
- WintoolNET:** Software for instrument remote management, downloadable for free at www.algodue.it, in the Client protected area.

NOTE: Subject to change without notice



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