

UPM309RGW <KIT30, KIT45, KIT70, KIT90>

Multifunction three-phase meter with 3 MFC150 Rogowski coils

- DIN 96x96 compact version, only 4 cm depth
- Fully bi-directional four quadrants measurements for all energies and powers
- Main electrical parameters measured and displayed for a cost-effective consumption analysis
- 4 available KITs: 30, 45, 70, 90 cm
- 3 selectable current scales
- 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 server 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.

The connections are very quick and easy, very useful for retrofitting applications on existing switchboards or for energy audit.

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 server 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 sent to PC allows to generate consumption profiles, recorded values trend, alarms/events report and costs calculation as well as critical values identification.
- The use of Rogowski coils for current measurement grants a quick installation, particularly on existing plants. In case of changes on the plant, the instrument can be fit for the current consumption without replacing the transducer.
- 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

- MFC150
- WintoolNET

» Available configurations

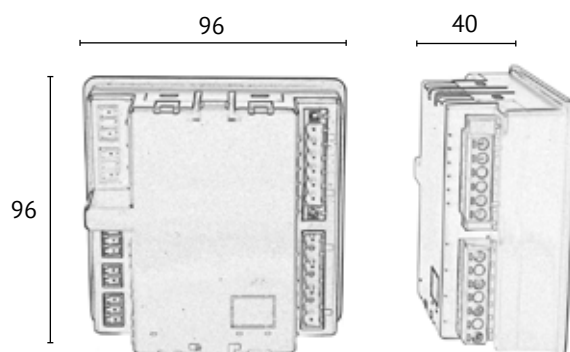
		BASIC	ENH
CURRENT INPUTS	Rogowski inputs (3 MFC150 included)	●	●
AUXILIARY POWER SUPPLY (make one choice only)	115 VAC ±15% (only for instrument with RS485 port)	●	●
	230 VAC ±15% (only for instrument with RS485 port)	●	●
	85...265 VAC (only for instrument with Ethernet port)		●
COMMUNICATION PORT (make one choice only)	RS485 for MODBUS RTU/ASCII communication	●	●
	Ethernet for HTTP, MODBUS TCP communication		●
INSTRUMENT REMOTE MANAGEMENT	WintoolINET	●	●
	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
- = Optional

+/- = 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% or 115 VAC ±15% on request Instrument with Ethernet port: 85...265 VAC
Frequency:	50/60 Hz
VOLTAGE INPUTS	
Maximum measurable voltage:	600 VAC max L-L
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:	3 selectable scales, 500/4000/20000A
Minimum current value for FFT calculation:	70 A for FSA 500 A, 400 A for FSA 4000 A, 1500 A for FSA 20000 A 2% harmonic accuracy ±2 digits
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
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 V _{DC} - 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 mA _{DC}
Maximum load:	500 Ω
DIGITAL INPUT (DI)	
Type:	Optoisolated
Voltage range:	230 V ±20%
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:	96x96x40 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
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

15 DIGIT ORDER CODE

UPM309RGW

Labelling
A = Algodue
C = Custom (instrument name on display, label, manual, Web server if present)

User instructions
M = Multilingual guide

Power supply
A = 115 VAC ±15% (only with RS485 port)
B = 230 VAC ±15% (only with RS485 port)
C = 85...265 VAC (only with Ethernet port)

Rogowski coil length
3 = No. 3 MFC150 30 cm (internal Ø~10 cm), 3 m cable
4 = No. 3 MFC150 45 cm (internal Ø~14 cm), 3 m cable
7 = No. 3 MFC150 70 cm (internal Ø~22 cm), 3 m cable
9 = No. 3 MFC150 90 cm (internal Ø~29 cm), 3 m cable

Communication port
5 = RS485 for MODBUS RTU/ASCII communication
W = Ethernet for HTTP, MODBUS TCP communication (only with ENH version)

Sign representation in Modbus protocol
1 = Sign bit
2 = 2's complement

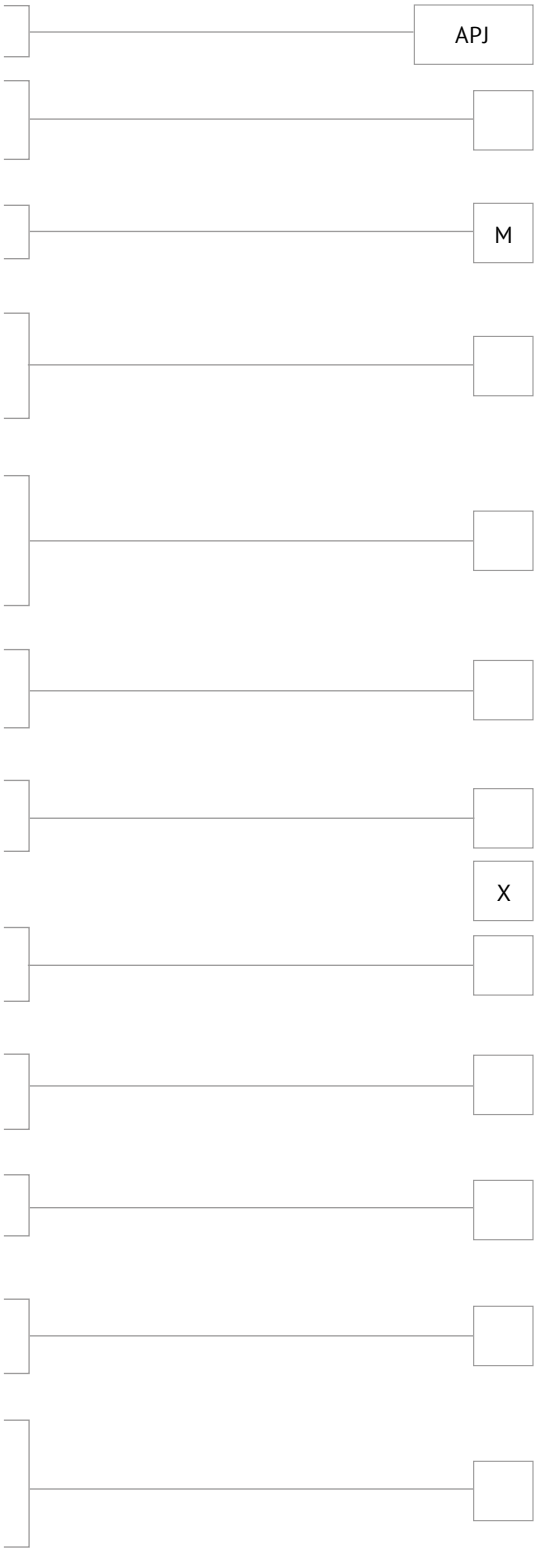
Version
B = Basic - reduced parameter set and functions (only with RS485 port)
H = ENH - extended parameter set and functions

Memory
1 = 1 MB (only with Basic version)
8 = 8 MB (only with ENH version)

Voltage and current THD & Harmonics
2 = THD values (only with Basic version)
3 = THD values + Harmonics up to 15th (only with ENH version)

Apparent energy counter
S = Separated Inductive&Capacitive counters
T = Total counters (Ind+Cap)

Inputs & outputs
A = 1DI, 2 NPN DO
B = 1DI, 2 PNP DO
C = 1DI, 2 NPN DO, 1AO (only with RS485 port and ENH version)
D = 1DI, 2 PNP DO, 1 AO (only with RS485 port and ENH version)



AVAILABLE FEATURES	BASIC	ENH	
	RS485	RS485	Ethernet
DI - Digital input	●	●	●
DO - Digital outputs	●	●	●
AO - Analog output		○	
WintoolNET for instrument remote management	●	●	●
Web server for instrument remote management			●

LEGEND: ●=Standard, ○=Optional

LEGEND:

AVG=1MB memory, active&reactive power AVG recording

MAM+EC=8MB memory, real time params MIN/AVG/MAX recording (up to 24 params programmable), energy counter recording

DI=1 digital input

DO=2 NPN digital outputs

AO=1 analog output

DEFAULT CONFIGURATION	ORDER CODE	VERSION		NO. 3 MFC150 INCLUDED	COMMUNICATION (Sign Bit in Modbus)		MEMORY		VAh COUNTER	I/O		
		BASIC	ENH	RGW Coil Length	RS485	ETH	AVG	MAM+EC	Sep. Ind&Cap	DI	DO	AO
UPM309RGW BASIC KIT30 RS485	APJAMB351XB12SA	●		30 cm	●		●		●	●	●	
UPM309RGW BASIC KIT45 RS485	APJAMB451XB12SA	●		45 cm	●		●		●	●	●	
UPM309RGW BASIC KIT70 RS485	APJAMB751XB12SA	●		70 cm	●		●		●	●	●	
UPM309RGW BASIC KIT90 RS485	APJAMB951XB12SA	●		90 cm	●		●		●	●	●	
UPM309RGW ENH KIT30 RS485	APJAMB351XH83SA		●	30 cm	●			●	●	●	●	
UPM309RGW ENH KIT45 RS485	APJAMB451XH83SA		●	45 cm	●			●	●	●	●	
UPM309RGW ENH KIT70 RS485	APJAMB751XH83SA		●	70 cm	●			●	●	●	●	
UPM309RGW ENH KIT90 RS485	APJAMB951XH83SA		●	90 cm	●			●	●	●	●	
UPM309RGW ENH KIT30 RS485 1AO	APJAMB351XH83SC		●	30 cm	●			●	●	●	●	●
UPM309RGW ENH KIT45 RS485 1AO	APJAMB451XH83SC		●	45 cm	●			●	●	●	●	●
UPM309RGW ENH KIT70 RS485 1AO	APJAMB751XH83SC		●	70 cm	●			●	●	●	●	●
UPM309RGW ENH KIT90 RS485 1AO	APJAMB951XH83SC		●	90 cm	●			●	●	●	●	●
UPM309RGW ENH KIT30 ETHERNET	APJAMC3W1XH83SA		●	30 cm		●		●	●	●	●	
UPM309RGW ENH KIT45 ETHERNET	APJAMC4W1XH83SA		●	45 cm		●		●	●	●	●	
UPM309RGW ENH KIT70 ETHERNET	APJAMC7W1XH83SA		●	70 cm		●		●	●	●	●	
UPM309RGW ENH KIT90 ETHERNET	APJAMC9W1XH83SA		●	90 cm		●		●	●	●	●	

Other order codes on request (MOQ 30 pcs)

NOTE:

- Subject to change without notice

- The code made up of 15 digits including the X



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