

AM-3-R

DIN 96x96 multifunction three-phase meter with Rogowski-coils

- 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
- 4 available KITS: 30, 45, 70, 90 cm coil length
- 3 selectable current scales
- Possibility to connect by PT
- Up to 8 MB for data recording
- Possibility to record all energy counters
- Up to 24 parameters selectable among real-time measurements for MIN/AVG/MAX recording
- MODBUS TCP communication by Ethernet port
- Possibility to manage the instrument by web interface
- 2 digital outputs, 1 digital input, 1 analogue output (optional)



» General features

AM-3-R is an innovative instrument for measuring and recording 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. AM-3-R 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.

Web interface is also available in case of using the instrument with Ethernet port: a very useful function that gives the possibility to manage the instrument by any PC connected on the network.

» Benefits

- AM-3-R 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.
- 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 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

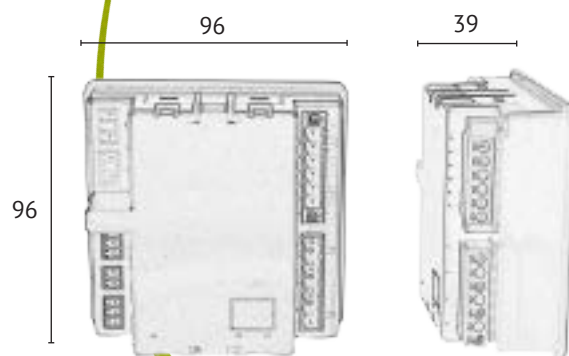
- ARTEMES server
- ARTEMES topo



» Available Configurations

auxiliary power supply	85...265 VAC / 110 VDC \pm 15% (only for instrument with ethernet port)	●
communication port	ethernet for HTTP, MODBUS TCP communication	●
instrument remote management	web server	●
2 digital outputs	for alarm events or pulse emissions	●
digital input	to synchronise the DMD value calculation	●
DMD value calculation mode	digital input synchronisation, fixed or sliding window	●
memory	8 MB	●
recordings	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 15th	●
apparent energy counters (make one choice only)	total counters	●
	separated inductive and capacitive counters	●

» Technical Drawing



» Measurements & Recordings

INSTANTANEOUS VALUES		
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]	● MAM
REACTIVE POWER (+/-)	$Q_{L1} - Q_{L2} - Q_{L3} - Q_{\Sigma}$ [var]	● 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 \emptyset (+/-)	$TAN\emptyset_{L1} - TAN\emptyset_{L2} - TAN\emptyset_{L3} - TAN\emptyset_{\Sigma}$	● 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 (+/-)	$P_{\Sigma DMD BAL}$ [W]	●
DMD REACTIVE POWER (imp&exp)	$Q_{L1DMD} - Q_{L2DMD} - Q_{L3DMD} - Q_{\Sigma DMD}$ [var]	●
BALANCE OF DMD SYSTEM REACTIVE POWER (+/-)	$Q_{\Sigma DMD BAL}$ [var]	●
DMD APPARENT POWER (imp&exp)	$S_{L1DMD} - S_{L2DMD} - S_{L3DMD} - S_{\Sigma DMD}$ [VA]	●
BALANCE OF DMD SYSTEM APPARENT POWER (+/-)	$S_{\Sigma DMD BAL}$ [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 \emptyset (imp&exp)	$TAN\emptyset_{L1MAX} - TAN\emptyset_{L2MAX} - TAN\emptyset_{L3MAX} - TAN\emptyset_{\Sigma MAX}$	●
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
- MAM = parameters for MIN/AVG/MAX recording (up to 24 params programmable)
- EC = parameters for Energy counter recording (fixed)
- +/- = signed value
- imp&exp = values splitted in imported and exported
- abs = absolute value
- ind&cap = values splitted in inductive and capacitive

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	85...265 VAC / 110 VDC \pm 15%
safety	300 V CAT III
frequency	50/60 Hz
VOLTAGE INOUTS	
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
inout impedance	\approx 1.3 Mohm
frequency	45 - 65 Hz
CURRENT INPUTS	
maximum value	3 selectable scales, 500/4000/20000 A
starting current (I _{st})	0.3 A for FSA 500 A, 1 A for FSA 4000 A, 10 A for FSA 20000 A
minimum current for FFT calculation	70 A for FSA 500 A, 400 A for FSA 4000 A, 1500 A for FSA 20000 A
TYPICAL ACCURACCY	
voltage	\pm 0.2% reading in 10% FS...FS range (FS=Full Scale value)
current	\pm 0.4% reading in 5% FS...FS range
	2% harmonic accuracy \pm 2 digits
power	\pm 0.5% reading \pm 0.1% FS (PF=1)
frequency	\pm 0.1% reading \pm 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 BOARD	
protocols	HTTP, NTP, DHCP, MODBUS TCP
Baud rate	10/100 Mbps
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 \pm 2ms ON time
maximum output reaction time (only for DO in alarm mode)	1 s
DIGITAL INPUT	
tape	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	1.5 mm ² / 16 AWG
SIZE & WEIGHT	
LxHxP, W	96x96x39 mm, max 310 g
ENVIRONMENTAL CONDITIONS	
operating time	-25°C ... +55°C (3K6)
storage temperature	-25°C ... +75°C (2K3)
max humidity (without condensation)	80%
sinusoidal vibration amplitude	50 Hz \pm 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 the 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



ORDER CODE	ROGOWSKI KIT DETAIL		POWER SUPPLY	COMMUNICATION PORT with SIGN BIT in Modbus	APPARENT EN. COUNTER (VAh)	I/O		REMOTE MANAGEMENT
	Length [cm]	Ø [cm]	Auxiliary	ETHERNET	SEPARATED Ind&Cap	DI	DO	Web Browser
ROGOWSKI COIL KIT: NO. 3 MFC150 INCLUDED								
AM-3-R30	30	~10	85...265VAC	•	•	•	•	•
AM-3-R45	45	~14	85...265VAC	•	•	•	•	•
AM-3-R70	70	~22	85...265VAC	•	•	•	•	•
AM-3-R90	90	~29	85...265VAC	•	•	•	•	•

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



AM-99-001-00073

NOTE: Subject to change without notice

