AM-3-D

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 1A or 5A CT and for direct connection up to 6A
- 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-D 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-D 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-D 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 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.

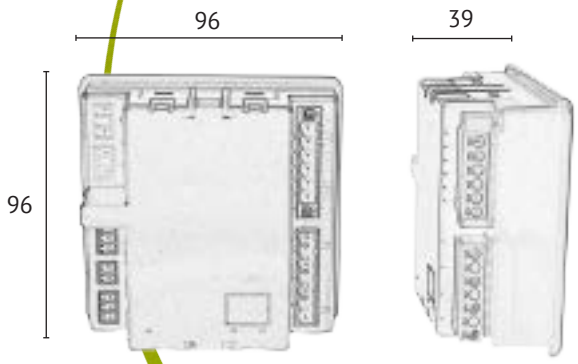
» Related Products

- ARTEMES server
- ARTEMES topo

» Available Configurations

auxiliary power supply	85...265 VAC / 110 VDC ±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)	●
	tThree phase, 3 wires, 2 currents (3.3.2)	●
	snigle 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_{Σ} [V]	● MAM
CURRENT (+/-)	I_{L1} - I_{L2} - I_{L3} - I_{N} - I_{Σ} [A]	● MAM
ACTIVE POWER (+/-)	P_{L1} - P_{L2} - P_{L3} - P_{Σ} [W]	● MAM
REACTIVE POWER (+/-)	Q_{L1} - Q_{L2} - Q_{L3} - Q_{Σ} [var]	● MAM
APPARENT POWER (+/-)	S_{L1} - S_{L2} - S_{L3} - S_{Σ} [VA]	● MAM
POWER FACTOR (ind&cap)	PF_{L1} - PF_{L2} - PF_{L3} - PF_{Σ}	● MAM
DPF (+/-)	DPF_{L1} - DPF_{L2} - DPF_{L3}	● MAM
TANGENT Ø (+/-)	$TANØ_{L1}$ - $TANØ_{L2}$ - $TANØ_{L3}$ - $TANØ_{\Sigma}$	● 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 (+/-)	$P_{\Sigma DMDBAL}$ [W]	●
DMD REACTIVE POWER (imp&exp)	Q_{L1DMD} - Q_{L2DMD} - Q_{L3DMD} - $Q_{\Sigma DMD}$ [var]	●
BALANCE OF DMD SYSTEM REACTIVE POWER (+/-)	$Q_{\Sigma DMDBAL}$ [var]	●
DMD APPARENT POWER (imp&exp)	S_{L1DMD} - S_{L2DMD} - S_{L3DMD} - $S_{\Sigma DMD}$ [VA]	●
BALANCE OF DMD SYSTEM APPARENT POWER (+/-)	$S_{\Sigma DMDBAL}$ [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)	$TANØ_{L1MAX}$ - $TANØ_{L2MAX}$ - $TANØ_{L3MAX}$ - $TANØ_{\Sigma MAX}$	●
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_{Σ} [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 15th		
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 ±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	>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	±0.2% reading in 10% FS...FS range (FS=Full Scale value)
current	±0.4% reading in 5% FS...FS range
	2% harmonic accuracy ±2 digits
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 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 ±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 mm2 / 14 AWG
terminals for I/O, AUX	1.5 mm2 / 16 AWG
SIZE & WEIGHT	
LxHxP, W	96x96x39 mm, max 310 g
EMVIRONMENTAL 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 ±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
saftey	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-D5	30	~10	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 suppply

AM99-001-00072

NOTE: Subject to change without notice