AUTOMETERS SYSTEMS

Operating instructions

Three-phase Digital Energy meters

IIST035-02 Stand 10-06-2012

Direct connection 80 A - Connection through CT .../5 A till 10.000/5 A

three-phase digital active and reactive energy-meter with measurement of active and reactive instantaneous power, set up for communication

Code	Description
AD3-80C	three-phase digital with direct connection 0.25-5 (80) A **2 tariff** - 2 S0
AD3-80MC	three-phase digital with direct connection 0.25-5 (80) A - **2 tariff** 2 S0 **(MID calibrated)**
AD3-5C	three-phase digital with connection by CT .../5 A, up to 10.000/5 A - 0.05-5 (6) A - **2 tariff** - 2 S0
AD3-5MC	three-phase digital with connection by CT .../5 A, up to 10.000/5 A 0.05-5 (6) A - **2 tariff** - 2 S0 **(MID calibrated)**

⚠ WARNING

The Autometers range of DIN rail mounted meters should only been installed by a competent and qualified electrician who is fully aware of the latest electricity regulations concerning the installation of Electricity meters.
The AD3-... must be installed in a suitable enclosure.

1) Quantities displayed

1a) Energy

- They are displayed on the main 8 digits counter:

Ref.	Energy	Unit	Symbol	ΣL	L1	L2	L3	Tariff
E1	Active Absorbed	MWh/kWh	→	•	•	•	•	T1
E2	Active Supplied	MWh/kWh	←	•	•	•	•	T1
E3	Reactive Absorbed	Mvarh/kvarh	→	•	•	•	•	T1
E4	Reactive Supplied	Mvarh/kvarh	←	•	•	•	•	T1
E5	Active Absorbed	MWh/kWh	→	•	•	•	•	T2
E6	Active Supplied	MWh/kWh	←	•	•	•	•	T2
E7	Reactive Absorbed	Mvarh/kvarh	→	•	•	•	•	T2
E8	Reactive Supplied	Mvarh/kvarh	←	•	•	•	•	T2

1b) Power

- Powers are displayed on the bar indicator and also on the 3 digits secondary counter:

Ref.	Power	Unit	Symbol	ΣL	Tariff
P1	Active Absorbed	MW/kW/W	→	•	T1
P2	Active Supplied	MW/kW/W	←	•	T1
P3	Reactive Inductive	Mvar/kvar/var	ξ	•	T1
P4	Reactive Capacitive	Mvar/kvar/var	⫩	•	T1
P5	Active Absorbed	MW/kW/W	→	•	T2
P6	Active Supplied	MW/kW/W	←	•	T2
P7	Reactive Inductive	Mvar/kvar/Var	ξ	•	T2
P8	Reactive Capacitive	Mvar/kvar/Var	⫩	•	T2

2) Display View (see quantities displayed)

- A green backlighted LCD display.
- With the front push button all register will appear.

3) User informations

- A quantity of informations are available on the display. They are divided into 4 groups:

A	**Default Page (currently growing Active Energy)**
B	**System Energy Registers (ΣL)**
C	**Phases Energy Registers (L1, L2 and L3)**
D	**Diagnostic Page**

A) Default Page (currently growing Active Energy)

- The value of the currently growing Active 3-phase Energy is represented (or the last one that has grown).
  The Energy is always Active, and may be Active Consumed (right arrow), Active Generated (left arrow), with Tariff T1 or T2, depending on the current Energy flowing.
- The value of currently flowing Active Power is visible (3 digits field), together with a dedicated bar-graph representing the percentage of the flowing power (10% division of the bar graph)
- In models with external CT, also the value of nominal value of primary winding current (5 to 9999) appears below the energy value
- A short keypress of the "command button" switches the backlight ON. A further short keypress enable the visualisation of system energy registers.
- If the command button is not pushed for 40 seconds, the backlight is automatically switched off, and the display returns to the default page

B) System Energy Registers (ΣL) E1 to E8 see Table

- This group is dedicated to show the System (ΣL) Energy registers, E1 to E8, as described in the above table.
- A short keypress of the "command button" allows to see all 8 registers, one at a time
- If the current rate corresponds to that of energy represented on the display, also the power and the bar-graph are represented
- By keeping the command button pushed for at least 4 seconds, the L1 Phase Energy registers group representation on display is enabled. If the command button is not pushed for 40 seconds, the backlight is automatically switched off, and the display returns to the default page

C) Phases Energy Registers (L1, L2 & L3) E1 to E8 see Table

- This group is dedicated to show the Phase Registers (with the same criteria of the System Energy registers). Initially, L1 group registers are displayed. A short keypress of the "command button" allows to see all 8 registers, one at a time
- By keeping the command button pushed for at least 4 seconds (less than 10 seconds), the L2 Phase Energy registers group representation on display is enabled. In the same way, once selected L2 registers, one can push the button for 4 seconds and start to see the L3 registers group.
- If the command button is not pushed for 40 seconds, the backlight is automatically switched off, and the display returns to the default page
- By keeping the command button pushed for at least 10 seconds, the diagnostic page is enabled

D) Diagnostic Page

- All display segments are activated, thus allowing the operator to see if the display is correctly working. By keeping the command button furtherly pushed, it is possible to see the value of the Firmware Release and of the Flash Checksum
- If the command button is not pushed for 40 seconds, the backlight is automatically switched off, and the display returns to the default page

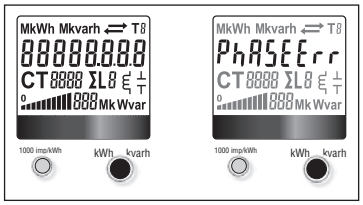
3.1) Zeroing all registers (only AD3-80C / AD3-5C models)

- A pressure of 20 sec. of the "command button" allows to enter in the zeroing menu and on the display appears "rESEt".
- The button must be released. To do the reset press it again for 4 sec., afterwards it will go back to the default visualization with all registers reset.
- After 4 sec. from the button release if the "command reset" is not done, it will go back to the default visualization without the reset.

3.2) Error condition

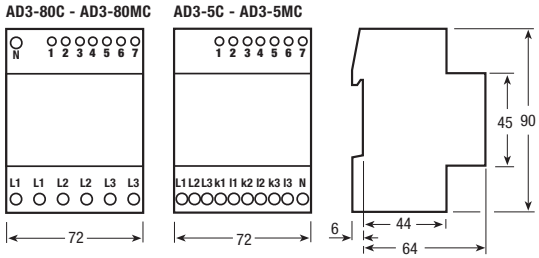
- When the display shows the message "ErrOr 01" or "ErrOr 02", the meter has got a malfunction and must be replaced.

Display

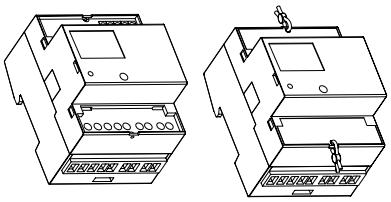


- Connection errors and phase out
- Energy value
- Energy export (absorbed →)
- Energy import (supplied ←)
- Energy line (L1-2-3)
- Running active power display
- MWh/kWh display
- Mvarh/kvarh display
- CT primary current
- Tarif Running tarif, called tarif (T1-T2)
- Phase summary line energy
- Displays capacitative, reactive power
- Displays inductive, reactive power
- Consumption Bar display (percentage of ***Pmax***)
- Precision control LED
- Readout selection push button

Dimension



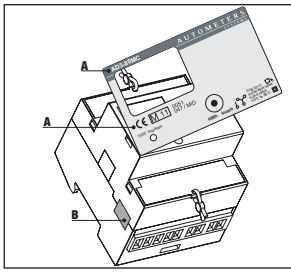
Sealable terminal coverse



MID calibrated

AD3-80MC / AD3-5MC

A) Device code and certification data indications
B) Safety-sealing between upper and lower housing part



Cable stripping length and max. terminal screw torque

80 A direct connection main terminals - Screw driver PZ2	15.5 mm — 2 Nm
5 A CT connection main terminals - Screw driver PZ1	14 mm — 0.8 Nm
Tariff and communication terminals Screw driver blade 0.8x3.5 mm	9 mm — 0.8 Nm

Quantity pulse output (S0) for AD3-80MC / AD3-5MC

Automatily

I prim. **(A)** 5-300 A = 100 imp/kWh
I prim. **(A)** 305-3000 A = 10 imp/kWh
I prim. **(A)** 3005-10000 A = 1 imp/kWh

Set Primary Current

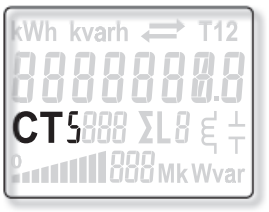
1) Press down the Minus button for 4 seconds and release. The display will now change just showing you CT5

2) By pressing the **"+"** button the CT ratio will increment in steps of 5, the **"-"** button will decrement the ratio by 5. Stop when you have reached desired setting.

3) To lock the setting into the meter, press down the large **"Command button"** on the front for 4 sec. and release, otherwise wait 8 sec. to cancel the modification and come back to normal display mode. Only on the **AD3-5C (not MID)**, when you have reached the desired CT setting, press the Menu button for 4 sec.; the display will show **"RESET"**, press the **"Command button"**. Your new setting is locked and the energy values have been reset to zero.
Please note that this means that on **AD3-5C** you can' t modify CT setting without resetting energies.

MID calibrated Energy-meters

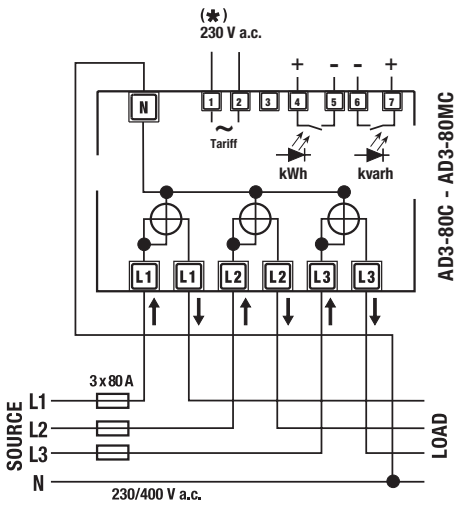
On MID calibrated meter (**AD3-5MC**) it's possible to show on display all energy registers measured at CT output (also via communication interface).
For this the "Command button ③" must be pushed for 30 seconds. In this mode **"CT 5"** flashes and all energy registers can be read as described in **3A)**, **3B)** and **3C)** of the operating instructions.
After a minute of **"Command button"** inactivity, the meter shows and communicates again the CT input energies.



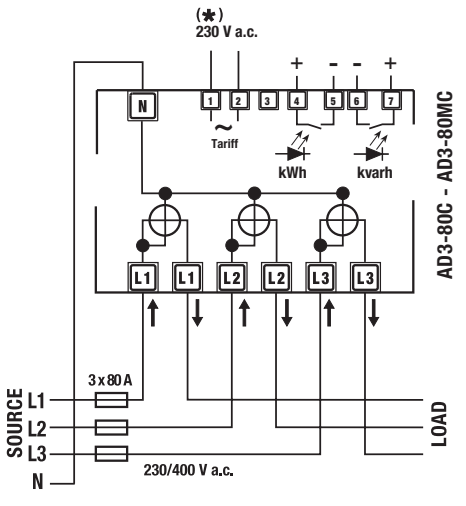
Note

Wiring diagram

Direct 80 A



(*)
230 V only required if more than one tariff



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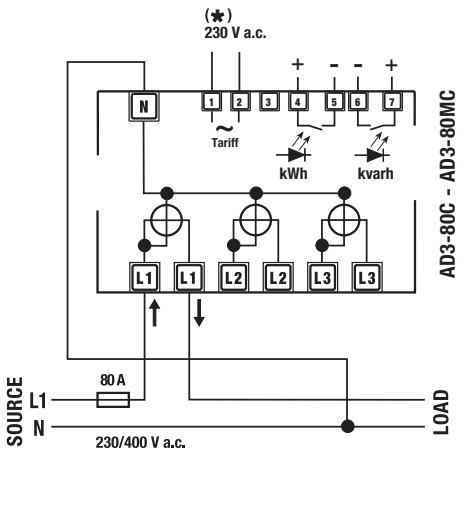
230 V only required if more than one tariff



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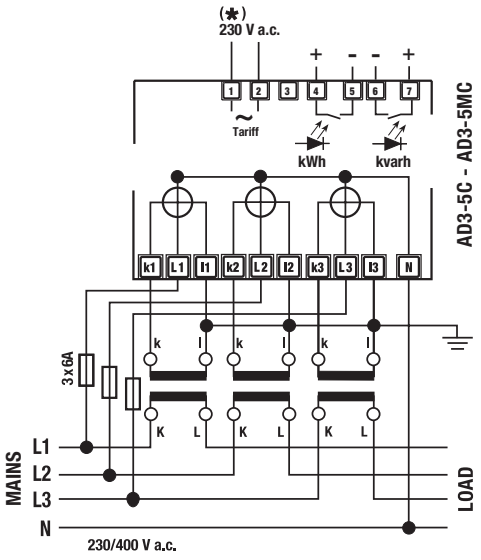
230 V only required if more than one tariff

(N) Neutral wire must be connected the meter

CT .../5 A



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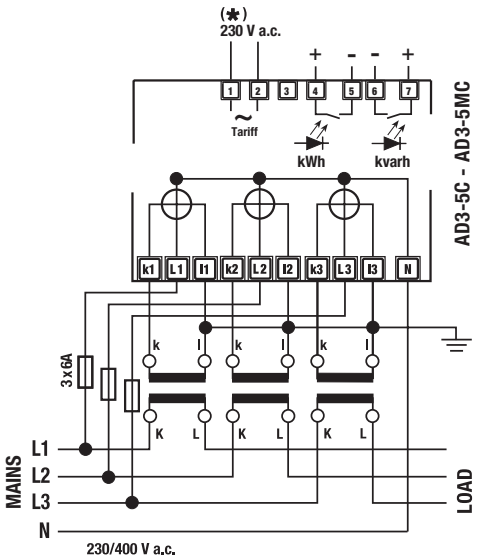
230 V only required if more than one tariff



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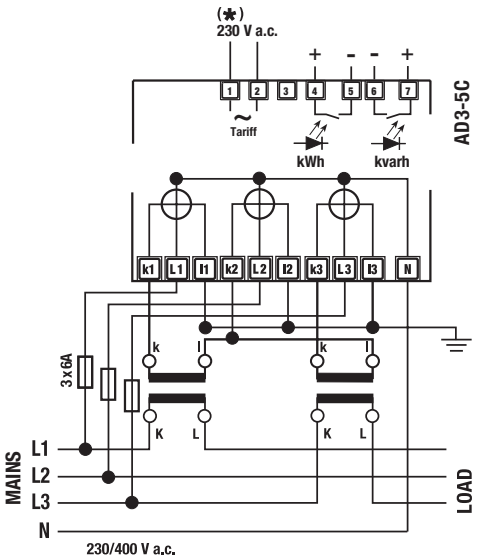

(*)
230 V only required if more than one tariff

(N) Neutral wire must be connected the meter

Instructions for the connection of transformer counters
A fuse of 6 A is recommended for the line protection. Current transformers must not be operated with open terminals since dangerous high voltages might occur which may result in personal injuries and property damage. In addition to this, the transformers are exposed to thermal overload.

Technical data

Data in compliance with EN 50470-1, EN 50470-3, EN 62053-23, EN 62053-31			**AD3-80C AD3-80MC**	**AD3-5C AD3-5MC**
General characteristics				
• Housing	DIN 43880	DIN	4 modules	4 modules
• Mounting	EN 60715	35 mm	DIN rail	DIN rail
• Depth		mm	70	70
Operating features				
• Connectivity	to single/three-phase network	n° wires	2-4	4
• Storage of energy values and configuration	digital display (EEPROM)	-	yes	yes
• Display tariffs identifier	for active and reactive energy	n° 2	T1 and T2	T1 and T2
Supply				
• Rated control supply voltage ***Un***		VAC	230	230
• Operating range voltage		V	184 ... 276	184 ... 276
• Rated frequency ***fn***		Hz	50	50
• Rated power dissipation (max. for phase) ***Pv***		VA (W)	≤8 (0.6)	≤8 (0.6)
Overload capability				
• Voltage ***Un***	continuous; phase/phase	V	480	480
	1 second: phase/phase	V	800	800
	continuous; phase/N	V	276	276
	1 second: phase/N	V	460	460
• Current ***Imax***	continuous	A	80	6
	momentary (0,5 s)	A	-	120
	momentary (10 ms)	A	2400	-
Display (readouts)				
• Connection errors and phase out	discernible from phase-sequence indic.	-	Phase Err	Phase Err
• Display type	LCD	n° digits	8 (2 decimal)	8 (2 decimal)
	digit dimensions	mm x mm	6.00 x 3	6.00 x 3
• Active energy: 1 display, 8 digit	2 tariffs	kWh	0.01	0.01
+ display import or export (arrow)	overflow	MWh	999999.99	999999.99
• Reactive energy: 1 display, 8-digit	2 tariffs	kvarh	0.01	0.01
+ display import or export (arrow)	overflow	Mvarh	999999.99	999999.99
• Instantaneous active power: 1 display, 3-digit		kW or MW	000 ... 999	000 ... 999
• Instantaneous reactive power: 1 display, 3-digit		kvar or Mvar	000 ... 999	000 ... 999
• Instantaneous tariff measurement	1 display, 1-digit	-	T1 or T2	T1 or T2
• Transformer primary current	steps of 5 A	A	-	5 ... 10.000
• Display period refresh		s	1	1
Measuring accuracy				
• Active energy and power	acc.to EN 50470-3	class	B	B
• Reactive energy and power	acc.to EN 62053-23	class	2	2
Measuring input				
• Type of connection		-	direct	transformer .../5 A
• Voltage ***Un***	phase/phase	V	400	400
	phase/N	V	230	230
• Operating range voltage	phase/phase	V	319 ... 480	319 ... 480
	phase/N	V	184 ... 276	184 ... 276
• Current ***Iref***		A	5	-
• Current ***In***		A	-	5
• Current ***Imin***		A	0.25	0.05
• Operating range current ***(Ist ... Imax)***	direct connection	A	0.015 ... 80	-
	transformer connection (CT)	A	-	0.003 ... 6
• Transformer current	primary current of the transformer	A	-	5 ...10.000
	smallest input step adjus. in 5 A steps	A	-	5
• Frequency		Hz	50	50
• Input waveform		-	sinusoidal	sinusoidal
• Starting current for energy measurement ***(Ist)***		mA	15	3
Pulse output S0	acc.to EN 62053-31			
• Pulse output	for act. and react. energy T1 and T2	-	yes	yes
• Quantity pulse output	for direct connection 80 A	Imp/kWh	500	-
	connec. CT .../5 A, automat. adjus.	Imp/kWh	-	100-10-1
• Pulse duration		ms	30 ±2 ms	30 ±2 ms
• Required voltage	min ... max	VAC (DC)	5 ... 230 ±5% (5 ... 300)	5 ... 230 ±5% (5 ... 300)
• Permissible current	pulse ON (max. 230 V a.c./d.c.)	mA	90	90
• Permissible current	pulse OFF (leak. cur. max. 230 V a.c./d.c.)	µA	1	1
Optical interfaces				
• Front side ***(accuracy control)***	LED	imp/kWh	1000	10.000
Lateral IR interfaces				
• For communication moduls connection **(LAN-TCP/IP / M-Bus / Modbus RTU / KNX / SD-Card Datalogger)**		-	yes	yes
Safety acc. to EN 50470-1				
• Indoor meter		-	yes	yes
• Degree of pollution		-	2	2
• Operational voltage		V	300	300
• AC voltage test (EN 50470-3, 7.2)		kV	4	4
• Impulse voltage test		1.2/50 µs-kV	6	6
• Protection class (EN 50470)		class	II	II
• Housing material flame resistance	UL 94	class	V0	V0
• Safety-sealing between upper and lower housing part **(mod. AD3-80MC - AD3-5MC)**		-	yes	yes
Connection terminals				
• Type cage main current paths	screw head Z +/-	POZIDRIV	PZ2	PZ1
• Type cage pulse output	blade for slotted screw	mm	0.8 x 3.5	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max.)	mm^2	1.5 (35)	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1.5 (35)	1 (4)
• Terminal capacity pulse output	solid wire min. (max.)	mm^2	1 (4)	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1 (2.5)	1 (4)
Environmental conditions				
• Mechanical environment		-	M1	M1
• Electromagnetic environment		-	E2	E2
• Operating temperature		°C	-10 ... +55	-10 ... +55
• Limit temperature of transportation and storage		°C	-25 ... +70	-25 ... +70
• Relative humidity (not condensation)		%	≤80	≤80
• Vibrations	50 Hz sinusoidal vibration amplitude	mm	±0.075	±0.075
• Degree protection	housing when mounted in front (term.)	-	IP51(*)/IP20	IP51(*)/IP20

(*) **For the installation in a cabinet at least with IP51 protection.**