Single-phase Digital Energy meters - Direct connection 80 A

IIST109-01   Stand 15-06-2012

active and reactive energy-meter with measurement of active and reactive instantaneous power, and inbuilt communication Modbus RTU - 2 tariff

Code	Description
AD1-80MBIC	single-phase digital active and reactice energy-meter with active and reactice power indication direct connection 0.25-5 (80) A **2 tariffs** - **2 S0** - and inbuilt communication **Modbus RTU -** with **MID** certified

⚠ 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 AD1-80 must be installed in a suitable enclosure.

- This family of devices provides a set of single phase energy meters designed to be directly connected to system where high current is required. All the meters are equipped with an easy to read LCD with green back light on which displays all the active and reactive energy counters, with a red light LED which blink in proportion to the measured active energy and with a optocoupler that allows the storage of energy on two different tariffs. Depending on the model a insulated Modbus communication interface is built in two solid state relay which generate pulses proportional to the measured energy. Modbus communication interfaces offer a set of 15 measures.

Display
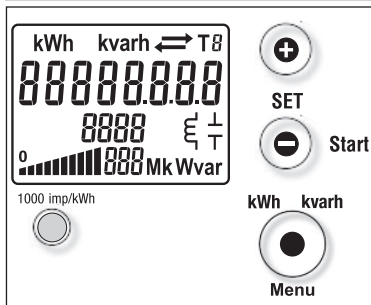
- Energy value
- kWh / kvarh display

T8 • Running tarif, called tarif

⇌
- Energy export (absorbed ←)
- Energy import (supplied →)

- Displays inductive, reactive power
- Displays capacitive, reactive power

- Full scale current indication
- Consumption Bar display (percentage of **Pmax**)

1000 imp/kWh

- Precision control LED

Commands

- **SET** / **Start** • Parameters set
- **Menu** • Menu key for reading selection
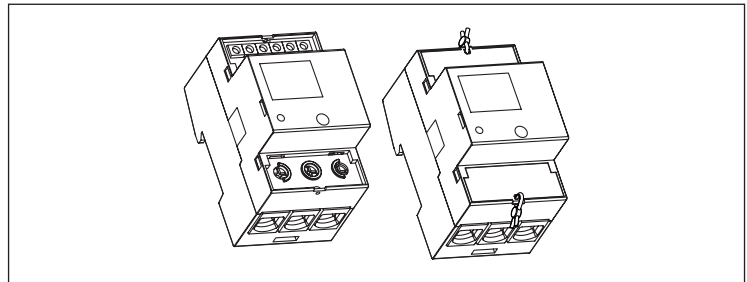
Dimension
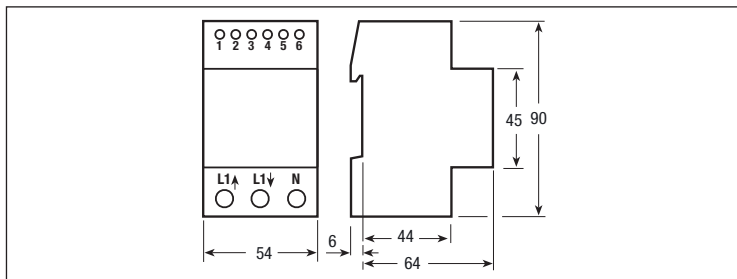
Symbols

- Measuring elements
- Reversal preventing device
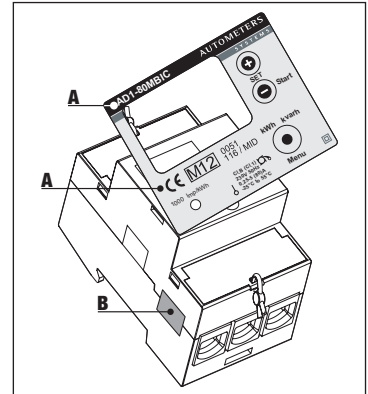- Protected by double insulation

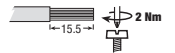### Sealable terminal covers

MID calibrated

AD1-80MBIC

A) Device code and certification data indications
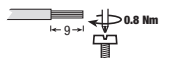
B) Safety-sealing between upper and lower housing part
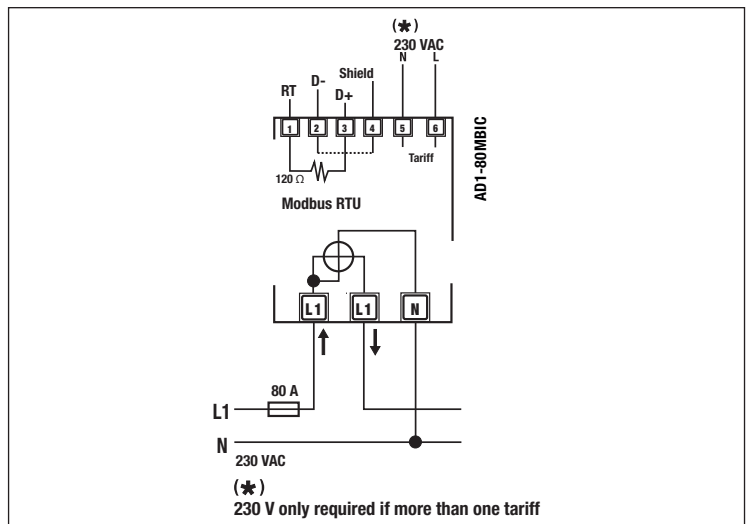
Cable stripping length and max. terminal screw torque

80 A direct connection main terminals - Screw driver PZ2   15.5 → 2 Nm

Tariff and communication terminals Screw driver blade 0.8x3.5 mm   9 → 0.8 Nm

Wiring diagram

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

A fuse of 80 A is recommended for the line protection.

Terminal Description

- **1:** Modbus network. For the termination of the for the termination of the network short this terminal with terminal 3.
- **2:** Modbus network. Data -
- **3:** Modbus network. Data +
- **4:** Modbus network. Shield
- **6-7:** Tariff signal, isolated by a Opto Coupler. When there is a voltage of 230 VAC connected the device store energies on the Tariff 2 registers, otherwise on the Tariff 1 registers.
- **L1 ↑:** Input for the phase conductor.
- **L1 ↓:** Output for the phase conductor.
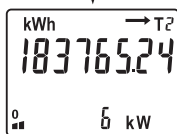- **N:** Measuring input of neutral.
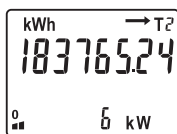
Main Menu

Device Switch ON

Page 1:
In this page, the value of the currently growing Active Energy is represented (or the last one that has grown). The energy may be Consumed or Generated, with Tariff T1 or T2, depending on the current Energy flowing
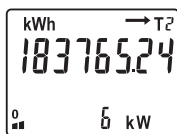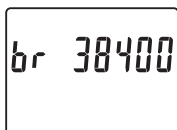
Page 1

```
kWh        → T2
18376524
0
    6  kW
```
kWh kvarh
Menu

Page 2:
By pushing any key the back light turns on

Page 2

```
kWh        → T2
18376524
0
    6  kW
```
kWh kvarh
Menu

Page 3:
The next 8 **"Menu key"** presses allow the display of the 8 energy counters.
The counters are:
- Active import energy on tariff 1 - Active export energy on tariff 1
- Reactive import energy on tariff 1 - Reactive export energy on tariff 1
- Active import energy on tariff 2 - Active export energy on tariff 2
- Reactive import energy on tariff 2 - Reactive export energy on tariff 2
When is displayed an energy counter corresponding to the running tariff, on the bottom row the power is displayed

Page 3

```
kWh        → T2
18376524
0
    6  kW
```
kWh kvarh
Menu

Page 4:
In this page the Modbus address or the primary address appears.
This value can be altered, see the section Communication Address.

Page 4

```
Addr001
```
kWh kvarh
Menu

Page 5:
In this page the communication baud rate appears.
This value can be altered, see the section Communication Baudrate.

Page 5

```
br 38400
```
kWh kvarh
Menu

Whichever the page on the display, if no key is pushed for at least 20 sec., the main page appears again.

Communication Address

In the Address page by kept pushed for 4 sec. the **"Start (-) key"** the value of the Address blink on the display:
Push **"Start (-) key"** or **"(+)"** charge the value. Push the **"Menu key"** to confirm, otherwise within 5 seconds the modification will be lost.

Main Menu:

```
Addr001
```
⊖ Start

```
Addr001
```
⊕
⊖ Start

```
Addr 101
```
kWh kvarh
Menu

Main Menu:

```
Addr 101
```
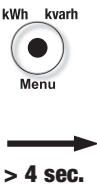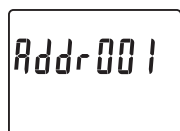
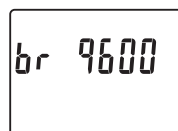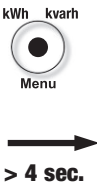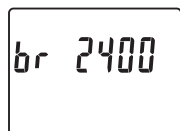> 4 sec.   > 4 sec.

Communication Baudrate

In the Baudrate page by kept pushed for 4 sec. the **"Start (-) key"** the value of the Baud rate blink on the display.
Push **"Start (-) key"** or **"(+)"** charge the value. Push the **"Menu key"** for 4 sec. to confirm, otherwise within 5 seconds the modification will be lost.

Main Menu:

```
br 2400
```
⊖ Start

```
br 9600
```
⊕
⊖ Start

```
br 9600
```
kWh kvarh
Menu

Main Menu:

```
br 9600
```

> 4 sec.   > 4 sec.

Firmware Information - Diagnostic Page of the Display

In any page of the Main Menu by kept push for 10 sec. the **"Menu key"** the diagnostic page of the display appears. If the **"Menu key"** is held down for other 4 sec. the display shows information about the firmware release and the firmware checksum.

Diagnostic Message

Error Condition
When the display show these messages, the meters has got a malfunction and must be replaced.

```
Errbr 02
```
```
Error 03
```
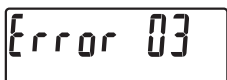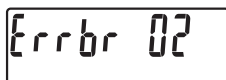
Service and Maintenance

It should not be necessary to recalibrate device during its lifetime as it is an electronic meter with no moving parts with electronics and voltage and current sensors that do not naturally degrade or change with time under specified environmental conditions. If a degradation in the performance is observed the device has probably been partly damaged and should be sent for repair or exchanged. If the meter is dirty and needs to be cleaned, use lightly moistened tissue with a water based mild detergent. Make sure no liquid goes into the meter as this could damage the meter.

Technical data

Data in compliance with EN 50470-1, EN 50470-3, EN 62053-23			**AD1-80MBIC** **direct connection 80 A** **inbuilt commun. Modbus**
General characteristics			
• Housing	DIN 43880	DIN	3 modules
• Mounting	EN 60715	35 mm	DIN rail
• Depth		mm	70
Operating features			
• Connectivity	to single-phase network	n° wires	2
• Storage of energy values and configuration	digital display (EEPROM)	-	yes
• Display tariffs identifier	for active and reactive energy	n° 2	T1 and T2
Supply			
• Certified voltage range *Un*		VAC	230 ±20%
• Operating voltage range		VAC	110 ... 276
• Certified frequency *fn*		Hz	50 ±2%
• Operating frequency range		Hz	48 ... 62
• Rated power dissipation (max.) *Pv*		VA (W)	≤8 (0.6)
Overload capability			
• Voltage *Un*	continuous	VAC	276
	momentary (1 s)	VAC	300
• Current *Imax*	continuous	A	125
	momentary (10 ms)	A	3750
Display			
• Display type	LCD	n° digits	8 (2 decimal)
	digit dimensions	mm x mm	6.00 x 3
• Active energy: 1 display, 7-digit	tariffs 2	kWh	0.01
+ display import or export (arrow)	overflow	kWh	999999.99
• Reactive energy: 1 display, 7-digit	tariffs 2	kvarh	0.01
+ display import or export (arrow)	overflow	kvarh	999999.99
• Instantaneous active power: 1 display, 3-digit		W, kW or MW	000 ... 999
• Instantaneous reactive power: 1 display, 3-digit		var, kvar or Mvar	000 ... 999
• Instantaneous tariff measurement		-	1
	1 display, 1-digit	-	T1 or T2
• Display period refresh		s	1
Measuring accuracy	at 23 ±1°C, referred to nominal values		
• Active energy and power	acc.to EN 50470-3	class	B
• Reactive energy and power	acc.to EN 62053-23	class	2
Measuring input			
• Type of connection	phase/N	-	direct
• Operating range voltage	phase/N	VAC	110 ... 276
• Current *Iref*		A	5
• Current *Imin*		A	0.25
• Operating range current *(Ist ... Imax)*	direct connection	A	0.020 ... 80
• Operating frequency		Hz	48 ... 62
• Certified frequency		Hz	50 ±2%
• Starting current for energy measurement *(Ist)*		mA	20
Optical interfaces			
• Front side *(accuracy control)*	LED	imp/kWh	1000
Safety acc. to EN 50470-1			
• Indoor meter		-	yes
• Degree of pollution		-	2
• Operational voltage		VAC	300
• AC voltage test (EN 50470-3, 7.2)		kV	4
• Impulse voltage test		1.2/50 µs-kV	6
• Protection class (EN 50470)		class	II
• Housing material flame resistance	UL 94	class	V0
• Safety-sealing between upper and lower housing part		-	yes
Embedded communication			
• Modbus RTU	RS-485 - 3 wires	-	up to 38.400 bps
Lateral IR interfaces			
• For communication moduls connection **(LAN-TCP/IP / M-Bus / KNX / SD-Card Datalogger)**		-	yes
Connection terminals			
• Type cage main current paths	screw head Z +/-	POZIDRIV	PZ2
• Type cage pulse output	blade for slotted screw	mm	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max.)	mm²	1.5 (50)
	stranded wire with sleeve min. (max.)	mm²	1.5 (50)
• Terminal capacity pulse output	solid wire min. (max.)	mm²	1 (4)
	stranded wire with sleeve min. (max.)	mm²	1 (2.5)
Environmental conditions			
• Mechanical environment		-	M1
• Electromagnetic environment		-	E2
• Operating temperature		°C	-25 ... +55
• Limit temperature of transportation and storage		°C	-25 ... +70
• Relative humidity (not condensation)		%	≤80
• Vibrations	50 Hz sinusoidal vibration amplitude	mm	±0.075
• Degree protection	housing when mounted in front (terminal)	-	IP51(∗)/IP20

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