AUTOMETERS SYSTEMS

Installation and Operating Instructions

Three-phase Digital Energy meters - BASIC Connection through CT .../5 A till 10.000/5 A

IIST066-01 Stand 13-03-2012

with additional partial active energy counter resettable and inbuilt communication Modbus RTU - 2 tariff

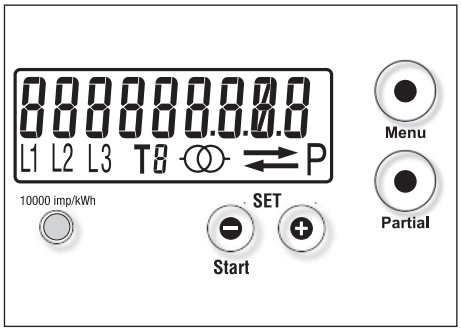
Code	Description
AD3-5CBIC	three-phase digital energy-meter with connection by CT .../5 A, up to 10.000/5 A - 0.05-5 (6) A - **2 tariff** and inbuilt communication **Modbus RTU**
AD3-5MBIC	three-phase digital energy-meter with connection by CT .../5 A, up to 10.000/5 A - 0.05-5 (6) A - **2 tariff** and inbuilt communication **Modbus RTU -** with **MID** certified

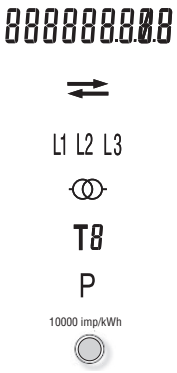
⚠ WARNING

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 AD3-5 must be installed in a suitable enclosure.

- This family of devices provides a set of energy meters aimed to be connected via external current transformer suitable for every need. All the meters are equipped with an easy to read LCD on which displays all the three phases active 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 are built in two solid state relay which generate pulses proportional to the measured energy. Both Modbus communication interfaces offers a set of 59 measures.

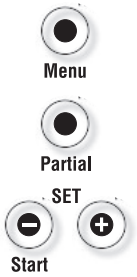
Display





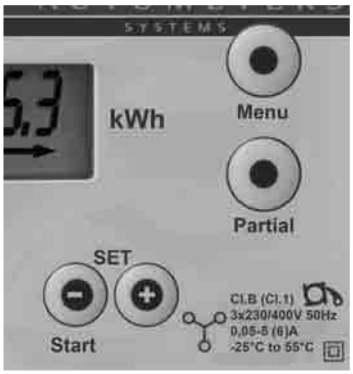
- Energy value
- Energy import (absorbed →)
- Energy export (supplied ←)
- Energy line (L1-L2-L3)
- CT indicator
- Tarif Running tariff, called tariff
- Energy value "Partial"
- Precision control LED

Commands



- Menu key for reading selection
- Command button for "partial" reading selection
- Parameters set

Adjusting the Modbus address and Baudrate



1) Press the **"Menu"** key until **"Addr 001"** appears on the display

2) Press and hold down the **"-"** key for 4 sec. and release

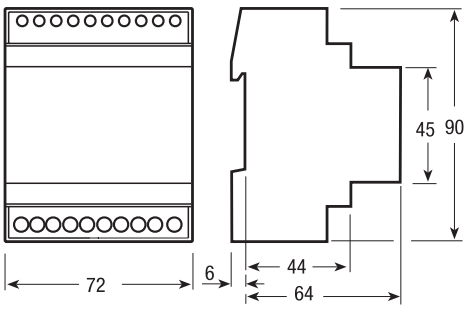
3) You will notice **"001"** blinking

4) Press the **"+"** key to increment the number.

5) To lock the number press and hold down the **"Menu"**key for 4 seconds.
The Modbus address has now been set.

- **To alter the Baudrate:**
Press the **"Menu"** key until **"br 9600"** appears and repeat above steps 2-5.

Dimension

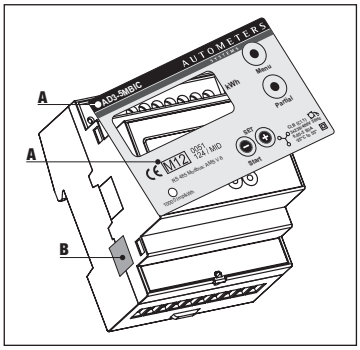


MID calibrated

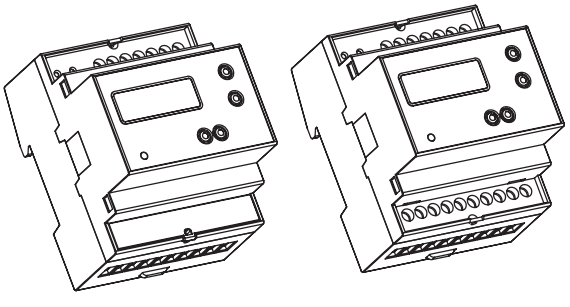
AD3-5MBIC

A) Device code and certification data indications

B) Safety-sealing between upper and lower housing part



Sealable terminal covers

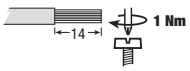


Symbols

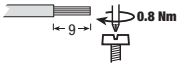
- Measuring elements
- Reversal preventing device
- Protected by double insulation

Cable stripping length and max. terminal screw torque

5 A CT connection main terminals - Screw driver PZ1



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



Main Menu

Page 1:
In this page the value of the currently growing 3-phase Active Energy is represented (or the last one that has grown).
The energy may be Active Consumed (right row), Active Generated (left row), with Tariff T1 or T2, depending on the current Energy flowing arrow.

Page 2-3-4:
In the second third and fourth pages are represented the remaining 3 energy registers.

Page 5:
In this page the CT ratio appears.
The CT ratio is modifiable, see the section CT Ratio.

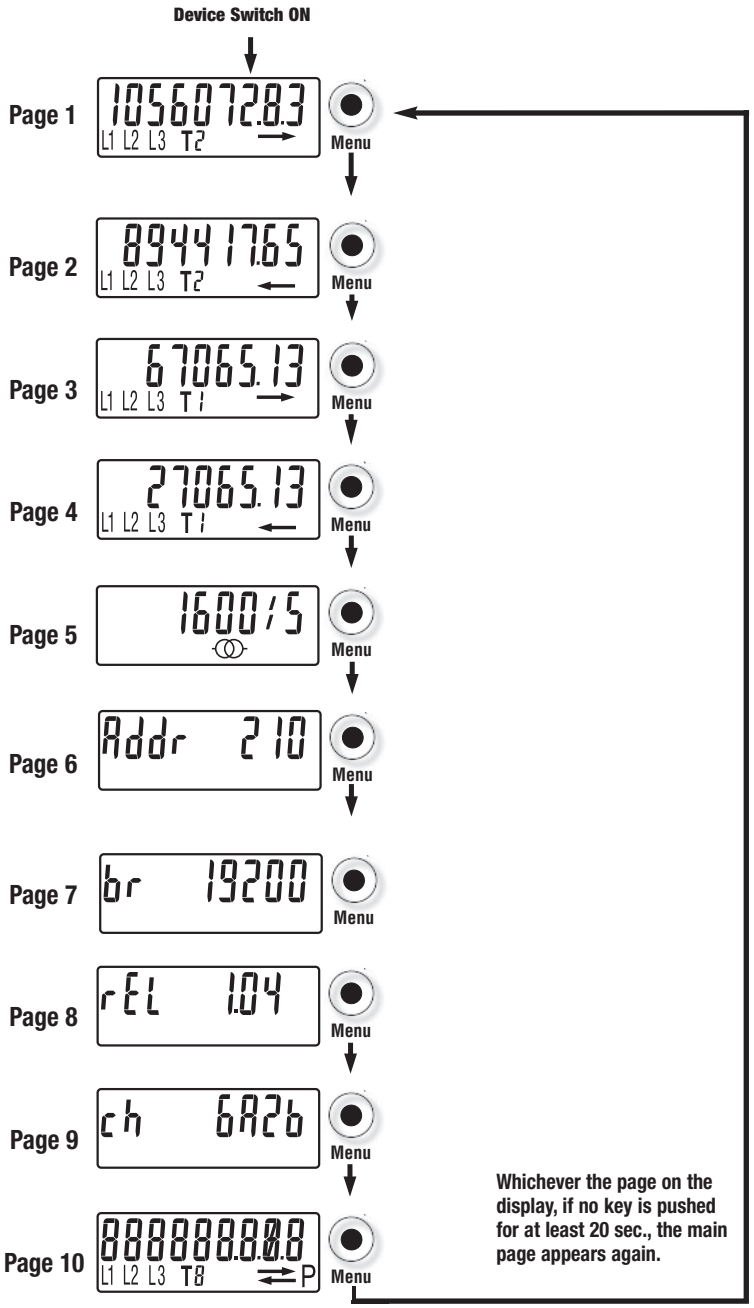
Page 6:
In this page the Modbus address or primary address appears.
This value can be altered, see the section Communication Address

Page 7:
In this page the communication baud rate appears. This value can be altered, see the section Communication Baudrate.

Page 8:
You can read the index of firmware release.

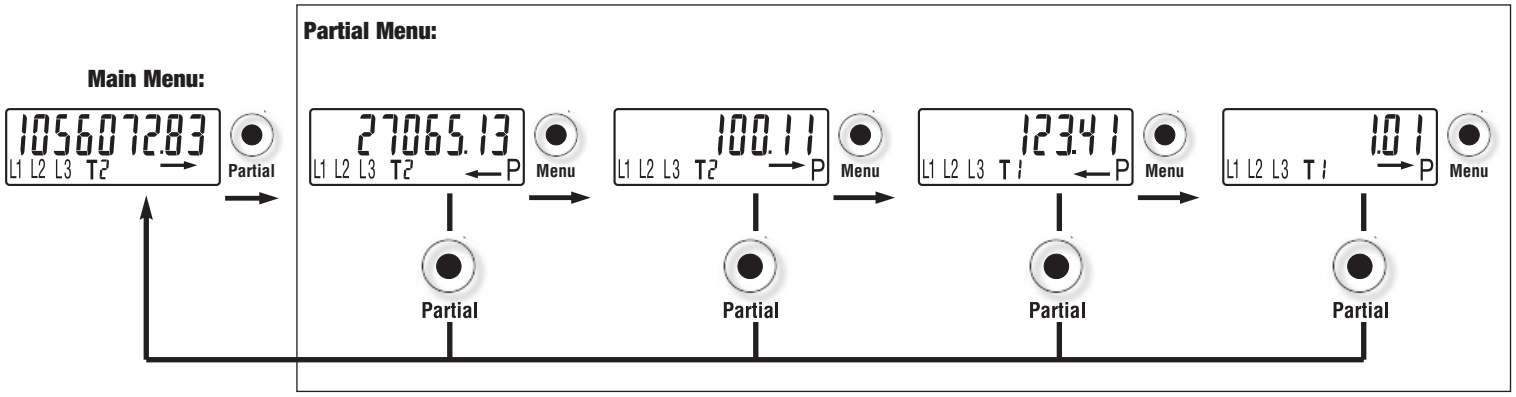
Page 9:
The checksum is periodically calculated to verify that the firmware is reliable. The result of the calculation appears in this page.

Page 10:
All the display segment are visible.



Partial Counter Menu

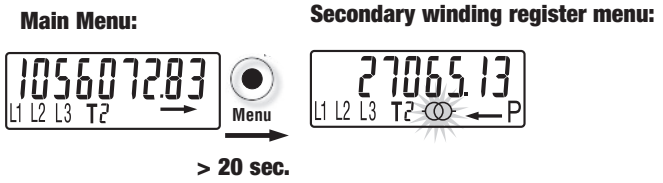
In any page of the **"Main Menu"**, a pressure of the **"Partial key"** allows to enter in the **"Partial Menu"** where partial active energy counters are readable in the main, second, third and fourth pages (i.e. for monthly energy consumption).. These counters are not saved when the device is switched off.
By pushing the partial key in any of the fourth pages, you go back to the **"Main Menu"**.



A pressure of 4 sec. of the **"Menu key"**, in every page of the **"Partial Counters"** allows to enter in the zeroing menu of the **"Partial Counters"**, and on the display appears **"rESET"**.
The key must be released. To do the reset press it again for 4 seconds.
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.

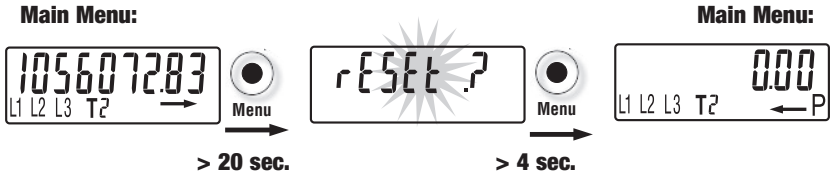
Secondary Winding Register Menu

On MID calibrated meters it's possible to show on display all energy registers measured at CT output (also via internal communication interface). For this, in any page of the **"Main Menu"**, the **"Menu key"** must be pushed for 20 second. In this mode " ⊂⊃ " appears and the meter show the same page of the **"Main Menu"** but in the first, second, third and fourth pages are shown the energy measured at the secondary winding of the CT. After a minute of **"Menu key"** inactivity, the meter shows and communicates again the CT input energies.



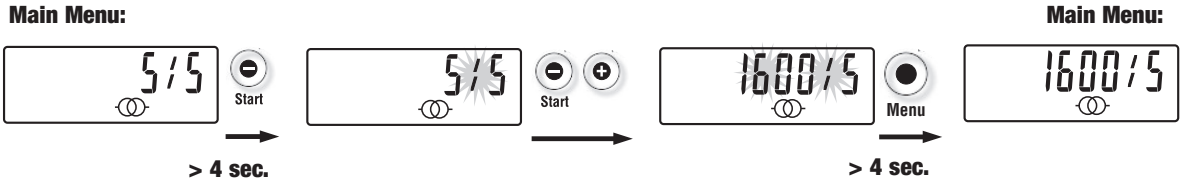
Energy Reset

A pressure of 20 sec. of the **"Menu key"**, on every page of the main menu, allows to enter in the zeroing menu of the main registers, and on the display appears **"rESET"**. The key 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.
This feature is present only in the models without MID-certification.



Primary CT Current Setting

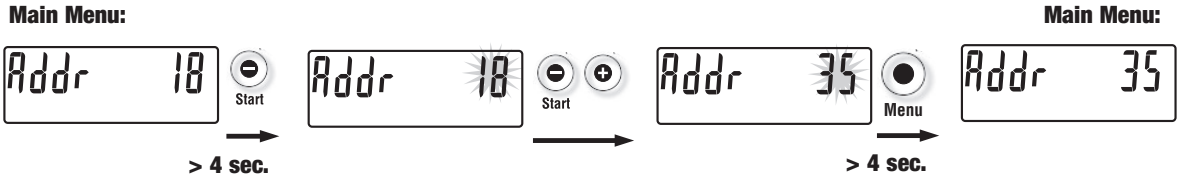
For the MID certified meters in the CT Ratio page by kept pushed for 4 sec. the **"Start (-) key"** the value of the primary winding blink on the display.
Push **"Start (-) key"** or **"(+)"** to change the value. Push the **"Menu key"** for 4 sec. to confirm, otherwise within 5 seconds the modification will be lost.



For the not MID certified meters to confirm the CT ratio you must reset the energy counters.

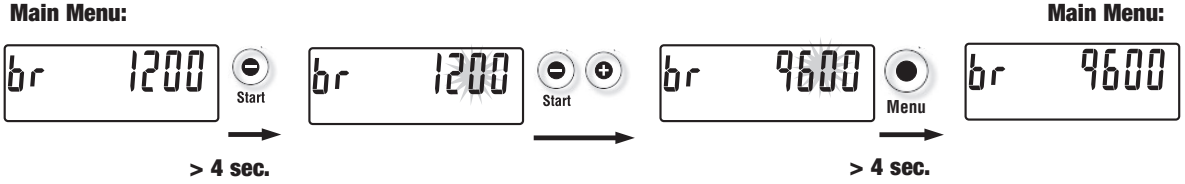
Communication Address

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 **"(+)"** to change the value. Push the **"Menu key"** for 4 sec. to confirm, otherwise within 5 seconds the modification will be lost.



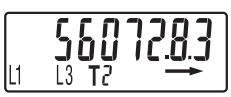
Communication Baudrate

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 **"(+)"** to change the value. Push the **"Menu key"** for 4 sec. to confirm, otherwise within 5 seconds the modification will be lost.



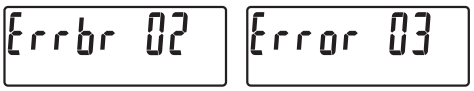
Diagnostic Message

Missing Phases
In case one or more phases is not detected, the corresponding icon disappears from the bottom row of the display.E.g. L2 is not detected.



Phase Sequence Error
When the 3 phases are not in the correct zero-crossing sequence this message appears and the icon L1 and L2 blink. To make this message to disappears, without change the wiring (Warning, in this way the measure may be wrong) you can keep pushed the **"Menu key"** for at least 4 sec.

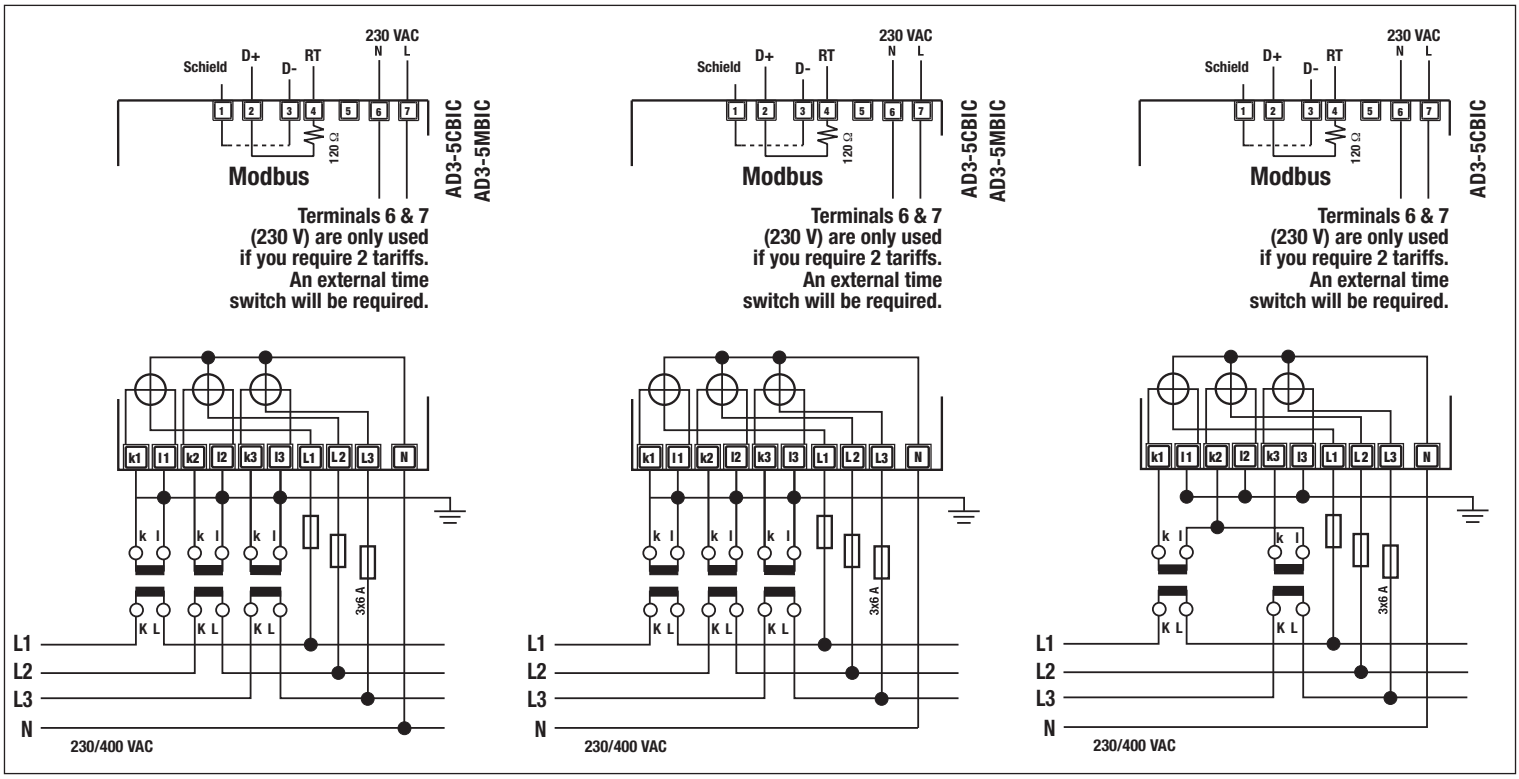
Error Condition
When the display show these messages, the meters has got a malfunction and must be replaced.



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.

Wiring diagram



(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.

Terminal Description

Modbus

1: Modbus network. Shield
2: Modbus network. Data +
3: Modbus network. Data -
4: Modbus network. For the termination of the network short this terminal with terminal 3.
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: Voltage connection of phase 1.
L2: Voltage connection of phase 2.
L3: Voltage connection of phase 3
N: Neutral connection.
K1-I1: Connection of the CT of phase 1
K2-I2: Connection of the CT of phase 2
K3-I3: Connection of the CT of phase 3

Technical Data

Data in compliance with EN 50470-1, EN 50470-3			**AD3-5CBIC / AD3-5MBIC** **CT connection till 10.000/5 A inbuilt communication Modbus**
General characteristics			
• Housing	DIN 43880	DIN	4 modules
• Mounting	EN 60715	35 mm	DIN rail
• Depth		mm	70
Operating features			
• Connectivity	to three-phase network	n° wires	4
• Storage of energy values and configuration	digital display (EEPROM)	-	yes
• Display tariffs identifier	for active energy	n° 2	T1 and T2
Supply			
• Certified voltage range ***Un***		VAC	230 ±20%
• Operating voltage range		VAC	110 ... 276 / 190 ... 480
• 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; phase/phase	VAC	480
	1 second: phase/phase	VAC	800
	continuous; phase/N	VAC	276
	1 second: phase/N	VAC	300
• Current ***Imax***	continuous	A	6
	momentary (0,5 s)	A	120
Display (readouts)			
• Connection errors and phase out	discernible from phase-sequence indic.	-	PHASE Err
• Display type	LCD	n° digits	9 (2 decimals)
	digit dimensions	mm x mm	6.00 x 3
• Active energy: 1 display, 9 digit - 2 tariffs	min. measuring energy	kWh	0.01
+ display import or export (arrow)	max. measuring overflow	kWh	9999999.99
• Instantaneous tariff measurement	1 display, 1-digit	-	T1 or T2
• Transformer primary current		A	5 ... 10.000
• Display period refresh		s	1
Measuring accuracy			
• Active energy and power	acc.to EN 50470-3	class	B
Measuring input			
• Type of connection		-	transformer .../5 A
• Voltage ***Un***	phase/phase	VAC	400
	phase/N	VAC	230
• Operating range voltage	phase/phase	VAC	190 ... 480
	phase/N	VAC	110 ... 276
• Current ***In***		A	5
• Current ***Imin***		A	0.05
• Operating range current ***(Ist ... Imax)***	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
• Certified frequency		Hz	50 ±2%
• Operating frequency		Hz	48 ... 62
• Input waveform		-	AC
• Starting current for energy measurement ***(Ist)***		mA	3
Optical interfaces			
• Front side ***(accuracy control)***	LED	imp/kWh	10.000
Safety acc. to EN 50470-1			
• Indoor meter		-	yes
• Degree of pollution		-	2
• Operational voltage		V	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 **(mod. AD3-5MBIC)**		-	yes
Embedded communication			
• Modbus RTU baudrate	RS-485 - 3 wires	-	up to 38.400 bps
Connection terminals			
• Type cage main current paths	screw head Z +/-	POZIDRIV	PZ1
• Type cage pulse output	blade for slotted screw	mm	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max.)	mm^2	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1 (4)
• Terminal capacity pulse output	solid wire min. (max.)	mm^2	1 (4)
	stranded wire with sleeve min. (max.)	mm^2	1 (4)
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 (term.)	-	IP51(*)/IP20

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

Note