SINGLE-PHASE AND THREE-PHASE SMART ELECTRONIC ELECTRICITY METERS

AM175
AM375

The AMx75 electricity meters series comprises modern electronic devices designed for use in AMM systems for the purposes of monitoring, controlling and regulating electricity consumption. These electricity meters make it possible to store operating data and are equipped with a communication module for two-way remote transmission of data and control commands. The communication protocol complies with IEC 62056-21 and DLMS. The electricity meters can be configured to meet the customer's specific needs and requirements. These electricity meters allow direct and semi-indirect measurement of active energy in both directions (consumption and supply) as well as measurement of reactive energy in four quadrants.

The electricity meters are designed for billing purposes. They are certified according to the Measuring Instruments Directive (MID) and according to WELMEC 7.2 for active energy billing. They are also approved for reactive energy measurement according to Act No. 505/1990 Coll., on metrology.

MEASURING SYSTEM

AMx75 series electricity meter:

- single-phase or poly-phase static device;
- active energy measurement in accuracy classes A, B, C;
- reactive energy measurement in accuracy classes 2 or 3;
- in compliance with EN 50470-1, EN 50470-3, IEC 62052-11, IEC 62053-21, IEC 62053-22, IEC 62053-23 and IEC 62054-24 (active/reactive energy);
- designed for direct or semi-indirect connection;
- features a real time clock with a replaceable battery.

The core of the measuring section consists of a microprocessor which carries out all the main calculations and operations. It converts analogue signals from current and voltage sensors into digital signals, calculates the required readings and controls subsequent processing and storage of data in the internal memory. Calibration is carried out by means of software calibration constants, which means that the measuring system does not contain any mechanically adjustable parts.

Another important feature is the checking and recording of unauthorized interventions that may damage the metrology function. The microprocessor also controls the data displayed, the disconnector, tariff switching, calibration LED flashing, etc. The values displayed and the disconnector status can be adjusted by means of two buttons.

Communication with the electricity meter is implemented locally via its optical interface and remotely via an external communication module with the electricity meter's master data management system (MDMS).

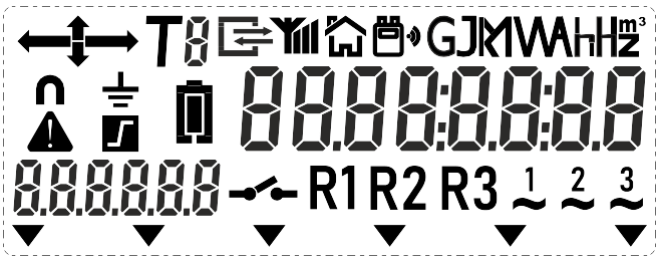
ELECTRICITY METER DESIGN

The AMx75 electricity meter, based on a tried and tested concept, is designed in such a way so as to cope with challenging operating conditions, be easy to operate and provide increased protection against tampering. Various parts of the electricity meter are protected from unauthorized interventions by a set of seals. The design allows easy installation. The dimensions of the electricity meter and terminal box casings are in compliance with DIN 43857. The electricity meter cover allows the devices to be stacked for storage purposes.

LCD DISPLAY

The data measured by the electricity meter can be displayed on the LCD display. The meter readings displayed differ based on the selected display mode. The modes include a customer and service mode with automatic display scrolling and a customer, service and battery mode with manual scrolling by means of buttons. The meter readings are displayed together with OBIS codes and usually with the respective units of measurement. The display also features a number of symbols indicating the current operating status of the electricity meter.

LCD DISPLAY LAYOUT (TWO LINES, 6+8)



BUTTONS

The electricity meter features three buttons. One of the buttons can be fitted with a seal. The buttons are used to move the data displayed up and down and to show data on the display in the battery mode. The buttons can be used for controlling the disconnector locally as well as for other functionalities of the electricity meter.

METER READINGS ON REQUEST AND FOR BILLING PURPOSES

The current billing information can be created on request. For example, the daily load profile data are saved at the end of the day. Information from the end of the billing period includes data from the registers as well as incremental and absolute energy. In case of a power cut, the meter keeps the general billing information and profiles.

CLOCK SYNCHRONIZATION (RTC)

The electricity meter is equipped with a real time clock (RTC). RTC adjusts the electricity meter time and date which allows proper generation of load curves and historical data on consumption. RTC is set during the production process, either locally via the optical interface, or remotely via a communication module. In case of a power cut, RTC runs on battery.

FIRMWARE UPDATES

Application FW and communication module FW in the electricity meter can be updated remotely without changing the electricity meter configuration. The update process is stable because no data blocks received are lost if communication is interrupted and damaged FW files, if any, are rejected.

PROTECTION AGAINST TAMPERING

The electricity meter is fitted with a battery. To replace the battery, the module cover needs to be opened (i.e. the seal on the module cover broken). The battery status is indicated on the display. Events like a power failure or tampering, such as opening of the terminal box cover or the module cover, electricity meter bypass, interference with terminals and a strong magnetic field, are detected.

COMMUNICATION INTERFACE OF THE ELECTRICITY METER

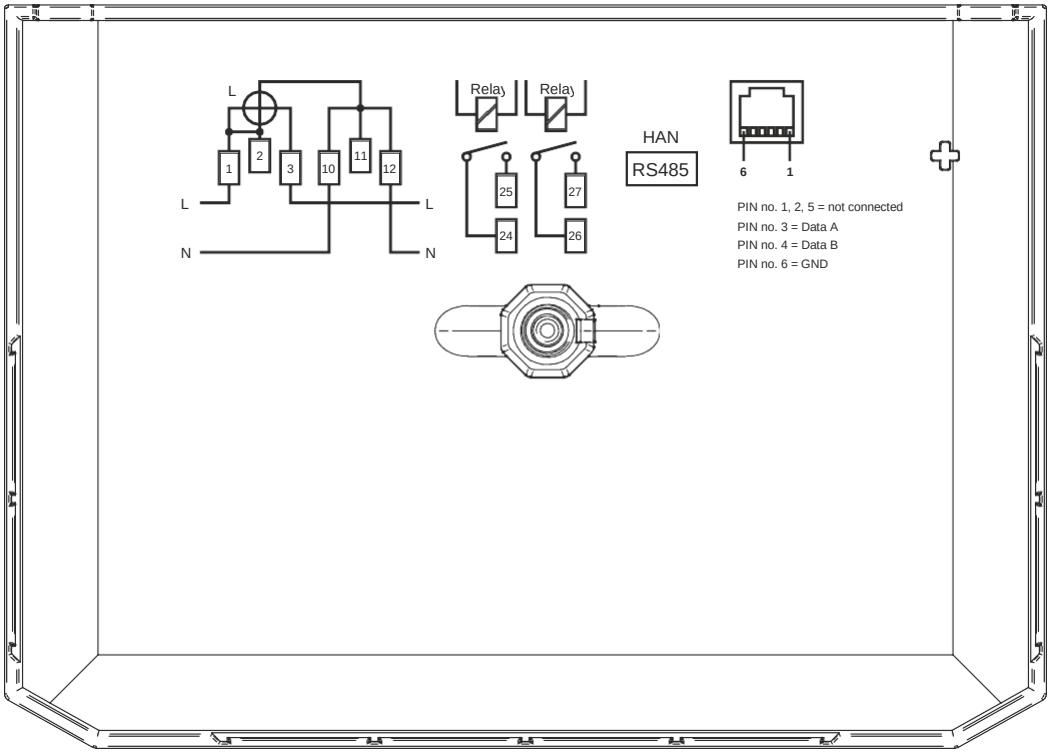
Access to the measuring instrument is possible via a number of communication interfaces:

- optical interface,
- external communication module (NB IoT, LTE, PLC),
- RS485/P1.

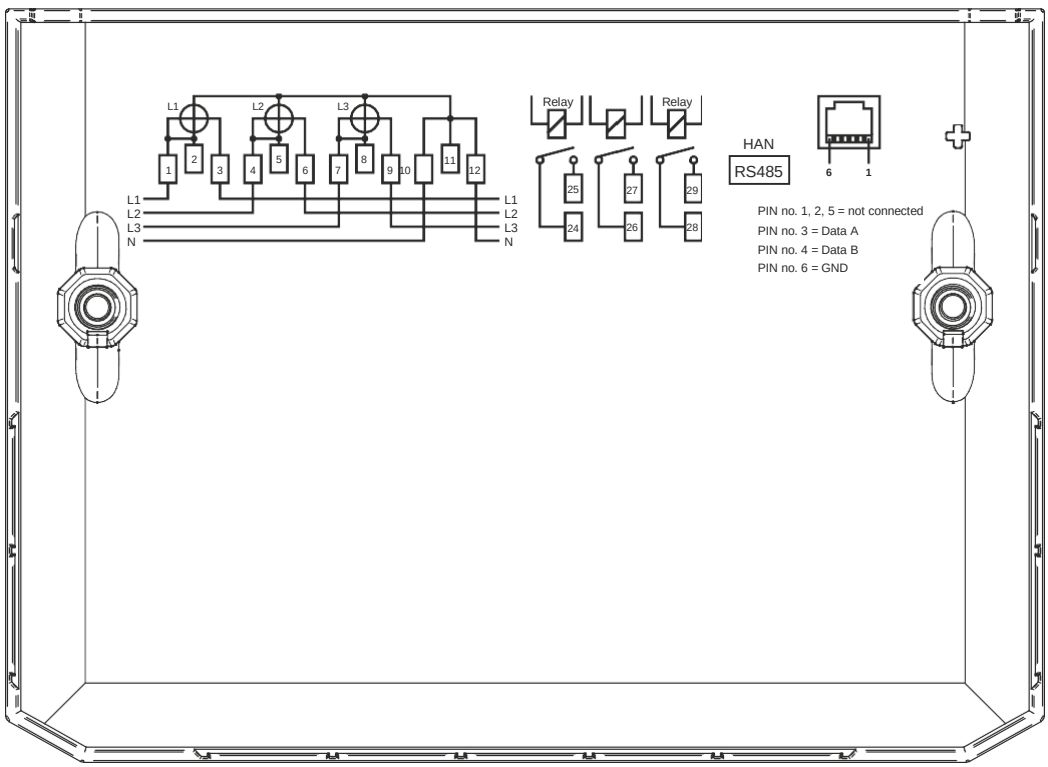
NORMS AND STANDARDS

EN 50470-1	Electricity metering equipment (AC) – Part 1: General requirements, tests and test conditions – Metering equipment (class indexes A, B and C)
EN 50470-3	Electricity metering equipment (AC) – Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C)
ČSN EN 60529	Degrees of protection provided by enclosures (IP Code)
ČSN EN 60900 – ed.4	Live working – Hand tools for use up to 1000 V AC and 1500 V DC.
IEC EN 62052-11	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Electricity meters
ČSN EN 62052-21	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 21: Tariff and load control equipment
ČSN EN 62052-31	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests
IEC EN 62053-21	Electricity metering equipment (AC) – Particular requirements – Part 21: Static meters for AC active energy (class indexes 1 and 2)
ČSN EN 62053-23	Electricity metering equipment (AC) – Particular requirements – Part 23: Static meters for reactive energy (class indexes 2 and 3)
IEC EN 62053-52	Electricity metering equipment (AC) – Particular requirements –Part 52: Symbols
ČSN EN 62054-21	Electricity metering equipment (AC) – Tariff and load control – Part 21: Particular requirements for time switches
ČSN EN 62056-6-1	DLMS/COSEM – Part 6-1: Object identification system (OBIS)
ČSN EN 62056-21	Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange
IEC EN 62056-46	Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC protocol
IEC EN 62056-47	Electricity metering – Data exchange for meter reading, tariff and load control – Part 47: COSEM transport layers for IPv4 networks
IEC EN 62056-53	Electricity metering – Data exchange for meter reading, tariff and load control – Part 53: COSEM application layer
IEC EN 62056-61	Electricity metering – Data exchange for meter reading, tariff and load control – Part 61: Object identification system (OBIS)
IEC EN 62056-62	Electricity metering – Data exchange for meter reading, tariff and load control – Part 62: Interface classes
ČSN EN 62059-41	Electricity metering equipment – Dependability – Part 41: Reliability prediction
IEC EN 60068	Environmental testing
IEC EN 60068-2-1	Environmental testing – Part 2-1: Testing – Test A: Cold
IEC EN 60068-2-2	Environmental testing – Part 2-2: Testing – Test B: Dry heat
IEC EN 61000	Electromagnetic compatibility (EMC)
IEC EN 61000-4-2	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge – Immunity test
IEC EN 61000-4-3	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
IEC EN 61000-4-4	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transients/burst immunity test
IEC EN 61000-4-5	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
IEC EN 61000-4-6	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
IEC EN 61000-4-8	Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test, IEC test
IEC EN 61000-4-11	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests
ČSN EN 62059-41	Electricity metering equipment – Dependability – Part 41: Reliability prediction
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission requirements
TNI CLC/TR 50579	EMC parameters – Severity levels, immunity requirements and test methods for disturbances in the frequency range 2–150KHz.
ČSN IS0 8601	Date- and time-related data – Exchange of information – Date and time display
CENELEC EN 50065-1	Signalling on low-voltage electrical installations in the frequency range 2–148.5kHz. General requirements, frequency bands and electromagnetic disturbances
CENELEC EN 50065-2-3	Signalling on low-voltage electrical installations in the frequency range 2–148.5kHz. Immunity requirements for network communication equipment and systems operating in the frequency range 3–95kHz and intended for use by electricity suppliers and distributors
CENELEC EN 50065-7	Signalling on low-voltage electrical installations in the frequency range 2–148.5kHz. Equipment impedance

AM175 TERMINAL BOX DIAGRAM



TERMINAL BLOCK DIAGRAM AM375



TYPE SPECIFICATION OF ELECTRICITY METERS

	AM	#	75.	#.	#	#	-	##	.	##	-	##	.		#	#	#
Single-phase		1															
Three-phase		3															
Model			75														
Direct connection				D													
Indirect connection				I													
Direct with neutral conductor measurement				Z													
Disconnector																	
Not fitted					0												
Direct electricity meters – disconnector					1												
Indirect electricity meters – auxiliary relay for external disconnector control					1												
Communication module																	
No internal communication module (external module can be used at any time)								E									
Internal module								I									
FW version (the manufacturer's hexadecimal coding)																	
Version 10 for series production										10							
HW version (the manufacturer's hexadecimal																	
coding) Version 01 for series production													01				
Type of internal module (the manufacturer's hexadecimal coding)																	
No internal module														00			
WMBus module														01			
Additional information (not relevant to metrology), (the manufacturer's hexadecimal coding)																	
Customer interface P1																	1
Customer interface RS485																	4
No tariff relay																0	
x relays with switch contact for AM175																1-2	
x relays with switch contact for AM375																1-3	
Number of buttons															2-3		

Example: AM175.D.1E-10.01-00.324

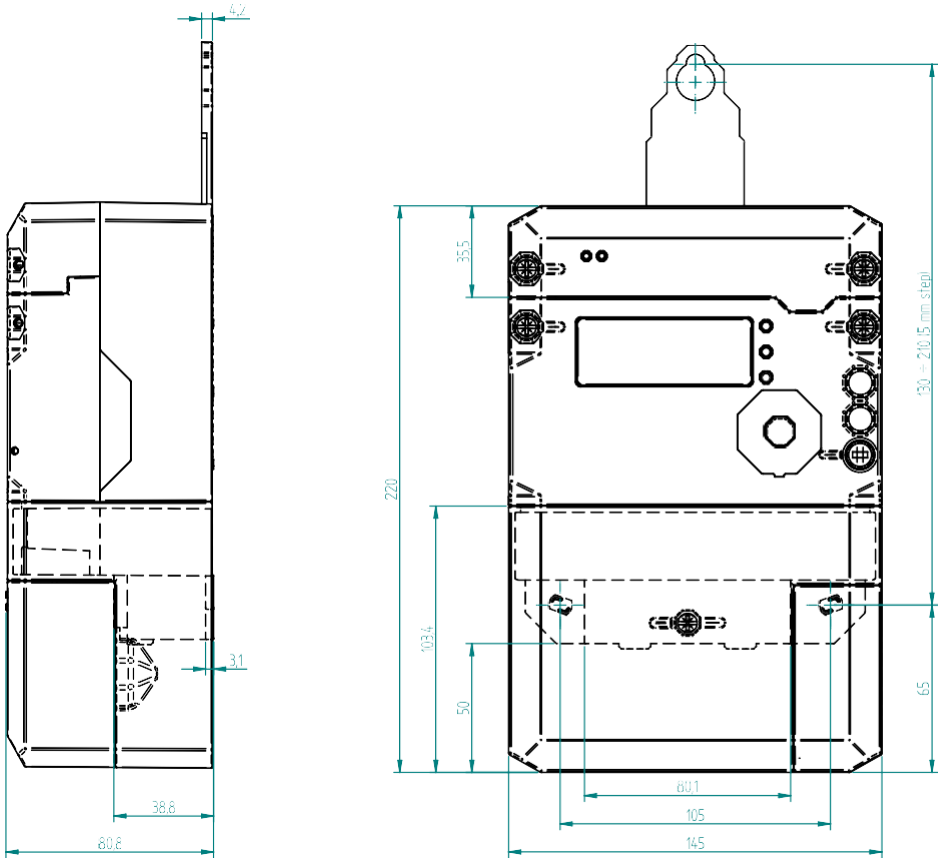
TECHNICAL PARAMETERS

Basic parameters	AM175.D	AM375.D
Connection	Direct, two-wire	Direct, four-wire
Reference voltage U_n	230 V	3 × 230/400 V
Specified operating voltage range	0.8 ÷ 1.15 U_n	0.8 ÷ 1.15 U_n
Limit operating voltage range	85 V to 270 V	85 V to 460 V
Reference frequency f_n	50 Hz	50 Hz
Limit operating frequency range	± 5 % f_n	± 5 % f_n
Consumption of each voltage circuit (including the communication module supply)	Max. 2 W, max. 4 VA capacity	Max. 2 W, max. 4 VA capacity
Consumption of each current circuit, including the influence of the disconnector	< 0.3 VA at I = 5 A < 1.2 VA at I = 10 A < 2.7 VA at I = 15 A < 4.8 VA at I = 20 A	< 0.3 VA at I = 5 A < 1.2 VA at I = 10 A < 2.7 VA at I = 15 A < 4.8 VA at I = 20 A
Number of tariffs	up to 8	up to 8
According to EN 50470-1, EN 50470-3 (active energy measurement)		
Reference current I_{ref}	5 A	5 A
Maximum current I_{max}	60 A, 80 A	100 A
Transition current Itr	0.1 I_{ref}	0.1 I_{ref}
Minimum current I_{min}	250 mA	250 mA
Inrush current I_{st}	10 mA	10 mA
Accuracy class of active energy measurement	B or A	B or A
According to IEC EN 62052-11, IEC EN 62053-23 (reactive energy measurement)		
Basic current I_b	5 A	5 A
Maximum current I_{max}	60 A, 80 A	100 A
Inrush current I_{st}	0.004 I_b	0.004 I_b
Accuracy class of reactive energy measurement	2 or 3	2 or 3
Disconnector technical parameters		
Maximum switching voltage	250 V	400 V
Maximum switching current	80 A	100 A
Mechanical life	1 × 10^5 cycles	1 × 10^5 cycles
Electrical life	5 × 10^3 cycles	5 × 10^3 cycles
Mechanical specifications		
Width × height × depth	145 × 220 × 80.8 mm	170 × 270 × 80.8 mm
Installation holes spacing (width × height)	105 mm × 130 ÷ 210 mm	150 mm × 160 ÷ 250 mm
Operating position	Vertical	Vertical
Electricity meter with protection class II insulation enclosure	according to EN 50470-1	according to EN 50470-1
Air distances and surface routes	according to EN 50470-1, IEC EN 62052-11	according to EN 50470-1, IEC EN 62052-11
Connection of current, voltage and auxiliary conductors		
Connecting screws, current	M6	M6
Tightening torque (recommended)	4.1 Nm	4.1 Nm
Clamp diameter	8.4 mm	8.4 mm
Conductor cross-section Min. / Max. firm (according to EN 60228, class 1&2)	2.5 mm^2 / 35 mm^2	2.5 mm^2 / 35 mm^2
Conductor cross-section Min. / Max. flexible (according to EN 60228, class 5&6)	2.5 mm^2 / 25 mm^2	2.5 mm^2 / 25 mm^2
Screw groove	PZ/S2 (combined – PZ & SL, size 2 according to ISO 4757)	PZ/S2 (combined – PZ & SL, size 2 according to ISO 4757)
Strength class / Surface finish	6.8 / Zn5c1B according to ISO 4042	6.8 / Zn5c1B according to ISO 4042

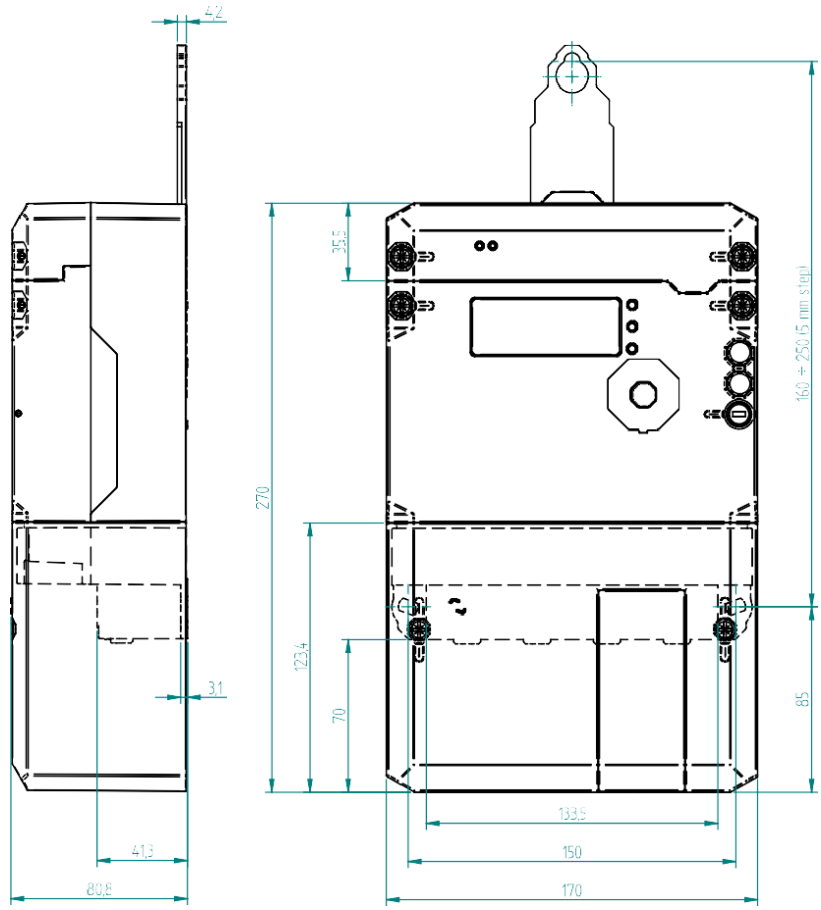
Connecting screws, voltage	M3	M3
Tightening torque (max.)	0.48 Nm	0.48 Nm
Clamp diameter	3 mm	3 mm
Conductor cross-section Min. / Max.	1.5 mm^2 / 4 mm^2	1.5 mm^2 / 4 mm^2
Screw groove	PZ/S1 (combined – PZ & SL, size 1 according to ISO 4757)	PZ/S1 (combined – PZ & SL, size 1 according to ISO 4757)
Strength class / Surface finish	4.6 / Zn5c1B according to ISO 4042	4.6 / Zn5c1B according to ISO 4042
Terminal for load control	Spring contacts	Spring contacts
Conductor cross-section Min. / Max.	0.2 / 2.5 mm^2	0.2 / 2.5 mm^2
Electricity meter cover securing		
Seal screws	M4	M4
Screw groove	PZ/S2 (combined – PZ & SL, size 2 according to ISO 4757)	PZ/S2 (combined – PZ & SL, size 2 according to ISO 4757)
Surface finish	Zn5c1B according to ISO 4042	Zn5c1B according to ISO 4042
Outputs		
Display (number and size of digits)	6 (5 mm) + 8 (8 mm)	6 (5 mm) + 8 (8 mm)
Active energy testing LED for consumption and supply	Programmable, usually 10,000 imp. / 1 kWh In idle position: LED off (programmable)	Programmable, usually 10,000 imp. / 1 kWh In idle position: LED off (programmable)
Reactive energy testing LED	Programmable, usually 10,000 imp. / 1 kvarh In idle position: LED off (programmable)	Programmable, usually 10,000 imp. / 1 kvarh In idle position: LED off (programmable)
Auxiliary relay output (0–3)*	Switching contact 5 A / 250 V, separated by galvanisation	Switching contact 5 A / 250 V, separated by galvanisation
Optical interface	IR interface and reading according to IEC EN 62056-21, Mode C	IR interface and reading according to IEC EN 62056-21, Mode C
P1	1 × RJ12 (optional instead of RS485)	1 × RJ12 (optional instead of RS485)
P2	Ready	Ready
RS485	1 × RJ45 or RJ12 (optional instead of P1)	1 × RJ45 or RJ12 (optional instead of P1)
Communication modules		
NB IoT	NB2, 3GPP rel.14 B1/B2/B3/B4/B5/B8/B12/ B13/B14/B17/B18/B19/B20/B25/ B28/B66/B70/B85	NB2, 3GPP rel.14 B1/B2/B3/B4/B5/B8/B12/ B13/B14/B17/B18/B19/B20/B25/ B28/B66/B70/B85
LTE	LTE Cat. 1, 3GPP rel.13 LTE-FDD B1/B3/B7/B8/B20/B28 GSM/GPRS/EDGE 900/1800 MHz	LTE Cat. 1, 3GPP rel.13 LTE-FDD B1/B3/B7/B8/B20/B28 GSM/GPRS/EDGE 900/1800 MHz
PLC	PRIME 1.4, G3	PRIME 1.4, G3
Real time		
Accuracy	according to IEC EN 62054-21	according to IEC EN 62054-21
Battery life	Min. 10 years	Min. 10 years
Battery type	ER14250	ER14250
Ambient conditions		
Operating temperature	–40°C to +70°C	–40°C to +70°C
LCD readability	–25°C to +70°C	–25°C to +70°C
Storage temperature	–40°C to +70°C	–40°C to +70°C
Mechanical class / Electromagnetic class	M1 / E2	M1 / E2
Relative humidity	according to EN 50470-1, IEC EN 62052-11	according to EN 50470-1, IEC EN 62052-11
IP	IP 54 (IP51 without sealing)	IP 54 (IP51 without sealing)

* based on the HW design

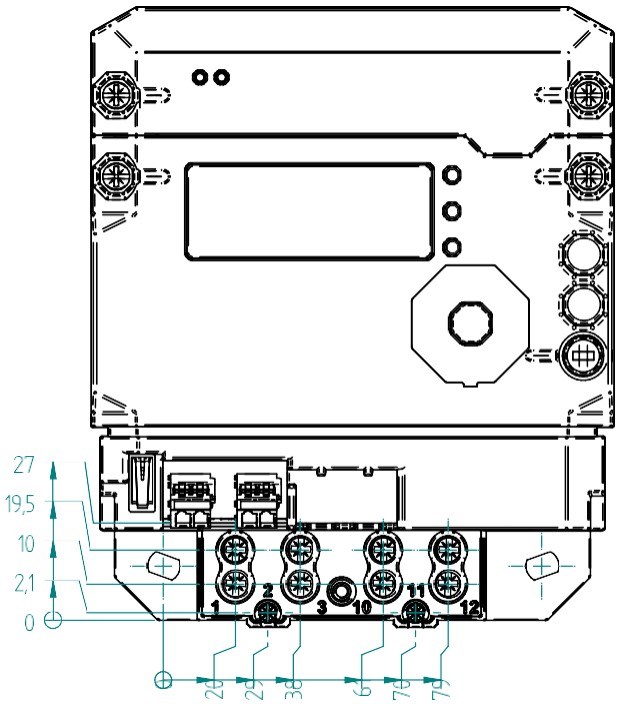
AM175 – DIMENSIONAL DRAWING

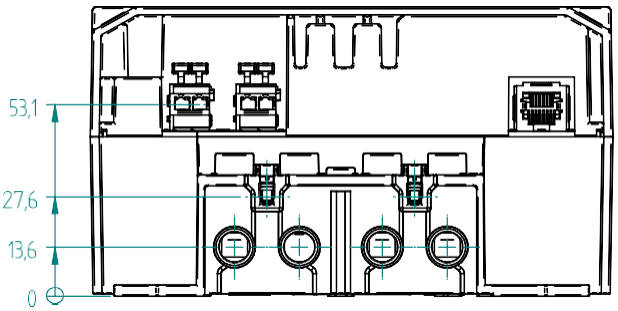


AM375 – DIMENSIONAL DRAWING

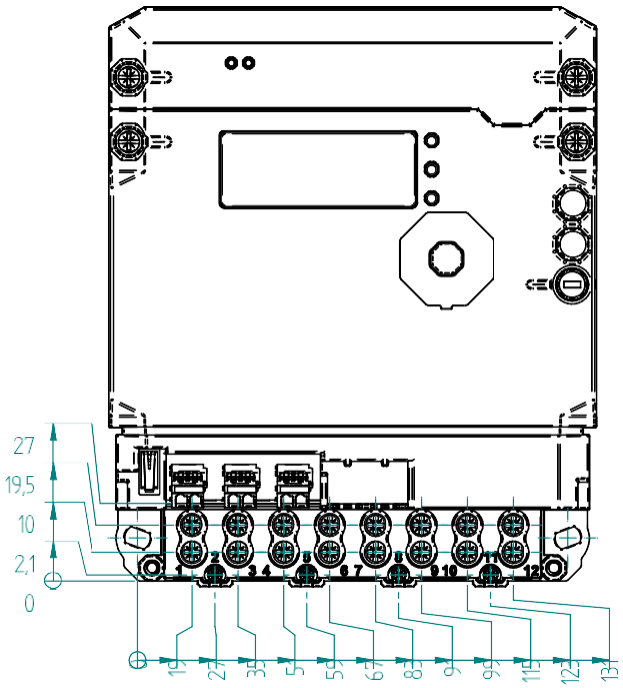


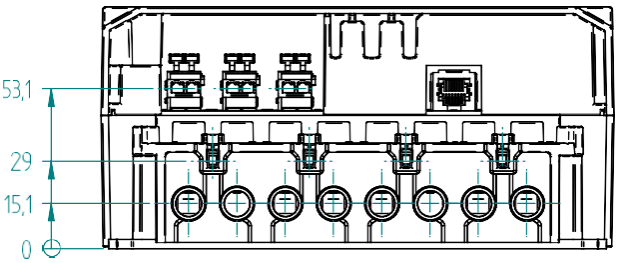
AM175 TERMINAL BOX DIMENSIONAL DRAWING





AM375 TERMINAL BOX DIMENSIONAL DRAWING





INSTALLATION

Installation is carried out by means of three screws “crosswise”. The spacing can be adjusted by moving the eyelet by two lengths. The electricity meter must be attached to a fixed fireproof object. Detailed installation instructions are provided below.

AUTHORIZATIONS FOR INSTALLATION

The following requirements must be met for the meter installation:

- Installation must be carried out by experts or qualified and properly trained technicians.
- The electricity meter must be installed on surfaces prepared and adjusted for that purpose, which needs to be checked prior to installation.
- Installation must reflect the user’s conditions for connection.

INSTALLATION PROCEDURE

Equipment necessary for installation:

- electricity meter with proper designation, properly completed type plate and required seals;
- electricity meter wiring diagram;
- fasteners required for attaching the electricity meters (screws etc.);
- seals and sealing pliers to seal the cover panel and terminal box cover;
- required tools in good condition;
- indication or measuring instrument.

Wiring

- make sure that there is no voltage in the supply wires;
- remove the insulation along the required length of the wire;
- connect wires in the respective terminals on the terminal box, tighten the terminal screws using appropriate torque (see Technical Data).

If the cross-section of the wire is small, pay attention to their proper position in the terminal box. A proper position is a position where the wire is placed in the terminal box groove. To make sure that the wire is attached to the strip properly, we recommend using a testing measuring instrument.

Wiring inspection

After installation, we recommend the following checks:

- the identification number of the electricity meter must correspond to the specified location of the electricity meter;
- the terminal box screws must be tightened properly;
- check the order in which the input and output conductors are connected;
- make sure that the neutral conductor is connected properly – improper connection may damage the electricity meter;
- function of the electricity meter – the respective LEDs must be ON and correct symbols must be shown on the display (no error messages present).

After the checks have been completed successfully, return the terminal box cover and seal it.

TYPICAL PROBLEMS DIAGNOSTICS

The display did not turn on	● no voltage in the supply wires ● the electricity meter is designed for different voltage
The L1, L2, L3 symbols are flashing one by one (only for poly-phase electricity meters)	● Incorrect phase sequence (switch any two phases)
One of the symbols L1, L2, L3 did not come up.	● the respective phase voltage is missing
The electricity meter is not communicating with the electronic device (PDA, PC…)	● optical probe is not connected to PC, PDA, … ● the serial port set improperly on PC, PDA… ● Starting speed set improperly ● SW does not support this type of device
The electricity meter is not communicating with the central (master system)	● low signal for communication ● excessive communication signal interference ● electricity meter unknown to the central ● improper (or no) AMM address of the electricity meter

MAINTENANCE AND STORAGE

Care and maintenance

The product does not require any maintenance and its minimum service life is 16 years. To remove dust and other dirt from the external surfaces, the manufacturer does not recommend using organic solvents, aggressive chemicals and abrasive cleaning agents. The specified storage temperatures must be complied with. Failure to do so may reduce the service life of the electronic components. Furthermore, the product must be protected from wet and moist conditions. Precipitation, humidity and liquids containing minerals could cause corrosion on the electrical circuits should the device get wet. The product is designed to be used indoors, i.e. it may only be used in areas providing additional protection against external influences (e.g. in a building or in a cabinet). The product must not be placed on and dried by a

source of heat or put into a source of heat (e.g. microwave oven, kitchen oven or radiator) as it could overheat and some of its parts could explode. It must not be exposed to excessive heat as it could lead to deformation of the covers. Do not store the device in cold areas, especially those which might get warm again (reaching the nominal operating temperature) as humidity could condensate inside the device and damage electronic components or deteriorate the insulation properties.

Service
Service is provided by the company ZPA Smart Energy a.s., Komenského 821, 541 01 Trutnov, Czech Republic, trademark Smart Energy, tel. +420 499 907 111, e-mail zpa@zpa.cz, www.zpa.cz

Battery replacement
To replace the battery, open the terminal box cover (the seal cover needs to be broken).

Transport
The electricity meter must be transported in the manufacturer's original packaging, or in packaging preventing damage to the device during transport or handling.

SAFETY

Manufacturer's warnings

The electricity meter is capable of safe operation. The manufacturer has issued the EU Declaration of Conformity in accordance with Act No. 90/2016 Coll. Despite that, the manufacturer points out that there are potential risks connected with improper handling or use of the electricity meter. For example:

- installation and maintenance must be carried out by properly trained staff with appropriate electrotechnical qualifications who must inform the operator that the device is ready for safe operation;
- the electricity meter must not be used for purposes other than those it has been designed for;
- the electricity meter must not be modified intentionally contrary to the type design;
- the electricity meter must not be run with voltage, current and/or frequency values other than those it has been designed for or professionally adjusted to;
- the electricity meter must be placed or secured in such a way so as to complicate or hinder its use by persons without electrotechnical qualifications, and children in particular;
- every time before the device is put into operation again, e.g. after repair or maintenance work, etc., the electricity meter protection against penetration must be renewed, while taking all the safety measures and carrying out inspections specified by electrotechnicians;
- during operation, the installation site must not be subject to a risk of fire or explosion as a result of generated gas, flammable liquid vapours and flammable dust;
- electricity meters may only be handled by qualified and properly trained staff and any handling must be carried out without voltage, except for measuring with an electricity meter with insulated tips;
- the electricity meter must not be operated in conditions or in an environment where safe operation is not guaranteed (e.g. placed on a flammable surface, cover made of a flammable material, insufficient protection against penetration of foreign elements, water or other liquids);
- electricity meters must be placed and operated indoors, i.e. in areas providing sufficient protection against external elements (e.g. inside a building or cabinet);
- the electricity meter must not be operated in conditions or in an environment where it is subject to vibrations and oscillations.

Should the user fail to abide by any of the above instructions, the manufacturer shall not be liable for any damage incurred as a result of such failure. Failure to comply with the storage and operating conditions specified in the "Care and maintenance" section may have a negative impact on the electricity meter service life.

Responsibility

The electricity meter owner (usually the energy provider) is responsible for making sure that all persons engaged in any work and use of the electricity meter:

- are informed and qualified in accordance with national regulations;
- have read and understood the relevant sections of this document;
- strictly comply with safety regulations and operational data set out in the individual sections.

The electricity meter owner is also responsible for:

- protection of people;
- prevention of damage to material;
- staff training.

SAFETY INSTRUCTIONS

The following safety instructions shall be observed in all circumstances:

- The wires which the device is to be connected to must not be under voltage during installation or replacement. Live contacts are dangerous to life. The relevant fuses should therefore be removed and stored at a safe place so that they cannot be returned by an unauthorized person unnoticed until the work has been completed.
- Local safety regulations must be complied with. The electricity meters shall only be installed by qualified and trained persons.
- Before opening, secondary circuits of current transformers must be short-circuited (in the terminal box cover) without exception. High voltage incurred by interrupting the current transformer circuits is life-threatening and damages the transformer.
- Transformers in a medium or high voltage system must be earthed on one side or at a neutral point on the secondary side. Otherwise, they could be charged with voltage exceeding the insulation force of the device and be dangerous to life.
- Make sure to hold or secure the device firmly during installation so as to avoid any injury as a result of a fall.
- Meters which have been subjected to a fall must not be installed even if they do not show any visible signs of damage. Such meters must be returned for re-testing either to an authorized repair centre or directly to the manufacturer. Internal damage may cause functional defects or a short circuit.

- Never clean the device under running water or with high-pressure equipment. Water penetration may cause a short circuit. The IP code of the device needs to be respected.

DISPOSAL

Based on the data provided in the ISO 14001 certificate, a majority of the components used can be separated and accepted for disposal or recycling as appropriate. At the end of its service life, the device shall be handed over to a specialized company engaged in separation of used materials and subsequent recycling. Discarded devices must be disposed of in an eco-friendly manner and in compliance with the Waste Act. The product does not contain any radioactive, carcinogenic or other materials with negative effects on health or the environment. All the plastic materials are recyclable. The packaging materials are recyclable and shall be handed over to a specialized company as a source of reusable material or energy at the end of their service life.

Disposal and legal regulations concerning environmental protection

For disposal purposes, local regulations concerning environmental protection must be complied with at all times.

Components	Disposal
Printed circuit boards, LCD, LED	Electronic waste. Disposal in compliance with local regulations.
Battery	Dangerous waste. Disposal in compliance with local regulations.
Metal components	Separate and deliver to waste collection point for disposal in compliance with local regulations.
Plastic components	Separate and deliver to waste collection point for disposal or regranulation in compliance with local regulations.