

SINGLE AND POLY-PHASE SMART ELECTRICITY METERS

AM165 AM365



The AMx60 and AMx65 families electricity meters are modern electronic devices, designed for use in AMM systems for monitoring, inspection and control of consumption of electrical energy. The AMx60 and AMx65 families are based on the same measurement and application core, the AMx65 family is an advanced product with an extended number of functionalities. Electricity meters enable to archive various operation data and are equipped with a communication module with an optical interface and two communication channels for bi-directional remote as well as local data and control commands transmission. Communication protocols comply with IEC 62056-21 and DLMS standards. Electricity meters can be configured as per specific requirements and needs of the customer. Electricity meters enable measurement of active energy in both directions (consumption and supply) and measurement of reactive energy in four quadrants.

Electricity meters are designed for billing purposes (certified for measurement of active energy as per MID Directive (2014/32/EU) for measurement of reactive energy as per national Act on metrology No. 505 / 1990 Coll.).

MEASURING SYSTEM

The AMx65 series electricity meter:

- is a single or poly phase electronic device,
- registers energy in up to 8* tariff register sets and single total register set,
- measures active energy in accuracy classes A, B or C,
- measures reactive energy in accuracy classes 2 or 3,
- complies with EN 50470-1, 50470-3 (active energy) and EN 62053-23 and EN 62053-23 (reactive energy),
- is designed for direct or semi-indirect connection,
- contains a real time clock with a replaceable battery.

At the heart of the electricity meter is the microprocessor that governs sampling of analog signals from voltage and current circuits, calculates all required values and controls follow-up processing and storage of data to electricity meter internal memory. Measuring system calibration uses software calibration constants, i.e. measuring system contains no mechanically adjustable components.

Another important functionality is checking for and logging of tampering occurrences that could hamper metrological functionality. The microprocessor also governs data displayed, disconnector, tariff switching, calibration LED flashing, etc. Display values and disconnector status can be changed via two push buttons.

Optional internal communication module has a standard optical interface and one or two bi-directional communication interfaces for local communication (e.g. RS485, WMBus, etc.) or remote communication with the MDMS (e.g. GPRS, PRIME, etc.).

A second optional internal module can support auxiliary inputs (tariff inputs, external buttons, etc.) and outputs (e.g. relay, SO, etc.).

* Based on HW and FW modification

LIQUID CRYSTAL DISPLAY (LCD)

The LCD shows measurand values. Displayed measurands vary according to the display mode chosen. The modes can be either customer or service mode with automatic screen scrolling or customer, service and battery mode with manual scrolling via push buttons. Values are displayed together with OBIS codes and usually with corresponding units. The display also shows other icons describing current status of the electricity meter.



PUSH BUTTONS

The electricity meter has two push buttons with one sealable. Push buttons can be used for up and down scrolling of display data, for pulling up display data in battery mode, for closing of accounting periods or for disconnecter control, if so allowed by specific setting.

REAL TIME CLOCK (RTC)

The electricity meter carries a Real Time Clock (RTC). RTC can be set via optical interface locally or via communication module remotely. A battery backs up the RTC during power outages. The battery can be replaced after opening the terminal cover (breaking of terminal cover seals cannot be avoided). Battery status is shown on the display.

TARIFFS

AMx65 can manage up to 8* tariffs. Tariff currently active is indicated on the display by symbols T1-T8*. Tariff switching is done either locally, based on the internal clock time-plan or limiter outputs, or remotely by the MDMS. Tariffs can be set by tariff inputs, provided the electricity meter is equipped with the appropriate module. Switching priorities can be modified in electricity meter configuration.

METER REGISTERS

The electricity meter carries active and reactive energy registers, separate for energy flow, phases and tariffs. Other registers log instantaneous effective values of voltage, current, active power and power factor.

SWITCHING FUNCTION (SCHEDULER)

The scheduler manages tariff switching, activates the event logger and generates further events for managing functionalities as required.

PROFILE REGISTERS (LOAD PROFILE)

Pre-selected values are logged to registers automatically at regular intervals. If memory capacity is exceeded, the oldest log is dropped (FIFO).

HISTORY REGISTERS

Based on events, generated by the scheduler, limiter, push buttons, etc. pre-selected values (registers) with time stamps are logged to pre-selected registers. For example, logged can be energy registers at the end of the billing period (e.g. last day of month at 23:59:59). If memory capacity is exceeded, the oldest log is dropped (FIFO).

EVENTS LOGGER

Any pre-selected event identified can be logged to the event logger together with a time stamp. If memory capacity is exceeded, the oldest log is dropped (FIFO).

As a rule, following events are logged:

- Strong DC magnetic field occurrence – e.g. if the electricity meter encounters a strong magnet (tampering),
- Terminal cover opening (tampering),
- Electricity meter case opening (tampering),
- Power outages and drops below pre-selected limits,
- Current effective value beyond limit during period monitored,
- Tariff switching,
- Disconnecter status change – by customer, by limiter or manually by push-buttons.

CORE EVENT LOGGERS

Event logger of successful FW changes – successful change of the Application FW done, logged are new FW version and change timestamp. Log count is limited to 48.

Event logger of unsuccessful FW changes – logged is timestamp of unsuccessful FW change. Logged are 128 changes.

Event logger of instrument transformer ratios (valid only for electricity meters with semi indirect current measurement) – setting of transformer ratio done, this change is logged to a special event logger. Logged with timestamps are transformer ratios and values of total energy registers A+, A-, RL (QI), RC (QII), RL (QIII), RC (QIV). Logged are latest 15 changes of settings.

LIMITER

Based on selected register real time values: voltage, current, power, energy, etc. and pre-selected limits, events are generated that can be used for managing electricity meter further activities (disconnecter opening / closing, log in event logger, tariff switching, etc.).

DISCONNECTOR / DISCONNECTOR RELAY

Based on configurable requirements, the disconnecter of a direct electricity meter can open / close its output current terminals and a semi-indirect electricity meter disconnecter relay can control an external contactor.

AUXILIARY RELAY

The electricity meter can be equipped with up to two* auxiliary relays to control an external contactor. Auxiliary relays are managed by the (scheduler) time switch or remotely.

S0 OUTPUTS

The electricity meter can be equipped with up to six* auxiliary S0 impulse outputs. Impulse frequency and length are configurable.

AUXILIARY INPUTS

The electricity meter can be equipped with up to six* auxiliary inputs. These can be configured as tariff inputs or as general inputs.

TAMPERING PROTECTION

The electricity meter is equipped with sensors of terminal cover or meter case opening and of an attempt to hamper measuring by magnetic field. Sensors report tampering.

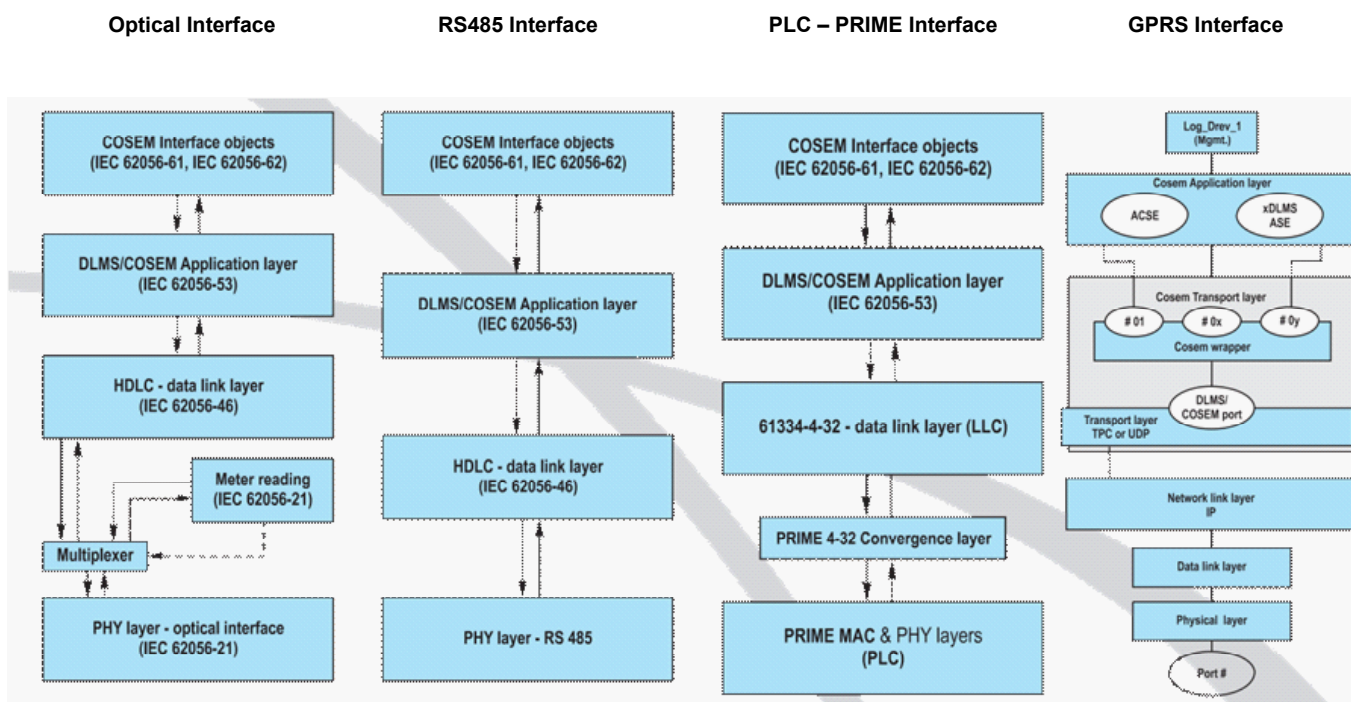
METER DESIGN

The AMx65 electricity meter, stemming from a design traditionally proven, is designed so as to withstand demanding operation conditions, enable simple handling and deliver increased protection from unauthorized consumptions. The set of sealing positions safeguards various concealed parts of the electricity meter from tampering. The design solution offers simple installation. The electricity meter case and outer terminal block dimensions comply with DIN 43857. The electricity meter cover enables stacking of meters for storage.

* Based on HW and FW modification

METER COMMUNICATION INTERFACE

The electricity meter can be accessed via optical, PLC PRIME or GPRS interfaces.



NORMS AND STANDARDS:

EN 50 470-1	Electricity metering equipment (a.c.) Part 1: General requirements, tests and test conditions -Metering equipment (class indexes A, B and C)
EN 50 470-3	Electricity metering equipment (a.c.) Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)
EN 60529	Degrees of protection provided by enclosures (IP Code)
EN 62052-21	Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 21: Tariff and load control equipment
EN 62052-11	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
EN 62053-21	Electricity metering equipment (a.c.) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)
EN 62053-23	Electricity metering equipment (a.c.) - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)
EN 62054-21	Electricity metering (a.c.) - Tariff and load control - Part 21: Particular requirements for time switches
EN 62056-21	Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange
EN 62056-46	Electricity metering - Data exchange for meter reading, tariff and load control - Part 46: Data link layer using HDLC protocol
EN 62056-47	Electricity metering - Data exchange for meter reading, tariff and load control - Part 47: COSEM transport layers for IPv4 networks
EN 62056-53	Electricity metering - Data exchange for meter reading, tariff and load control - Part 53: COSEM application layer
EN 62056-61	Electricity metering - Data exchange for meter reading, tariff and load control - Part 61: Object identification system (OBIS)
EN 62056-62	Electricity metering - Data exchange for meter reading, tariff and load control - Part 62: Interface classes
EN 60068	Environmental testing
EN 60068-2-1	Environmental testing – Part 2-1: Tests – Test A: Cold
EN 60068-2-2	Environmental testing – Part 2-2: Tests – Test B: Dry heat
EN 61000	Electromagnetic compatibility (EMC)
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques -Electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) -Part 4-3: Testing and measurement techniques - Radiated, radiofrequency, electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient / burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity 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

* Based on HW and FW modification



TECHNICAL DATA

Basic Data	AM165	AM365.D
Connection	Direct two-wire	Direct four-wire
Nominal Voltage U_n	220 V or 230 V	3 x 220 / 380 V or 3 x 230 / 400 V
Nominal Voltage Range	0.9 – 1.1 U_n	0.9 – 1.1 U_n
Operation Voltage Range Limits	85 thru 270 V (phase - neutral voltage)	85 thru 460 V (lower limit is determined by phase - neutral voltage, upper limit by phase - phase voltage)
Nominal Frequency f_n	50 Hz	50 Hz
Operation Frequency Range Limits	$\pm 5\%$ f_n	$\pm 5\%$ f_n
Actual Consumption of Each Voltage Circuit (PLC Module Included)	Max. 2 W, max. 4 VA capacitive	Max. 1.5 W, max. 3 VA capacitive
Consumption of PLC Coupling Circuit	Max. 10 VA capacitive	Max. 10 VA capacitive in phase L1
Actual Consumption of Each Current Circuit (Disconnecter Included)	< 0.3 VA for I = 5 A < 1.2 VA for I = 10 A < 2.7 VA for I = 15 A < 4.8 VA for I = 20 A	< 0.3 VA for I = 5 A < 1.2 VA for I = 10 A < 2.7 VA for I = 15 A < 4.8 VA for I = 20 A
As Per EN 50470-1, EN 50470-3 (Active Energy Measurement)		
Reference Current I_{ref}	5, 10, 15 or 20 A	5, 10, 15 or 20 A
Maximum Current I_{max}	40, 60 or 80 A	60, 80 or 100 A
Transitional Current I_{tr}	0.1 I_{ref}	0.1 I_{ref}
Minimum Current I_{min}	0.5 I_{tr}	0.5 I_{tr}
Start-Up Current I_{st}	0.02 I_{tr}	0.02 I_{tr}
Active Energy Accuracy Class	A or B	A or B
As Per EN 62052-11, EN 62053-23 (Reactive Energy Measurement)		
Basic Current I_b	Same as I_{ref} for active energy	Same as I_{ref} for active energy
Maximum Current I_{max}	Same as I_{max} for active energy	Same as I_{max} for active energy
Start-Up Current I_{st}	0.004 I_b	0.004 I_b
Reactive Energy Accuracy Class	2 or 3	2 or 3
Disconnecter Technical Specification		
Maximum Switching Power		25 000 VA
Maximum Switching Voltage	250 V	380 V
Maximum Tripping Current	80 A	100 A
Mechanical Service Life	1×10^5 cycles	5×10^5 cycles
Electrical Service Life	5×10^3 cycles	5×10^3 cycles
Mechanical Specification		
Weight (With Disconnecter / Without Disconnecter)	0.91 / 0.87 kg	1.83 / 1.42 kg
Width	125 mm	183 mm
Height	204 mm	280 mm
Depth	74 mm	82 mm
A-Base Installation As Per Dimensional Sketch (Width x Height)	105 mm x 155 / 175 mm	150 mm x 210 / 230 mm
Case Dimensions	As per DIN 43857	As per DIN 43857
Operating Position	Vertical	Vertical
Connection of Current And Neutral Wires		
Connecting Screws	M5 x 12 mm	M6 x 14 mm
Torque	3.2 Nm	5.6 Nm
Terminals Diameter	7.2 mm	8.6 mm
Wire Cross-Section Max.	35 mm ²	50 mm ²
Wire Cross-Section Min.	1 mm ²	1 mm ²
Screw Head Shape and Diameter	CH (cylindrical head) / 6 mm	CH (cylindrical head) / 6,5 mm
Cross Groove	SL - PZ (Combination Slot – Pozidrive, size 2 as per ISO 4757)	SL - PZ (Combination Slot – Pozidrive, size 2 as per ISO 4757)
Strength Class	5.6	5.6
Outputs		
Display*	8+8 digits	8+8 digits
Testing LED For Active Energy	Configurable, usually 10,000 imp. / kWh	Configurable, usually 10,000 imp. / kWh
Testing LED For Reactive Energy	Configurable, usually 10,000 imp. / kvarh	Configurable, usually 10,000 imp. / kvarh
S0 Output (0 - 6)*	Class A as per CSN EN 62053-31	Class A as per CSN EN 62053-31
Auxiliary Relay Output (0 - 2)*	Closing contact 5 A / 250 V	Closing contact 5 A / 250 V
Real Time Function		
Accuracy	As per EN 62054-21	As per EN 62054-21
Back-Up Time	Minimum 5 years	Minimum 5 years
Battery Type	Li-SOCI2 case ½ AA	Li-SOCI2 case ½ AA
Impact of Surroundings		
Operation Temperature	-25 (-40)°C thru +70°C by HW modification	-25 (-40)°C thru +70 °C by HW modification
Storage Temperature	-35 (-40)°C thru +70°C by HW modification	-35 (-40)°C thru +70 °C by HW modification
Ingress Protection	IP 53	IP 53
Mechanical Environment	M1	M1
Electromagnetic Environment	E2	E2

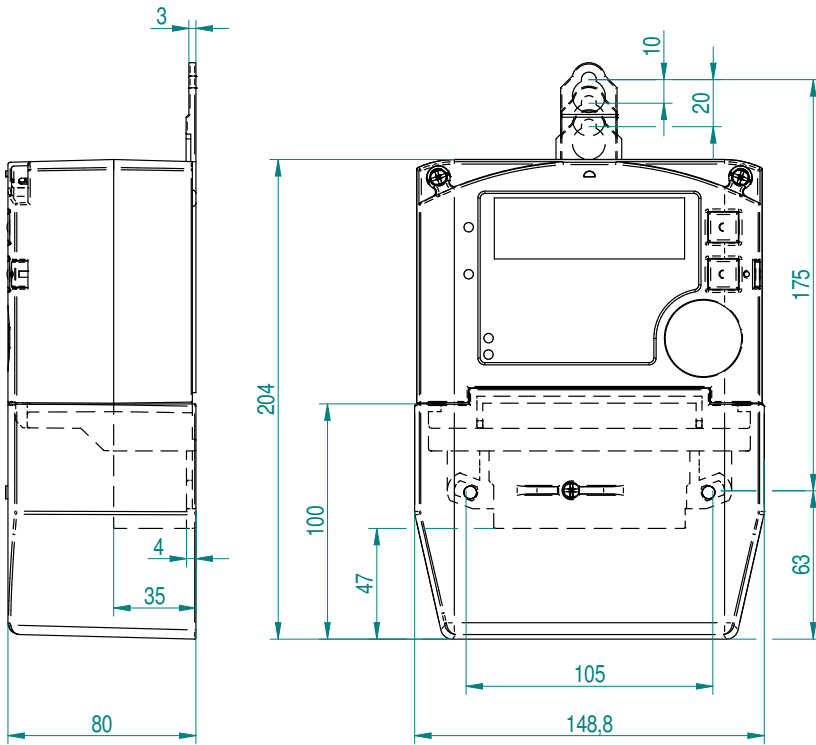
* Based on HW and FW modification

TECHNICAL DATA

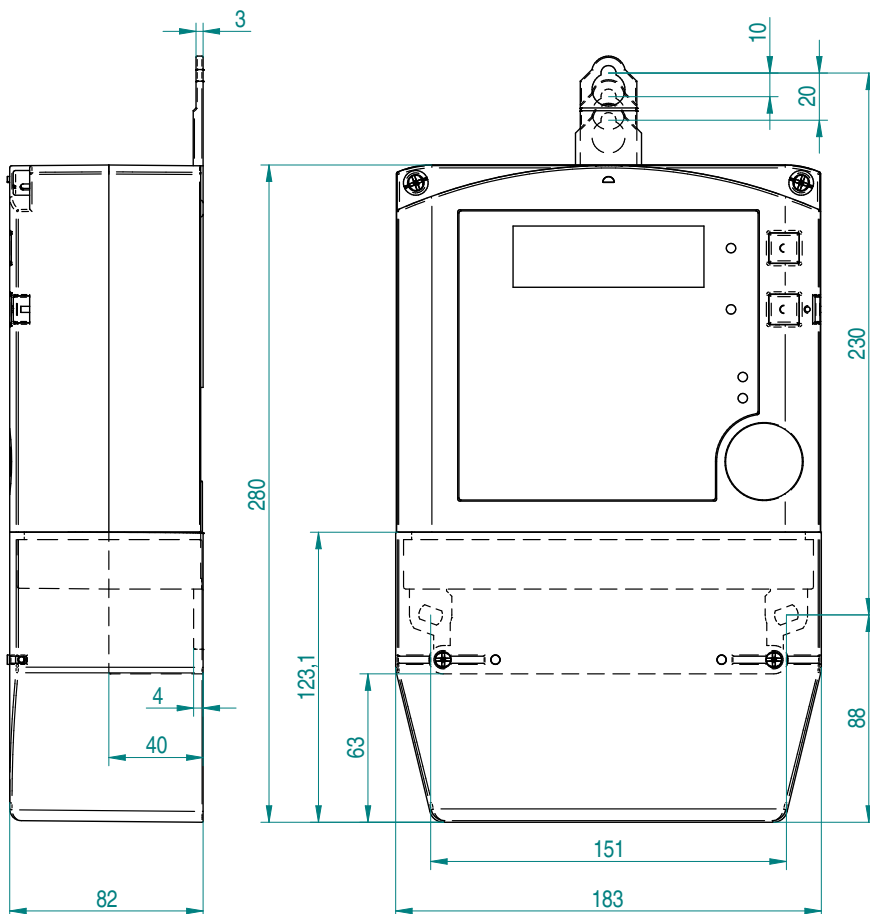
Basic Data		AM365.I
Connection		Via Current Transformers
Nominal Voltage U_n		3 x 220 / 380 V or 3 x 230 / 400 V
Nominal Voltage Range		0.9 - 1.1 U_n
Operation Voltage Range Limits		85 thru 460 V (lower limit is determined by phase - neutral voltage, upper limit by phase - phase voltage)
Nominal Frequency f_n		50 Hz
Operation Frequency Range Limits		$\pm 5\% f_n$
Actual Consumption of Each Voltage Circuit (PLC Module Included)		Maximum 1.5 W, Maximum 3 VA Capacitive
Consumption of PLC Coupling Circuit		Maximum 10 VA Capacitive on Phase L1
Actual Consumption of Each Current Circuit (Disconnecter Included)		< 0.3 VA for I = 5 A
As Per EN 50470-1, EN 50470-3 (Active Energy Measurement)		
Reference Current I_{ref}		1.2 or 5 A
Maximum Current I_{max}		2.4 or 6 A
Transitional Current I_{tr}		$(0.05 * I_{ref}) \Rightarrow 0.05, 0.1$ or 0.25 A
Minimum Current I_{min}		$(0.2 * I_{tr}) \Rightarrow 0.01, 0.02$ or 0.05 A
Start-Up Current I_{st}		$(0.02 * I_b) \Rightarrow 0.001, 0.002$ or 0.005 A
Active Energy Accuracy Class		B or C
As Per EN 62052-11, EN 62053-23 (Reactive Energy Measurement)		
Basic Current I_b		Same as I_{ref} for Active Energy
Maximum Current I_{max}		Same as I_{max} for Active Energy
Start-Up Current I_{st}		0.003 I_n
Reactive Energy Accuracy Class		2 or 3
Disconnecter Relay Technical Specification		
Maximum Switching Power		2,000 VA
Maximum Switching Voltage		277 V
Maximum Tripping Current		8 A
Mechanical Service Life		1×10^7 Cycles
Electrical Service Life		1×10^5 Cycles
Mechanical Specification		
Weight		1.42 kg
Width		183 mm
Height		280 mm
Depth		82 mm
A-Base Installation As Per Dimensional Sketch (Width x Height)		150 mm x 210 / 230 mm
Case Dimensions		As per DIN 43857
Operating Position		Vertical
Connection of Current And Neutral Wires		
Connecting Screws		M5 x 12 mm
Torque		3.2 Nm
Terminals Diameter		5.6 mm
Wire Cross-Section Max.		20 mm ²
Wire Cross-Section Min.		1 mm ²
Screw Head Shape And Diameter		CH (cylindrical head) / 6,5 mm
Cross Groove		SL - PZ (Combination Slot - Pozidrive, size 2 as per ISO 4757)
Strength Class		5.6
Outputs		
Display*		8+8 digits
Testing LED For Active Energy		Configurable, Usually 10 000 imp / kWh
Testing LED For Reactive Energy		Configurable, Usually 10 000 imp / kvarh
S0 Output (0 - 6)*		Class A as per CSN EN 62053-31
Auxiliary Relay Output (0 - 2)*		Closing Contact 5 A / 250 V
Real Time Function		
Accuracy		As per EN 62054-21
Back-Up Time		Minimum 5 years
Battery Type		Li-SOCI2 case ½ AA
Impact of Surroundings		
Operation Temperature		-25 (-40)°C thru +70 °C by HW modification
Storage Temperature		-35 (-40)°C thru +70 °C by HW modification
Ingress Protection		IP 53
Mechanical Environment		M1
Electromagnetic Environment		E2

* Based on HW and FW modification

METER HOUSING DIMENSIONAL SKETCH AM165



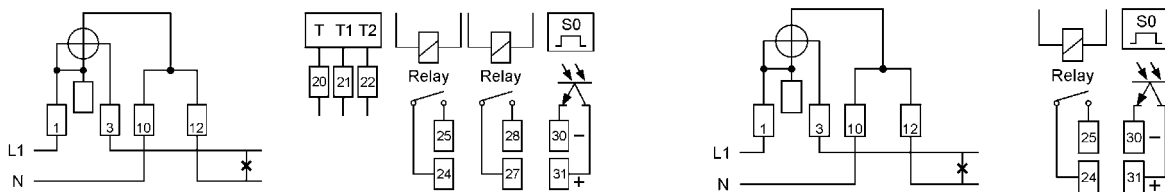
METER HOUSING DIMENSIONAL SKETCH AM365.D AND AM365.I



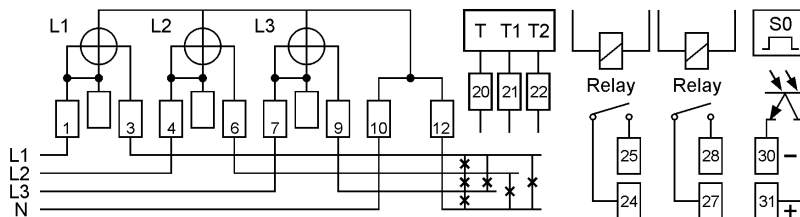
* Based on HW and FW modification

TERMINAL BOARD WIRING DIAGRAM EXAMPLES

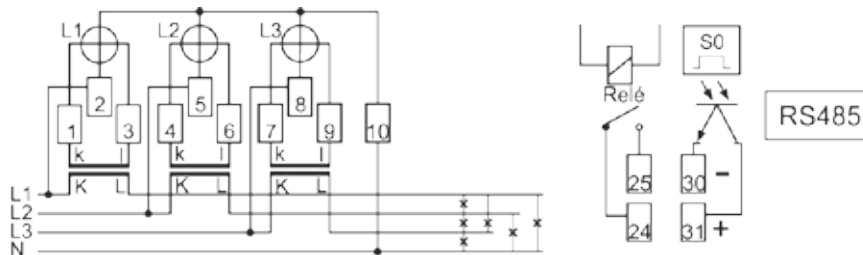
AM165



AM365.D

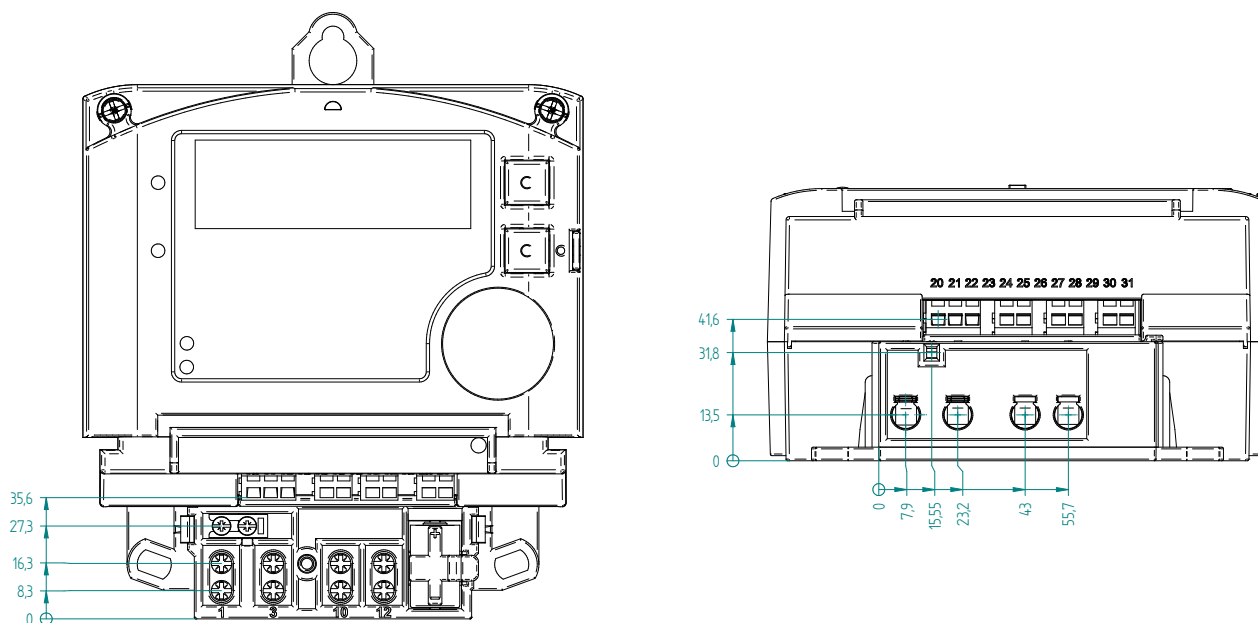


AM365.I



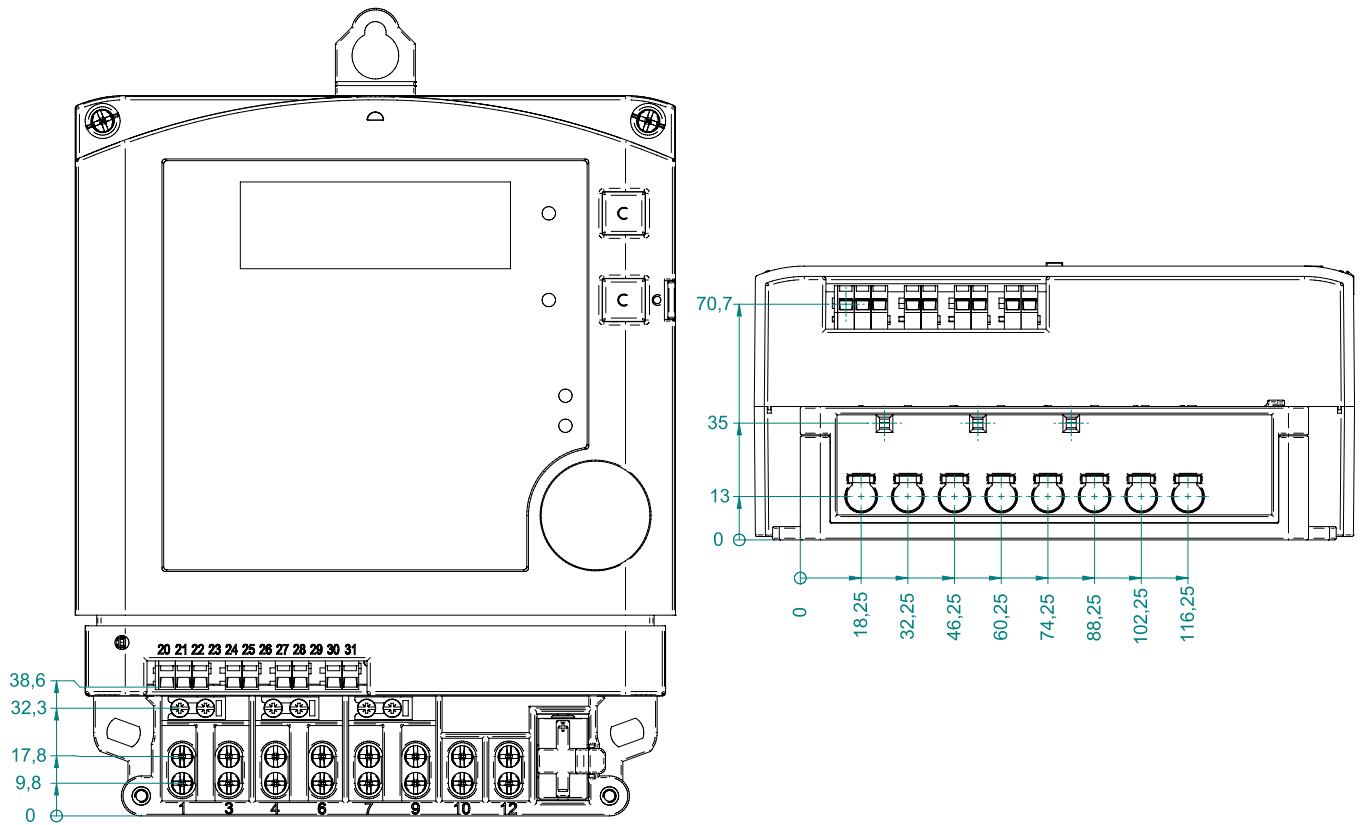
TERMINAL BOARD DIMENSIONAL SKETCH

AM165

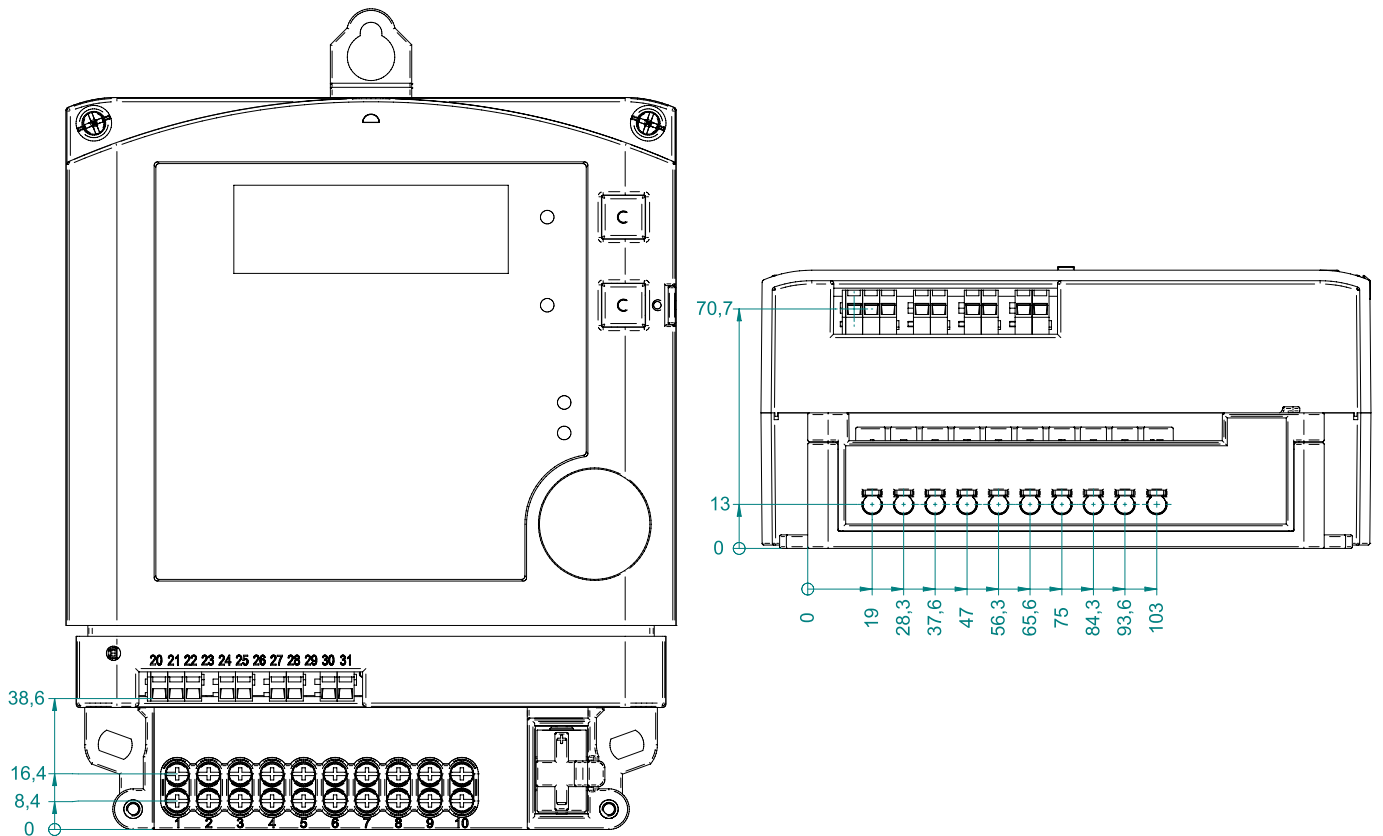


* Based on HW and FW modification

AM365.D



AM365.I



* Based on HW and FW modification

INSTALLATION

Installation is done using three screws on an A-Base. Sliding of hook in and out changes pitch. The electricity meter shall be fixed to a solid and fireproof object. Detailed instructions follow.

INSTALLATION AUTHORIZATION

Prior to electricity meter installation, the following pre-requisites shall be met:

- Installation shall be done only by qualified personnel, adequately trained,
- Installation shall be done only on surfaces for such purpose prepared and modified,
- Installation shall be done only in line with user (usually utility) wiring conditions.

INSTALLATION EXECUTION

Prior to and during electricity meter installation, the following shall be observed / used:

- Electricity meter with correct designation, correctly filled-in label, prescribed seals,
- Terminal Board Wiring Diagram,
- Prescribed connecting material for electricity meter connection (screws, etc.),
- Seals and sealing pliers for sealing of cover plates and terminal cover,
- Prescribed, undamaged tools,
- Measuring device or indicator.

Wires Connection

During electricity meter installation, the following shall be observed:

- Supply wires shall be checked to be voltage free,
- Supply wires shall be stripped of insulation in sufficient length,
- Wires shall be inserted into appropriate terminals of terminal block, terminal board screws shall be tightened using appropriate torque (see section Technical data).

If wire cross-section is small, attention shall be paid to its correct location in terminal block. Correct location of wire is inside the terminal block groove. Usage of a measuring device is recommended for verification of correct wire attachment.

INSTALLATION INSPECTION

After electricity meter installation, the following shall be checked:

- Electricity meter identification number shall match meter prescribed location,
- Derivation jumper(s) on current terminal(s) 1 (and 4 and 7, poly phase meter only) in terminal block upper part shall be connected,
- Tightening of terminal block screws shall be proper,
- Connection order of input and output wires shall be correct,
- Connection of neutral wire shall be proper – incorrect connection can result in electricity meter breakdown,
- Electricity meter functions – corresponding LEDs shall be lit and display shall show correct signs (no error messages shall be present),
- Tariff switching and identification shall be correct.

Electricity meter installation inspection completed successfully, terminal cover shall be mounted and sealed.

TROUBLESHOOTING

Display did not light up	No voltage in supply wires Derivation jumper on terminal 1 disconnected (AM165) Derivation jumpers on terminals 1,4,7 disconnected (AM365.D) Electricity meter designed for different voltage
L1, L2, L3 symbols flash one after the other (Poly phase meters only)	Incorrect order of phases (swap positions of any two phases)
One of the symbols: L1, L2, L3, did not light up	Corresponding phase voltage is missing
Electricity meter not communicating with reading device (PC, PDA, etc.)	Optical probe not connected to PC, PDA, etc. Incorrectly set up serial port on PC, PDA, etc. Incorrectly set up start-up speed PC, PDA SW does not support electricity meter
Electricity meter not communicating with MDMS	Poor communication signal Excess disturbance of communication signal Electricity meter unknown to MDMS Electricity meter has incorrect (or missing) AMM address

* Based on HW and FW modification



TYPE DESIGNATION

	AM	#	6	#	.	#	.	#	I	-	##	.	##	-	##	.	#	#	#
Single Phase		1																	
Poly Phase		3																	
Measuring Core 4Q			6																
Model Light				0															
Model Advanced, new case				5															
Direct Connection								D											
Semi-indirect Connection								I											
Disconnecter Not Mounted									0										
Direct Meters - I_{max} of Disconnecter = I_{max} of Meter									1										
Semi-indirect Meters - Disconnecter Relay for External Disconnecter Control									1										
Internal Communication Module										I									
SW (FW) Version																			
AMx60 - As per DLMS standard (2x server)																			80
AMx65 - As per DLMS standard (3x server)																			81
HW Modification for AMx60																			
Standard Display 4+7																			00
Standard Display 4+7 + internal derivation jumpers																			01
Advanced Display 8+8 (4Q)																			40
Advanced Display 8+8 (4Q) + internal derivation jumpers																			41
Advanced Display 8+8 (4Q), up to -40 °C (display heating, internal battery)																			42
Advanced Display 8+8 (4Q), up to -40 °C + internal derivation jumpers																			43
HW Modification for AMx65																			
Advanced Display 8+8 (4Q)																			40
Advanced Display 8+8 (4Q) + internal derivation jumpers																			41
Advanced Display 8+8 (4Q), up to -40 °C (display heating)																			42
Advanced Display 8+8 (4Q), up to -40 °C + internal derivation jumpers																			43
Internal Module for AMx60																			
Without Module																			M 0
PLC PRIME - Atmel ATPL210																			P 1
PLC PRIME - Atmel SAM4																			P 2
RS485																			S 1
GPRS Module																			G 1
Internal Module for AMx65																			
PLC PRIME - Atmel SAM4																			WAN HAN
GPRS Module																			1 x
RS485 - slave																			2 x
Without HAN Communication																			3 x
WMBus																			x 0
RS485 - slave																			x 1
RS485 - master (+12 V)																			x 2
USB																			x 3
																			x 4
																			x 5
Additional Information On I/O Interface of AMx60																			
8 Tariffs Without External Control, Without Auxiliary Terminal																			0 X 8
1 Standard Output S0																			1
1 Auxiliary Relay Instead of External Tariff Switching																			R
8 Tariffs																			8
Additional Information On I/O Interface of AMx60.I																			
8 Tariffs Without External Control, Without Auxiliary Terminal																			0 X 8
8 Tariffs, Relay for External Disconnecter Control (13, 15 / 33)																			0 D 8
1 Standard Output S0																			1
1 Auxiliary Relay Instead of External Tariff Switching																			R
8 Tariffs																			8
Additional Information On I/O Interface of AMx65																			
Without Tariff Terminals																			0
x Tariff Inputs Against the Common Terminal (where x = 1 to 3)																			1 - 3
x Tariff Inputs Against L (3 + x, where x = 1 to 3)																			4 - 6
x Tariff Inputs Against N (6 + x, where x = 1 to 3)																			7 - 9
Without Auxiliary Relays																			0
x Relays With Closing Contact (x * 2 Terminals, where x = 1 to 2)																			1 - 2
x Relays With Switching Contact (x * 3 Terminals, where x = 1 to 2)																			3 - 4
Without S0 Output																			0
x S0 Outputs With One Common Terminal (where x = 1 to 6)																			1 - 6
External Power Supply 230 V, 5 Auxiliary 24 V Inputs																			S 0 1

MAINTENANCE AND STORAGE

Care And Maintenance

The product is a maintenance-free electricity meter with a determined minimum operation service life of 15 years. For possible cleaning of the outside surface from dust and other impurities, the manufacturer does not recommend use of organic solvents, aggressive chemicals and abrasive cleaning agents. Prescribed storage temperatures shall be complied with: failure to do so can result in shortening of electronic components service life. The electricity meter shall be protected against wet and humid conditions. It is designed for internal use, i.e. it may be used only in places providing additional protection against effects of external environment (e.g. in a building or cabinet). Precipitation, humidity and liquids containing minerals can cause corrosion of electric circuits if the electricity meter becomes wet. The electricity meter shall not be placed on and dried by a source of heat or inserted into a source of heat (e.g. microwave oven, classic oven or radiator / heater) as it can overheat and some of its parts explode. It shall not be exposed to excessive heat as this can lead to deformation of case / cover. The electricity meter shall not be stored in cold premises, especially with subsequent warming-up (to nominal operation temperature). Humidity can condensate inside and damage electronic components, or electricity meter isolation properties can deteriorate.

Service

Service shall be ensured by: ZPA Smart Energy a.s., Komenskeho 821, Střední Předměstí, 541 01 Trutnov, Czech Republic, Trademark Smart Energy, Tel. + 420 499 907 111, E-mail zpa@zpa.cz, www.zpa.cz.

Battery Replacement

Battery can be replaced after opening of the terminal cover (breaking of terminal cover seals cannot be avoided).

Transport

Electricity meter shall be packed for transport either in the package, in which it was originally delivered by the manufacturer, or in a package causing / ensuring no damage due to handling or transport.

SAFETY

Manufacturer Warnings

The electricity meter is capable of safe operation. The manufacturer has issued a Declaration of Conformity as per Section 13 of Act 22/97 Coll. Despite this fact, the manufacturer warns of the risk of possible danger resulting from electricity meter incorrect handling or incorrect use as follows:

- Installation and maintenance shall be performed by personnel with corresponding electro-technical qualification and adequately trained, that shall inform the operator on conditions of safe operation,
- Electricity meter shall not be used for purposes other than those it was manufactured for,
- Electricity meter shall not be wilfully modified contrary to its type design,
- Electricity meter shall not be operated with voltage, current or frequency other than those it was produced or professionally modified for,
- Electricity meter shall be located and secured so as to complicate or disable handling by persons with no electro-technical qualification, especially children,
- Before every new putting to operation, e.g. after repair, maintenance etc., electricity meter Ingress Protection shall be restored in full, all safety measures taken and inspection done by a designated electrical inspector,
- During operation, premises where the electricity meter is installed, shall be free of danger of fire or explosion in case of development of gases, vapours of inflammable liquids and occurrence of inflammable dust,
- Electricity meter shall be handled by a qualified and adequately trained person only, and handling shall be performed without voltage with the exception of measurement by measuring meter with insulated tips,
- Electricity meter shall not be operated under conditions or in an environment not ensuring safe operation (e.g. location on inflammable base, cover from inflammable material, insufficient protection from penetration of foreign elements, water or other liquids),
- Electricity meter shall be located and operated in an indoor environment, i.e. in places providing additional protection against effects of external environment (e.g. inside a building or cabinet),
- Electricity meter shall not be operated in an environment with major vibrations and oscillations or under such conditions.

Failure of the user to observe any of the aforesaid warnings renders the manufacturer not being liable for a defect occurring as an incidental consequence of this failure. Non-observance of storage and operation conditions recommended in article Care And Maintenance can have an adverse effect on the electricity meter service life.

RESPONSIBILITY

The electricity meter owner (usually utility) is responsible for ensuring that all persons engaged in working with and handling the electricity meter:

- are knowledgeable and qualified as per national regulations,
- have read and understood corresponding parts of this document,
- strictly observe safety regulations and operation data stipulated in its individual articles.

The electricity meter owner is further responsible for:

- protection of persons,
- prevention of damage to material,
- personnel training.

Safety Instructions

The following safety regulations shall be observed under all circumstances:

- Wires the electricity meter is connected to shall be powered neither during installation nor replacement. Powered contacts pose a life threat. For this reason, until the work is finished, the corresponding power supply fuses shall be removed and stored in a place, safeguarding against unnoticed reinstallation by a person holding no responsibility,
- Local safety regulations shall be observed. Electricity meter installation shall be executed solely by qualified and trained personnel,
- With no exception, prior to terminal cover opening, current transformer secondary circuits shall be short circuited. High voltage generated during current transformer circuit interruption poses a life threat and damages the transformer,
- Transformers in medium or high voltage systems shall be grounded on one side or in a neutral point on the secondary side. Non-observance can result in their being charged to a voltage exceeding electricity meter isolation strength and also posing a life threat,
- During installation, the electricity meter shall be firmly held or secured against falling and causing injury,
- Dropped electricity meters shall not be installed even if showing no visible signs of damage. They shall be returned for inspection either to designated repair office or directly to manufacturer. Internal damage can cause functional failures or a short circuit,
- Electricity meter shall by no means be cleaned under running water or by high-pressure equipment. Water penetration can cause a short circuit.

DISPOSAL

As per certificate ISO 14001 data, electricity meter components are mostly separable and so can be disposed of or recycled accordingly. At the end of its service life, the electricity meter shall be handed over to specialized companies, dealing in used material separation and consequent recycling. An unused electricity meter shall be disposed of ecologically as per the Waste Act.

The electricity meter contains no radioactive, carcinogenic or other materials having an adverse effect either on human health or environment. All plastic materials can be recycled.

Packaging is recyclable and at the end of its service life shall be handed over to specialized companies as a source of secondary raw materials or energy.

Liquidation And Legal Regulations, Concerning Environment Protection

Electricity meter disposal shall strictly observe local regulations for environment protection.

Components	Disposal
Printed circuit boards, LCD, LED	Electronic waste. Dispose of as per local regulations.
Battery	Dangerous waste. Dispose of as per local regulations.
Metal parts	Separate and hand over to the waste collection centre for disposal as per local regulations.
Plastic components	Separate and hand over for disposal or re-granulation as per local regulations.