SINGLE-PHASE STATIC ACTIVE ELECTRICITY METERS

ED 110

DISPLAY, CONSUMPTION AND SUPPLY, 2 TARIFFS

The ED 110.is an electronic, programmable electricity meter for monitoring consumption and supply of electricity in the area of retail consumption.

Measuring system

The ED 110.D0 electricity meter is a single-phase, static, one or two tariff meter of active energy for class A or B in compliance with ČSN EN 50470-1 and 50470-3 designed for direct connection.

The microprocessor transfers the analogue signal from the current and voltage sensors, to a digital signal. The meter includes a display, senses tariff inputs, communicates via the optointerface, generates IR and S0 impulses and selects values which are stored in the memory. The meter can be customised to customer requirements. The voltage and current circuits are not galvanically separated. The meter measures direct current and harmonic components in the circuit (voltage and current). The negative impacts of DC components are eliminated in each measuring period. The measuring system is calibrated through the programming menu. The meter does not include any mechanically moving parts. The measuring system is highly accurate.

The electricity meter measures and stores the following basic quantities, which are viewable on the display:

*   Consumption and supply for each of 2 tariffs (i.e. 4 registers of energy)
*   Time of reading in the register for each register of consumption and supply (i.e. 4 registers of time)
*   Summary registers of total time of consumption and supply
*   Maximum current and maximum output
*   Operating time, number of mains failure, time from resetting the maxima of current and output

In addition, the ED 110.D0 measures and displays:

*   Instantaneous effective voltage
*   Instantaneous effective current
*   Instantaneous active output

Range of current measurement

The ED 110.D0 electricity meter measures from a start-up current of 40A and complies with the DC component and harmonics standard. However the maximum permitted permanent current applied to the terminal board is up to 32A.

Inputs

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Outputs and communication

The electricity meter is equipped with a test LED output. The constant for the conversion of consumed energy to the number of transmitted pulses is programmable. The electricity meter can be equipped with the SO interface that complies with IEC 61393 / DIN 43864. The circuit is galvanically separated by the opto-electronic component. A transistor with an open collector is connected to the output of this. It transmits impulses with the corresponding frequency to the consumed energy. The number of impulses and their length are programmable.

Display of measured quantities
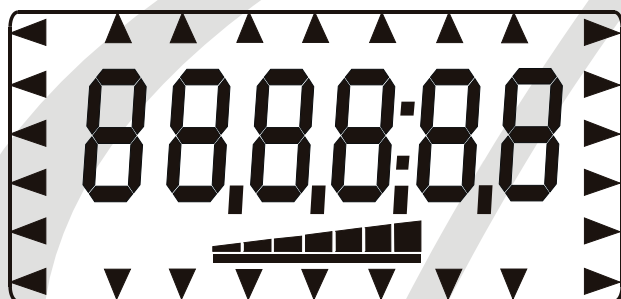
- The display can be configured to show:
- Measured consumption or supply of active energy in kWh for rates T1 or T2

- Effective value of current
- Effective value of voltage
- Instantaneous output
- Maximum current
- Maximum output
- Cos φ
- Number of voltage failures and operation time.

In addition, it shows the active tariff and direction in which the meter reads consumption or supply. The meter can be configured to show specific values from all measured values and these can be displayed gradually and at different speeds of rotation on the display. The measured data is stored in registers which can be read via the IR interface.

Events are recorded in registers for individual tariffs (optional number of decimal places). These include: consumption, supply, consumption + supply, consumption – supply. It is possible to calculate the sum of the absolute values of consumption and supplies, or absolute values of sums, or remainders of consumptions and supplies etc. To save maximum values, a suitable filter for peak values can be configured. For ease of use, the meter displays a barchart showing the amount of instantaneous output. If current is below the start-up value, the barchart is not displayed.

Optointerface

The opto-interface enables a direct local reading. This complies with ČSN EN 62056-21. The opto-head is placed on the meter case. The electrical input / output is by RS 232 or USB to a PC, PDA or PDA/ mobile terminal.

Indicators

For the purpose of calibration, a red LED is used. The diode transmits light impulses at the corresponding frequency to the measured energy. This can be reconfigured (typically 10 000 imp./kWh).Design of electricity meter
The design solution enables a simple installation on a bar DIN.

Meter design

The design allows for a simple DIN bar installation.

Technical data

Basic data	
Accuracy class	Class A or B complies with ČSN EN 50470-1, 50470-3
Constant of electricity meter (test LED output)	Programmable, usually 10 000 imp/1 kWh
Connection	Direct two-wire
Nominal voltage U_n	230V
Range of operating voltage	0.75 U_n to 1.15 U_n
Own consumption (voltage circuits incl. power supply)	Max. 0.7 W, max. 8VA cap.
Own consumption of current circuit	Max. 0.05 VA
Reference frequency f_n	50 Hz
Operating frequency	45 to 55 Hz
Start-up current I_{st}	Below 15 mA
Minimum current I_{min}	200 mA
Reference current I_{ref}	5 A
Maximum current Imax permanently	32 A
Maximum range of measurement	15 mA to 40 A
Rate switching over – external terminals	
Switch-over voltage U_t	230 V
Permitted range	0.75 U_t to 1.15 U_t
Max. consumption at U_t = 230V	1.5 mA
Outputs	
Test LED output	Programmable, usually 10 000 imp./ 1 kWh
Pulse output S0	Class A complies with ČSN EN 62053-31
• Output connection	Direct, two-wire, output of type open collector
• Impulse number	Programmable from 0.15 to 10 000 imp./1 kWh
• Impulse width	Adjustable by programme, usually 40 ms
• Supply voltage nominal	24 V DC
• Supply voltage maximum	30 V DC
• Current	5 to 15 mA DC

• Maximum length of wiring	1000
Impact of surroundings	
Temperature range	
• Operating	-25°C to +55°C
• Storage	-25°C to +55°C
Humidity	Without condensation
Ingress protection	IP 20
Mechanical environment	M1
Electromagnetic environment	E2
Resistance to voltage impulses	
Impulse voltage	8 kV
Impulse shape	1.2 µs/ 50 µs
Electromagnetic compatibility	
Electrostatic discharges	Complies with ČSN EN 61000-4-2
• Test voltage	8 kV
• Number of discharges	10
High frequency electromagnetic field	Complies with ČSN EN 61000-4-3
• Severity grade 3, vertical and horizontal polarization	
Fast transient phenomena (impulse groups)	Complies with ČSN EN 61000-4-4
• Length of impulse group	15 ms
• Period of impulse group	300 ms
• Length of test	60 s
• Test voltage	4 kV
Suppression of radio interference	Complies with ČSN EN 55022
• Peak phase of interfering voltage within zone	0.15 to 30 MHz
• Peak phase of intensity of electromagnetic field within zone	30 ÷2000 MHz
• Resistance to interference spread in wiring pursuant to ČSN EN 61000-4-6	0.15-80 MHz
Weight and dimensions	
Weight	Approx. 0.12 kg
Width	53 mm
Height	58 mm
Depth	90 mm
Installation	On bar DIN
Operation position	Discretionary
Wire connection	
Diameter of terminal	3.4 mm
Maximum cross-section of wire:	
• Rope	4 mm^2
• Strand	4 mm^2
Minimum cross-section of wire	1 mm^2
• Diameter of head	4.7 mm
• Cross slot	Combined slot
• Torque	0.5 Nm
Other technical parameters correspond to ČSN EN 50470-1.50470-3	

Optical communication

The electricity meter includes an optical infrared communication interface as an option. This complies with the ČSN EN 62056-21 standard. This interface is activated by changing the communication speed. The meter has three modes:
- Programming mode – for meter configuration
- Manufacturer specification mode - service commands configuration
- Read-out mode

Establishing communication

Communication may be addressed or non- addressed. The address is stored in the meter memory. This is configurable up to eight places and can also include ASCII characters. If the meter address is empty, the meter responds to all addresses. 'Quick identification' can be done by shortening the response of communication, when switching over the direction. The responses can be shortened from 200ms to 20ms. This is optionally adjustable, including the response after the switch-over of the communication speed. The speed is typically set-up at 300 Bd. After communication is established, the speed can be increased from 300 up to 9600 Bd. The optical head supports higher communication speeds.

Programming mode

The meter is configured in the programming mode by the manufacture. The configuration is locked by the use of a hardware 'jumper'. Access to the programming mode is password protected, in compliance with the "Access level 3" standard. The password and encrypting algorithm are saved in the meter. To disable the detection of the algorithm from the communication, a random number is used. This is generated by the electricity meter. In the default set-up, reconfiguration of parameters and resetting (change of content) of selected registers is restricted.

Manufacturer specification mode

The manufacturer specification mode issues two password protected commands. These are; a command for deleting maxima and a command for the transition to the calibration mode.

Meter read-out

The names of registers (e.g. 1.8.1) are optional and discretionary. Specific registers can be eliminated from the read-out. Other operations within the register list are fully readable or can be configured by computer. Following a successful read-out, the registers
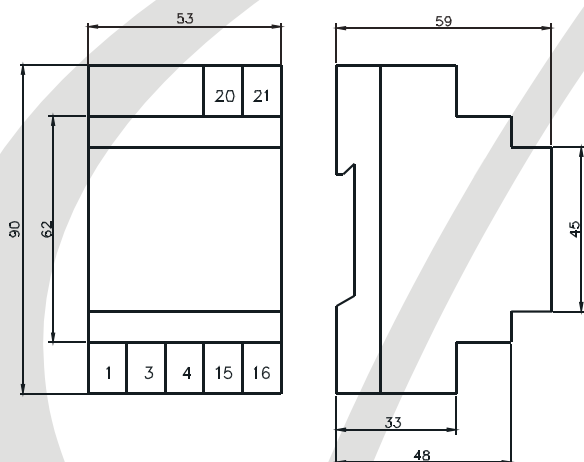
of maxima shall be deleted. If this is not required, such maxima can be deleted via the manufacturer specification mode.
Terminal board connection scheme – connection of switch-over tariffs

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Two-tariff – control with terminal 13 against terminal 15
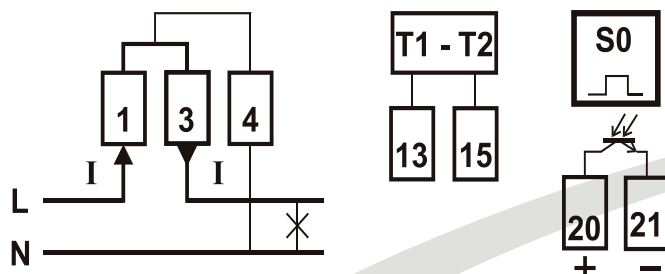
Dimensional drawing

Type designation

	ED 110. D	#.	#	#	#	#	#	#	-	#	#
With display, 1 to 2 tariffs	**0**										
Without optical communication		0									
With optical communication		**1**									
Without control of tariffs			0								
Free tariff switch-over			**1**								
Without tariff switch-over				X							
Tariff switch-over – Czech logics				**C**							
Tariff switch-over – European logics				**E**							
Software modification (customer design)					**00**	**-**	**99**				
One-tariff with S0								1			
Two-tariff with S0								2			
One-tariff without S0								**3**			
Two-tariff without S0								**4**			
Hardware modification (customer design)										**00**	**- 99**

RECYCLING OF PACKAGING MATERIAL

ZPA recommends that all packaging material be recycled in an environmentally friendly way, in compliance with the Waste Act.

This product: does not contain radioactive, carcinogenic or other materials harmful to health or environment. All applied plastic materials can be fully recycled.
Packing materials:
Special packing boxes can be recycled
Used boxes are recyclable.

MANUFACTURER WARNING

The product is capable of safe operation. The manufacturer issued the Declaration of Conformity in compliance with Sect. 13 of the Act 22/97 Coll. Nevertheless, the manufacturer notifies of the risk of a possible danger resulting from improper handling or inadequate application of the product:

- Installation and maintenance shall be performed by an expert person with the applicable electrotechnical qualification that notifies the operator of the conditions of safe operation.
- The product may not be used for other purposes that it was manufactured for.
- The product may not be modified wilfully to differ from the type designation.
- The product may not be operated with different voltage, current and frequency than for which it was manufactured or modified professionally.
- The product shall be located and secured so that persons without electrotechnical qualification, especially children, can handle it with difficulties or not at all.
- Before each new commissioning, e.g. after a repair, maintenance, etc., Ingress Protection shall be renewed in the full range as well as all measures for ensuring safety and a revision shall be performed by a revision technician.
- During the operation, pay attention to ensure no danger of fire or explosion occurs during the creation of gases, vapours of flammable liquids and occurrence of flammable dust in the area where the product is installed.
- Each handling with the product by an expert person, safe for the measurement with insulated tips of the measuring device, shall be performed without voltage.

The product may not be operated in the conditions and environment that do not ensure safe operation (e.g. location on a flammable base, cover from a flammable material, insufficient protection against penetration of foreign substances or water or other liquids).

Default designs of the meters are printed in bold letters.
Different designs and customer modifications can be ordered following a prior agreement with the manufacturer.

The direction of measured energy forms an integral part of the meter:
ODB – consumption
ODB/DOD - consumption and supply

It shall be specified in the customer sheet, which shall form a part of the purchase contract.