

SINGLE-PHASE ELECTRONIC METER

ZE114



The electricity meter ZE114 series is a modern, fully programmable meter for monitoring the consumption of electric energy in low-demand areas. It is able to meet the monitoring requirements of active energy accuracy class A or B. Its structure is designed to connect to the network TN-C.

The meter is equipped with a calibration LED. Meter registers the collection and supply of electricity. Direction of energy flow is indicated by arrows. Identifying software version can be determined from marking 0.2.1. It is displayed on the LCD when starting the meter. Furthermore, it is possible to identify the read out via the IR optical interface. The communication protocol is in accordance with EN 62056-21, mode C. Communication takes place at 300 to 9600 Bd. The electricity meter can be equipped with up to two extensions on the menu: RS485, S0 output, relay control external tariffs.

Meter calibration is performed based on detection accuracy of measurements and inserting the calculated calibration constants. The electricity meter has no mechanical adjustments.

Surge meter is protected designs voltage inputs. Any confusion when installing wires is indicated on the LCD.



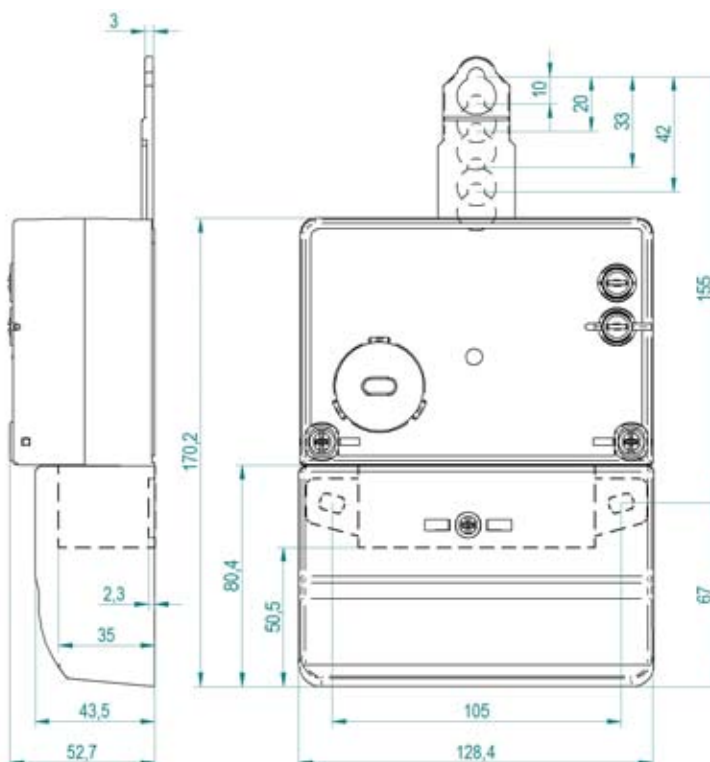
TECHNICAL DATA

BASIC DATA	
Accuracy Class	A or B
Nominal Voltage U_n	230 V
Operating Voltage Range	$0.75 U_n$ to $1.15 U_n$
Reference Frequency	50 Hz
Maximum Current (I_{max})	60 A
Reference Current (I_{ref})	5 A
Minimum Current (I_{min})	0.15 A
Start-Up Current (I_{st})	≤ 20 mA
Type Version	Shunt
Consumption in Voltage Circuits	
- Active Power Consumption at U_n	0,8 W
- Apparent Consumption at U_n	8 VA
Consumption in the Current Circuits	≤ 0.01 VA at (I_{ref})
Type of Measured Energy	Measures Effective Energy
Connection	Direct
INPUTS AND OUTPUTS	
Test Output LED (visible spectrum)	Option: 500; 1,000; 10,000 imp/kWh, Linear
Optical Interface	IR Interface and read-out as per EN 62056-21, Mod C, 300 to 9 600 Bd
Controlled Output * - Contact relay (for 2T) - Related to Tariff T2 (ON status)	Maximum 250 VAC / 2 A
RS485 *	Active
S0 *	Option: 100; 250; 500; 1,000 imp/kWh
External Management Tariffs *	Up to 4 tariffs
LCD	
Display Range	8 positions
The Resolution Power in the Operating Mode	Option: 1 kWh; 0.1 kWh
The Resolution Power in the Test Mode	0.001 kWh
Digit Height of Energy Data	8.35 mm
Direction of Power Transmission and Display of Energy Flow	Yes
Indications Magnetic Interference *	Yes
Indications Opening the Main Cover *	Yes
Indications Opening the Terminal Cover *	Yes
Showing Active Tariff *	Yes
Backlighting *	Yes
Readable Display Values	-33 °C to $+60$ °C
Method of Calculating Energy Costs	Default: $A = +A + -A $ or $A = +A $... Registers 15.8.x (1.8.x)
ENVIRONMENTAL CONDITIONS	
Working Temperature	-40 °C to $+70$ °C
Storage Temperature	-40 °C to $+75$ °C
Insulation Encapsulated Devices	Protection Class II
Ingress Protection	IP 54
Resistance to Permanent Magnet	Minimum 0.5 T
Mechanical Environment	M1
Electromagnetic Environment	E2
WEIGHT AND DIMENSIONS	
Weight	0.6 kg
External Dimensions Including Terminal Cover	170 x 129 x 53 mm
Mounting on the Cross	Horizontal: 105 mm Vertical: 113, 120, 135, 145 or 155 mm
Diameter of Current Connecting Terminals	7.0 mm
Connection Screws in the Terminal Board	SL/PZ2 Combined Cross or SL/PZ1
Screws in the Cover of the Terminal Board	SL/PZ2 Combined Cross; \emptyset bore for seal 2.5 mm
UV stable material box	Yes
Fire resistance terminal	As per UL94 V0

* Optional

DIMENSIONAL SKETCH

Electricity meter complies as per DIN 43857.



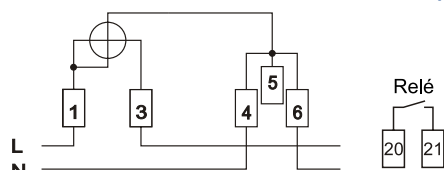
OUTPUT CONTROL - RELAY (FOR 2T) *

Galvanically isolated relay contact switch is connected to the auxiliary terminals 20 and 21. The relay is bistable and maintains its position and de-energized. The relay contact is closed when active T2 tariff for all other tariffs (including T1) is open. This can be customized on request. Updating the status of the relay takes place only in an energized meter. Once connected to the voltage meter relay status updates after about 15 second delay (due to capacitor charging power).

MANUAL TEST OF RELAY *

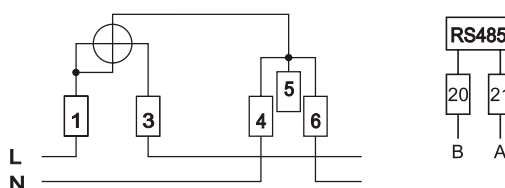
To verify the correct relay function is possible by short pressing of the sealable button to change the status of the contact relay on the opposite status. After 30 seconds of inactivity, the relay returns to its original status (according to the tariff plan). During this time the signal opening / closing of the relay contact (an arrow with symbol R on the LCD, switched on lights, disconnected doesn't light) also changes. This test does not affect the energy counting registers into appropriate tariff.

TERMINAL BOARD EXAMPLES (WIRING DIAGRAM)



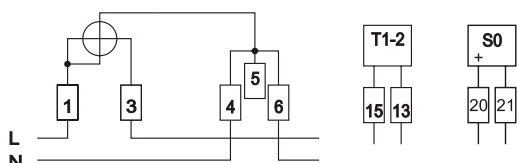
Legend

1	Input Phase L1	4, 5, 6	Neutral Wire N
3	Output Phase L1	20, 21	Relay Contacts



Legend

1	Input Phase L1	4, 5, 6	Neutral Wire N
3	Output Phase L1	20, 21	Relay Contacts



Legend

1	Input Phase L1	13, 15	Tariff Switching
3	Output Phase L1	20, 21	Relay Contacts
4, 5, 6	Neutral Wire N		

The electricity meter may / may not be equipped with a voltage terminal no. 2 with an internal shunt jumper. Auxiliary terminals S0 may be marked as 20, 21 or 40, 41

* Optional

LCD DESCRIPTION

The electricity meter ZE114 series is provided with LCD. The operation temperature range for the correct function is -33 ° C to +60 ° C. After the connection of the electricity meter to the electrical network, permanent backlight will occur and there will be an approx. 3 sec. test of all segments of the LCD.

Indication of the direction of energy flow (consumption or supply) is done by the arrow symbols as -P, respectively +P.



SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	The battery symbol. When it is displayed, the battery is low or discharged completely.		Energy flow direction.
L1L2L3	Phases symbols presence. For single-phase electricity meter not used.	▼	Not used (first from the left).
	Tampering. Not used.	▼	Opening of the terminal cover * (second from left).
8888:88:88	OBIS code registry value (energy, time, date, error code, etc.).	▼	Opening of the main cover * (third from left).
T8	Active tariff.		Ongoing communication symbol.
8888	OBIS code of displayed unit.	kWhh	Unit of the currently displayed unit (kWh, kW, ...)
	Bargraf.		

Examples of display screen

EXAMPLE	DESCRIPTION
	Segment control of LCD. After the connection of the electricity meter to the electrical network, permanent backlight will occur and there will be an approx.. 3 sec. test of all segments of the LCD.
	F.F – Internal error of the meter. Example: active tariff T2, F.F 00000000 stands faultless condition. The customer should contact the manufacturer if it shows any error code.
	1.8.0 – Total energy Example: 25897,3 kWh (the sum of all energy tariffs), active tariff T1, running communication (LCD backlight is turned off).
	1.8.1 – Energy in tariff T1 Example: energy in T1 is 24697,2 kWh, active tariff T2, in the meter flowing current in the direction +P, base cover has been open.
	1.8.2 – Energy in tariff T2 Example: energy in T2 is 1200,1 kWh, active tariff T2, in the meter flowing current in the direction +P, terminal cover has been open.
	0.9.2 – actual date Example: date is 29th May 2015, active tariff T1, active tariff T2, in the meter flowing current in the direction +P, terminal and base cover have been open, running communication.
	Test Mode - gauge mode Example: the meter is switched to the test-mode (3 decimal places), energy in T1 is 4,697.296 kWh, active tariff T1, in the meter flowing current in the direction +P, terminal cover has been open, running communication.

Read-out Example

REGISTER	THE DEDUCTIBLE UNITS (DEPENDING ON THE DESIGN)
C.1.0	Serial number
0.0.0	Customer number = barcode
0.3.0	Active energy measuring constant [imp/kWh]
F.F	Error code
1.8.0	Energy A in total: $A = +A + -A $
1.8.1	Energy A in tariff T1, calculation: $A = +A + -A $
1.8.2	Energy A in tariff T2, calculation: $A = +A + -A $
2.8.0	Energy -A (in total), calculation formula: $-A = -A $
2.8.1	Energy -A in tariff T1, calculation formula: $-A = -A $
2.8.2	Energy -A in tariff T2, calculation formula: $-A = -A $
C.8.0	Operating period in total +A. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.
C.8.1	Operating period of tariff register T1. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.
C.8.2	Operating period of tariff register T2. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.
C.82.0	Operating period in total -A. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.
C.7.1	The number of power failures in phase
0.2.2	Name of tariff programm
0.2.1	SW version
C.2.1	Date and time of the last parameterization. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.
C.2.9	Date and time of the last read-out. Format RRMDDhhmm, RR-year, MM-month, DD-date, hh-hours, mm-min.

TROUBLESHOOTING

Display did not light up	<ul style="list-style-type: none"> No voltage in supply wires
Meter not communicating with reading device (PDA, PC ...)	<ul style="list-style-type: none"> Optical probe not connected to PC, PDA, ... Incorrectly set up serial port on PC, PDA, ... Incorrectly set up start-up speed

MAINTENANCE AND STORAGE

Care And Maintenance

The device is a maintenance-free product with 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 using 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 product 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 the 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 device becomes wet. The product 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 it can lead to deformation of case / cover. The device 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 isolation properties of the product can deteriorate.

Service

Service shall be ensured by: 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

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

Transport

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

SAFETY

Manufacturer Warnings

The product is capable of safe operation. The manufacturer has issued the EU Declaration of Conformity as per Act 90/2016 Coll.

Despite this fact, the manufacturer warns of the risk of possible danger resulting from incorrect handling or incorrect use of the product as follows:

- Installation and maintenance must be performed by a personnel with the corresponding electro-technical qualification and adequately trained, that shall inform the operator on conditions of safe operation;

- The product shall not be used for purposes other than those it was manufactured for;
- The product shall not be willfully modified contrary to the type design;
- The product shall not be operated with voltage, current or frequency other than those it was produced or professionally modified for;
- The product 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., Ingress Protection shall be restored in full, all safety measures taken and inspection done by a designated electrical inspector;
- During operation, premises where the device is installed, shall be free of danger of fire or explosion in case of development of gases, vapors of inflammable liquids and occurrence of inflammable dust,
- The product 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;
- The product shall not be operated under conditions or in an environment not ensuring safe operation (e.g. location on flammable base, cover from inflammable material, insufficient protection from penetration of foreign elements, water or other liquids);
- The product 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).
- The product 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 device service life.

Responsibility

The owner of the device is responsible for ensuring that all persons engaged in working and handling the product:

- 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 owner of the device is further responsible for:

- Protection of persons;
- Prevention of damage to material;
- Personnel training.

Safety Instructions

The following safety instructions shall be observed under all circumstances:

- Wires the device 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. The device 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 product isolation strength and also posing a life threat;
- During installation, the product shall be firmly held or secured against falling and causing injury;
- Dropped device shall not be installed even if showing no visible signs of damage. It shall be returned for inspection either to designated repair office or directly to manufacturer. Internal damage can cause functional failures or a short circuit;
- The product shall by no means be cleaned under running water or by high-pressure equipment. Water penetration can cause a short circuit. It is necessary to respect ingress protection of the device.

DISPOSAL

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

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

Packing 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 the Environment Protection

The product 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 center for disposal as per local regulations.
Plastic components	Separate and hand over for disposal or re-granulation as per local regulations.