



# EU-TYPE EXAMINATION CERTIFICATE

**Number: TCM 221/16 – 5422**

## Addition 1

This addition replaces all previous versions of this certificate in full wording.

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**In accordance:** with Directive 2014/32/EU of the European Parliament and of the Council on the harmonisation of the Member States relating to the making available on the market of measuring instruments (implemented in Czech Republic by Government Order No. 120/2016 Coll.).

**Manufacturer:** Zakład Elektronicznych Urządzeń Pomiarowych POZYTON Sp. z o.o.  
ul. Staszica 8  
42-202 Częstochowa  
Poland

**For:** active electrical energy meter - 1-phase  
type: LP-1  
Accuracy class: A or B  
mechanical environment class: M1  
electromagnetic environment class: E2  
temperature range: -40 °C...+70 °C

**Valid until:** 13 October 2026

**Document No:** 0511-CS-A030-16

**Description:** Essential characteristics, approved conditions and special conditions, if any, are described in this certificate.

**Date of issue:** 13 December 2016

**Certificate approved by:**



RNDr. Pavel Klenovský

## 1. Meter Characteristics

The electricity meter **LP-1** is a 1-phase up to four-tariff active energy meter designed to measure residential and light industrial energy consumption. Meter is intended for connection to the distribution network directly.

It measure active energy in classes B or A as per EN 50470-1 and EN 50470-3 in both import and export directions.

It measure reactive energy in classes 2 or 3 as per EN 62053-23 and in class 1 as per EN 62053-24 in four quadrants.

The meter is equipped with two current transformers, in phase and neutral circuits.

The LP-1 meter depending on customer requirements can be configured to work in standard mode or prepayment mode.

Besides energy, it can also measure and register; load and energy registers profiles of active power in both directions and reactive in four quadrants in 1, 15, 30 or 60 minutes of the integration period, maximum demand, active power over-limit consumption, instantaneous effective values of voltage, current, power (active, reactive and apparent), frequency and voltage interruptions.

Meter has also additional register of active energy, counted when strong magnetic field occurs in meter's vicinity.

Energy values measured (e.g. up to four consumption and supply tariffs, total energy across all tariffs) with additional information as actual active tariff, power direction are shown on the graphical LCD which is backlit. Values to be displayed are configurable. Metering data measured by the meter can be scrolled manually using capacitive keyboard on the meter front or automatically in predefined sequence of LCD screens (upon the customer's definition), the keyboard is also used for manual data entry.

The QR codes presented on the LP-1 meter LCD allows the automation of the reading process and access to the measurement data.

Software separation design methodology used in **LP-1** meter, allows the manufacturer to easily modify legally non-relevant software part.

The **LP-1** meter, equipped as a standard, with an QWERTY keyboard (optionally with RFID antenna), **Wi-Fi** communication module and optical interface for local readout, configuration and parameterization.

Under the keyboard (which can be sealed) are located:

- space for two communication modules,
- switches for blocking: optical interface, keyboard and remote configuration,
- mechanical switch intended for: resetting of billing data, unlocking of meter and additional communication modules parameterization that is available via optical interface and manually setting of date and time,
- SD card slot,
- USB Type A connector,
- two batteries in compartments: first for internal clock (CR2032 type), second one (AAA, LR03 type) enables readout of metering data in case of voltage failure.

Measured values can be read from LCD also in no power mode. To activate this mode, battery indicated key on keyboard must be pushed for at least 3 seconds.

All billing data are registered in non-volatile memory, meter tariffs are switched by internal real time clock which can be remotely synchronized (e.g. via Wi-Fi communication module).

Meter can be also equipped with:

- second communication or general purposes module,
- high current relay for load control and meter prepayment functionality

On the nameplate LEDs are placed for testing purposes.



**Hardware Version: A****Firmware Version:**

v.01.XX (legally relevant software CRC: 7C60)

v.02.XX (legally relevant software CRC: F9AE)

**Type designation including internal identification of configuration is:****LP-1-**

F81CEMOQUVY-A26EF0202(example)

**where (internal identification of configuration):**

F81	C	E	M	O	Q	U	V	Y-	A	26	E	F	02	02
														Legally non-relevant software version
														Legally relevant software version
														Reference current – 5 A
														Reference voltage – 230 V
														Communication interfaces
														Hardware generation
														Optical interface blocking switch
														High current relay for load control
														Measurement and registration of the voltage with 0,1 V accuracy
														Optional remote date and time programming by communication interfaces
														External battery input
														Maximum demand indicator
														Remote configuration blocking switch
														Sensor of cover opening
														Manufacturer marking

Detailed explanation of letters/digits – see user`s manual

**2. Main Metrological Characteristics**

Measurement	- active energy in 1-phase 2-wire distribution network - measurement both import and/or export of energy - up to 4 tariffs (tariffs are switched by internal RTC)
Measurement Method	Static meter Current inputs (phase and neutral) with current transformers, voltage input with resistor divider
Class	B or A
Display	LCD
Reference Voltage $U_n$	230 V
Reference Frequency $f_n$	50 Hz
Reference Current $I_{ref}$	5 A
Transitional Current $I_{tr}$	0,5 A
Minimum Current $I_{min}$	0,25 A



Starting Current $I_{st}$	20 mA
Maximum Current $I_{max}$	60 A
Constant (LED)	2400 imp/kWh
Specified Operating Temperature Range	-40°C...+70°C (3K7)
Degree of Protection Against Dust and Water	IP51
Protective Class (Electrical)	II
Mechanical Environment	M1
Electromagnetic Environment	E2

### 3. Interfaces

- Optical interface: as per EN 62056-21
- Two interface connectors intended for the communication/general purposes modules

### 4. Main Functional Characteristics

- Internal tariff switching – energy import and energy export can each be split up into 4 tariffs
- Ability to display energy values with up to 3 decimal places
- Load profiles (P+, P-, Q1, Q2, Q3, Q4)
- Energy registers profiles (EP+, EP-, EQ1, EQ2, EQ3, EQ4)
- Number of voltage interruptions
- Additional register of active energy counted when strong magnetic field occurs in meter vicinity
- High current relay for load control and meter prepayment functionality (option)

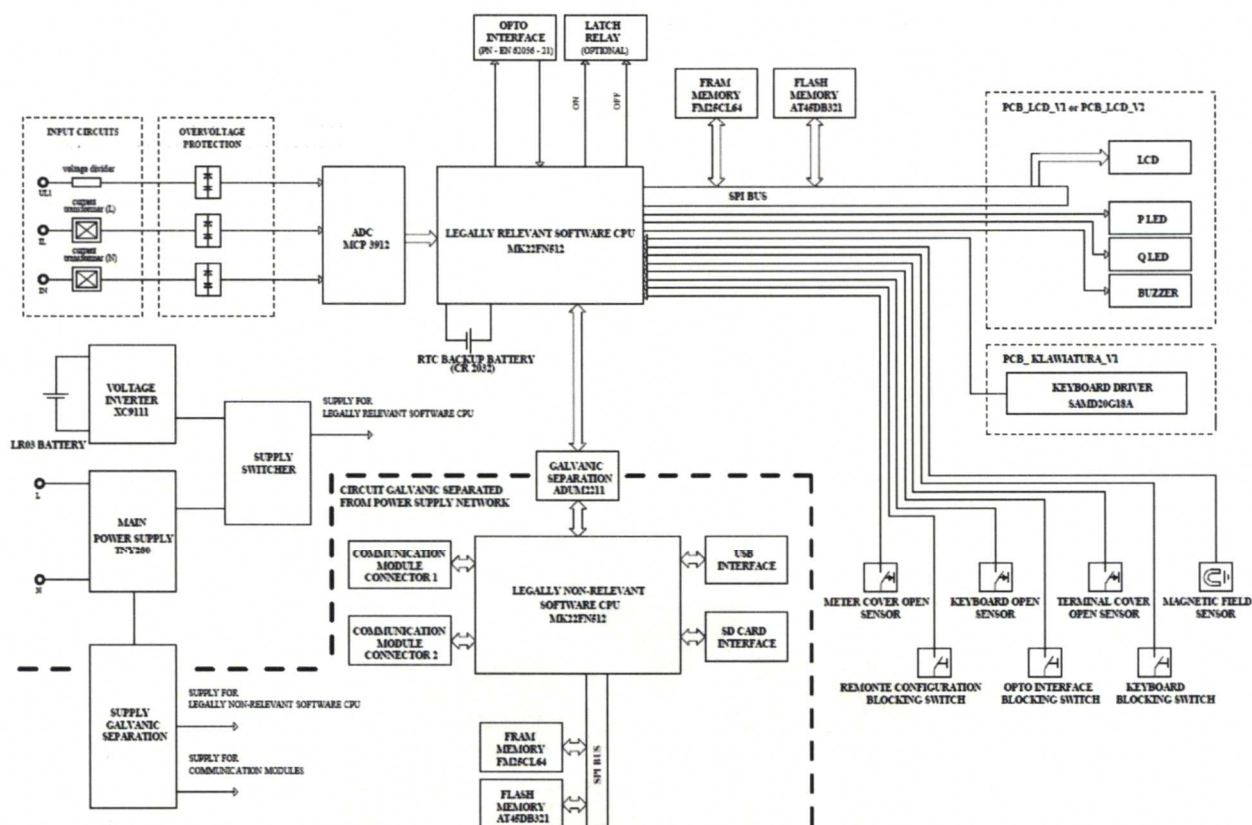
### The meters also measure additional values (and display them if so configured):

- Reactive power and energy in four quadrants
- 10 maximum active power values (value, date, time) in both directions
- Instantaneous value of active and reactive power with actual cycle minute (active in both directions and reactive in four quadrants)
- Instantaneous effective voltage value
- Instantaneous effective current value
- Instantaneous power
- Frequency
- Date and time of last billing period closing
- Historical active and reactive energy registers (both directions/quadrants, all tariffs and total)
- Maximum demand value programmed into meter's memory

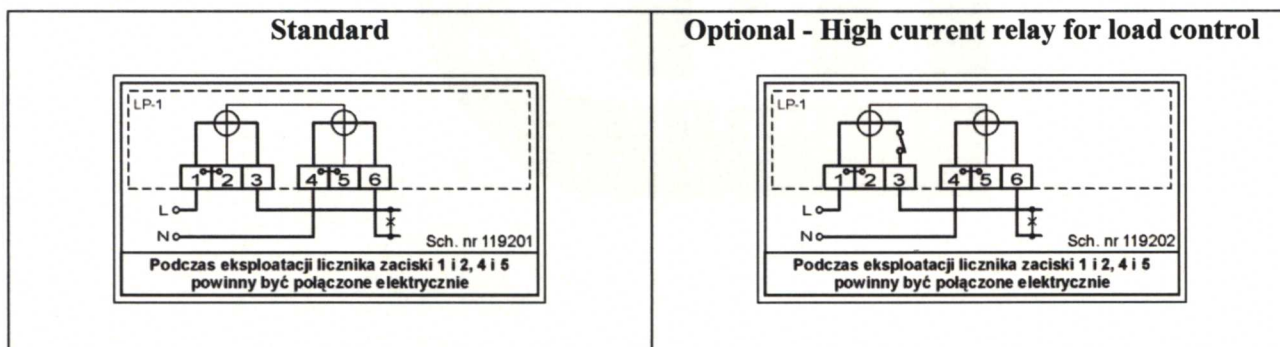




## 5. Meter Block Diagram



## 6. Wiring Diagrams



## 7. Photographs of the Meter







Location of the  
manufacturer's  
postal address

## 8. Type test

Meters were tested at the Czech Metrology Institute Brno as per EN 50470-1 and EN 50470-3 standards. Test results are presented in Test Report No. 6011-PT-TS039-16 and 6011-PT-TS044-16.

The meters complied with all test requirements.

## 9. Meter Marking

### 9.1 Name-plate

The following data shall be quoted on the meter name-plate:

- Manufacturer's name or his trade mark;
- Manufacturer's address;
- Type Designation or meter commercial name;
- "CE" marking and supplementary metrological marking;
- Number of EU-type examination certificate;
- Serial number and year of production;
- Class index;
- Specified operating temperature range (in °C or as IEC environmental class);
- Types of distribution network (graphical symbol);
- Reference voltage;
- Reference (rated) current;
- Maximum current;
- Minimum current;
- Reference frequency;
- Constant of meter;
- Sign of double square for meters with protective class II.

### 9.2 Supplementary Documentation

The meter shall be accompanied by supplementary documentation. A batch of identical meters intended for a single customer can be accompanied by a single copy of supplementary documentation only. This documentation shall as a minimum include all data listed on the name-plate (see 9.1, except for serial number and production year) and also the following:

- Brief description of meter, including values / data measured, data logging and display possibilities
- Wiring diagrams (the wiring diagram shall be also shown on the meter case)
- Storage conditions
- EMC data
- Starting current
- Transitional current
- Consumption of voltage and current circuits
- Maximum cross-section of connecting conductors
- Mass and dimensions
- Way of meter disposal

### 9.3 Sealing

The meter is sealed by two manufacturer's official marks (Module D of MID) or by two marks of notified body (module F of MID). These marks are pendent seals or stickers (position of marks - refer to Photographs of the Meters).

## 10. Testing for declaration of conformity to type

The conformity assessment procedure consists of these tests (at reference conditions):

1. Test of no-load
2. Test of starting
3. Accuracy of meter (using test output)
4. Test of meter constant

Tests are performed in accordance with the EN 50470-1 and EN 50470-3 standards. Meter intrinsic errors  $e(I, \cos \varphi)$  are measured at reference voltage 230 V, 50 Hz and currents and  $\cos \varphi$  as given in tables below. After the test, the composite errors  $e_c$  are calculated at rated operating conditions according to the formula as follows:

$$e_c = \sqrt{e^2(I, \cos \varphi) + \delta^2(T, I, \cos \varphi) + \delta^2(U, I, \cos \varphi) + \delta^2(f, I, \cos \varphi)}$$

where

- $e(I, \cos \varphi)$  - intrinsic error for a given current and  $\cos \varphi$ ;
- $\delta(T, I, \cos \varphi)$  - additional percentage error due to variation of temperature in rated temperature range and for a given current and  $\cos \varphi$ ; the value was determined during type examination;
- $\delta(U, I, \cos \varphi)$  - additional percentage error due to variation of voltage  $\pm 10\%$   $U_{ref}$  for a given current and  $\cos \varphi$ ; the value was determined during type examination;
- $\delta(f, I, \cos \varphi)$  - additional percentage error due to variation of frequency  $\pm 2\%$   $f_{ref}$  for a given current and  $\cos \varphi$ ; the value was determined during type examination.

Table given values are substituted for  $\delta(T, I, \cos \varphi)$ ,  $\delta(U, I, \cos \varphi)$ ,  $\delta(f, I, \cos \varphi)$  in the formula. The meter is considered compliant if the composite errors are smaller than the maximum permissible errors MPE.

MPE values for class A are given in Directive 2014/32/EU of the European Parliament and of the council on measuring instruments, Annex MI-003, Table 2.



Calculation of composite error															
		Additional error (%)						Composite error (%) in temp. ranges				MPE (%) for class B in temp. ranges			
Current	cos φ	δ(T,I,cos φ)				δ(U,I,cos φ)	δ(f,I,cos φ)								
		1	2	3	4										
I <sub>min</sub>	1	0,19	0,26	0,39	0,60	0,04	0,02	0,20	0,26	0,39	0,60	±2,0	±2,5	±3,5	±4,0
I <sub>tr</sub>	1	0,19	0,24	0,33	0,62	0,07	0,14	0,25	0,29	0,37	0,64	±2,0	±2,5	±3,5	±4,0
	0,5i	0,86	1,48	1,95	2,52	0,07	0,14	0,87	1,49	1,96	2,52	±2,0	±2,5	±3,5	±4,0
	0,8c	0,10	0,29	0,34	0,39	0,03	0,06	0,12	0,30	0,35	0,40	±2,0	±2,5	±3,5	±4,0
I <sub>ref</sub>	1	0,19	0,25	0,32	0,48	0,04	0,03	0,20	0,25	0,32	0,48	±2,0	±2,5	±3,5	±4,0
	0,5i	0,84	1,42	1,77	2,53	0,06	0,16	0,86	1,43	1,78	2,54	±2,0	±2,5	±3,5	±4,0
	0,8c	0,09	0,28	0,32	1,04	0,03	0,05	0,11	0,29	0,33	1,04	±2,0	±2,5	±3,5	±4,0
I <sub>max</sub>	1	0,19	0,31	0,33	0,47	0,05	0,02	0,20	0,31	0,33	0,47	±2,0	±2,5	±3,5	±4,0
	0,5i	0,85	1,44	1,74	2,48	0,06	0,15	0,87	1,45	1,75	2,49	±2,0	±2,5	±3,5	±4,0
	0,8c	0,15	0,15	0,30	0,39	0,03	0,08	0,17	0,17	0,31	0,40	±2,0	±2,5	±3,5	±4,0

Temperature Range 1: +5 °C thru +30 °C

Temperature Range 2: -10 °C thru +5 °C and +30 °C thru +40 °C

Temperature Range 3: -25 °C thru -10 °C and +40 °C thru +55 °C

Temperature Range 4: -40 °C thru -25 °C and +55 °C thru +70 °C