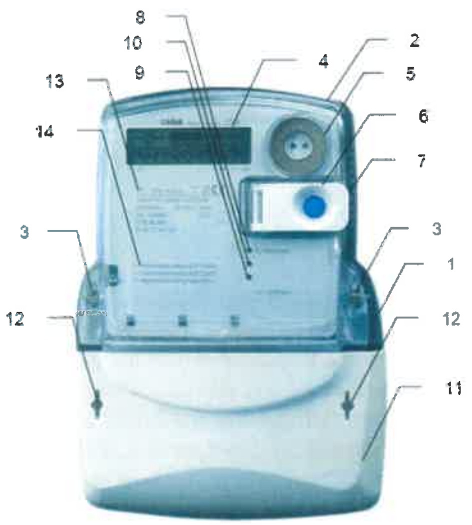
1. Opis merila (Instrument)

The MT174 electronic three-phase meters are designed for measurement and registration of active energy in three-phase three or four-wire or one-phase two wire networks. To the network it can be connected directly or half directly though current transformers.

2. Sestava merila (Design of the instrument)

2.1 Zgradba (Construction)



1. Meter base
2. Meter cover
3. Meter cover fixing screw
4. LCD
5. Optical port
6. Scroll push-button
7. Reset push-button
8. LED imp/kWh
9. LED imp/kvarh (option)
10. LED imp/kVAh (option)
11. Terminal block cover
12. Terminal cover fixing
13. Meter data
14. Legend

2.2 Merilni pretvornik (Sensor)

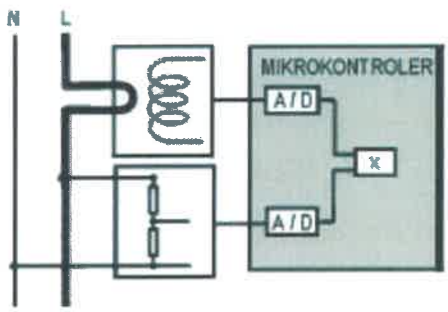


Figure 1: (Metering element)

The MT174 meters are equipped with three metering elements. The metering elements enable accurate measurement of active, reactive and apparent energy. The voltage range is from 0,8 Un to 1,15 Un - within it the MT174 meters measure energy with declared accuracy. The metering elements consist of a current and a voltage sensor. The current sensor is a Rogowski coil (a current transformer with an air core), while the voltage sensor is a resistive voltage divider. Signals of currents and voltages are fed to the A/D converters. Then they are digitally multiplied so that instantaneous power is calculated. The instantaneous power is integrated in the microcontroller, where it is further processed.

2.3 izdelava izmerjenih vrednosti (Measurement value processing)

2.3.1 Princip delovanja (Operating principle)

The meter is connected via terminal block to the network. The metering elements consist of a current and voltage sensor, which signals are fed to the analog/digital converter where they are multiplied. The microcontroller acquires signals from the metering element, processes them and calculates values of measured energy. Results are stored in registers and can be seen on LCD.

2.3.2 Strojna oprema (Hardware)

Software was developed for meter which is designed based on the microcontroller MSP430F47197. MSP430F47197 microcontroller also includes A / D converters, which provide conversion of the measured quantities (current) from the sensor and the voltage divider into a digital format.

2.3.3 Programska oprema (Software)

The software identifies the software version and the checksum of the software. Version of the program is to be read by reading the register 0.2.0 and checksum software by reading the register C.1.6. The register C.1.6 value is calculated. Checksum is changed by each increasing of the software version. The register can be read easily by using the user interface - repeatedly pressed the button to display the value (scroll key). For the purposes of verification and metrological control measure should be set in such a way that the registers 0.2.0 and C.1.6 are always assessable trough display by scrolling through registers.

2.4 Kazanje izmerjenih vrednosti (Indication of the measurement results)

Data are displayed in the right-side by means of eight alphanumeric characters. An indicator of energy flow direction is displayed in the left top corner. A physical unit of displayed physical quantity is shown in the right top corner. The indicator of L1, L2, L3 phase voltages presence is displayed in the middle of the top row. If certain phase voltage is not present, the indicator of that phase is not displayed. When the indicators L1, L2 and L3 blink, this indicates wrong phase sequence. When the indicator L1, L2 or L3 blinks and at the same time the arrow indicating export energy flow direction is displayed, it indicates reverse energy flow through the metering element in that phase. In the LCD bottom row there are eleven signal flags that indicate current valid tariff, meter status and alarms.

Figure 1: LCD

2.5 Dopustne funkcije in naprave (Permissible functions and devices)

The meters can be equipped with the following communication channels:

- Optical interface (always built-in)
- RS485 interface (on request)
- Built-in communication channels enable:
- Billing data readout
- Load-profiles readout
- Log-book registers readout
- Meter parameters readout
- Meter parameters setting
- Communication with the meter in progress is indicated on the LCD by the signal flag.

Tariff input

One (two-tariff meters) or two tariff inputs (three or four-tariff meters) for external tariff changeover can be built into the MT174 meters.

Pulse output

One pulse output (active energy meters for one energy flow direction or absolute meters) or two pulse outputs (active and reactive energy meter for one energy flow direction or active energy meters for two energy flow directions) can be built into the MT174 meters.

Tariff output

One or two tariff outputs can be built into the MT174 meters for controlling an external device by a tariff program that is stored in the meter instead of pulse output(s).

Four metering elements

Into the meter can be installed four transducers. If the measured value differs more than 6 %, the event is recorded in the logbook.

2.6 Tehnična dokumentacija (Technical documentation)

For the meter MT174 it is valid all technical documentation which is saved in MIRS into reference file 6413-4/2012, 6413-5/2013, 6413-3/2014, 6413-9/2014 and 6413-8/2022.

2.7 Vgrajena oprema in funkcije, ki niso predmet odobritve (Integrated equipment and functions not subject to approval)

- Additional measured quantities and futures:
- Energy (reactive and apparent)
- Demand (reactive and apparent)
- Reactive energy and demand by quadrants
- Instantaneous power
- Phase voltages (UL1, UL2, UL3)
- Phase currents (IL1, IL2, IL3)
- Phase power factors
- Frequency
- Load profile

3. Tehnični podatki (Technical data)

- Reference voltages:	3 x 230 V/400 V 3 x 230 V 230 V
- CT operated meter	
- Reference Current/Max. current:	1 A (6 A)
- Direct connected meter	
- Reference Current/Max. current:	5 A, 10 A, 15 A, 20 A (85 A, 120 A)
- Reference frequency:	50 Hz, 60 Hz
- Accuracy class:	A, B
- Starting current:	20 mA
- Minimum current:	250 mA (50 mA)
- Meter constant:	500 imp/kWh for I_{max} = 120 A 1000 imp/kWh for I_{max} = 85 A 10000 imp/kWh for CT operated meters
- Protective class of insulation:	II
- Environment / influence quantities:	
- Climatic environment:	-40 °C do 70 °C, 95 % non-condensing humidity, closed location
- Mechanic environment:	M1
- Electromagnetic environment:	E2

4. Vmesniki in pogoji združljivosti (Interfaces and compatibility conditions)

4.1 Vmesniki (Interfaces)

The meters can be equipped with the following communication channels:

- Optical interface (always built-in)
- RS485 interface
- Protocol IEC 62053-31, mode C

5. Zahteve za izdelavo, dajanje v uporabo in pravilno uporabo (Requirements on production, putting into use and consistent utilisation)

5.1 Zahteve za izdelavo (Requirements on production)

Electronic three-phase electricity meters must be constructed in accordance with the requirements of the section 2 of this certificate.

For built-in sensor the requirements of section 2.2 of this certificate shall be fulfilled.

5.2 Zahteve za dajanje v uporabo (Requirements on putting into use)

Before the first application, the following has to be done:
Visually check the compliance with the approved type,
Check the operation of the measuring instrument without loading,
Check starting current,
Check correct operation of a pulse transmitter in comparison with a matrix LCD.

5.3 Zahteve za pravilno uporabo (Requiremet for consistent utilisation)

Before the first application, the following has to be done:

- Visually check the compliance with the approved type,
- Check the operation of the measuring instrument without loading,
- Check starting current,
- Check correct operation of a pulse transmitter in comparison with a matrix LCD.

5.3.1 Največji dopustni pogrešek (Maximum permissible error (MPE))

For the confirmation of the compliance of an individual meter during the verification procedure, putting into operation or inspection of compliance with the maximum permissible errors (MPE), Table 2, Annex V (MI003) "Active electrical energy meters" of Directive 2014/32/EU of the European Parliament and Council, a measurement error as a combined error of measuring accuracy at reference conditions and contributions of influence quantities is defined. The error at reference conditions is defined, in testing procedures for an individual meter. In continuation, a factor of contributions of influence quantities for the temperature range from +5 °C to +30 °C, voltage and frequency are stated (table 2 and 3). The factor is considered when defining a common measurement error for a certain meter type.

A sum of squares of individual quantities is stated, and calculated by formula in the tables below:

$$\sqrt{\delta_T^2(T, I, \cos\varphi) + \delta_U^2(U, I, \cos\varphi) + \delta_f^2(f, I, \cos\varphi)}$$

Three-phase meter MT174, direct connection (for conductors with maximum cross section up to 25 mm^2

Table 1: Three phase meter with balanced loads I_{max} = 85 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Active energy - reception				
I_{min}	0,25	1	2	0,08
I_{tr}	0,5	1	3	0,06
I_{tr}	0,5	0,5L	2	0,05
I_{tr}	0,5	0,8C	3	0,08
I_{ref}	5	1	10	0,05
I_{ref}	5	0,5L	6	0,05
I_{ref}	5	0,8C	8	0,06
I_{max}	85	1	100	0,08
I_{max}	85	0,5L	50	0,07
I_{max}	85	0,8C	80	0,07
Active energy - generation				
I_{min}	0,25	1	2	0,07
I_{tr}	0,5	1	3	0,07
I_{tr}	0,5	0,5L	2	0,10
I_{tr}	0,5	0,8C	3	0,08
I_{ref}	5	1	10	0,07
I_{ref}	5	0,5L	6	0,06
I_{ref}	5	0,8C	8	0,06
I_{max}	85	1	100	0,08
I_{max}	85	0,5L	50	0,07
I_{max}	85	0,8C	80	0,08

Table 2: Three phase meter carrying single phase load, balanced voltage supplied to voltage circuits I_{max} = 85 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Active energy - reception				
I_{tr}	0,5	L_1 1	2	0,08
I_{tr}	0,5	L_2 1	2	0,08
I_{tr}	0,5	L_3 1	2	0,07
I_{tr}	0,5	L_1 0,5L	1	0,11
I_{tr}	0,5	L_2 0,5 L	1	0,10
I_{tr}	0,5	L_3 0,5 L	1	0,12
I_{ref}	5	L_1 1	3	0,04
I_{ref}	5	L_2 1	3	0,09
I_{ref}	5	L_3 1	3	0,07
I_{ref}	5	L_1 0,5L	2	0,05
I_{ref}	5	L_2 0,5 L	2	0,08
I_{ref}	5	L_3 0,5 L	2	0,08
I_{max}	85	L_1 1	50	0,06
I_{max}	85	L_2 1	50	0,09
I_{max}	85	L_3 1	50	0,06
I_{max}	85	L_1 0,5L	25	0,05
I_{max}	85	L_2 0,5 L	25	0,08
I_{max}	85	L_3 0,5 L	25	0,09
Active energy – generation				
I_{tr}	0,5	L_1 1	2	0,11
I_{tr}	0,5	L_2 1	2	0,09
I_{tr}	0,5	L_3 1	2	0,09
I_{tr}	0,5	L_1 0,5L	1	0,13
I_{tr}	0,5	L_2 0,5 L	1	0,14
I_{tr}	0,5	L_3 0,5 L	1	0,10
I_{ref}	5	L_1 1	33	0,03
I_{ref}	5	L_2 1	32	0,09
I_{ref}	5	L_3 1	33	0,08
I_{ref}	5	L_1 0,5L	16	0,06
I_{ref}	5	L_2 0,5 L	16	0,09
I_{ref}	5	L_3 0,5 L	17	0,08
I_{max}	85	L_1 1	192	0,05
I_{max}	85	L_2 1	192	0,09
I_{max}	85	L_3 1	193	0,07
I_{max}	85	L_1 0,5L	97	0,05
I_{max}	85	L_2 0,5 L	96	0,10
I_{max}	85	L_3 0,5 L	96	0,10

Three-phase meter MT174, direct connection (for conductors with maximum cross section up to 35 mm^2)

Table 3: Three phase meter with balanced loads I_{max} = 120 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Delovna energija - sprejem Active energy - reception				
I_{min} (I_{ref} = 5 A)	0,25	1	1	0,08
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	1	1	0,06
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	0,5 L	1	0,05
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	0,8 C	1	0,08
I_{tr} (I_{ref} = 10 A)	1	1	2	0,05
I_{tr} (I_{ref} = 10 A)	1	0,5 L	1	0,05
I_{tr} (I_{ref} = 10 A)	1	0,8 C	2	0,06
I_{ref} (I_{ref} = 5 A)	5	1	8	0,06
I_{ref} (I_{ref} = 5 A)	5	0,5 L	4	0,05
I_{ref} (I_{ref} = 5 A)	5	0,8 C	6	0,06
I_{ref} (I_{ref} = 5 A)	10	1	15	0,06
I_{ref} (I_{ref} = 5 A)	10	0,5 L	8	0,07
I_{ref} (I_{ref} = 5 A)	10	0,8 C	12	0,06
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	1	173	0,06
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	0,5 L	85	0,07
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	0,8 C	140	0,06
Delovna energija - oddaja Active energy - generation				
I_{min} (I_{ref} = 5 A)	0,25	1	1	0,08
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	1	1	0,06
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	0,5 L	1	0,11
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	0,8 C	1	0,08
I_{tr} (I_{ref} = 10 A)	1	1	2	0,06
I_{tr} (I_{ref} = 10 A)	1	0,5 L	1	0,09
I_{tr} (I_{ref} = 10 A)	1	0,8 C	2	0,06
I_{ref} (I_{ref} = 5 A)	5	1	8	0,06
I_{ref} (I_{ref} = 5 A)	5	0,5 L	4	0,05
I_{ref} (I_{ref} = 5 A)	5	0,8 C	6	0,07
I_{ref} (I_{ref} = 5 A)	10	1	15	0,06
I_{ref} (I_{ref} = 5 A)	10	0,5 L	8	0,06
I_{ref} (I_{ref} = 5 A)	10	0,8 C	12	0,06
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	1	173	0,08
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	0,5 L	85	0,07
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	0,8 C	139	0,07

Table 4: Three phase meter carrying single phase load, balanced voltage supplied to voltage circuits
I_{max} = 120 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Active energy - reception				
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L1, PF = 1	1	0,07
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L2, PF = 1	1	0,08
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L3, PF = 1	1	0,07
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L1, PF = 0,5 L	1	0,08
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L2, PF = 0,5 L	1	0,08
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L3, PF = 0,5 L	1	0,04
I_{tr} (I_{ref} = 10 A)	1	L1, PF = 1	1	0,07
I_{tr} (I_{ref} = 10 A)	1	L2, PF = 1	1	0,10
I_{tr} (I_{ref} = 10 A)	1	L3, PF = 1	1	0,05
I_{tr} (I_{ref} = 10 A)	1	L1, PF = 0,5 L	1	0,07
I_{tr} (I_{ref} = 10 A)	1	L2, PF = 0,5 L	1	0,05
I_{tr} (I_{ref} = 10 A)	1	L3, PF = 0,5 L	1	0,04
I_{ref} (I_{ref} = 5 A)	5	L1, PF = 1	3	0,05
I_{ref} (I_{ref} = 5 A)	5	L2, PF = 1	3	0,09
I_{ref} (I_{ref} = 5 A)	5	L3, PF = 1	3	0,08
I_{ref} (I_{ref} = 5 A)	5	L1, PF = 0,5 L	2	0,05
I_{ref} (I_{ref} = 5 A)	5	L2, PF = 0,5 L	2	0,08
I_{ref} (I_{ref} = 5 A)	5	L3, PF = 0,5 L	2	0,06
I_{ref} (I_{ref} = 5 A)	10	L1, PF = 1	5	0,04
I_{ref} (I_{ref} = 5 A)	10	L2, PF = 1	5	0,09
I_{ref} (I_{ref} = 5 A)	10	L3, PF = 1	5	0,06
I_{ref} (I_{ref} = 5 A)	10	L1, PF = 0,5 L	3	0,04
I_{ref} (I_{ref} = 5 A)	10	L2, PF = 0,5 L	3	0,09
I_{ref} (I_{ref} = 5 A)	10	L3, PF = 0,5 L	3	0,08
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L1, PF = 1	58	0,04
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L2, PF = 1	58	0,10
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L3, PF = 1	58	0,07
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L1, PF = 0,5 L	29	0,05
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L2, PF = 0,5 L	29	0,09
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L3, PF = 0,5 L	29	0,07
Active energy - generation				
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L1, PF = 1	1	0,06
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L2, PF = 1	1	0,10
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L3, PF = 1	1	0,09
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L1, PF = 0,5 L	1	0,14
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L2, PF = 0,5 L	1	0,10
I_{tr} (I_{ref} = 5 A), I_{min} (I_{ref} = 10 A)	0,5	L3, PF = 0,5 L	1	0,12
I_{tr} (I_{ref} = 10 A)	1	L1, PF = 1	1	0,06
I_{tr} (I_{ref} = 10 A)	1	L2, PF = 1	1	0,10
I_{tr} (I_{ref} = 10 A)	1	L3, PF = 1	1	0,08
I_{tr} (I_{ref} = 10 A)	1	L1, PF = 0,5 L	1	0,04
I_{tr} (I_{ref} = 10 A)	1	L2, PF = 0,5 L	1	0,11
I_{tr} (I_{ref} = 10 A)	1	L3, PF = 0,5 L	1	0,08
I_{ref} (I_{ref} = 5 A)	5	L1, PF = 1	3	0,04
I_{ref} (I_{ref} = 5 A)	5	L2, PF = 1	3	0,09
I_{ref} (I_{ref} = 5 A)	5	L3, PF = 1	3	0,09
I_{ref} (I_{ref} = 5 A)	5	L1, PF = 0,5 L	2	0,04

I_{ref} (I_{ref} = 5 A)	5	L2, PF = 0,5 L	2	0,10
I_{ref} (I_{ref} = 5 A)	5	L3, PF = 0,5 L	2	0,07
I_{ref} (I_{ref} = 5 A)	10	L1, PF = 1	5	0,04
I_{ref} (I_{ref} = 5 A)	10	L2, PF = 1	5	0,09
I_{ref} (I_{ref} = 5 A)	10	L3, PF = 1	5	0,06
I_{ref} (I_{ref} = 5 A)	10	L1, PF = 0,5 L	3	0,04
I_{ref} (I_{ref} = 5 A)	10	L2, PF = 0,5 L	3	0,09
I_{ref} (I_{ref} = 5 A)	10	L3, PF = 0,5 L	3	0,06
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L1, PF = 1	58	0,05
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L2, PF = 1	58	0,11
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L3, PF = 1	58	0,07
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L1, PF = 0,5 L	29	0,06
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L2, PF = 0,5 L	29	0,09
I_{max} (I_{ref} = 5 A & I_{ref} = 10 A)	120	L3, PF = 0,5 L	29	0,08

Three-phase meter MT174, semidirect connection

Table 5: Three phase meter carrying three phase load, balanced voltage supplied to voltage circuits I_{max} = 6 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Active energy - reception				
I_{min}	0,01	1	2	0,10
I_{tr}	0,05	1	3	0,06
I_{tr}	0,05	0,5L	2	0,10
I_{tr}	0,05	0,8C	3	0,08
I_{ref}	1	1	10	0,12
I_{ref}	1	0,5L	6	0,11
I_{ref}	1	0,8C	8	0,07
I_{max}	6	1	100	0,08
I_{max}	6	0,5L	50	0,11
I_{max}	6	0,8C	80	0,06
Active energy - generation				
I_{min}	0,01	1	2	0,15
I_{tr}	0,05	1	3	0,09
I_{tr}	0,05	0,5L	2	0,13
I_{tr}	0,05	0,8C	3	0,07
I_{ref}	1	1	10	0,10
I_{ref}	1	0,5L	6	0,12
I_{ref}	1	0,8C	8	0,08
I_{max}	6	1	100	0,08
I_{max}	6	0,5L	50	0,08
I_{max}	6	0,8C	80	0,08

Table 6: Three phase meter carrying single phase load, balanced voltage supplied to voltage circuits I_{max} = 6 A

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
				[%]
Active energy - reception				
I_{tr}	0,05	L_1 1	2	0,09
I_{tr}	0,05	L_2 1	2	0,12
I_{tr}	0,05	L_3 1	2	0,11
I_{tr}	0,05	L_1 0,5L	1	0,08
I_{tr}	0,05	L_2 0,5 L	1	0,07
I_{tr}	0,05	L_3 0,5 L	1	0,10
I_{ref}	1	L_1 1	3	0,09

I	I [A]	PF	Imp.	$\delta_T^2(T,I,\cos\varphi) + \delta_U^2(U,I,\cos\varphi) + \delta_f^2(f,I,\cos\varphi)$
I_{ref}	1	L_2 1	3	0,05
I_{ref}	1	L_3 1	3	0,09
I_{ref}	1	L_1 0,5L	2	0,12
I_{ref}	1	L_2 0,5 L	2	0,10
I_{ref}	1	L_3 0,5 L	2	0,12
I_{max}	6	L_1 1	50	0,09
I_{max}	6	L_2 1	50	0,06
I_{max}	6	L_3 1	50	0,08
I_{max}	6	L_1 0,5L	25	0,10
I_{max}	6	L_2 0,5 L	25	0,08
I_{max}	6	L_3 0,5 L	25	0,11
Active energy – generation				
I_{tr}	0,05	L_1 1	2	0,13
I_{tr}	0,05	L_2 1	2	0,11
I_{tr}	0,05	L_3 1	2	0,17
I_{tr}	0,05	L_1 0,5L	1	0,27
I_{tr}	0,05	L_2 0,5 L	1	0,27
I_{tr}	0,05	L_3 0,5 L	1	0,23
I_{ref}	1	L_1 1	3	0,10
I_{ref}	1	L_2 1	3	0,07
I_{ref}	1	L_3 1	3	0,10
I_{ref}	1	L_1 0,5L	2	0,13
I_{ref}	1	L_2 0,5 L	2	0,10
I_{ref}	1	L_3 0,5 L	2	0,13
I_{max}	6	L_1 1	50	0,09
I_{max}	6	L_2 1	50	0,11
I_{max}	6	L_3 1	50	0,08
I_{max}	6	L_1 0,5L	25	0,09
I_{max}	6	L_2 0,5 L	25	0,07
I_{max}	6	L_3 0,5 L	25	0,10

6. Nadzor merila v uporabi (Surveillance of the instrument in use)

6.1 Potrebna dokumentacija (Documentation necessary)

- EC type examination certificate with annex,
- User manual,
- Test certificates for modules or peripheral devices (if necessary).

6.2 Posebna oprema ali programska oprema (Special equipment or software)

The following tools are used for managing the meters:

For service meter programming and local data downloads:
- MeterView or Symbiot (Iskraemeco software)
- Optical probe
- Personal computer

The tool is intended for the operators who service or reprogram the meters in the laboratory or in the field.

For data downloading and meters programming in the field:
- MeterRead or Symbiot (Iskraemeco software)
- Optical probe

- Personal computer

The tool is intended for a personnel who read-out the meters in the field.

6.3 Identifikacija programske opreme (Identification of software)

Software is identified through the versions of the software and checksum which shall be displayed on LCD.

version Register 0.2.0	date Register: C.1.5	check sum Register: C.1.6
1.06	20. 1. 2014	391B

6.4 Identifikacija strojne opreme (Indentification of hardware)

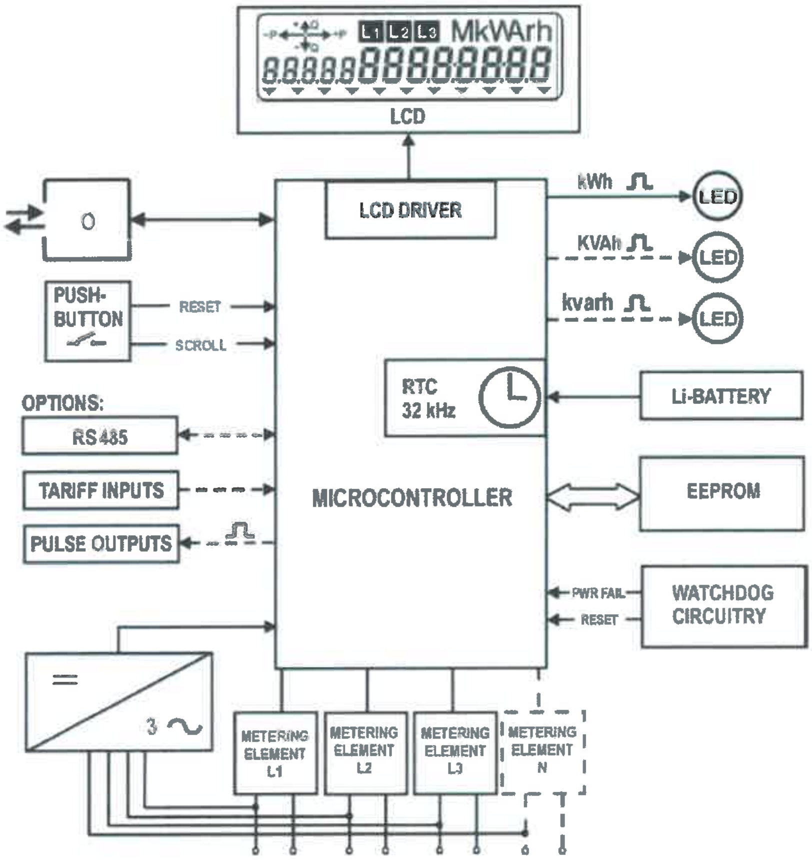


Figure 1: Meter block diagram

The meter consists of:

- metering elements
- Meter power supply unit
- Microcontroller with EEPROM
- RTC with a Li-battery
- LCD
- Pulse emitting LED(s)
- Scroll push-button
- Reset push-button
- IR optical port
- RS 485 (option)
- Tariff input(s) (option)

- Pulse output(s) or tariff output(s) (option)

6.5 Naravnavanje (Adjustment)

A meter casing is closed; therefore, adjustment is performed only during the production. Later adjustment during the meter life span is not expected.

7. Zaščita (Security measures)

Name plate is protected by sealings, unless it can't be removed without being destroyed.

Figure 2: Location of sealings

The meters are sealed at the following places:
The screws of the meter cover – metrological seals

8. Oznake in napisi (Markings and inscriptions)

- CE marking and supplementary metrology marking
- Manufacturer's name and address
- Accuracy class
- Reference voltage
- Climatic environment
- Output constant
- Meter identification type designation
- Serial number
- Temperature range

Figure 3: Example of nameplate