



## ME162

### Single-Phase Electronic Meter

## Technical Description

Version 0.1, 01.07. 2004

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## ME162 – Single-phase electronic meter

The ME162 single-phase electronic meters are intended for electric energy measurement and registration in single-phase two-wire networks in household. Measuring and technical characteristics of the meters comply with the IEC 62052-11 and IEC 62053-21 (IEC 61036) international standards for electronic active energy meters, class 1 or 2.

The meters are designed and manufactured in compliance with the standards and ISO 9001 and even more severe Iskraemeco's standards.

### Meter characteristics

- **Active energy meter**
  - accuracy class 1 or 2
- **Energy measurement and registration modes**
  - standard – as an induction meter
  - other options:
    - bi-directional
    - absolute (*always positive*)
- **One or multi-tariff registration (up to 4 tariffs):**
  - with external tariff changeover
  - with internal time switch
- **Internal clock**
- **Display modes on LCD:**
  - automatic data scroll
  - manual (triggered with a key)
- **Data display on LCD in voltage-free state (option)**
- **Display illumination (option)**
- **Indications:**
  - LED:
    - Imp / kWh
  - LCD:
    - Active tariff display
    - Energy flow direction
- **Auxiliary inputs / outputs:**
  - up to two (impulse or tariff) outputs
  - up to two tariff inputs
- **Communication:**
  - IR optical port for local meter programming and data downloading
- **Quality:**
  - high measuring accuracy and time stability
  - high operation reliability and long lifetime (20 years)
- **A compact plastic case** is made of high quality self-extinguishable material. It is water and dust protected (IP53).

## 1. Meter configuration

1. Measuring element
2. Meter power supply unit
3. Microprocessor
4. LCD
5. Impulse LED
6. Scroll key
7. IR optical port
8. Impulse output 1 (S0 or OPTOMOS relay)
9. Impulse output 2 (S0 or OPTOMOS relay)
10. Tariff input 1
11. Tariff input 2

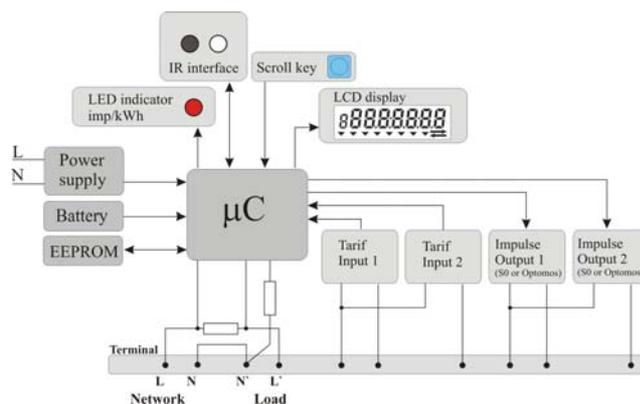


Fig. 1 - Meter block diagram

## 2. Energy measurement and registration

A meter measures and registers electric energy:

- **In single-phase two-wire network:**
  - only positive active energy
  - separately positive and negative active energy (A+, A-)
  - absolute active energy | A |

Measurement can be performed in max. four different tariffs.

## 3. Real time clock

A real time clock is controlled by a 32 kHz quartz oscillator. The clock accuracy complies with the requirements stated in the IEC 62054-21 (IEC 61038) standard. A clock stand-by power supply source is built in the meter. It is performed with a Li battery and assures energy for up to 5-year clock operation in case of power shortage.

The real time clock generates:

- a tariff program, season changeover, transition to day light saving period and vice-versa

## 4. Display

### Display and indications:

The meter is equipped with a standard LCD.

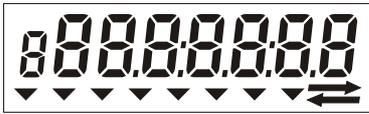


Fig. 2 - Standard display

Measuring data are displayed with seven 7-segment 8 mm high digits, and one 7-segment 6 mm high identification numbers.

Symbols indicating energy flow direction, a valid tariff and meter statuses are also displayed.

### 4.1. Data display on LCD

Data that are defined in auto scroll and manual scroll sequences are displayed.

Data are reviewed with a key or they are cyclically displayed.

CODE / LCD	DESCRIPTION
<b>Stand.</b>	
0	Total positive active energy (A+)
0*	Total absolute active energy  A
1	Positive active energy in first tariff (T1)
1*	Absolute active energy in first tariff  T1
2	Positive active energy in second tariff (T2)
2*	Absolute active energy in second tariff  T2
3	Positive active energy in third tariff (T3)
3*	Absolute active energy in third tariff  T3
4	Positive active energy in fourth tariff (T4)
4*	Absolute active energy in fourth tariff  T4
5	Total negative active energy (A-)
6	Negative active energy in first tariff (T1)
7	Negative active energy in second tariff (T2)
8	Negative active energy in third tariff (T3)
9	Negative active energy in fourth tariff (T4)
t	Time
d	Date YY-MM-DD
F	Fatal error

Table 1 – Display of register codes

#### Notes:

- (\*)The same register code can be used for different data on a standard display. Register codes are described on the front plate. At the same meter type the given register code has only one meaning.

### 4.2. Scroll key

The meter is equipped with one mechanical key on the meter cover.

#### Key function:

- LCD test
- As an option, data defined in auto scroll and manual scroll sequences can be displayed even when there is no voltage in the network or the meter is not connected.

## 5. Communication interface

### 5.1. IR optical port

The meter is provided with an optical port that enables meter parameter setting and data downloading.

The optical port complies with the IEC 62056-21 (IEC 61107) standard, a mode C protocol is employed; data transmission rate is 9600 bit/sec.

## 6. Inputs and outputs

### 6.1. Inputs

The meter is equipped with one (two-rate meters) or two (3- and 4-rate meters) tariff inputs that are used for external tariff changeover with a phase voltage.

### 6.2. Outputs

The meter is equipped with one or two impulse outputs. Two impulse outputs are used in case of bi-directional energy flow (an output for each energy flow direction).

Outputs can be an S0 (IEC 62053-31 type A, DIN 43864) or opto-MOS relay type.

## 7. Handling with the meter

Two sets of tools are available:

#### • For service programming and readout:

- MeterView (Iskraemeco software)
- an optical probe
- a PC: a desk-top, a laptop

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

#### • For billing readout and programming:

- MeterRead (Iskraemeco software) for all types of Palm-top PCs operating in the Windows CE environment
- an optical probe

The tool is intended for meter readers in the field.

### 8. Maintenance

The meter is designed and manufactured in such a way that no maintenance interventions are required in the entire lifetime. Measuring stability assures that no recalibration is required. If battery is built into the meter, its capacity is sufficient to back up all functions for the entire meter lifetime.

### 9. Lifetime

The meter is designed for a 20-year lifetime at normal operating conditions.

### 10. Meter connection procedure

1. Place the meter to a connection position,
2. Connect the meter to network; moment of force for fixing conductors is 2.5 Nm.
3. Check connection indication:
  - LED is lit (load current is less than starting current)
  - LED is blinking (proportional to load current strength)

### 11. Meter case

The meter case is made of self-extinguishing polycarbonate that can be recycled.

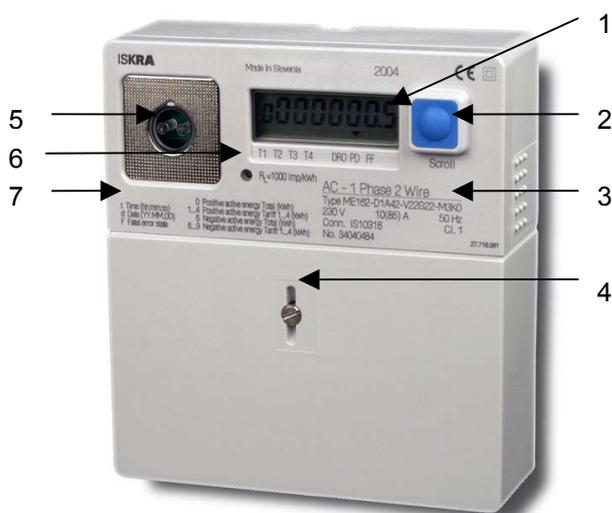
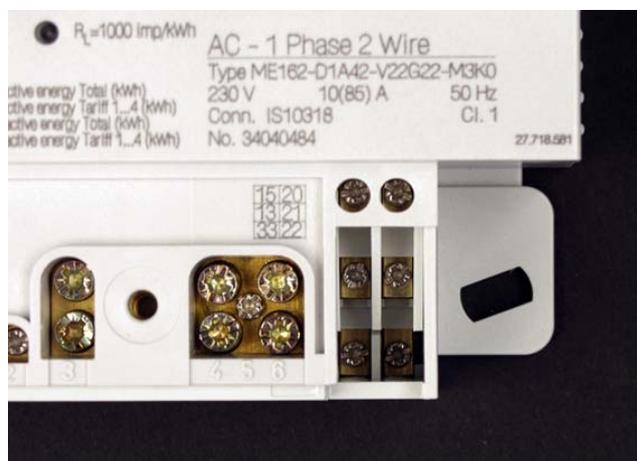


Fig. 3 – Meter constituent parts

1. LCD
2. A Scroll key
3. Meter technical data
4. A terminal cover sealing screw
5. An IR optical interface
6. Impulse LED for meter testing and meter constant
7. A legend of data identification codes



Current terminals Additional voltage terminals Auxiliary terminals



Auxiliary terminals



Terminal cover sealing screw

**11.1. Dimensions**

Meter fixing dimensions comply with the DIN 43857 standard.

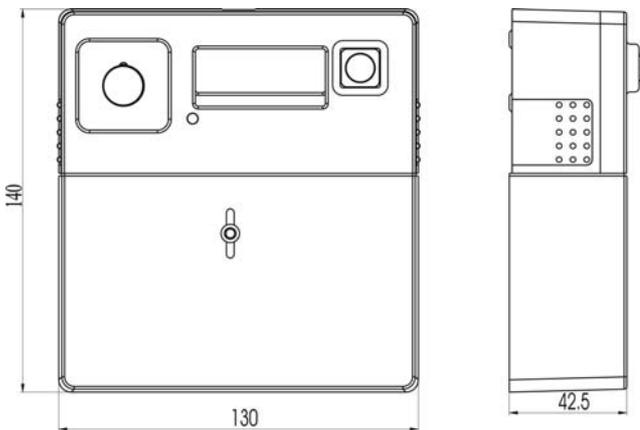


Fig. 4 – Meter fixing dimensions.

**12. Terminal block**

**12.1.1. Terminal block**

It is made of high-quality polycarbonate that assures:

- Mechanical strength and resistance to high temperatures
- Protection against voltage-breakdown

**12.1.2. Current terminals**

Current terminals are made of brass. For tropic regions they are nickel plated. Current terminals configuration at the ME162-D1 meters is in compliance with the DIN 43857 standard; at the ME162-D3 meters it is in compliance with the BS 5685 standard. Current terminal bore diameter is 8.5 mm. Connection conductors are fixed in current terminals with two screws. Both meter versions (DIN and BS) enable maximum six auxiliary terminals with 3.5 mm bore diameter.

**12.1.3. Auxiliary voltage terminals**

The meter can be equipped with max. two auxiliary voltage terminals - 2 (L1), 5 (N). They enable simple connection of auxiliary external devices.

**13. Connection diagrams**

The meter connection diagrams in compliance with BS 5685 and DIN 43857 respectively are shown in the figure 5.

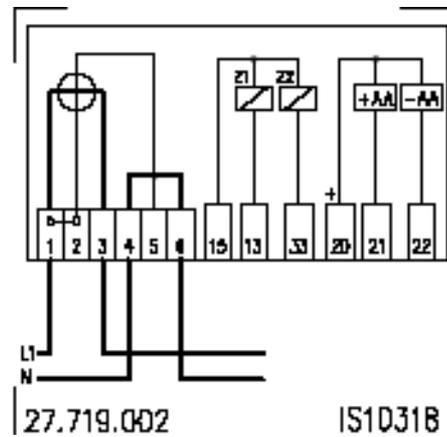
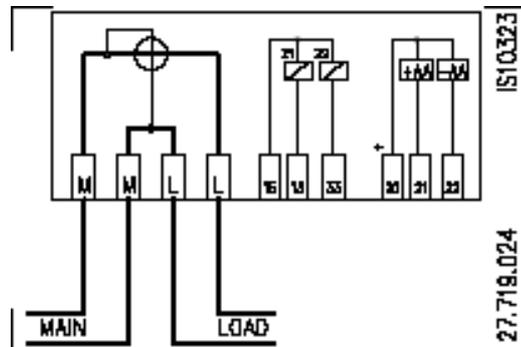


Fig. 5 – Connection diagrams

**14. Technical data**

Accuracy class	2 or 1
Basic current I <sub>b</sub>	5, 10, 20 A
Max. current I <sub>max</sub>	85, 100 A
Thermal current	1.2 I <sub>max</sub>
Min. current	0.05 I <sub>b</sub>
Starting current	0.004 I <sub>b</sub>
Rated voltage U <sub>n</sub>	120, 220, 230, 240 V,
Voltage range	0.8 U <sub>n</sub> ... 1.15 U <sub>n</sub>
Rated frequency	50 Hz, 60 Hz
Meter constant	1000 imp/kWh
Clock accuracy (25°C)	≤ 6 ppm or ≤ ±3 min / year
RTC control	Quartz crystal 32 kHz
Temperature range of operation	-25°C ... +60°C
Extended temperature range of operation	- 40°C ... +70°C
Storing temperature	-40°C ... +85°C
Current circuit burden	<25 mW / 25 mVA
Voltage circuit burden	<0.8 W / 10 VA
Dielectric strength	4 kV, 50 Hz, 1 min
Impulse voltage	6 kV, 1.2/50 μs
Short-circuit current	30 I <sub>max</sub>
Electrostatic discharge	15 kV (IEC 1000-4-2)
Electromagnetic field	10 V/m (IEC 1000-4-3)
EMC: High frequency disturbances	6 kV (IEC 1000-4-4)
Flame class	V0 (Standard UL 94)
Optical port	IEC 62056-21 (IEC 61107)
Impulse outputs: S0	t <sub>i</sub> = 40 ms (on request from 10 to 160 ms)
opto-MOS relay	t <sub>i</sub> = 80 ms (on request from 10 to 160 ms) Switching power: 25 VA (100 mA, 250 V)
Dimensions (h x w x d)	97 x 130 x 43 mm
Mass	Approx. 0.380 kg

*Table 2 – Technical data*
**15. Meter type designation**
**ME162-D1A41-V22G22-M3K0**

M	electronic meter
E	single-phase meter
162	meter with LCD and internal clock
D1	terminal block for direct connection up to 85 A by DIN 43857
D3	terminal block for direct connection up to 100 A by BS 5685
A4	active energy measurement, accuracy class 1
A5	active energy measurement, accuracy class 2
1	energy measurement in one direction
2	energy measurement in two directions
4	absolute energy measurement
V 12	1 tariff input
V 22	2 tariff inputs
G12	1 impulse S0 output
G 22	2 impulse S0 outputs
L11	1 OPTOMOS relay, make contact
L 21	2 OPTOMOS relays, make contact
M	additional device
3	real time clock with Li-battery
K	communication interface
0	optical port complies with IEC 62056-21 (IEC 61107)

*Table 3 – Meter type designation*

Owing to periodically improvements of our products the supplied products can differ in some details from data stated in this technical description.

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