

User's Manual

GB

Single phase electrical energy meter WM1-6
Single phase electrical energy meter WM1M6

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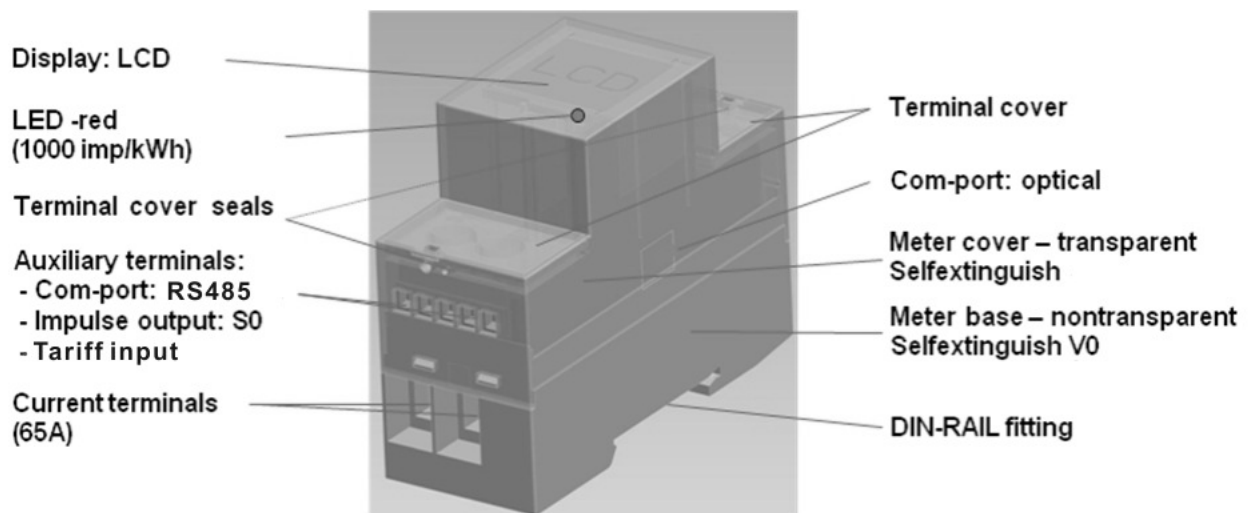
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1 DESCRIPTION

The meters **WM1-6** and **WM1M6** are intended for energy measurements in single-phase electrical power network and can be used in residential, industrial and utility applications. Meters measure energy directly in 2-wire networks according to the principle of fast sampling of voltage and current signals. A built-in microprocessor calculates energy, power and power factor from the measured signals. It also controls LCD, LED and installed modules.

1.1 Overview

- Single phase direct connected DIN-rail mounting meter
- MID approval (option)
- Class 1 for active energy according to EN 62053-21 and B according to EN 50470-3
- Class 2 for reactive energy according to EN 62053-23
- Basic current 5A (I_b)
- Maximum current 65A (I_{max})
- 230V rated system voltage input (U_n)
- Voltage operating range -20% ... +20% U_n
- Reference frequency 50/60 Hz
- Power consumption voltage circuit < 8VA at U_n
- Temperature range climatic condition as indoor meter according EN 62052-11
- Display LCD 7+1 digit (100Wh resolution)
- Multifunctional front red LED
- Pulse output (option) according to EN 62053-31:2001
- Serial communication (option)
- Tariff input (option)
- DIN-rail mounting according to EN 60715
- Sealable terminal cover
- 2 DIN modules width
- External bistable switch control (option)

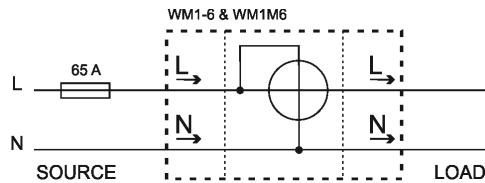


2 INSTALLATION

Warning: Installation must be carried out and inspected by a specialist or under his supervision.

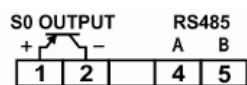
When working on the meter, switch off the mains voltage!

It is recommended to use 65 A fuse for the line protection.

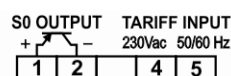


2.1 Connection of modules

Meter can be equipped with different modules. Pictures below are showing two most equipped combinations.



Pulse out. & communication



Pulse out. & tariff input

Check labels on the side of the meter to check what modules are built in.

3 OPERATION

Warning: Case is sealed, do not open the meter. No warranty if case is opened.

3.1 Communication

As an option serial **RS485** communication module with speed 1200 to 19200 bit/s can be built-in.

It uses **MODBUS RTU** protocol to read and change settings of the meter and to read measuring results.

RS485 serial communication can be used together with optical (IR) communication in order to control a bistable switch Iskra BICOM.

Meter has built-in optical (IR) communication port on the side as a standard. Special **WM-USB** adapter (size 1 DIN module) can easily be attached to it. It can be used for direct communication with PC to change settings of devices without RS485 communication. Communication settings for WM-USB are fixed to:

Communication speed	19200 bit/s
Frame	8, none, 2
Address	33

Drivers for WM USB are installed automatically when MiQen 2.1 software is installed. If not, it is possible to install them manually from ..."MiQen 2.1 installation folder" / Drivers.

Extended data set

- Special option for industrial process metering and energy management/monitoring systems.
- Values are not registered/stored in the meter memory.
- Measured quantities listed below can be shown also on LCD (except Power Angle Total).

Modbus table

Address	Contents	Data	
	INSTANTANEOUS VALUES		
30105	30106	Frequency	T5
30107	30108	U1	T5
30126	30127	I1	T5
30140	30141	Active Power Total (Pt)	T6
30148	30149	Reactive Power Total (Qt)	T6
30156	30157	Apparent Power Total (St)	T5
30164	30165	Power Factor Total (PFt)	T7
30172		Power Angle Total (atan2(Pt,Qt))	T17
	ENERGY		
30400		Error register	T1
30401		Energy Counter 1 Exponent	T2
30402		Energy Counter 2 Exponent	T2
30403		Energy Counter 3 Exponent	T2
30404		Energy Counter 4 Exponent	T2
30405		Current Active Tariff	T1
30406	30407	Energy Counter 1	T3
30408	30409	Energy Counter 2	T3
30410	30411	Energy Counter 3	T3
30412	30413	Energy Counter 4	T3

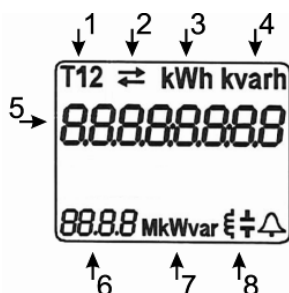
3.2 Input and output modules

As an option device can have built-in:

- **Tariff input** that supports measurement of energy in two tariffs. When there is voltage on it (check values in technical data) it stores data in Tariff 2 registers otherwise in Tariff 1 registers. Tariffs can be set via communication by MiQen software.
- **Pulse (SO) output** module that counts imported active energy with a fixed pulse rate 1 imp/Wh.

3.3 LCD

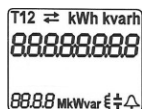
On LCD measured data are presented. Display scrolls automatically. Displayed quantities and scroll time can be set via communication by MiQen software.

Display description

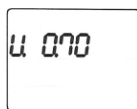
1. Tariff set for displayed counter
2. Energy import (→)
Energy export (←)
3. kWh display
4. kvarh display
5. Value
6. Info:
kVAh display
A – currently active counter
S – apparent power
PF – power factor
U – voltage
F – frequency
I – current
7. W – active power
var – reactive power
8. inductive / capacitive

Possible options

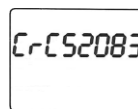
Start up displays:



Segment check



Built version

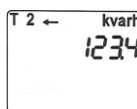


CRC check

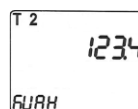
Energy counter displays (up to 4 counters) – are displaying current energy counter **settings** (tariff, import / export / total, active / reactive / apparent), its **value** and **current activity** (counting (A) / not counting ()).



Energy counter:
Set tariff: 1 (T1)
dir.: imp. (→)
Value: 123.4 kWh
Currently: active (A)

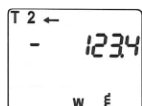


Energy counter:
Set tariff: 2 (T2)
Energy dir.: exp. (←)
Value: 123.4 kvarh
Currently: not active

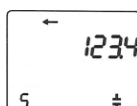


Energy counter:
Set tariff: 2 (T2)
Energy dir: total
Value: 123.4 kVAh
Currently: no data

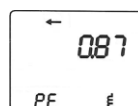
Other displays – are displaying measured **quantity** (P, Q, S, PF, U, f and I), its **value**, **direction** of active energy flow (import / export), **reactance** (inductive / capacitive) and active tariff. Some examples of displays are shown below:



P (W)
Value: -123.4
Inductive
E flow: exp.(←)
Current tariff: T2



S (VA – no unit displayed)
Value: 123.4
Capacitive
E flow: exp.(←)
Current tariff: -



Power factor
Value: 0.87
Inductive
E flow: exp.(←)
Current tariff: -

3.4 LED

Multifunctional LED counting pulses for Active Energy 1 imp/Wh. If constantly lit indicates no load ($I < 0,02A$).

3.5 Settings

All parameterisation can be done via communication with **MiQen software** (version 2.1 or later). **WM1M6 (MID)** has limited parameterisation. Counter settings and counter reset are not enabled.

With MiQen software meter can be set to **Test measuring mode** that displays measurements with precision of 2 digits. After power off meter automatically goes back to normal operation.

Security - password

Meter has possibility of two level password (4 characters from A to Z).

Password Level 1 – enables resetting the counters.

Password Level 2 – enables all available settings and resets.

If meter password is forgotten, device serial number should be sent to Iskra Sistemi, d.d. to receive device default password.

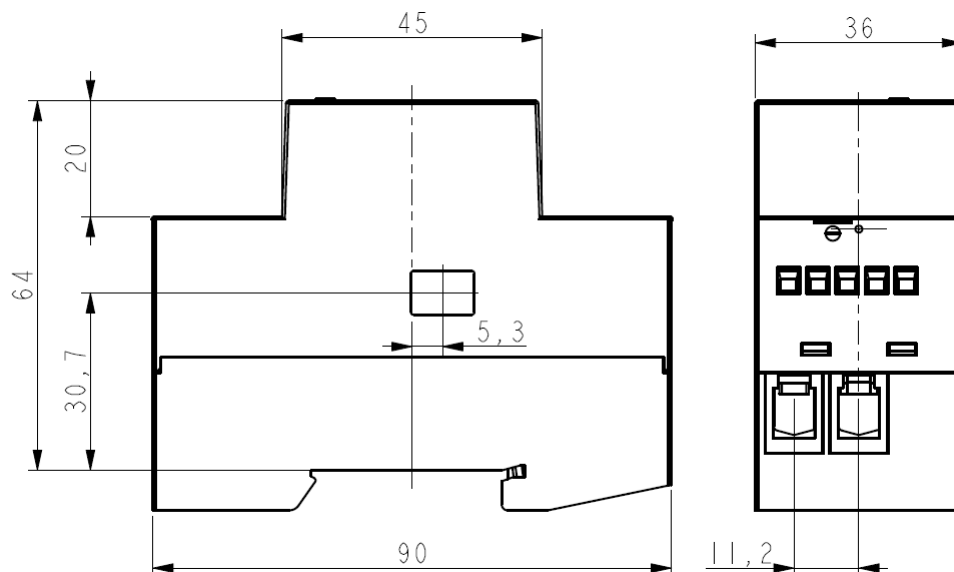
3.6 Service and Maintenance

If meter is used under specified conditions, it should not be necessary to recalibrate it during its lifetime. If degradation in the performance is observed it has probably been partly damaged and should be sent for repair or exchanged. In the meter firmware and parameter control function is integrated. In case of ERROR 1 or ERROR 2 indication on LCD the meter should be returned to manufacturer.

3.7 Firmware upgrade

Firmware upgrade is only possible for WM1-6 (non MID) type meter.

4 DIMENSIONAL DRAWINGS



5 TECHNICAL DATA

Rail mounting according DIN EN 60715

Mechanical input:

Main inputs	
Contacts capacity:	1.5 ... 16 (25) mm ²
Connection screws:	M5
Max torque:	3.5 Nm (PZ2)
Optional modules	
Contact capacity:	0.05 ... 1 (2.5) mm ²
Screws:	M3
Max torque:	0.6 Nm

Measuring input:

Type (connection):	single phase (1b)
Reference current (Iref):	5 A
Maximum current (Imax):	65 A
Minimum current (Imin):	0.25 A
Transitional current (Itr):	0.5 A
Starting current:	20 mA
Power consumption at Iref	< 0.1 VA
Voltage (Un):	230 V (±20 %)
Power consumption at Un:	< 8 VA
Nominal frequency (fn):	50 and 60 Hz

Accuracy:

Active energy and power:	class 1 (B)
Standard:	EN 62053-21, EN 50470-3
Reactive energy and power:	class 2
Standard:	EN 62053-23

LCD:

Number of digits:	8 (7+1)
Height of digits:	4.52 mm

LED:

Colour:	red
Pulse rate:	1 imp/Wh
LED on:	no load indication

Pulse output (option):

Pulse rate:	1 imp/Wh
Pulse duration:	32 ± 2 ms
Rated voltage DC:	40 V max
Switched current	40 mA max
Standard:	EN 62053-31 (A&B)

Serial communication (option):

Type:	RS485
Speed:	1200 to 19200 bit/s
Protocol:	MODBUS RTU

Optical communication:

Type:	IR
Connection:	via WM USB adapter
Speed:	19200 bit/s
Frame:	8, n, 2
Protocol:	MODBUS RTU
Address:	33 - fixed

Tariff input (option):

Rated voltage:	230 V (± 20%)
Input resistance:	450 kOhm

Safety:

Indoor meter:	yes
Degree of pollution:	2
Protection class:	II
AC voltage test:	4 kV
Installation Category:	300 Vrms cat. III
Standard:	EN 50470

Ambient conditions and EMC:

According standards for indoor active energy meters.

Temperature and climatic condition according to EN 62052-11

Ambient conditions and Safety:

According standards for indoor active energy meters.

Temperature and climatic condition according to EN 62052-11

Dust/water protection:	IP50
Operating temp. range:	-25 ... 55°C
Storage temp. Range	-40 ... 70°C
Enclosure material:	self extinguish complying UL94 V

Indoor meter:	yes
Degree of pollution:	2
AC voltage test:	4 kV
Standard:	EN 50470

EC Directives conformity:

EC Directive on Measuring Instruments 2004/22/EC

EC Directive on EMC 2004/108/EC

EC Directive on Low Voltage 2006/95/EC

EC Directive WEEE 2002/96/EC

5.1 Disposal

It is forbidden to deposit electrical and electronic equipment as municipal waste. The manufacturer or provider shall take waste equipment free of charge.

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