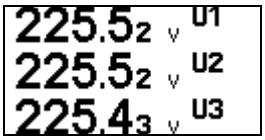
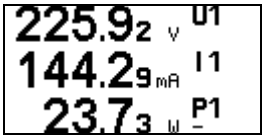
MC646/MC640 Multifunction meter

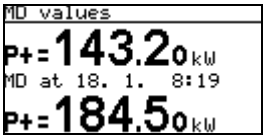
Iskra MIS

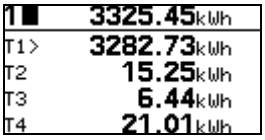
PROPERTIES

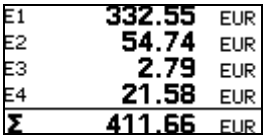
- **Measurements of instantaneous values of more than 150 quantities (U, I, P, Q, S, PF, PA, f, φ, MD, energy, energy cost by tariffs, etc.)**
- **Accuracy class 0.5**
- **Harmonic analysis of phase, phase-to-phase voltages and currents up to the 31st harmonic**
- **Measurements of 40 minimal and maximal values in different time periods**
- **32 adjustable alarms**
- **Frequency range from 16 Hz to 400 Hz**
- **RS 485 communication up to 115,200 bit/s**
- **MODBUS and DNP3 communication protocol**
- **Up to 4 (2+2) inputs or outputs (pulse outputs, alarm outputs, tariff inputs, digital inputs)**
- **Universal power supply 48-276V AC, 20-300V DC**
- **Graphical LCD 128 x 64 dots with illumination**
- **Direct 65A connection (MC646)**
- **CT 5A connection (MC640)**
- **Housing for DIN rail mounting**
- **Adjustable tariff clock, display of electric energy consumption in optional currency**
- **User-adjustable display of measurements**
- **Multilingual support**
- **User-friendly PC MiQen software**

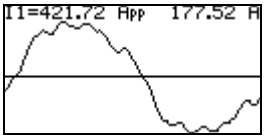


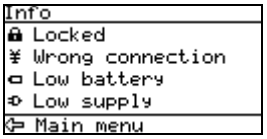












DESCRIPTION

The meter is intended for measuring, analyzing and monitoring single-phase or three-phase electrical power network. The meter measures TRMS value according to the principle of fast sampling of voltage and current signals. A built-in microprocessor calculates measurements (voltage, current, frequency, energy, power, power factor, phase angles, etc.) from the measured signals.

USE

The MC646 / MC640 multifunction meter is intended for monitoring and measuring electrical quantities of a three-phase electric-energy distribution system. The meter is provided with 32 program adjustable alarms, up to four input or output modules and communication. With the RS 485 communication the meter can be set and measurements can be checked. The meter functions also as an energy meter, with the additional function of cost management by tariffs. A tariff input or a tariff clock can be set. At tariff clock setting, four periods and four work groups as well as electric energy price for each period and work groups (16 different price periods) are available. Additionally 20 places are available for setting holidays or days when special tariff rules are valid. As an energy meter it records energy in all four quadrants and four tariffs.

COMPLIANCE WITH STANDARDS:

Standard SIST EN	Description
61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
60529	Degrees of protection provided by enclosures (IP code)
50160	Voltage characteristics of electricity supplied by public distribution systems
62052−11 62052−21	Electricity metering equipment – General requirements, tests and test conditions

DESCRIPTION OF PROPERTIES

MEASUREMENTS

- RMS values of currents and voltages
- Measurements of energy, power and power factors in all 4 quadrants
- Minimal / maximal values
- Average values of measurements per interval
- Measurement of THD values of current and voltage (from 0 to 400 %)
- Harmonic analysis of phase, phase-to-phase voltages and currents up to the 31st harmonic

ALARMS

The meter supports recording and storing of 32 alarms in four groups. A time constant of maximal values in a thermal mode, a delay time and switch-off hysteresis are defined for each group of alarms.

COMMUNICATION

The meter is equipped with RS485 communication. Communication enables transfer of instantaneous measurements, records in the memory, settings and updating. Communication supports MODBUS and DNP3 protocols.

INPUT / OUTPUT MODULES

The modules are available with double inputs/outputs. Each module has three terminals. The meter is available without, with one or with two modules. The following modules are available:

- Pulse (Alarm) output 2 outputs
- Tariff (Digital) input 2 inputs

POWER SUPPLY

The universal power supply enables connection of the meter to DC (20−300 V) or AC voltage (48−276 V / 40…70 Hz).

HANDLING THE COSTS

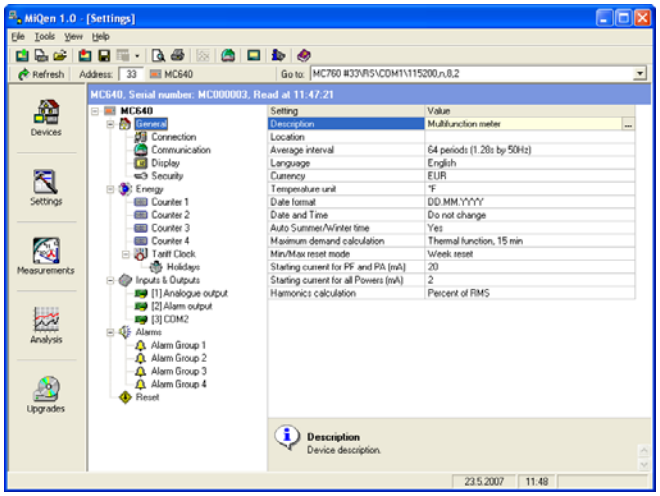
A special meter function is cost evaluation of energy (active, reactive, apparent and total) per tariffs. The meter itself enables tracing the costs in optional currency and calculates consumption by means of the adjustable tariff clock and electric energy price.

DATA DISPLAY

Data are displayed on 128 x 64 dot graphic LCD with illumination. Indication symbols on the front side that are illuminated at the communication, alarm and pulse are for additional help.

MIQEN

MiQen software is intended for supervision of the meter on PC. Network and the meter setting, display of measured and stored values and analysis of stored data in the meter are possible via the serial communication. The information and stored measurements can be exported in standard Windows formats. Multilingual software functions on Windows 98, 2000, NT, XP operating systems.



TECHNICAL DATA

INPUTS

Frequency		
Nominal frequency range	50, 60 Hz	
Measuring frequency range	16−400 Hz	
Voltage		
Nominal voltage	500 V_{L-N}	
Maximum voltage	600 V_{L-N}	
Consumption	< 0.1 VA	
Current	MC646	MC640
Nominal current	10 A	5A
Maximum current	65 A	12.5A
Consumption	< 0.1 VA	

POWER SUPPLY

Power supply	Universal
Nominal voltage AC	48−276 V
Nominal frequency	40−65 Hz
Nominal voltage DC	20−300 V
Consumption	< 5 VA

COMMUNICATION

Communication type	RS485
Connection type	Network
Connection terminals	Screw terminals
Max. connection length	1000 m
Transfer mode	Asynchronous
Protocol	MODBUS RTU, DNP3 (auto detect)
Transfer rate	2.400 to 115.200 b/s
Number of bus stations	Up to 32

INPUT / OUTPUT MODULES

Pulse (Alarm) output	
Max. voltage	40 V AC/DC
Max. current	30 mA
Pulse length	Programmable 1…999 ms
Tariff (Digital) input	
Voltage	230 or 110 VAC ±20 %
Frequency range	45…65 Hz
Max. current	< 0.6 mA

ACCURACY

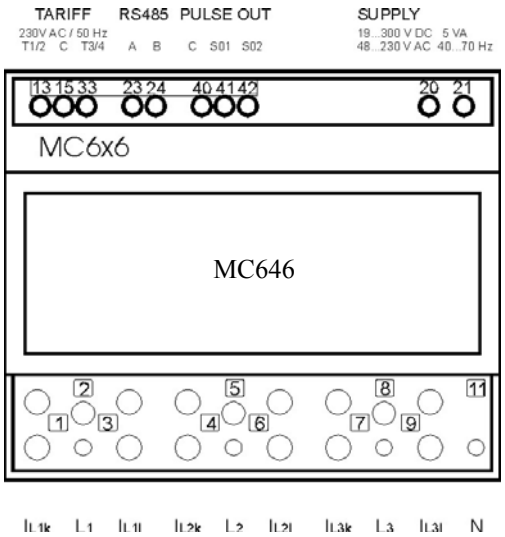
Accuracy is presented as percentage from nominal value of the measurement except when it is stated as an absolute value.

Measurement		Accuracy
Rms current (I1, I2, I3, Iavg, In)		0,5
Rms phase voltage (U1, U2, U3, Uavg)	62.5−750 V 10−500 V	0,5
Phase-to-phase voltage (U12, U23, U31, Uavg)		0,5
Active, reactive and apparent power		0,5
Frequency (f)		10 mHz
Power factor (PF)		0,5
Phase and phase-to-phase angle (φ, φ12, φ23, φ31)		0,5
THD (0…400%)		0,5
Active energy	SIST EN 62052−11	Class 1
	SIST EN 62052−21	
Real time clock (RTC)		1 min / month

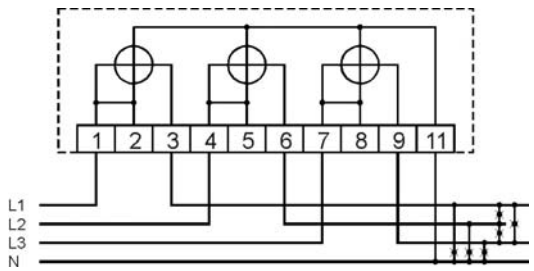
CONNECTION

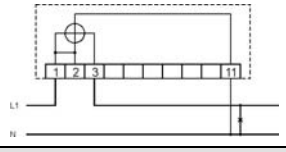
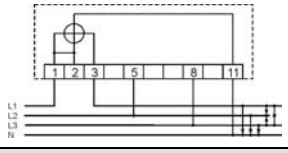
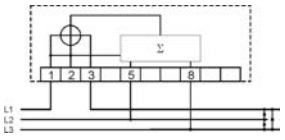
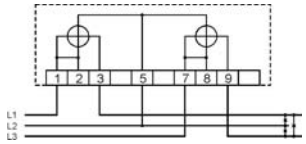
Converter voltage inputs can be connected either directly to low-voltage network or via a high-voltage transformer to high-voltage network. Current inputs up to 65A could be connected to network directly (MC646), or via corresponding current transformer (MC640).

DIRECT 65A CONNECTION (MC646)



4u − four-wire, non-uniform load

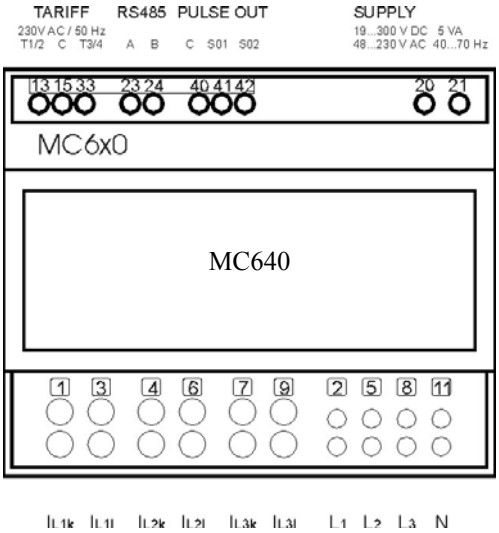


1b − single wire, uniform load	4b − four-wire, uniform load
	
3b − three-wire, uniform load	3u − three-wire, uniform load
	

TERMINALS

Connection	Max. conductor cross-sections
Voltage inputs	≤ 2.5 mm^2 without connector sleeve
Current inputs 65A	≤ 16 mm^2 without connector sleeve
Current inputs 5A	≤ 6 mm^2 without connector sleeve
Power supply	≤ 2.5 mm^2 without connector sleeve
Modules	≤ 2.5 mm^2 without connector sleeve

CT 5A CONNECTION (MC640)



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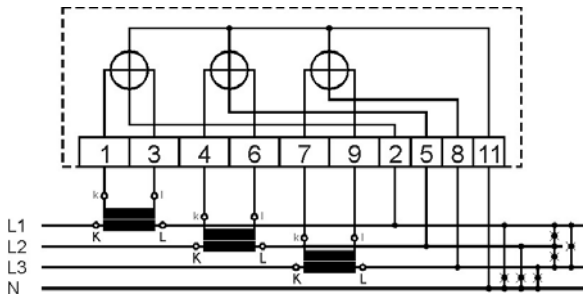

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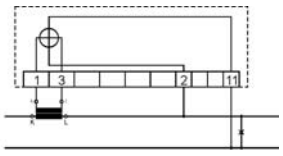	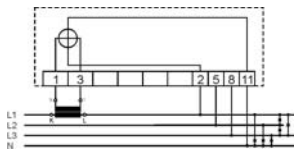
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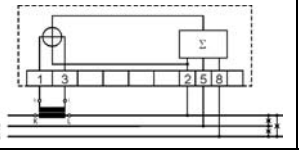
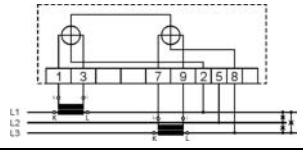
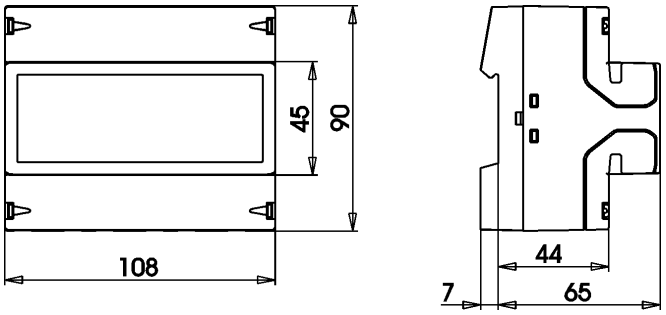
	

CONNECTION TABLE

Function		Terminals	
Measuring inputs	AC current	I1	1, 3
		I2	4, 6
		I3	7, 9
	AC voltage	U1	2
		U2	5
		U3	8
		N	11
Auxiliary power supply		+ / AC	20
		– / AC	21
Input / Output modules	Tariff input	T1/2	13
		C	15
		T3/4	33
	Pulse output	C	40
		S01	41

		S02	42
Communication RS 485		A	23
		B	24

DIMENSIONS



All dimensions are in millimeters

SAFETY FEATURES

SAFETY	In compliance with SIST EN 61010−1: 2004 600 V rms, installation category II 300 V rms, installation category III Pollution degree 2
TEST VOLTAGE	3.7 kV rms, in compliance with SIST EN 61010−1: 2004
EMC	Directive on electromagnetic compatibility 2004/108/EC In compliance with SIST EN 61326-1: 1998
PROTECTION	In compliance with SIST EN 60529: 1997 Enclosure protection: IP52 Protection for connection terminals: IP20 Protection cover against non authorized access
AMBIENT CONDITIONS	Climatic class 3 In compliance with SIST EN 62052−11: 2004 In compliance with SIST EN 62052−21: 2005
Operation temperature	−20 to +70°C
Storage temperature	−25 to +70°C
Humidity	≤ 90% r.h.
ENCLOSURE	PC Non-flammable, according to UL 94 V0
BATTERY	Type: CR2032 Li-battery Nominal voltage: 3V Life span: Approx. 6 years (23°C)
WEIGHT	Approx. 450g

ORDERING

Measuring centre:

The following data shall be stated:

- Type of a meter
- Type of a modules

Supplement:

- MiQen software (Standard or Professional edition)

ORDERING CODE

An example of a completely filled-in ordering code:

MC640 2PO 2TI-230

Meter type

MC646

MC640

Pulse output

WO Without

2PO 2 X Pulse output

Tariff input

WO Without

2TI-110 2 X Tariff input 110V

2TI-230 2 X Tariff input 230V

DICTIONARY

RMS	*Root Mean Square*
MODBUS / DNP3	*Industrial protocol for data transmission*
MiQen	*Software for Iskra instruments*
AC	*Alternating current*
PA	*Power angle (angle between current and voltage)*
PF	*Power factor*
THD	*Total harmonic distortion*
MD	*Measurement of average values in time interval*
Harmonic voltage – harmonic	*Sine voltage with frequency equal to integer multiple of basic frequency*
Hand-over place	*Connection spot of consumer installation in public network*

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