

# MC666/MC660 Network analyzer

## MC656/MC650 Network recorder

### PROPERTIES

- Evaluation of the electricity supply quality in compliance with SIST EN 50160 (MC666 / MC660)
- Measurements of instantaneous values of more than 150 quantities (U, I, P, Q, S, PF, PA, f, φ, THD, MD, energy, energy cost by tariffs, etc.)
- Accuracy class 0.5
- Harmonic analysis of phase, phase-to-phase voltages and currents up to the 63<sup>rd</sup> harmonic (MC666 / MC660), up to the 31<sup>st</sup> harmonic (MC656 / MC650)
- Recording up to 32 measurements and 32 alarms in the internal memory (8 MB flash)
- 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 (MC666 / MC656)
- CT 5A connection (MC660 / MC650)
- Housing for DIN rail mounting
- Adjustable tariff clock, display of electric energy consumption in optional currency
- Multilingual support
- User-friendly PC MiQen software

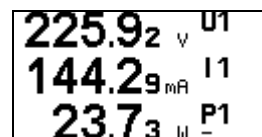
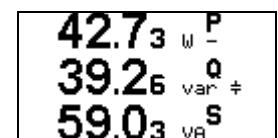
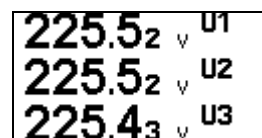
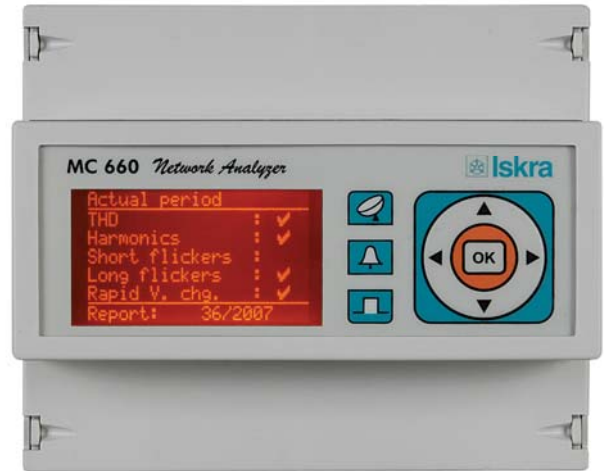
### DESCRIPTION

The meter is intended for measuring, analyzing and monitoring single-phase or three-phase electrical power network. The meter measures RMS 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, THD phase angles, etc.) from the measured signals.

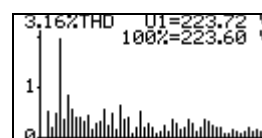
### USE

The MC666 / MC660 network analyzer is used for permanent analysis of electricity supply quality in compliance with the SIST EN 50160 standard. Reports are stored in the internal memory for the period of the last 7 years. Moreover, more than 170,000 deviations of the measurements from the standard values are stored, which enables finding eventual reasons for the problems in network. Optional limits and required quality in a monitored period can be defined for each monitored characteristic. The following characteristics are measured and recorded:

- Frequency deviations
- Voltage deviations
- Voltage dips
- Voltage interruptions
- Voltage unbalances
- Over-voltages
- Fast voltage changes
- Flicker intensity
- THD
- Harmonics



E1	332.55	EUR
E2	54.74	EUR
E3	2.79	EUR
E4	21.58	EUR
<b>Σ</b>	<b>411.66</b>	<b>EUR</b>



Info
🔒 Locked
⚠️ Wrong connection
🔋 Low battery
🔌 Low supply
⏪ Main menu

### COMPLIANCE WITH STANDARDS:

Standard	Description
SIST EN	
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	Electricity metering equipment – General requirements, tests and test conditions
62052-21	

## 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 63<sup>rd</sup> harmonic

### RECORDER

A built-in recorder (8 Mb) enables storing measurements and detected alarms. The recorder is additionally used for measurements related to the inspection of voltage quality.

### 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

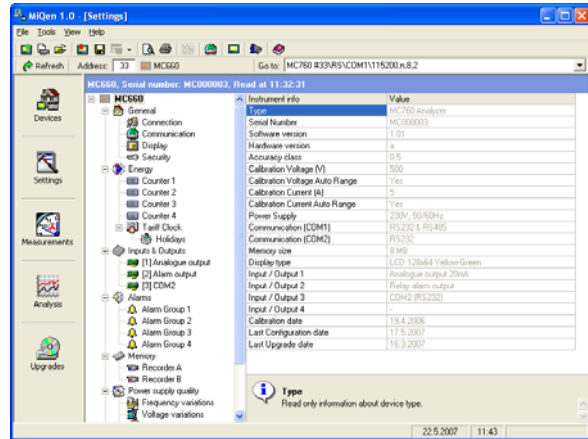
A special meter function is cost evaluation of energy (active, reactive, apparent and total) per tariffs. The meter itself enables tracing the costs in optional currency and calculates consumption by means of the adjustable tariff clock and electric energy price.

### 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

	SIST EN 62052-21	
Real time clock (RTC)		1 min / month

### INPUTS

Frequency		
Nominal frequency range	50, 60 Hz	
Measuring frequency range	16-400 Hz	
Voltage		
Nominal voltage	500 V <sub>L-N</sub>	
Maximum voltage	600 V <sub>L-N</sub>	
Consumption	< 0.1 VA	
Current	MC666/MC656	MC660/MC650
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

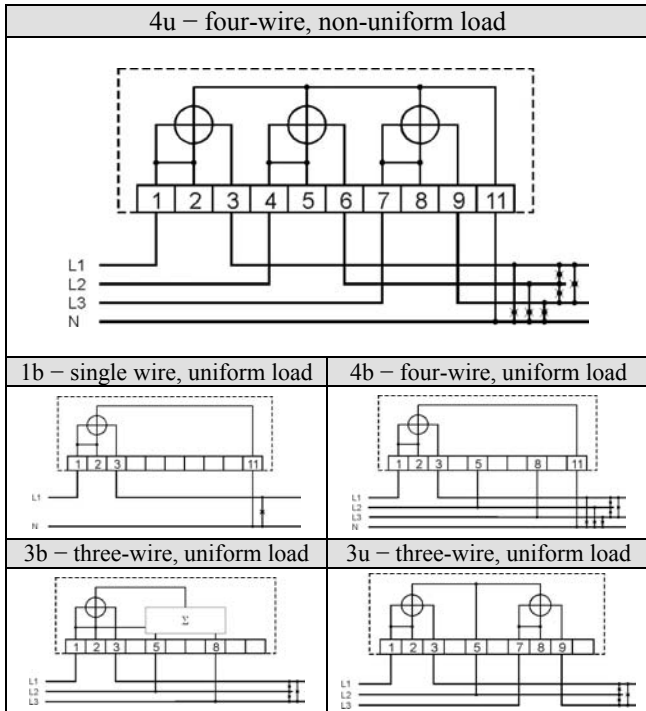
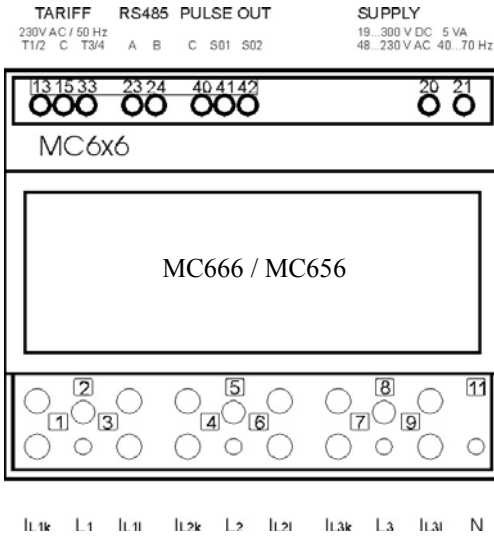
Accuracy is presented as percentage from nominal value of the measurement except when it is stated as an absolute value.

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

## 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 (MC666 / MC656), or via corresponding current transformer (MC660 / MC650).

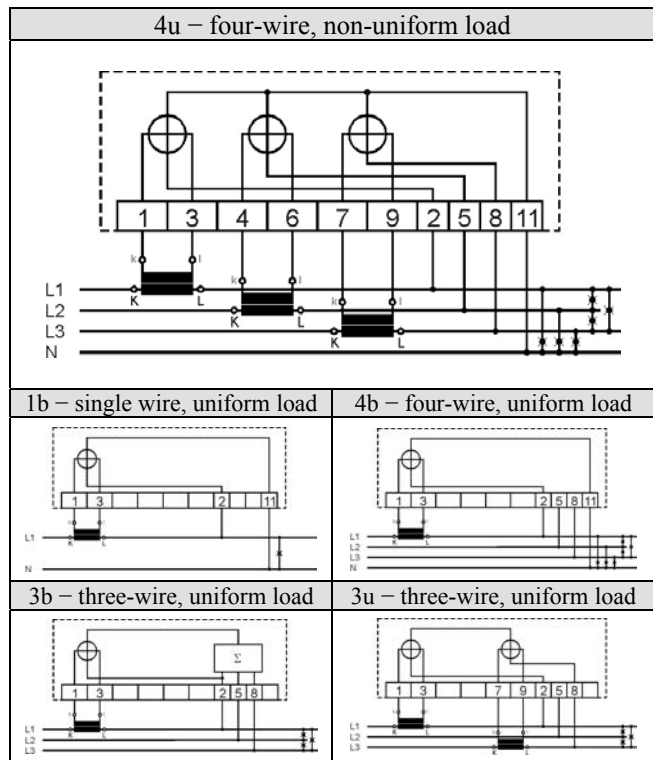
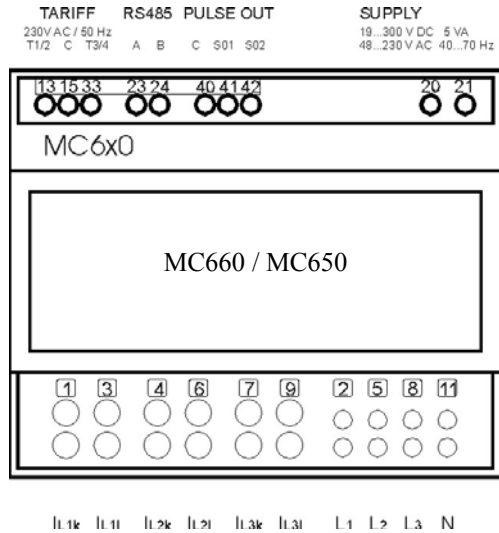
### DIRECT 65A CONNECTION (MC666 / MC656)



### TERMINALS

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

### CT 5A CONNECTION (MC660 / MC650)

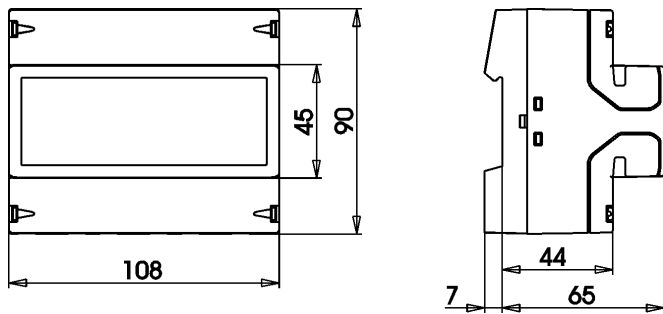


### CONNECTION TABLE

Function		Terminals	
Measuring inputs	AC current	I1	1, 3
		I2	4, 6
		I3	7, 9
	AC voltage	U1	2
		U2	5
		U3	8
Auxiliary power supply		N	11
Input / Output modules	Tariff input	+ / AC	20
		- / AC	21
		T1/2	13
	Pulse output	C	15
		T3/4	33
		C	40
	S01	41	
	S02	42	

Communication RS 485	A	23
	B	24

## DIMENSIONS



All dimensions are in millimeters

## SAFETY FEATURES

<b>SAFETY</b>	In compliance with SIST EN 61010-1: 2004 600 V rms, installation category II 300 V rms, installation category III Pollution degree 2
<b>TEST VOLTAGE</b>	3.7 kV rms, in compliance with SIST EN 61010-1: 2004
<b>EMC</b>	Directive on electromagnetic compatibility 2004/108/EC In compliance with SIST EN 61326-1: 1998
<b>PROTECTION</b>	In compliance with SIST EN 60529: 1997 Enclosure protection: IP52 Protection for connection terminals: IP20 Protection cover against non authorized access
<b>AMBIENT CONDITIONS</b>	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.
<b>ENCLOSURE</b>	PC Non-flammable, according to UL 94 V0
<b>BATTERY</b>	Type: CR2032 Li-battery Nominal voltage: 3V Life span: Approx. 6 years (23°C)
<b>WEIGHT</b>	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:

**MC660 2PO 2TI-230**

### Meter type

MC666  
MC660  
MC656  
MC650

### 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	<i>Root Mean Square</i>
Flash	<i>Type of a memory module that keep its content in case of power supply failure</i>
MODBUS / DNP3	<i>Industrial protocol for data transmission</i>
MMC	<i>Multimedia Card</i>
MiQen	<i>Software for Iskra instruments</i>
AC	<i>Alternating current</i>
PA	<i>Power angle (angle between current and voltage)</i>
PF	<i>Power factor</i>
THD	<i>Total harmonic distortion</i>
MD	<i>Measurement of average values in time interval</i>
Harmonic voltage – harmonic	<i>Sine voltage with frequency equal to integer multiple of basic frequency</i>
Hand-over place	<i>Connection spot of consumer installation in public network</i>
Flicker	<i>Voltage fluctuation causes changes of luminous</i>



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