Multimeter

MC330

Energy Meter

MC320

PROPERTIES

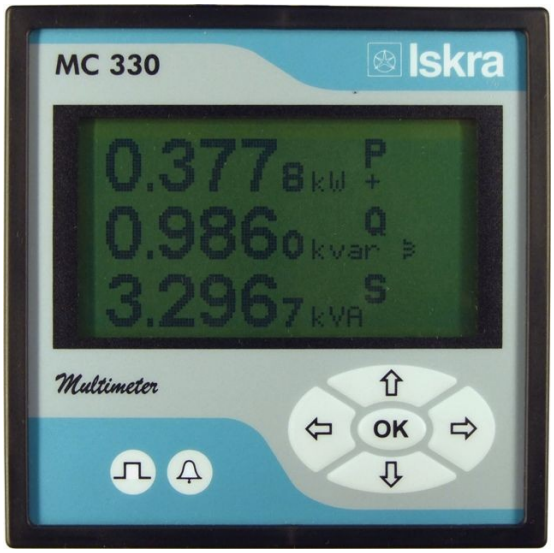
- **Measurements of instantaneous values for more than 60 quantities (U, I, P, Q, S, PF, PA, f, φ, THD, MD …) - only MC330**
- **4 Energy counters**
- **Accuracy class U, I, P 0.5 (active energy Class 1)**
- **Frequency range from 16 Hz to 400 Hz**
- **Up to 2 tariff inputs (option)**
- **Up to 2 pulse or alarm outputs (option)**
- **AC or Universal (option) power supply**
- **Graphical LCD; 128 x 64 dots with illumination**
- **Automatic range of nominal current (max. 12.5 A) and voltage (option)**
- **User-adjustable display of measurements**
- **Multilingual support (13 languages)**
- **Isolated communication RS485 or RS232 up to 115,200 bit/s or USB 2.0 (option)**
- **MODBUS communication protocol supported**
- **User-friendly PC MiQen software for setting via communication (option)**

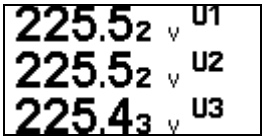
DESCRIPTION

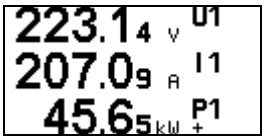
The meter is intended for measuring, analysing and monitoring of single-phase or three-phase electrical power network. The meter measure TRMS value according to the principle of fast sampling of voltage and current signals. A built-in microprocessor calculates measurands (voltage, current, frequency,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

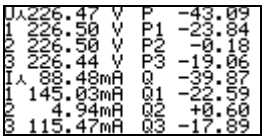
USE

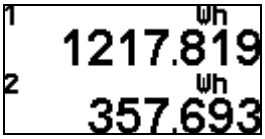
The meter is intended for monitoring and measuring electrical quantities of single and three-phase electric-energy system. The MC330 and MC320 record energy like the electricity meter in all four quadrants in up to four tariffs. Up to 2 pulse outputs or 2 tariff inputs are available for measurements control. MC330 can use pulse output as alarm output. Outputs type are available as mechanical relay or open collector outputs (S0).

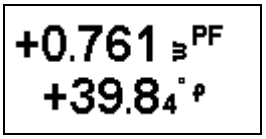


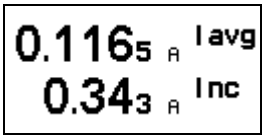












COMPLIANCE WITH STANDARDS:

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)
62052−11*	Electricity metering equipment – General requirements, tests and test conditions
62053−21*	Electricity metering equipment (a.c.) Particular requirements
62053−31	Electricity metering equipment (a.c.) Particular requirements

* − Partial compliance

DESCRIPTION OF PROPERTIES

MEASURANDS

RMS values of currents and voltages (only MC330)
Measurements of active, reactive, apparent power and power factor (only MC330)
Measurements of energy in all 4 quadrants
Average values of measurands per interval (only MC330)

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:

- Output module (relay version MC330 only) 2 outputs
- Tariff input 2 inputs

Output module is available as:
Opto output according EN62053-31:2001 (27 V, 27 mA)
Relay output in MC330 can be used for pulse output or alarm output (40 V, 1 A)

COMMUNICATION

Option is communication module for reading measured values and instrument setting. Available is RS 232 or RS 485 or USB communication type module. For USB connection is used USB B connector. Communication is galvanic separated from other circuits. For setting we suggest using MIQEN software.

SUPPLY

Standard is AC power supply enables connection of the meter to AC voltage (57.7 & 63.5 / 100 & 110 / 230 / 400).
Option is a universal power supply enables connection of the meter to DC (20−300 V) or AC voltage (48−276 V / 50 Hz).

MIQEN

MiQen software is intended for supervision of the meter on PC. It enables setting meter parameters that are transferred into the instrument via communication (option). Multilingual software functions on Windows 98, 2000, NT, XP operating systems.

DATA DISPLAY

Data are displayed on 128 x 64 dot graphic LCD with illumination (37 x 69 mm). An indication symbols on the front side are optical LED for energy flow and active alarm (MC330 only).

TECHNICAL DATA

EU DIRECTIVES:

Degree on electrical equipment designed for use within certain voltage limits **URLRS 53/00**
(Directive **2006/95/EC** on low voltage):
SIST EN 61010-1: 2002
Safety requirements for electrical equipment for measurement, control and laboratory use, part 1: General requirements
Decree on electromagnetic compatibility (EMC) **URLRS 61/00**
(Directive **2004/108/EC** on electromagnetic compatibility):
SIST EN 1326-1: 2007

SAFETY:

Protection: protection class **II**
600 V rms, installation category **II**
300 V rms, installation category **III**
pollution degree 2
in compliance with **SIST EN 61010-1**: 2002
Enclosure material: PC/ABS
incombustibility–self-extinguishability,
complying with **UL 94 V-0**
Enclosure protection: IP 52 (IP 00 for terminals)
in compliance with **SIST EN 60529**: 1997
Cutting for installation: $92^{+0,8}$ mm
Converter mass: max. 500 g

AMBIENT CONDITIONS:

Temperature range of operation: -10 to +60°C
Storage temperature range: -40 to +70°C
Average annual humidity: ≤ 75% r.h.

INPUTS

Input signals	Current	Voltage
Nominal frequency range	50, 60 Hz	
Measuring frequency range	16 −400 Hz	
Nominal value (In, Un)	1 / 5 A	75, 120, 250, 500 V $_{L-N}$
Maximal value	12.5 A	600 V $_{L-N}$
Consumption	< 0.1 VA	< 0.1 VA

POWER SUPPLY

Power supply	Universal	AC
Nominal voltage AC	48−276 V	57.7 & 63.5 / 100 &110 / 230 / 400
Nominal frequency	40−65 Hz	40−65 Hz
Nominal voltage DC	20−300 V	−
Consumption	< 3 VA	< 3 VA
Self-powered L_1	−	< 3 VA

REFERENCE CONDITIONS

Ambient temperature: −10 … 23 … 55°C
Voltage input: +/- 20% Un
Voltage input with voltage autorange 50 … 500 V
Current input 0 … 100 % In
Active/reactive power, factor: $\cos\varphi$ =1 / $\sin\varphi$ =1
Waveform: Sinus
Frequency: f_N=50 or 60 Hz

ACCURACY

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

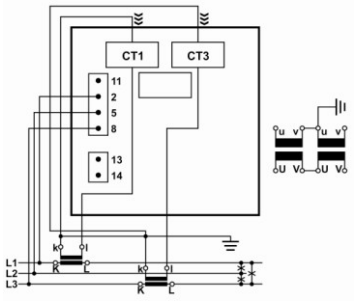
Measurand		Accuracy
Rms current (I1, I2, I3, Iavg, In, MD)		0.5
Rms phase voltage (U1, U2, U3, Uavg, MD)	25 … 600 V	0.5
Phase-to-phase voltage (U12, U23, U31, Uavg)		0.5
Frequency (f)		10 mHz
Power factor (PF)		0.5
Phase and phase-to-phase angle (φ, φ12, φ23, φ31)		0.5°

Measurand		Accuracy
Active, reactive and apparent power		0.5
Active energy	SIST EN 62053-21	Class 1
Reactive energy	SIST EN 62053-23	Class 2
Pulse output	SIST EN 62053-31	Class A & B

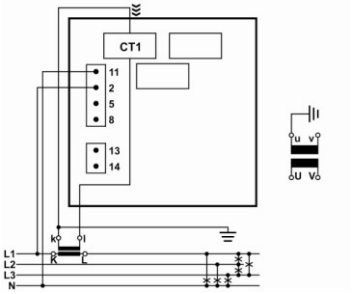
CONNECTION

Voltage inputs can be connected either directly to low-voltage network or via a high-voltage transformer to high-voltage network.

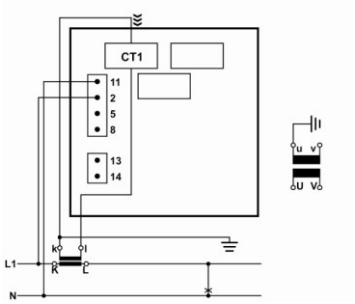
Current inputs shall be connected to network via a corresponding current transformer.



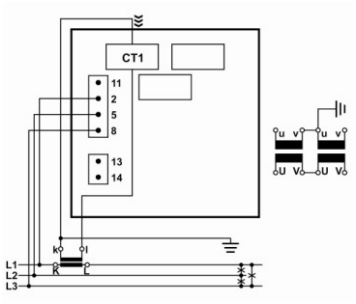
3u − thee-wire, unbalanced load



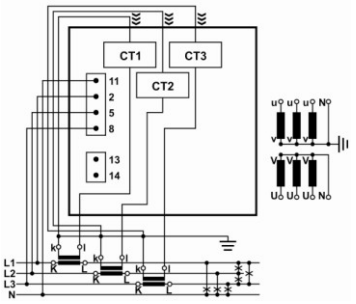
4b − four-wire, balanced load



1b − single-wire, balanced load

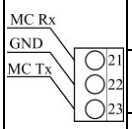


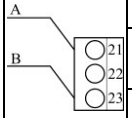
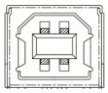
3b − three-wire, balanced load



4u − four-wire, unbalanced load

Inputs / Quantities		Terminals	
Measuring inputs:	AC current	IL1	CT1
		IL2	CT2
		IL3	CT3
	AC voltage	UL1	2
		UL2	5
		UL3	8
		N	11
Auxiliary power supply:		+ / AC_L	13
		– / AC_N	14
Input / Output modules	Output	Out −1	15
		C−12	16
		Out −2	17
	Tariff input	T 1/2	18
		C	19
		T 3/4	21

	Connector	Terminals	Position	Data direction	Description
RS232	Connector		21	MC input pin	Data reception (Rx)
			22	–	Grounding (⏚)
			23	MC output pin	Data transmission

					(Tx)
RS485	Connector		21	To/From MC	A
			22	–	Do not connect!
			23	To/From MC	B
USB	Connector			To/From MC	USB B

DIMENSIONAL DRAWING

TERMINALS

Connection	Max. conductor cross-sections
Voltage inputs (4)	≤ 2.5 mm^2; one conductor
Current inputs (3)	≤ Ø 6 mm; one conductor with insulation
Power supply (2)	≤ 2.5 mm^2; one conductor
Modules (2 x 3)	≤ 2.5 mm^2; one conductor

DATA FOR ORDERING

Measuring centre:

The following data shall be stated:
Type of a meter
Voltage range
Type of power supply
Type of a module
Communication

Supplement:

MiQen software

ORDERING

When ordering the meter, all required specifications shall be stated in compliance with the ordering code.
The meters automatic range of input current (up to 5 A) is not stated in the code.

EXAMPLE OF ORDERING:

The MC3X0 meter is connected to secondary phase voltage up to 500 V_{L-N} and 5 A secondary current. A universal supply and two modules are built-in the meter. The first module is an relay output and the second one is a tariff input. Meter is without communication and calibration frequency 50, 60 Hz.

Ordering code:
MC330-AV-EDC/AC-2RO-2TI-WO

GENERAL ORDERING CODE

All specifications are obligatory
An example of a completely filled-in ordering code:

MC330-240V-EDC/AC-2RO-2TI-RS485-f

Meter type
MC330
MC320

Voltage range (Uln)
AV automatic range 50…500 V
63 V 57.7 V and 63.5 V
100 V 110 V
240 V 230 V and 240 V

Power supply
EDC/AC Universal
E57/63 V 57.7 V / 63.5 V AC
E100/110 V 100 V/ 110 V AC
E230/240 V 230 V / 240 V AC
E400 V 400 V AC

Module 1 (Optional)
WO Without
2S0 2 X pulse output
2RO 2 X Relay output (MC330 only)

Module 2 (Optional)
WO Without
2TI 2 X Tariff input

Comm. RS485 or RS232 module (Optional)
WO Without
RS485 RS485 communication
RS232 RS232 communication
USB USB communication

Calibration frequency *
Blank 50, 60 Hz (default)
f16 16 2/3 Hz
f400 400 Hz

* Calibration frequency is valid only for measuring inputs and not for power supply.

Dictionary:

RMS	*Root Means Square*
PA	*Power angle (between current and voltage)*
PF	*Power factor*
MiQen	*Software for MC meters*
AC	*Alternating quantity*

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Printed in Slovenia • Subject to change without notice • Version 6.04 / Jan-2013 • GB P 22.444.000