



## *Measuring centers MC7x0 series*

### **Network Recorder - MC750 TH**

- Measurements of instantaneous values of more than 140 quantities (U, I, P, Q, S, PF, PA, f,  $\phi$ , THD, MD, energy, energy cost by tariffs, etc.)
- Harmonic analysis of phase, phase-to-phase voltages and currents up to the 63rd harmonic
- Recording up to 64 measurands and 32 alarms in the internal memory (8 MB flash)
- 32 adjustable alarms
- RS 232/RS 485 communication up to 115,200 bit/s or Ethernet/USB communication
- Up to 4 inputs or outputs (analogue, pulse, relay and watchdog outputs, digital, tariff, pulse and analogue inputs)

## PROPERTIES

- Measurements of instantaneous values of more than 140 quantities (U, I, P, Q, S, PF, PA, f,  $\phi$ , THD, MD, energy, energy cost by tariffs, etc.)
- Active energy class 0.5S
- Harmonic analysis of phase, phase-to-phase voltages and currents up to the 63rd harmonic
- Recording up to 64 measurands 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 232/RS 485 communication up to 115,200 bit/s or Ethernet/USB communication
- MODBUS and DNP3 communication protocol
- Memory card (MMC or SD) for data transmission, setting and upgrading
- Up to 4 inputs or outputs (analogue, pulse, relay and watchdog outputs, digital, tariff, pulse and analogue inputs)
- Additional communication port (COM2)
- Universal or AC power supply
- Graphical LCD; 128 x 64 dots with illumination
- Automatic range of nominal current and voltage (max. 12.5 A and 750 V)
- Adjustable tariff clock, display of electric energy consumption in optional currency
- Multilingual support
- User-friendly PC MiQen software
- Extension unit with analogue outputs – EX104 (up to 4 modules with 4 analogue outputs)

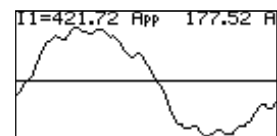
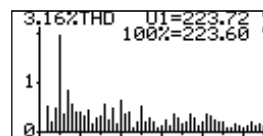
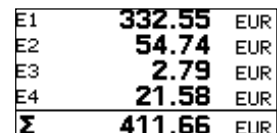
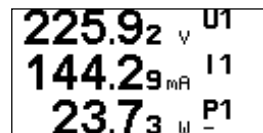
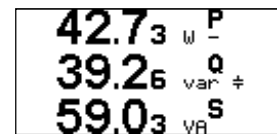
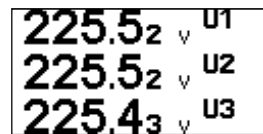
## DESCRIPTION

The meter is intended for measuring, analysing 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 measurands (voltage, current, frequency, energy, power, power factor, THD phase angles, etc.) from the measured signals.

## USE

**MC750 TH** is intended for monitoring, measuring and recording of electrical quantities of a three-phase electric-energy distribution system. The meter is provided with 32 adjustable alarms, 8MB flash recorder (up to 64 measurands and 32 alarms), up to four input or output modules and communication. With the RS 232/RS 485 or Ethernet/USB communication the meter can be set, measurements checked and stored data downloaded. The meter functions also as an electricity 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 a work group (16 different price periods) are available. Additionally, 20 places are available for setting holidays or days when special tariff rules are valid.

As an electricity meter it records energy in all four quadrants in four tariffs.



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

## COMPLIANCE WITH STANDARDS

Standard EN	Description
61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
60529	Degrees of protection provided by enclosure (IP code)
62052-11*	Electricity metering equipment – General requirements, tests and test conditions
62053-21*	Electricity metering equipment (a.c.) Particular requirements
62053-22*	Electricity metering equipment (a.c.) Particular requirements
62053-23*	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
- Measurements of energy, power and power factors in all 4 quadrants
- Minimal / maximal values
- Average values of measurands 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 63rd harmonic

### RECORDER

A built-in recorder (8Mb) enables storing of up to 64 measurements and detected alarms (up to 32).

### ALARMS

Up to 32 alarms divided in four groups can be set. A time constant of maximal values in a thermal mode, a delay time and switch-off hysteresis are defined for each group of alarms. Alarms can be recorded and can trigger relay output and beeper.

### COMMUNICATION

The meter is equipped with RS232 and RS485 (DB9 or terminal connection), Ethernet (RJ-45 terminal) and USB (USB-B type) or USB (USB-A type) communication. Communication enables transfer of instantaneous measurements, records from the memory, settings and updating. Communication supports MODBUS and DNP3 protocols.

### MEMORY CARD

The meter is provided with a slot for a full size MMC or SD\* (128 MB to 2 GB) memory card formatted to FAT16. It is used for transfer of measurements from the internal memory, meter setting and software updating.

\* - MMC and compatible SD memory cards are supported. Order at *Iskra, d.d.* to assure functionality.

## 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:

- Relay output 2 outputs
- Analogue output 2 x 20 mA outputs
- Pulse output 2 outputs
- Bistable alarm output 1 output
- Analogue input 2 inputs
- Pulse input 2 inputs
- Digital input 2 inputs
- Tariff input 2 inputs
- Additional communication port (COM2) 1 port
- Communication port for analogue extender EX104 1 port

### ANALOGUE EXTENDER EX104 (ACCESSORY)

If there is a demand for additional analogue outputs analogue extender EX104 can be used.

It is a standalone unit, connected to meter via module 2 (module needs to be – Communication port for analogue extender EX104). Up to 4 units with 4 analogue outputs can be used on one meter. More information can be found on Analogue extender EX104 datasheet.

### SUPPLY

Power supply connection of the meters is adaptive. A universal power supply enables connection of the meter to DC (20–300 V) or AC voltage (48–276 V 40 ... 70 Hz).

AC power supply enables connection of the meter to AC voltage.

### HANDLING THE COSTS

A special meter function is cost evaluation of energy (active, reactive 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.

### MIQEN

MiQen software is intended for supervision of the meter on PC. Network and the meter setting, display of measured, stored values and analysis of data from the meter are possible via serial or Ethernet communication. The information and stored measurements can be exported in standard Windows formats. Multilingual software functions on Windows 8, 7, XP, NT, 2000 operating systems. MiQen can be downloaded from *Iskra, d.d.* webpage [www.iskra.eu](http://www.iskra.eu).

### DATA DISPLAY

Data are displayed on 128 x 64 dot graphic LCD with illumination (37 x 69 mm). Indication symbols on the front side are optical LEDs indicating energy flow, access to memory card and active alarm.

## TECHNICAL DATA

### EU DIRECTIVES

Directive **2014/35/EU** on low voltage.  
 Directive **2014/30/EU** on electromagnetic compatibility.  
 Directive on RoHS **2011/65/EU**.

### SAFETY

Protection: protection class II  
**600 V rms**, installation category II  
**300 V rms**, installation category III  
 pollution degree 2  
 in compliance with **EN 61010-1**

Enclosure material: PC/ABS  
 incombustibility or self-extinguishability  
 in compliance with **UL 94 V-0**

Enclosure protection: IP 52 (IP 20 for terminals)  
 in compliance with **EN 60529**

Cutting for installation: 92<sup>+0,8</sup> mm

Converter mass: approx. 600 g

### AMBIENT CONDITIONS

Climatic class: 3  
 in compliance with **EN 62052-11**  
 in compliance with **EN 62052-21**

Temperature range of operation: -10 to +65°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 range (In, Un)	1 / 5 A	75, 120, 250, 500 V <sub>L-N</sub>
Maximal value	12.5 A	600 V <sub>L-N</sub>
Consumption	< 0.1 VA	< 0.1 VA

### ACCURACY

Accuracy is presented as percentage from range except when it is stated as an absolute value.

Measurand	Accuracy	
Rms current (I1, I2, I3, Iavg, In)	0.5	
Rms phase voltage (U1, U2, U3, Uavg)	0.5	
Phase-to-phase voltage (U12, U23, U31, Uavg)	0.5	
Frequency (f)	0.02	
Power factor (PF)	1	
Phase and phase-to-phase angle (φ, φ12, φ23, φ31)	0.5°	
THD	0.5	
Active power	0.5	
Reactive power	1	
Apparent power	0.5	
Measurand	Standard	Accuracy
Active energy	EN 62053-22	Class 0.5S
Reactive energy	EN 62053-23	Class 2
Pulse output	EN 62053-31	Class A & B

### POWER SUPPLY

Power supply	Universal	AC
Nominal voltage AC	48-276 V	57.7 / 63.5 / 100 / 110 / 230 / 400 / 500... V
Nominal frequency	40-70 Hz	40-65 Hz
Nominal voltage DC	20-300 V	-
Consumption	< 12 VA	< 8 VA

### REAL TIME CLOCK (RTC)

RTC accuracy 1 min/month (30 ppm)  
 To enable clock operation backup battery or supercap is built-in.  
 Supercap life span approx. 2 days  
 Battery life span approx. 6 years (at 23°C)

### REFERENCE CONDITIONS

Ambient temperature: -10 ... 23 ... 65°C  
 Input: 0...100 % Un  
 (connected to a measuring transformer) 0...100 % In  
 Active/reactive power, factor: cosφ = 1 / sinφ = 1  
 Waveform: Sinus

### COMMUNICATION TYPES

	Ethernet	RS485	RS232	USB
Type of connection	Network		Direct	
Max. conn. length	-	1000 m	3 m	5 m
Terminals	RJ-45	DB9 female connector or screw terminals		USB-B type
Insulation	3.7 kV rms., 1 minute between terminals and other circuits			
Transfer mode	Asynchronous			
Protocol	MODBUS RTU / DNP3			
Transfer rate	10/100 Mb/s autodetect	2.400 to 115.200 bit/s		Full speed USB 2.0

### TERMINALS DIMENSIONS

Connection	Max. conductor cross-sections
Voltage inputs (4)	≤ 2.5 mm <sup>2</sup> ; one conductor
Current inputs (3)	≤ ∅ 6 mm; one conductor with insulation
Power supply (2)	≤ 2.5 mm <sup>2</sup> ; one conductor
Modules (2 x 3)	≤ 2.5 mm <sup>2</sup> ; one conductor

### CONNECTION TERMINALS AND MARKINGS

Inputs / Quantities		Terminals		
Measuring inputs:	AC current	IL1	1	3
		IL2	4	6
		IL3	7	9
	AC voltage	UL1	2	
		UL2	5	
		UL3	8	
N		11		
Auxiliary power supply:		+ / AC	13	
		- / AC	14	
Input / Output modules	Module 1	I/O-1	15	
		C-1/2	16	
		I/O-2	17	
		I/O-3	18	
	Module 2	C-3/4	19	
		I/O-4	21	

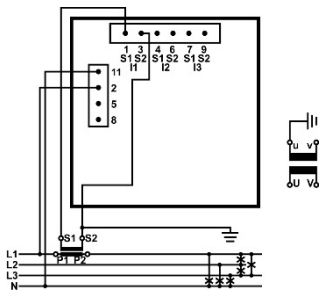
**COMMUNICATION TERMINALS**

Communication		Terminals	
RS232	DB9 female or screw terminals	Rx	3
		⏏	5
		Tx	2
RS485		B	7
		A	8
Ethernet		RJ-45	TD+
	TD-		2
	RD+		3
	RD-		6
USB	USB-B type	-	-
RS232 (module 2)	Screw terminals	Rx	27
		⏏	26
RS485 (module 2)		A	23
		B	24
RS485 for EX104 (module 2)		A	23
		B	24

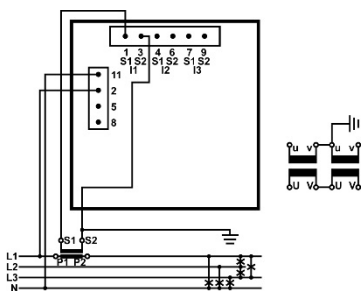
**CONNECTION**

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

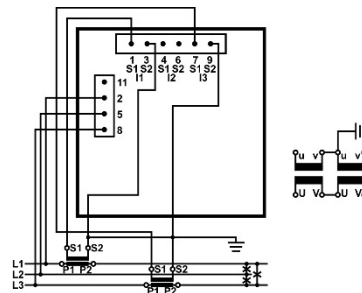
Current inputs shall be connected to network via a corresponding current transformer.



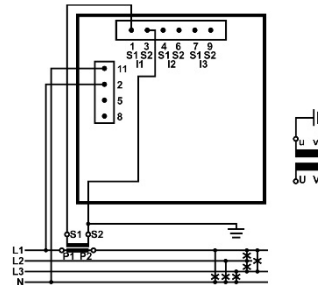
1b (1W1b) – single phase connection



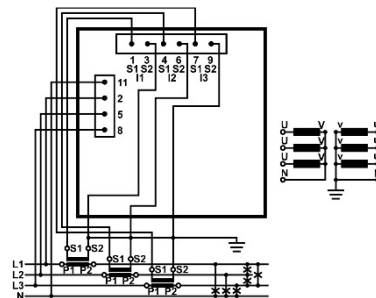
3b (1W3b) – Three phase, three wire connection with balanced load



3u (2W3u) – Three phase, three wire connection with unbalanced load

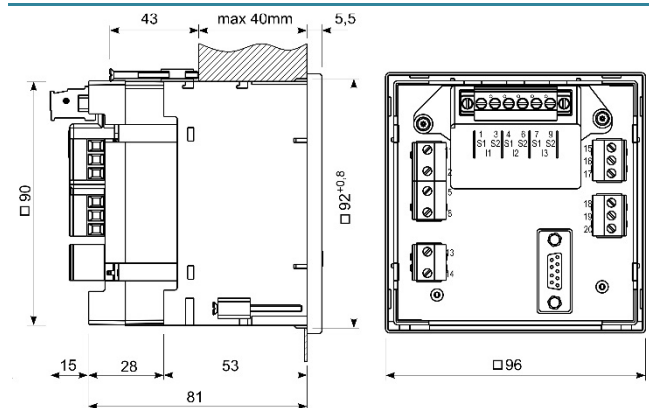


4b (1W4b) – Three phase, four wire connection with balanced load



4u (1W4u) – Three phase, four wire connection with unbalanced load

**DIMENSIONAL DRAWING**



**DATA FOR ORDERING**

General ordering code

The following specifications shall be stated:

Device type	Accuracy class	Nominal frequency	Aux. power supply	Com. Type (COM1)	I/O 1&2 module 1	I/O 3&4 module 2	RTC back. supply	Comment
MC750 TH	X	X	X	X	X	X	X	
							X Supercap C Battery *	
								Not available for Nominal freq. 16 2/3 Hz
								A 2x Analogue output S 2x Pulse output M 2x Relay (alarm) output B 1x Bistable Relay (alarm) output I 2x Analogue input (mADC) U 2x Analogue input (VDC) R 2x Analogue input (R/Temp.) D 2x Digital input (230 VAC/DC) E 2x Digital input (75...110 VAC/DC) F 2x Digital input (5...48 VAC/DC) P 2x Pulse input (5...48 VDC) T 2x Tariff input (230 VAC/DC) I/O1&2 module 1 only Z 2x Tariff input (75...110 VAC/DC) I/O1&2 module 1 only Y 2x Tariff input (5...48 VAC/DC) I/O1&2 module 1 only W 1x Status (Watchdog) + 1x Relay (alarm) output G COM2 – RS232 I/O3&4 module 2 only C COM2 – RS485 I/O3&4 module 2 only X Comm. port for analogue extender EX104 I/O3&4 module 2 only N Without *
								R RS232/485 (DB9 connector) * T RS232/485 (Screw terminals) E Ethernet & USB U USB
								U Universal * A 57.7 V AC B 63.5 V AC C 100 V AC D 110 V AC E 230 V AC F 400 V AC G 500 V AC
								S 50, 60 Hz * A 400 Hz B 16 2/3 Hz
								H Class 0.5S
MC750 TH								Network recorder

\* - Default value

Nominal frequency is valid only for measuring inputs and not for power supply

*Printed in Slovenia • Subject to change without notice • Version 2.02 / Oct-2016 • GB P 22.440.000*



**Iskra, d.d.**

Stegne 21

SI-1000 Ljubljana

Slovenia

Tel.: +386 1 51 31 000

Fax: +386 1 51 11 532

[www.iskra.eu](http://www.iskra.eu)

[info@iskra.eu](mailto:info@iskra.eu)