MC740 – Multifunction Meter

Iskra MIS

PROPERTIES

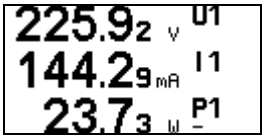
- **Measurements of instantaneous values of more than 130 quantities (U, I, P, Q, S, PF, PA, f, φ, MD, energy, energy cost by tariffs, etc.)**
- **Accuracy class 0.5 (optional 0.2)**
- **Measurements of 40 minimal and maximal values in different time periods**
- **32 adjustable alarms**
- **Frequency range from 16 Hz to 400 Hz**
- **RS 232/RS 485 communication up to 115,200 bit/s or Ethernet communication**
- **MODBUS and DNP3 communication protocol**
- **MMC for meter setting and upgrading**
- **Up to 4 inputs or outputs (analogue outputs, pulse outputs, alarm outputs, tariff 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**
- **User-adjustable display of measurements**
- **Multilingual support**
- **User-friendly PC MiQen software**

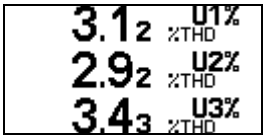
DESCRIPTION

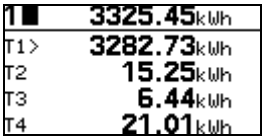
The meter is intended for measuring, analysing and monitoring single-phase or three-phase electrical power network. The meter records TRMS value according to the principle of fast sampling of voltage and current signals. A built-in microprocessor calculates measurands (voltage, current, frequency, energy,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

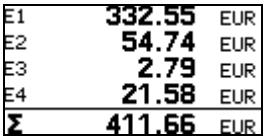
USE

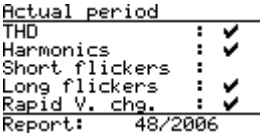
The MC740 multifunction meter is intended for monitoring and measuring electrical quantities of a three-phase electric-energy distribution system. The meter is provided with 32 program adjustable alarms, up to four input or output modules and communication. With the RS 232/RS 485 or Ethernet communication the meter can be set and measurements can be checked. 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.

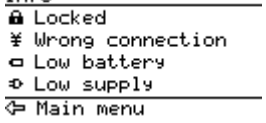












COMPLIANCE WITH STANDARDS:

Standard SIST EN	Description
61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
61036*	Alternating current static watt-hour meters for active energy
61268*	Alternating current static var-hour meters for reactive energy
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

* − 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 %)

ALARMS

The meter records and stores 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 RS232 and RS485 communication via the DB9 terminal or Ethernet communication via the RJ-45 terminal. Communication enables transfer of instantaneous measurements and updating. Communication supports MODBUS and DNP3 protocols.

MMC

The meter is provided with a slot for a full size MMC (128Mb to 512Mb). It is used for the meter setting and software updating.

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:

- Alarm output 2 outputs
- Analogue output 2 x 20 mA outputs
- Pulse output 2 outputs
- Tariff input 2 inputs
- Bistable alarm output 1 output
- Additional communication port (COM2)

SUPPLY

Power supply connection of the meters (MC) is adaptive. A universal power supply enables connection of the meter to DC (20−300 V) or AC voltage (48−230 V / 50 Hz).
AC power supply enables connection of the meter to AC voltage (57.7 / 63.5 / 100 / 110 / 230 / 400 / 500 V).

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, and display of measured values are possible via the serial or Ethernet communication. 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). Indication symbols on the front side that are illuminated at the access to MMC, communication and alarm are of additional help.

TECHNICAL DATA

EU DIRECTIVES:

Decree on electrical equipment designed for use within certain voltage limits **URLRS 53/00**
(Directive **73/23/EEC** 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 **89/336/EEC** on electromagnetic compatibility):
SIST EN 61036 item 4.5: 1998
Meters for active energy (classes 1and 2).

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: approx. 600 g

AMBIENT CONDITIONS:

- Climatic class: 3
  in compliance with **SIST EN 62052−11**: 2004
  in compliance with **SIST EN 62052−21**: 2005
- 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 (In, Un)	5 A	500 V_{L-N}
Maximal vale	12.5 A	750 V_{L-N}
Consumption	< 0.1 VA	< 0.1 VA

POWER SUPPLY

Power supply	Universal	AC
Nominal voltage AC	48−230 V	57.7 / 63.5 / 100 / 110 / 230 / 400 / 500 V
Nominal frequency	40−65 Hz	40−65 Hz
Nominal voltage DC	20−300 V	−
Consumption	< 5 VA	< 7 VA

AUXILIARY BATTERY

An auxiliary battery is built in the meter for the real time clock operation. The battery shall be replaced by the authorised service.

- Type CR2032 Li-battery
- Nominal voltage 3 V
- Life span approx. 6 years (typical 23°C)

REFERENCE CONDITIONS

- Ambient temperature: −10, 22 and 55°C
- Input: 0…100 % Un
  (connected to a measuring transformer) 0…100 % In
- Active/reactive power, factor: cosφ =1 / sinφ =1
- Sine form: Sinus

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)		0.5 (optional 0.2)
Rms phase voltage (U1, U2, U3, Uavg)	62.5−750 V	<0.5 (optional 0.2)
	10−500 V	0.5 (optional 0.2)
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
THD	0…400 %	0.5

Measurand		Accuracy
Active, reactive and apparent power		0.5 (optional 0.2)
Active energy	SIST EN 61036	Class 1
Reactive energy	SIST EN 61268	Class 2

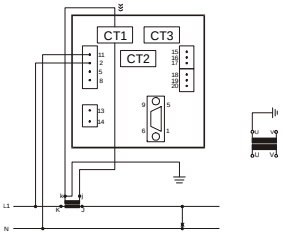
REAL TIME CLOCK (RTC):

RTC accuracy 1 min/month (30 ppm)

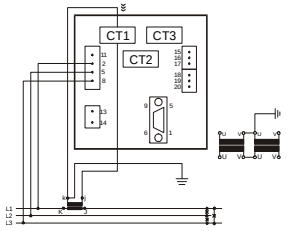
CONNECTION

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

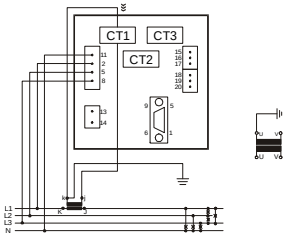
Current inputs shall be connected to network via a corresponding current transformer.



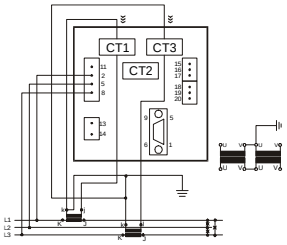
1b − single-wire, uniform load



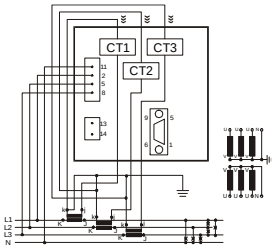
3u − three-wire, uniform load



4b − four-wire, uniform load



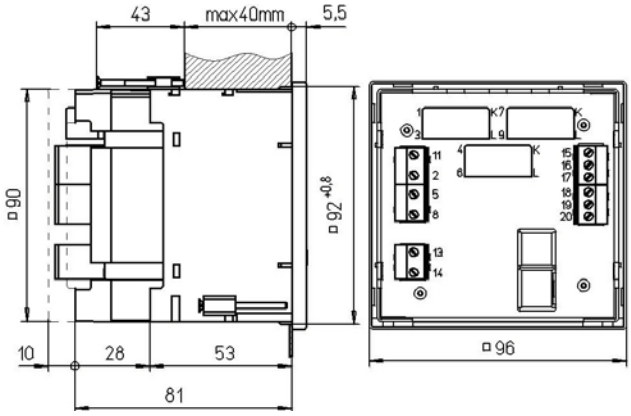
3b − three-wire, non-uniform load



4u − four-wire, non-uniform load

Inputs / Quantities		Terminals	
Measuring inputs:	AC current	IL1	TT1
		IL2	TT2
		IL3	TT3
	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−12	16
		I/O−2	17
	Module 2	I/O−3	18
		C−34	19
		I/O−4	21

DIMENSIONAL DRAWING



TYPE OF COMMUNICATION

Communication		Terminals	
DB9 female	RS 232	Rx	3
		#	5
		Tx	2
	RS 485	B	7
		A	8
RJ-45	Ethernet	TD+	1
		TD−	2
		RD+	3
		RD−	6
Screw terminals (COM2)	RS 232	Rx	18
		#	19
		Tx	20
	RS 485	B	20
		A	18

TERMINALS

Connection	Max. conductor cross-sections
Voltage inputs (4)	≤ 5 mm^2; one conductor
Current inputs (3)	≤ Ø 6 mm; one conductor with insulation
Power supply (2)	≤ 2.5 mm2; one conductor
Modules (2 x 3)	≤ 2.5 mm2; one conductor

COMMUNICATION CONNECTION

	Ethernet	RS 232	RS 485
Type of connection	Direct		Network
Max. connection length	-	3 m	1000 m
Terminals	RJ-45	DB9 female	
Insulation	3.7 kV rms., 1 minute between terminals and other circuits		
Transfer mode	Asynchronous		
Protocol	MODBUS RTU / DNP3		
Transfer rate	10/100Mb/s autodetect	1.200 do 115.200 bit/s	

DATA FOR ORDERING

Measuring centre:

The following data shall be stated:

- Type of a meter
- Type of power supply
- Type of communication
- Type of a module(s)
- MMC (option)

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 t 5 A) and voltage (up to 500 V_{L-N}) is not stated in the code.

EXAMPLE OF ORDERING:

The MC740 multifunction meter is connected to secondary phase voltage up to 500 V_{L-N} and 5 A secondary current. A universal supply is built-in the meter. RS 232/RS 485 communication and two modules are applied. The first module is an alarm output and the second one is a pulse output. A memory card with 1GB capacity is also ordered.

Ordering code:
MC740−EDC/AC−RS−2AL 2PO−1G

GENERAL ORDERING CODE

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

MC740−EDC/AC−RS−2AL 2PO−1G

Meter type

MC740

Power supply

EDC/AC	Universal
E57,7V	57.7 V AC
E63,5V	63.5 V AC
E100V	100 V AC
E110V	110 V AC
E230V	230 V AC
E400V	400 V AC
E500V	500 V AC

Communication (COM1)

RS	RS 232 / RS 485
E	Ethernet

Module 1 / Module 2

WO	Without
2AL	2 X Alarm output
2AN	2 X Analogue output
2PO	2 X Pulse output
2TI	2 X Tariff input
1BAL	1 X Bistable alarm output
2DI	2 X Digital input
RS2	1 X RS 232 (COM2) – only module 2
RS4	1 X RS 485 (COM2) – only module 2

MMC (option) 1GB

Dictionary:

RMS	*Root Mean Square*
PA	*Power angle (between current and voltage)*
PF	*Power factor*
THD	*Total harmonic distortion*
MD	*Measurement of average values in time interval*
Ethernet	*IEEE 802.3 data layer protocol*
MODBUS / DNP3	*Industrial protocol for data transmission*
MMC	*MultiMedia Card*
MiQen	*Software for MC meters*
AC	*Alternating quantity*
RTC	*Real Time Clock*

TÜV SÜD Management Service

CE

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