MULTIFUNCTION METER MC 740

- Measurements of instantaneous values of more than **140 quantities**.
- **Class S** measuring accuracy according to EN61000-4-30.
- Voltage and current auto range measurements up to **1000 V_{RMS}, 12.5 A**.
- Wide frequency measurement range **16 Hz – 400 Hz**.
- Up **to three independent communication ports**.
- Support for **NTP real time synchronisation**.
- Up to **4 inputs/ouputs**.

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NOTE!

This data sheet is valid for the ***MC 740 Multifunctional meter*** with hardware version D.

FEATURES

- Measurements of instantaneous values of more than 140 quantities (U, I, P, Q, S, PF, PA, f, ϕ, THD, MD, energy, energy cost by tariffs, etc.).
- Measuring methods accuracy is class S (0.2%) according to EN61000-4-30.
- Four quadrant energy measurement with class 0.5 S for active and 1 for reactive energy (8 programmable energy counters, up to four tariffs, tariff clock, etc.).
- Automatic range selection of 3 current and 4 voltage channels (max. 12.5 A and 1000 V_{RMS}) with 32 kHz sampling rate.
- Measurements of 40 minimal and maximal values in different time intervals (from 1 period to 256 periods).
- Frequency range from 16 Hz to 400 Hz.
- Up to three independent communication ports (RS232 or RS485 up to 115,200 bit/s, Ethernet and USB 2.0).
- MODBUS and DNP3 communication protocols.
- Support for NTP real time synchronisation.
- Memory card (MMC or SD) for meter setting and upgrading.
- Universal or AC power supply.
- Graphical LCD; (128 x 64) dots with illumination.
- Up to 4 inputs or outputs (analogue, pulse, relay and watchdog outputs, digital, tariff, pulse and analogue inputs).
- Multilingual support.
- 96 mm square panel mounting.
- User-friendly PC MiQen software.
- Extension unit with four configurable analogue outputs – EX104 (0.4 mA_{DC} … 20 mA_{DC}, 0 V_{DC} … 10 V_{DC}).

DESCRIPTION

MC 740 is an important device for permanent monitoring measuring and analysing 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.

MC 740 performs measurements in compliance with regulatory requested standard EN 61000-4-30.

With the RS232/RS485 or Ethernet/USB communication the meter can be set and measurements checked.

APPLICATION AND BENEFITS

MC 740 Multifunctional meter is intended for monitoring and measuring of electrical quantities of a three-phase electric-energy distribution system.

Identifying relevant fixed measuring points is the most important task prior to complete system installation. This system itself will not prevent disturbances in network but it will help diagnose their origin and effects. This is possible only with system approach by using time synchronized meters with wide range of measuring parameters.

COMPLIANCE WITH STANDARDS

MC 740 Multifunctional meter follows required procedures and meets the precision requirements for class S measuring device as described in standard IEC EN 61000-4-30.

Standard EN	*Description*
61010-1: 2010	*Safety requirements for electrical equipment for measurement, control and laboratory use.*
61557-12:2008	*Electrical safety in LV distribution systems up to 1 kV a.c. and 1.5 kV d.c. – Combined performance measuring and monitoring devices for electrical parameters.*
62053-21*	*Electricity metering equipment (a.c.) Particular requirements.*
*62053-22:2003**	*Electricity metering equipment - Static meters for active energy (classes 0.2 S and 0.5 S).*
*62053-23:2003**	*Electricity metering equipment - Static meters for reactive energy (classes 2 and 3).*
61326-1:2006	*EMC requirements for electrical equipment for measurement, control and laboratory use.*
60529:1997/A1:2000	*Degrees of protection provided by enclosures (IP code).*
*62052–11**	*Electricity metering equipment – General requirements, tests and test conditions.*
62053-31	*Electricity metering equipment (a.c.) Particular requirements.*

Table 1: *List of applicable standards*

**** – Partial compliance***

DESCRIPTION OF PROPERTIES

Measurands

- TRMS 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.

Memory card

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

* - Please note that not all SD memory cards are supported. Order at Iskra, d.o.o. to assure functionality.

Alarms

Alarms are powerful tool for ***MC 740 Multifunctional meter*** control and supervision features.

MC 740 Multifunctional meter supports setting 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.

For each parameter is possible to set limit value, condition and alarm activation action (sound signal and/or digital output switch if available).

Real time synchronisation

Network time protocol (NTP):

MC 740 Multifunctional meter supports NTP time synchronisation. Ethernet access to NTP server is required for proper operation.

NOTE!

NTP can usually maintain time to within tens of milliseconds over the public Internet, but the accuracy depends on infrastructure properties - asymmetry in outgoing and incoming communication delay affects systematic bias. It is recommended that dedicated network rather than public network is used for synchronisation purposes.

Communication

MC 740 Multifunctional meter has a wide variety of communication possibilities to suit specific demands. The meter is equipped with RS232/RS485 (DB9 or terminal connection) or Ethernet (RJ-45 terminal) and USB (USB-B type) communication. It can also be equipped with communication port for EX104 extension unit.

COM2 port is optional and can be ordered as one of I/O modules.

Different configurations are possible (to be specified with an order).

Configuration	*COM1*	*COM2*
1	*RS232/485*	*/*
2	*RS232/485*	*RS232 or 485*
3(1)	*Ethernet & USB*	*/*
4(1)	*Ethernet & USB*	*RS232 or RS485*

(1) Galvanic separation between Eth. and USB is 1 kV_{ACRMS}

Table 2: ***List of communication configurations***

MC 740 Multifunctional meter supports standard communication protocols MODBUS RTU, MODBUS TCP and DNP3.

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 for communication with EX104 needs to be specified at order). Up to 4 analogue outputs can be used with one meter. More information can be found in Analogue extender EX104 data sheet (E P22.495.400).

Supply

Power supply connection of the meters is adaptive. A universal power supply enables connection of the meter to DC (20 V−300 V) or AC voltage (48 V − 276 V, 40 Hz ... 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, Ethernet or USB communication. The information and stored measurements can be exported in standard Windows formats. Multilingual software functions on Windows XP operating system or higher. MiQen can be downloaded from Iskra, d.o.o. webpage www.iskra.eu.

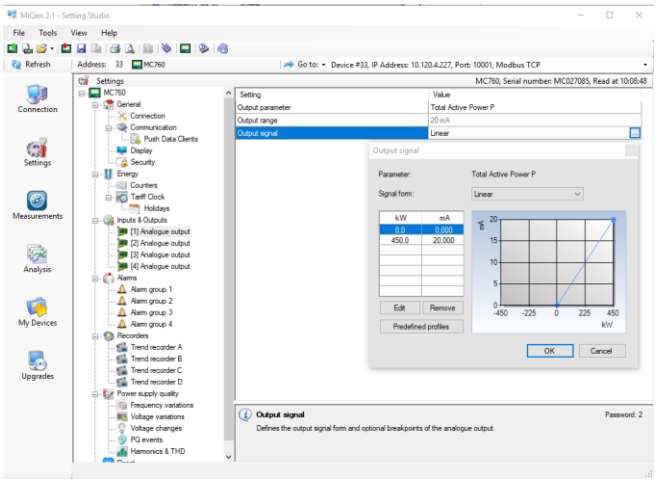


Figure 1 ***Sample of MiQen setting and acquisition software***

MiQen software is intended for:

- Setting all of the instruments parameters (online and offline).
- Viewing current measured readings and stored data.
- Setting and resetting energy counters.
- Complete I/O modules configuration.
- Evaluation of the electricity supply quality in compliance with SIST EN 50160.
- Viewing and exporting time-stamped PQ anomaly details.
- Upgrading instruments firmware.
- Searching the net for devices.
- Virtual interactive instrument.

NOTE!

MiQen software functions depend on the type of connected device.

Data display

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

MEASUREMENTS

Online measurements

NOTE!

In MiQen settings, software device will represent itself as MC 740A.

Online measurements are available on display or can be monitored with setting and monitoring software **MiQen**.

Readings on display are performed continuously with refresh time dependent on set average interval whereas rate of readings monitored with **MiQen** is fixed and refreshed approx. each second.

For better overview over numerous readings, they are divided into several groups, which contain basic measurements, min. and max. values, harmonics and alarms.

Each group can represent data in visually favored graphical form or detailed tabelaric form. Latter allows freezing readings and/or copying data into various report generation software tools.

Interactive instrument

Additional communication feature of a device allows interactive handling with a dislocated device as if it would be operational in front of user.

This feature is useful for presentations or product training.

Selection of available quantities

Available online measuring quantities and their appearance can vary according to set type of power network and other settings such as; average interval, max. demand mode, reactive power calculation method.

Complete selection of available online measuring quantities is shown in a table on the next page.

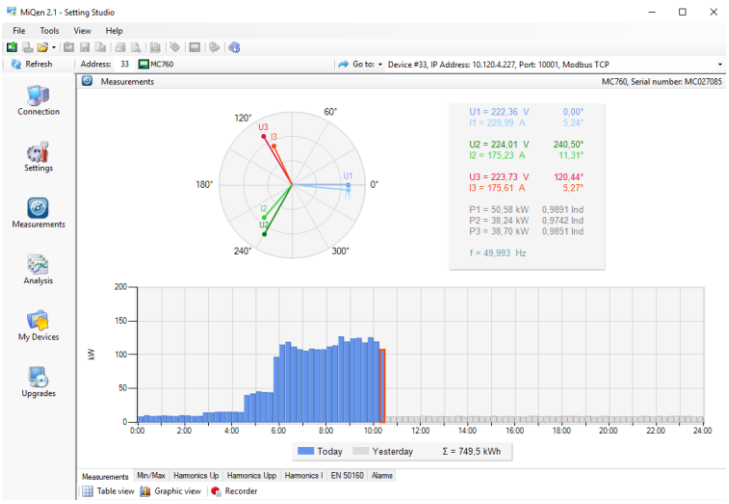


Figure 2 ***Sample of online measurements in graphical form – phase diagram and daily total active power consumption histogram***

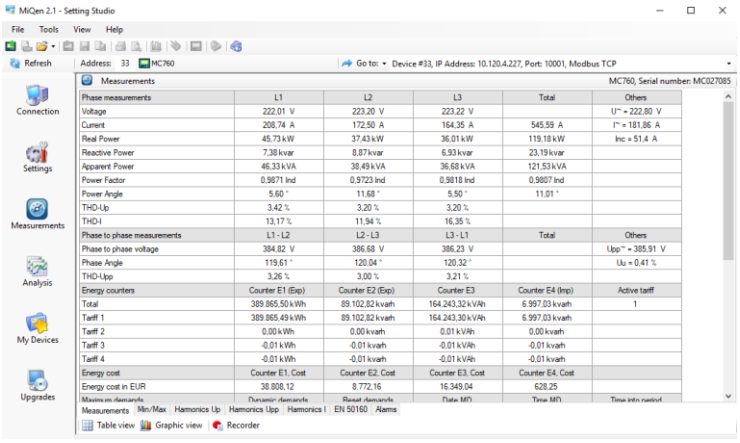


Figure 3 ***Sample of online measurements in tabular form***

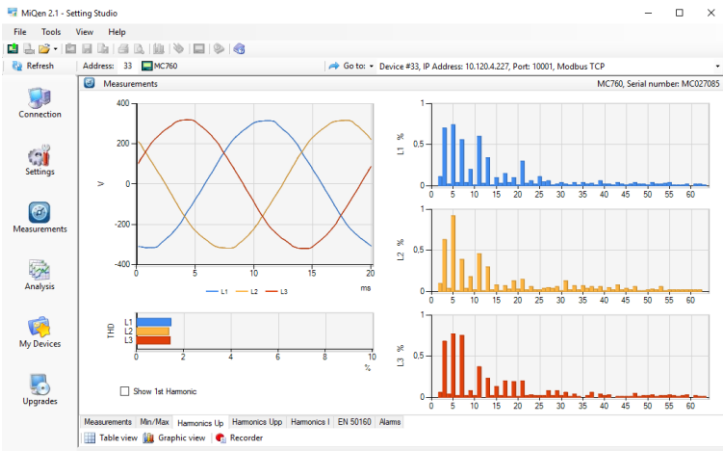


Figure 4 ***Sample of online harmonic measurements in graphical form***

Meas. type	Measurement	3-phase 4-wire	3-phase 3-wire	1-phase	comments
Phase measurements	*Voltage*				
	U_{1-3_RMS}	☑		☑1ph	
	U_{AVG_RMS}	☑		☑	
	U_{1-3_DC}	☑		☑1ph	*DC component of phase voltages*
	Current				
	I_{1-3_RMS}	☑	☑	☑1ph	
	I_{TOT_RMS}	☑	☑	☑	
	I_{AVG_RMS}	☑	☑	☑	
	$I_{NEUTRAL\_calc}$	☑	☑	☑	*calculated neutral current*
	Power				
	P_{1-3_RMS}	☑		☑1ph	
	P_{TOT_RMS}	☑	☑	☑	
	Q_{1-3_RMS}	☑📖		☑1ph📖	*reactive power can be calculated as a squared difference between S and P or as delayed sample*
	Q_{TOT_RMS}	☑	☑	☑	
	Qb_{1-3_RMS}	☑		☑1ph	*Budeanu reactive power Phase*
	Qb_{TOT_RMS}	☑	☑	☑	*Budeanu reactive power Total*
	S_{1-3_RMS}	☑		☑1ph	
	S_{TOT_RMS}	☑	☑	☑	
	PF_{1-3_RMS}	☑		☑1ph	
	PF_{TOT_RMS}	☑	☑	☑	
	φ_{1-3_RMS}	☑		☑1ph	*PA – Power angle*
	Harmonic analysis				
	$THD\text{-}U_{1-3}$	☑		☑1ph	
	$THD\text{-}I_{1-3}$	☑	☑	☑1ph	
	$TDD\text{-}I_{1-3}$	☑	☑	☑1ph	
	$U_{1-3\_harmonic\_1-63\_\%}$	☑📖		☑1ph📖	*% of RMS or % of base*
	$U_{1-3\_harmonic\_1-63\_ABS}$	☑		☑1ph	
	$U_{1-3\_harmonic\_1-63\_\varphi}$	☑		☑1ph	
	$I_{1-3\_harmonic\_1-63\_\%}$	☑📖	☑📖	☑1ph📖	*% of RMS or % of base*
	$I_{1-3\_harmonic\_1-63\_ABS}$	☑	☑	☑1ph	
	$I_{1-3\_harmonic\_1-63\_\varphi}$	☑	☑	☑1ph	
Phase to phase measurements	*Voltage*				
	Upp_{1-3_RMS}	☑	☑		
	Upp_{AVG_RMS}	☑	☑		
	$THD\text{-}Upp_{1-3}$	☑	☑		
	$\varphi_{x\text{-}y\_RMS}$	☑			*Phase-to-phase angle*
	$Upp_{1-3\_harmonic\_1-63\_\%}$	☑📖	☑📖	☑1ph📖	*% of RMS or % of base*
	$Upp_{1-3\_harmonic\_1-63\_ABS}$	☑	☑	☑1ph	
	$Upp_{1-3\_harmonic\_1-63\_\varphi}$	☑	☑	☑1ph	

Meas. type	*Measurement*	*3-phase 4-wire*	*3-phase 3-wire*	*1-phase*	*comments*
Metering	*Energy*				
	Counter E_{1-8}	☑	☑	☑	*each counter can be dedicated to any of four quadrants (P-Q, import-export, L-C). Total energy is a sum of one counter for all tariffs. Tariffs can be fixed, date/time dependent or tariff input dependent*
	E_{TOT_1-8}	☑	☑	☑	
	Active tariff	☑	☑	☑	
Maximum demand measurements	*Maximum demand*				
	MD_I_{1-3}	☑	☑	☑1ph	
	MD_P_{import}	☑	☑	☑	
	MD_P_{export}	☑	☑	☑	
	MD_Q_{ind}	☑	☑	☑	
	MD_Q_{cap}	☑	☑	☑	
	MD_S	☑	☑	☑	
Min and max measurements	*Min and max*				
	$U_{1-3\_RMS\_MIN}$	☑		☑1ph	
	$U_{1-3\_RMS\_MAX}$	☑		☑1ph	
	$Upp_{1-3\_RMS\_MIN}$	☑	☑		
	$Upp_{1-3\_RMS\_MAX}$	☑	☑		
	$I_{1-3\_RMS\_MIN}$	☑	☑	☑1ph	
	$I_{1-3\_RMS\_MAX}$	☑	☑	☑1ph	
	$P_{1-3\_RMS\_MIN}$	☑		☑1ph	
	$P_{1-3\_RMS\_MAX}$	☑		☑1ph	
	$P_{TOT\_RMS\_MIN}$	☑	☑	☑1ph	
	$P_{TOT\_RMS\_MAX}$	☑	☑	☑1ph	
	$S_{1-3\_RMS\_MIN}$	☑		☑1ph	
	$S_{1-3\_RMS\_MAX}$	☑		☑1ph	
	$S_{TOT\_RMS\_MIN}$	☑	☑	☑1ph	
	$S_{TOT\_RMS\_MAX}$	☑	☑	☑1ph	
	$freq_{MIN}$	☑	☑	☑	
	$freq_{MAX}$	☑	☑	☑	
Other measurements	*Miscellaneous*				
	$freq_{MEAN}$	☑	☑	☑	
	Internal temp.	☑	☑	☑	
	Date, Time	☑	☑	☑	
	Last Sync. time	☑📖	☑📖	☑📖	*UTC*

📖 For more information see ***MC 740 Multifunctional meter*** User's manual.

Table 3: ***Selection of available measurement quantities***

TECHNICAL DATA

Measurement inputs

Nominal frequency range	50 Hz, 60 Hz
Measuring frequency range	16 Hz–400 Hz

Voltage measurements:

Number of channels	4 (1)
Sampling rate	32 kHz
Min. voltage for sync.	1 V_{rms}
Nominal value (U_N)	500 V_{LN} , 866 V_{LL}
Max. measured value (cont.)	600 V_{LN}; 1000 V_{LL}
Max. allowed value	1.2 × U_N permanently 2 × U_N ; 10 s
Consumption	< U^2/4.2 MΩ per phase
Input impedance	4.2 MΩ per phase

(1) **4th channel is used for measuring U EARTH-NEUTRAL**

Current measurements:

Number of channels	3
Sampling rate	32 kHz
Nominal value (I_{NOM})	1 A, 5 A
Max. measured value (I_1-I_3 only)	12.5 A sin.
Max. allowed value (thermal)	15 A cont. ≤ 300 A; 1 s
Consumption	< I^2 × 0.01 Ω per phase

Basic accuracy under reference conditions

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

Measurand	Accuracy	According to
Voltage L-N, L-L	± 0.2%	EN 61557-12
Current	± 0.2%	EN 61557-12
Active power (I_N = 5 A)	± 0.5%	EN 61557-12
Active power (I_N = 1 A)	± 0.5%	EN 61557-12
Active energy	Cl. 0.5S	EN 62053-22
Reactive energy	Cl.1	EN 62053-24
Frequency (f)	± 0.01 Hz	EN 61557-12
Power factor (PF)	± 0.5%	EN 61557-12
THD (U)	± 0.3%	EN 61557-12
THD (I)	± 0.3%	EN 61557-12
Real time clock (RTC)	< ± 1s/day	IEC61000-4-30

Table 4: ***Accuracy of measurands.***

For complete overview of accuracy for all measured parameters and measuring ranges see Users' manual.

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.

Module type	Number of I/O per module
Relay output (RO)	2
Analogue output (AO)	2 x 20 mA
Analogue input (AI)	2
Pulse output (PO)	2
Pulse input (PI)	2
Bistable Digital output (BO)	1
Digital output (DO)	2
Digital input (DI)	2
Tariff input (TI)	2
Additional communication port (COM2)	1
Status output (WO)	1 + 1xRO
Communication port for analogue extender EX104	1

Table 5: **List of available I/O modules**

Analogue input (AI):

Three types of analogue inputs are suitable for acquisition of low voltage DC signals from different sensors. According to application requirements it is possible to choose current, voltage or resistance (temperature) analogue input. They all use the same output terminals.

MiQen software allows setting an appropriate calculation factor, exponent and required unit for representation of primary measured value (temperature, pressure, wind speed, etc.).

DC current input:

Nominal input range	–20 mA…0…20 mA (±20%)
Input resistance	20 Ω
Accuracy	0.5 % of range
Temperature drift	0.01% / °C
Conversion resolution	16 bit (sigma-delta)
Analogue input mode	internally referenced Single-ended

DC voltage input:

Nominal input range	–10 V…0…10 V (±20%)
Input resistance	100 kΩ
Accuracy	0.5 % of range
Temperature drift	0.01% / °C
Conversion resolution	16 bit (sigma-delta)
Analogue input mode	internally referenced Single-ended

Resistance (temperature) input:

Nominal input range (low)*	0 Ω - 200 Ω (max. 400 Ω) Pt100 (-200°C–850°C)
Nominal input range (high)*	0 kΩ – 2 kΩ (max. 4 kΩ) Pt1000 (-200°C–850°C)
Connection	2-wire
Accuracy	0.5 % of range
Conversion resolution	16 bit (sigma-delta)
Analogue input mode	internally referenced Single-ended

*** Low or high input range and primary input value (resistance or temperature) are set by the MiQen setting software**

Analogue output (AO):

Output range	*0 mA…20 mA*
Accuracy	*0.5% of range*
Max. burden	*150 Ω*
Linearization	*Linear, Quadratic*
No. of break points	*5*
Output value limits	*±120% of nominal output*
Response time (measurement and analogue output)	*depends on set general average interval (0.1 s – 5 s)*
Residual ripple	*< 1 % p.p.*

Outputs may be either short or open-circuited. They are electrically insulated from each other and from all other circuits.

Output range values can be altered subsequently (zoom scale) using the setting software, but a supplementary error results.

Digital output (RO, BO, WO)

Type	*Relay switch*
Purpose	*Alarm output, General purpose, Digital output, Pulse output, Status output (watchdog)*
Rated voltage	*230 $V_{AC/DC}$ ± 20% max*
Max. switching current	*1000 mA*
Contact resistance	*≤ 100 mΩ (100 mA, 24 V)*
Impulse	*Max. 4000 imp/hour*
	Min. length 100 ms

Digital output (DO, PO)

Type	*Optocoupler open collector switch*
Purpose	*Alarm output, General purpose digital output, Pulse output*
Rated voltage	*40 $V_{AC/DC}$*
Max. switching current	*30 mA (R_{ONmax} = 8 Ω)*
Pulse length	*programmable (2 ms… 999 ms)*

Universal Power Supply

Power supply	***Universal***	***AC***
Nominal voltage AC	*48 V–276 V*	*110 V/230 V/400 V*
Nominal frequency	*40 Hz–70 Hz*	*40 Hz–65 Hz*
Nominal voltage DC	*20 V–300 V*	*–*
Consumption	*< 8 VA*	*< 8 VA*

Safety:

Protection:	*protection class **II***
⚠ ⧈	*functional earth terminal must be connected to earth potential!*
	Voltage inputs via high impedance
	Double insulation for I/O ports and COM ports
Pollution degree	*2*
Installation category (measuring inputs)	*CAT II ; 600 V*
	CAT III ; 300 V
	Acc. to EN 61010-1
Test voltages	*U_{AUX}↔I/O, COM1: 3510 VAC_{rms}*
	U_{AUX}↔U, I inputs: 3510 VAC_{rms}
	U, I inputs↔I/O, COM1: 3510 VAC_{rms}
	HV I/O ↔ I/O, COM1: 3510 VAC_{rms}
	U inputs↔ I inputs: 3510 VAC_{rms}

Mechanical

Dimensions	96 mm × 96 mm × 96.5 mm (CT 101.5 mm)
Mounting	Panel mounting 96 mm × 96 mm
Required mounting hole	$92^{+0.8}$ mm × $92^{+0.8}$ mm
Enclosure material	PC/ABS
Flammability	Acc. to UL 94 V-0
Weight	600 g
Enclosure material	PC/ABS
	Acc. to UL 94 V-0

Ambient conditions:

Ambient temperature	K55 temperature class
	Acc. to EN61557-12
	-10 °C …55 °C
Storage temperature	-40 °C to +70 °C
Average annual humidity	≤90 % r.h. (no condensation)
Pollution degree	2
Enclosure protection	IP 40 (front plate)
	IP 20 (rear side)
Installation altitude	≤2000 m

Real time clock

A built-in real time clock is also without external synchronization very stable when device is connected to auxiliary power supply. For handling shorter power interruptions without influence on RTC, device uses high capacity capacitor battery. It ensures auxiliary supply (for internal RTC only) for more than two days of operation (6 years with battery).

To enable clock operation backup supercap or battery is built-in.

Supercap life span	approx. 2 days
Type	Low power embedded RTC
RTC stability	< 1 sec/day
Battery life span	approx.. 6 years (at 23 °C)

Connection cables

MC 740 Multifunctional meter *is equipped with European style pluggable terminals for measuring voltages, auxiliary supply, communication and I/O modules.*

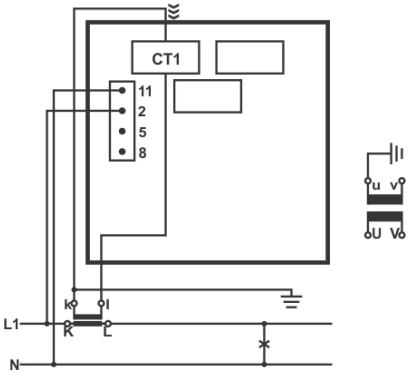
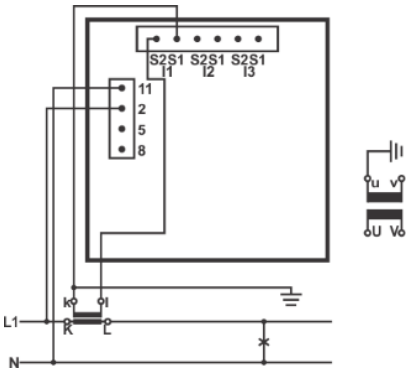
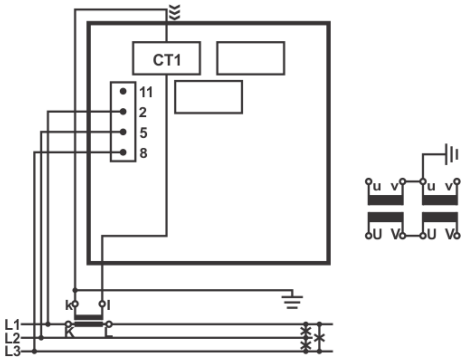
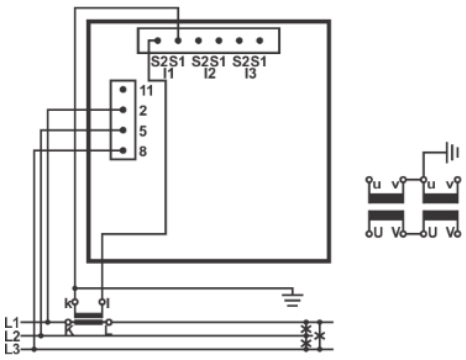
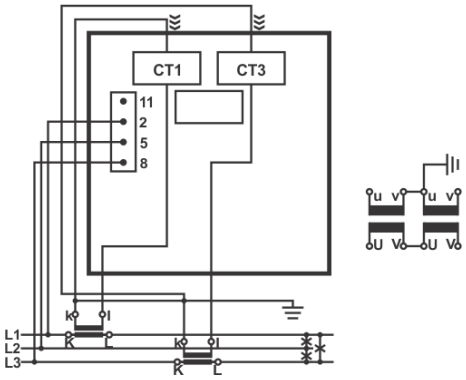
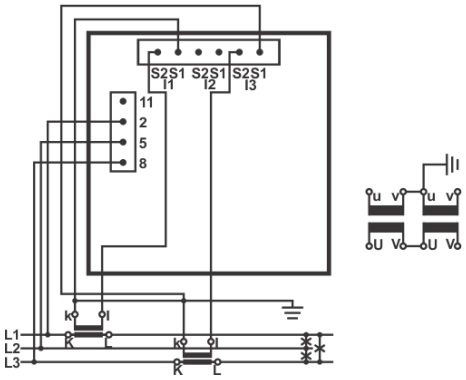
Measuring current cables can be connected in two ways. They shall be attached as through-hole connection without screwing or as detachable screw terminals.

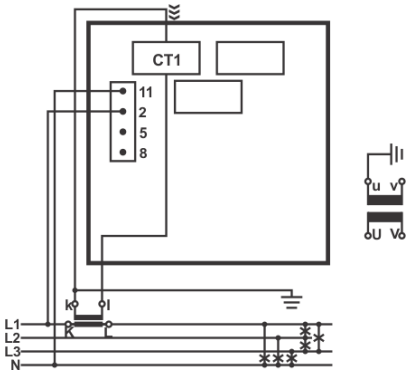
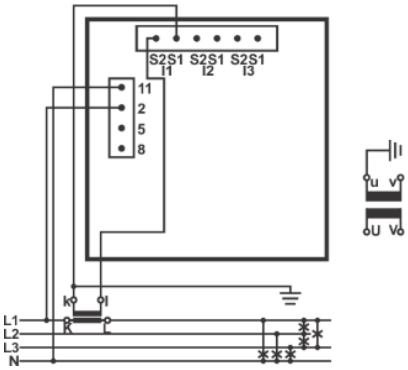
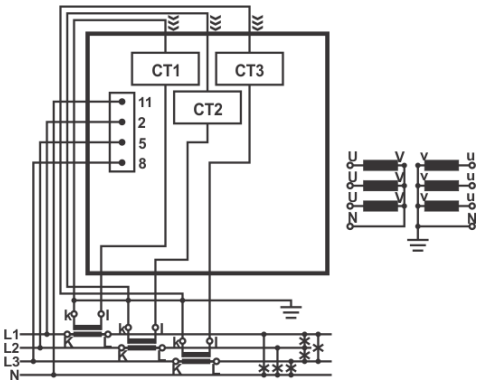
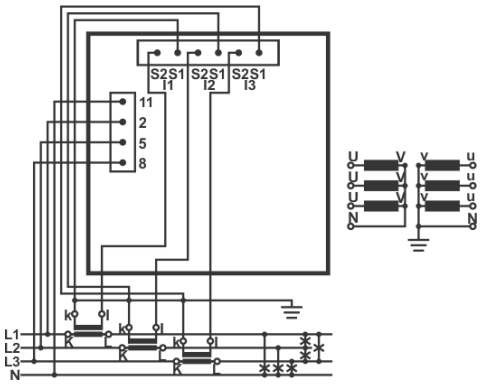
> *NOTE!*
>
> *Stranded wire must be used with insulated end sleeve to assure firm connection.*

Voltage inputs (4)	≤2.5 mm^2 , AWG 24-12 single wire
Current inputs (3)	≤Ø 6 mm one conductor with insulation
Supply (3)	≤2.5 mm^2 , AWG 24-12 single wire
Com (5), I/O (6)	≤2.5 mm^2 , AWG 24-12 single wire

CONNECTION

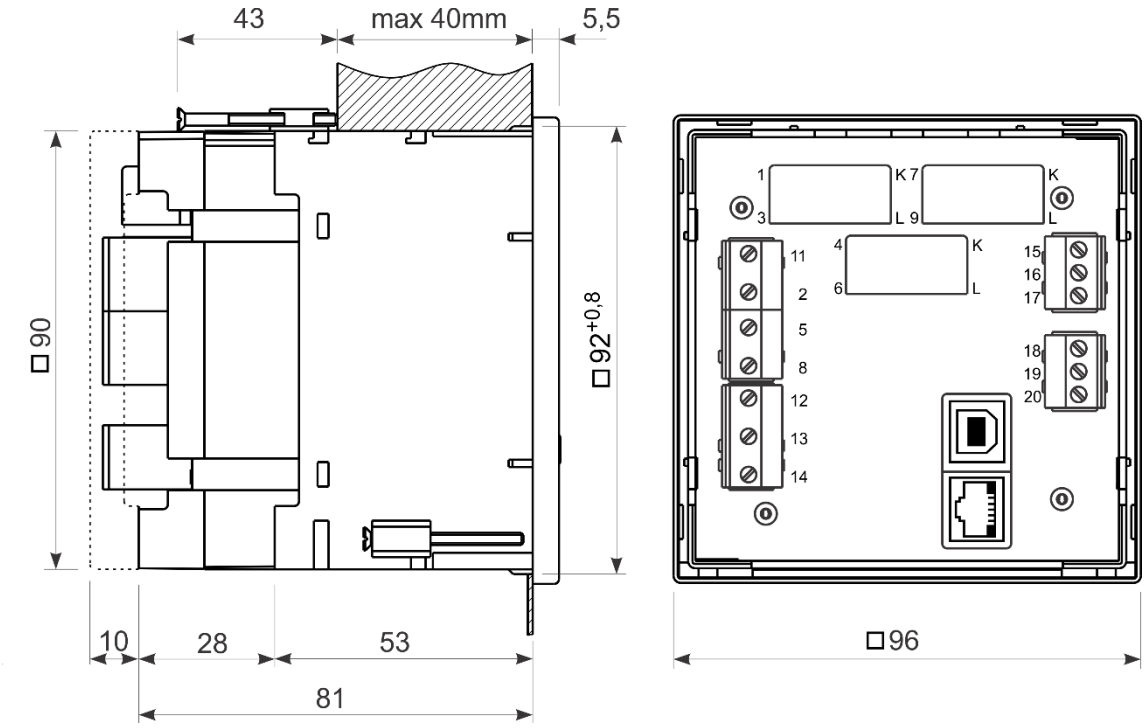
Two possible connections of current are available, through-hole connection and terminal connection (see pictures below).

System/connection	*Through-hole connection assignment*	*Terminal connection assignment*
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.*		

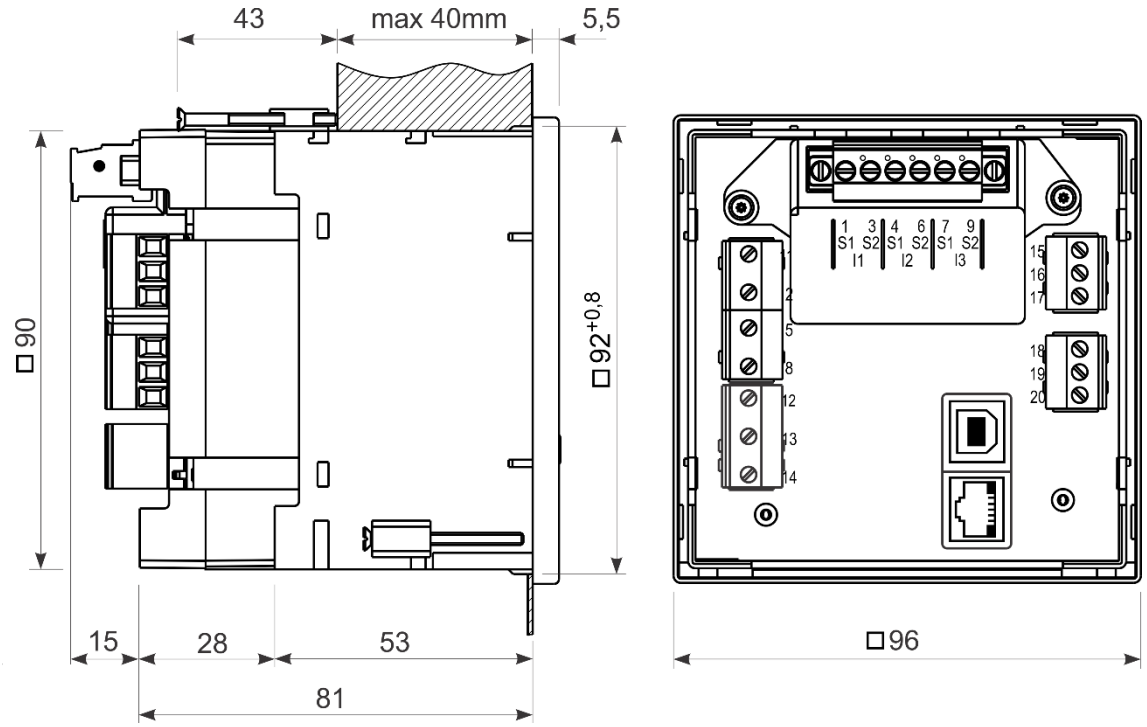
System/connection	Through-hole connection assignment	Terminal connection assignment
4b (1W4b) *Three-phase, four wire connection with balanced load*		
4u (3W4) *Three-phase, four wire connection with unbalanced load.*		

DIMENSIONAL DRAWING

Dimensions for MC 740 (through-hole connection assignment):



Dimensions for MC 740 (terminal connection assignment):



CONNECTION TABLE

Function			Connection	Comment
Measuring input:	AC current	IL1	1/3	⚠ CAT II 600V CAT III 300V
		IL2	4/6	
		IL3	7/9	
	AC voltage	UL1	2	⚠ CAT II 600V CAT III 300V
		UL2	5	
		UL3	8	
		UN	11	
Inputs / outputs:	Module 1/2	⊖→+	15	
		⊖→- (common)	16	
		⊖→+	17	
	Module 3/4	⊖→+	18	
		⊖→- (common)	19	
		⊖→+	20	
Auxiliary power supply:		+ / AC (L)	13	⚠ CAT III 300V
		– / AC (N)	14	
		GROUND	12	⚠ GROUND terminal must be always connected !!
Communication:	RS485	A	21	RS232 and RS485 are both supported, but only one at the time can be used! In case of Ethernet/USB communication, terminals from 21 to 25 are not used (unconnected).
		B	22	
	RS232	RX	23	
		GND	24	
		TX	25	
Communication: DB9 female	RS232	Rx	3	
		⏚	5	
		Tx	2	
	RS485	B	7	
		A	8	

Table 6: ***Connections***

DATA FOR ORDERING

When ordering ***MC 740 Multifunctional meter***, all required specifications shall be stated in compliance with the ordering code. Additional information could be stated. Note that fixed or programmable specifications are not part of ordering code.

General ordering code

The following specifications shall be stated:

Device Type	Nominal freq.	Aux. power supply	Comm. COM1	I/O module 1/2	I/O module 3/4	RTC backup supply	Current connection		
MC 740	**X**	**X**	**X**	**X**	**X**	**X**	**X**		
							T	Through Hole Transformer*	
							C	Screw Terminal Connector	
						C		Supercap*	
						B		Battery	
				N				Without *	
				A				2× Analogue output	Not available for Nominal freq. 16 2/3
				S				2× Pulse output	
				M				2× Relay (alarm) output	
				B				1× Bistable relay (alarm) output	
				W				1× Status + 1× Relay output	
				I				2× Analogue input - mA $_{DC}$	
				U				2× Analogue input - V $_{DC}$	
				R				2× Analogue input - R/Temp.	
				P				2× Pulse input 5 - 48 V $_{DC}$	
				D				2× Digital input 230 V $_{AC/DC}$	
				E				2× Digital input 110 V $_{AC/DC}$	
				F				2× Digital input 5 - 48 V $_{AC/DC}$	
				T				2× Tariff input 230 V $_{AC/DC}$	I/O module 1/2 only
				Z				2× Tariff input 110 V $_{AC/DC}$	I/O module 1/2 only
				Y				2× Tariff input 5 - 48 V $_{AC/DC}$	I/O module 1/2 only
				G				RS232 Communication - COM2	I/O module 3/4 only
				C				RS485 Communication - COM2	I/O module 3/4 only
				X				Output Extender - COM2	I/O module 3/4 only
			T					RS232 & RS485 Terminal *	
			R					RS232 & 485 DB9	
			E					Ethernet & USB	
		U						20 ... 300 V $_{DC}$, 80 ... 276 V $_{AC}$ *	
		D						110 V $_{AC}$	
		E						230 V $_{AC}$	
		F						400 V $_{AC}$	
	S							50, 60 Hz *	
	A							400 Hz	
	B							16 2/3 Hz	

***- standard**

Example of ordering:

MC 740 with a universal-HI supply is connected to a universal high voltage and 5 A secondary current on 50 Hz network. Ethernet & USB communication, watchdog output (plus one relay output) as I/O 1/2 and two pulse outputs as I/O 3/4. RTC with supercap supply. Through-hole type current transformers.

Voltage and current nominal value are due to auto-range fixed to max. nominal value and are therefore omitted from ordering code.

Connection type is user programmable and is therefore omitted from ordering code. Default is 4u connection.

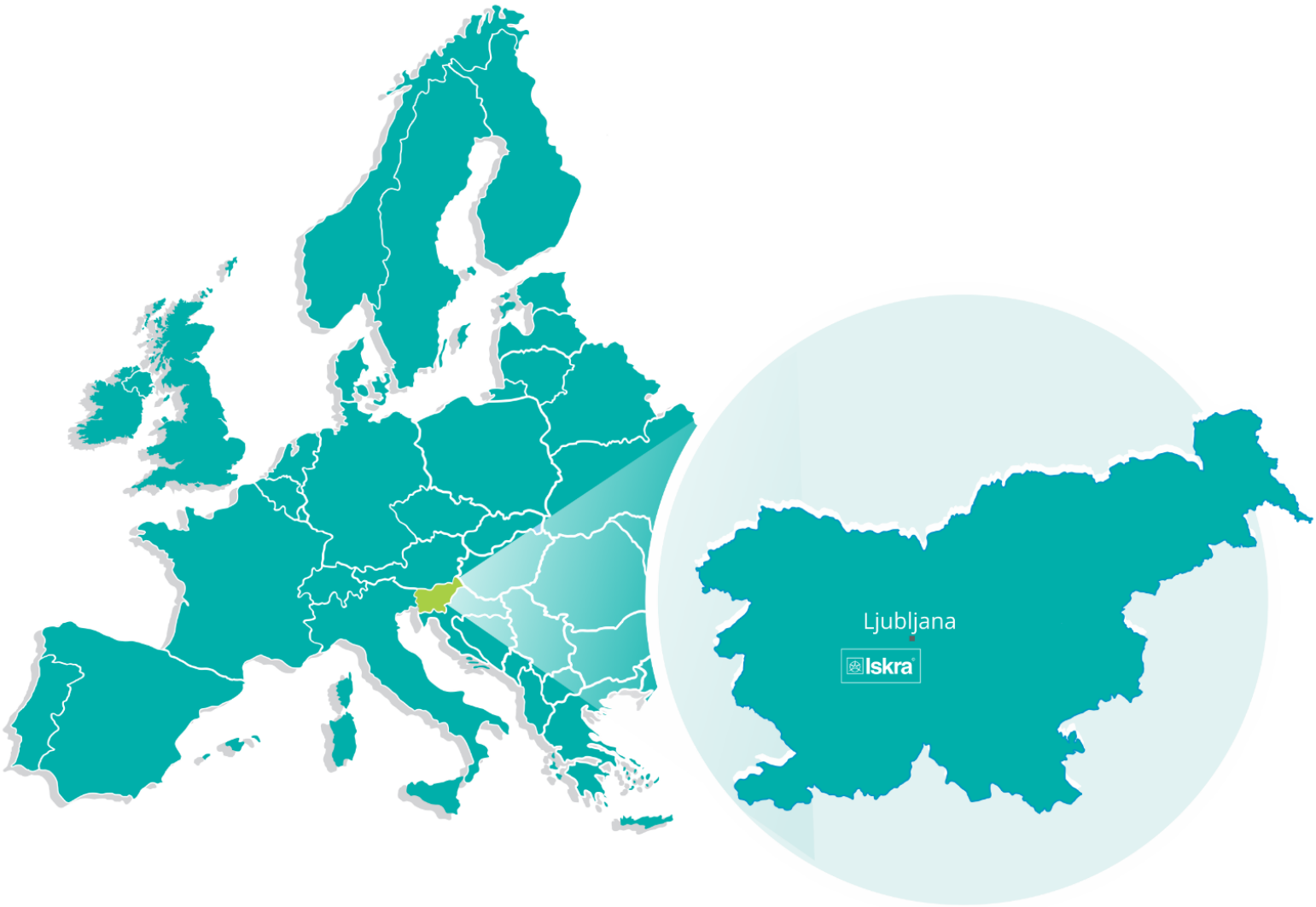
Example ordering code:

MC 740 S U E W S C T

						Through Hole Transformer
					Supercap	
				2× Pulse output		
			1× Status + 1× Relay output			
		Ethernet & USB				
	Universal HIGH (20 V DC... 300 V DC, 80 V AC... 276 V AC)					
50 Hz, 60 Hz						

DICTIONARY:

RMS	*Root Mean Square*
PA	*Power angle (between current and voltage)*
PF	*Power factor*
VT	*Voltage measuring transformer*
CT	*Current measuring transformer*
THD	*Total harmonic distortion*
Ethernet	*IEEE 802.3 data layer protocol*
MODBUS / DNP3	*Industrial protocol for data transmission*
MiQen	*ISKRA setting and acquisition Software*
AC	*Alternating quantity*
RTC	*Real Time Clock*
IRIG	*Inter-range instrumentation group time codes*
NTP	*Network Time Protocol*



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