ENERGY SECTOR

UNIVERSAL MEASURING DEVICES **MC 7xx**

- **RELEVANT FOR** ELECTRICITY DISTRIBUTION AND ENERGY PRODUCTION COMPANIES, UTILITIES, DWELLINGS, ENERGY MANAGEMENT SOLUTION PROVIDERS, INDUSTRY, BUSINESS BUILDINGS, DESIGNERS OF SMALL POWER STATIONS, PANEL BUILDERS

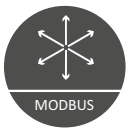
Iskra®

FEATURES

NETWORK ANALYZER **MC 770**

NETWORK RECORDER **MC 750**

MULTIFUNCTION METER **MC 740**



FEATURES

- **CLASS A** ACCORDING TO **61000-4-30** MEASURING METHODS IMPLEMENTED (MC740/750 CLASS S)
- EVALUATION OF THE **ELECTRIC SUPPLY QUALITY IN COMPLIANCE WITH EN 50160** (ONLY MC 770)
- **MEASUREMENTS OF INSTANTANEOUS VALUES OF MORE THAN 140 QUANTITIES** (U, I, P, Q, PF, PA, f, ϕ, THD, MD, ENERGY, ENERGY COST BY TARIFFS, ETC.)
- **MC 770: CLASS A (0.1%)** ACCURACY IN COMPLIANCE WITH EN 61000-4-30.
  MC 740/750: CLASS S (0.2%) ACCURACY IN COMPLIANCE WITH EN61000-4-30.
- **FOUR QUADRANT ENERGY MEASUREMENT CLASS 0.2S** FOR ACTIVE ENERGY (0.5S FOR MC740/750)
- **32** ADJUSTABLE **ALARMS**
- **FREQUENCY RANGE** FROM 16 Hz TO 400 HZ
- **RS232/RS485 COMMUNICATION** UP TO 115,200 BIT/S OR **ETHERNET/USB COMMUNICATION**
- **MODBUS RTU/TCP AND DNP3 COMMUNICATION** PROTOCOL
- **UP TO 4 INPUTS OR OUTPUTS** (ANALOGUE INPUTS/OUTPUTS, DIGITAL INPUTS/OUTPUTS, ALARM/WATCHDOG OUTPUTS, PULSE INPUT/OUTPUTS, TARIFF INPUTS).
- **AUTOMATIC RANGE SELECTION OF 3 CURRENT AND 4 VOLTAGE CHANNELS** (MAX. 12.5 A AND 1000 VRMS) WITH 32 kHz SAMPLING RATE.
- **ADJUSTABLE TARIFF CLOCK**, DISPLAY OF ELECTRIC ENERGY CONSUMPTION IN OPTIONAL CURRENCY
- **MULTILINGUAL** SUPPORT
- USER-FRIENDLY PC **MiQEN SOFTWARE**

FOR WHOM

- FOR ELECTRICITY DISTRIBUTION AND ENERGY PRODUCTION COMPANIES, UTILITIES, DWELLINGS, ENERGY MANAGEMENT SOLUTION PROVIDERS, INDUSTRY, BUSINESS BUILDINGS, DESIGNERS OF SMALL POWER STATIONS, PANEL BUILDERS, ETC.

FAMILY **FEATURES**

PQ EVALUATION ACC. TO STANDARD EN 50160 (ONLY MC 770)

THE **EN 50160 STANDARD SPECIFIES THE MOST IMPORTANT VOLTAGE CHARACTERISTICS OF ELECTRICITY SUPPLIED** BY PUBLIC DISTRIBUTION SYSTEMS AND THE LIMIT VALUES WHERE SUCH CHARACTERISTICS CAN BE EXPECTED. EN 50160 SPECIFIES ALLOWABLE VOLTAGE VALUES AT:

- **VOLTAGE AND FREQUENCY** DEVIATIONS
- **VOLTAGE DIPS**, **SWELlS, RVC, INTERRUPTIONS** AND **VOLTAGE UNBALANCE**
- **HARMONICS, INTERHARMONICS** AND **THD**
- **FLICKER** INTENSITY

CLASS A ACCORDING TO STANDARD EN 61000-4-30

Mc770 SUPPORTS MEASURING METHODES ACCORDING TO STANDARD EN 61000-4-30 FOR CLASS A POWER QUALITY ANALYZERS
Mc740/750 SUPPORT MEASURING METHODES ACCORDING TO STANDARD EN 61000-4-30 FOR CLASS S POWER QUALITY ANALYZERS

HANDLING THE COSTS - MC 770, MC 750, MC 740

A SPECIAL FUNCTION OF THE METER IS ENERGY COST EVALUATION (ACTIVE, REACTIVE, TOTAL) BY TARIFFS. THE METER ENABLES TRACING THE ENERGY COSTS IN OPTIONAL CURRENCY. CONSUMPTION IS CALCULATED BY MEANS OF THE ADJUSTABLE TARIFF CLOCK AND ELECTRICITY PRICE BY TARIFFS.

MC 770 ELECTRICAL NETWORK ANALYZER

- **MC 750 FUNCTIONALITY +**
- PERMANENT ANALYSIS OF **POWER QUALITY IN COMPLIANCE WITH EN 50160**
- **CLASS A** ACCORDING TO **61000-4-30** MEASURING METHODS IMPLEMENTED
- OPTIONAL **SETTING OF LIMIT VALUES OF THE ELECTRICAL NETWORK** CHARACTERISTICS

MC 750 - ELECTRICAL NETWORK RECORDER

- **MC 740 FUNCTIONALITY +**
- RECORDING **UP TO 64 MEASURING QUANTITIES AND 32 ALARMS** IN THE INTERNAL MEMORY (8 MB FLASH)
- **MEASURING INSTANTANEOUS VALUES OF MORE THAN 140 ELECTRICAL QUANTITIES** (ALSO THD, MD, ENERGY, ELECTRICITY PRICE BY TARIFFS, HARMONICS)
- DISPLAY OF **ELECTRIC CONSUMPTION** IN OPTIONAL CURRENCY
- **RS232/RS485 OR ETHERNET/USB** COMMUNICATION

MC 740 - MULTIFUNCTION METER

- **MONITORING AND MEASURING OVER 130 ELECTRICAL QUANTITIES** OF THREE-PHASE ELECTRIC-ENERGY DISTRIBUTION SYSTEM
- **32 PROGRAM ADJUSTABLE ALARMS**
- **UP TO 4 INPUTS OR OUTPUTS**
- **RS232/RS485 OR ETHERNET/USB** COMMUNICATION
- **SETTINGS OF A TARIFF CLOCK** (FOUR PERIODS, FOUR WORKING GROUPS, ELECTRICITY PRICE FOR EACH PERIOD AND A WORKING GROUP, 16 DIFFERENT PRICE PERIODS)

TEHNICAL **DATA**

INPUTS

INPUT SIGNALS	CURRENT	VOLTAGE
NOMINAL FREQUENCY RANGE	50, 60 Hz	50, 60 Hz
MEASURING FREQUENCY RANGE	16 – 400 Hz	16 – 400 Hz
NOMINAL VALUE (I_N, U_N)	1 A, 5 A	500 V_{LN} , 866 V_{LL}
MAXIMAL VALUE	12.5 A	600 V_{LN} ; 1000 V_{LL}
CONSUMPTION	< 0.1 VA	< 0.1 VA

ACCURACY

MEASURAND	RANGE	ACCURACY
RMS CURRENT (I1, I2, I3, Iavg, In)	1-5 A	± 0.1 % MC 770 ± 0.2 % MC 740/750
RMS PHASE VOLTAGE (U1, U2, U3, Uavg)	75 – 500 V	± 0.1 % MC 770 ± 0.2 % MC 740/750
PHASE-TO-PHASE VOLTAGE (U12, U23, U31, Uavg)	120 – 800 V	± 0.1 % MC 770 ± 0.2 % MC 740/750
FREQUENCY (f)		± 0.01 Hz
POWER FACTOR (PF)	-1...0...+1 U = 50...120 % Un I = 2...20 % In I = 20...200 % In	 ± 0.5 % ± 0.5 %
PHASE AND PHASE-TO-PHASE ANGLE (φ, φ12, φ23, φ31)		0.5°
THD	0...400 %	± 0.3 %
ACTIVE POWER	75 - 500 (In = 1 A) 375 - 2500 (In = 5 A)	MC 770 ± 0.2% MC 740/750 ± 0.5%
REACTIVE AND APPARENT POWER	[W/var/VA]	± 0.5%

MEASURAND	STANDARD	ACCURACY
ACTIVE ENERGY	EN 62053-22	MC 770 Cl. 0.2S MC 740/750 Cl. 0.5S
REACTIVE ENERGY	EN 62053-24	MC 770 Cl. 0.5S MC 740/750 Cl. 1
PULSE OUTPUT	EN 62053-31	Class A & B

ACCURACY IS PRESENTED AS PERCENTAGE FROM RANGE EXCEPT WHEN IT IS STATED AS AN ABSOLUTE VALUE.

POWER SUPPLY

POWER SUPPLY	UNIVERSAL	AC
NOMINAL VOLTAGE AC	48–276 V	110 /230 /400 V
NOMINAL FREQUENCY	40–70 Hz	40–65 Hz
NOMINAL VOLTAGE DC	20–300 V	–
CONSUMPTION	< 8 VA	< 8 VA

REAL TIME CLOCK (RTC)

- RTC STABILITY < 1 SEC / DAY
- 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

- MC770
  AMBIENT TEMPERATURE K55 TEMPERATURE CLASS
  ACC. TO EN61557-12: -10 °... 55 °C
- INPUT: 0...100 % U_N
- CONNECTED TO A MEASURING TRANSFORMER: 0...100 % I_N
- 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	1.200 TO 115.200 BIT/S		FULL SPEED USB 2.0

I/0 MODULE 1 & 2

MODULE TYPE	NUMBER OF I/O PER MODULE
RELAY OUTPUT (RO)	2
ANALOGUE OUTPUT (AO)	2
ANALOGUE INPUT (AI)	2 X 0 ... 20 mA
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
STATUS OUTPUT (WO)	1 X WO + 1 X RO
ADDITIONAL COMMUNICATION PORT (COM2)	1 (RS232 OR RS485)
COMMUNICATION PORT FOR ANALOGUE EXTENDER EX104	1

INPUT / OUTPUT MODULES

MODULE TYPE - NUMBER OF I/O PER MODULE

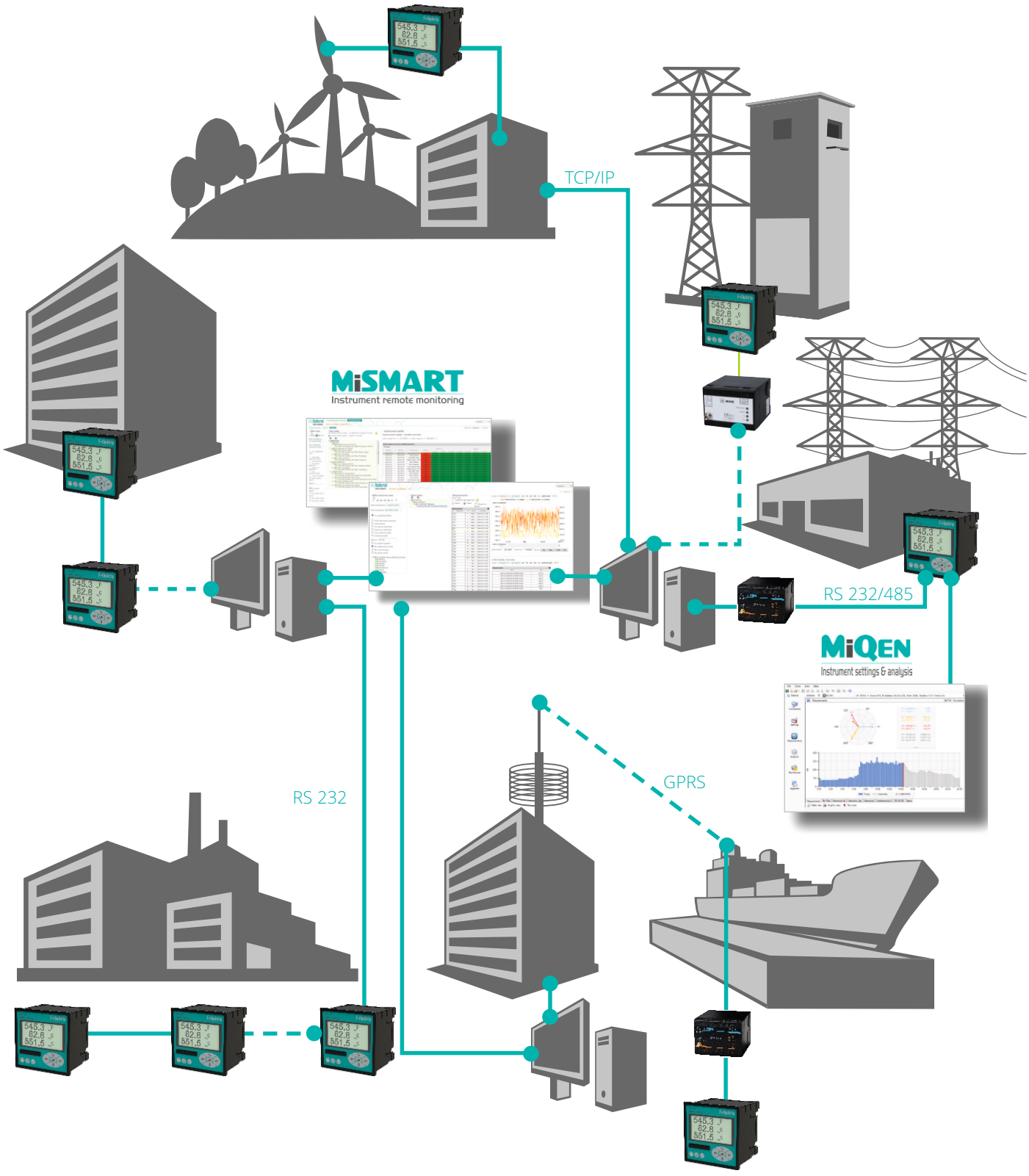
- **RELAY OUTPUT (RO)** - 2
- **ANALOGUE OUTPUT (AO)** - 2 x 20 mA
- **ANALOGUE INPUT (AI)** - 2
- **PULSE OUTPUT (PO)** - 2
- **PULSE INPUT (PI)** - 2
- **BISTABLE DIGITAL OUTPUT (BO)** - 1
- **DIGITAL OUTPUT (DO)** - 2
- **DIGITAL INPUT (DI)** - 2
- **TARIFF INPUT** - 2
- **ADDITIONAL COMMUNICATION PORT (COM2)** - 1
- **STATUS OUTPUT (WO)** - 1 + 1 x RO
- **COMMUNICATION PORT FOR ANALOGUE EXTENDER EX 104**

INSTRUMENT	MC 740	MC 750	MC 770
HARDWARE CONFIGURATION			
BACKLIGHT LCD 128X64	●	●	●
KEYBOARD KEYS	5	5	5
MMC CARD	●	●	●
POWER SUPPLY (UNIV./AC)	O/O	O/O	O/O
ENERGY COUNTERS	4	4	4
REAL TIME CLOCK	●	●	●
MEMORY SIZE	–	8 MB	8 MB
AUTO RANGE CURRENT	●	●	●
AUTO RANGE VOLTAGE	●	●	●
COMMUNICATION (COM1)			
COMMUNICATION PORTS	1	1	1
RS232 & RS485 / ETHERNET & USB	O/O	O/O	O/O
MODBUS AND DNP3	●	●	●
AVAILABLE FUNCTIONS			
SETUP WIZARD	●	●	●
WRONG CONNECTION WARNING	●	●	●
CUSTOM SCREENS	●	●	●
RESET DEFAULT SETTINGS	●	●	●
PROGRAMMABLE REFRESH TIME (LCD , COMM.)	●/●	●/●	●/●
MD CALCULATION (TF, FW, SW)	●/●/●	●/●/●	●/●/●
TARIFF CLOCK	●	●	●
COST MANAGEMENT	●	●	●
PROGRAMMABLE ALARMS	32	32	32
ALARMS RECORDING	–	●	●
MEASUREMENTS RECORDING	–	●	●
EN 50160 ANALYSIS	–	–	●
PC SOFTWARE	MIQEN	MIQEN	MIQEN
SYSTEM SOFTWARE	MISMART	MISMART	MISMART
AVAILABLE MEASUREMENTS			
ACTUAL VALUES: U, I, P, Q, S, PF, PA, F,Φ	●	●	●
ENERGY	●	●	●
MAXIMUM DEMANDS	●	●	●
MINIMUM VALUES: U, I, P, Q, S, PF, PA, F,Φ	●	●	●
MAXIMUM VALUES: U, I, P, Q, S, PF, PA, F,Φ	●	●	●
THD (ACTUAL)	●	●	●
HARMONICS	UP TO 63rd	UP TO 63rd	UP TO 63rd
I/0 MODULES			
I/O MODULE 1 (SEE NEXT PAGE)	O	O	O
I/O MODULE 2 (SEE NEXT PAGE)	O	O	O

LEGEND: – FEATURE NOT SUPPORTED ● MC HAS FEATURE O OPTIONAL FEATURE

POSSIBLE **USE**

APPLICATIONS



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