



Measuring transducers

MT4xx and (U)MT5xx

Measuring transducer MT440

MT 440 Programmable multifunctional transducer

- Real time measurements of more than 50 quantities
- Power accuracy class 0.5
- 16 adjustable alarms
- Input frequency: 50/60 Hz, 400 Hz
- Serial communication (RS232 or RS485 up to 115,200 bit/s)
- MODBUS communication protocol
- Up to 4 I/O (analogue out, alarm out, pulse out, general purpose relay out, general purpose solid-state out)
- Wide aux. power supply 24 – 300 Vdc, 40 – 276 Vac
- Auto range of current and voltage (max. 12.5 A and 600 V_{L-N})
- Simple USB setting without auxiliary power supply
- User-friendly setting software, MiQen
- Housing for DIN rail mounting



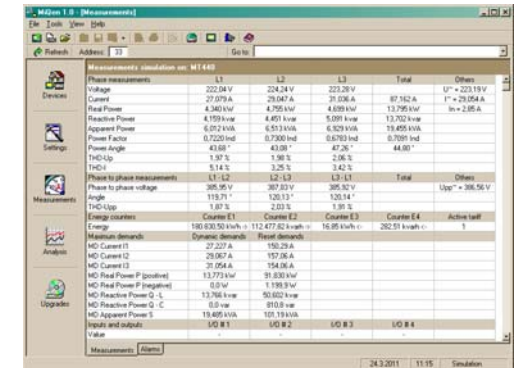
*RMS measurements of more than 50 parameters
128 samples per cycle*

Measured parameters:

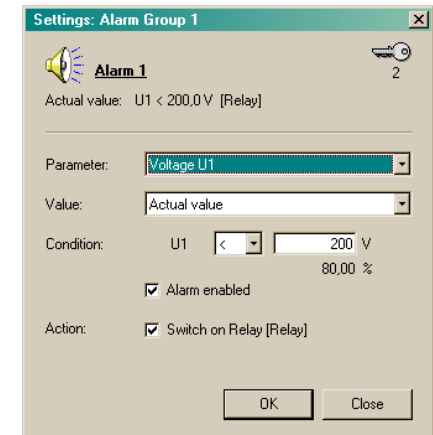
- $U, I, P, Q, S, PF, PA, f, \varphi$
- *Maximum Demands (without timestamps)*
- THD
- Energy

Alarms:

- 2 alarm groups
- Each group up to 8 alarms
- Delay time setting
- Hysteresis setting
- Electromechanic or solid state relay alarm output
- Programmable output signal (cont. pulsed, inversed...)



Phase measurements	L1	L2	L3	Total	Others
Voltage	222.04 V	224.24 V	225.28 V		U ^m = 233.19 V
Current	27.075 A	29.047 A	31.038 A	87.162 A	I ^m = 29.054 A
Real Power	4.340 kW	4.755 kW	4.889 kW	13.984 kW	Im = 2.185 A
Reactive Power	4.199 kvar	4.491 kvar	5.091 kvar	13.782 kvar	
Apparent Power	6.072 kVA	6.513 kVA	6.829 kVA	19.415 kVA	
Power Factor	0.7203 ind	0.7260 ind	0.7079 ind		
Power Angle	43.68 °	43.09 °	47.26 °	44.80 °	
THD-U	1.37 %	1.38 %	2.06 %		
THD-I	5.14 %	3.25 %	3.42 %		
Phase to phase measurements	L1-L2	L2-L3	L3-L1	Total	Others
Phase to phase voltage	395.95 V	397.03 V	395.82 V		U ^{ppm} = 395.56 V
Angle	119.71 °	126.13 °	126.14 °		
THD-Upp	5.97 %	2.03 %	1.97 %		
Energy counters	Counter E1	Counter E2	Counter E3	Counter E4	Active tariff
Energy	180.830 kWh	112.477 kWh	16.85 kWh	202.91 kWh	1
Maximum demands	Report demands				
MD Current I1	27.227 A	150.29 A			
MD Current I2	29.067 A	157.36 A			
MD Current I3	31.054 A	164.06 A			
MD Real Power P (positive)	13.773 kW	31.830 kW			
MD Real Power P (negative)	0.0 kW	1.789 kW			
MD Reactive Power Q -L	13.766 kvar	50.602 kvar			
MD Reactive Power Q -C	0.0 var	910.0 var			
MD Apparent Power S	19.405 kVA	101.19 kVA			
Inputs and outputs	I/O #1	I/O #2	I/O #3	I/O #4	
Value	-	-	-	-	



Settings: Alarm Group 1

Alarm 1

Actual value: U1 < 200.0 V [Relay]

Parameter: Voltage U1

Value: Actual value

Condition: U1 < 200 V

80.00 %

☒ Alarm enabled

Action: ☒ Switch on Relay [Relay]

OK Close

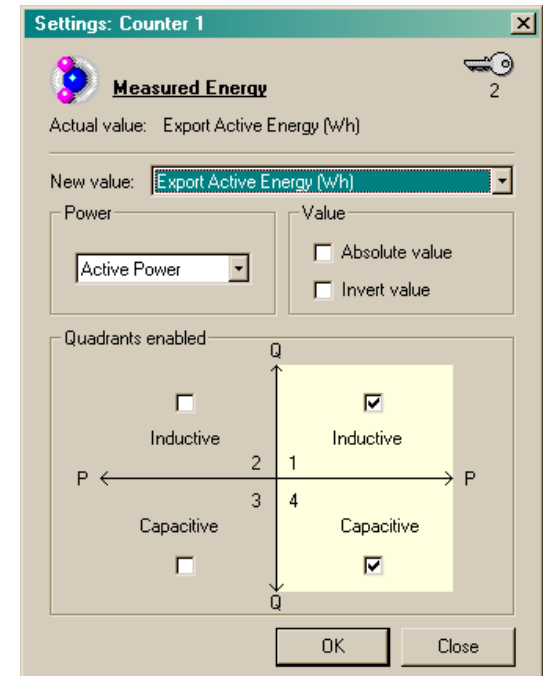
Energy:

- 4 Energy counters
- Energy measurement in all quadrants
- Up to 4 programmable pulse outputs (option)

Communication:

- Serial RS485 / RS232 Communication
- Up to 115.200 bit/s
- Modbus protocol
- USB 2.0 for fast set-up*

* USB communication is not galvanic isolated and can be only used when instrument is not connected to supply and aux. supply



Analogue output:

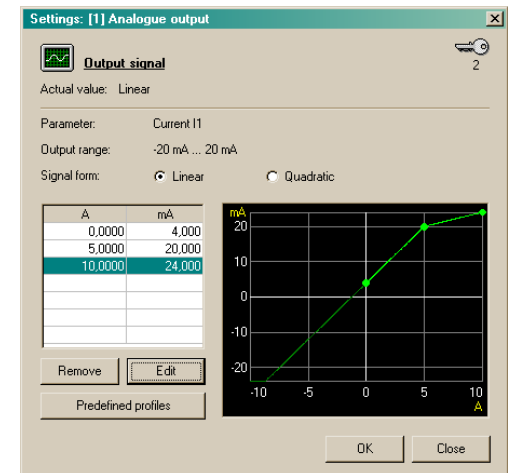
- *Isolated, fully programmable, DC current or voltage output*
- *Up to 5 breakpoints; non-linear characteristics*
- *Standard response time (100ms) and optionally fast response time (50ms)*

Electromechanic relay output:

- *Support for alarms, pulse outputs or as general purpose digital output*

Solid-state relay output:

- *Support for alarms, pulse outputs or as general purpose digital output*



MT 416 Programmable AC Voltage transducer

- *RMS AC voltage measurements*
- *Voltage auto range measurements up to 600 V_{L-N}*
- *Frequency measurement range 16 – 400 Hz*
- *AC or wide auxiliary power supply range
24 – 300 Vdc, 40 – 276 Vac*
- *Accuracy class 0.5 (EN 60688)*
- *Serial (RS232 or RS485) communication*
- *Sophisticated analogue output; 2 voltage and 4 current ranges, non-linear characteristics ...*
- *Simple USB setting without auxiliary power supply*



MT 418 Programmable AC Current transducer

- *RMS AC current measurements*
- *Voltage auto range measurements up to 12 A*
- *Frequency measurement range 16 – 400 Hz*
- *AC or wide auxiliary power supply range
24 – 300 Vdc, 40 – 276 Vac*
- *Accuracy class 0.5 (EN 60688)*
- *Serial (RS232 or RS485) communication*
- *Sophisticated analogue output; 2 voltage and 4 current ranges, non-linear characteristics ...*
- *Simple USB setting without auxiliary power supply*

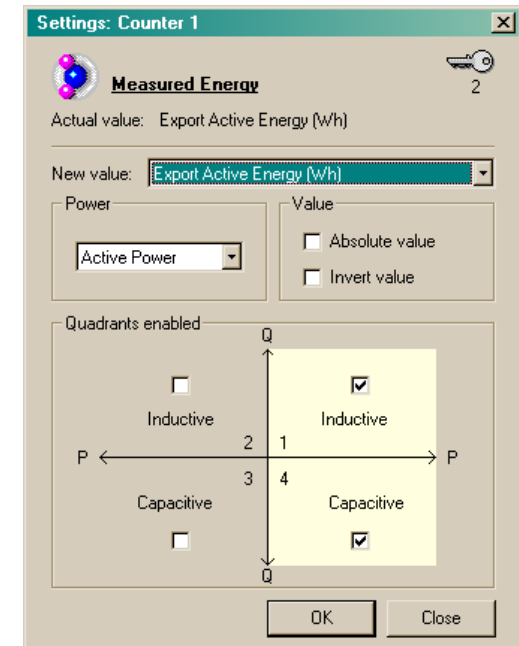


Measured parameters:

- U or I , f
- Maximum Demands (MT418)
- THD

Communication:

- Serial RS485 / RS232 Communication
- Up to 115.200 bit/s
- Modbus protocol
- USB 2.0 for fast set-up*

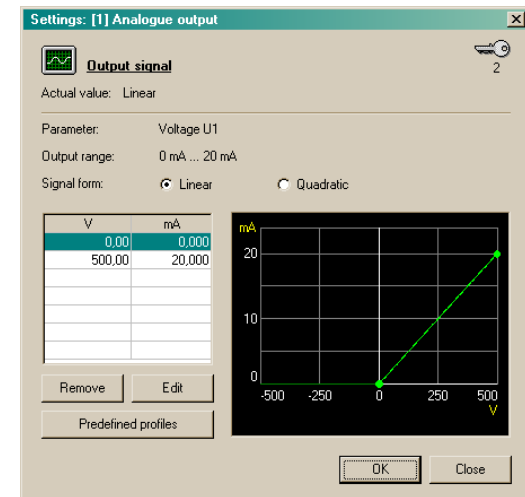


* USB communication is not galvanic isolated and can be only used when instrument is not connected to supply and aux. supply

Analogue output

Analogue output:

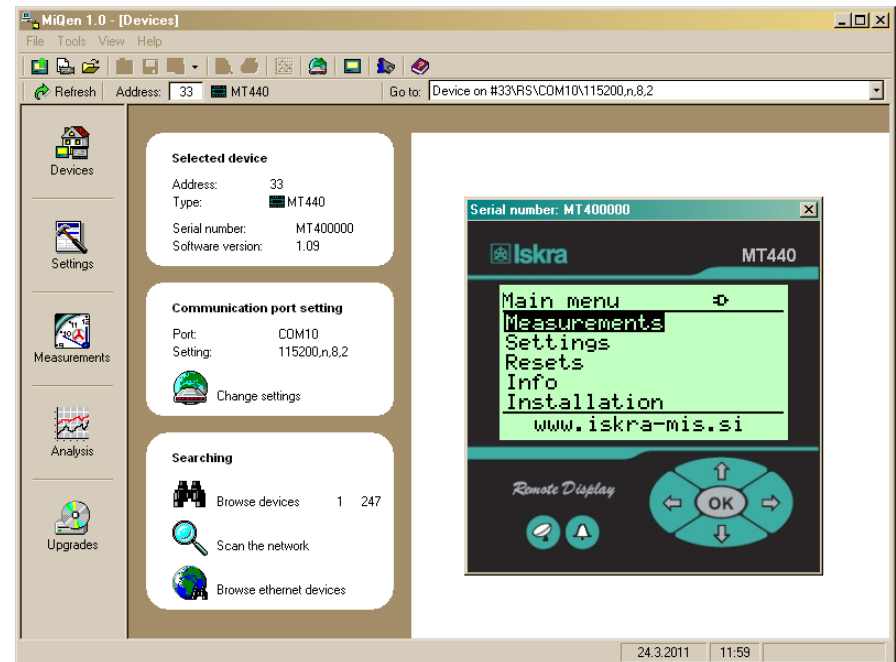
- Isolated, fully programmable, DC current or voltage output
- Programmable input parameter MT416: U, f, THD(U),
- Programmable input parameter MT418: I, f, THD(I), MD, dyn.MD
- Up to 5 breakpoints; non-linear characteristics
- Standard response time (100ms) and optionally fast response time (50ms)



User friendly PC software Multilanguage support

Freeware edition

- *Setting all of the instruments parameters (online and offline)*
- *Viewing present values*
- *Setting and resetting energy counters*
- *Complete I/O modules configuration*
- *Searching the net for devices*
- *Virtual interactive instrument*
- *Comprehensive help support*



MT 406 Self powered AC Voltage transducer

- *Sinusoidal AC voltage measurements*
- *Voltage range measurements up to 500 VL-N*
- *Galvanic insulation between input and output*
- *Accuracy class 0.5 (EN 60688)*
- *Self powered*



MT 408 Self powered AC Current transducer

- *Sinusoidal AC current measurements*
- *Current range measurements up to 6 A*
- *Galvanic insulation between input and output*
- *Accuracy class 0.5 (EN 60688)*
- *Self powered*



Measuring transducer for physical quantities



Common features

- *Programmable inputs and outputs*
Outputs: -20...+20mA; -10...+10V
Bent characteristic - up to 6 breaking points, quadratic function
- *Typical accuracy: class 0.5*
- *User friendly setting software*
MiQen

Process - types

- *MI456 – measuring of DC voltage*
- *Nominal voltages:*
 - 50 mV to 1 V
 - 1 V to 50 V
 - 50 V to 300 V
- *MI458 – measuring of DC current*
- *Nominal currents:*
 - 1mA to 10mA
 - 10mA to 100mA



Measuring transducer for physical quantities

- *MI450 – measuring of resistance of PT100, PT1000...*
- *Connection:*
 - 4 wires
 - 3 wires
 - 2 wires
- *Input range:*
 - 10Ω to $50k\Omega$
 - 100Ω to $500k\Omega$



Family comparison: MI4xx vs MT4xx

OLD FAMILY	REPLACED BY
MI404	MT440
MI400	
MI401	
MI413	
MI414	
MI421	
MI436	
MI438	
MI416	MT416
MI420	
MI418	MT418
MI406	MT406
MI408	MT408
EX104	EX104



MT560 / UMT560 *Multi Transducer & Analyzer*

MT550 / UMT550 *Multi Transducer & Recorder*

MT540 / UMT540 *Multifunction Transducer*

RD500 *Remote Display*

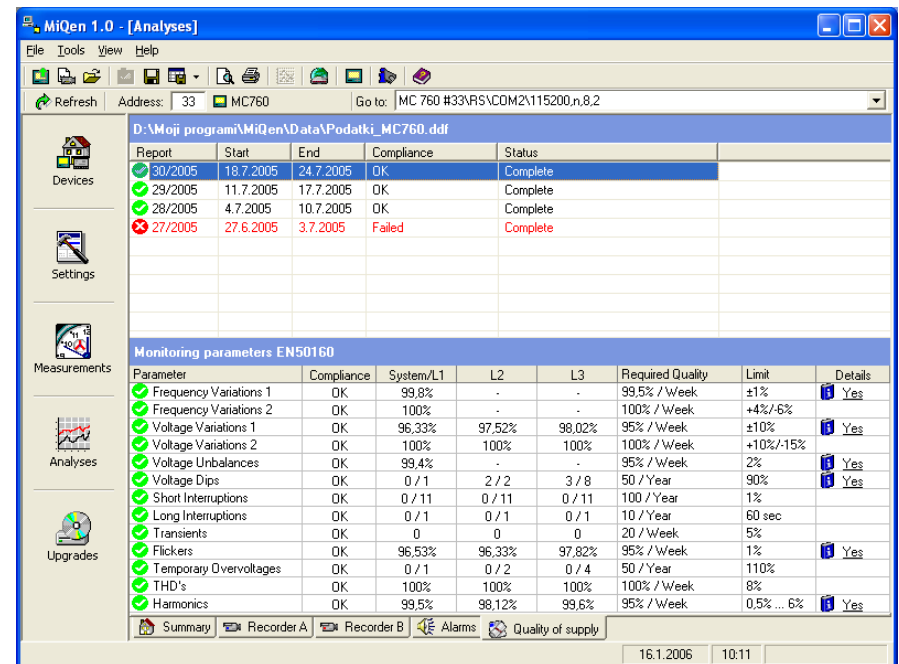
- *EN50160 Power supply quality analyses*
- *Measurements recording – 8 MB Flash*
- *Alarm monitoring*
- *Real time measurements over 150 parameters*
- *Accuracy class 0,2*
- *Min/Max measurements*
- *Energy Cost Management*
- *RS232 & RS485 (Modbus, DNP3) or Ethernet (RTU, TCP) / USB Communication*
- *Up to 4 I/O (Analogue, Pulse, Alarm output, Digital input, COM2)*
- *Remote LED Display connection*
- *Large Frequency range from 16⅔ Hz to 400 Hz*
- *Nominal Voltage and Current Auto range*
- *Universal HI (70-276V AC, 70-300V DC) / LO (48-70V AC, 20-100V DC) power supply*

SIST EN50160

Permanent monitoring for up to 7 years (4 MB Flash)

Monitoring parameters:

- *Frequency variations*
- *Voltage variations*
- *Voltage Dips*
- *Voltage Interruptions*
- *Voltage Unbalances*
- *Rapid voltage changes*
- *Flickers*
- *THD's*
- *Harmonics*



MIQen 1.0 - [Analyses]

File Tools View Help

Refresh Address: 33 MC760 Go to: MC760 #33\RS\COM2\115200,n,8,2

D:\Moji programi\MIQen\Data\Podatki_MC760.ddf

Report	Start	End	Compliance	Status
30/2005	18.7.2005	24.7.2005	OK	Complete
29/2005	11.7.2005	17.7.2005	OK	Complete
28/2005	4.7.2005	10.7.2005	OK	Complete
27/2005	27.6.2005	3.7.2005	Failed	Complete

Monitoring parameters EN50160

Parameter	Compliance	System/L1	L2	L3	Required Quality	Limit	Details
Frequency Variations 1	OK	99.8%	-	-	99.5% / Week	±1%	Yes
Frequency Variations 2	OK	100%	-	-	100% / Week	+4%/-6%	Yes
Voltage Variations 1	OK	96.33%	97.52%	98.02%	95% / Week	±10%	Yes
Voltage Variations 2	OK	100%	100%	100%	100% / Week	+10%/-15%	Yes
Voltage Unbalances	OK	99.4%	-	-	95% / Week	2%	Yes
Voltage Dips	OK	0 / 1	2 / 2	3 / 8	50 / Year	90%	Yes
Short Interruptions	OK	0 / 11	0 / 11	0 / 11	100 / Year	1%	Yes
Long Interruptions	OK	0 / 1	0 / 1	0 / 1	10 / Year	60 sec	Yes
Transients	OK	0	0	0	20 / Week	5%	Yes
Flickers	OK	96.53%	96.33%	97.82%	95% / Week	1%	Yes
Temporary Overvoltages	OK	0 / 1	0 / 2	0 / 4	50 / Year	110%	Yes
THD's	OK	100%	100%	100%	100% / Week	8%	Yes
Harmonics	OK	99.5%	98.12%	99.6%	95% / Week	0.5% ... 6%	Yes

Summary Recorder A Recorder B Alarms Quality of supply

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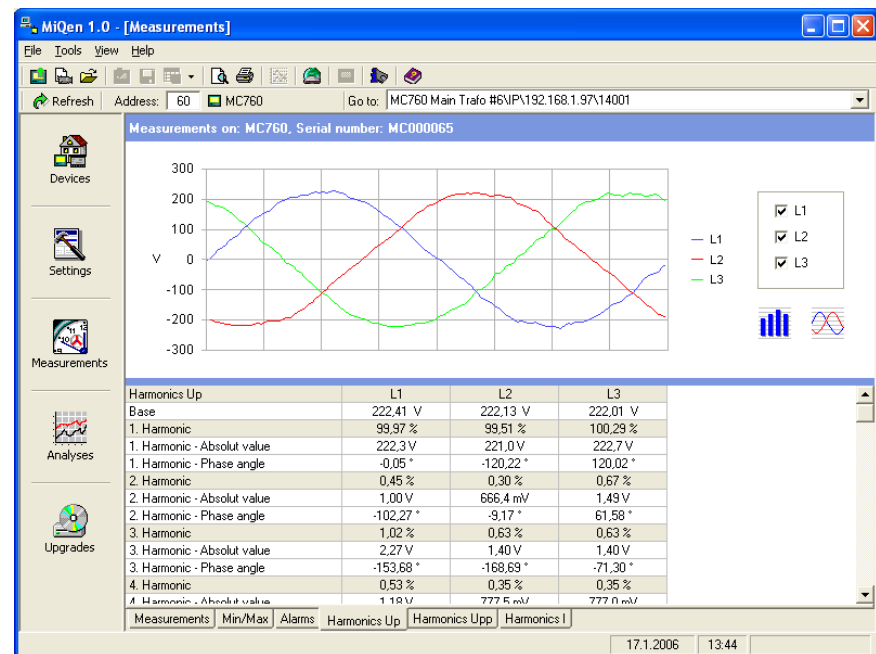
True RMS measurements over 150 parameters

128 samples per cycle

Programmable analogue outputs

Measured parameters:

- $U, I, P, Q, S, PF, PA, f, \varphi$
- *Maximum Demands*
- *THD*
- *Harmonics up to 63rd*
- *Energy*
- *Cost Management*
- *Min / Max values*

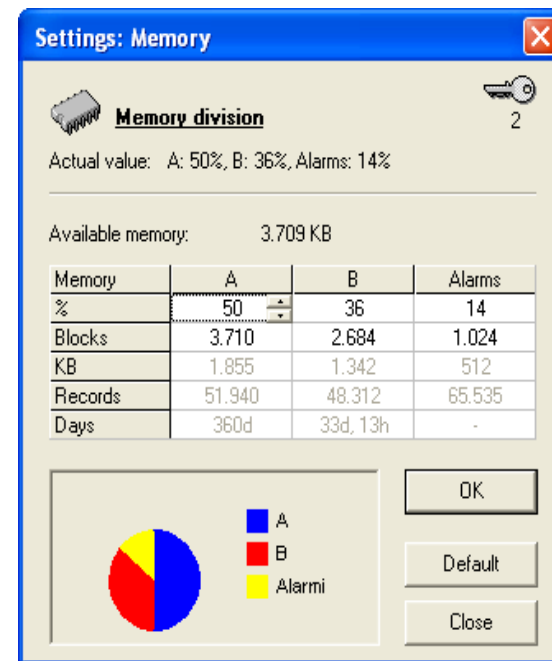


Recording:

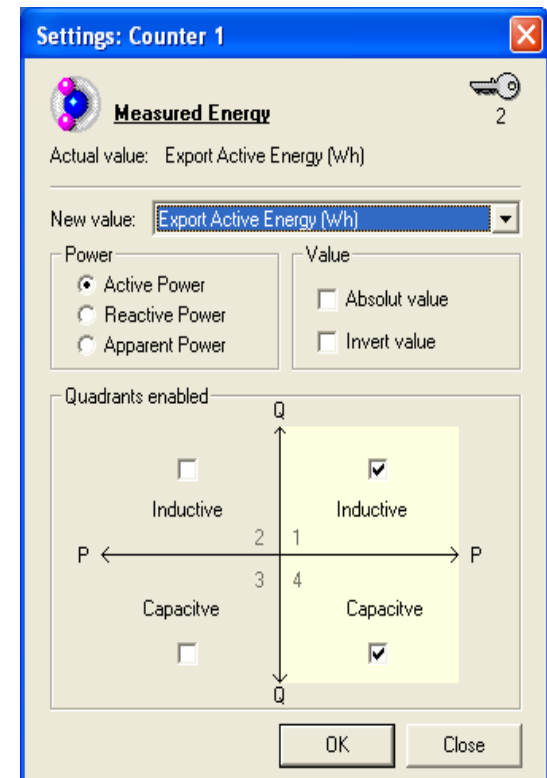
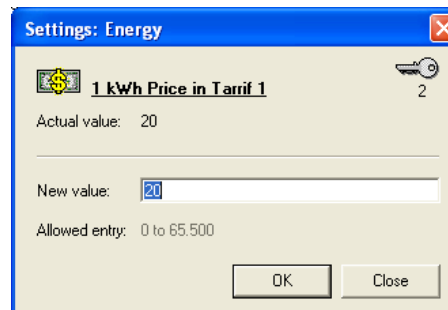
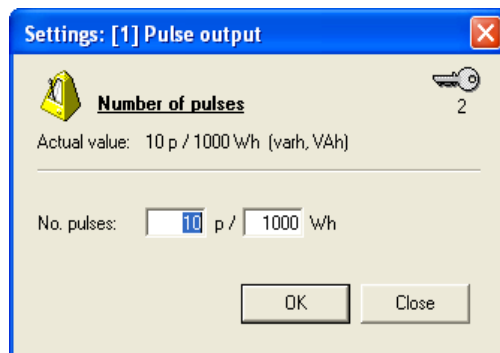
- *8 MB Flash Memory (4MB reserved for Voltage Quality reports)*
- *1 Event (Alarms) + 2 Measurements recorders*
- *Each recorder up to 16 parameters*
- *Sampling time from 1 to 60 min*

Alarms:

- *4 alarm groups*
- *Each group up to 8 alarms*
- *Compare time delay setting*
- *Hysteresis setting*
- *Bistabile, common or solid state relay alarm output*
- *Programmable output signal*



- *4 Energy counters*
- *Energy measurement in all quadrants*
- *Programmable pulse outputs*
- *Tariff inputs*
- *Programmable tariff clock*
- *Cost management*



COM1: Serial or Ethernet / USB

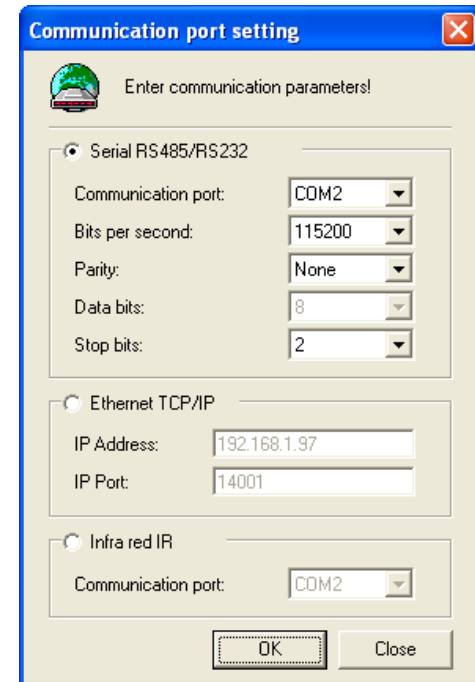
- *RS232 & RS485*
- *Up to 115.200 bit/s*
- *Modbus & DNP3 protocol*

COM2: Serial communication

- *RS232 or RS485*
- *2 Inputs / Outputs remains*

Remote LCD

- *Display data from up to 32 transducers*
- *RS485 communication*



Type differences

	(U)MT540	(U)MT550	(U)MT560
Power supply	Universal , AC	Universal, AC	Universal, AC
Real time clock	●	●	●
Energy counters	4	4	4
Tariff clock	●	●	●
Alarms	32	32	32
Recording	-	● (8 MB)	● (8 MB)
EN50160	-	-	●
Analogue output	○	○	○
Alarm output	○	○	○
Pulse output	○	○	○
Tariff input	○	○	○
Communication	●	●	●
COM2	○	○	○
Remote LED Connection	○	○	○

Available measurements

	(U)MT540	(U)MT550	(U)MT560
Actual values U,I, P,Q,S,PF,PA,f,φ	●	●	●
Energy	●	●	●
Cost management	●	●	●
Maximum demands	●	●	●
Min / Max values	●	●	●
THD	●	●	●
Harmonics	● (up to 31st)	● (up to 31st)	● (up to 63rd)

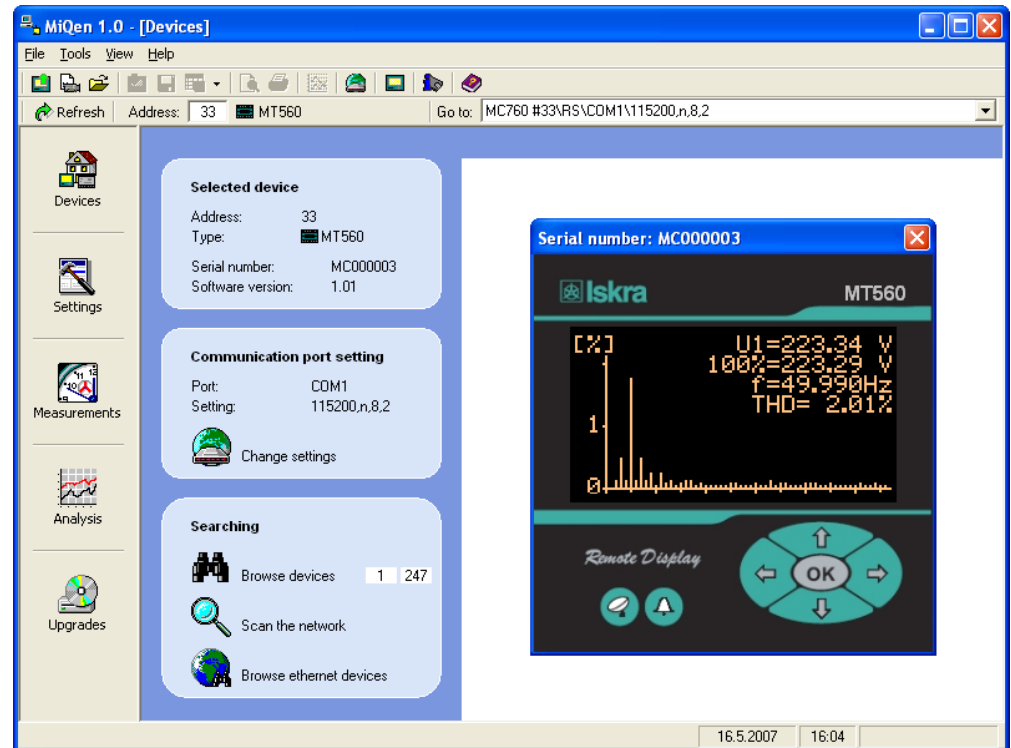
User friendly PC software Multilanguage support

Standard edition (SE)

- *Device management*
- *Settings*
- *Measurements*
- *Upgrades*
- *Freeware*

Professional edition (PE)

- *SE & Analyses*



(U)MT51x

Single phase Measuring Transducers



MT511 / UMT511 *Power Transducer & Recorder*

MT510 / UMT510 *Power Transducer*

MT516 / UMT516 *Voltage Transducer*

MT518 / UMT518 *Current Transducer*

- *Real time single phase measurements (U, I, P, Q, S, f, $\cos\varphi$, energy, THD, MD)*
- *Measurements recording – 8 MB Flash*
- *Alarm monitoring and recording*
- *Accuracy class 0,2*
- *Maximum demand measurements*
- *RS232 & RS485 (Modbus) or Ethernet / USB Communication*
- *Up to 2 I/O (Analogue, Pulse, Alarm, Digital)*
- *Large Frequency range from 16 Hz to 400 Hz*
- *Nominal Voltage and Current Auto range up to 600V, 12.5A*
- *Universal aux. Power Supply*
- *User friendly setting software MiQen*

Type differences

	(U)MT511	(U)MT510	(U)MT516	(U)MT518
Power supply	AC / DC	AC / DC	AC / DC	AC / DC
Real time clock	●	-	-	-
Energy counters	4	4	-	-
Alarms	16	16	16	16
Recording	● (8 MB)	-	-	-
Analogue in / out	○	○	○	○
Digital in / out	○	○	○	○
Alarm output	○	○	○	○
Pulse output	○	○	-	-
Comm. serial	●	●	●	●
Comm. Ethernet / USB	○	○	○	○

Available measurements

	(U)MT511	(U)MT510	(U)MT516	(U)MT518
Actual values: U, f	●	●	●	-
Actual values: I, f	●	●	-	●
Actual values: P,Q,S,PF,φ	●	●	-	-
Energy	●	●	-	-
Maximum demands	●	●	●	●
THD U	●	●	●	-
THD I	●	●	-	●

User friendly PC software

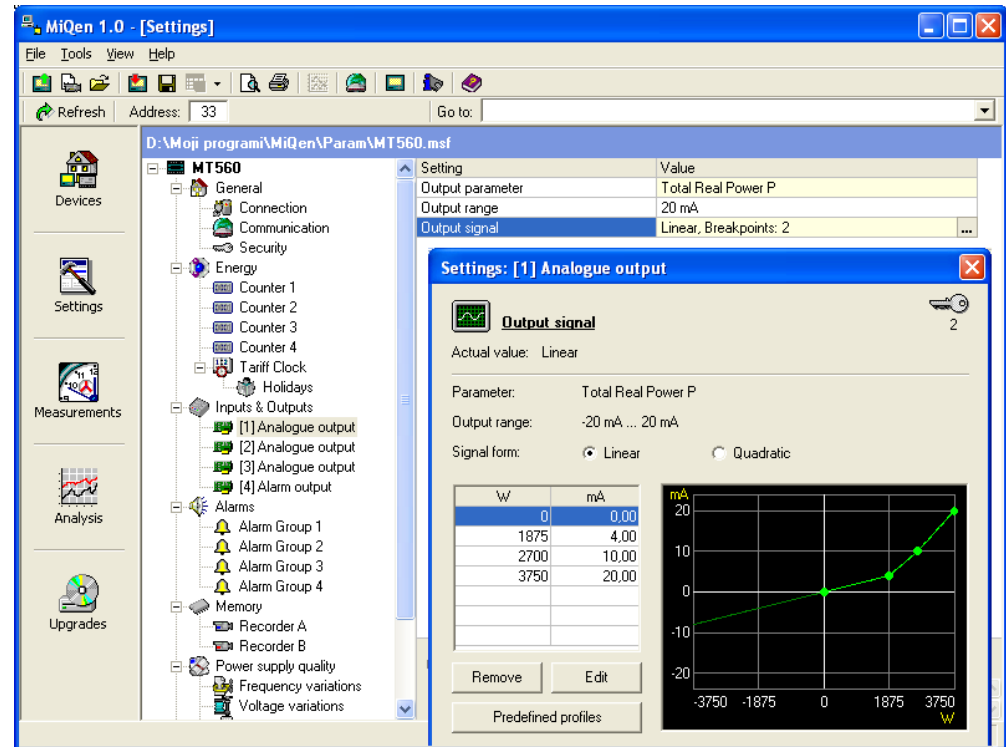
Multilanguage support

Standard edition (SE)

- *Device management*
- *Settings*
- *Measurements*
- *Upgrades*
- *Freeware*

Professional edition (PE)

- *SE & Analyses*



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