



# CURRENT TRANSDUCER UMT 518/MT 518

- True RMS **AC current measurements**.
- Current auto range measurements up to **12.5 A**.
- **Wide frequency measurement range** 16 Hz – 400 Hz.
- High **accuracy class 0.2** (IEC-688), **0.1 on communication**.
- **Serial or Ethernet and USB** communication.
- Up to **two I/O modules**.
- Powerful **analogue out**; 6 voltage and current ranges, non-linear characteristics, etc..
- **User friendly PC setting software**.

## FEATURES

- Measurements of true RMS current, frequency, THD I and MD.
- High accuracy class 0.2 (IEC-688).
- Frequency range from 16 Hz to 400 Hz.
- 16 adjustable alarms.
- RS232/RS485 communication up to 115,200 bit/s or USB communication and Ethernet simultaneously.
- MODBUS communication protocol.
- Up to 2 inputs or outputs (analogue outputs, digital inputs, alarm outputs, digital outputs).
- Universal power supply (two voltage ranges).
- Automatic range of nominal current (max. 12.5 A).
- Housing for DIN rail mounting.
- User-friendly PC MiQen software.

## DESCRIPTION

(U)MT 518 is intended for measuring and monitoring single-phase electrical power network. Input current is electrically isolated from the system by means of current transformer. (U)MT 518 measures true RMS current value by means of fast sampling of current signals, which makes instruments suitable for acquisition of transient events. A built-in microcontroller calculates measurands (current, frequency, THD I, MD) from the measured signals. Measurands can be then converted into load independent DC current or voltage which is proportional to the true RMS measured value for the purpose of regulation of analogue and/or digital devices.

## COMPLIANCE WITH STANDARDS

<b>Standard EN</b>	<b>Description</b>
61010-1:2001	<i>Safety requirements for electrical equipment for measurement, control and laboratory use</i>
60688:1995 / A2: 2001	<i>Electrical measuring transducers for converting AC electrical variables into analogue and digital signals</i>
61326-1:2006	<i>EMC requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements</i>
60529:1997/A1:2000	<i>Degrees of protection provided by enclosures (IP code)</i>
60 068-2-1/ -2/ -6/ -27/-30	<i>Environmental testing (-1 Cold, -2 Dry heat, -30 Damp heat, -6 Vibration, -27 Shock)</i>
UL 94	<i>Tests for flammability of plastic materials for parts in devices and appliances</i>

## APPLICATION

The (U)MT 518 current transducer is used for a permanent monitoring of a single-phase current and frequency values. Wide range of various I/O modules makes (U)MT 518 a perfect choice for numerous applications. (U)MT 518 is delivered configured to default values. Subsequent customer configuration is possible with user friendly setting software MiQen. (U)MT 518 supports a wide range of communication interfaces. Standard serial RS232/485 with speed up to 115200 baud is perfect for simple applications and serial bus interfacing. Ethernet 10/100 is ideal for a long distance monitoring and configuration of numerous transducers. USB 2.0 can be used for a fast set-up or memory acquisition.

## TECHNICAL DATA

### Measurement input:

- Nominal frequency range 50 Hz, 60 Hz
- Measuring frequency range: 16 Hz–400 Hz (max. 1000 Hz)

### Current measurements:

- Nominal value ( $I_N$ ) 0.31 A...5 A
- Max. measured value 12.5 A sinusoidal
- Max. allowed value (thermal) 15 A cont.
- (acc. to IEC/EN 60 688)  $20 \times I_N$ ;  $5 \times 1$  s
- Consumption  $< I^2 \times 0.01 \Omega$  per phase

### System:

Current inputs can be connected either directly to low-voltage network or shall be connected to network via a corresponding current transformer (with standard 1 A or 5 A outputs).

## BASIC ACCURACY UNDER REFERENCE CONDITIONS

### Total accuracy (measurements and analogue output) according to IEC/EN 60 688.

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

Measurand	Accuracy ( $\pm\%$ of reading)	
Current Rms	0.2	0.1 <sup>(1)</sup>
Frequency (f)	10 mHz	
THD(I) (0...400 %)	0.5	

<sup>(1)</sup> On communication

## COMMUNICATION

(U)MT 518 has a wide variety of communication possibilities to suit specific demands. It is equipped with two standard communication ports (COM1A and COM1B). This allows different users to access data from a device simultaneously and by using ethernet communication, data can be accessed worldwide.

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

Configuration	COM1A	COM1B
1	RS232/485 <sup>(1)</sup>	/
2	Ethernet	USB

<sup>(1)</sup> RS485 communication is available through DB9 or screw-in terminals, while RS232 is available only through DB9

Serial communication:	RS232 <sup>(1)</sup>	RS485 <sup>(1)</sup>
Connection type	Direct	Network
Connection terminals	DB9 <sup>(1)</sup>	screw terminals <sup>(1)</sup>
Function	Settings, measurements and records acquisition, firmware upgrade	
Insulation	Protection class I, 3.3 kV <sub>ACRMS</sub> 1 min	
Max. connection length	3 m	1000 m
Transfer mode	Asynchronous	
Protocol	MODBUS RTU	
Transfer rate	2.4 kBaud to 115.2 kBaud	
Number of bus stations	/	$\leq 32$

<sup>(1)</sup> Both types of comm. are available but only one at a time

### Ethernet:

Connection type	Network
Connection terminals	RJ-45
Function	Settings, measurements and records acquisition, firmware upgrade
Insulation	Protection class I, 3.3 kV <sub>ACRMS</sub> 1 min
Transfer mode	Asynchronous
Protocol	MODBUS TCP
Transfer rate	10/100 Mb/s autodetect

### USB:

Connection type	Direct
Connection terminals	USB-B
Function	Settings, measurements and records acquisition, firmware upgrade
Insulation	Protection class I, 3.3 kV <sub>ACRMS</sub> 1 min
Transfer mode	Asynchronous
Protocol	MODBUS RTU, DNP3 (autodetect)
Transfer rate	USB 2.0

## INPUT/OUTPUT MODULES

(U)MT 518 is equipped with two multipurpose input/output slots. The following modules are available:

Alarm (digital) output	2 outputs	any I/O
Analogue output	2 outputs	any I/O
Digital input	2 inputs	any I/O
Watchdog (status) output	2 outputs	any I/O
Alarm (digital) output	2 outputs	any I/O
Analogue output	2 outputs	any I/O
Digital input	2 inputs	any I/O
Watchdog (status) output	2 outputs	any I/O
Alarm (digital) output	2 outputs	any I/O

### Analogue output:

Each of up to two analogue outputs is fully programmable and can be set to any of 6 hardware ranges, 4 current and 2 voltage, without opening an instrument. They all use the same output terminals.

### Programmable DC current output:

Output range values –100...0...100%

-1...0...1 mA	Range 1
-5...0...5 mA	Range 2
-10...0...10 mA	Range 3
-20...0...20 mA	Range 4
other ranges possible	by MiQen software

Burden voltage	10 V
External resistance	$R_{Bmax} = 10 \text{ V} / I_{outN}$

### Programmable DC voltage output:

Output range values –100 %...0...100 %

-1...0...1 V	Range 5
-10...0...10 V	Range 6
other ranges possible	by software

Burden current	5 mA
External resistance	$R_{Bmin} = U_{outN} / 5 \text{ mA}$

### General:

Linearization	Linear, Quadratic
No. of break points	5
Output value limits	$\pm 120\%$ of nominal output
Response time (measurement and analogue output)	< 100 ms
Residual ripple	< 0.5 % p.p.

The outputs 1 and 2 may be either short or open-circuited. They are electrically insulated from each other (500 VACrms) and from all other circuits (3320 VACrms).

All output range values can be altered subsequently (zoom scale) using the setting software, but a supplementary error results (see INTRINSIC ERROR).

### Alarm (digital) output:

Type	Relay switch
Rated voltage	48 V AC/DC (+40% max)
Max. switching current	200 mA
Contact resistance	$\leq 100 \text{ m}\Omega$ (100 mA, 24 V)
Impulse	Max. 4000 imp/hour Min. length 100 ms

Insulation voltage	
Between coil and contact	4000 VDC
Between contacts	1000 VDC

### Digital input

Rated voltage	48 V AC/DC ( $\pm 40\%$ max)
Max. current	< 1,5 mA
Min. signal width	20 ms
Min. pause width	40 ms
SET voltage	40 %...120 % of rated voltage
RESET voltage	0 %...10 % of rated voltage

### Watchdog (status) output

Type	Relay switch
Normal operation	Relay in ON position
Failure detection delay	$\approx 1.5 \text{ s}$
Rated voltage	48 V AC/DC (+40 % max)
Max. switching current	1000 mA
Contact resistance	$\leq 100 \text{ m}\Omega$ (100 mA, 24 V)

## UNIVERSAL POWER SUPPLY

### Standard (high):

Nominal voltage AC	80 V...276 V
Nominal frequency	40 Hz...65 Hz
Nominal voltage DC	70 V...300 V
Consumption	< 5 VA
Power-on transient current	< 20 A ; 1 ms

### Optional (low):

Nominal voltage AC	48 V...77 V
Nominal frequency	40 Hz...65 Hz
Nominal voltage DC	19 V...70 V
Consumption	< 5 VA
Power-on transient current	< 20 A ; 1 ms

## SAFETY:

Protection:	protection class I (protective earth terminal due to touchable metal parts (USB-B, RJ-45, DB9), current limiting fuse 1 A on aux. supply Voltage inputs via high impedance Double insulation for I/O ports and COM1 port
 	
Pollution degree	2
Installation category	CAT III ; 600 V <sub>⊥</sub> meas. inputs CAT III ; 300 V <sub>⊥</sub> aux. supply Acc. to EN 61010-1
Test voltages	UAUX↔I/O, COM1: 2210 VACrms UAUX↔U inputs: 3320 VACrms U inputs↔I/O, COM1: 3320 VACrms U inputs↔I inputs: 3320 VACrms
Enclosure material	PC/ABS Acc. to UL 94 V-0
Enclosure protection	IP 40 (IP 20 for terminals)

## MECHANICAL

Dimensions	(100 × 127 × 75) mm
Mounting	Rail mounting (35 × 15) mm acc. to DIN EN 50 022
Enclosure material	PC/ABS, PC (sliding cover)
Flammability	Acc. to UL 94 V-0
Weight	375 g

## AMBIENT CONDITIONS:

Ambient temperature	usage group II 0...15...30...45 °C Acc. to IEC/EN 60 688
Operating temperature	-30 °C to +70 °C (2x rated class)
Storage temperature	-40 °C to +70 °C
Average annual humidity	≤ 93% r.h.
Average annual humidity	≤ 93% r.h.

## REFERENCE CONDITIONS:

Ambient temperature	15°C...30°C
Relative humidity	≤ 93% r.h.
Voltage input	57.7 V...500 V
Current input	0.31 A...5 A
Frequency	45 Hz...65 Hz
Active/Reactive power factor	cosφ = 1, sinφ = 1
Waveform	Sinus

**INTRINSIC-ERROR (FOR ANALOGUE OUTPUTS):**

For intrinsic-error for analogue outputs with bent or linear-zoom characteristic multiply accuracy class with correction factor (c). Correction factor c (the highest value applies):

Linear characteristic

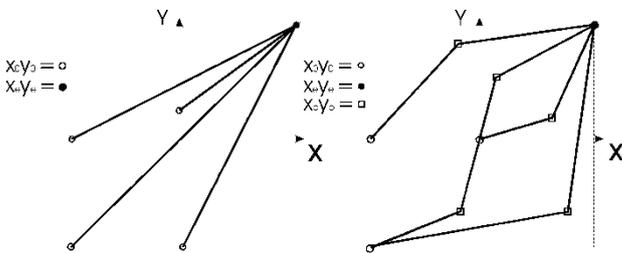
$$c = \frac{1 - \frac{y_0}{y_e}}{1 - \frac{x_0}{x_e}} \quad \text{or} \quad c = 1$$

Bent characteristic

$$x_{b-1} \leq x \leq x_b$$

b – number of break point (1 to 5)

$$c = \frac{y_b - y_{b-1}}{x_b - x_{b-1}} \cdot \frac{x_e}{y_e} \quad \text{or} \quad c = 1$$



Limit of the output range

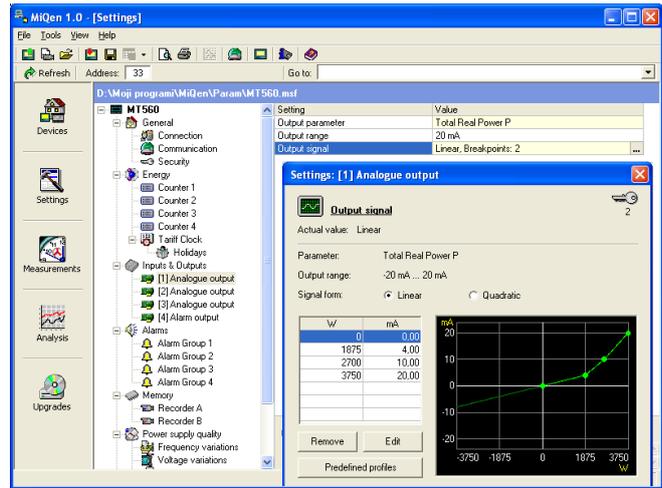
Examples of settings with linear and bent characteristic.

**ALARMS**

(U)MT 518 supports recording and storing of 16 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.

**MIQEN - SETTING AND ACQUISITION SOFTWARE**

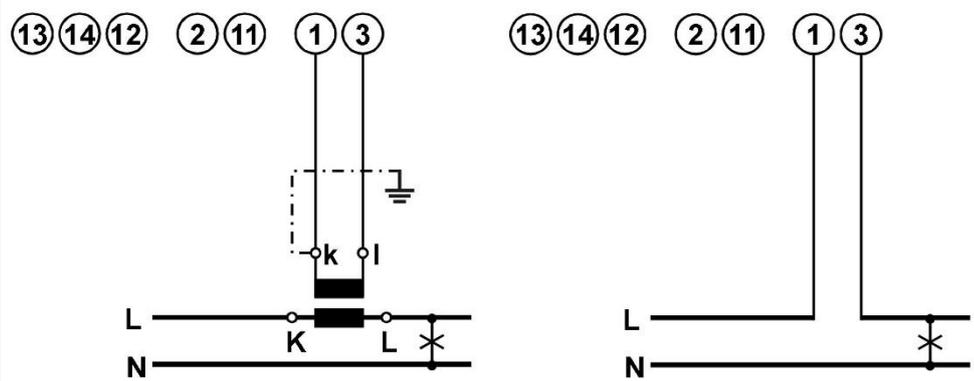
MiQen software is intended for supervision of (U)MT 518 and many other instruments on a PC. Network and the transducer setting, display of measured and stored values and analysis of stored data in the transducer are possible via the serial, Ethernet or USB communication. The information and stored measurements can be exported in standard Windows formats. Multilingual software functions on Windows 98, 2000, NT, XP operating systems.



MiQen software is intended for:

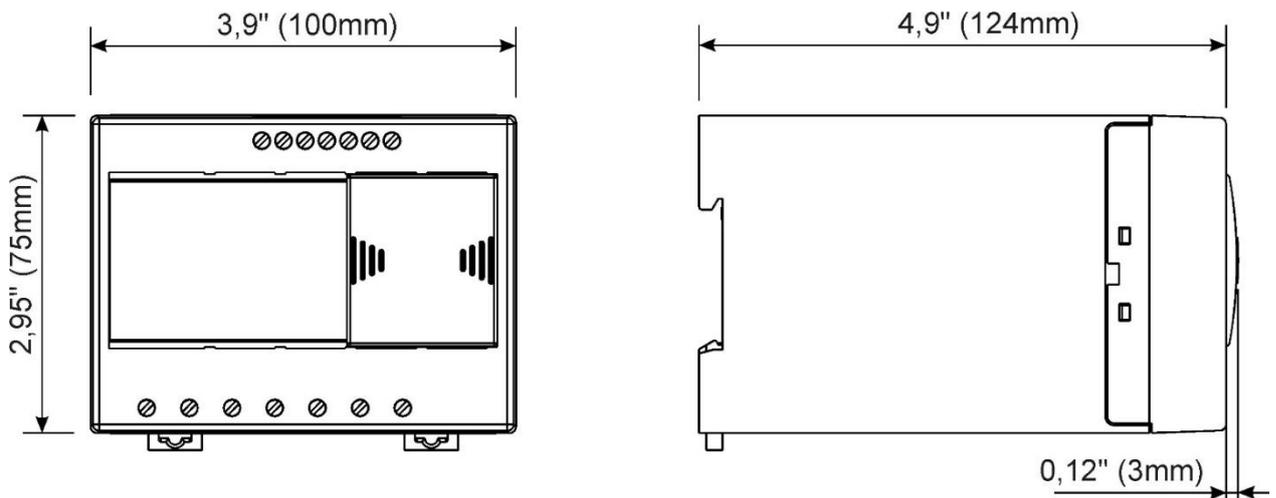
- Setting all of the instruments parameters (online and offline).
- Viewing current measured readings.
- Setting and resetting energy counters.
- Complete I/O modules configuration.
- Upgrading instruments firmware.
- Searching the net for devices.
- Virtual interactive instrument.
- Comprehensive help support.

## CONNECTION

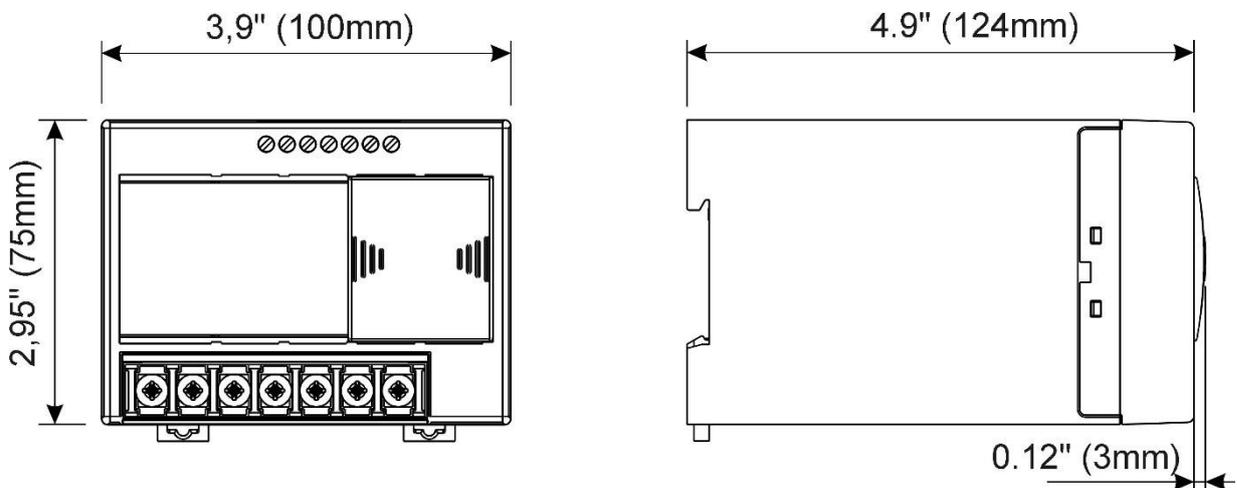
System/ connection	Terminal assignment
Single-phase connection 1b (1W)	

## DIMENSIONAL DRAWING

Dimensions for MT 518 (standard EU clamp style terminals):



Dimensions for UMT 518 (ring type terminal block):



**CONNECTION TABLE**

Function			Connection
Measuring input:	AC current	IL1	1/3
			2
			11
		I/O	
Inputs / outputs:	Module 1	⊖ → +	15
		⊖ → —	16
	Module 2	⊖ → +	17
		⊖ → —	18
Auxiliary power supply:	+ / AC (L)		13
	- / AC (N)		14
	GROUND		12
Communication:	RS485	Rx / A	23*#
		NC	24*#
		Tx / B	25*#

\*If ETHERNET/USB communication is supported, terminals 23, 24, and 25 are not used (unconnected)

# RS232 communication is available only on DB9 connection terminal under transparent cover

## DATA FOR ORDERING

### (U)MT 518:

The following data shall be stated:

- Type of a transducer
- Type of power supply
- Type of communication
- Type of I/O module(s)

### Supplement:

MiQen software

## ORDERING

When ordering (U)MT 518, all required specifications should be stated in compliance with the ordering code. Additional information could be stated regarding functionality of analogue outputs. Default settings for analogue outputs provided that no ordering information is given will be:

Analogue output	Input quantity	Output quantity
AO1	IL1 (0...5) A	0...20 mA
AO2	f (45...65) Hz	0...20 mA

If different analogue output settings are required, a proper input quantity / output quantity pair for each analogue output should be provided.

The transducers automatic range of input current (5 A) is not stated in the code.

### Example of ordering:

**MT 518** with EU style clamp terminals and with a universal-HI supply is connected to a universal high voltage and 5 A secondary current on 50 Hz network. Ethernet & USB communication, digital input as I/O1 and relay output as I/O2.

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

Example ordering code:

```

MT 518  S  H  E  F  M
          |  |  |  |  |
          |  |  |  |  Relay (alarm) output
          |  |  |  Digital input 48 V AC/DC
          |  |  Ethernet & USB
          |  70 VDC.. 300 VDC, 80 VAC... 276 VAC
          50 Hz, 60 Hz
    
```



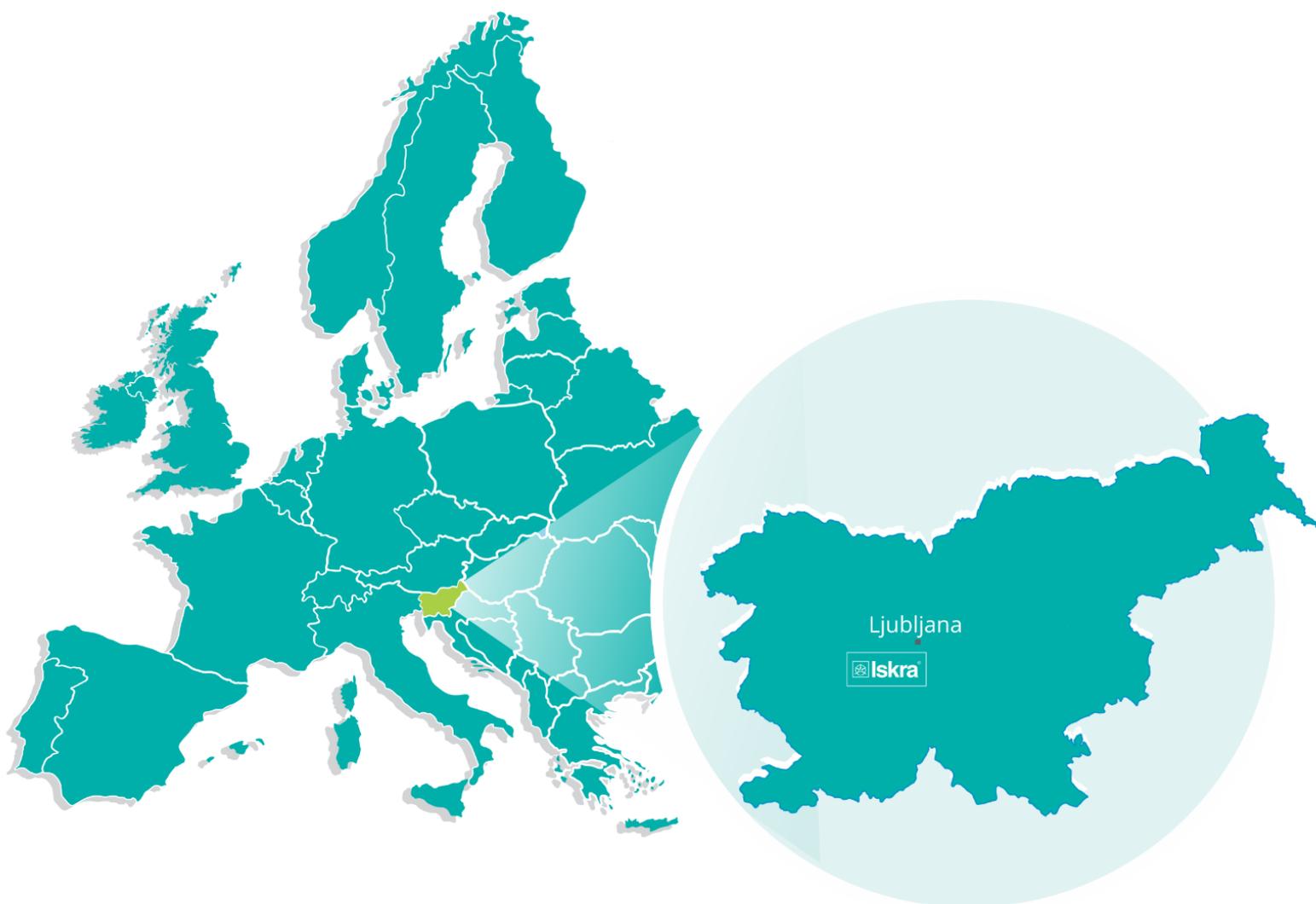
## DISPOSAL



It is forbidden to deposit electrical and electronic equipment as municipal waste.  
The manufacturer or provider shall take waste equipment free of charge.

## DICTIONARY:

<i>RMS</i>	<i>Root Mean Square</i>
<i>PO</i>	<i>Pulse output</i>
<i>TI</i>	<i>Tariff input</i>
<i>PA</i>	<i>Power angle (between current and voltage)</i>
<i>PF</i>	<i>Power factor</i>
<i>THD</i>	<i>Total harmonic distortion</i>
<i>Ethernet</i>	<i>IEEE 802.3 data layer protocol</i>
<i>MODBUS/DNP3</i>	<i>Industrial protocol for data transmission</i>
<i>MiQen</i>	<i>ISKRA setting and acquisition Software</i>
<i>AC</i>	<i>Alternating quantity</i>
<i>IR</i>	<i>Infrared (optical) communication</i>



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