

K 2006

Three-phase Comparator (Class 0.01) for verification of Reference Standard Meters and other precision Electrical Measuring Equipment and Systems



The K 2006 is a three phase comparator which has been especially developed for universal laboratory and test area use. It is intended for checking and calibration of reference standard power and energy meters, for calibration of precision current and voltage sources and for verification of electrical standard measurements and electricity meter test systems.

The unit uses analogue - digital converters (ADCs) for its data acquisition, these being controlled and read by a digital signal processor (DSP).

The comparator may be directly connected to an external computer system over its RS 232 C serial interface.

The comparator is distinguished by having very wide measuring ranges for all AC values while still being of accuracy class 0.01%:

Voltage: 30 V ... 500 V
Current: 50 mA ... 160 A.

In addition, low currents from 1 mA are measured.

Range selection may be made either manually or automatically.

The advanced conception of the K 2006 Comparator is based on our considerable previous experience of reference standard meters and comparators. The instrument is capable of measuring all principle parameters of a mains frequency network, from 15 to 70 Hz, and harmonics up to 3500 Hz.

The basic accuracy of the system is 0.01%. The transfer error of the unit can be verified at any time by using an external DC reference voltage.

Features

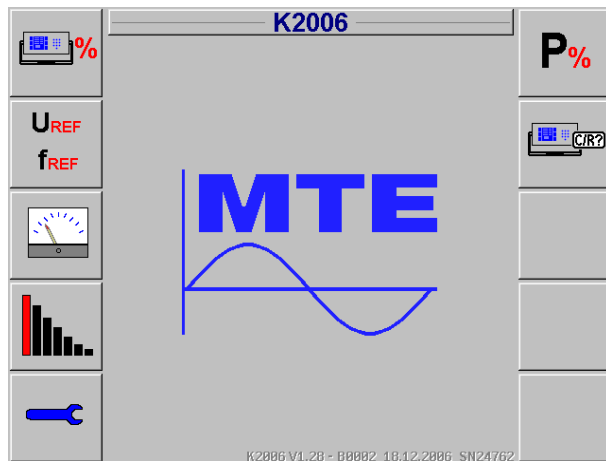
- Excellent price / performance ratio
- Universal unit for many applications
- One wide range input for each signal:
Voltage: 30 V - 500 V
Current: 1 mA - 160 A
- High precision and long term stability
- Can be used with computer system
- Automatic range switching
- Analogue - digital data acquisition with 6 x ADCs
- Verification against D.C. reference voltage
- Error calculator for test of reference standard meters
- Harmonics measurement up to 32nd
- Display of vector diagram or waveform

Options

- Software package for portable and laboratory system applications

Software and Operation

Main Menu



The main functions, error %, test against U-ref, f-ref, load values $UI\phi$, harmonics and basic system settings are directly accessed with soft keys.

Technical Data

Measuring values

Phase angle:	0° ... 360°
Frequency:	15 ... 70 Hz
Bandwidth:	up to 3500 Hz

Voltage

Voltage range:	30 V ... 500 V
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Current

Current range:	1 mA ... 160 A
	50 mA ... 160 A
	10 mA ... 50 mA
	1 mA ... 10 mA

Power / Energy

	30 V ... 500 V
	50 mA ... 160 A
	10 mA ... 50 mA
	1 mA ... 10 mA

External DC-Source

Reference Voltage:	1 / 10 VDC
DC-Input:	0.9 - 1.1 V
	9 - 11 V

General Data

Supply:	90 V ... 280 V, 45 ... 66 Hz.
Dimensions:	W 609 x H 165 x D 345 mm
Weight:	17 kg
Display:	Colour monitor
Interfaces:	RS 232 C

Ambient Conditions

Temperature range:	15 °C ... 40 °C
Temperature coefficient:	Voltage / Current
	Power
	Reference voltage
	Reference frequency

Meter constant

Active, reactive
apparent energy:

$$CP = 20'800 / (Un \cdot In) \text{ Imp/Ws (vars, VAs)}$$

$$cp = 7.488E+10 / (Un \cdot In) \text{ Imp/kWh (kvarh, kVAh)}$$

The meter constant of the impulse outputs depends on the highest selected internal current $In(A)$ and voltages $Un(V)$ ranges. Each range combination has its own meter constant.

Example: $Un = 260 \text{ V}$, $In = 8 \text{ A}$

$$CP = 10 \text{ Imp/Ws (vars, VAs)}$$

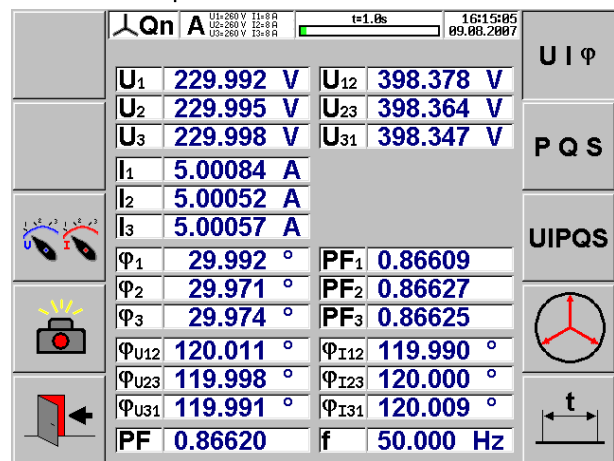
$$cp = 3.6E+07 \text{ Imp/kWh (kvars, kVAh)}$$

Output level: 5 V (galvanic isolation)

Output frequency: $fo = 20'800 / (Un \cdot In) \cdot P\Sigma (Q\Sigma, S\Sigma) \text{ Hz}$

$$fmax. = 62'400 \text{ Hz}$$

Submenu $UI\phi$



Further sub-menus provide access to power measurement (PQS), vector diagram, phase-phase voltage U , phase angles $U-U$, $I-I$ are directly accessed via the soft keys. Ranges can be fixed, results can be stored in internal memory. The exit key is used to return to the next higher menu level.

Measurement Error

$\leq 0.005^\circ$

Drift

$\leq 80 \text{ ppm}$

$\leq 15 \text{ ppm / year}$

$\leq 80 \text{ ppm}$

$\leq 25 \text{ ppm / year}$

$\leq 120 \text{ ppm}$

$\leq 25 \text{ ppm / year}$

$\leq 200 \text{ ppm}$

$\leq 25 \text{ ppm / year}$

$\leq 100 \text{ ppm}^*$

$\leq 30 \text{ ppm / year}$

$\leq 150 \text{ ppm}^*$

$\leq 30 \text{ ppm / year}$

$\leq 250 \text{ ppm}^*$

$\leq 30 \text{ ppm / year}$

* Related to the apparent power ($\cos \phi = 1$)

$\leq 60 \text{ ppm}$

$\leq 25 \text{ ppm / year}$

$\leq 50 \text{ ppm}$

$\leq 20 \text{ ppm / year}$