COM1003 | COM3003

Single Phase or Three Phase Comparator

Primary Standard with Accuracy Class 0.01

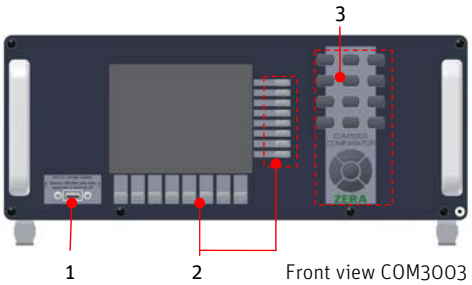
The System Concept

Comparator COM1003/COM3003 is part of the ZERA high precision measuring instrument series. To meet the requirements a single phase COM1003 or a three phase COM3003 is available.

As AC/DC transfer standard comparator serves for testing current and voltage meters as well as single phase or poly phase* power and energy meter testing systems in metrological institutes, official testing places and other testing fields of energy suppliers or manufacturers of electricity meters.

Via soft keys, 6.4″ colour display and integrated user software MT3701 inputs, measurements and visualisations will be performed during the operation. An additional external control including evaluation and report generation is achieved via windows based user software SSM3000 and external Windows PC.

* only COM3003



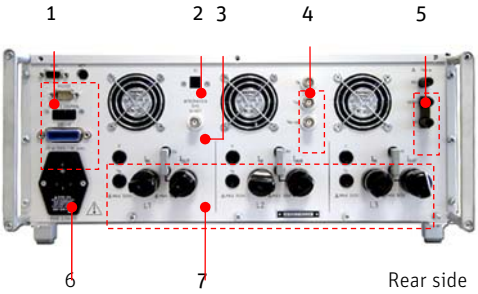
Front view COM3003
Three-phase Comparator

1	USB connection
2	Softkeys
3	Alphanumeric keypad, Enter and cursor keys

Features

- High accuracy (class 0.01), independent of measuring mode
- Excellent long-term stability by using of DC-capable current transformers
- Recalibration period by PTB can possibly be set for > 2 years
- RS232 and IEEE 488 interface
- SCPI compatible IEEE488 interface commands
- Automatic measuring range selection
- Only one current input for the complete measuring range
- Direct traceability of measuring accuracy by connection of DC- and frequency standard devices

COM3003 with suitcase



Rear side
COM3003

1	Interface: RS232, Remote control, IEEE, VGA and external keypad
2	Scanning head input f. comparative P measurement
3	Quartz output for integration time
4	Power proportional pulse outputs (2x) Pulse inputs for comparative P measurement (1x)
5	1 V and 10 V DC reference input
6	Mains supply 115/230 V
7	Current and voltage inputs

Functions

The following functions are available via softkeys:

- Actual values
- Vectorial diagram
- Curve diagram
- Harmonic measurement
- Error measurement
- Reference measurement

User Software Data management

Individual functions of the integrated user software are described in the following.

Measurement data can be stored on an especially configured USB stick.

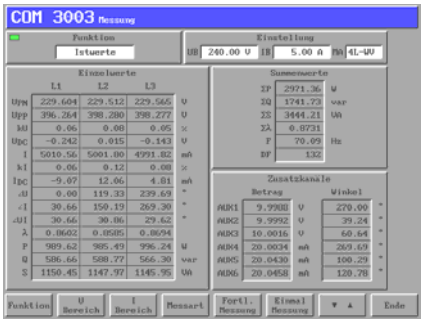
For evaluation and reporting of the measurement results data management software MTVis can be used on external PC.

Display with softkeys

Actual Values Measurement

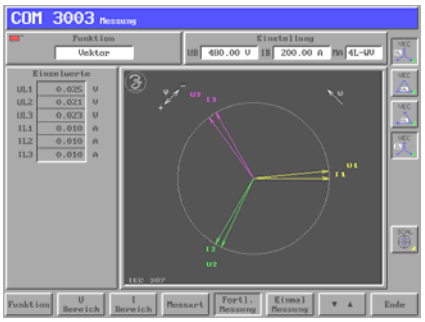
The following system parameters are displayed as averages values over an adjustment integration time:

- RMS values of phase voltages and currents and their DC component
- All angles between currents and voltages calculated from the fundamental components
- Active, reactive and apparent power, per phase or total
- Frequency and direction of rotating field



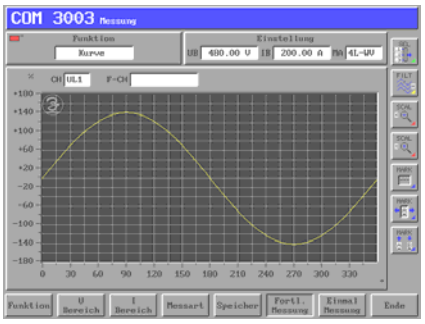
Vector Display

Actual values can be displayed in table form or as vectorial graphic.



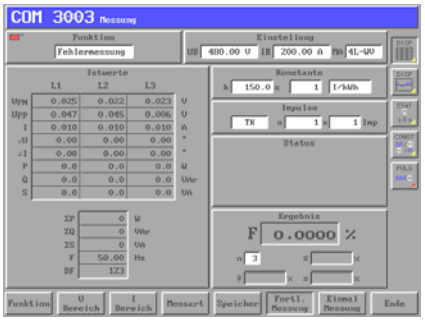
Waveform Display

The waveforms of voltage and currents can be measured and displayed. The user can choose between display as curves with indication of individual values and harmonic displaying with individual distortion values.



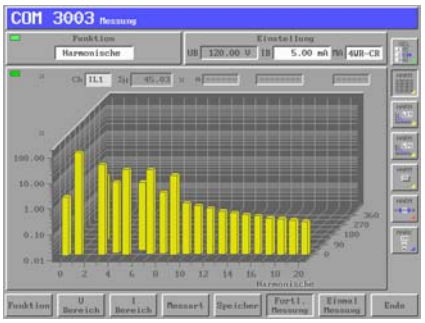
Error Measurement

Static and electromechanical power meters as well as all kind of measuring instruments with power proportional frequency output can be tested in the menu “Error measurement”.
The user can select between scanning head input or frequency input.



Harmonic Measurement

Harmonic spectrum measurement in voltage and current up to the 40th THD conforming to EN50160. The harmonic spectrum can be displayed in a chart or in a diagram. All measured harmonic values can be stored according to the customer information data on USB stick. The system has also the ability to scan the measured harmonic by using a cursor and to display the scanned values referring to the cursor position on the screen.



Technical Data

Comparator	COM1003	COM3003
General		
Power supply	115/230 V + 10 % -15 %, 50…60 Hz	115/230 V + 10 % -15 %, 50…60 Hz
Power consumption	approx. 80 VA	approx. 120 VA
Temperature range	15° … 40° C	15° … 40° C
Relative humidity (not condensing)	max. 95 %	max. 95 %
Dimensions (HxWxD)	172 x 465 x 460 mm	172 x 465 x 460 mm
Weight	16 kg	25 kg
Max. height above sea level	2000 m	2000 m
Reference Meter		
Voltage measurement	30 V … 500 V	30 V … 500 V
Voltage ranges	60 - 120 - 240 - 480 V	60 - 120 - 240 - 480 V
Current measurement	1 mA … 160 A	1 mA … 160 A
Current ranges	5-10-20-50-100-200-500 mA 1-2-5-10-20-50-100-200 A	5-10-20-50-100-200-500 mA 1-2-5-10-20-50-100-200 A
Reference voltage ranges	1 V and 10 V DC	1 V and 10 V DC
Fundamental frequency	15 … 70 Hz	15 … 70 Hz
Bandwidth	DC … 3500 Hz	DC … 3500 Hz
Measuring modes	2 wire active and reactive 2 wire DC [3] mixed signals (AC+DC) in all measuring modes	4 wire active and apparent, reactive true, cross and Q60 4 wire DC [3] 3 wire active and reactive true, cross connected A and B 2 wire active and reactive 2 wire DC [3] mixed signals (AC+DC) in all measuring modes
Accuracy class rating according to PTB for measuring power and energy [1] *Independent of measuring mode*	< 100 x 10^{-6}	< 100 x 10^{-6}
Recalibration period according to PTB [4]	> 2 years	> 2 years
Voltage measurement accuracy	< 30 x 10^{-6}	< 30 x 10^{-6}
Voltage measurement accuracy DC [3]	< 50 x 10^{-6} (30 V … 500 V)	< 50 x 10^{-6} (30 V … 500 V)
Voltage measurement long term stability	< 15 x 10^{-6} / year	< 15 x 10^{-6} / year
Current measurement accuracy	< 50 x 10^{-6} (50 mA … 160 A) < 70 x 10^{-6} (10 mA … < 50 mA) < 150 x 10^{-6} (1 mA … <10 mA)	< 50 x 10^{-6} (50 mA … 160 A) < 70 x 10^{-6} (10 mA … < 50 mA) < 150 x 10^{-6} (1 mA … < 10 mA)
Current measurement accuracy DC [3]	< 350 x 10^{-6} (50 mA … 160 A)	< 350 x 10^{-6} (50 mA … 160 A)
Current measurement long term stability	< 25 x 10^{-6} / year	< 25 x 10^{-6} / year
Power/energy measurement accuracy [2] *Independent of measuring mode*	< 80 x 10^{-6} (50 mA … 160 A) < 100 x 10^{-6} (10 mA … < 50 mA) < 180 x 10^{-6} (1 mA … < 10 mA) [7]	< 80 x 10^{-6} (50 mA … 160 A) < 100 x 10^{-6} (10 mA … < 50 mA) < 180 x 10^{-6} (1 mA … < 10 mA) [7]
Power/energy measurement accuracy DC [3]	< 400 x 10^{-6} (50 mA … 160 A)	< 400 x 10^{-6} (50 mA … 160 A)
Power/energy measurement long term stability	< 30 x 10^{-6} / year	< 30 x 10^{-6} / year
Phase angle measurement error	< 0.005°	< 0.005°
DC reference voltage measurement accuracy	< 20 x 10^{-6}	< 20 x 10^{-6}
DC reference voltage measurement long term stability	< 5 x 10^{-6} / year	< 5 x 10^{-6} / year
Temperature drift	U < 0.5 x 10^{-6} / K I < 0.5 x 10^{-6} / K P < 1 x 10^{-6} / K DC reference input < 1 x 10^{-6} / K Quartz time base < 0.1 x 10^{-6} / K	U < 0.5 x 10^{-6} / K I < 0.5 x 10^{-6} / K P < 1 x 10^{-6} / K DC reference input < 1 x 10^{-6} / K Quartz time base < 0.1 x 10^{-6} / K

Status: 4th February 2016

1 Within the range of 30 V … 500 V and 50 mA … 160 A
2 Related to the active power with power factors from 1 to 0.5 i and from 1 to 0.8 c in the range of 30 V … 500 V
3 Only with option DC measurement
4 Period defined by PTB (national metrological authority), corresponding operation time and stability of the device provided.
5 Up to the 40th harmonic for current and voltage
7 Related to 10 mA

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