

## Products 2011/2012

Precision Measurement of Power, Energy, TRMS Values, Harmonics and Flicker



LMG500 – flexible 1-8 power channels and high bandwidth (10 MHz)



LMG450 – the compact 4-power channels device



LMG95 – the most accurate in its class



LMG95e – precision at low cost



LMG-CONTROL – the LMG in your PC for remote-control, data acquisition and analysis



Current Sensors



Precision High Voltage Divider



AC Power Sources



CE-TEST – Compliance test system according to EU standards and directives

Instrument Type	Power Channels	Frequency Range (Bandwidth)	Basic Accuracy	Ranges Voltage, Current	Harmonic Analysis	Computer Interfaces	Process Signal Interface	Applications	Special Features
LMG500	1-8 (modular)	DC, 0.05Hz-10MHz	0.025%	3V-1000V 20mA-32A Sensor inputs for current and voltage channels 30mV-4V	1.) EN61000-3-2 2.) 0.1Hz-50kHz, to 99th harmonics also interharmonics	RS232, IEEE488.2, Ethernet, USB	Inputs: 8 analog 8 digital 2 frequency  Outputs: 8 analog 8 digital	For very fast frequency inverters with steep slew rates; wideband power loss measurement at reactances (motor filters etc.), high speed motors (high performance spindles) with fundamental >3kHz, electronic ballasts; measurement of pulsed high voltage signals of short duration <3μs; efficiency of complex systems.	Very precise at small cos φ and/or high frequencies due to low group delay <3ns between U and I input; the delay time can be adjusted according to measurement setup and used sensors. High dynamic of U and I range, each with only one connector pair. Earth capacity of the inputs <30pF, hence no aberration of measuring signals. 3MSamples/s, absolutely gapless power measurement with simultaneous transient monitoring.
LMG450	4	DC, 0.1Hz-20kHz	0.11%	6V-600V 0.6A-16A (60Apk) Current sensor input 120mV-4V	1.) EN61000-3-2 (pre-compliance) 2.) 1Hz-10kHz, up to 99th harmonics also interharmonics	RS232, IEEE488.2, Ethernet	Inputs: 2x 4 analog 4 digital 1 frequency  Outputs: 2x 4 analog 4 digital	Universal power meter for nearly all applications of modern power electronics and mains analysis. Measuring of motor related magnitudes at frequency inverter outputs.	All essential features contained in base device: printer and RS232 interface, formula editor, vector diagram, harmonic analysis (pre-compliance). Grouping of four measuring channels in two sets for measuring systems with different frequencies, 2 Aron circuits, flicker measuring, star-delta conversion, smart current sensor inputs with automatic recognition.
LMG95	1	DC, 0.05Hz-500kHz	0.025%	6V-600V 0.15A-20A (960Apk) Shunt voltage 30mV-4V, other ranges on request	1.) EN61000-3-2 2.) 0.1Hz-10kHz, up to 99th harmonics also interharmonics	RS232, IEEE488.2, Ethernet	Inputs: 4 analog 4 digital 1 frequency  Outputs: 4 analog 4 digital	High precision power measurement at switched devices, reference meter for calibration of power.	For standards compliant EMC test systems: Mains feedback EN61000-3-2/-3/-11/-12, Current harmonics EN61000-4-7 (Ann. B), Flicker meter EN61000-4-15.
LMG95e	1	DC, 0.05Hz-50kHz	0.11%	6-600V 0.15-20A (960Apk) Shunt voltage 30mV-4V	EN61000-3-2 (pre-compliance)	RS232, IEEE488.2, Ethernet	n/a	Test benches, quality control.	Economic version of LMG95.

<b>LMG-CONTROL</b>	<p>LMG-CONTROL is the remote control software for ZES ZIMMER® power meters of the LMG series to configure the instrument, display, analyze and log measuring values. The base module is free of cost and contains already a rich selection of plugins which display the current measuring values in different ways. LMG-Control may be extended by additional modules like</p> <ul style="list-style-type: none"> <li>• Waveform Analysis allows examining the measured sampling values in various ways, like harmonic analysis up to 1 MHz and recording of transient events.</li> <li>• MotorTorque can compute torque and speed of a motor or generator from the measuring values of input current and input voltage. The option MotorTorque can be used with frequency converter- and mains-operated IEC-standard motors.</li> </ul>
<b>CE-Test61k</b>	<p>CE-Test61k allows to test products interferences towards the power distribution system caused by current harmonics in accordance with EN 61000-3-2/-12 and flicker in accordance with EN 61000-3-3/-11 (directive 2004/108/EU). Additionally it is possible to measure and document perturbations of the public power system in the frequency range from 2 kHz to 9 kHz according to EN 61000-4-7 annex B.</p>
<b>CE-Test Standby</b>	<p>CE-Test-Standby system offers monitoring the power consumption in standby mode of home appliances, IT devices and similar equipment. The system tests conformity with the requirements of the EU directive on ecodesign 2009/125/EU, in conjunction with regulation 1275/2008 and in accordance with IEC/EN 62301.</p>

## Current Sensors

### „Plug N'Measure“ Current Sensors for Extended Current Ranges up to 5000A

Precision current transducers	0.02%	DC...1MHz	0.8A...5000A
Precision current transformer	0.02%	15Hz...5kHz	5A...1500A
Clamp-on current sensor CT	0.15%	2Hz...50kHz	0.3A...3000A
Prec. wideband current transf.	0.25%	30Hz...1MHz	10A...1000A
Hall effect current sensors	0.3%	DC...200kHz	0.3A...2000A
Shunt for standby measurements	0.15%	DC...100kHz	0.15mA...1A

HF differential transformer with load resistor for the almost reactionless measurement of current, e.g. for discharge lamps.

Technical data, information and selection guide in the user manual „ZES Sensors and Accessories“ (available on request and at [www.zes.com](http://www.zes.com)).

## Voltage Divider

### Precision High Voltage Divider

Precision high voltage divider for 3/6/9/12/30kV to 300kHz, 0.05% Negligible phase error, therefore best suited for wideband power measuring.

- 1-channel HST for single ended voltages
- 2-channel for difference voltages
- 3-channel HST for three phases systems (inverters)

Power quality analysis in railway technology and medium-voltage systems. Insulation diagnostics by  $\tan \delta$  measuring down to 0.1Hz. Suitable for outdoor application (IP65) with high overvoltage.

## AC Power Sources, AC Filter (Digest)

Series	Type	Phases	Power kVA	Frequency	UA	Application
I	5001i	1	5	DC, 16Hz-5kHz	0-270V	Usable for CE-Test61k
	15003i	3	15			
RP	801RP	1	0.8	16Hz-500Hz		Usable with certain limitations for CE-Test61k
	1251RP		1.2			
AC-Filter	TT-AC1000	1	1	Mains frequency	Mains	For tests according to EN61000-3-2

## Energy Counters and Displays to Monitor and Maintain Production and Factory

Instrument Type	PM396	TM396	PM190 PM151
Phases	1-3		-
Bandwidth	45-65Hz (1kHz)		DC
Basic Accuracy	Active Power P: 0.1%		0.1% ±1 Digit
Input	230VLN/ 400VLL 5A (opt. 1A)	as above + 25A-option for I-input	0-10V 0/4-20mA
Computer Interfaces	RS485, RS232, (optional Profibus)		-
Outputs	2 digital 2 analog		4 relais 4 optocoupler
Display	LCD, 4 x 3 digits + unit		VF-display 3 digits+sign 101/51 segm. bar
Values/ Applications	Phase values of current, voltage, power factor active/ reactive/ apparent power. Total values of active/ reactive/ apparent power, average power, maximum average power, active/ reactive/ apparent energy. Local collection and display of power and energy, also for import and export. Cost-effective replacement of many separate devices in panel mounting.		For displaying and monitoring of processes.
Special Features	Evaluation software included in delivery, harmonic analysis.	Optional: CEE plug and socket for easy measuring of loads with CEE connectors.	Bar graph for simultaneous analog display of measuring and limit values, standard process inputs.

## Test Systems for EN61000-3-2/-3/-11/-12 (Harmonics, Flicker)

Instrument Type	Phases	Basic Accuracy	Input	Computer Interfaces	Application	Special Features
CE-Test61k-1PL95	3	0.03%	3V-1000V 20mA-32A	RS232, IEEE488.2, USB	For EMC test systems meeting standard EN61000-3-2/-3/-11/-12, harmonics analyzer meets EN61000-4-7, flicker meter meets EN61000-4-15.	Packages to build complete systems, consisting of power analyzer LMG95 or LMG500, AC power sources, reference impedance and evaluation software CETest61k; components can also be ordered and used separately. Easy integration of customer owned power sources.
CE-Test61k-1PL95	1		6V-600V 0,5A-20A (960Apk)	RS232, IEEE488.2		

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