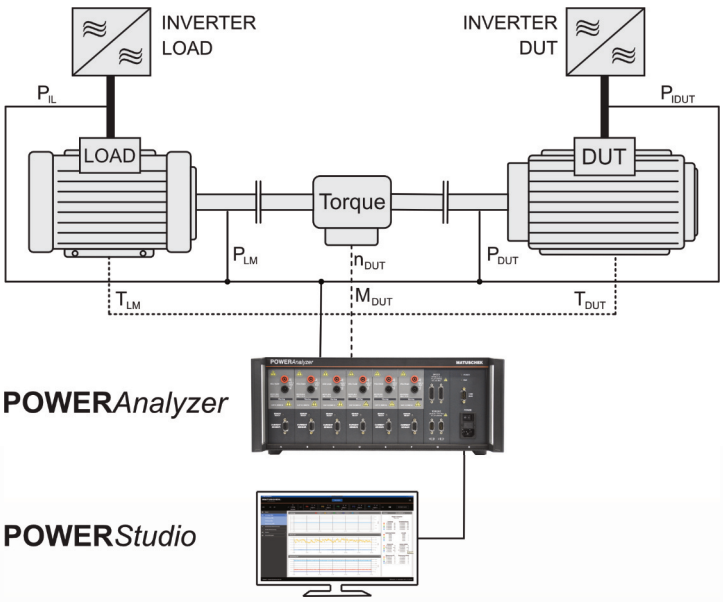
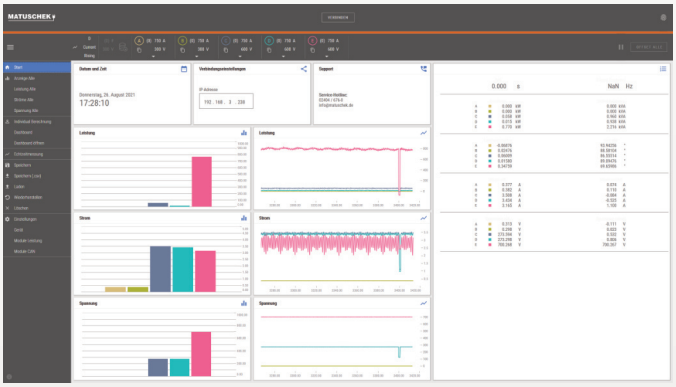
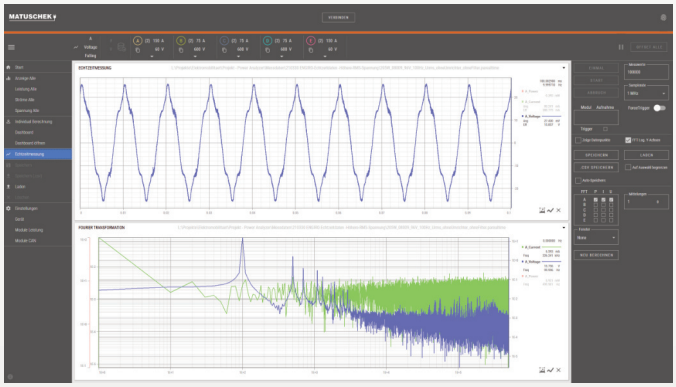
POWER*Analyzer* LK601 Power Measurement

The combination of the newly developed **POWER***Analyzer* and its associated **POWER***Studio* software is an innovative system for high-precision electrical power measurement and analysis.



The multi-channel system impresses with its high bandwidth, sampling resolution and sampling rate. This allows recording and analyzing of high-frequency signal components. The LK601 is future-proof in terms of flexibility and expandability. With its characteristics it matches all requirements of modern e-drive and machine test benches.





Software **POWER***Studio*

Accuracy (Excerpt)

current

frequency	selected range / Isens_factor	accuracy ± (% measured value + % range value)
DC	1 mA - 5 mA	0.05 + 0.15
	10 mA - 500 mA	0.05 + 0.1
0.05 Hz - 45 Hz	all ranges	0.04 + 0.04
45 Hz - 65 Hz	all ranges	0.015 + 0.03
65 Hz - 1 kHz	all ranges	0.04 + 0.04
1 kHz - 10 kHz	1 mA - 5 mA	0.25 + 0.05
	10 mA - 500 mA	0.15 + 0.05
10 kHz - 20 kHz	1 mA - 5 mA	0.5 + 0.2
	10 mA - 500 mA	0.3 + 0.2
20 kHz - 50 kHz	1 mA - 5 mA	1.5 + 0.5
	10 mA - 500 mA	0.7 + 0.5
50 kHz - 100 kHz	1 mA - 5 mA	3.5 + 0.5
	10 mA - 500 mA	2 + 0.5
100 kHz - 300 kHz	all ranges	5 + 0.5

voltage

frequency	accuracy ± (% measured value + % range value)
DC	0.05 + 0.1
0.05 Hz - 45 Hz	0.04 + 0.04
45 Hz - 65 Hz	0.015 + 0.03
65 Hz - 1 kHz	0.04 + 0.04
1 kHz - 10 kHz	0.1 + 0.05
10 kHz - 20 kHz	0.3 + 0.2
20 kHz - 50 kHz	0.4 + 0.2
50 kHz - 100 kHz	0.65 + 0.2
100 kHz - 300 kHz	5 + 0.5

active power

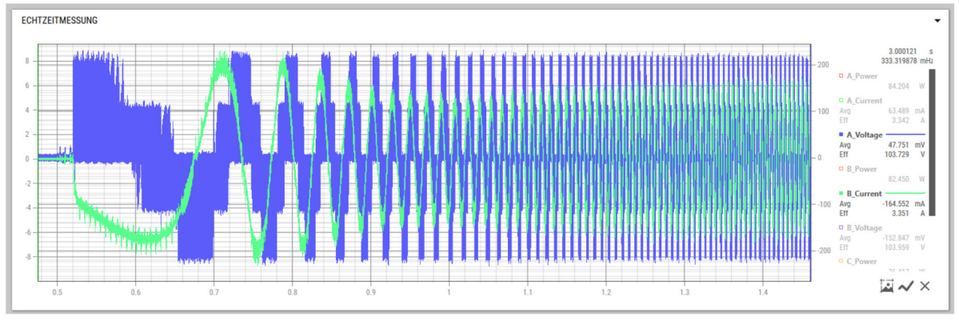
frequency	selected range / Isens_factor	accuracy ± (% measured value + % range value)
DC	1 mA - 5 mA	0.1 + 0.15
	10 mA - 500 mA	0.1 + 0.1
0.05 Hz - 45 Hz	all ranges	0.08 + 0.04
45 Hz - 65 Hz	all ranges	0.02 + 0.03
65 Hz - 1 kHz	all ranges	0.08 + 0.04
1 kHz - 10 kHz	1 mA - 5 mA	0.35 + 0.05
	10 mA - 500 mA	0.25 + 0.05
10 kHz - 20 kHz	1 mA - 5 mA	0.8 + 0.2
	10 mA - 500 mA	0.6 + 0.2
20 kHz - 50 kHz	1 mA - 5 mA	1.9 + 0.5
	10 mA - 500 mA	1.1 + 0.5
50 kHz - 100 kHz	1 mA - 5 mA	4.2 + 0.5
	10 mA - 500 mA	2.7 + 0.5
100 kHz - 300 kHz	all ranges	10 + 0.5

Effective input range:

Udc and Idc:	0 - ±130 % of the measurement range
Urms and Irms:	5 - 130 % of the measurement range
Power (DC measurement):	0 - ±130 %
(AC measurement):	±130 % of the power range when the voltage and current range is 5 to 130%.

Conditions:

Temperature: 23 ± 3 °C, Humidity: 35 - 70 % RH, Input waveform: Sine wave,
Power factor: 1, Common mode voltage: 0 V, Line filter: OFF,
Frequency filter: 100 kHz or less when ON, after warm-up 1h,
Input range: 5 - 130 % RMS



Highspeed data acquisition

Technical Specification

Sample rate	10 MS/s
Sample resolution	16 bit
Voltage ranges	12 ranges 1.5 - 1000 V (RMS)
Current ranges	9 ranges 0.5 A - 250 A (RMS) or 1.5 A - 750 A (RMS) or 1.5 A - 1200 A (RMS)
Bandwidth	1 MHz
Precision	< 0.05 % (for power value)
Signal latency	< 5 ns
Max. count of channels	6 per device (max. 30 channels in multi device operation)
Optional Extension	Motor card: 2x torque 2x rotary encoders
Interfaces	Ethernet, CAN
Misc.	Includes power supply for external current sensors

High-precision electrical power measurement

Up to six electrical power phases can be recorded and analyzed with the **POWER***Analyzer* LK601 simultaneously. Especially within [1]EOL testing, the **POWER***Analyzer* can fully bring out its advantages in terms of reproducibility and accuracy of measurement results. Thanks to its modular concept, it can be adjusted to changing testing environments without any problems. Therefore it also provides many opportunities for R&D activities of all kind.

A power sensing channel consists of a high-resolution current and voltage sensing path. The device operates with 12 ranges up to 1000 volts (RMS) for measuring the voltage. Currents up to 1200 amps (RMS) can be measured by selecting the appropriate sensor. The sensor power supply is already provided by the LK601. The [2]DUT is sampled with up to 10 MS/s (millions of data points per second). With an measurement deviation of less than 0.05 % of the power value and a very high channel synchronity, the **POWER***Analyzer* delivers excellent high measurement accuracy even at small power factors.

In addition to the power channels the **POWER***Analyzer* LK601 offers the option of recording additional physical variables. Besides an off-the-shelf equipped CAN interface, the system offers a further slot for our motor card. Herewith machine torque and position can be recorded. Thanks to this flexibility, the system can be used in a future-proof manner.

A complex user interface and a device display were deliberately omitted during development. All recorded values are displayed and analyzed centrally by the **POWER***Studio* software via Ethernet. No settings have to be made on the device itself. This ensures a high degree of reproducibility and fail-safety.

Thanks to its clear structure, the **POWER***Studio* software offers a high degree of customizability and flexibility. In addition to several classic views of the measured values, customized dashboards can be configured. Furthermore the software provides a powerful toolbox to create user defined calculations. The UX-friendly concept enhances the easy and intuitive operation of the **POWER***Analyzer*. Our integrated real-time measurement enables seamless data acquisition even with high-frequency signals, which enables the R&D teams to dig deep into optimization of their own development.

[1]EOL = END-OF-LINE
[2]DUT = Device Under Test

POWERAnalyzer LK601 Accessories

Motor card

Up to two torque sensors and two rotary encoders can be connected to the motor card, which was specially developed for use on machine test benches. The card supports all common sensor signal types (frequency RS422, TTL, HTL, analog).

Encoder interface (speed, rotation angle)		**D-SUB15, Female**	
Encoder power supply (5 V / 400 mA, short-circuit proof)			
Differential:	TTL 5 V (RS422) HTL 30 V max.	A/AN, B/BN, Z/ZN A/AN, B/BN, Z/ZN	10 MHz max. 400 kHz max.
Single Ended:	TTL 5 V HTL 30 V max.	A, B, Z A, B, Z	1 MHz max. 200 KHz max.

Torque sensor interface (torque)		**D-SUB9, Male**	
Analog:	0-5 V, 0-10 V +-2.5 V, +-5 V, +-10 V	Unipolar Bipolar	15 kHz @ -3 dB 15 kHz @ -3 dB
Digital:	TTL 5 V (RS422)	A/AN	1 MHz max.

Current sensor

Danisense DS200ID
- 200 Arms
- 370 Apeak
- DC - 1000 KHz
- Ratio 500 : 1

Order Number: POANCSA001

Danisense DS600ID
- 600 Arms
- 1000 Apeak
- DC - 500 KHz
- Ratio 1500 : 1

Order Number: POANCSB001

Accessories

Voltage probe

Cable length 2 m
1000 V, CAT II / 16 A
Highly flexible
Diameter 4 mm

Clamp
1000 V, CAT III / 32 A
Ø 4 mm

Current Sensor connecting cable

Cable length 2 m

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