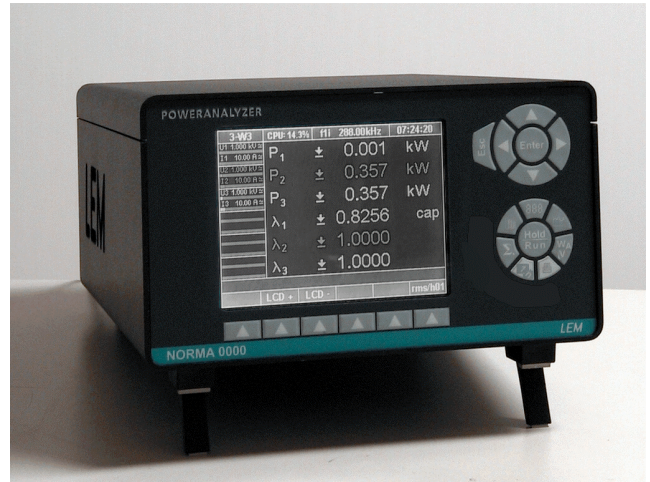


Power Analyzer NORMA 3000

- Compact System 1- 3 Phases
- 0,3 - 1000 V, 0,03 - 10 A direct
- Bandwidth DC to 1 MHz
- Sample rate 100 kHz
- 0,3% Basic Accuracy for 2 Years
- 5,7" Graphic Display b/w
- Non gapping Average Values



General

Measuring System

The power analyzer NORMA 3000 measures exactly current and voltage and calculates active, reactive and apparative power and other derived values.

The accuracy of this instrument is not depending on wave form, frequency and phase shift in a wide range.

Harmonics are calculated up to half the sampling rate.

The DSO – function visualises the values in wave form.

Voltage up to 1000 V and current up to 10 A can be measured directly due to integrated voltage dividers and shunts. It is also possible to connect external voltage divider as well as shunts or probes.

The firmware of the analyser can be updated via the standard interface RS232.

Precision

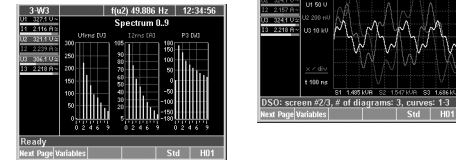
The power analyser NORMA 3000 is designed to measure signals in a wide frequency range. The input stages are DC coupled, suited with pulse amplifier.

A zero- and offset calibration against a stable voltage reference runs automatically in short time periods to stabilize the accuracy.

All voltage and current channels are separated by a new technology of barriers for high channel isolation and common mode rejection.

User Interface

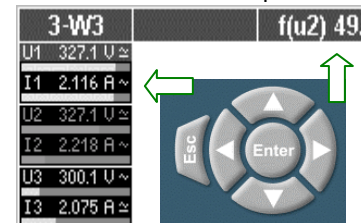
The power analyzer NORMA 3000 is easy to use. Due to a generous number of keys and a large display it is possible to switch directly to the desired screen:



6 function keys (soft keys):



Cursor block to access parameters:



With arrow keys a cursor can be moved to several fields. The settings behind these fields are accessible by pressing Enter.

Several configurations can be saved. Factory configurations are also

available.



Analyzer, Accessories		
Analyzer		
NORMA 3000 1 phase	Single phase Power Analyzer, Display b/w 5,7", RS232 Interface for Firmware upload Sampling rate 100 kHz	EA 1301 Z
NORMA 3000 3 phase	Three phase Power Analyzer, Display b/w 5,7", RS232 Interface for Firmware upload Sampling rate 100 kHz	EA 1303 Z

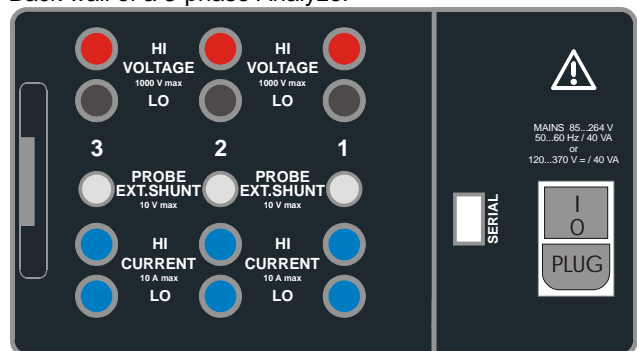
Accessories		
MC1	Measuring Cable set for one Power Phase. Cable lengths 1,5 m	EA 1030 Z
Shunt 300	300 A 0,2mOhm 0-1MHz	EA 1033 Z
Shunt 1000	1000 A 0,1mOhm 0- 0,5 MHz	EA 1034 Z
Shunt 1500	1500 A 0,1mOhm 0-0,2 MHz	EA 1035 Z
Shunt 450	450 A enhanced voltage drop 0,5mOhm 0-0,5 MHz	EA 1036 Z
MCS	measuring cable for shunt 1,5m	EA 1039 Z
RR 3030	Lemflex 30/300/3000A with BNC plug, 10 Hz-50kHz	EA 1051 Z
Probe PR1200	passive AC probe 1000 / 1A 30 Hz – 10 KHz	EA 1052 Z
SP	Star point adapter 3 phases	EA 1059 Z
Bag	Carrying bag for NORMA 3000	EA 1060 Z

Software		
PowerVIEW Basic	PC Software basic package for numerical visualisation	EA 1090 Z
PowerVIEW Motor	Plug-In Motor supports PI Process Interface	EA 1091 Z
PowerVIEW Storage	Plug-In Storage Storage functions	EA 1092 Z
PowerVIEW Analysis	Plug-In Analysis (FFT, DSO, Vector)	EA 1093 Z
PowerVIEW Developer	Plug-In for own developments please ask for additional training + support	EA 1094 Z
LabVIEW driver	driver for Lab View applications	EA 1099 Z

Services		
1 Year Support	\ Handling Guidance \ Setting Proposals \ Software and Firmware Updates	EA 1070 Z
Cal BU	Recalibration for the first Power Phase of an analyzer including ÖKD test report	EA 1071 Z
Cal PP	Recalibration for each other Power Phases of this analyzer including ÖKD test report	EA 1072 Z
Cal 500	Recalibration of a shunt up to 500A	EA 1075 Z
Cal 1500	Recalibration of a shunt up to 1500A	EA 1076 Z

Connections

Back wall of a 3-phase Analyzer



Specifications

Voltage

8 Ranges:
0,3 – 1 – 3 – 10 – 30 – 100 – 300 – 1000 V
 $U_{peak} = 2 \times range$
Input Impedance: 2 MOhm // 20pF
CMR common mode rejection:
80 dB at 100 kHz
Sampling Frequency: 100 kHz

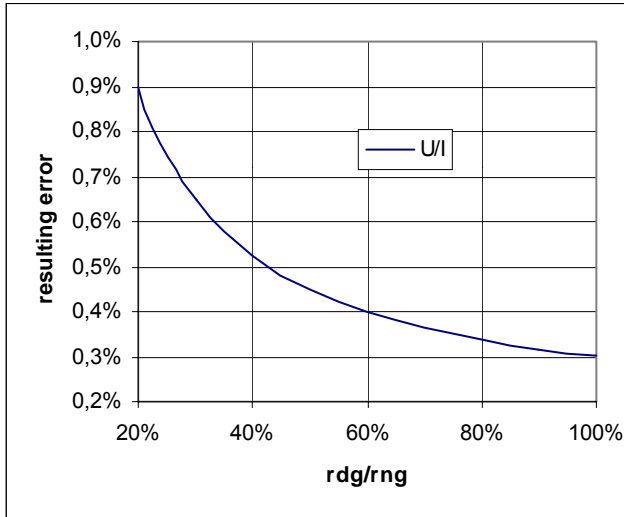
Current

6 Ranges:
30 – 100 mA – 0,3 – 1 – 3 – 10 A
 $I_{peak} = 2 \times range$
Input Impedance with integrated shunts:
ranges 30, 100mA: 1 Ohm
ranges 0,3, 1A: 0,1 Ohm
ranges 3, 10 A: 0,01 Ohm
Input for external shunt or probe:
BNC terminal, 100 kOhm // 30pF
30 – 100mV – 0,3 – 1 – 3- 10 V
overload max. 20 V_{RMS}
CMR common mode rejection:
80 dB at 100 kHz
Sampling Frequency: 100 kHz

Basic Accuracy

Error of	V	I
Range	0,15%	0,15%
Reading	0,15%	0,15%

Diagram shows resulting error depending on reading to range ratio:



Valid for averaged values at 23 ± 1 °C ambient temperature, sinus waveform and after 1 hour turn on time with measuring signal.

Bandwidth and Angular Error

	V and I via BNC	I direct measured
Bandwidth -3dB	1 MHz	0,3 MHz
	between V und I	
Angular Error	0,1° + 0,1° /kHz	

The instrument has low runtime errors between voltage and current. Mostly no additional errors must be considered for power measurement at $\cos\phi$ higher 0,7.

Measuring Values

No gapping calculation of averaged values for each phase. In three phase system additionally calculation of total power and averaging of V and I of the three phases. The fundamental H01 will be calculated in synchronous mode also for these values.

U_{RMS} effective value, U_{rm} rectified mean, U_m mean value
 U_{p-} , U_{p+} , U_{pp} peak values
 U_{cf} crest factor U_{cf} , U_{ff} form factor
 U_{fc} fundamental content
 U_{thd} distortion factor DIN, IEC

I_{RMS} effective value, I_{rm} rectified mean, I_m mean value
 I_{p-} , I_{p+} , I_{pp} peak values
 I_{cf} crest factor I_{cf} , I_{ff} form factor
 I_{fc} fundamental content
 I_{thd} distortion factor DIN, IEC

P active power [W]
 Q reactive power [Var]
 S apparent power [VA]
 λ , $\cos\phi$ phase angular

Number of digits 4 or 5 dependent on measured value.

Frequency and Synchronisation

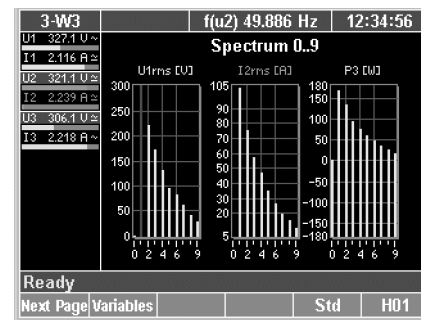
Range: 0,1 Hz ... 50 kHz

Accuracy: $\pm 0,01\%$ v. MW.

Channels which can be selected: all U/I or external input
 One of three low pass filter with different frequencies can be switched into the signal.

The frequency is always visible on the top of the screen.

FFT



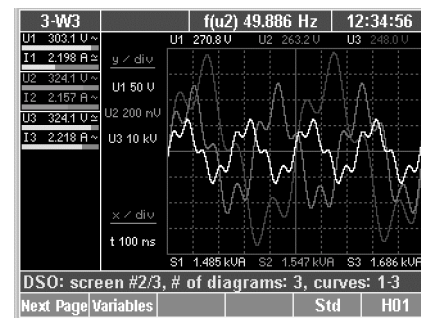
Calculation of harmonics with graphical representation. Up to 3 bar graphs are displayed at the same time.

Measured values: U, I, P per phase

Order: 1. to 100. harmonics, max.

50 kHz

DSO



Simultaneous display of up to 3 measured values on sample level. Quick view of curve form and distortion.

Interface

RS232 Interface for firmware upload and data exchange with the PC. A printer can be connected over an external transformer.

Instrument data

The Power Analyzer NORMA 3000 is extremely compact and equipped with a solid metal case. Dimensions: B = 237mm H = 150mm (3HE) T = 310mm

Weight: ca. 3 kg

Display: 5.7" 320 x 240 pixel

Background lighting and contrast decidable.

Ambient conditions:

Working temp.: + 15 ... 45 °C

Storage temp.: - 20 ... + 50 °C

Climatic class:

KYG DIN 40040, max. 85 % rel. humidity, no condensation.

Net connection:

85 ... 264 V AC, 50 ... 60 Hz, DC 100 ... 260 V, ca. 40VA
 European plug with switch.

Measure connection:

Safety sockets 4 mm, 2 for each input.

Ext. Shunt connection over BNC socket

Operation: film keyboard with cursor, functional keys and direct functions

Norms

El. Safety:

EN 61010-1/ 2. Edition 1000V CAT II (600V CAT III)

Degree of pollution 2, safety class I.

EN 61558 for transformer

EN 61010-2-031/032 for accessories

Max. input voltage:

for voltage inputs Measurement range $1000V_{\text{eff}}$, $2kV_{\text{peak}}$

for current inputs Measurement range $10A_{\text{eff}}$, $20A_{\text{peak}}$

Test voltages:

Net input - case (protective conductor): 1,5 kV a.c.

Net connection – Measurement input: 5,4 kV a.c.

Measurement inputs – case: 3,3 kV a.c.

Measurement input – Measurement input: 5,4 kV

Electromagnetic susceptibility:

Emission: IEC 61326-1, EN 50081-1, EN 55011 Class B

Immunity: IEC 61326-1 / Annex A (industrial sector), EN 50082-1