

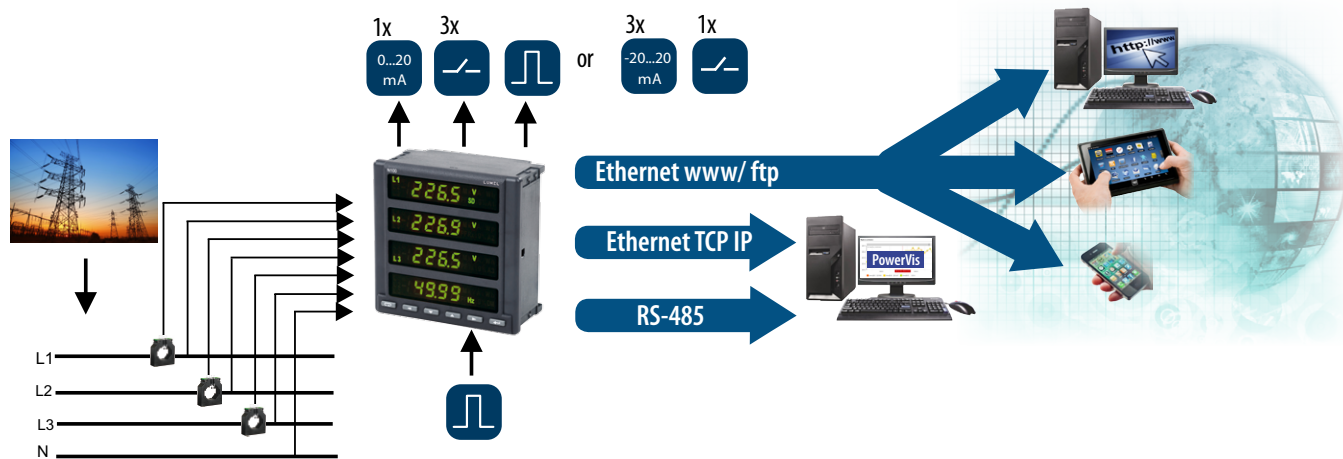


N100 - POWER NETWORK ANALYZER

- Measurement of power network parameters in 3 or 4-wire, balanced or unbalanced systems.
- Two-color LED display (red, green).
- Four quadrant energy measurement.
- Indications taking into consideration programmed ratio values.
- Storage of minimal and maximal values.
- Backlit units of all measured quantities.
- Programmable number of pages and selection of displayed quantities on each of the 20 pages.
- Configurable analog and alarm outputs.
- Pulse output to control of the consumption of active energy (option).
- Pulse input to count the consumption of active energy from external counter.
- Digital RS-485 interface with MODBUS protocol.
- Archiving data in the internal memory file system memory 8 GB (option).
- Ethernet interface 10/100 BASE-T (option)
 - protocol: MODBUS TCP/IP, HTTP, FTP,
 - services: www server, ftp server, DHCP client.
- Battery support of RTC.



EXAMPLE OF APPLICATION



MEASUREMENT OF POWER NETWORK PARAMETERS

- phase voltages U_1, U_2, U_3
- phase-to-phase voltages U_{12}, U_{23}, U_{31}
- phase currents I_1, I_2, I_3
- phase active powers P_1, P_2, P_3
- phase reactive powers Q_1, Q_2, Q_3
- phase apparent powers S_1, S_2, S_3
- phase active power factors Pf_1, Pf_2, Pf_3
- phase reactive /to active power factors $tg\varphi_1, tg\varphi_2, tg\varphi_3$
- active, reactive and apparent 3-phase power P, Q, S
- 3-phase active, reactive and apparent powers $Pf, tg\varphi$
- frequency f
- average 3-phase voltage U_5
- average phase-to-phase voltage U_{mf}
- average 3-phase current I_5
- average active power e.g. 15 min. P_{demand}
- average apparent power S_{demand}
- average current I_{demand}
- 3-phase active, reactive and apparent energy EnP, EnQ, EnS
- active energy from external counter $EnPE$,
- total harmonic distortion factors for phase voltages and phase currents $THD_{U1}, THD_{U2}, THD_{U3}, THD_{I1}, THD_{I2}, THD_{I3}$ and for 3-phase voltage and 3-phase current THD_{UV}, THD_{I}
- harmonics of phase voltages and currents – up to the 51 th

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION
		<p>or</p>	

TECHNICAL DATA

MEASURED PARAMETERS AND MEASURING RANGES

Measured value	Measuring range	L1	L2	L3	Σ	Class (*) / Basic error (*) class relative to the measured value acc. to EN61557-12
Current I/5 A 1 A~ 5 A~	0.010 ..0.100..1.200 A (tr_l=1) 0.050 ..0.500.. 6.000 A (tr_l=1) ...20.00 kA (tr_l≠1)	•	•	•	•	Class 0.2
Voltage L-N 57.7 V~ 230 V~ 400 V~	5.7..11.5 ..70.0 V (tr_U=1) 23.0..46 ..276.0 V (tr_U=1) 40.0..80 ..480.0 V (tr_U=1) ...480.0 kV (tr_U≠1)	•	•	•	•	Class 0.2
Voltage L-L 100 V~ 400 V~ 690 V~	10,0 ..20..120.0 V (tr_U=1) 40,0..80 .. 480.0 V (tr_U=1) 69,0..138 ..830.0 V (tr_U=1) ...830,0 kV (tr_U≠1)	•	•	•	•	Class 0.5
Active power P _r , average active power P _{dt}	.. (-)1999.9 W ..(-)1999.9 MW (tr_U≠1, tr_l≠1)	•	•	•	•	Class 0.5
Reactive power Q _i	.. (-)1999.9 Var ..(-)1999.9 MVar (tr_U≠1, tr_l≠1)	•	•	•	•	Class 2
Apparent power S _r , average apparent power S _{dt}	.. 1999.9 VA ..1999.9 MVA (tr_U≠1, tr_l≠1)	•	•	•	•	Class 0.5
Active energy EnP (imported or exported)	.. (-)1999.9 Wh ..(-)1999.9 MWh (tr_U≠1, tr_l≠1)	•	•	•	•	Class 0.5
Reactive energy EnQ (inductive or capacitive)	.. (-)1999.9 Varh ..(-)1999.9 MVarh (tr_U≠1, tr_l≠1)	•	•	•	•	Class 2
Apparent energy EnS	.. 1999.9 VAh ..1999.9 MVAh (tr_U≠1, tr_l≠1)	•	•	•	•	Class 0.5
Active power factor PF _i	-1.00 ..0 ..1.00	•	•	•	•	±0.01 of basic error
Coefficient tgφ _p (ratio of reactive power to active power)	-1.20 ..0 ..1.20	•	•	•	•	±0.01 of basic error
Frequency f	45.00 ..65.00...500 ^(*) Hz	•	•	•	•	Class 0.2
Total harmonic distortion of voltage THDU, THDI	0.0 ..100.0 %	•	•	•	•	Class 5 50/60 Hz
Amplitudes of the voltage U _{h1} ... U _{h50} , and current I _{h1} ... I _{h50} harmonics	0.0 ..100.0 %	•	•	•	•	Class 5 50/60 Hz

tr_l – current transformer ratio: 1..10000,

tr_U – voltage transformer ratio: 1..4000;

(*) – for frequencies 65 .. 400 Hz phase voltages required are greater than 45% U_n
– for frequencies 400 .. 500 Hz phase voltages required are greater than 85% U_n

OUTPUTS

Output type	Properties
Analog output	1 output: 0...20 mA (4...20 mA) programmable or 3 outputs -20..0..20 mA programmable, depending on version. Basic errors 0.2%.
Relay output	3 or 1 relay programmable depending on version, voltageless NO contact, load capacity 250 V a.c./ 0.5 A a.c.
Active energy impulse output	1 OC (NPN), passive, supply voltage 18..27 V, (for version with 3 relay outputs, 1 analog output). Accuracy, as for the active energy.

INPUTS

Input type	Properties
Passive pulse input	0/12...36 V d.c. (for version with 3 relay outputs, 1 analog output)

DIGITAL INTERFACE

Type of interface	Transmission protocol	Remarks
RS-485	Modbus RTU 8N2,8E1,8O1,8N1 address 1..247	baud rate: 4.8, 9.6, 19.2 38.4, 57.6, 115.2 kbit/s
Ethernet 10/100 Base-T	Modbus TCP,HTTP,FTP	WWW server, FTP server, DHCP client

EXTERNAL FEATURES

Readout field	4 x 4 ½ LED digits, backlighted units	two-color (red, green), 14 mm
Overall dimensions	144 x 144 x 77 mm	panel cut-out: 138 ^{+0.5} x 138 ^{+0.5} mm
Weight	0.8 kg	
Protection grade	from frontal side: IP40	from terminal side: IP20

RATED OPERATING CONDITIONS

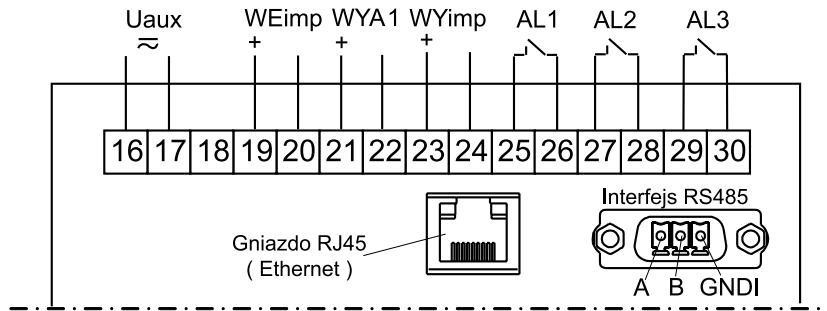
Supply voltage	85...253 V a.c. (40...400 Hz) or 90...300 V d.c.	power input ≤ 12 VA
Power consumption	in voltage circuit ≤ 0.5 VA	in current circuit ≤ 0.1 VA
Input signal	0...0.1...1.2 I _n ; 0.1...0.2...1.2 U _n for current, voltage, Pf, tgφ ₁	• frequency 45...50...60...65 Hz, • sinusoidal signal (THD ≤ 8%)
Power factor	-1...0...1	
Preheating time	5 min.	
Temperature	-10...23...55°C, class K55 acc. to EN61557-12	
Humidity	0...40...65...95%	inadmissible condensation
Operating positions	any	
External magnetic field	≤ 40...400 A/m d.c.	≤ 3 A/m a.c. 50/60 Hz
Short duration overload	voltage input: 2 U _n (5 sec.)	current input: 50 A (1 sec.)
Admissible crest factor	current: 2	voltage: 2
Additional error (in % of the intrinsic error)		from ambient temperature changes: < 50%/ 10°C

SAFETY AND COMPABILITY REQUIREMENTS

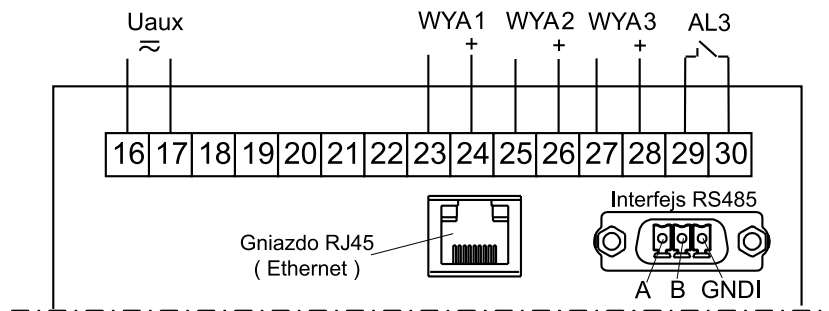
Electromagnetic compatibility	noise immunity	acc.to EN 61000-6-2
	noise emissions	acc.to EN 61000-6-4
Isolation insured by the casing	double	acc. to EN 61010-1
Isolation between circuits	basic	
Pollution level	2	
Installation category	III	
Maximal phase-to-earth voltage	• for supply circuit and relay outputs: 300 V • for measuring input: 500 V • for circuit of RS-485, Ethernet, pulse input and output, analog outputs: 50 V	
Altitude a.s.l.	< 2000 m	

CONNECTION DIAGRAMS

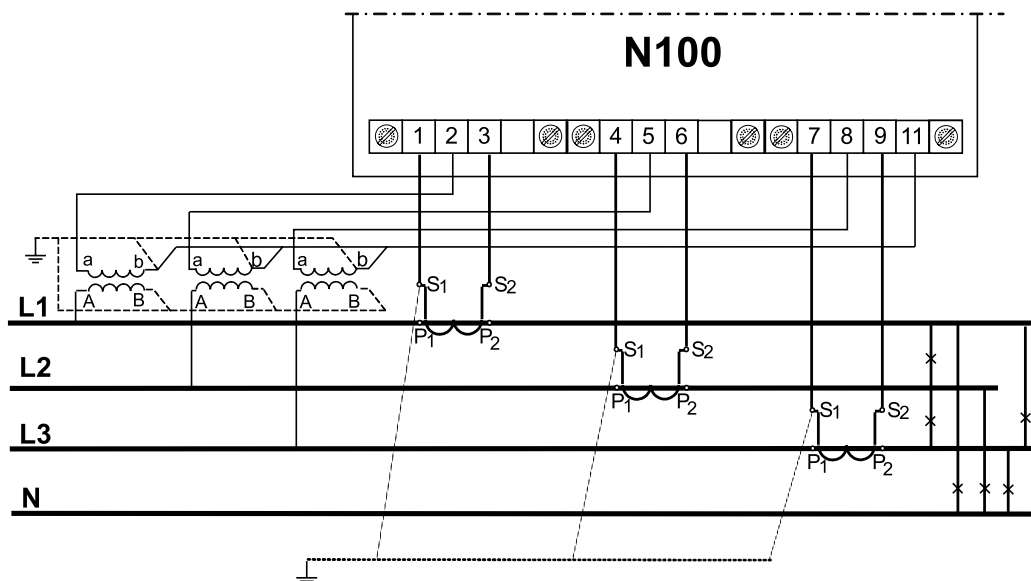
Output signals connection



Version with 3 relay outputs, 1 analog output



Version with 3 analog outputs, 1 relay output



Indirect measurement in a four-wire network – connection of input signals

ORDERING

Code	Description
N100 1100M0*	3-phase power network analyzer N100 input current 1A/5A, X/1A, X/5A, voltage input 3x57.7/100V, 1x analog output 0/4-20mA, 3x relay output, 1x pulse input/output, RS-485 interface, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate
N100 1110M0*	3-phase power network analyzer N100 input current 1A/5A, X/1A, X/5A, voltage input 3x57,7/100V, 1x analog output 0/4-20mA, 3x relay output, 1x pulse input/output, Ethernet and RS-485 interface, internal memory file system 8GB, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate
N100 2110M0*	3-phase power network analyzer N100 input current 1A/5A, X/1A, X/5A, voltage input 3x230/400V, 1x analog output 0/4-20mA, 3x relay output, 1x pulse input/output, Ethernet and RS-485 interface, internal memory file system 8GB, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate

* Upon agreement, an option to order a calibration certificate for the product is available against payment. Then, in the execution code, in the place of the last character, enter the digit **2**, e.g. **N100 2110M2**. The customer will then receive a standard test certificate and a calibration certificate (against payment).

SEE ALSO:



ND40 - power network analyzer/recorder



RE92 - dual loop controller



P30U - universal transducer of temperature and standard signals



K5 - synchronization meter



N43 - rail mounted 3-phase power network meter



P43 - 3-phase transducer of power network parameters



ND1 - analyser of network parameters



Current transformers from 5 A up to 6 kA



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