

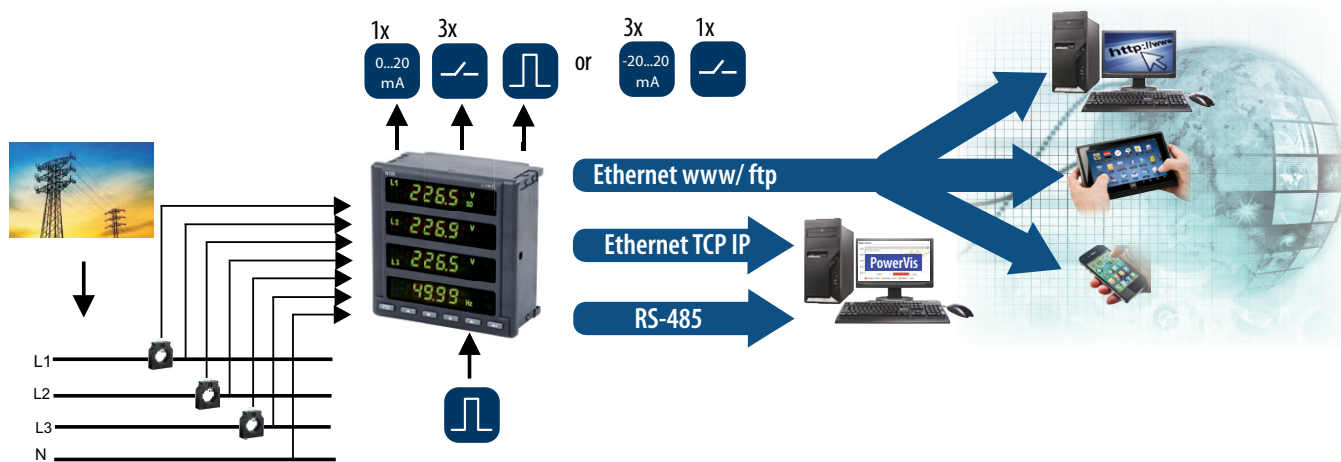


N100 - POWER NETWORK ANALYZER

- 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

MOD
BUS
TCP

www
ftp

Password
protection

RTC

THD

Har
51

INPUTS

OUTPUTS

RS
485

0 .. 20
mA

or

1x

3x
 -20...20 mA

Ethernet

GALVANIC ISOLATION

Ethernet

RS
485

pulse

analog

alarm

phase L1

phase L2

phase L3

pulse

Supply

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/S A 1 A~ 5 A~	0.010 ..0.100..1.200 A (tr_I=1) 0.050 ..0.500.. 6.000 A (tr_I=1) ...20.00 kA (tr_I≠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 _{at}	.. (-)1999.9 W ..(-)1999.9 MW (tr_U≠1, tr_I≠1)	•	•	•	•	Class 0.5
Reactive power Q _r	.. (-)1999.9 Var ..(-)1999.9 MVar (tr_U≠1, tr_I≠1)	•	•	•	•	Class 2
Apparent power S _r , average apparent power S _{at}	.. 1999.9 VA ..1999.9 MVA (tr_U≠1, tr_I≠1)	•	•	•	•	Class 0.5
Active energy EnP (imported or exported)	.. (-)1999.9 Wh ..(-)1999.9 MWh (tr_U≠1, tr_I≠1)	•	•	•	•	Class 0.5
Reactive energy EnQ (inductive or capacitive)	.. (-)1999.9 Varh ..(-)1999.9 MVarh (tr_U≠1, tr_I≠1)	•	•	•	•	Class 2
Apparent energy EnS	.. 1999.9 VAh ..1999.9 MVAh (tr_U≠1, tr_I≠1)	•	•	•	•	Class 0.5
Active power factor PF _r	-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 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_I, tr_U – ratio of current, voltage transformer

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

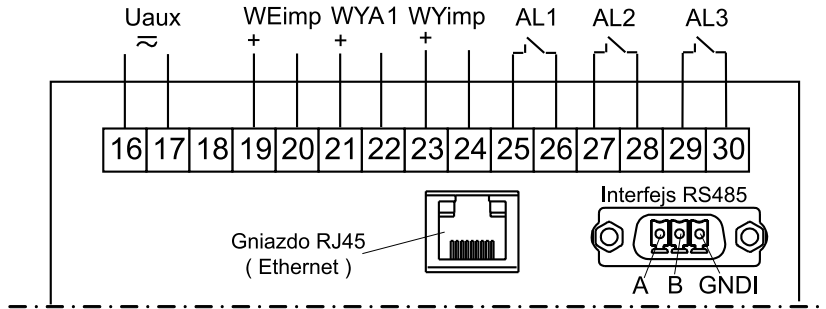
Supply voltage	85...253 V a.c. (40...400 Hz) or 90...300 V d.c.	power input ≤ 12 VA
Power consumption	in voltage circuit ≤ 0.5 VA	in current circuit ≤ 0.1 VA
Input signal	0...0.1...1.2 I _n ; 0.1...0.2...1.2 U _n for current, voltage, P _f , tgφ _i	• frequency 45...50...60...65 Hz, • sinusoidal signal (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

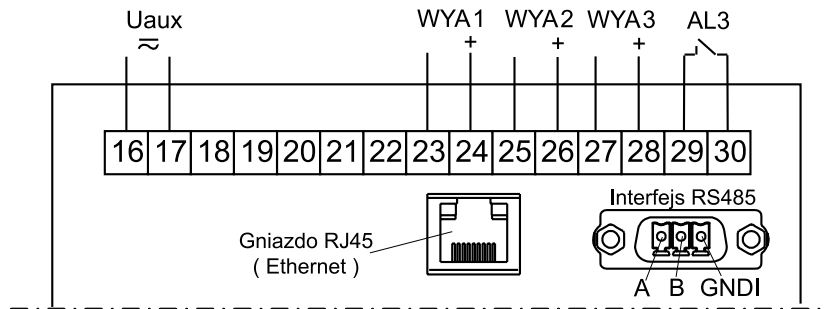
Electromagnetic compatibility	noise immunity	acc.to EN 61000-6-2
	noise emissions	acc.to EN 61000-6-4
Isolation insured by the casing	double	acc. to EN 61010-1
Isolation between circuits	basic	
Pollution level	2	
Installation category	III	
Maximal phase-to-earth voltage	• for supply circuit and relay 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

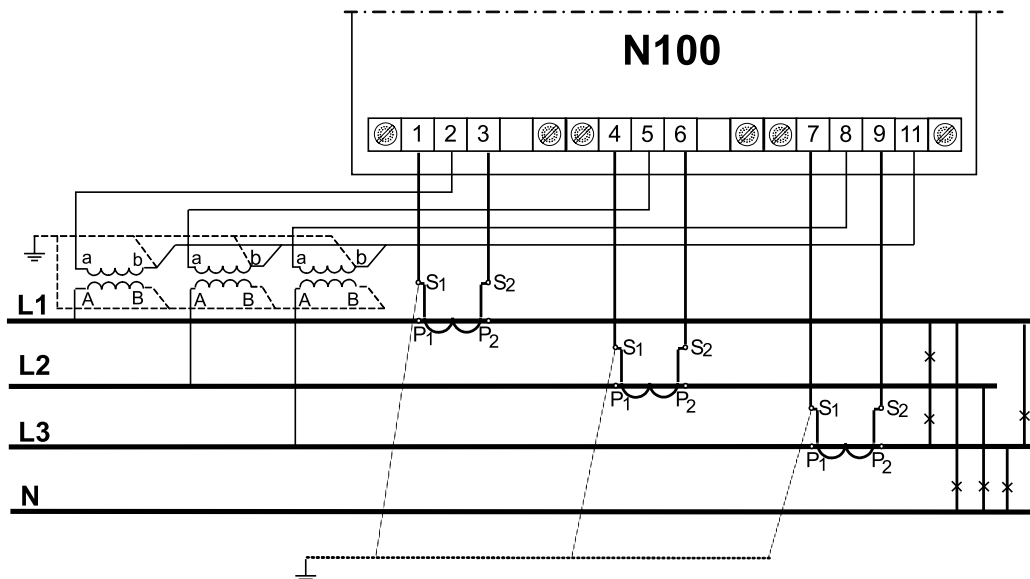
Output signals connection



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

MeterN100 -	X	X	X	XX	X	X
Input voltage (phase/phase-to-phase) Un:						
3 x 57.7/ 100 V	1					
3 x 230/ 400 V	2					
3 x 400/ 690 V	3					
Outputs:						
3 x relay, 1 x analog, 1x pulse input, 1 x pulse output	1					
3 x analog, 1 x relay	2					
Additional equipment:						
without Ethernet interface				0		
with Ethernet interface, internal memory				1		
Version:						
standard					00	
input frequency up to 500 Hz (custom version G189)*					02	
custom-made**					XX	
Language:						
Polish						P
English						E
other**						X
Acceptance tests:						
without additional quality requirements						0
with an extra quality inspection certificate						1
acc.to customer's request						X

* - measurement of harmonics and THD aren't available for custom version G189 of N100 meters.
Measurement of the other network parameters (without harmonics and THD) respectively:
1) for frequency 65...400 Hz – phase voltages required are greater than 45 % Un;
2) for frequency 400...500 Hz – phase voltages required are greater than 85 % Un;
Additional error of measured quantity < 100 %. The rest of the parameters stay without modification.

** - only after agreeing with the manufacturer

N100 meter has in standard:

- universal current input 1/ 5 A,
- interface RS-485,
- supply 85...253 V a.c. (40...400 Hz) or 90...300 V d.c.

Notice:

- for output version: 3 x relay, 1 x analog output, 1 x pulse input, 1 x pulse output – the analog output has the range of 0...20 mA.
- for output version: 3 x analog output, 1 x relay – the analog outputs have the range of -20..0..20 mA.
- For both version the analog outputs are programmable.

Order example:

The code: **N100 - 2 1 1 00 E 0** means:

- N100** - N100 meter,
- 2** - input voltage 3 x 230/400 V,
- 1** - 3 x relay, 1 x analog, 1x pulse input, 1 x pulse output
- 1** - with Ethernet, internal memory,
- 00** - standard version,
- E** - english version,
- 0** - without additional quality requirements.

SEE ALSO:



ND40 - power network analyzer/recorder



RE92 - dual loop controller



P30U - universal transducer of temperature and standard signals



KS31 - Digital synchronizing unit



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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