

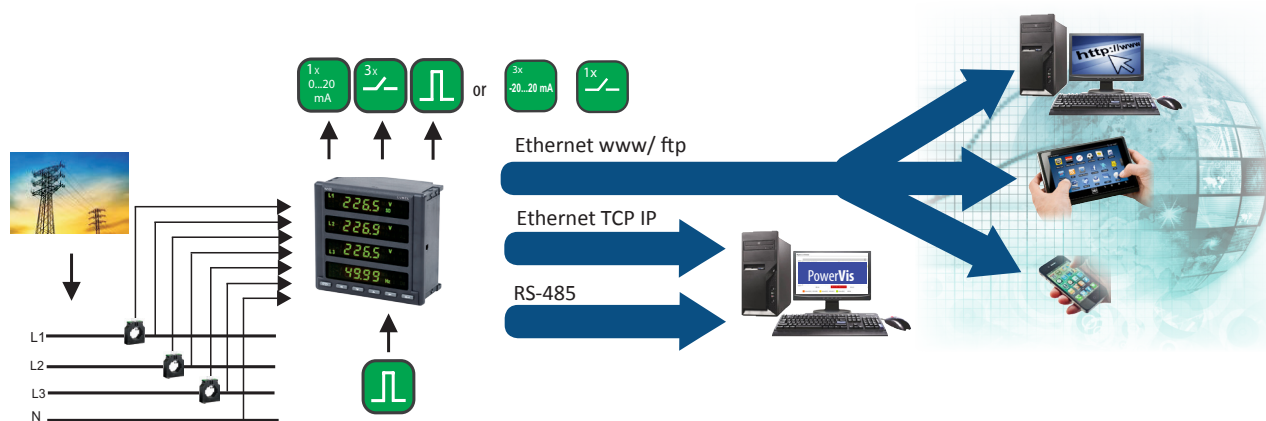


N100 - POWER NETWORK ANALYZER

- 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
- active phase powers: P_1, P_2, P_3
- reactive phase powers: Q_1, Q_2, Q_3
- apparent phase powers: S_1, S_2, S_3
- active power factors: PF_1, PF_2, PF_3
- reactive/active power factors: $tg\varphi_1, tg\varphi_2, tg\varphi_3$
- active, reactive and apparent 3-phase power: P, Q, S
- mean 3-phase power factors: $PF, tg\varphi$
- frequency f
- average 3-phase voltage: U_s
- average phase-to-phase voltage: U_{mf}
- average 3-phase current: I_s
- average active power 15 min. P_{demand}
- average apparent power S_{demand}
- average current I_{demand}
- active, reactive and apparent 3-phase 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 voltages and currents THD_U, THD_I
- harmonics for current and phase voltage up to 51 st!

OUTPUTS

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	1x OC (NPN), passive, supply voltage 18 ... 27 V, (for version with 3 relay outputs, 1 analog output). Accuracy, as for the active energy

FEATURES	INPUTS	OUTPUTS		GALVANIC ISOLATION				
<div style="display: flex; flex-wrap: wrap; gap: 5px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">MOD BUS TCP</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">www ftp</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">Password protection</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">RTC</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">THD</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">Har 51</div> </div>	<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">AC</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">[Square Wave]</div> </div>	<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">RS 485</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">0 .. 20 mA</div> </div>	<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">3x [Slope]</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">[Square Wave]</div> </div>	or	<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">1x [Slope]</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">RS 485</div> </div>	<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">3x -20...20 mA</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">Ethernet</div> </div>	<div style="display: grid; grid-template-columns: repeat(3, 1fr); gap: 5px;"> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">Ethernet</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">RS 485</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">analog</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">alarm</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">pulse</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">phaseL1</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">phaseL2</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">phaseL3</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">pulse</div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; background-color: #008000; color: white; text-align: center; width: 40px; height: 40px; margin: 2px;">Supply</div> </div>	

INPUTS

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

DIGITAL INTERFACE

Interface type	Transmission protocol	Remarks
RS-485	Modbus RTU 8N2,8E1,8O1,8N1	Address 1..247
Ethernet 10/100 Base-T -option	Modbus TCP, HTTP, FTP	WWW server, FTP server, DHCP client

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 1/5 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 _v , average active power P _{dt}	..(-)1999.9 W ..(-)1999.9 MW (tr_U≠1.tr_I≠1)	•	•	•	•	Class 0.5
Reactive power Q _i	..(-)1999.9 Var ..(-)1999.9 MVar (tr_U≠1.tr_I≠1)	•	•	•	•	Class 2
Apparent power S _v , average apparent power S _{dt}	..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 _i	-1.00 ..0 ..1.00	•	•	•	•	± 0.01 of basic error
Coefficient tgφ _i (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 and current THDI	0.0 ..100.0 %					Class 5 50 / 60 Hz
Amplitudes of the voltage U _{h1} ... U _{h50} , and current I _{h1} ... I _{h50}	0.0 ..100.0 %	•	•	•		Class 5 50 / 60 Hz

tr_I, tr_U – ratio of current and voltage transformer

EXTERNAL FEATURES

Readout field	4 X 4 1/2 LED digits, backlit units,	two color (red, green), 14 mm
Overall dimensions	144 x 144 x 77 mm	mounting hole 138 ^{+0.5} x 138 ^{+0.5} mm
Weight	0.8 kg	
Protection grade	from frontal side: IP65	from terminal side: IP20

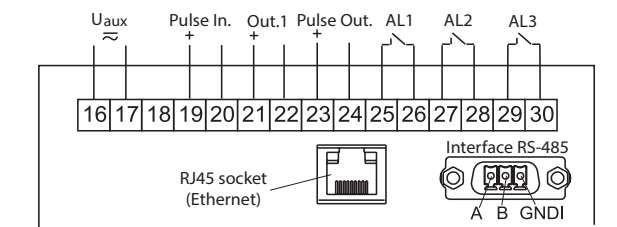
RATED OPERATING CONDITIONS

Supply voltage	85...253 V a.c. (40...50...400 Hz) or 90...300 V d.c. or 20...40 V a.c., 20...60 V d.c.	power consumption $\leq 12VA$
Power consumption	in voltage circuit $\leq 0.5 VA$	in current circuit $\leq 0.1 VA$
Input signal	0...0.1...1.2 In; 0.1...0.2...1.2 Un for current, voltage, PF, tg ϕ ,	frequency 45...50...60...65 Hz, sinusoidal (THD $\leq 8\%$)
Power factor	-1...0...1	
Preheating time	5 min.	
Ambient temperature	-10...23...55°C, class K55 acc. to EN61557-12	
Humidity	0...40...65...95%	without condensation
Operating position	any	
External magnetic field	$\leq 40...400 A/m$ d.c.	$\leq 3 A/m$ a.c. 50/60 Hz
Short-term overload	voltage input: 2 Un (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 change: $< 50\% / 10^\circ C$

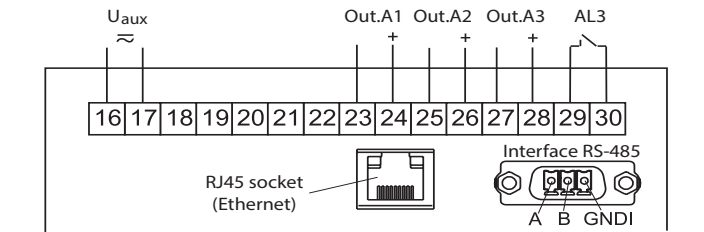
SAFETY AND COMPABILITY REQUIREMENTS

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	acc. to EN 61010-1
Polution level	2	acc. to EN 61010-1
Installation category	III	acc. to EN 61010-1
Maximal phase-to-earth voltage	<ul style="list-style-type: none"> for supply circuit and relay outputs 300 V for measuring input 500 V for circuits of RS-485, Ethernet, pulse input and output, analog outputs: 50 V 	acc. to EN 61010-1
Altitude a.s.l.	$< 2000 m$	

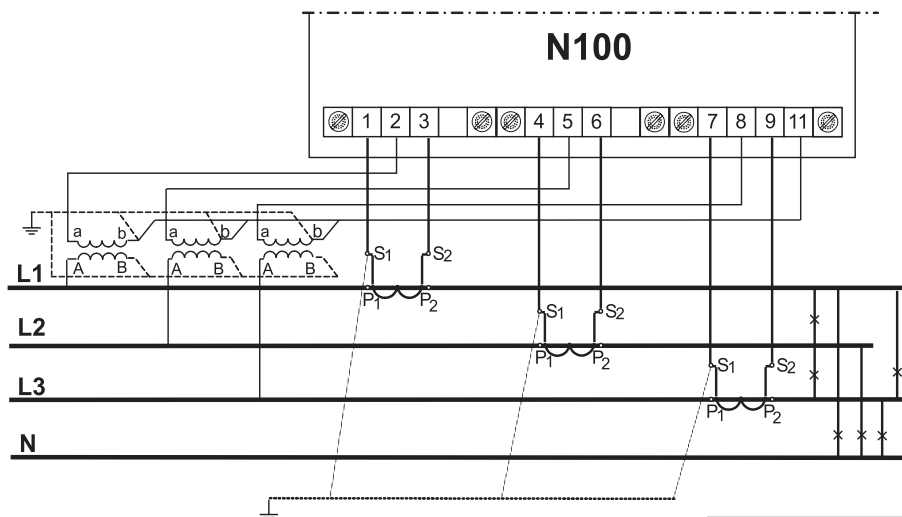
CONNECTION DIAGRAMS



Version with 3 relay outputs,
1 analog output



Version with 3 analog outputs,
1 relay output



Indirect measurement in 4-wire network -
connection of input signals

ORDERING CODE

Meter N100 -	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, 1 x 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	
custom-made*					XX	
Language:						
Spanish						S
English						E
French						F
Acceptance tests:						
without additional quality requirements						0
with an extra quality inspection certificate						1
acc.to customer's request*						X

N100 meter has in standard:

- universal power input
- interface RS485
- supply 85 ... 253 Va.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 - meter N100

2 - input voltage 3x 230/ 400 V

1 - 3x relay, 1x analog output, 1x pulse input, 1x pulse output

1 - with Ethernet, internal memory

00 - standard version

E - user's manual in English

0 - without additional quality requirements.

* only after agreeing with the manufacturer

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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DS-N100_EN_120717