# ND30
-METER OF POWER NETWORK PARAMETERS

- **Measurement and recording** of 54 power network parameters, including **current and voltage harmonics up to 51st**, in 1-phase 2-wire or 3-phase 3 or 4-wire balanced and unbalanced systems.
- **graphical color display**: LCD TFT 3,5", 320 x 240 pixels, **fully configurable by a user** (10 vies, 8 parameters in each)
- indications include the values of programmed ratios.
- Memory of minimum and maximum values.
- 2 configurable alarm outputs.
- Optional: analog output 0/4...20 mA and 2 PT 100 inputs (eg. for measurement of transformer temperature).
- Data archiving in the internal memory 8 gB (option).
- Digital output RS-485 - MODBUS protocol.
- **Modern and user-friendly Ethernet interface** 10/100 BASE-T (option):
  - protocol: MODBUS TCP/iP, HTTP, FTP,
  - services: www server, ftp server, DHCP client.
- Programming of parameters using **free econ software**.
- Battery backup RTC.
- Overall dimensions: 96 x 96 x 77 mm.

EXAMPLE OF APPLICATION
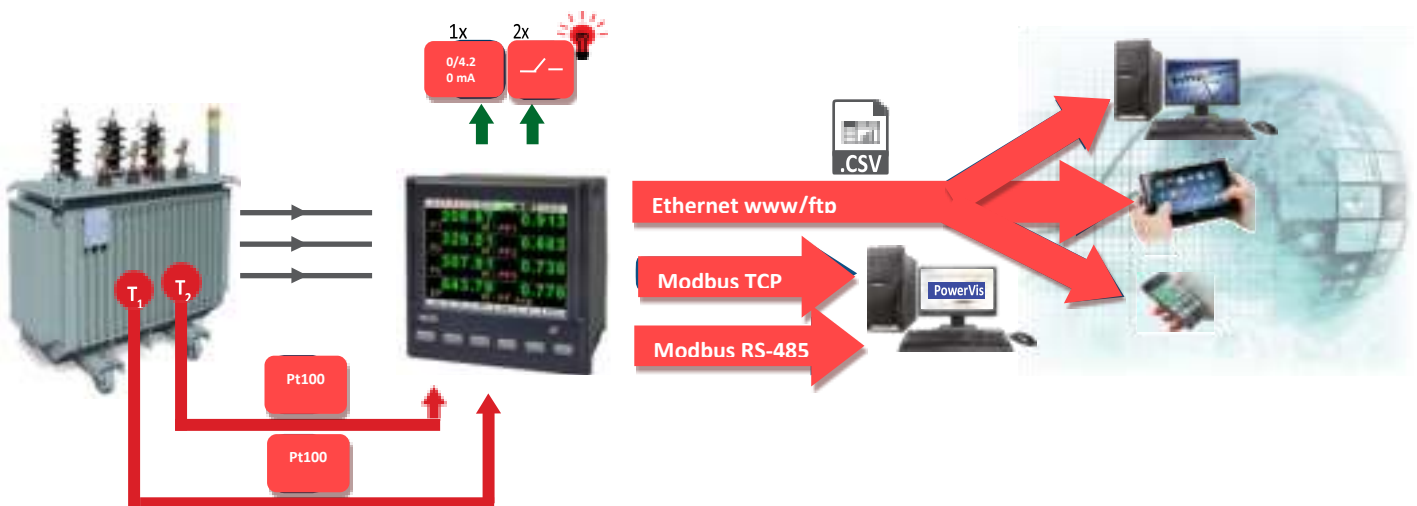
MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS

- 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_1, tg_2, tg_3
- active, reactive and apparent 3-phase power: P, Q, S
- mean 3-phase power factors: PF, tg
- frequency f
- mean 3-phase voltage: U_s

- mean phase-to-phase voltage: U_{mf}
- mean 3-phase current: i_s
- 15, 30, 60 minutes' mean active power: P_{demand}
- mean apparent power S_{demand}
- average current i_{demand}
- active, reactive and apparent 3-phase energy: EnP, EnQ, EnS
- active, reactive and apparent energy from external counter: EnPE
- total harmonic content coefficients for phase voltages and 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!
- temperature (2 x Pt100 input)

ND30 - METER OF POWER NETWORK PARAMETERS

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PRECISION INSTRUMENTATION

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION

TECHNICAL DATA

MEASURING RANGE

Measured value	Measuring range	I1	I2	I3	Σ	class (*) / Basic error (*) class relative to the measured value acc. to en61557-12
Current 1/5A 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_i, 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 1
Apparent power S_i, avarage 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)	.. (-)1999.9Wh ..(-)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 1
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 $tg\varphi_i$ (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 0.1
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

INPUTS

input type	properties
input Pt100 (T1, T2) - option	2 x Pt100, 2-wire, -50...400°C, basic error 0.5 %

DIGITAL INTERFACE

interface type	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 -option	Modbus TCP,HTTP,FTP		WWW server, FTP server, DHCP client

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ND30 - METER OF POWER NETWORK PARAMETERS

EXTERNAL FEATURES

|		
readout field	graphic color display lCD TFT 3,5", 320 x 240 pixels	
overall dimensions	96 x 96 x 77 mm	mounting hole 92.5 x 92.5 mm
Weight	0.3 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), 90...300 V d.c. or 20...40 V a.c., 20...60 V d.c.	power consumption ≤ 6 VA
power consumption	in voltage circuit ≤ 0.2 VA	in current circuit ≤ 0.1 VA
input signal	0...0.1...1.2 in; 0.1...0.2...1.2 Un for current, voltage, PFi, tgi	frequency 45...50...60...65 Hz, sinusoidal (THD ≤ 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	≤ 40...400 A/m d.c.	≤ 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°C

SAFETY AND COMPATIBILITY 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	• 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
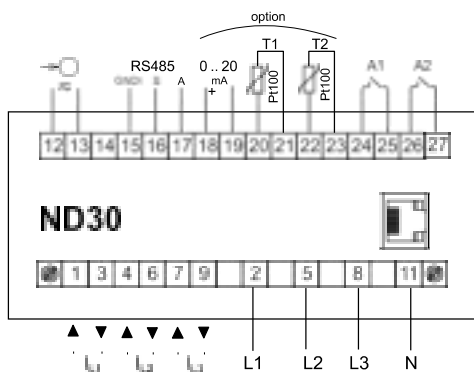
Description of meter connections strips
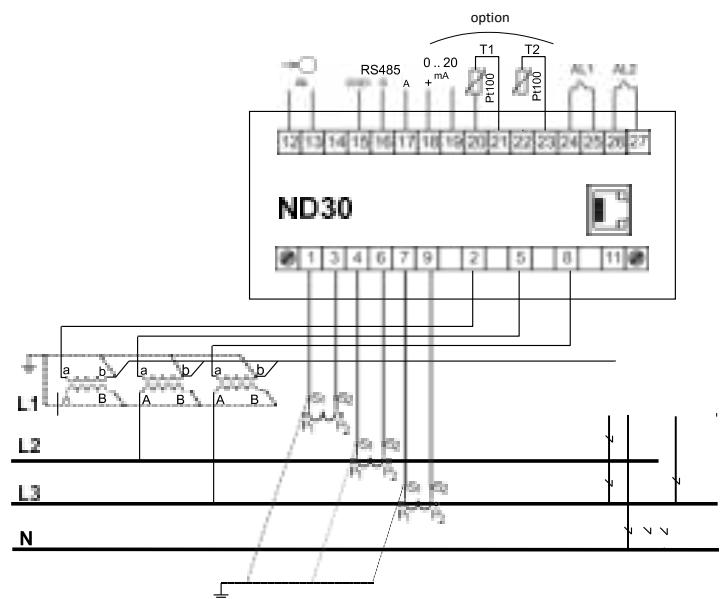
indirect measurement in 4-wire network - connection of input signals

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DISPLACING OF MEASUREMENT PARAMETERS

up to 10 programmable screens
(8 parameters per page);
ability to change color for all screens

Available colors for digital indications:
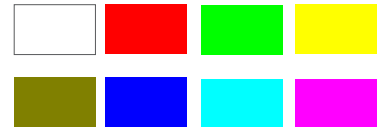
two screens dedicated to harmonics;
indication of individual harmonic
for voltages and currents (up to 51st);
bargraph presentation for all harmonics
with zoom function

easy to use and intuitive menu;
information bar with status of: phase
sequence, alarm outputs, temperature
measurements*, archiving and memory*,
Ethernet* and RS-485 interfaces,
time and date

*- availability of feature depends on
hardware version of ND30

ND30 - METER OF POWER NETWORK PARAMETERS

METER CONFIGURATION WITH FREE eCON SOFTWARE
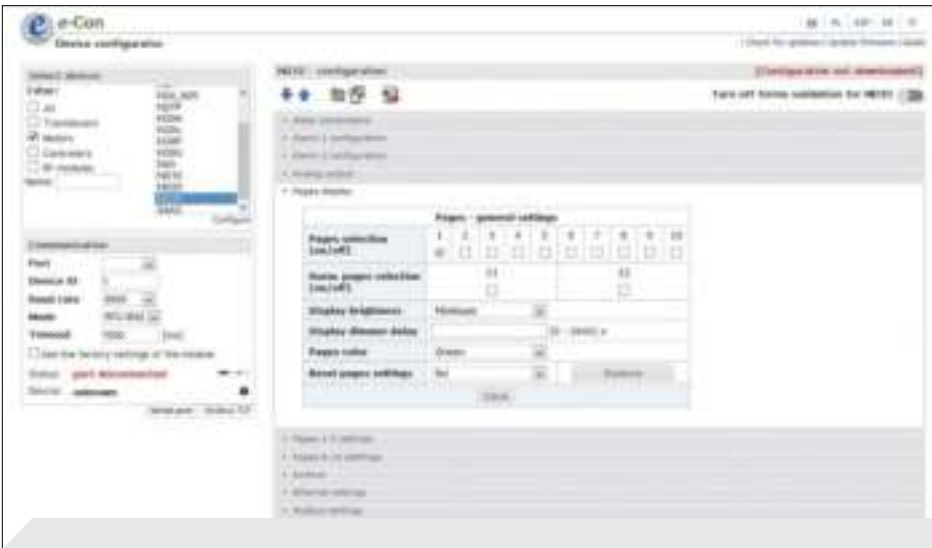
ability to configure and update ND30
with free eCon software
(via RS-485 or Ethernet* interface)

*- availability of feature depends on hardware version of ND30

REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW SERVER, FTP

WEB server* for remote reading
of current measurement data;
FTP server* for downloading
archived CSV files

*- availability of feature depends on hardware version of ND30

ND30 - METER OF POWER NETWORK PARAMETERS

ORDERING CODE

Meter ND30 -	X	X	X	X	XX	X	X
input voltage (phase/phase-to-phase) un:							
3 x 57.7/ 100 V, 3x 230/ 400 V	1						
3 x 110/ 190 V, 3 x 400/ 690 V	2						
additional outputs /inputs:							
2 relays		1					
2 relays, 1 analog output, 2 inputs PT100		2					
interface:							
RS-485			1				
RS-485 and Ethernet, internal memory			2				
supply:							
85...253 V a.c., 90...300 V d.c.				1			
20...40 V a.c., 20...60 V d.c.				2			
version:							
standard					00		
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

* only after agreeing with the manufacturer

order example:
The code: **nD30 - 1 2 2 1 00 e 0** means:

    nD30 - meter ND30
        1 - input voltage 3 x 57.7/ 100 V, 3x 230/ 400 V
        2 - 2 relays, 1 analog output, 2 inputs PT100
        2 - RS-485 and Ethernet, internal memory
        1 - supply: 85...253 V a.c., 90...300 V d.c.
        00 - standard version
        e - user's manual in English
        0 - without additional quality requirements.

SEE ALSO:

ND40 - power network analyzer/

RE92 - dual loop

P30U - universal transducer of temperature and standard signals

KS31 - Digital synchronizing unit

N43 - rail mounted 3-phase power network

P43 - 3-phase transducer of power network parameters

ND1 - analyser of network parameters

Current transformers from 5 A up to 6 kA

Free **eCON** software

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