

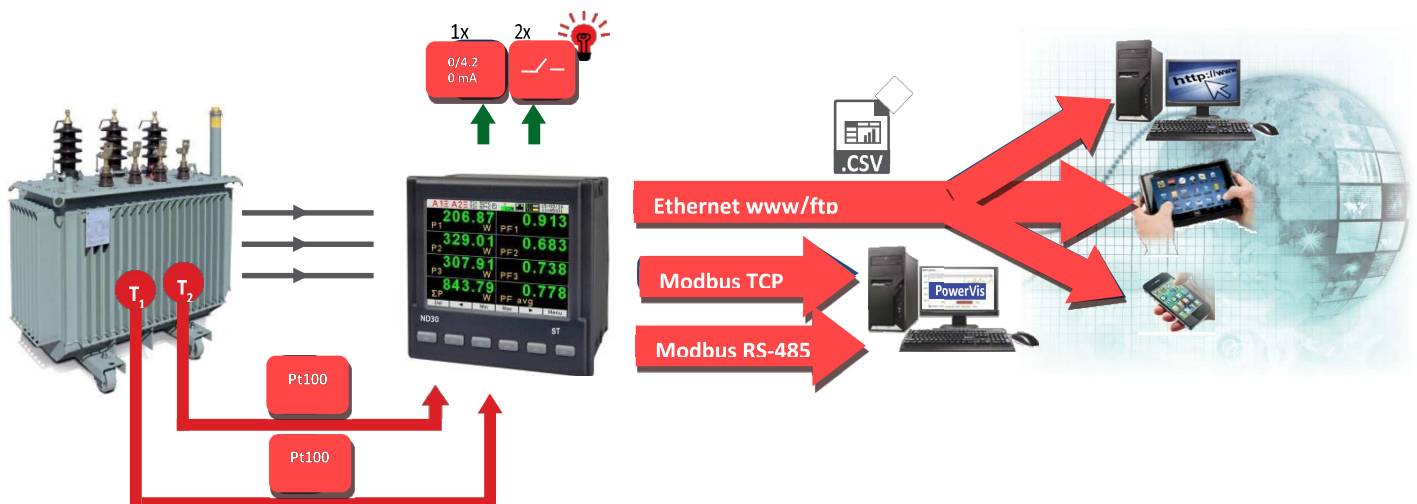
ND30

-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**: ICD TFT 3,5", 320 x 240 pixels, **fully configurable by a user** (10 views, 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 8GB (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: 96x96x77 mm.



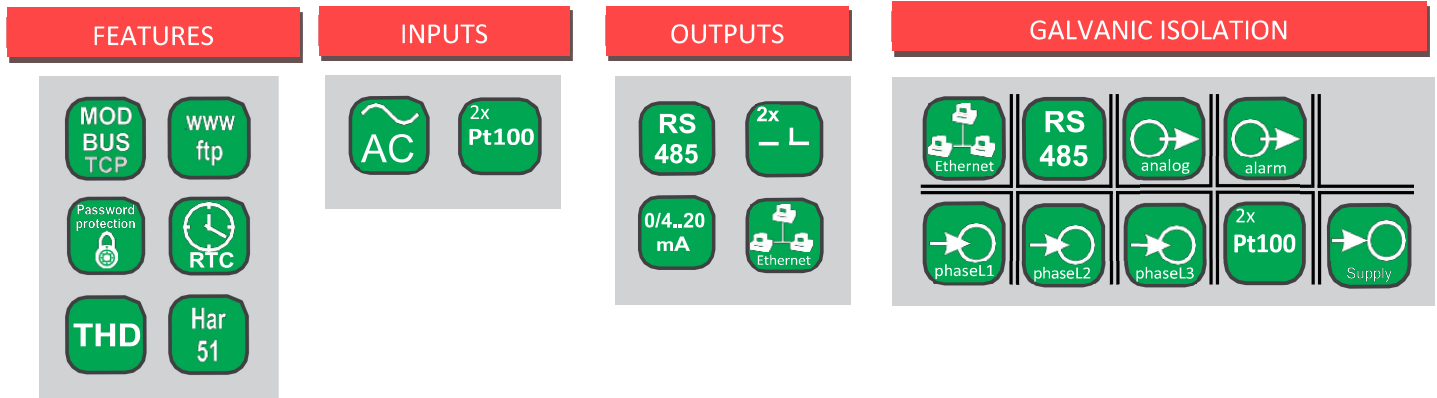
EXAMPLE OF APPLICATION



MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS

- | | |
|---|--|
| □ phase voltages: U_1, U_2, U_3 | □ mean phase-to-phase voltage: U_{m} |
| □ phase-to-phase voltages: U_{12}, U_{23}, U_{31} | □ mean 3-phase current: i |
| □ phase currents i_1, i_2, i_3 | □ 15, 30, 60 minutes' mean active power: $P_{average}$ |
| □ active phase powers: P_1, P_2, P_3 | □ mean apparent power $S_{average}$ |
| □ reactive phase powers: Q_1, Q_2, Q_3 | □ average current $i_{average}$ |
| □ apparent phase powers: S_1, S_2, S_3 | □ active, reactive and apparent 3-phase energy: EnP, EnQ, EnS |
| □ active power factors: PF_1, PF_2, PF_3 | □ active, reactive and apparent energy from external counter: $EnPE$ |
| □ reactive/active power factors: $tg\phi_1, tg\phi_2, tg\phi_3$ | □ total harmonic content coefficients for phase voltages and currents $THD_{U1}, THD_{U2}, THD_{U3}, THD_{I1}, THD_{I2}, THD_{I3}$ |
| □ active, reactive and apparent 3-phase power: P, Q, S | □ and for 3-phase voltages and currents THD_{U}, THD_{I} |
| □ mean 3-phase power factors: $PF, tg\phi$ | □ harmonics for current and phase voltage up to 51 st! |
| □ frequency f | □ temperature (2 x Pt100 input) |
| □ mean 3-phase voltage: U_m | |

ND30 - METER OF POWER NETWORK PARAMETERS



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 I/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 I-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 I-I 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 _a , 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 _a , 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 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 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 0.1
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

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

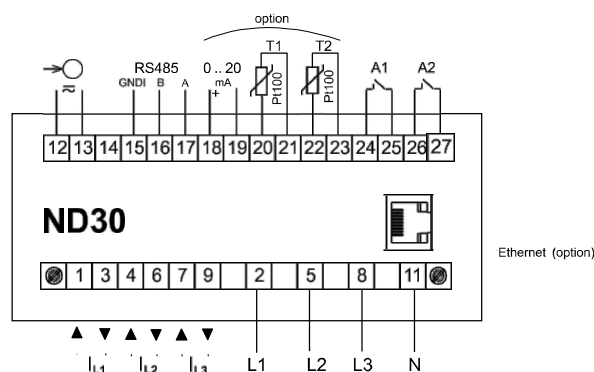
RATED OPERATING CONDITIONS

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, PF, tgφ	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

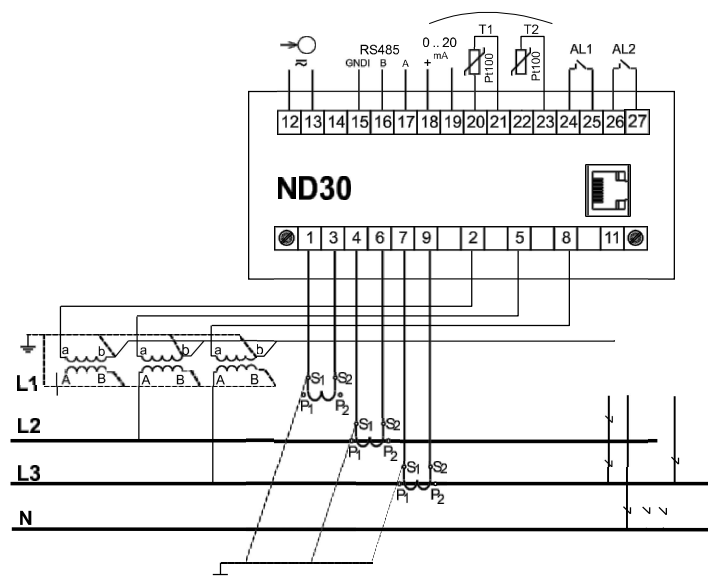
SAFETY AND COMPATIBILITY REQUIREMENTS

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
pollution 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

ND30 - METER OF POWER NETWORK PARAMETERS

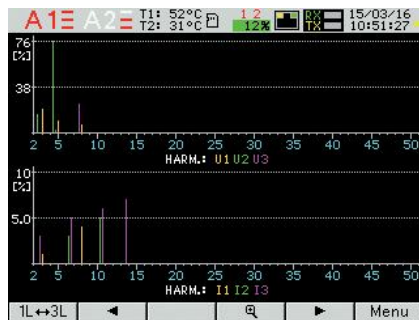
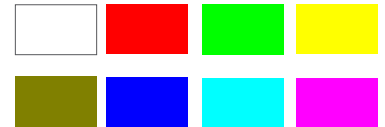
DISPLACING OF MEASUREMENT PARAMETERS



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

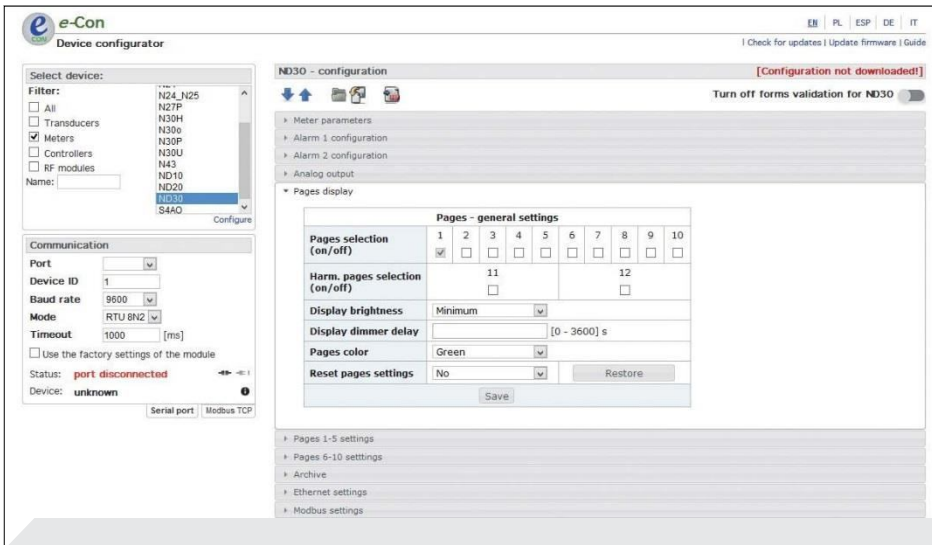


easy to use and intuitive menu;
information bar with status of: phase
sequence, alarm outputs, temperature
measurements*, archiving and memory*,
Ethernet* and RS-485 interfaces,
time and date

*- 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




3-PHASE POWER NETWORK METER TYPE ND30

Page 1

U12	378.040	V	I1	1.005	A
U23	383.467	V	I2	2.105	A
U31	392.184	V	I3	1.805	A
f	49.999	Hz	I avg	1.638	A

Page 3

ΣP	843.787	W	P DMD	843.795	W
ΣQ	725.969	var	S DMD	1125.611	VA
I avg	1.638	A	I DMD	1.638	A
tg avg	0.810		PF avg	0.778	

Page 5

ΣP	843.787	W	EnP+	21.661	GWh
ΣQ	725.969	var	EnP-	2786.344	MWh
ΣS	1125.615	VA	EnQ L	13.761	Mvarh
En S	24.854	GVAh	EnQ C	12.036	Mvarh

Page 2

U12	378.040	V	ΣP	843.787	W
U23	383.467	V	ΣQ	725.969	var
U31	392.184	V	ΣS	1125.615	VA
U123	384.564	V	PF avg	0.778	

Page 4

THDU12	43.049	%	THD I1	4.100	%
THDU23	43.359	%	THD I2	5.784	%
THDU31	22.461	%	THD I3	10.879	%

U2	228.917	V	I2	2.105	A
U3	231.231	V	I3	1.805	A
f	49.999	Hz	I avg	1.638	A

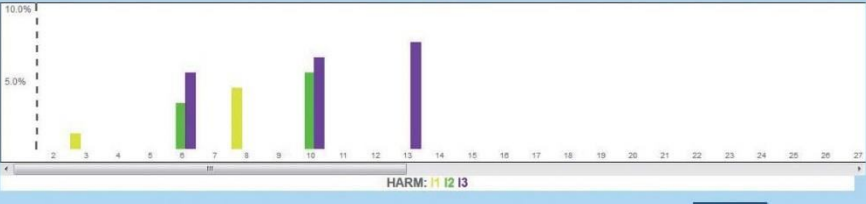
U23	383.494	V	ΣQ	725.923	var
U31	392.211	V	ΣS	1125.737	VA
U123	384.588	V	PF avg	0.778	

Harmonics numbers

Harmonic U no : H18 U1=0.0 %, U2=0.0 %, U3=0.0 %



HARM: U1 U2 U3



HARM: H1 H2 H3

Close

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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

Power Network 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						U	
Other*						X	
Acceptance Tests:							
Without Additional Quality Requirements							0
With An Extra Quality Inspection Certificate							1
Acc.To Customer'S Request*							X

Order Example:

The code: **ND30 122100U0** 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
- U - User's Manual In English
- 0 - Without Additional Quality Requirements.

* only after agreeing with the manufacturer

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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