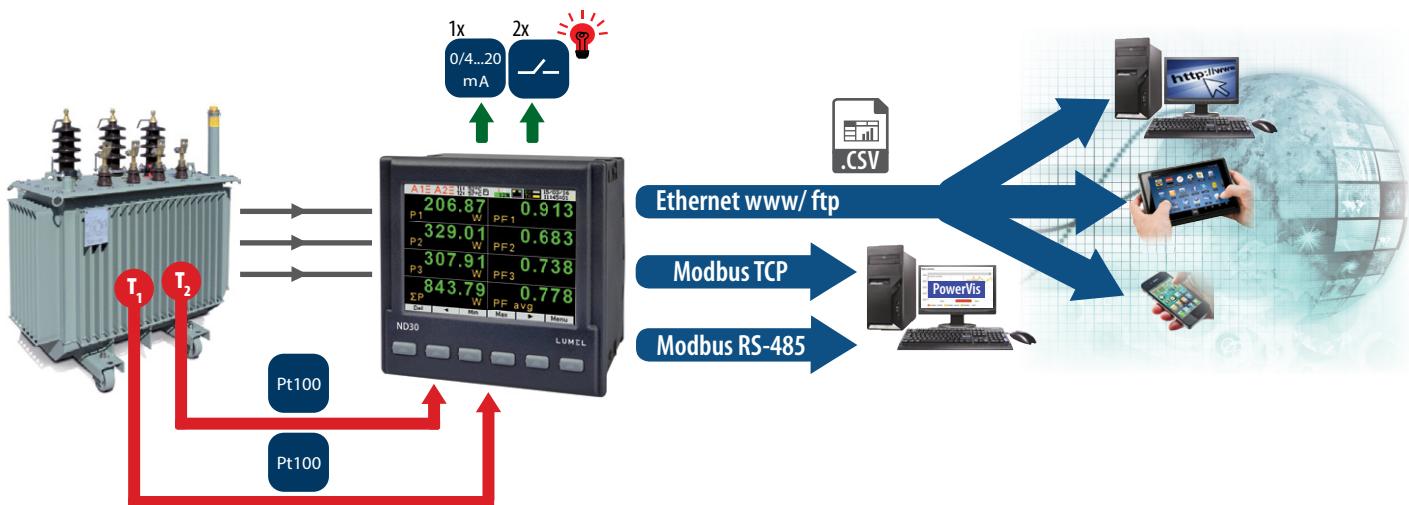




## ND30 - METER OF POWER NETWORK PARAMETERS

- **Measurement** 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).
- **Additional 2 pages for harmonics presentation and 1 dedicated page for visualization in the form of an analog meter.**
- 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).
- Archiving of up to 32 measured parameters 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

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• phase voltages: <math>U_1, U_2, U_3</math></li> <li>• phase-to-phase voltages: <math>U_{12}, U_{23}, U_{31}</math></li> <li>• phase currents <math>I_1, I_2, I_3</math></li> <li>• active phase powers: <math>P_1, P_2, P_3</math></li> <li>• reactive phase powers: <math>Q_1, Q_2, Q_3</math></li> <li>• apparent phase powers: <math>S_1, S_2, S_3</math></li> <li>• active power factors: <math>PF_1, PF_2, PF_3</math></li> <li>• reactive/active power factors: <math>\text{tg}\varphi_1, \text{tg}\varphi_2, \text{tg}\varphi_3</math></li> <li>• active, reactive and apparent 3-phase power: <math>P, Q, S</math></li> <li>• mean 3-phase power factors: <math>PF, \text{tg}\varphi</math></li> <li>• frequency <math>f</math></li> <li>• mean 3-phase voltage: <math>U_s</math></li> </ul> | <ul style="list-style-type: none"> <li>• mean phase-to-phase voltage: <math>U_{mf}</math></li> <li>• mean 3-phase current: <math>I_s</math></li> <li>• 15, 30, 60 minutes' mean active power: <math>P_{\text{demand}}</math></li> <li>• mean apparent power <math>S_{\text{demand}}</math></li> <li>• average current <math>I_{\text{demand}}</math></li> <li>• active, reactive and apparent 3-phase energy: <math>EnP, EnQ, EnS</math></li> <li>• active, reactive and apparent energy from external counter: <math>EnPE</math></li> <li>• total harmonic content coefficients for phase voltages and currents <math>\text{THD}_{U1}, \text{THD}_{U2}, \text{THD}_{U3}, \text{THD}_{I1}, \text{THD}_{I2}, \text{THD}_I</math> and for 3-phase voltages and currents <math>\text{THD}_{U'}, \text{THD}_I</math></li> <li>• harmonics for current and phase voltage up to 51 st!</li> <li>• temperature (2 x Pt100 input)</li> </ul> |
|---|--|

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION
MOD BUS TCP www ftp Password protection RTC THD Har 51	AC 2x Pt100	RS 485 0/4..20 mA	Ethernet RS 485 analog alarm phaseL1 phaseL2 phaseL3 2x Pt100 Supply

## TECHNICAL DATA

### MEASURING RANGE

Measured value	Measuring range	L1	L2	L3	$\Sigma$	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_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 $P_i$ , 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 1
Apparent power $S_i$ , 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 <sup>1)</sup>
Reactive energy EnQ (inductive or capacitive)	.. (-)1999.9 Varh .. (-)1999.9 MVarh (tr_U ≠ 1, tr_l ≠ 1)				.	Class 1
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 $tg\varphi_i$ (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 $U_{h1} \dots U_{h50}$ , and current $I_{h1} \dots I_{h50}$	0.0 .. 100.0 %	.	.	.		Class 5 50 / 60 Hz

tr\_l, tr\_U – ratio of current and voltage transformer

<sup>1)</sup> Class 0.5 S acc. to EN 62053-22

### 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 8N2,8E1,801,8N1	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

## 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

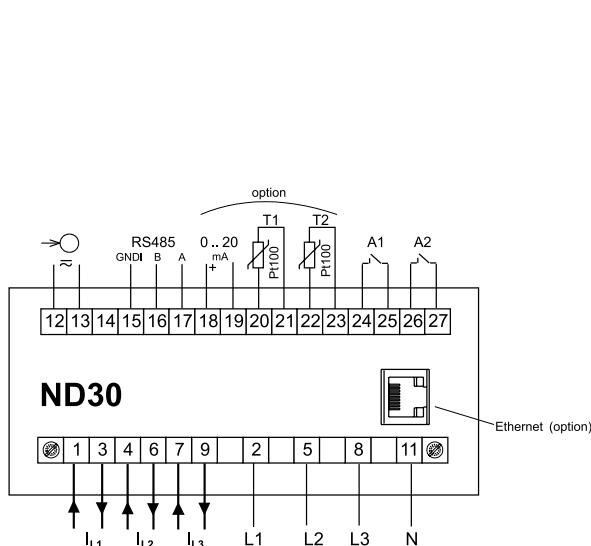
## RATED OPERATING CONDITIONS

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

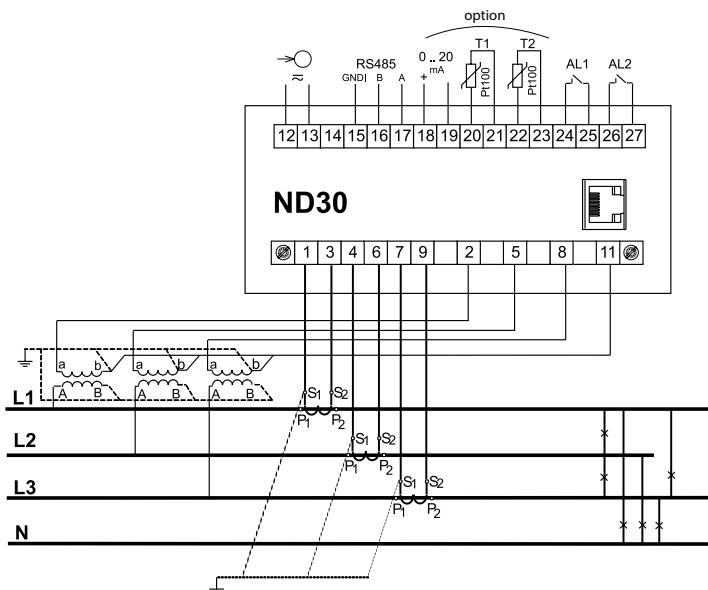
## SAFETY AND COMPABILITY REQUIREMENTS

Electromagnetic compatibility	noise immunity noise emissions	acc. to EN 61000-6-2 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

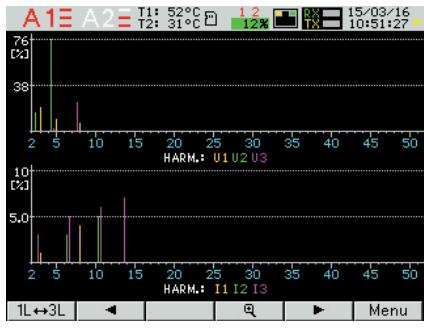
## DISPLAYING OF MEASUREMENT PARAMETERS

A1	A2	T1: 52°C T2: 31°C	1 2	12%	RX TX	15/03/16 11:33:16
<b>225.48</b>		U1 V	I1	<b>1.005</b>	A	
<b>228.91</b>		U2 V	I2	<b>2.105</b>	A	
<b>231.22</b>		U3 V	I3	<b>1.805</b>	A	
<b>49.999</b>	f	Hz	avg	<b>1.638</b>	A	
Del	<	Min	Max	>	Menu	

A1	A2	T1: 131°C T2: 32.9°C	1 2	12%	RX TX	15/03/16 13:04:26
<b>843.80</b>			<b>ΣP</b>	<b>W</b>	21 660 807.201	En P+ kWh
<b>726.01</b>			<b>ΣQ</b>	<b>var</b>	2 786 343.635	En P- kWh
<b>1.126</b>			<b>ΣS</b>	<b>kVA</b>	13 760.862	En Q kvarh
24 853 934.200					12 035.698	En S kVAh
En S kVAh					En Q+ kvarh	
Del	<	Min	Max	>	Menu	

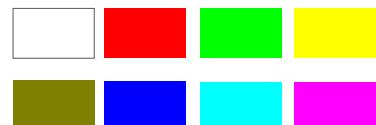
A1	A2	T1: 52°C T2: 57°C	1 2	12%	RX TX	15/03/16 12:02:57
<b>225.48</b>		U1 V	S1	<b>226.57</b>	VA	
<b>1.005</b>	I1 A		PF1	<b>0.913</b>		
<b>206.88</b>	P1 W		tg1	<b>0.447</b>		
<b>92.387</b>	Q1 var	f		<b>49.999</b>	Hz	
Del	<	Min	Max	>	Menu	

A1	A2	T1: 49°C T2: 53°C	1 2	3%	RX TX	22/09/15 13:36:31
U1	<b>0.905</b>	%	I1	<b>0.905</b>	%	
U2	<b>0.905</b>	%	I2	<b>0.903</b>	%	
U3	<b>0.903</b>	%	I3	<b>0.903</b>	%	
<b>Har. 5</b>						
50160	<	▼	▲	>	Menu	



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

presentation in the form of analog  
meter view with min/max preview  
for display value and 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

**LUMEL**  
EVERYTHING COUNTS

## METER CONFIGURATION WITH FREE eCON SOFTWARE

The screenshot shows the e-Con Device configurator interface for the ND30 meter. On the left, there's a sidebar with a 'Select device' filter (set to 'Meters') and a 'Communication' section where the port is set to 'Serial port'. The main area is titled 'ND30 - configuration' and contains sections for 'Pages display' (with tabs for 'Pages - general settings', 'Pages 1-5 settings', 'Pages 6-10 settings', 'Archive', 'Ethernet settings', and 'Modbus settings'), 'Meter parameters', 'Alarm 1 configuration', 'Alarm 2 configuration', and 'Analog output'. A status bar at the bottom right indicates 'Configuration not downloaded!'.

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 THROUG ETHERNET: WWW SERVER, FTP

The screenshot shows the LUMEL 3-PHASE POWER NETWORK METER TYPE ND30 web interface. It displays various pages of data:

- Page 1:** Real-time measurements for phases U12, U23, U31, and frequency f.
- Page 2:** Power values ( $\Sigma P$ ,  $\Sigma Q$ ,  $\Sigma S$ ) and power factors for each phase.
- Page 3:** Harmonic data for THD (THD I1, THD I2, THD I3).
- Page 4:** Harmonic data for THD (THDU12, THDU23, THDU31).
- Page 5:** Energy consumption data (EnP+, EnP-, EnQ, EnS).

On the right side, there's a 'WWW SERVER' icon and a box stating 'WEB server\* for remote reading of current measurement data; FTP server\* for downloading archived CSV files'. Below the interface, a note says '\*- availability of feature depends on hardware version of ND30'.

**Harmonics numbers:**

Two stacked bar charts show harmonic content for phases U1, U2, U3 and I1, I2, I3. The top chart for U-phases has a y-axis from 0.0% to 76.1%, and the bottom chart for I-phases has a y-axis from 0.0% to 10.0%. Both charts have an x-axis from 2 to 27.

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## ORDERING CODE

Meter ND30 -	X	X	X	X	XX	X	X
<b>Input voltage (phase/phase-to-phase) Un:</b>							
3 x 57.7 / 100 V, 3x 230 / 400 V	1						
3 x 110 / 190 V, 3 x 400 / 690 V		2					
<b>Additional outputs /inputs:</b>							
2 relays		1					
2 relays, 1 analog output, 2 inputs PT100			2				
<b>Interface:</b>							
RS-485			1				
RS-485 and Ethernet, internal memory			2				
<b>Supply:</b>							
85...253 V a.c., 90...300 V d.c.			1				
20...40 V a.c., 20...60 V d.c.			2				
<b>Version:</b>							
standard			00				
custom-made*			XX				
<b>Language:</b>							
Polish			P				
English			E				
other*			X				
<b>Acceptance tests:</b>							
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.

For more information about Lumel products  
please visit our website:

[www.lumel.com.pl](http://www.lumel.com.pl)

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ND30-19B\_en



**LUMEL**  
EVERYTHING COUNTS

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