



# POWER NETWORK MEASUREMENTS

Analysers, Multimeters & Transducers



Measurements of electrical energy and 1 or 3-phase network parameters belong to the LUMEL's main competence area. We offer in the scope of devices for energy measurements and monitoring:

- 1- and 3-phase power network parameters meters and transducers,
- electronic three-phase and single-phase watt-hour meters,
- synchronizing units.

The instruments are destined to measure following parameters:

- Voltage (U), (phase/ phase-to-phase)
- Current (I)
- Frequency (f)
- Active power (P)
- Reactive power (Q)
- Apparent power (S)
- Active power factors (Pf)
- Active/reactive power factors (tg φ)
- Active energy (EnP)
- Reactive energy (EnQ)
- Apparent energy (EnS)
- Mean voltage
- Mean power
- 15-minutes' active power
- THD for phase voltages and currents
- Harmonics of phase currents and voltages
- Min and max of above parameters

- Free programming software LPConfig
- Customized displaying pages with measured parameters
- RS485 Modbus communication
- Co-operation with current transformers (CT) and voltage transformers (VT)
- Pulse outputs



# METERS & ANALYSERS

## N17Z

- indicator of voltage or current with a.c. + d.c. measurement.  
**Features:** 3 or 4-digits display, programmable with PD15 programmer.



## N20Z

- indicator of voltage, current or frequency with a.c. + d.c. measurement,  
**Features:** 5-digits display with three colours, IP65, 2 alarms, programming via free delivered software and PD14 programmer.



## N30P - NEW

- meter of 1-phase network parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage – all measured in one time.  
**Features:** IP65, 2 or 4-alarm relays, analog output, RS485, programmable by buttons and free software.



## N14 - NEW FUNCTIONS

- multimeter of 3-phase balanced and unbalanced network parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage.  
**Features:** alarm relay, RS485, pulse output, programmable by buttons and free software.



## ND20 - NEW

- meter of 3-phase balanced and unbalanced network parameters: voltage, current, active, reactive and apparent power,  $\cos\phi$ ,  $\tan\phi$ , frequency, active and reactive energy.  
**Features:** harmonic measurements up to 25<sup>th</sup>, THD factors, analog, relay and pulse (energy) outputs. Programmable by the free LPConfig program and front buttons.



## N13 - NEW FUNCTIONS

- multimeter of 3-phase balanced and unbalanced network parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage, THD U&I, harmonics(25).
- tetraquadrantic measurement of energy (counting in separate registers of exported and imported active energy, and also inductive and capacitive reactive energy – counters available through RS-485).
- calculated and displayed current in the neutral wire.  
**Features:** alarm relay, analog output, RS485, pulse output, 8 displaying pages, programmable by buttons.



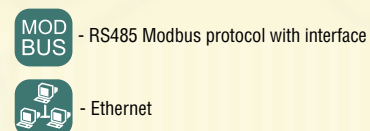
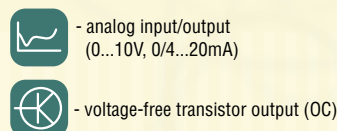
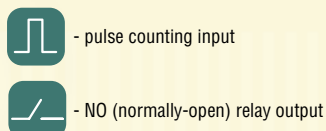
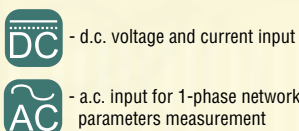
## N10 / N10A

- analyser of 3-phase balanced and unbalanced network parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage, THD U&I, harmonics(25).  
**Features:** 3 alarm relays, 3 analog outputs (N10A), RS485, pulse input, pulse output, 20 displaying pages, programmable by buttons.



## ND1 - 3-phase network analyser and recorder - NEW

- Features:**
- analyser-recorder of three-phase power network parameters with storage of data and events,
  - LCD TFT 5.7" colour screen, 320 x 240 pixels, with a touch screen panel for the analyser service,
  - replaceable external CompactFlash card with a capacity up to 4GB,
  - communication interfaces: Ethernet 10 Base-T, Modbus TCP/IP Slave, USB 1.1 Device, RS-485 Modbus Slave, RS-485 Modbus Master
  - programming of the analyser visualization (selection of measured quantities and the kind of representation),
  - data storage in the 6MB internal buffer with data support, (for before and after damage states),
  - dedicated visualization in following forms: digital or analog displays, bargraphs, harmonics, vectorial diagrams, statistics, binary inputs,
  - IP65 protection grade from the frontal side,
  - context help in the user's configuration menu,
  - storage of voltage decays and voltage dips acc. to the EN 50160 standard,
  - storage of selected measured parameters,
  - measurement of current and voltage harmonics up to the 51st.



# TRANSDUCERS

## P20Z

- transducer of current or voltage of 1-phase network

## P13

- power (active or reactive) transducer of 1-phase or 3-phase balanced network,  
**Features:** measurement via CT and VT, outputs: 0-5mA, 0-20mA, +/- 5mA, +/-20mA, 0-10V, +/-10V.

## P12P

- multitransducer of 1-phase or 3-phase balanced network, measurement via CT and VT of parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage,

**Features:** outputs: 0-5mA, 0/4-20mA, 0-10V, 2 alarm relays, RS485 and RS232 interfaces, programmed by buttons and free software.

## P10

- Transducer of 3-phase power network parameters: voltage, current, active, reactive and apparent power,  $\cos\phi$ ,  $\text{tg}\phi$ , frequency, active, reactive and apparent energy.

**Features:** current and voltage harmonic measurements up to 25<sup>th</sup>, THD factors, monitoring of mean power, analog, relay and digital outputs.

## P43 - NEW

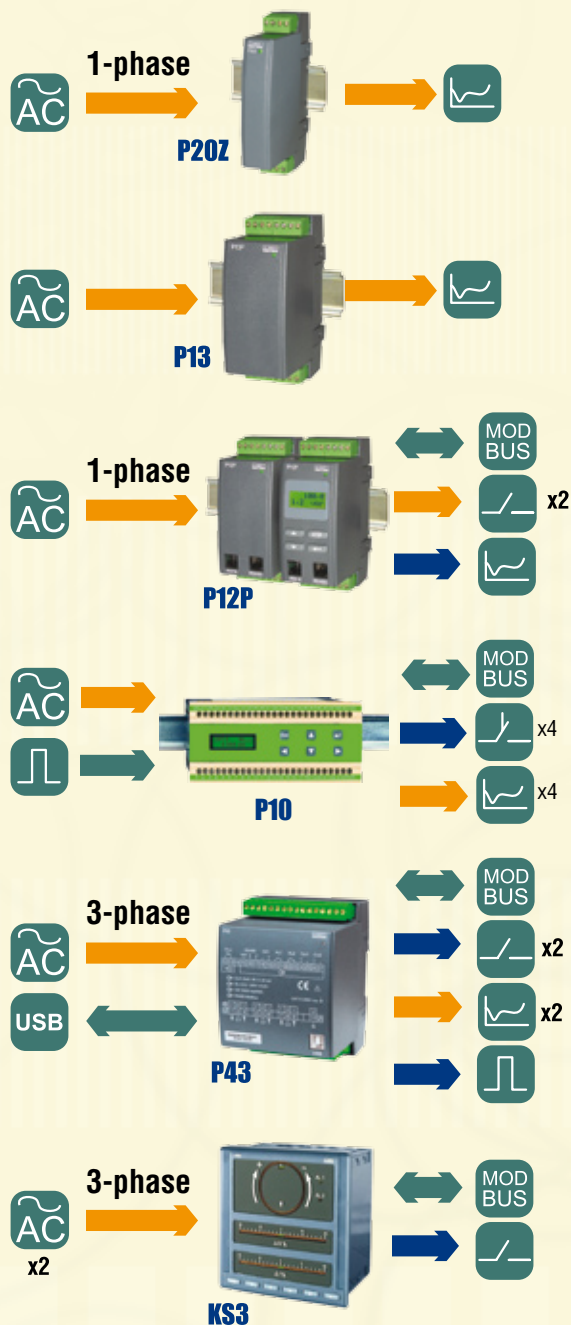
- multitransducer of 3-phase balanced and unbalanced network, measurement via CT and VT of parameters: U, I, f, P, Q, S,  $\cos\phi$ , energy, mean power, mean voltage,

**Features:** 2 outputs: +/-20mA, 2 alarm relays, RS485 interface, pulse OC output, USB. Programmable by the free LPConfig program.

## KS3

- synchronizing unit destined for the automatic synchronization of 3-phase generators with the power network.

**Features:** bargraph or digit displaying, programmable by buttons, RS485, visualization of:  $\Delta V\%$ ,  $\Delta f\%$ ,  $\phi$



# ANALOG METERS AND ACCESSORIES

**ASR** – bar type current transformers

**ASK** – plug-in current transformers

**WSK** – wound current transformers

**KBU** – split core current transformers

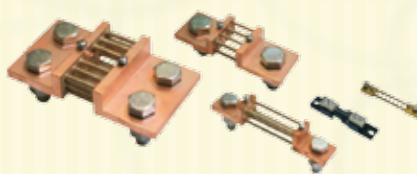
**SWMU** – current transformers with built-in transducer

## Shunts:

- ranges from 1A up to 15kA
- voltage drops: 50, 60, 75, 100 and 150mV
- class: 0.5

## Current transformers features:

- Rated current intensity: 5-10-15-20-25-30-40-50-60-75-100 A, with decadic multiple of these values
- Secondary nominal current: 5A or 1A
- Accuracy class: 0,5 or 1, Rated frequency: 50-60Hz



## Analog meters:

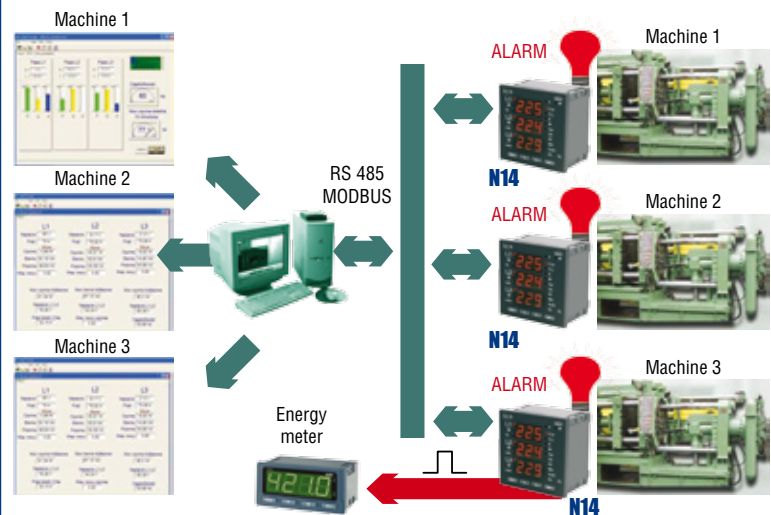
- direct measurement,
- measurement via CTs and VTs,
- measurement via current shunts,

# APPLICATIONS

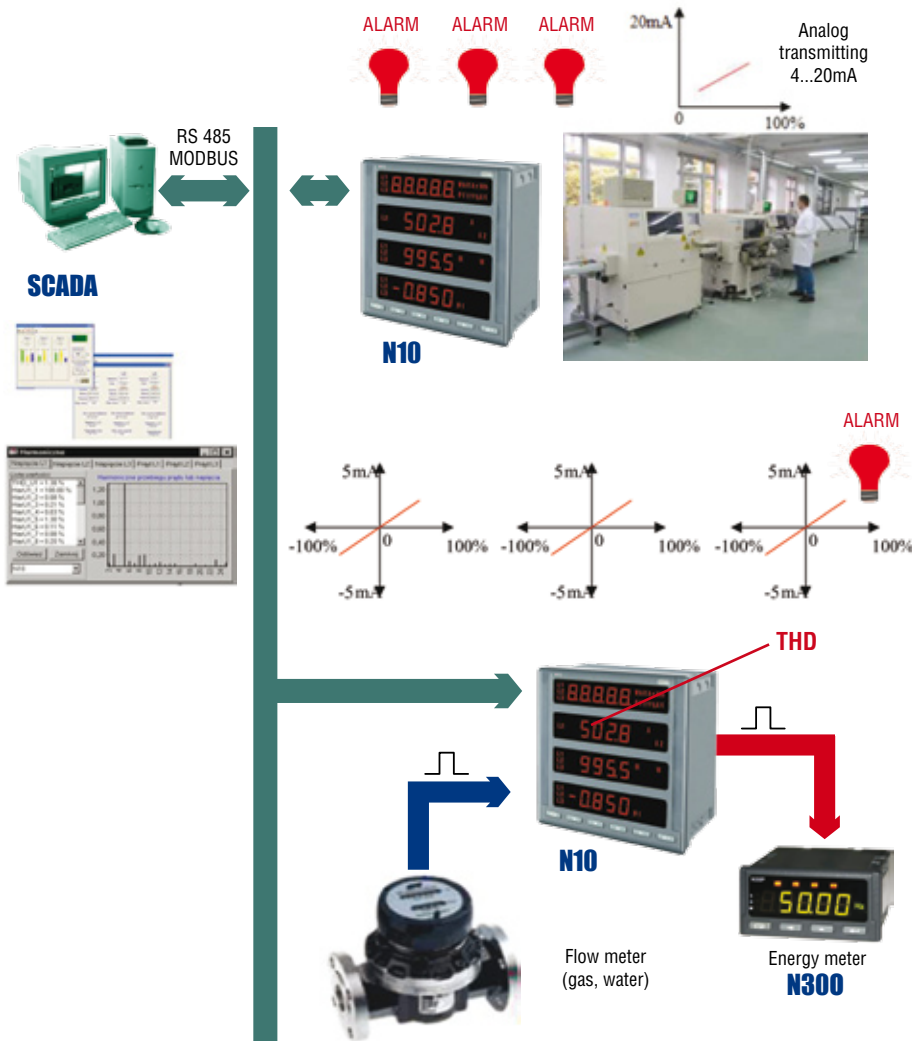
## Measurement and monitoring of the power consumption of the machine and archiving by KD7 paperless recorder



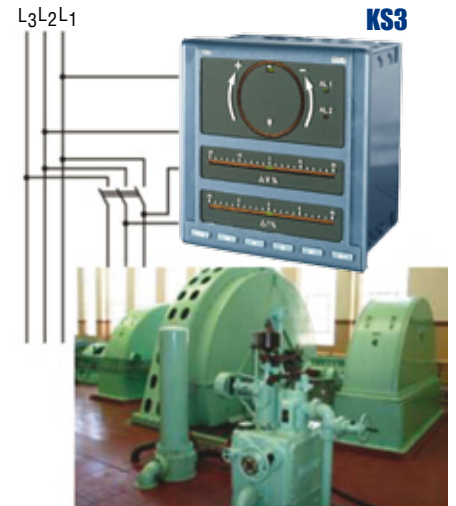
## Measurement and displaying of the network parameters and energy of the 3-phase machines



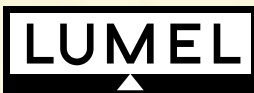
## Measurement and displaying of the network parameters and energy of the 3-phase machines



## Automatic synchronization of connecting the generator to main network



## Measurement of a.c. current of 1-phase engine



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## METERS OF SINGLE PHASE NETWORK PARAMETERS

**TABLE 1. N30P ORDERING CODES:**

N30P -	X	X	XX	XX	X	X
<b>Supply:</b>						
85...253 V a.c./d.c.	1					
20...40 V a.c./d.c.	2					
<b>Additional outputs:</b>						
lack	0					
OC output, RS-485, analog outputs	1					
OC output, RS-485, analog outputs and change-over relay outputs	2					
<b>Unit:</b>						
unit code acc. to the table 9			XX			
<b>Version:</b>						
standard					00	
custom-made*					XX	
<b>Language:</b>						
Polish						P
English						E
other*						X
<b>Acceptance tests:</b>						
without extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

**TABLE 2. N20Z ORDERING CODES:**

N20Z -	X	X	XX	XX	X
<b>Input:</b>					
100 V	1				
250 V	2				
400 V	3				
1 A	4				
5 A	5				
Frequency: 20...500 Hz	6				
<b>Supply:</b>					
85...253 V a.c./d.c.	1				
20...40 V a.c./d.c.	2				
<b>Unit:</b>					
unit code acc. to table - can be found in datasheet				XX	
<b>Version:</b>					
standard					00
custom-made*					XX
non-standard settings					99
<b>Acceptance tests:</b>					
without extra requirements					8
with an extra quality inspection certificate					7
acc. to customer's request*					X

\* - After agreeing with manufacturer

## ANALYSERS OF 3-PHASE, 3 AND 4 WIRE POWER NETWORK

**TABLE 3. ND1 ORDERING CODES:**

ND1 -	X	X	XX	X	X
<b>Current input:</b>					
1 A (X/1A)	1				
5 A (X/5A)	2				
<b>Voltage input:</b>					
57.7/100 V		1			
230/400 V		2			
400/690 V		3			
<b>Version:</b>					
standard			00		
custom-made*			XX		
<b>Language:</b>					
Polish				P	
English				E	
other*				X	
<b>Acceptance tests:</b>					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

**TABLE 4. N14 ORDERING CODES:**

N14 -	X	X	XX	X
<b>Current input:</b>				
1 A (X/1A)	1			
5 A (X/5A)	2			
<b>Voltage input:</b>				
57.7/100 V		1		
230/400 V		2		
400/690 V		3		
<b>Version:</b>				
standard			00	
input voltage: 110/190 V			01	
custom-made*			XX	
<b>Acceptance tests:</b>				
without extra requirements				8
with an extra quality inspection certificate				7
acc. to customer's request*				X

**TABLE 5. ND20 ORDERING CODES:**

ND20 -	X	X	X	XX	X	X
<b>Current input:</b>						
1 A (X/1A)	1					
5 A (X/5A)	2					
<b>Voltage input:</b>						
57.7/100 V			1			
230/400 V			2			
<b>Supply:</b>						
85...253 V a.c./d.c.				1		
20...40 V a.c./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 extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

**TABLE 6. N10 ORDERING CODES:**

N10 -	X	X	X	X	X	XX	X
<b>Current input:</b>							
1 A (X/1A)	1						
5 A (X/5A)	2						
<b>Input phase voltage:</b>							
100 V			1				
400 V			2				
<b>Digital output:</b>							
without interface						0	
with RS-485 interface						1	
<b>Display:</b>							
red digits						1	
green digits						2	
<b>Supply:</b>							
85...250 V dc, ac 40...400 Hz						0	
<b>Version:</b>							
standard							00
custom-made*							XX
<b>Acceptance tests:</b>							
without extra requirements							8
with an extra quality inspection certificate							7
acc. to customer's request*							X

**TABLE 7. N13 ORDERING CODES:**

N13 -	X	X	X	X	X	XX	X
<b>Current input:</b>							
1 A (X/1A)	1						
5 A (X/5A)	2						
<b>Voltage input:</b>							
57.7/100 V			1				
230/400 V			2				
400/690 V			3				
<b>Analog output:</b>							
without analogue output						0	
with programmable output -20...20mA						1	
<b>Digital output:</b>							
without interface							0
with RS-485 interface							1
<b>Display:</b>							
red digits							1
green digits							2
<b>Version:</b>							
standard							00
custom-made*							XX
<b>Acceptance tests:</b>							
without extra requirements							8
with an extra quality inspection certificate							7
acc. to customer's request*							X

\* - After agreeing with manufacturer

# 1-PHASE AND 3-PHASE NETWORK PARAMETERS TRANSDUCERS

**TABLE 8. P20Z ORDERING CODES:**

P20Z -	XX	X	X	X	XX	X
<b>Input range:</b>						
0..60 V	01					
0..100 V	02					
0..150 V	03					
0..250 V	04					
0..400 V	05					
0..500 V	06					
0..600 V	07					
1 A	08					
5 A	09					
<b>Output range:</b>						
0..5 mA		1				
0..20 mA		2				
4..20 mA		3				
0..10 V		4				
<b>Supply:</b>						
85..253 V ac/dc			1			
20..40 V ac/dc			2			
<b>Kind of terminals:</b>						
inseparable screws				1		
socket-plug screws				2		
<b>Version:</b>						
standard					00	
custom-made*					XX	
<b>Acceptance tests:</b>						
without extra requirements						8
with an extra quality inspection certificate						7
acc. to customer's request*						X

**TABLE 9. P43 ORDERING CODES:**

P43 -	X	X	X	XX	X	
<b>Current input:</b>						
1 A (X/1A)	1					
5 A (X/5A)	2					
<b>Voltage input:</b>						
57.7/100 V		1				
230/400 V		2				
<b>Supply:</b>						
85..253 V a.c./d.c.			1			
20..40 V a.c./d.c.			2			
<b>Version:</b>						
standard					00	
custom-made*					XX	
<b>Acceptance tests:</b>						
without extra requirements						8
with an extra quality inspection certificate						7
acc. to customer's request*						X

**TABLE 10. P10 I P10A ORDERING CODES:**

P10 / P10A -	X	X	X	X	XX	X
<b>Input current In:</b>						
1 A (X/1)	1					
5 A (X/5)	2					
<b>Input voltage (phase-to-neutral) Un:</b>						
100 V		1				
400 V		2				
<b>Interface:</b>						
without interface				0		
with RS-485 interface				1		
<b>Supply:</b>						
85...250 V d.c. lub a.c. 40...400 Hz					0	
<b>Version:</b>						
standard						00
custom-made*						XX
<b>Acceptance tests:</b>						
without extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

\* - after agreeing with the manufacturer

**TABLE 10. P12P ORDERING CODES:**

P12P -	X	X	XX	X	X	X	XX	X
<b>Kind of transducer:</b>								
without a display	1							
with a display	2							
<b>Input:</b>								
100V 1A			1					
100V 5A			2					
400V 1A			3					
400V 5A			4					
<b>Custom-made versions (for input range):</b>								
600V 5A				5				
10V 5A				6				
120V 5A				7				
50V 5A				8				
<b>Programmed converted parameter:</b>								
voltage						00		
current						01		
frequency						02		
active power						03		
reactive power						04		
apparent power						05		
3-phase active power						06		
3-phase reactive power						07		
3-phase apparent power						08		
cos φ						09		
tg φ						10		
φ						11		
active energy						12		
reactive energy						13		
apparent energy						14		
3-phase active energy						15		
3-phase reactive energy						16		
3-phase apparent energy						17		
<b>Output:</b>								
voltage 0..10V							1	
current 0..20mA							2	
current 4..20mA							3	
current 0..5 mA							4	
<b>Supply:</b>								
85..253 V d.c. or a.c. (40..400 Hz)								1
20..50 V d.c. or a.c. (40..400 Hz)								2
<b>Kind of terminals:</b>								
socket-plug screws								0
<b>Version:</b>								
standard								00
custom-made*								XX
<b>Acceptance tests:</b>								
without extra requirements								8
with an extra quality inspection certificate								7
acc. to customer's request*								X

\* - After agreeing with manufacturer

## KS3 SYNCHRONIZING UNIT

**TABLE 11. KS3 ORDERING CODES:**

KS3 -	X	XX	X	X	XX	X
<b>Kind of display:</b>						
digital display	1					
bargraphs (diode lines)	2					
<b>Input:</b>						
100 V					01	
110 V					02	
240 V					03	
400 V					04	
<b>Digital output:</b>						
without interface						0
with RS-485 interface						1
<b>Supply:</b>						
85..250 V a.c./d.c.						0
24 V a.c./d.c.						1
<b>Version:</b>						
standard						00
custom-made*						XX
<b>Acceptance tests:</b>						
without extra requirements						8
with an extra quality inspection certificate						7
acc. to customer's request*						X

\* - After agreeing with manufacturer

For datasheets and ordering codes of other LUMEL's products please visit:

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