POWER NETWORK ANALYZER
ND40

ND40

C E

USER'S MANUAL - QUICK START

Full version of user's manual available at
www.lumel.com.pl

Scan the code

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1. General Specification

The ND40 Meter is designed for the measurement and analysis of three-phase, 3- or 4-wire power network parameters in balanced or unbalanced systems.

Complete set of the Analyzer includes:

- ND40 Meter   1 pc
- abbreviated User's Manual   1 pc
- mounting brackets to fix the device in the panel   4 pcs
- key   1 pc
- warranty card   1 pc
- ferrite filter STAR-TEC 74271132   1 pc
- SD card   1 pc

Caution! On the SD card is located ND40 Setup software and user manual.

1.1. Features of the Device

- measurement and calculation of energy quality parameters according to EN 50160 standard.
- intuitive operation of the device by means of the touch screen and graphical user interface based on Linux.
- color touch screen LCD TFT 5,6", 640x480 pixels
- communication interfaces : Ethernet 10/100 Base-T, Modbus TCP/IP Slave, RS-485 Modbus Slave
- all phases are separated
- IP65 enclosure protection of the user
- selection of the time zone, automatic adjustment for Daylight Saving Time, synchronization with the time serv
- data archiving on an SD card
- WWW server, FTP server
- logs of interrupts, dips, swells, alarms and audits
- Firmware update option
- language choice Polish/English
- dedicated visualization in the form of, among others: digital, analog displays, harmonics, vector diagrams, trends, waveforms records

1.1.1. Operational safety

Caution! Removal of the meter housing during the warranty period voids the warranty.

- The assembly and the installation of the electrical connections may be carried out only by a duly qualified electrician.
- Always check the connections before turning the meter on.
- Prior to removing the analyzer housing, always turn the supply off and disconnect the measurement circuits.
- The device is intended for installation and use in industrial electromagnetic environments.
- A switch or a circuit-breaker should be installed in the building or facility. It should be located near the device, easily accessible to the operator, and suitably marked.

1.2.1. Connection diagrams

Caution! PE conductor must be connected.

Model	No.	Description
Fig.1. Terminal plate.1	1	Measurement output of electrical parameters.
	2	Additional inputs/outputs - optional equipment depending on ND40 execution code. There are relay outputs, binary inputs and analog outputs.
	3	Measurement inputs of temperature and resistance.
	4	Ethernet communication interface.
	5	RS 485 Modbus Slave communication interface.
	6	ND40 analyzer power supply.
	7	Earth terminals for screens connection.

1.2.1.1. Measurement signals

3-wire network. Direct measurement.
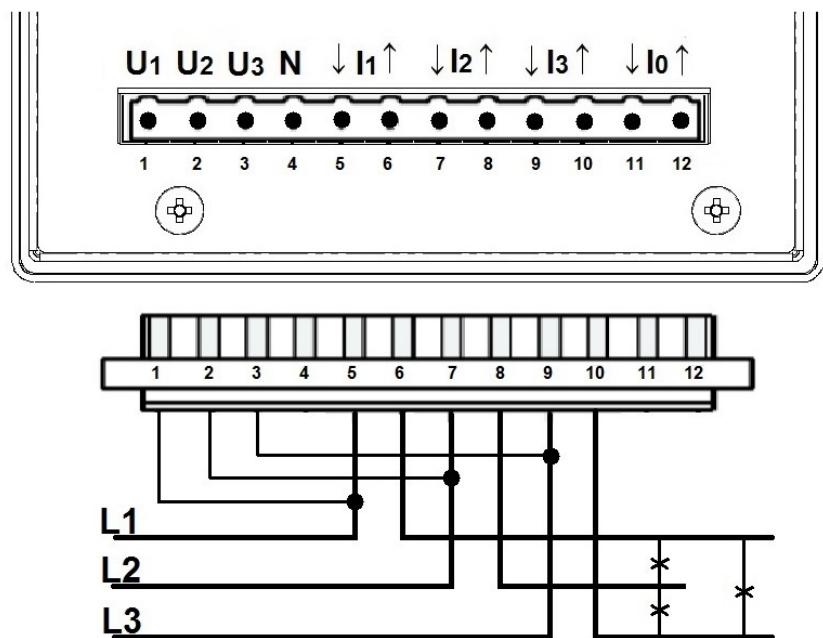
Fig.2. Diagram - 3-wire network.

3-wire network. Semi-indirect measurement.
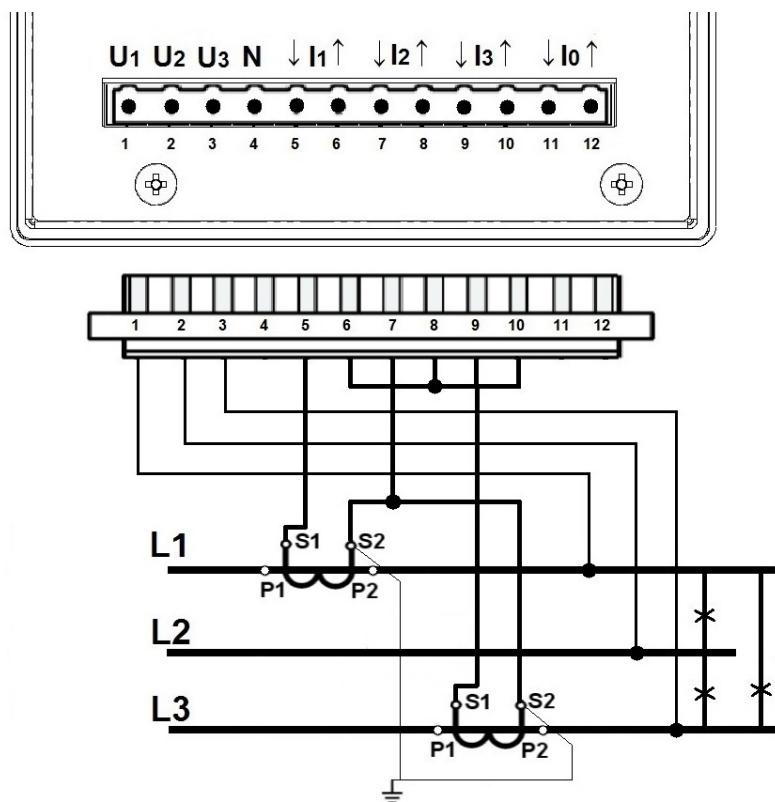
Fig.3. Diagram - 3-wire network.

3-wire network. Indirect measurement using two current transformers and two or three voltage transformers.
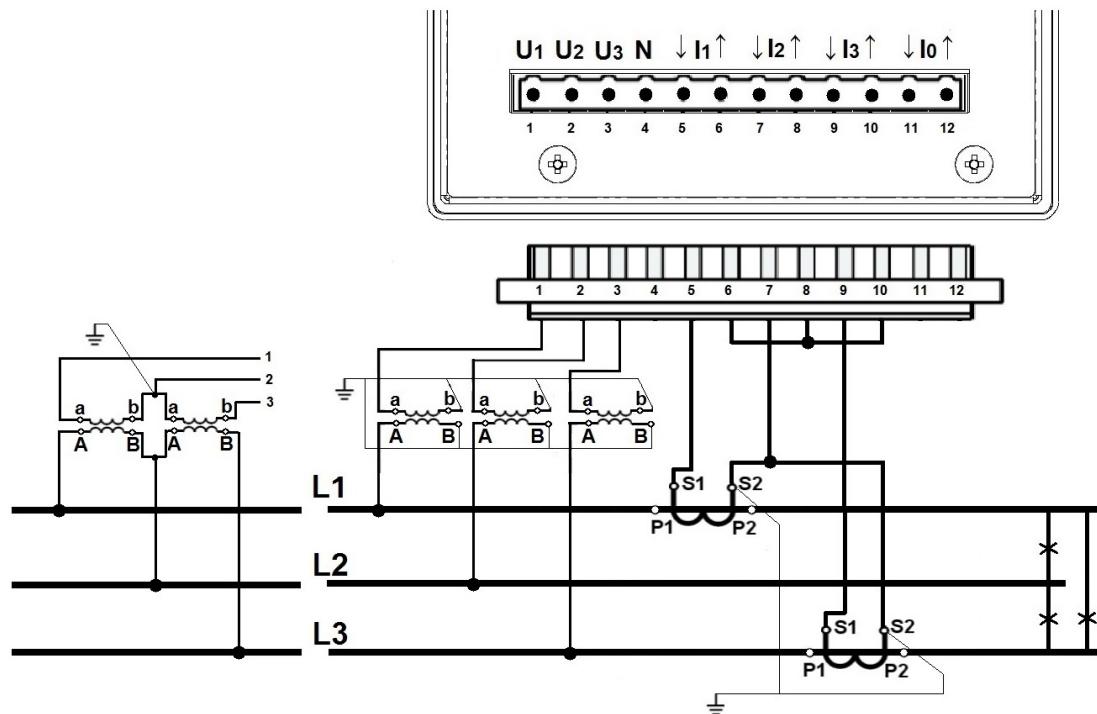
Fig.4. Diagram - 3-wire network.

4-wire network. Direct measurement.
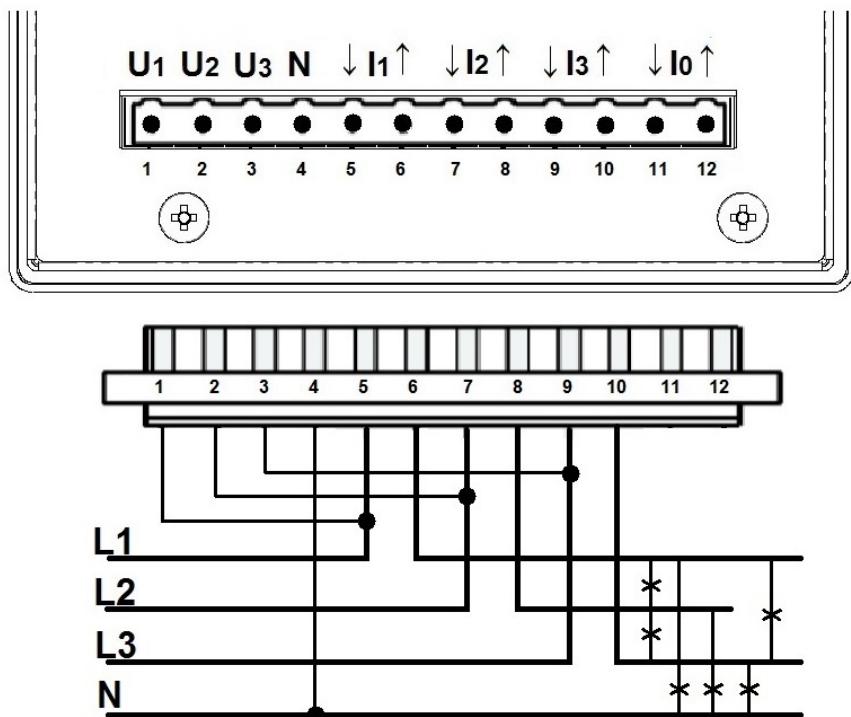
Fig.5. Diagram - 4-wire network.

4-wire network. Semi-indirect measurement.
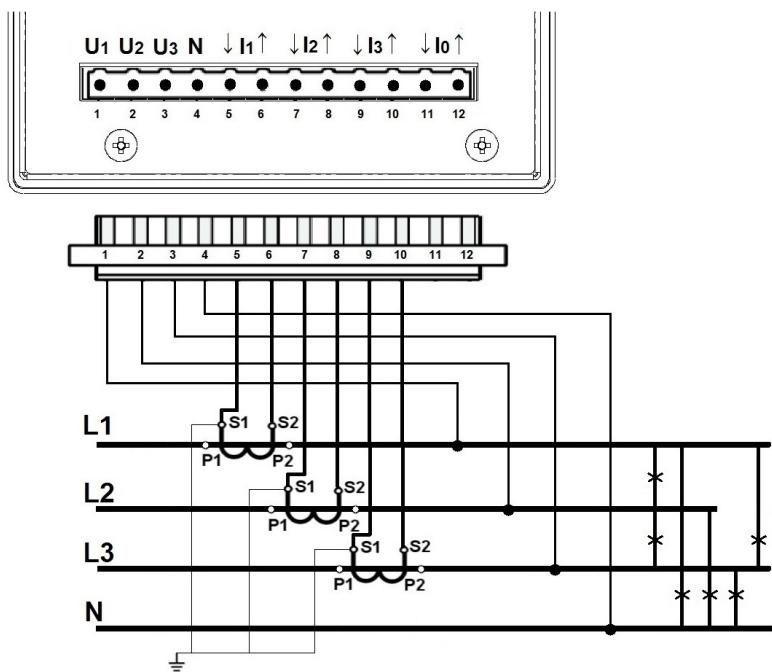
Fig.6. Diagram - 4-wire network.

4-wire network. Semi-indirect measurement using four current transformers.
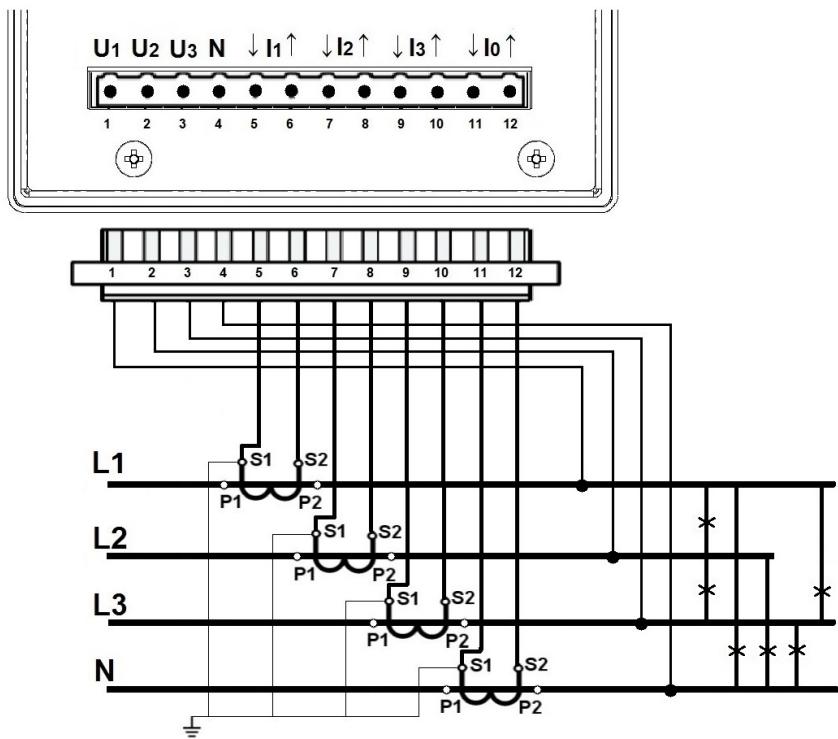
Fig.7. Diagram - 4-wire network.

4-wire network. Indirect measurement using three current transformers and two or three voltage transformers.
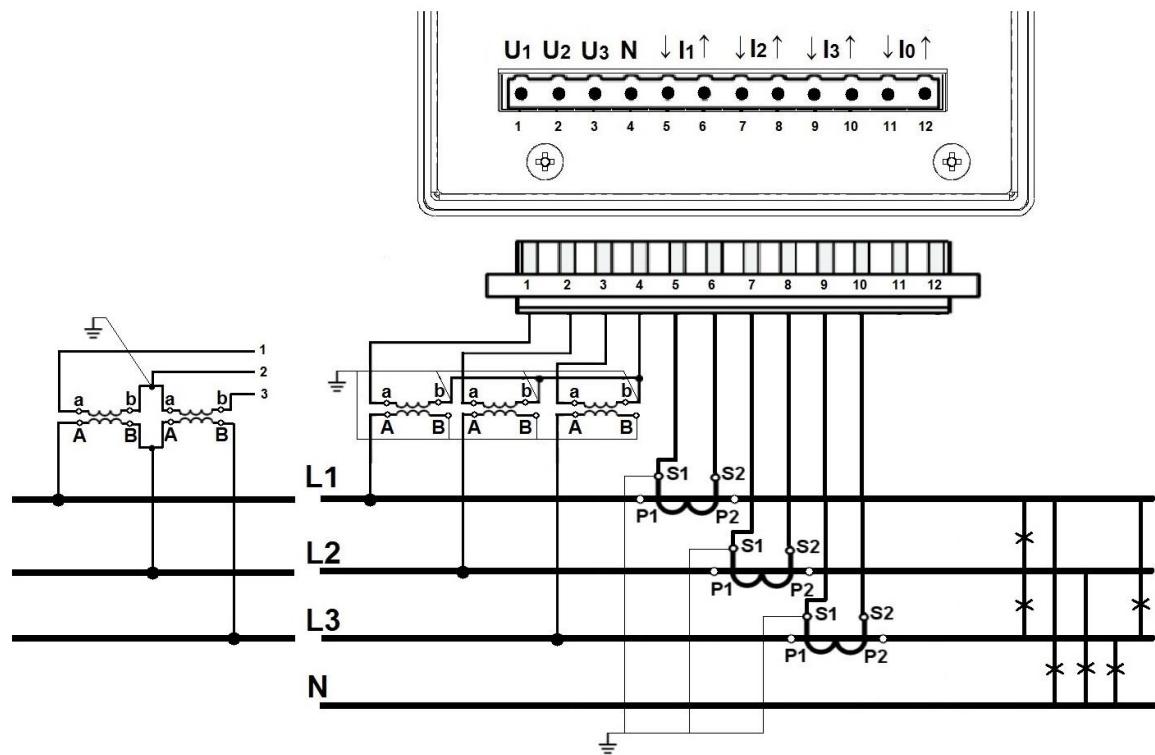

Fig.8. Diagram - 4-wire network.

4-wire network. Indirect measurement using 4 current transformers and two or three voltage transformers.
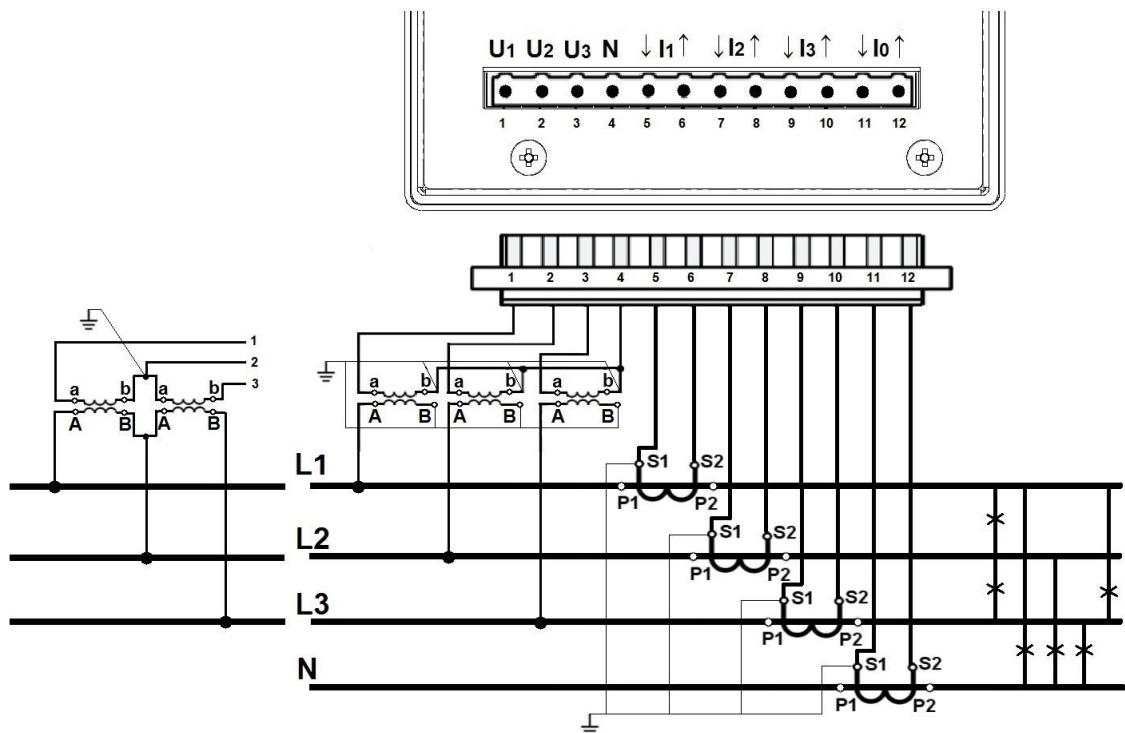
Fig.9. Diagram - 4-wire network.

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1.2.1.2. Communication interfaces

Ethernet (RJ45) socket.

To connect the meter to the hub (concentrator) or the switch, it is necessary to use a cable with 1:1 leads.
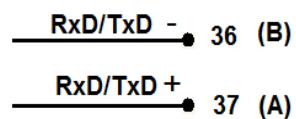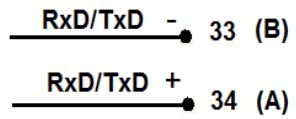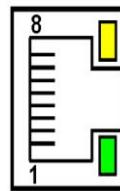
RS485 interface(Slave) is assigned jto terminal pairs 33-34 and 36-37.

Fig.10. Com. Interfaces.

1.2.1.3. Card of 8 Relay outputs

Relay outputs configured as normally open (NO).

Where:

terminals 13-14: output 1,	terminals 21-22: output 5,
terminals 15-16: output 2,	terminals 23-24: output 6,
terminals 17-18: output 3,	terminals 25-26: output 7,
terminals 19-20: output 4,	terminals 27-28: output 8.

Version with 8 relays uses the upper and lower part
of the expansion card terminal, terminals from 13 to 28.
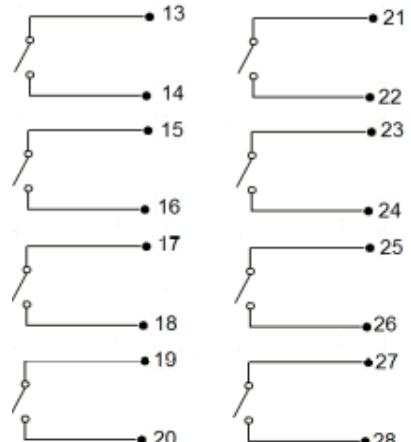
Fig.11. Relay outputs

1.2.1.4. Card of 6 Binary inputs 4 relay outputs

Connection of relay outputs

Relay outputs configured as normally open (NO).

where:
terminals 13-14: output 1,
terminals 15-16: output 2,
terminals 17-18: output 3,
terminals 19-20: output 4,
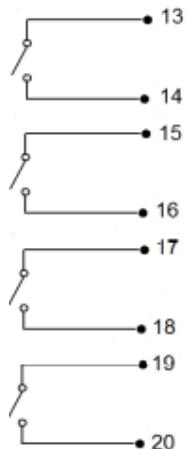
Version with 4 relays uses the upper part of the expansion card terminal, terminals from 13 to 20.

Fig.12. Relay inputs.

Connection of binary outputs
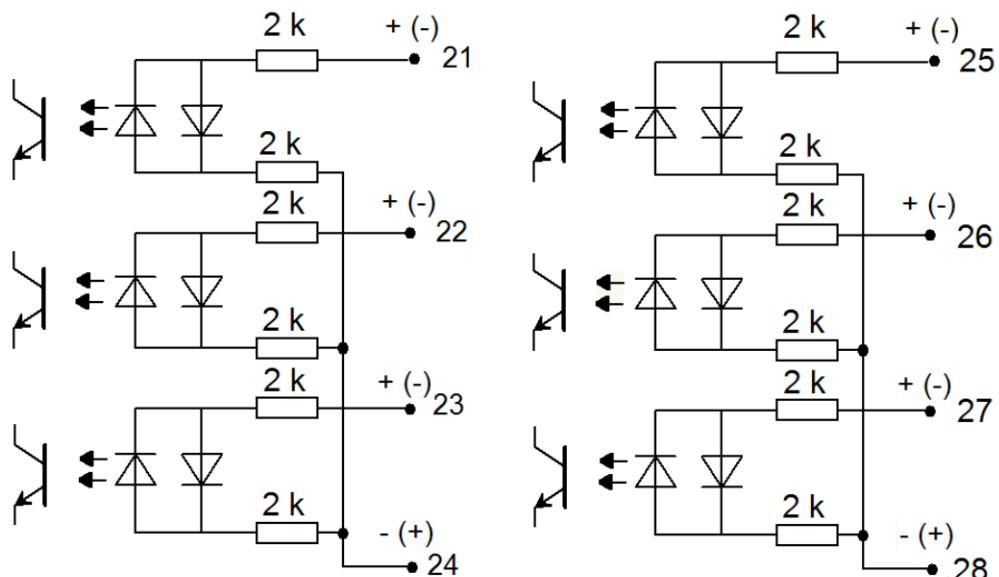
Fig.13. Binary inputs.

Binary inputs BI 1...BI 6 are controlled by signals:

0 V dc   – inactive binary input
+5...24 V dc – active binary input
+8...24 V dc – input as counting input (high level)

Where:
terminal 21 : binary input BI 1,   terminal 25 : binary input BI 4,
 terminal 22 : binary input BI 2,   terminal 26 : binary input BI 5,
terminal 23 : binary input BI 3,   terminal 27 : binary input BI 6.

        terminal 24: common terminal for inputs BI 1-3
        terminal 28: common terminal for inputs BI 4-6

1.2.1.5. Card for 6 binary inputs and 3 Analog outputs

Connection of analog outputs

Version with analog inputs uses the upper part of the expansion card terminal and includes 3 pairs of terminals:

13 - 14 analog output 1 (AO1)
16 - 17 analog output 2 (AO2)
19 - 20 analog output 3 (AO3)
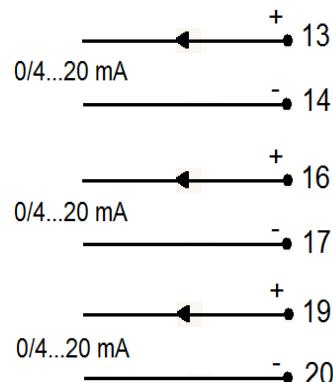
Fig.14. Analog outputs

Connection of binary outputs
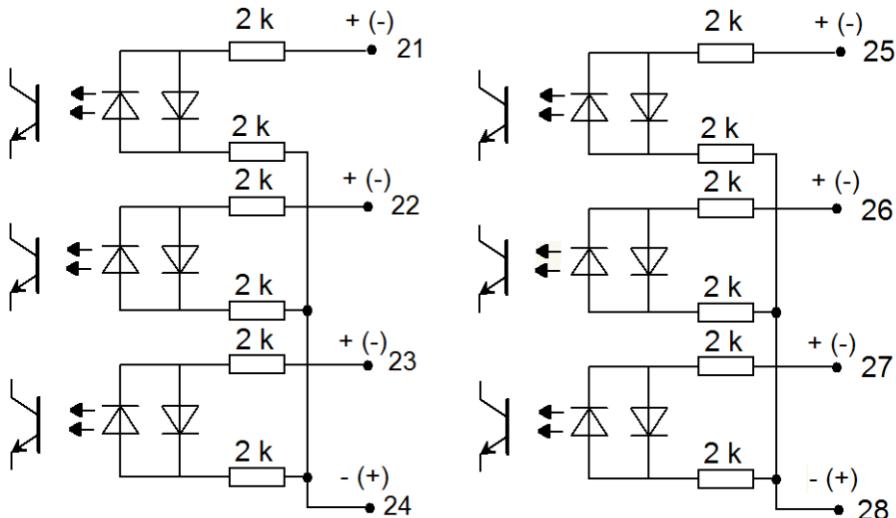
Fig.15. Binary outputs

Binary inputs BI 1...BI 6 are controlled by signals:

0 V dc   – inactive binary input
+5...24 V dc – active binary input
+8...24 V dc – input as counting input (high level)

Where:
terminal 21 : binary input BI 1,   terminal 25 : binary input BI 4,
terminal 22 : binary input BI 2,   terminal 26 : binary input BI 5,
terminal 23 : binary input BI 3,   terminal 27 : binary input BI 6.

terminal 24: common terminal for inputs BI 1-3
terminal 28: common terminal for inputs BI 4-6

1.2.1.6. Card for 4 binary inputs and 6 Analog outputs

Connection of analog outputs

Version with analog inputs uses both part of the expansion card terminal and includes 6 pairs of terminals:
13 – 14 : analog output 1 (AO1)
16 – 17 : analog output 2 (AO2)
19 – 20 : analog output 3 (AO3)

21 – 22 : analog output 4 (AO4)
24 – 25 : analog output 5 (AO5)
27 – 28 : analog output 6 (AO6)
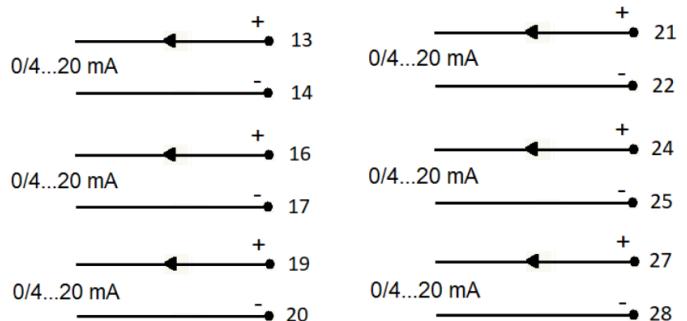
Fig.16. Analog outputs

Connection of binary outputs
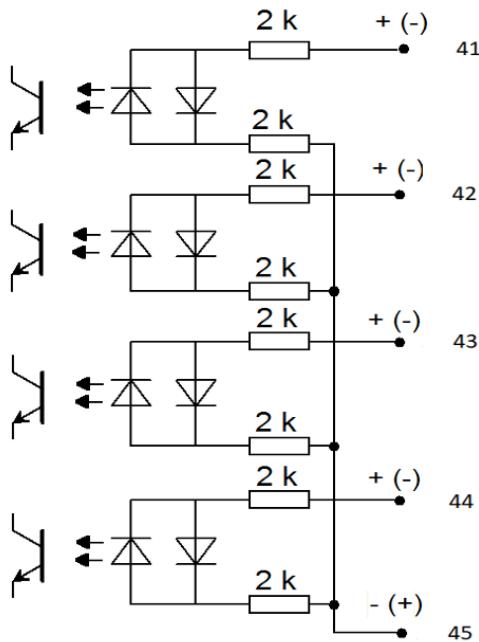
Fig.17. Binary outputs

Binary inputs BI 1...BI 4 are controlled by signals:

0 V dc   – inactive binary input
+5...24 V dc – active binary input
+8...24 V dc – input as counting input (high level)

Where:
terminal 41 : binary input BI 1,   terminal 44 : binary input BI 4,
terminal 42 : binary input BI 2,   terminal45 : common terminal for inputs BI 1-4
terminal 43 : binary input BI 3,

1.2.2. Installation

ND40 analyzer is adapted to be fixed to the panel by means of mounting brackets. Housing dimensions 144 x 144 x 104 mm, mounting hole dimensions 138 x 138 mm.
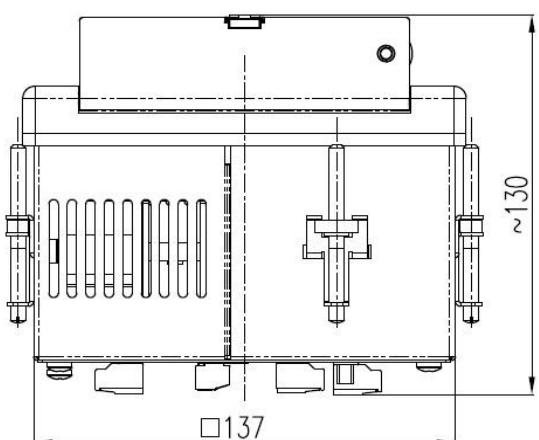
Fig.14. Dimensions - bottom.
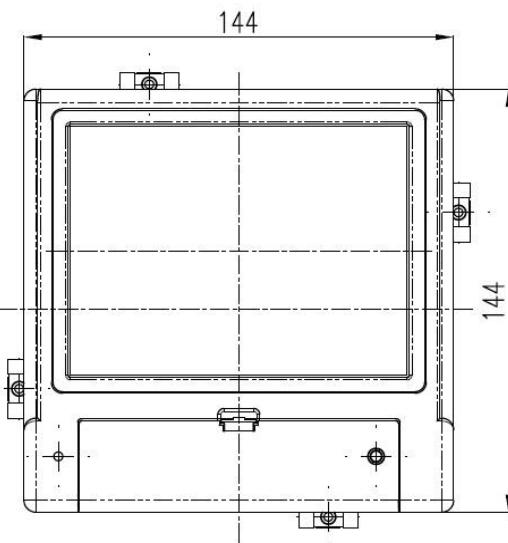
Fig.15. Dimensions - front.
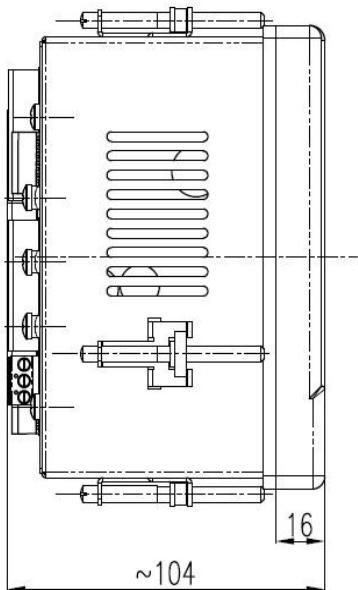
Fig.16. Dimensions - side.
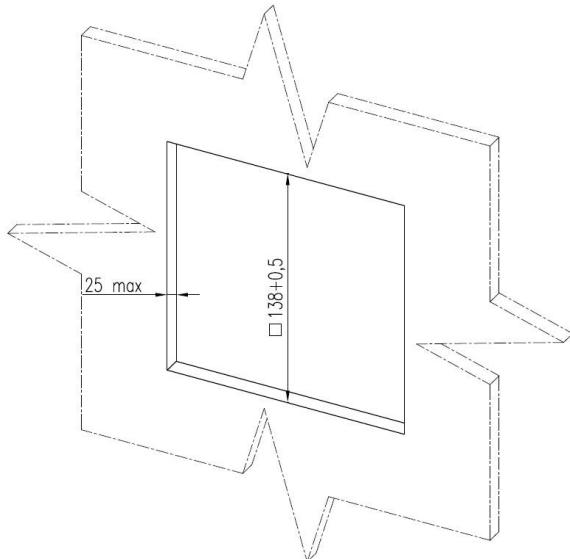
Fig.17. Dimensions - mounting hole.

2. Operation

After touching any area of the screen, the set of the analyzer's management and navigation tools is displayed.

Description of individual elements to operate the analyzer available to the user.

Example	No.	Description
Fig.22. Main screen.	1	Change of view (selection list)
	2	Change of the current view screen (selection list)
	3	SD card status
	4	Alarms status (the symbol and the change of the upper bar to red color)
	5	Current time and date
	6	Change of the current view screen
	7	Change of the view
	8	Switching to the Control Panel.
	9	System information
	10	Options available for the selected view

List of sample screen available in ND40.

Screen	Example	Screen	Example
Large digital view	**Fig.23. Screen 1.**	Vector diagram	**Fig.24. Screen 6.**
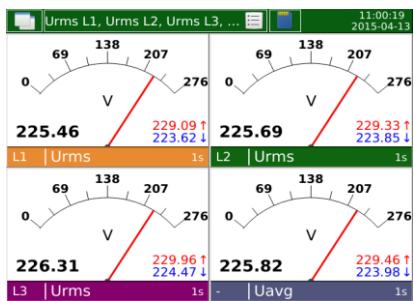
Analog indicators	 **Fig.25. Screen 2.**	Waveform	 **Fig.26. Screen 7.**
Trends	 **Fig.27. Screen 3.**	Temperature / Resistance	 **Fig.28. Screen 8.**
Harmonics	 **Fig.29. Screen 4.**	Binary inputs	 **Fig.30. Screen 9.**
Energy	 **Fig.31. Screen 5.**	Logs	 **Fig.32. Screen 10.**
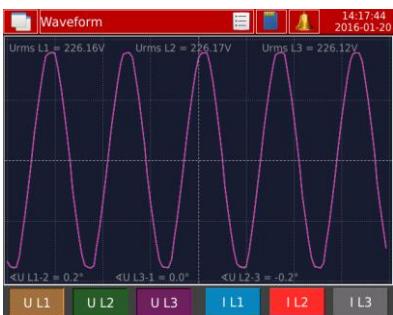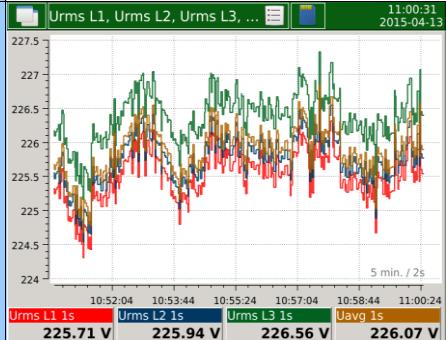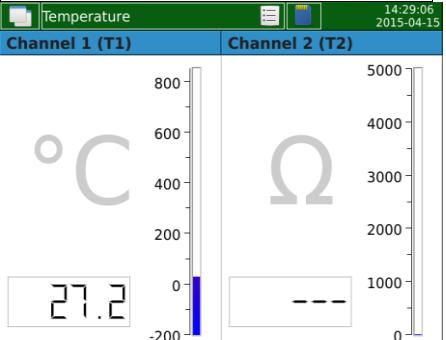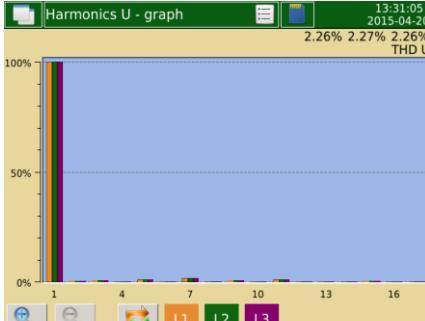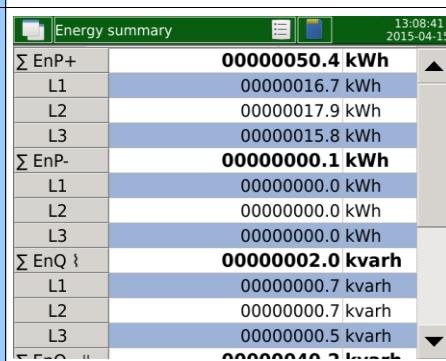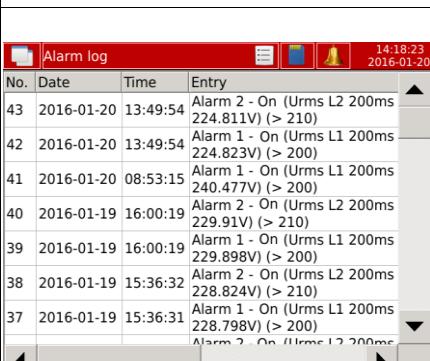
2.1. Description of Control Panel functions
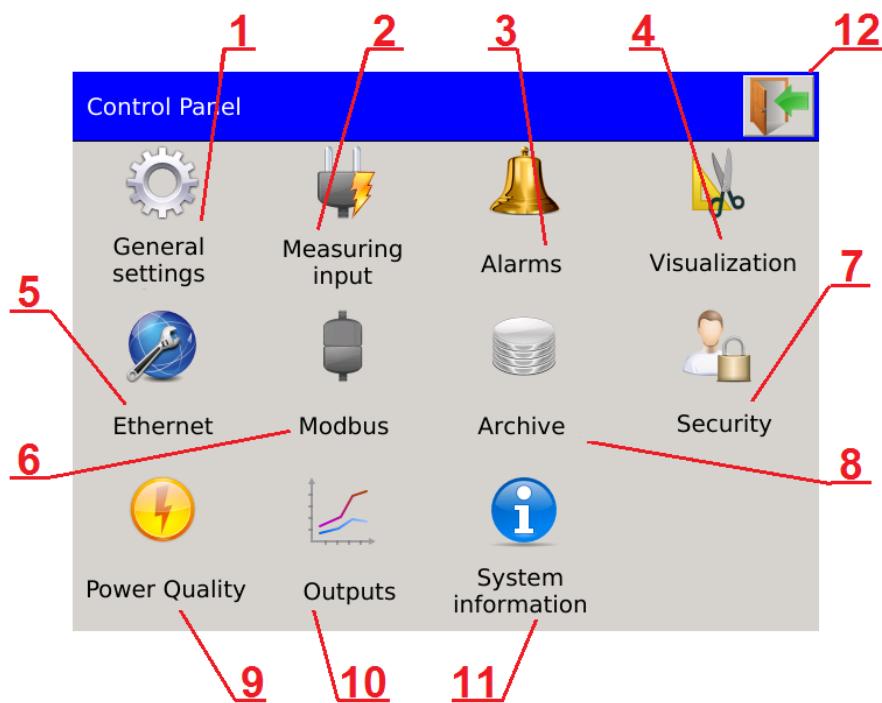
Fig.33. Control panel - main screen.

No.	Description
1	General settings of the analyzer, e.g. date, time, display settings.
2	Configuration of measurement inputs, e.g. transformers, ranges, frequencies, temperature/resistance sensors.
3	Alarms settings, e.g. setting the source, activate/deactivate conditions, relays, handling e-mails informing about events.
4	Settings of screens and views. Management of defined date sets and creation of user's data sets.
5	Setting the analyzer's identification in Ethernet network, configuration of FTP, WWW, SMTP servers and e-mail.
6	Settings of Modbus RTU and TCP/IP transmission and other communication protocols.
7	Configuration of archiving parameters and conditions.
8	Management of users rights, setting passwords and access rights.
9	Setting parameters for dips, interrupts and swells.
10	Configuration of parameters for analog outputs and relays (depending on the version)
11	Information about the analyzer, updating module.
12	Completion of work in the Control Panel, saving configuration changes and export of settings to a file.

2.2. Web server

Depending on the settings, access to the Web server may be preceded by verification of users, available anonymously (without the login window) or turned off.
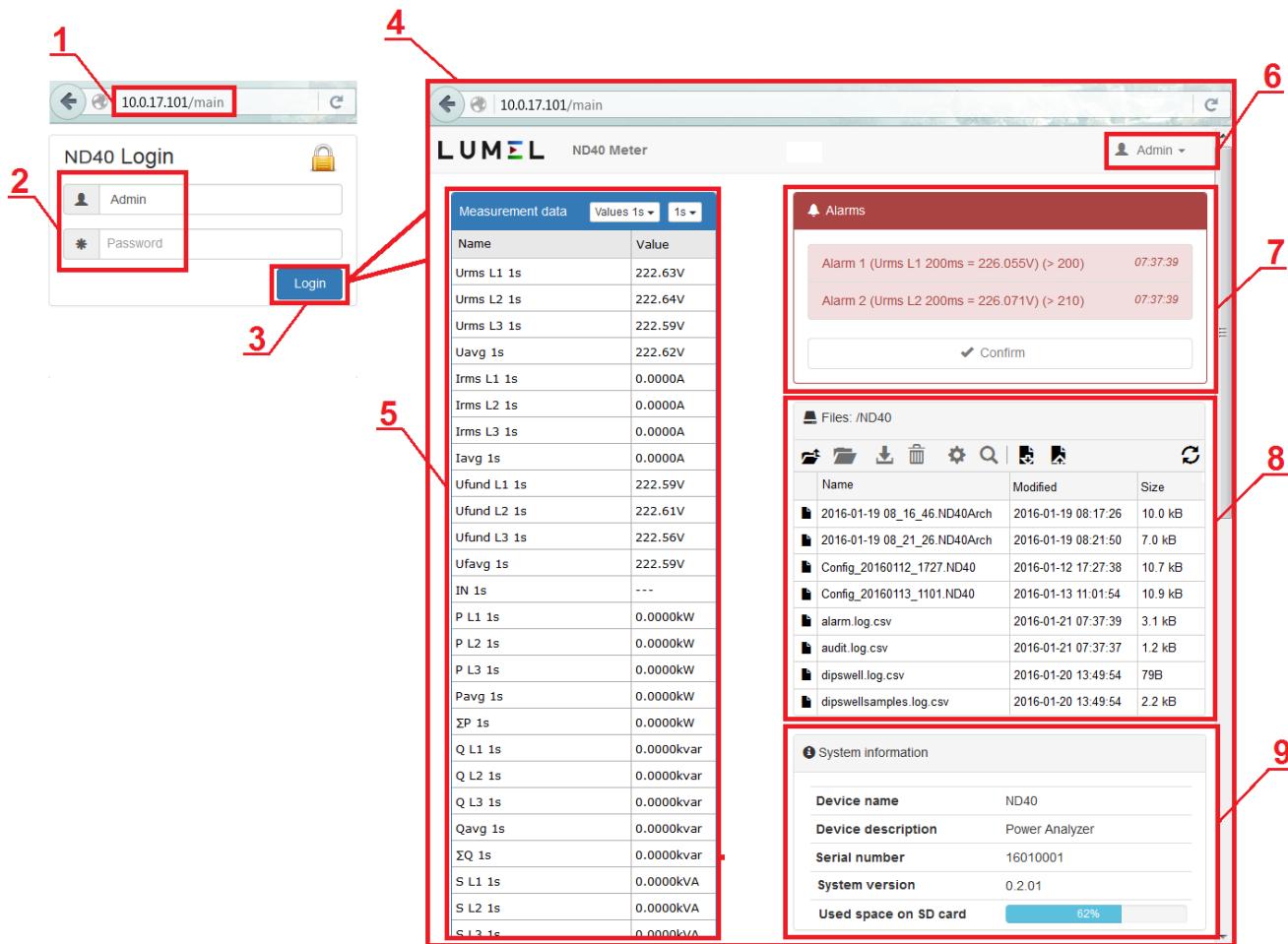
Fig.30. Web server - general view.

No.	Description
1	IP address assigned to the device. Address check or change in Ethernet tab in the Control Panel.
2	Password and login. Standard login: Admin, no password. Possible edition of the access in Ethernet tab (users and rights) in the Control Panel.
3	Switching to the main page is preceded by user verification.
4	Web server main page window.
5	Data presentation module with selectable refresh time and default or user generated sets of data presentation.
6	Additional options, depending on user rights.
7	Alarm module with possibility to preview and confirm events.
8	Managing files on the SD card
9	Information module.

2.3. SD memory card

Sample files are stored on SD card.

Function	Sample file	Description
Archive	2016-01-19 08_16_46.ND40Arch	Archive file with the option of preview and export to csv. Format compatible with SQLite.
Configuration	Config_20160112_1727.ND40	The configuration file allows the User to set the configuration from the file on the device.
Alarm logs	alarm.log.csv	Information about alarms occurrence.
System logs	audit.log.csv	Information about system events.
Dips and swells	dipswell.log.csv	Information about the event occurrence.
Dips and swells measurements	dipswellsamples.log.csv	Information with additional measurements preceding and occurring immediately after the event.
Update	ND40_firmware_0.2.5.img	Update file

2.4. Update

To update the software of the ND40 analyzer the update file should be downloaded from the manufacturer's website. The downloaded file must be copied to the SD card of the analyzer.

In the Control Panel, in System Information tab, select the Update group and then select the update file.
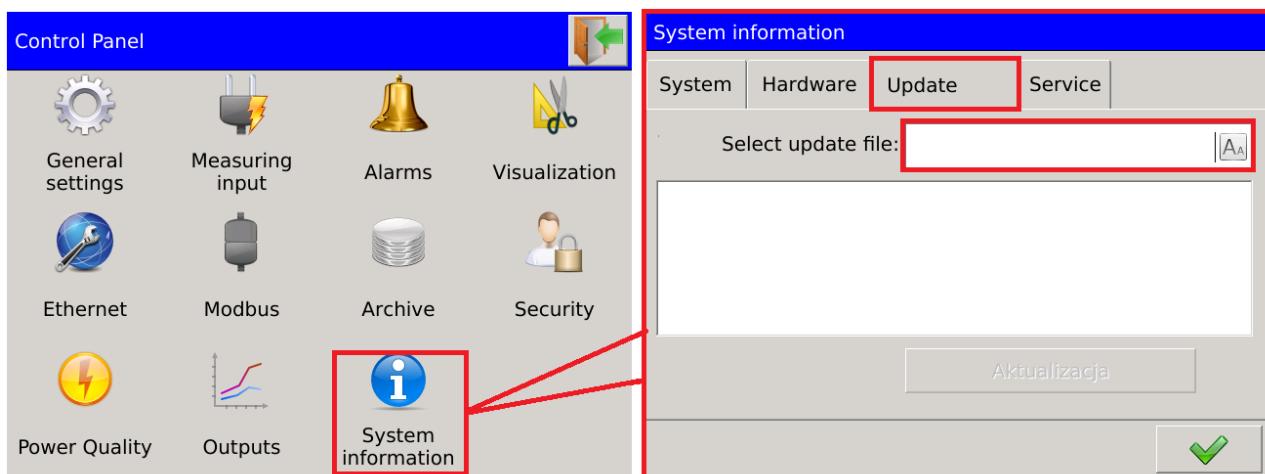
Fig.31. **Selection of update file.**

The User confirms the selection from the list of detected files. Information about the update file will be displayed in the next window. The update process of the selected version will be completed after selecting Update.
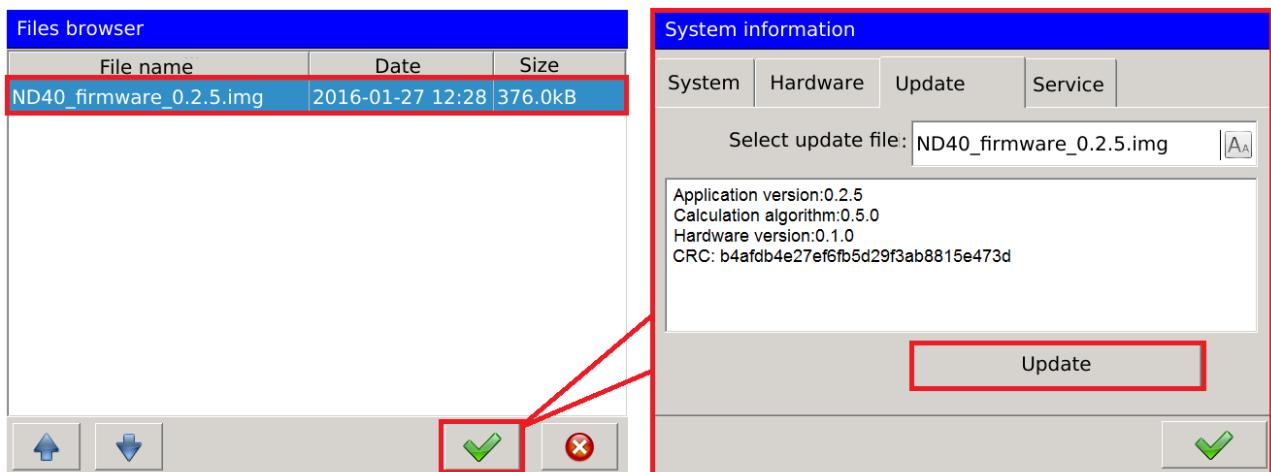
Fig.32. Update.

3. Technical data

3.1. Measurements

Basic error with respect to the nominal value.

Measured value			Measurement range	Basic error (EN-61000-4-4)[1]		Remarks	
Symbol		**Agreg.**		Class A/S	Class S	Class A/S	Class S
Voltage							
RMS	Urms L1, Urms L2, Urms L3, Uavg L123.	200 ms	Un = Udin = 230 V : 23.0...345.0 V (Ku = 1) ...1.38 MV (Ku ≠ 1)^2 Un = Udin = 57.7 V : 5.7...70 V (Ku = 1) ...280 kV (Ku ≠ 1)^2	**±0.2%** Udin$^{1)}$		Class B	
		1 s		**±0.2%** Udin$^{1)}$		Class B	
		3 s		±0.,1% Udin	±0.2% Udin	Class A	Class S
		10 min		±0.1% Udin	±0.2% Udin	Class A$^{1)}$	Class S
		2 hours		±0.1% Udin	±0.2% Udin	Class A$^{1)}$	Class S
Basic RMS	Ufund L1, Ufund L2, Ufund L3, Ufavg L123.	200 ms 1 s 3 s 10 min 2 hours	Un = Udin = 230 V : 23.0...345.0 V (Ku = 1) ...1.38 MV (Ku ≠ 1)^2 Un = Udin = 57.7 V : 5.7...70 V (Ku = 1) ...280 kV (Ku ≠ 1)^2	**±0.2%** Udin$^{1)}$			
Phase-to-phase	Umf L1-2, Umf L2-3, Umf L3-1, Umf avg L123.	200 ms 1 s 3 s 10 min 2 hours	Unmf = 400 V : 40.0...600.0 V (Ku = 1) ...2.4 MV (Ku ≠ 1)^2 Un = 100 V : 10.0...120.0 V (Ku = 1) ...480 kV (Ku ≠ 1)^2	**±0.5%** Unmf			

Asymmetry	Vunb.	200 ms	0.00…100.,00%	±0.3%			
		1 s					
		3 s					
		10 min					
		2 hours					
Half wave	Uhalf1 L1 ... Uhalf24 L1, Uhalf1 L2 ... Uhalf24 L2, Uhalf1 L3 ... Uhalf24 L3.	200 ms	$U_n = U_{din} = 230$ V : 23.0...345.0 V (Ku = 1) ...1.38 MV $(Ku \neq 1)^2$ $U_n = U_{din} = 57.7$ V : 5.7...70 V (Ku = 1) ...280 kV $(Ku \neq 1)^2$	±0.2% U_{din}[1]	±1% U_{din}[1]	Class A	Class S
Harmonics	Har1 UL1 ... Har51 UL1, Har1 UL2 ... Har51 UL2, Har1 UL3 ... Har51 UL3.	1 s	0.00…100.00%	$U_m \geq 1\% U_{nom}$ ±5% U_m $U_m < 1\% U_{nom}$ ±0.05% U_{nom}		Class I	
Distortion factor	THD U L1, THD U L2, THD U L3, THD Uavg L123.	1 s	0.00…200.00%	±5% [7]			
Harmonics groups distortion factor	THDS U L1, THDS U L2, THDS U L3, THDS Uavg L123.	1 s	0.00…200.00%	±5%			
Harmonics sub-groups distortion factor	THDG U L1, THDG U L2, THDG U L3, THDG Uavg L123.	1 s	0.00…200.00%	±5%			
Partially weighted distortion factor	PWHD U L1, PWHD U L2, PWHD U L3, PWHD Uavg L123.	1 s	0.00…200.00%	±5%			
Demand	U Demand	15 min 30 min 1 hour	$U_n = U_{din} = 230$ V : 23.0...345,0 V (Ku = 1) ...1,38 MV $(Ku \neq 1)^2$ $U_n = U_{din} = 57.7$ V : 5.7...70 V (Ku = 1) ...280 kV $(Ku \neq 1)^2$	±0.1% U_{din}			
Current							
RMS	Irms L1, Irms L2, Irms L3, Iavg L123.	200 ms	$I_n = 5$ A : 0.050...7.5 A (Ki = 1) ..150.0 kA $(Ki \neq 1)^2$ $I_n = 1$ A : 0.010...1.5 A (Ki = 1) ..30.0 kA $(Ki \neq 1)^2$	±0.2% In		Class B	
		1 s		±0.2% In		Class B	
		3 s		±0.1% In	±0.2% In	Class A	Class S
		10 min		±0.1% In	±0.2% In	Class A[1]	Class S
		2 hours		±0.1% In	±0.2% In	Class A[1]	Class S
Neutral	IN	200 ms	$I_n = 5$ A : 0.050...7.5 A (Ki = 1) ...150.0 kA $(Ki \neq 1)^2$ $I_n = 1$ A :	±0.5% In		Class S	
		1 s		±0.5% In			
		3 s		±0.5% In			
		10 min		±0.5% In			

		2 hours	0.010...1.5 A (Ki = 1) ...90.0 kA (Ki ≠ 1)^2	±0.5% In	
Neutral countable	INC	200 ms 1 s 3 s 10 min 2 hours	In = 5 A : 0.150...22.5 A (Ki = 1) ...450.0 kA (Ki ≠ 1)^2 In = 1 A : 0.030...4.5 A (Ki = 1) ...450.0 kA (Ki ≠ 1)^2	±0.2% In	
Harmonics	Har1 IL1 ... Har51 IL1, Har1 IL2 ... Har51 IL2, Har1 IL3 ... Har51 IL3.	1 s	0.00…100.00%	$I_m \geq 3\%\ I_{nom}$ $\pm5\%\ I_m$ $I_m < 3\%\ I_{nom}$ $\pm0.15\%\ I_{nom}$	Class I
Distortion factor	THD I L1, THD I L2, THD I L3, THD Iavg L123.	1 s	0.00…200.00%	±5% [7]	
Harmonics groups distortion factor	THDS I L1, THDS I L2, THDS I L3, THDS Iavg L123.	1 s	0.00…200.00%	±5% [7]	
Harmonics sub-groups distortion factor	THDG I L1, THDG I L2, THDG I L3, THDG Iavg L123.	1 s	0.00…200.00%	±5% [7]	
Partially weighted distortion factor	PWHD I L1, PWHD I L2, PWHD I L3, PWHD Iavg L123.	1 s	0.00…200.00%	±5% [7]	
Demand	I Demand	15 min 30 min 1 hour	In = 5 A : 0.050...7.5 A (Ki = 1) ...150.0 kA (Ki ≠ 1) In = 1 A : 0.010...1.5 A (Ki = 1) ...150.0 kA (Ki ≠ 1)	±0.2% In	
Power					
Active imported power	EnP + L1, EnP + L2, EnP + L3, ∑EnP + L123.	-	L1, L2, L3 : 0...3e+3 Gwh L123: 0...9e+3 Gwh	±0.5% [7]	
Active exported power	EnP - L1, EnP - L2, EnP - L3, ∑EnP - L123.	-	L1, L2, L3 : 0...3e+3 Gwh L123: 0...9e+3 Gwh	±0.5% [7]	
Reactive inductive imported energy	EnQ + ⟩ L1, EnQ + ⟩ L2, EnQ+ ⟩ L3, ∑EnQ+ ⟩ L123.	-	L1, L2, L3 : 0...3e+3 GVArh L123: 0...9e+3 GVArh	±0.5% [7]	

Reactive inductive exported energy	EnQ - ⦚ L1, EnQ- ⦚ L2, EnQ - ⦚ L3, ∑EnQ - ⦚ L123.	-	L1, L2, L3 : 0...3e+3 GVArh L123: 0...9e+3 GVArh	±0.5% [7]	
Reactive capacitive imported energy	EnQ + ⊣⊢ L1, EnQ + ⊣⊢ L2, EnQ+ ⊣⊢ L3, ∑EnQ+ ⊣⊢ L123.	-	L1, L2, L3 : 0...3e+3 GVArh L123: 0...9e+3 GVArh	±0.5% [7]	
Reactive capacitive exported energy	EnQ - ⊣⊢ L1, EnQ - ⊣⊢ L2, EnQ- ⊣⊢ L3, ∑EnQ- ⊣⊢ L123.	-	L1, L2, L3 : 0...3e+3 GVArh L123: 0...9e+3 GVArh	±0.5% [7]	
Apparent energy	EnS L1, EnS L2, EnS L3, ∑EnS L123.	-	L1, L2, L3 : 0...3e+3 GVArh L123: 0...9e+3 GVArh	±0.5% [7]	
Active power	P L1, P L2, P L3, Pavg L123, ∑P L123.	200 ms 1 s 3 s 10 min 2 hour	In = 5A, Un =230V: -2587.5...2587.5W (Ki=1,Ku=1) In = 1A, Un =230V: -517.3...517.3W (Ki=1,Ku=1) In = 5A, Un =57,7V: -525...525W (Ki=1,Ku=1) In = 1A, Un =57.7V: -105...105 W (Ki=1,Ku=1)	±0.5% [7]	
Reactive power	Q L1, Q L2, Q L3, Qavg L123, ∑Q L123.	200 ms 1 s 3 s 10 min 2 hour	In = 5A, Un=230V: -2587.5...2587.5W (Ki=1,Ku=1) In = 1A, Un=230V: -517.3...517.3W (Ki=1,Ku=1) In = 5A, Un =57.7V: -525...525W (Ki=1,Ku=1) In = 1A, Un =57.7V: -105...105 W (Ki=1,Ku=1)	±0.5% [7]	
Apparent power	S L1, S L2, S L3, Savg L123, ∑S L123.	200 ms 1 s 3 s 10 min 2 hour	In = 5A, Un=230V: 1.5...2587.5VA (Ki=1,Ku=1) In = 1A, Un=230V: 0.23...517.5VA (Ki=1,Ku=1) In = 5A, Un =57.7V: 0.285...525W (Ki=1,Ku=1) In = 1A, Un =57.7V: 0.057...105 W (Ki=1,Ku=1)	±0.5% [7]	
Demand	P Demand,	15 min 30 min 1 hour	In = 5A, Un=230V: -2587,5...2587,5W (Ki=1,Ku=1) In = 1A, Un=230V: -517,3...517,3W (Ki=1,Ku=1) In = 5A, Un =57,7V: -525...525W (Ki=1,Ku=1) In = 1A, Un =57,7V: -105...105 W (Ki=1,Ku=1)	±0.5% [7]	

	Q Demand	15 min 30 min 1 hour	In = 5A, Un=230V: -2587.5...2587.5W (Ki=1,Ku=1) In = 1A, Un=230V: -517.3...517.3W (Ki=1,Ku=1) In = 5A, Un =57.7V: -525...525W (Ki=1,Ku=1) In = 1A, Un =57.7V: -105...105 W (Ki=1,Ku=1)	±0.5% [7]	
	S Demand	15 min 30 min 1 hour	In = 5A, Un=230V: 1.5...2587.5VA (Ki=1,Ku=1) In = 1A, Un=230V: 0.23...517.5VA (Ki=1,Ku=1) In = 5A, Un =57,7V: 0.285...525W (Ki=1,Ku=1) In = 1A, Un =57.7V: 0.057...105 W (Ki=1,Ku=1)	±0.5% [7]	
Other					
Frequency	f	1 s	For 50Hz 42.5 … 57.5Hz	±0.05Hz	Class S
		10 s	For 60Hz 51 ... 69Hz	±0.05Hz	Class S
Power distortion factor	dPF L1, dPF L2, dPF L3, dPFavg L123.	200 ms 1 s 3 s 10 min 2 hour	0…1	±0.5% [7]	
Active power factor	PF L1, PF L2, PF L3, PFavg L123.	200 ms 1 s 3 s 10 min 2 hour	-1...1	±0.5% [7]	
tgφ factor	tgφ L1, tgφ L2, tgφ L3, tgφavg L123.	200 ms 1 s 3 s 10 min 2 hour	-10…10	±1% [7]	
Angle between the voltage and current	φ L1, φ L2, φ L3, φavg L123.	200 ms 1 s 3 s 10 min 2 hour	-180°…180°	±0.5% [7]	

Voltage phase-to-phase angle	∢ U L1-2,
	∢ U L2-3,
	∢ U L3-1.
		200 ms
		1 s
		3 s
		10 min
		2 hour
			Un = 230 V :
			40.0...600.0 V (Ku = 1)
			    ...2.39 MV (Ku ≠ 1)[2]
			Un = 100 V :
			10.0...120.0 V (Ku = 1)
			    ...480 kV (Ku ≠ 1)[2]
				±0.5% [7]	

Temperature / Resistance	T1, T2	1s	Pt100: -200...850° Pt1000: -200...850° Resistance: 0...5000 Ω	±0.2% [7]	

Swell Dip Interrupt	Swell Dip Interrupt	f=50Hz 10ms[2) f=60Hz 8.3ms[2)	Un = Udin = 230 V : 23.0...345.0 V (Ku = 1) ...1.38 MV (Ku ≠ 1) Un = 57,7 V : 5.7...70 V (Ku = 1) ...280 kV (Ku ≠ 1)	±0.2% Udin[1)	±1% Udin[1)	Class A	Class S

1. Measurement error in relation to Udin values in accordance with **EN-61000-4-30**.
2. Range Ku = 1...4000.0 and Ki = 1...20000.0
3. Udin - the value obtained from the declared supply voltage Uc = Un by the transformer ratio, according to **EN-61000-4-30**.
4. I_m, U_m – measured values of currents and voltages acc. to **EN-61000-4-7.**
5. I_{nom} , U_{nom} – nominal values of currents and voltages acc. to **EN-61000-4-7.**
6. I_n , U_n – nominal values of currents and voltages acc. to **EN-61000-4-30.**
7. Measurement error in relation to the full measuring range.

3.2. Expansion cards

Availability of inputs/outputs depends on the ordered version of the analyzer.

3.2.1   3 galvanically isolated analog outputs

Type:	3 galvanically isolated current outputs
Output signal:	0/4...20 mA
Output basic error:	0.5 %
Load resistance:	≤ 500 Ω
Isolation:	500 V dc
Response time:	200 ms

3.2.2   6 galvanically isolated analog outputs

Type:	6 galvanically isolated current outputs
Output signal:	0/4...20 mA
Output basic error:	± 0.1 % of measuring range
Load resistance:	≤ 500 Ω
Isolation:	500 V dc
Response time:	200 ms

3.2.3 Binary inputs

Type:	2 groups of 3 digital inputs with common ground
Control signal:	0/5...24 V dc
Switching frequency:	Up to 4 Hz – input voltage from range +5…24 V d.c. Up to 500 Hz - input voltage from range +8…24 V d.c.
Isolation:	1200 V dc

3.2.4. Alarm outputs

Type:	8 or 4 programmable electromagnetic relays, normally open (NO)
Voltage of contacts / current of load:	≤ 250 V ac / 1.5 A
	≤ 30 V dc / 1 A
Output basic error:	200 ms + hysteresis time

3.3. Reference conditions and rated operating conditions

Storage conditions (temperature and humidity)	Temperature : -20…50°C (-4…122°F) Humidity : below 75% RH (without condensation)
Operating conditions (temperature and humidity)	Temperature : 0…50°C (32…122°F) Humidity : 75% RH (without condensation)
Power supply	85…240 V ac, 40...400Hz 90…320 V dc
Maximum power consumption in the circuit	supply ≤ 20VA voltage ≤ 0.2 VA current ≤ 0.2 VA
Acceptable crest factor	Current measurement: 2 Voltage measurement: 2
Resistance to dust and water	IP65 – from the front side IP20 – from the terminal side

3.4. Operating safety acc. to EN 61010-1, basic isolation

Installation category	III
Degree of pollution	2
voltage of isolation relative to earth	RS485: 500V ac/dc Ethernet : 250V ac / 500V dc Temperature measurement input: 500V ac/dc Voltage input: 2140 V ac/dc Power and relay outputs circuits: 2140 V ac/dc Analog outputs: 500V ac/dc Binary inputs: 1200V ac/dc
Maximum operating voltage relative to earth	For power and relay outputs circuits: 300 V For measurement input: 500 V For RS485 circuits, Ethernet, relay outputs, analog outputs and binary inputs: 50 V

Height above the sea level	< 2000 m

3.5. Electromagnetic compatibility

Electromagnetic emissions	conforms EN 61000-6-4
Interference immunity	conforms EN 61000-6-2

3.6. Assembly

Dimensions	144 Width× 144 Height × 90 Depth mm (5.669" Width × 5.669" Height × 3.897" Depth)
Dimensions of mounting hole	$138^{-0.5}$ Width x $138^{-0.5}$ Height mm ($5.433^{-0.02}$" Width × $5.433^{-0.02}$" Height)
Weight	1.6 kg (5.44 oz.)

3.7. Conformity with standards

EN 61010	Operational safety
EN 61000-6-4	Electromagnetic compatibility
EN 61000-6-2	
EN 50160	Measurements and parameters recounting
EN 61000-4-30	
EN 61000-4-7	
EN 61557	

4. Ordering codes

Analyzer/Recorder of Network Parameters ND40	X	X	XX	X	X
Measurement class:					
Class S	0				
Class A/S	1				
Additional inputs/outputs:					
none		0			
8 relay outputs		1			
6 binary inputs, 4 relay outputs		2			
6 binary inputs, 3 analog outputs		3			
4 binary inputs, 6 analog outputs		4			
Versions:					
standard			00		
Voltage input (57.7 V/ 100 V)			01		
special*			XX		
Language					
Polish				P	
English				E	
German				D	
Russian				R	
Other*				X	
Acceptance tests:					
without extra requirements					0
with quality inspection certificate					1
acc. to customer's requirements					X

*after agreement with the manufacturer

LUMEL

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ND40-09D-2