

# LUMEL

## DIGITAL PANEL METER N24, N25

SERVICE MANUAL- QUICK START

Full version of user's manual available at [www.lumel.com.pl](http://www.lumel.com.pl)

- The removal of the meter housing during the guarantee contract period may cause its cancellation.
- The meter fulfills requirements related to electromagnetic compatibility and can be used in the industrial electromagnetic environment.
- When connecting the supply, one must remember that a switch or a circuit-breaker should be installed in the building. This switch should be located near the device, easy accessible by the operator, and suitably marked as an element switching the meter off.
- Non-authorized removal of the housing, inappropriate use, incorrect installation or operation, creates the risk of injury of personnel or meter damage.

For more detailed information, please study the User's Manual.

## 2. INSTALLATION

The meter has separable strips with screw terminals which enable the connection of external wires of 2.5 mm<sup>2</sup> cross-section. In execution for current measurement, the plug enables a permanent fixing to the socket by means of screws. The meter is adapted to be mounted in a panel by means of clamps, acc. to the fig. 1.

One must prepare a hole of 92<sup>+0.6</sup> x 45<sup>+0.6</sup> mm in the panel which the thickness should not exceed 6 mm.

The meter must be introduced from the panel front with disconnected supply voltage. Before the insertion into the panel, one must check the correct placement of the seal. After the insertion into the hole, fix the meter by means of clamps (fig.1).

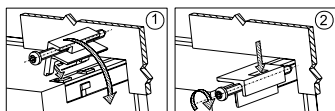


Fig. 1. N24 and N25 meter fixing.

**\*Output for the supply of external transducers:** 24 V ± 5% 30 mA  
**Short duration overload (1 s):** input of sensors: 30 V

### 4.3. Technical Data of N24Z, N25Z meters

**\*Measuring range of voltage Un:** 1...100...120 V a.c., 2.5...250...300 V a.c., 4...400...600 V a.c. (input resistance > 2 MΩ)  
**\*Measuring range of current In:** 0.01...1...1.2 A a.c. (input resistance 10 mΩ ± 10%)  
0.05...5...6 A a.c. (input resistance 2 mΩ ± 10%)  
**Measurement of frequency:** 20...500 Hz (in voltage range 24...480 V) input resistance > 2 MΩ  
**Basic error** (at manufacturer's settings):  
- voltage and current: ± (0.5% of the range + 1 digit) in frequency interval 20...500 Hz  
- frequency: ± (0.02% of the range + 1 digit)

**Sustained overload:** 150% Un (only for 400 V input), 120% Un (for other Un), 120% In

**Short duration overload (1 s):** voltage input 2 Un (<1000 V), current input 10 In

### 4.4. Technical Data of N24H, N25H meters

**\*Measuring range of unipolar voltage Un:** 0...100...110 V d.c., 0...250...275 V d.c. (input resistance > 2 MΩ)  
**\*Measuring range of bipolar voltage Un:** -120...-100...100...120 V d.c., -300...-250...-250...300 V d.c., -600...-400...400...600 V d.c. (input resistance > 2 MΩ)  
**\*Measuring range of bipolar current In:** -1.2...-1...1...1.2 A d.c. (input resistance 10 mΩ ± 10%)  
-6...-5...5...6 A d.c. (input resistance 2 mΩ ± 10%)  
**Basic error** (at manufacturer's settings): voltage and current: ± (0.2% of the range + 1 digit)

**Sustained overload:** 150% Un (we. ± 400 V), 120% Un (for other Un), 120% In

**Short duration overload (1 s):** voltage input 2 Un (<1000 V), current input 10 In

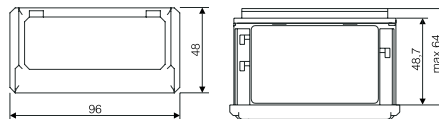


Fig. 2. N24 and N25 meter overall dimensions

## 2.1. Connection Diagrams

### 2.1.1 Electrical Connection of the N24S, N25S meter

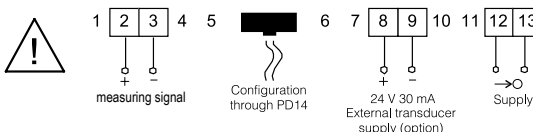


Fig. 3. Electrical connection of the N24S, N25S meters

### 2.1.2 Electrical Connection of the N24T, N25T meter

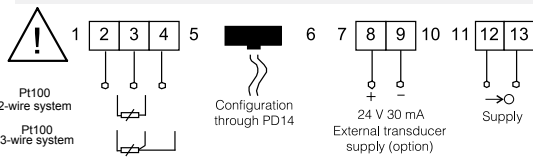


Fig. 4. Electrical connection and measuring inputs of the N24T, N25T meter

### 2.1.3 Electrical Connection of the N24Z, N24H, N25Z, N25H meter

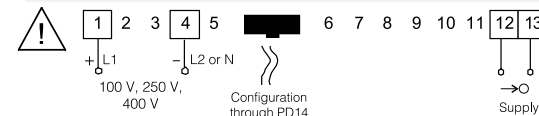


Fig. 5. Electrical connections of N24Z, N24H and N25Z, N25H meters for the measurement of voltage (and frequency measurement only for the N24Z and N25Z meters)

## 3. SERVICE

### 3.1. Messages after the Supply Connection

After switching the supply on, the meter displays the meter name appropriate to the kind of measured signal: N24E, N25E, where E is the appropriate execution of the S, t, z, h, meter and next, the program version in the shape x.xx – where x.xx is the number of the current program version or the number of a custom-made execution. Till the time to obtain the required number of correct measurements (acc. to the table 1 – for N24S, N24T, N24H, N25S, N25T, N25H meters or acc. to the table 2 – for N24Z and N25Z meters) the arithmetical mean value from until now measurements is displayed. The measurement of a value from behind the measuring range causes the setting of the overflow and the beginning of the counting of correct measurements again. The time is set by the manufacturer on 1 sec.

In case of any error occurrence or exceeding of the range value, one of the message described in the section 6 (see full version of user's manual, available at [www.lumel.com.pl](http://www.lumel.com.pl)) will be displayed.



\* Measuring ranges of the meter, supply voltage ranges and availability of the output for supplying object transducers depend on the execution/version of the meter and are described on the meter's nameplate.

### 4.5. Common Technical Data for the Whole N24 and N25 Series

#### \*Rated operating conditions:

- supply voltage: 230 V ± 10% a.c. (45...65 Hz), 110 V ± 10% a.c. (45...65 Hz), 24 V ± 10% a.c. (45...65 Hz), 85... 253 V a.c. (45...65 Hz) or d.c., 20... 40 V a.c. (45...65 Hz) or d.c.  
- ambient temp.: -10...23...55°C, - storage temp.: -25...+85°C  
- humidity < 95% (condensation inadmissible), - work position: any

#### Additional errors in rated operating conditions:

from ambient temperature changes: (50% of basic error/10 K)  
**Averaging time (programmable):** ≥ 0.5 s (by default 1 s)

#### Preheating time:

30 minutes  
**Readout field:** 4-digit LED display (N24 series); 5-digit LED display (N25 series)

- digit height: 20 mm (N24)/14 mm (N25 series); - colour: red;  
- indication range: -1999...9999 (N24 series); -19999...99999 (N25 series)

**Ensured protection grade from the frontal side:** IP65 acc. to EN 60529  
**Overall dimensions:** 96 x 48 x 64 mm (with terminals)

**Weight:** < 0.25 kg

**Input power** < 6 VA

**Galvanic isolation between:** supply-measuring input 3.2 kV d.c.

**Electromagnetic compatibility:** - noise immunity acc. to EN 61000-6-2;

- noise emission acc. to EN 61000-6-4

#### Safety requirements acc. to EN 61010-1:

- isolation between circuits: basic;
- installation category III (for the 400 V option – category II);
- pollution grade: 2;
- maximal phase-to-earth working voltage:
  - for the supply circuit: 300 V, -for the measuring input 600 V – category II (300 V – cat. III)
  - for the programming input: 50 V
- altitude above sea level: < 2000 m,

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## 1. BASIC REQUIREMENTS, OPERATIONAL SAFETY

In the safety service scope, the meter meets the requirements of the EN 61010-1 standard.

Meaning of the symbol: **Caution: risk of hazard.**

### Observations concerning the operational safety

- All operations concerning transport, installation, and commissioning as well as maintenance, must be carried out by qualified, skilled personnel, and national regulations for the prevention of accidents must be observed.
- The programming of N24 and N25 meter series parameters must be carried out after disconnecting measuring circuits
- Before switching the meter on, one must check the correctness of connections to the network.
- Do not connect the meter to the network through an auto-transformer.
- Before removing the meter housing, one must switch the supply off and disconnect measuring circuits.

### 3.2. Meter Configuration using eCon software

The free delivered eCon software, available on the [www.lumel.com.pl](http://www.lumel.com.pl) page, is destined for the N24 and N25 meter series configuration.

The configuration user's manual for N24 and 25 meters using eCon software is also available on the [www.lumel.com.pl](http://www.lumel.com.pl) page. The PD14 programmer is required for the configuration.

#### CAUTION!

The programming of meter parameters must be carried out when measuring circuits are switched off!

## 4. TECHNICAL DATA

### 4.1. Technical Data of N24S, N25S meters

**\*Measuring range of voltage Un:** -11 mV...-10 mV...60 mV...66 mV, -66 mV...60 mV...60 mV...66 mV, -0.5 V...0 V...10 V...11 V, -11 V...-10 V...-10 V...-11 V - (input resistance > 1 MΩ)

**\*Measuring range of current In:** -1 mA...0 mA...20 mA...22 mA, 3,6 mA...4 mA...20 mA...22 mA - (input resistance 10 Ω ± 1%)

**Basic error** (at manufacturer's settings): ± (0.2% of the range + 1 digit)

**\*Output for supply external transducers:** 24 V ± 5% 30 mA

**Sustained overload:** 110% Un, 110% In

**Short duration overload (1 s):** voltage input 10 Un, current input 5 In

### 4.2. Technical Data of N24T, N25T meters

**\*Measuring range of temperature Pt100:** -50°C...150°C, -50°C...400°C (current flowing through the sensor < 300 μA)

Resistance of wires connecting the resistance: ≤ 5 Ω by wire for the automatic compensation, ≤ 10 Ω by wire for the manual compensation

**Temp. measurement by thermocouple of J type:** -50°C...1200°C,

**Temp. measurement by thermocouple of K type:** -50°C...1370°C

**Basic error** (at manufacturer's settings): ± (0.2% of the range + 1 digit)

#### Additional errors in rated operating conditions:

- compensation of cold junction temperature changes: ± 0.2% of the range
- compensation of wire resistance changes: ± 0.2% of the range

