NR30 - RAIL MOUNTED POWER NETWORK METER

- Measurement of 54 power network parameters and current and voltage harmonics up to 51st, in 1-phase 2-wire or 3-phase 3 or 4-wire balanced and unbalanced systems.
- Backlit LCD screen fully configurable by a user (22 views, 3 parameters in each).
- For direct (up to 63A) and indirect measurement (x/1A or x/5A).
- Indications considering values of programmed ratios.
- Memory of minimum and maximum values.
- 2 configurable alarm outputs.
- Optional: with an additional module of analog outputs S4AO (max. 4 current or voltage outputs).
- Digital output RS-485 - MODBUS protocol.
- Archiving of up to 32 measured parameters in the internal memory 8 GB.
- Modern and user-friendly Ethernet interface 10/100 BASE-T:
  - protocol: MODBUS TCP/IP, HTTP, FTP,
  - services: www server, ftp server, DHCP client.
- New communication protocols: MQTT, BACNET, PROFINET coming soon.
- Programming of parameters through USB using free eCon software.
- Battery backup RTC.
- Modular housing for S-rail according to EN 62208 (the meter has a width of 6 modules).

EXAMPLE OF APPLICATION

L1 L2 L3
MV switchgear
NR30
Modbus RTU
Modbus TCP/IP
Ethernet
L1 L2 L3
LV switchgear
NR30
Modbus RTU
Modbus TCP/IP
Ethernet
L1 L2 L3
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www.lumel.com.pl
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**EXAMPLE OF APPLICATION**

- **Modbus TCP/IP**
- **MQTT**
- **Ethernet**
- **iiot systems**
- **SCADA**
- **PLC control systems**
- **BMS systems - Building Automation**

* MQTT/PROFINET/BACNET protocols in the NR30 meter soon

**MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS**

- phase voltages: $U_1$, $U_2$, $U_3$
- phase-to-phase voltages: $U_{12}$, $U_{23}$, $U_{31}$
- phase currents $I_1$, $I_2$, $I_3$
- active phase powers: $P_1$, $P_2$, $P_3$
- reactive phase powers: $Q_1$, $Q_2$, $Q_3$
- apparent phase powers: $S_1$, $S_2$, $S_3$
- active power factors: $PF_1$, $PF_2$, $PF_3$
- reactive/active power factors: $tg\phi_1$, $tg\phi_2$, $tg\phi_3$
- active, reactive and apparent 3-phase power: $P$, $Q$, $S$
- mean 3-phase power factors: $PF$, $tg\phi$
- frequency $f$
- mean 3-phase voltage: $U_s$
- mean phase-to-phase voltage: $U_{ph}$
- mean 3-phase current: $I_s$
- 15, 30, 60 minutes’ mean active power: $P_{demand}$
- mean apparent power $S_{demand}$
- average current $I_{demand}$
- active, reactive and apparent 3-phase energy: $EnP$, $EnQ$, $EnS$
- active, reactive and apparent energy from external counter: $EnPE$
- total harmonic content coefficients for phase voltages and currents $THD_{pf}$, $THD_{qr}$, $THD_{qr'}$,$THD_{pf'}$, $THD_{qr''}$, $THD_{pf''}$ and for 3-phase voltages and currents $THD_1$, $THD_2$
- harmonics for current and phase voltage up to 51st!
NR30 - RAIL MOUNTED POWER NETWORK METER

**TECHNICAL DATA**

### MEASURING RANGES

<table>
<thead>
<tr>
<th>Measured value</th>
<th>Measuring range</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Σ</th>
<th>Class (*) / Basic error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current 1/5 A</td>
<td>0.010 - 0.100, 1 - 200 A (tr_i=1)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.2</td>
</tr>
<tr>
<td>Voltage L-N</td>
<td>5.7 - 11.5 V (tr_U=1)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.2</td>
</tr>
<tr>
<td>Voltage L-L</td>
<td>10.0 - 120.0 V (tr_U=1)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.5</td>
</tr>
<tr>
<td>Active power P</td>
<td>(-)1999.9 W</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.5</td>
</tr>
<tr>
<td>Reactive power Q</td>
<td>(-)1999.9 Var</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 1</td>
</tr>
<tr>
<td>Apparent power S</td>
<td>1999.9 VA</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.5</td>
</tr>
<tr>
<td>Active energy E</td>
<td>(-)1999.9 Wh</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.5</td>
</tr>
<tr>
<td>Reactive energy E</td>
<td>(-)1999.9 MVarh</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 1</td>
</tr>
<tr>
<td>Apparent energy S</td>
<td>1999.9 MVAh</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.5</td>
</tr>
<tr>
<td>Active power factor PF</td>
<td>-1.00 .. 1.00</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>± 0.01 basic error</td>
<td></td>
</tr>
<tr>
<td>Coefficient tgφ</td>
<td>-1.20 .. 0.00</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>± 0.01 basic error</td>
<td></td>
</tr>
<tr>
<td>Frequency f</td>
<td>45.00 - 65.00 Hz</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 0.1</td>
<td></td>
</tr>
<tr>
<td>Total harmonic distortion of voltage THDU and current THDI</td>
<td>0.0 - 100.0 %</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 5</td>
<td></td>
</tr>
<tr>
<td>Amplitudes of the voltage U_L1-U_L3, and current i_L1 - i_L3</td>
<td>0.0 - 100.0 %</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>Class 5</td>
<td></td>
</tr>
</tbody>
</table>

tr_i, tr_U -- ratio of current and voltage transformer

### OUTPUTS

#### Interface Type

- **USB 1.1/2.0**: Modbus RTU 8N2
- **RS-485**: Modbus RTU 8N2, 8E1, 8O1, 8N1
- **Ethernet 10/100 Base-T**: Modbus TCP, HTTP, FTP

#### Remarks

- USB 1.1/2.0: baud rate 115.2 kbit/s; firmware update
- RS-485: baud rate 4.8, 9.6, 19.2, 38.4, 57.6, 115.2 kbit/s
- Ethernet: WWW server, FTP server, DHCP client

### DIGITAL INTERFACE

<table>
<thead>
<tr>
<th>Interface type</th>
<th>Transmission protocol</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 1.1/2.0</td>
<td>Modbus RTU 8N2</td>
<td></td>
</tr>
<tr>
<td>RS-485</td>
<td>Modbus RTU 8N2, 8E1, 8O1, 8N1</td>
<td>Address 1..247</td>
</tr>
<tr>
<td>Ethernet 10/100 Base-T</td>
<td>Modbus TCP, HTTP, FTP</td>
<td>WWW server, FTP server, DHCP client</td>
</tr>
</tbody>
</table>

**FEATURES**

- **MOD BUS TCP:**
- **RS 485:**
- **THD:**
- **RTC:**
- **Password protection:**
- **THD:**
- **AC:**
- **RS:**
- **485:**
- **Zasilanie:**
- **2x Ethernet:**

**INPUTS**

- **AC:**
- **RTC:**
- **Password protection:**
- **THD:**
- **AC:**
- **RS:**
- **485:**
- **Zasilanie:**
- **2x Ethernet:**

**OUTPUTS**

- **2x programmable relays, non-voltage contacts, load capacity 0.5 A / 250 V a.c. or 5 A / 30 V d.c.**

**GALVANIC ISOLATION**

- **Ethernet:**
- **RS 485:**
- **analog:**
- **alarm:**
- **phases:**
- **Supply:**
NR30 - RAIL MOUNTED POWER NETWORK METER

EXTERNAL FEATURES

Readout field 20 x 4 lines LCD character display; white background, black characters

Overall dimensions 105 x 110 x 60 mm

Weight 0.3 kg

Protection grade from frontal side: IP50 from terminal side: IP00

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: ≤ 0.5 VA

in current circuit: ≤ 0.1 VA (In = 1/5 A);

≤ 2.0 VA (In = 63 A)

Input signal 0...0, 1...1, 2 in; 0, 1...0, 2...1, 2 Un for current, voltage, PF, tg, power

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% inadmissible 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 for In = 1A/5A (1 sec.)

630 A for In = 63A (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, analog outputs: 50 V

acc. to EN 61010-1

Altitude a.s.l. < 2000 m

CONNECTION DIAGRAMS

Description of connection strips in the execution of the meter for indirect connections

Description of connection strips in the execution of the meter for direct connections 63A
NR30 - RAIL MOUNTED POWER NETWORK METER

DISPLAYING OF MEASUREMENT PARAMETERS

- Easy to use and intuitive menu;
- Information bar with status of: min. max values, phase sequence, alarm outputs, archiving status, Ethernet and RS-485 interfaces.
- Up to 22 programmable screens (3 parameters per page).
- One screen dedicated to harmonics; indication of individual harmonic for voltages and currents (up to 51st).

METER CONFIGURATION WITH FREE eCON SOFTWARE

- Ability to configure and update* NR30 with free eCon software (via RS-485, USB or Ethernet interface).
- * - update only via USB port.
NR30 - RAIL MOUNTED POWER NETWORK METER

REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW, FTP SERVER

ORDERING CODE

Input current In:
1/5 A (X/A ; X/5) 1
63 A 2

Input voltage (phase/phase-to-phase) Un:
3 x 57.7/100 V up to 3 x 100/170 V 1
3 x 230/400 V up to 3 x 400/690 V 2

Interface:
RS-485 and Ethernet 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
with S4AO: 4 current outputs 0/4 .. 20 mA 01
with S4AO: 4 voltage outputs 0 .. 10 V 02
with S4AO: 4 analog outputs (2 x 0..10V; 2 x 0/4..20mA) 03
custom-made* XX

Language:
Polish P
English E
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: NR30-1.1.2.1.00.E.0 means:
NR30 – NR30 meter
1 – input current 1/5 A (X/A; X/5)
1 – input voltage 3x57.7/100 V up to 3x100/170 V,
2 – RS485 and Ethernet,
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.

* only after agreeing with the manufacturer