



NR30 - RAIL MOUNTED POWER NETWORK METER

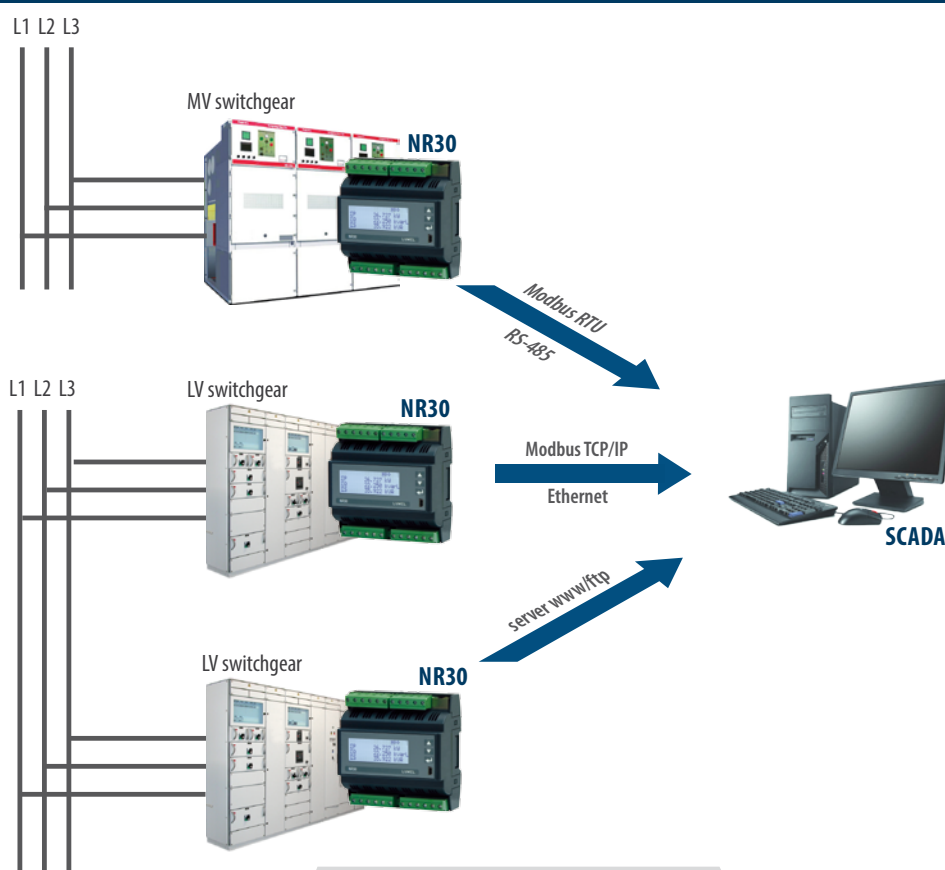
NR30IoT - RAIL MOUNTED POWER NETWORK METER FOR IoT APPLICATIONS

- Measurement of 54 power network parameters and current and voltage harmonics up to 63rd, in 1-phase 2-wire or 3-phase 3 or 4-wire balanced and unbalanced systems.
- The MQTT protocol is ideal for communication in distributed acquisition systems data - IoT applications (NR30IoT).
- High accuracy class (0.2S for active energy).
- 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,
 - protocol: MQTT (NR30IoT),
 - services: www server, ftp server, DHCP client.
- 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).

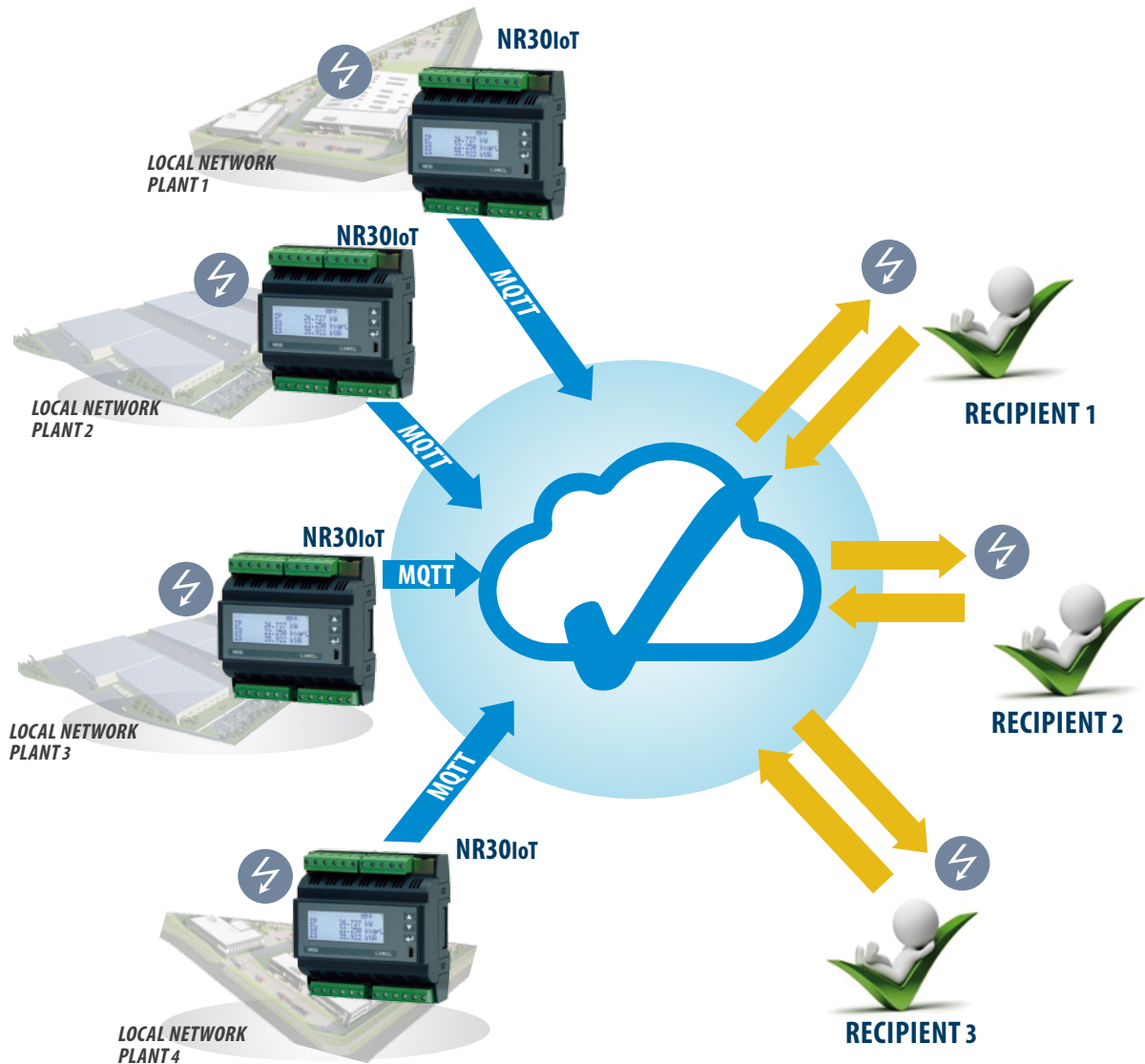


- Supervisory relay mode for alarm outputs (NR30 and NR30IoT)
- MQTT protocol (for NR30)

EXAMPLE OF APPLICATION



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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_{mf}
- 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 $THD_{U1}, THD_{U2}, THD_{U3}, THD_{I1}, THD_{I2}, THD_{I3}$ and for 3-phase voltages and currents THD_V, THD_I
- harmonics for current and phase voltage up to 63rd!

| FEATURES | INPUTS | OUTPUTS | GALVANIC ISOLATION |
|----------|--------|---|--------------------|
| | | <p style="font-size: small; text-align: center;">* -available only with an additional S4A0 module</p> | |

TECHNICAL DATA

MEASURING RANGES

| Measured value | Measuring range | L1 | L2 | L3 | Σ | Class |
|---|--|----|----|----|---|---------------------------|
| Current I/5 A 1 A~ 5 A~ | 0.010 ..0.100..1.200 A (tr _I =1) 0.050 ..0.500.. 6.000 A (tr _I =1) ...20.00 kA (tr _I ≠1) | • | • | • | | 0.2 (EN 61557-12) |
| 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) | • | • | • | | 0.2 (EN 61557-12) |
| 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) | • | • | • | | 0.5 (EN 61557-12) |
| Active power P _v , average active power P _{dt} | .. (-)1999.9 W ..(-)1999.9 MW (tr _U ≠1.tr _I ≠1) | • | • | • | • | 0.5 (EN 61557-12) |
| Reactive power Q _i | .. (-)1999.9 Var ..(-)1999.9 MVar (tr _U ≠1.tr _I ≠1) | • | • | • | • | 1 (EN 61557-12) |
| Apparent power S _v , average apparent power S _{dt} | ..1999.9 VA ..1999.9 MVA (tr _U ≠1.tr _I ≠1) | • | • | • | • | 0.5 (EN 61557-12) |
| Active energy EnP (imported or exported) | .. (-)1999.9 Wh ..(-)1999.9 MWh (tr _U ≠1.tr _I ≠1) | | | | • | 0.2S (EN 62053-22) |
| Reactive energy EnQ (inductive or capacitive) | .. (-)1999.9 Varh ..(-)1999.9 MVarh (tr _U ≠1.tr _I ≠1) | | | | • | 1 (EN 61557-12) |
| Apparent energy EnS | .. 1999.9 VAh ..1999.9 MVAh (tr _U ≠1.tr _I ≠1) | | | | • | 0.5 (EN 61557-12) |
| Active power factor PF _i | -1.00 ..0 ..1.00 | • | • | • | • | 1 (EN 61557-12) |
| Coefficient tg | -999,99 .. 0 .. 999,99 | • | • | • | • | 1 |
| Frequency f | 45.00..65.00 Hz | | | | • | 0.1 (EN 61557-12) |
| Total harmonic distortion of voltage THDU and current THDI | 0.0 ..100.0 % | • | • | • | • | 5 (EN 61557-12) |
| Amplitudes of the voltage U _{h2} ... U _{h63} and current I _{h2} ... I _{h63} | 0.0 ..100.0 % | • | • | • | | II (IEC61000-4-7) |

tr_I - Ratio of current transformer = Primary current of transformer / Secondary current of current transformer,
tr_U - Ratio of voltage transformer = Primary voltage of transformer / Secondary voltage of voltage transformer,

OUTPUTS

| Output type | Properties |
|--------------|--|
| Relay output | 2 x programmable relays, non-voltage contacts, load capacity 0.5 A / 250 V a.c. or 5 A / 30 V d.c. |

DIGITAL INTERFACE

| Interface type | Transmission protocol | Remarks |
|------------------------|---|--|
| USB 1.1/2.0 | Modbus RTU 8N2 | baud rate115.2 kbit/s; firmware update |
| RS-485 | Modbus RTU 8N2, 8E1, 8O1, 8N1 Address 1..247 | baud rate: 4.8, 9.6, 19.2 38.4, 57.6, 115.2 kbit/s |
| Ethernet 10/100 Base-T | Modbus TCP, HTTP, FTP MQTT (NR30IoT) | WWW server, FTP server, DHCP client |

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 |

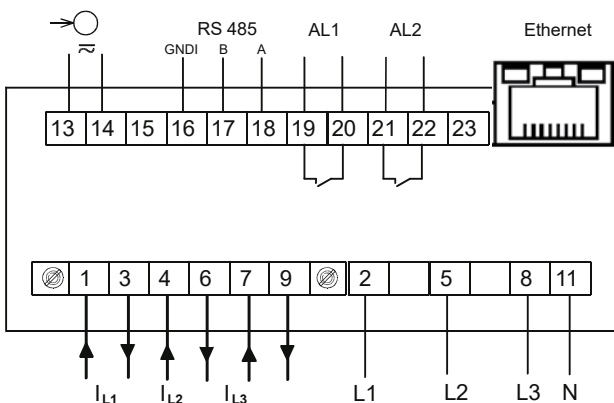
RATED OPERATING CONDITIONS

| | | |
|--|--|---|
| 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, 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% | 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 |

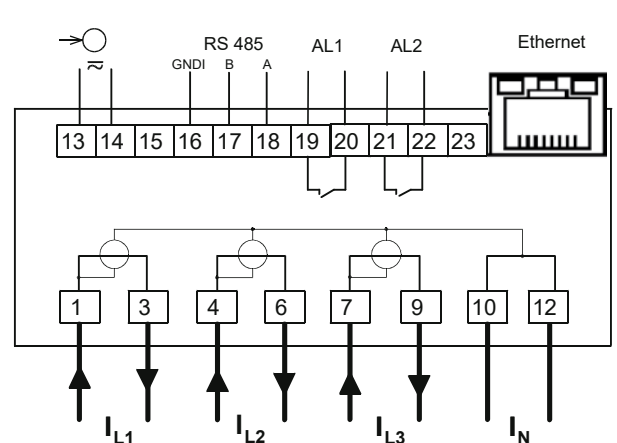
SAFETY AND COMPABILITY REQUIREMENTS

| | | |
|---------------------------------|---|----------------------|
| 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 |
| Polution level | 2 | acc. to EN 61010-1 |
| Installation category | III | acc. to EN 61010-1 |
| Maximal phase-to-earth voltage | <ul style="list-style-type: none"> 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

DISPLAING OF MEASUREMENT PARAMETERS

| | A1 | 1 | 2 | 3 | A2 | 1 | 2 | 3 | E | T |
|----|----|---|---|---|--------|---|---|---|---|---|
| U1 | | | | | 103.75 | | | | V | |
| U2 | | | | | 99.234 | | | | V | |
| U3 | | | | | 101.86 | | | | V | |

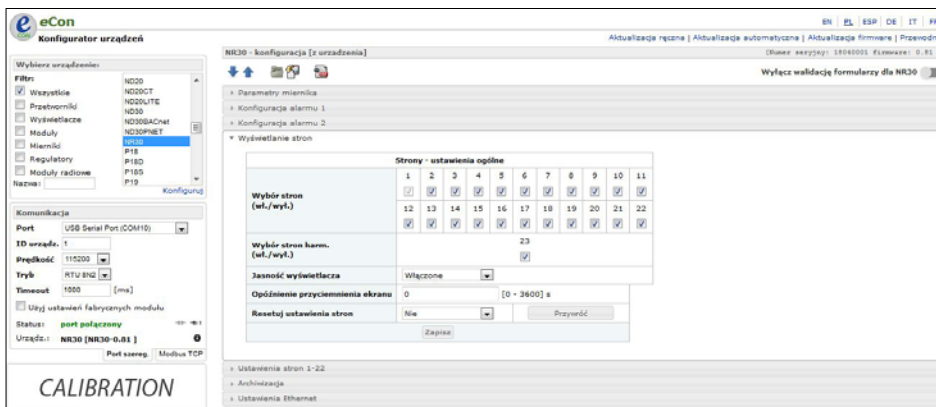
up to 22 programmable screens
(3 parameters per page)

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

| | H05 | | | | M00E |
|----|-------|--|----|-------|------|
| U1 | 3.28% | | I1 | 4.17% | |
| U2 | 1.42% | | I2 | 2.38% | |
| U3 | 2.35% | | I3 | 3.42% | |

one screen dedicated to harmonics;
indication of individual harmonic
for voltages and currents (up to 63rd)

METER CONFIGURATION WITH FREE eCON SOFTWARE



ability to configure and update*
NR30/NR30IoT with free eCon software
(via RS-485, USB or Ethernet interface)

*- update only via USB port

REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW, FTP SERVER

LUMEL
EVERYTHING COUNTS

Miernik parametrów sieci 3-fazowej typ NR30

| | | | |
|---|--|--|---|
| Strona 1 U1 232.804 V U2 230.099 V U3 232.099 V | Strona 2 U12 400.306 V U23 399.696 V U31 402.218 V | Strona 3 I1 34.999 A I2 40.002 A I3 30.003 A | Strona 4 P1 7256.724 W P2 6356.399 W P3 5496.909 W |
| Strona 5 Q1 3705.170 var Q2 6657.176 var Q3 4275.123 var | Strona 6 PF1 0.891 PF2 0.691 PF3 0.789 | Strona 7 Ilg1 0.511 Ilg2 1.047 Ilg3 0.778 | Strona 8 ΣP 19.110 kW ΣQ 14.637 kvar ΣS 24.316 kVA |
| Strona 9 U avg 231.667 V I avg 35.001 A I(N) 5.636 A | Strona 10 PF avg 0.786 Ilg avg 0.766 f 49.999 Hz | Page 11 U1 232.804 V I1 34.999 A P1 7256.724 W | Page 12 Q1 3705.170 var S1 8147.503 VA PF1 0.891 |
| Page 13 U2 230.099 V I2 40.002 A P2 6356.399 W | Page 14 Q2 6657.176 var S2 9204.444 VA PF2 0.691 | Page 15 U3 232.099 V I3 30.003 A P3 5496.909 W | Page 16 Q3 4275.123 var S3 6963.669 VA PF3 0.789 |
| Page 17 P DMD 19.111 kW S DMD 24.318 kVA I DMD 35.001 A | Page 18 ΣP 19.110 kW EnP+ 0.000 Wh EnP- 0.000 Wh | Page 19 ΣQ 14.637 kvar EnQ L 319.314 kWh EnQ C 43.232 kWh | Page 20 ΣS 24.316 kVA En S 366.842 kWh f 49.999 Hz |
| Page 21 THD U1 6.935 % THD U2 6.926 % THD U3 6.926 % | Page 22 THD I1 11.660 % THD I2 11.693 % THD I3 11.706 % | | |

WEB server for remote reading
of current measurement data;
FTP server for downloading
archived CSV files



ORDERING CODE

| Code | Description |
|-------------------------|---|
| NR30IoT 2221MSM0 | Rail-mounted 3-phase power network meter (MQTT) NR30IoT Current input 63A, Voltage input 3x230/400V or 3x400/690V, 2x relays, Ethernet and RS-485 interface, internal memory 8GB, supply 85-253V a.c. Or 90-300V d.c., MQTT protocol, Supervisory relay, documentation and descriptions in Polish and English version, test certificate |
| NR30IoT 1221MSM0 | Rail-mounted 3-phase power network meter (MQTT) NR30IoT Current input 1A/5A, X/1A, X/5A, Voltage input 3x230/400V or 3x400/690V, 2x relays, Ethernet and RS-485 interface, internal memory 8GB, supply 85-253V a.c. or 90-300V d.c., MQTT protocol, Supervisory relay, documentation and descriptions in Polish and English version, test certificate |
| NR30IoT 1222MSM0 | Rail-mounted 3-phase power network meter (MQTT) NR30IoT Current input 1A/5A, X/1A, X/5A, Voltage input 3x230/400V or 3x400/690V, 2x relays, Ethernet and RS-485 interface, internal memory 8GB, supply 20-40V a.c. or 20-60V d.c., MQTT protocol, Supervisory relay, documentation and descriptions in Polish and English version, test certificate |