



## NR30 - RAIL MOUNTED POWER NETWORK METER

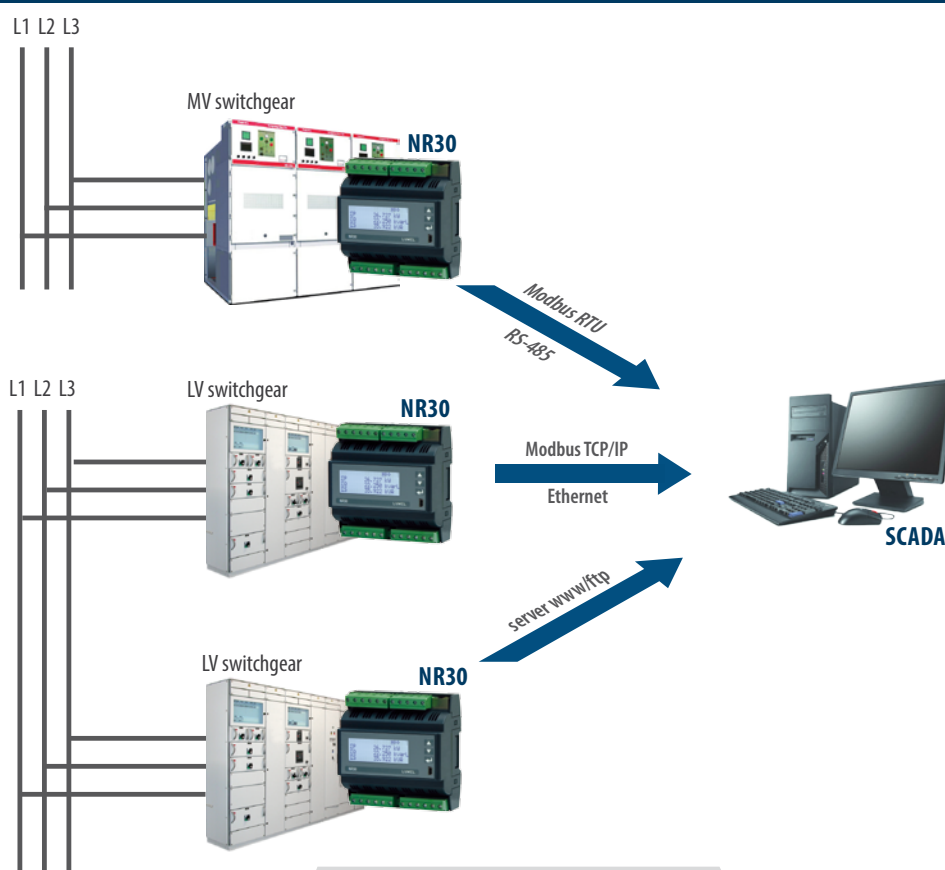
### NR30IoT - RAIL MOUNTED POWER NETWORK METER FOR IoT APPLICATIONS

- 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).

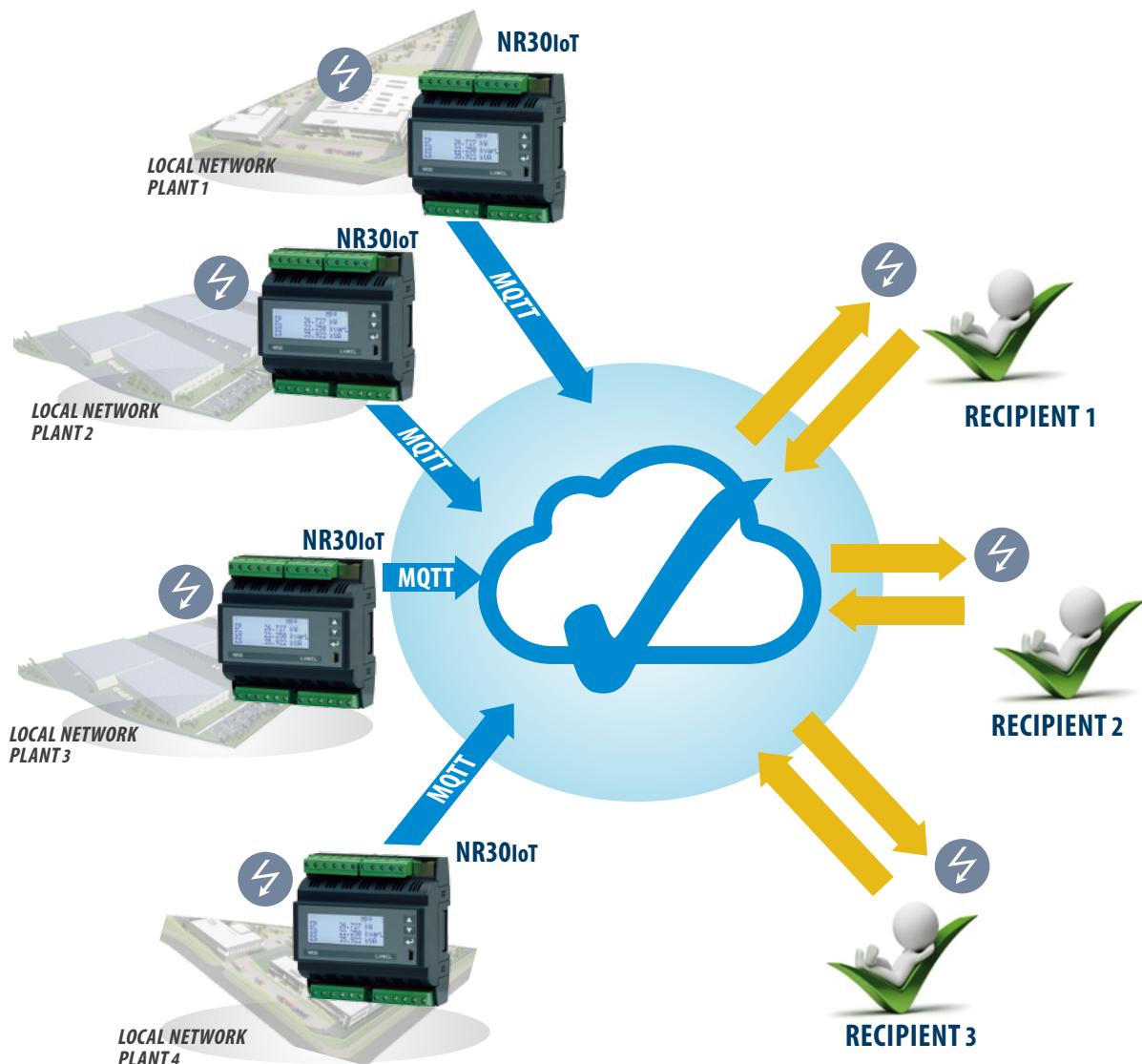


- Supervisory relay mode for alarm outputs (NR30 and NR30IoT)
- MQTT protocol (for NR30)

## 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 <sub>v</sub> , average active power P <sub>dt</sub>	.. (-)1999.9 W ..(-)1999.9 MW (tr_U≠1.tr_I≠1)	•	•	•	•	0.5 (EN 61557-12)
Reactive power Q <sub>i</sub>	.. (-)1999.9 Var ..(-)1999.9 MVar (tr_U≠1.tr_I≠1)	•	•	•	•	1 (EN 61557-12)
Apparent power S <sub>v</sub> , average apparent power S <sub>dt</sub>	..1999.9 VA ..1999.9 MVA (tr_U≠1.tr_I≠1)	•	•	•	•	0.5 (EN 61557-12)
<b>Active energy EnP (imported or exported)</b>	.. (-)1999.9 Wh ..(-)1999.9 MWh (tr_U≠1.tr_I≠1)				•	<b>0.2S (EN 62053-22)</b>
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 <sub>i</sub>	-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 <sub>h2</sub> ... U <sub>h63</sub> and current I <sub>h2</sub> ... I <sub>h63</sub>	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	WWW server, FTP server, DHCP client
	MQTT (NR30IoT)	

## 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

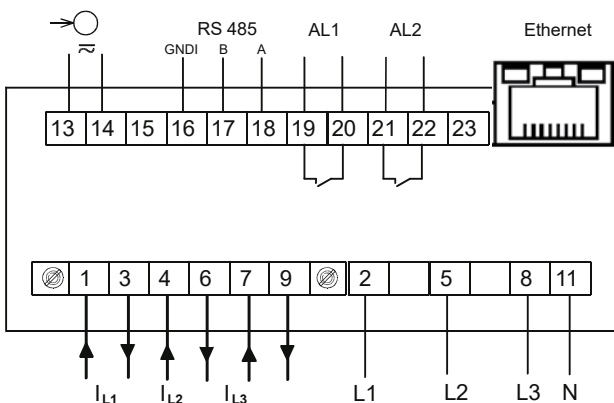
## RATED OPERATING CONDITIONS

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

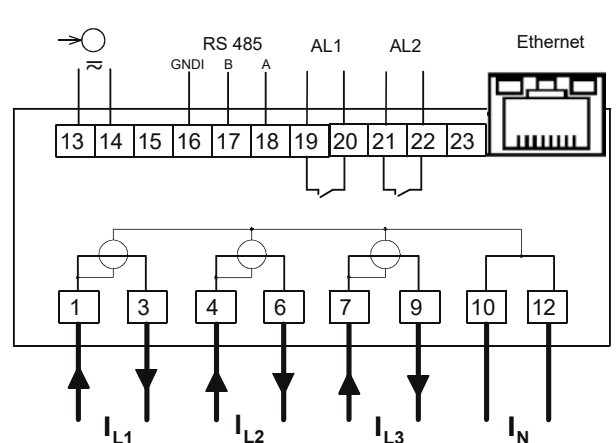
## SAFETY AND COMPABILITY REQUIREMENTS

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"> <li>for supply circuit and relay outputs 300 V</li> <li>for measuring input 500 V</li> <li>for circuits of RS-485, analog outputs: 50 V</li> </ul>	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

## DISPLAYING 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	

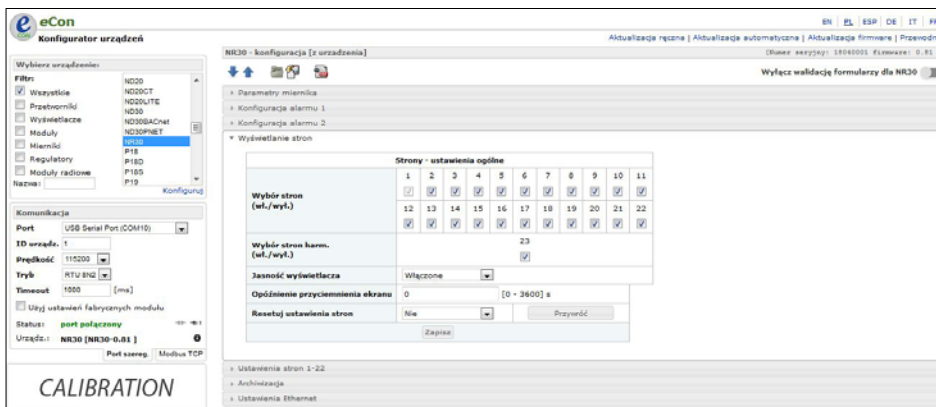
up to 22 programmable screens  
(3 parameters per page)

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
<b>NR30IoT 2221MSM0</b>	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
<b>NR30IoT 1221MSM0</b>	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
<b>NR30IoT 1222MSM0</b>	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

