

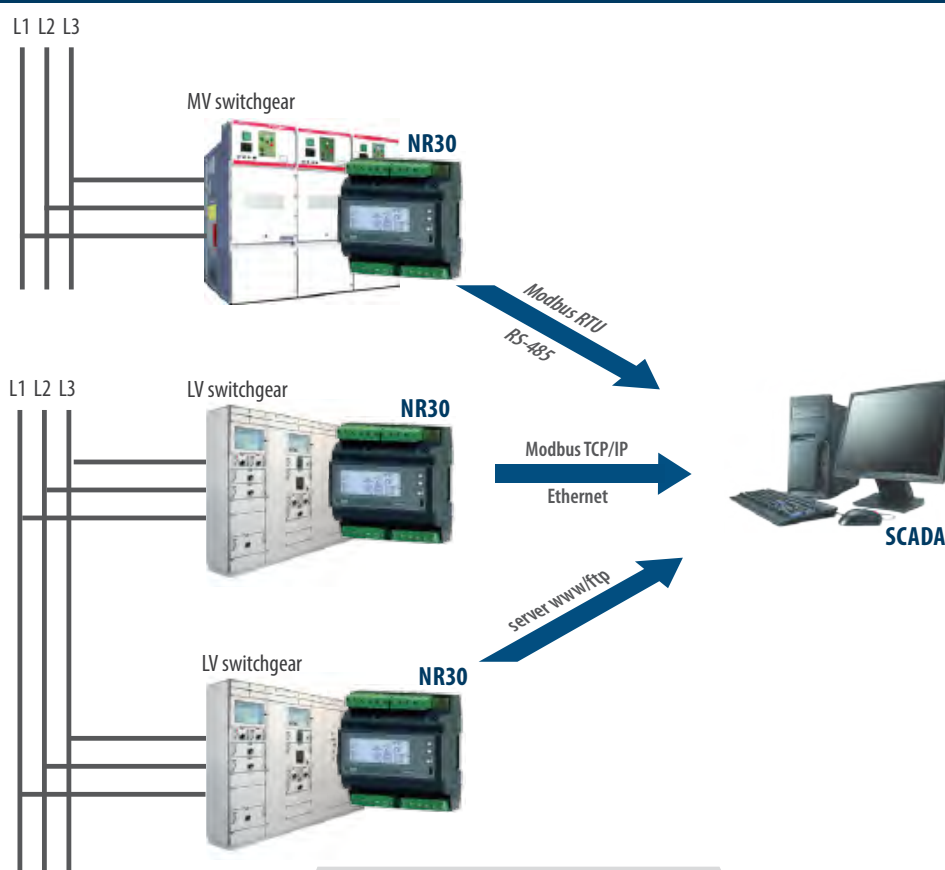


NR30 - RAIL MOUNTED POWER NETWORK METER

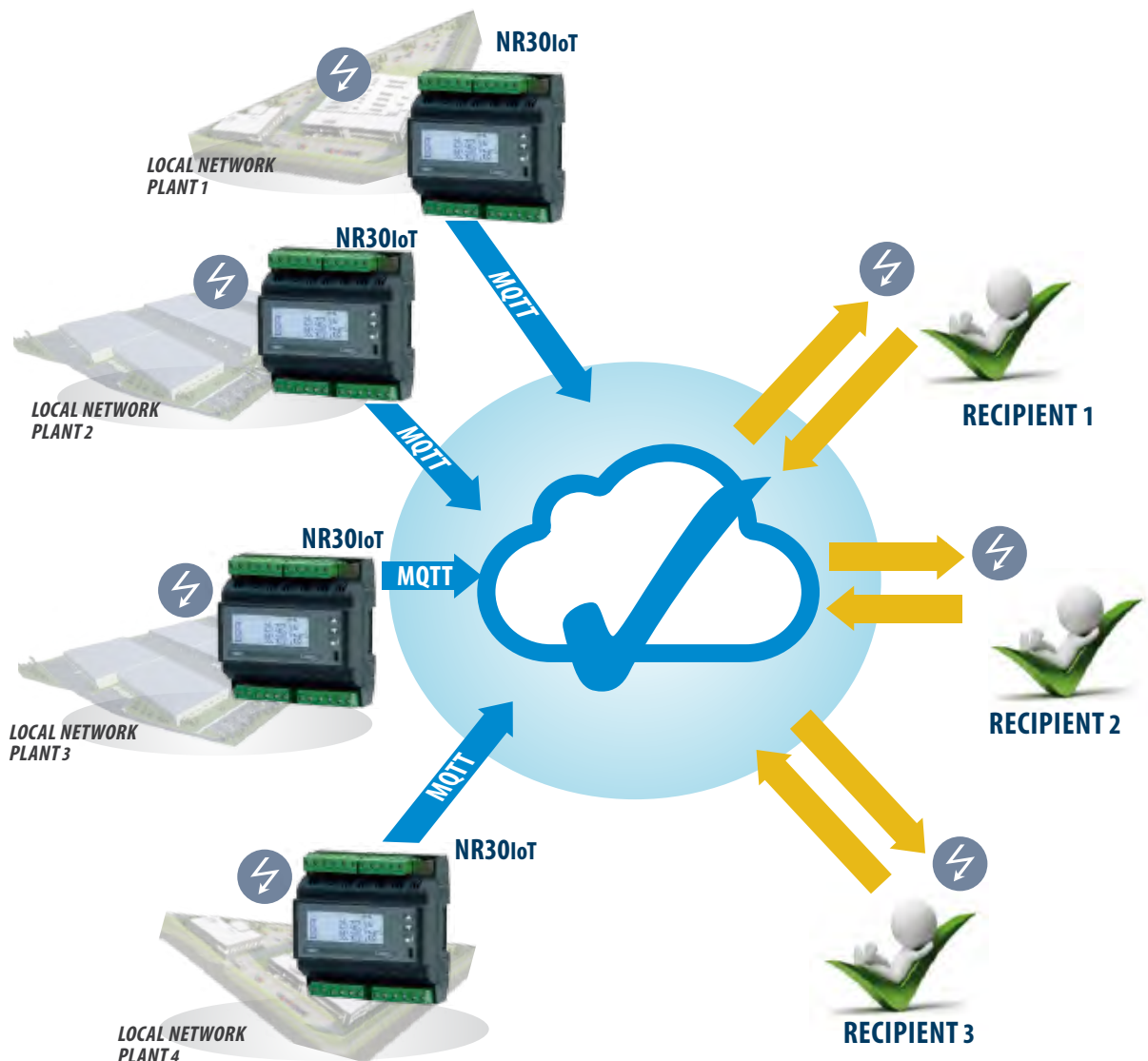
NR30IoT - RAIL MOUNTED POWER NETWORK METER FOR IoT APPLICATIONS

- **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 S4A0 (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).
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- **Supervisory relay mode for alarm outputs (NR30 and NR30IoT)**
 - **MQTT protocol (for NR30)**

EXAMPLE OF APPLICATION



EXAMPLE OF APPLICATION



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_U, THD_I
- harmonics for current and phase voltage up to 63rd!

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION
		* -available only with an additional S4A0 module	

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 _i , 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 _i , 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
	Modbus TCP, HTTP, FTP	baud rate: 4.8, 9.6, 19.2 38.4, 57.6, 115.2 kbit/s
Ethernet 10/100 Base-T	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

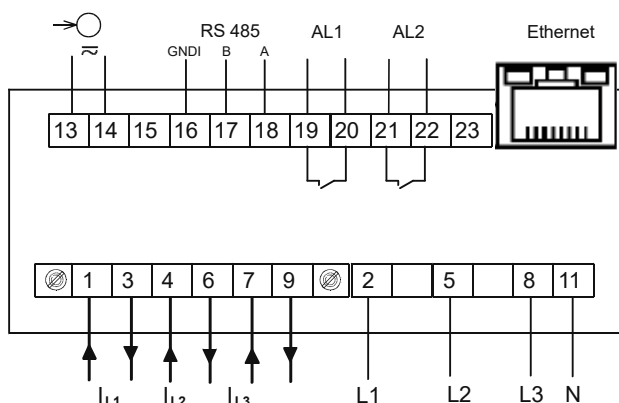
RATED OPERATING CONDITIONS

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

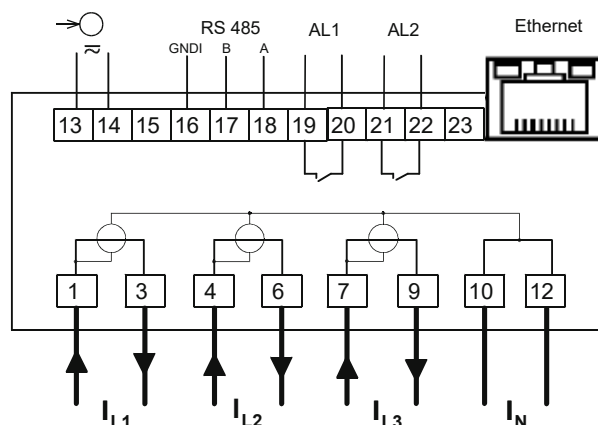
SAFETY AND COMPABILITY REQUIREMENTS

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	- 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				U		
U2					99.234				U		
U3					101.86				U		

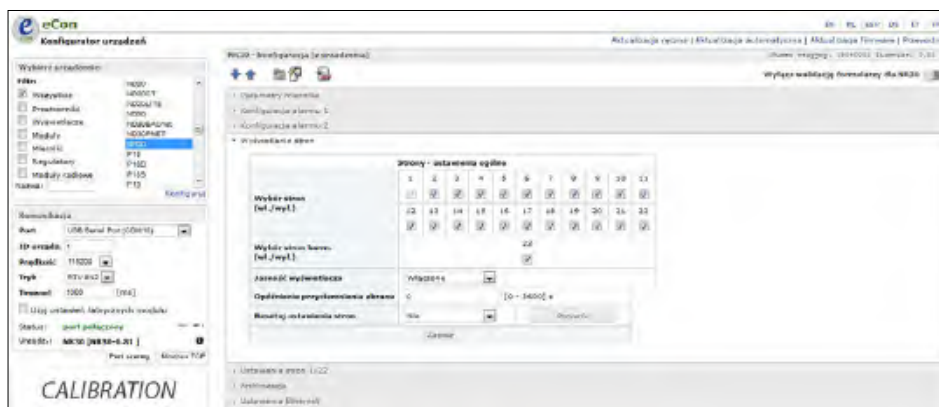
up to 22 programmable screens
(3 parameters per page)

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

Miennik parametrów sieci 3-fazowej typ NR30

Strona 1 U1 232.601 V I1 230.098 A Q1 232.601 V	Strona 2 U12 400.306 V U23 399.696 V U31 400.218 V	Strona 3 P1 34.969 W P2 40.000 W P3 30.100 W	Strona 4 PF1 0.991 PF2 0.991 PF3 0.991	Strona 5 U1 232.601 V I1 230.098 A Q1 232.601 V	Strona 6 U12 400.306 V U23 399.696 V U31 400.218 V	Strona 7 P1 34.969 W P2 40.000 W P3 30.100 W	Strona 8 PF1 0.991 PF2 0.991 PF3 0.991	Strona 9 U1 232.601 V I1 230.098 A Q1 232.601 V	Strona 10 U12 400.306 V U23 399.696 V U31 400.218 V	Strona 11 P1 34.969 W P2 40.000 W P3 30.100 W	Strona 12 PF1 0.991 PF2 0.991 PF3 0.991
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Page 13: U1 232.601 V, I1 230.098 A, Q1 232.601 V
Page 14: U12 400.306 V, U23 399.696 V, U31 400.218 V
Page 15: P1 34.969 W, P2 40.000 W, P3 30.100 W
Page 16: PF1 0.991, PF2 0.991, PF3 0.991
Page 17: U1 232.601 V, I1 230.098 A, Q1 232.601 V
Page 18: U12 400.306 V, U23 399.696 V, U31 400.218 V
Page 19: P1 34.969 W, P2 40.000 W, P3 30.100 W
Page 20: PF1 0.991, PF2 0.991, PF3 0.991
Page 21: THD U1 6.935 %, THD U2 6.926 %, THD U3 6.926 %
Page 22: THD I1 11.660 %, THD I2 11.660 %, 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

* Upon agreement, an option to order a calibration certificate for the product is available against payment. Then, in the execution code, in the place of the last character, enter the digit **2**, e.g. **NR30IoT 1222MSM0**. The customer will then receive a standard test certificate and a calibration certificate (against payment).

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