



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).

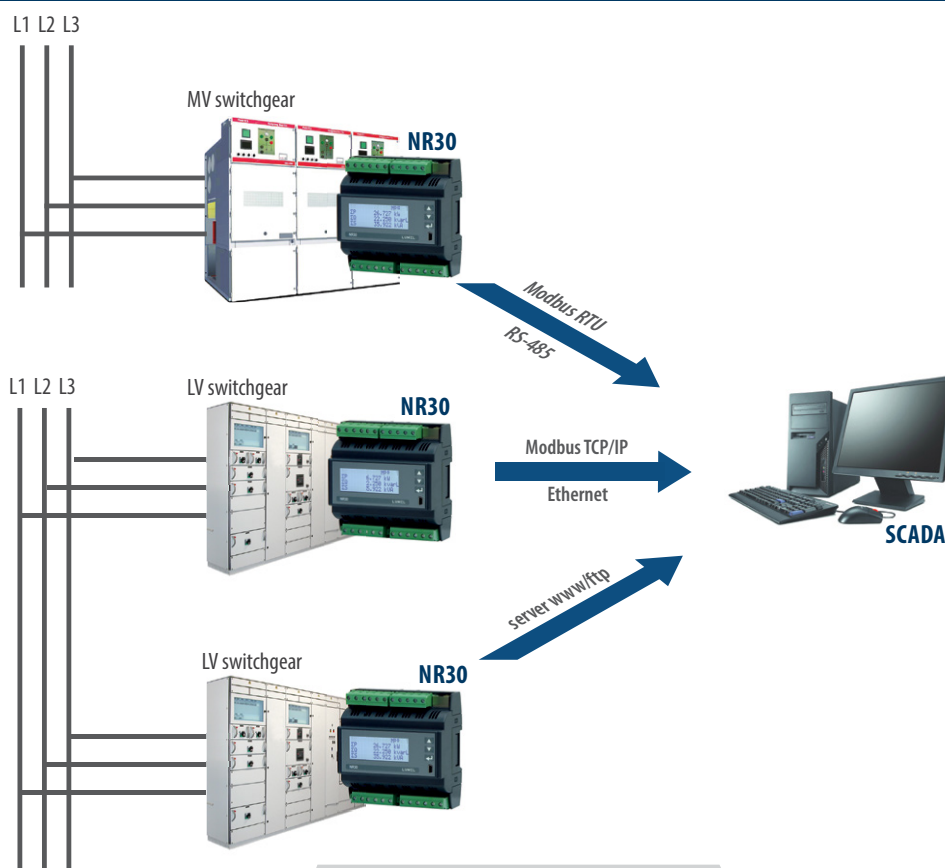


- **Supervisory relay mode for alarm outputs (NR30 and NR30IoT)**
- **MQTT protocol (for NR30)**

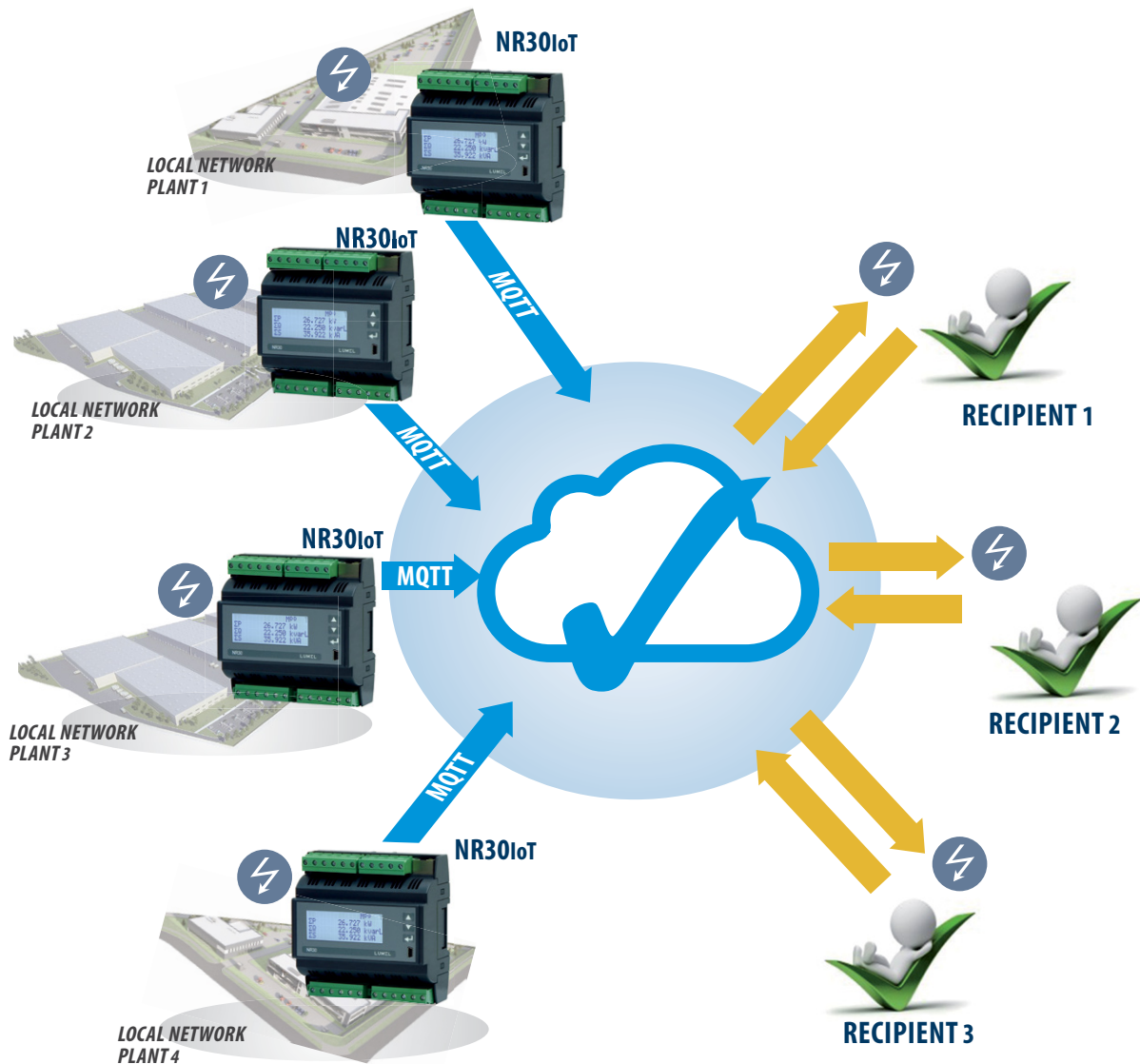
Remark:

- To make functions active, order appropriate licence key – details in ordering code.

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

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION
		<p>* -available only with an additional S4A0 module</p>	

TECHNICAL DATA

MEASURING RANGES

Measured value	Measuring range	L1	L2	L3	Σ	Class
Current I/5A 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

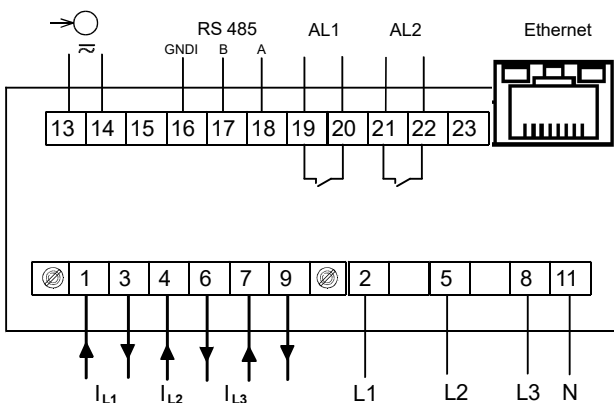
RATED OPERATING CONDITIONS

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

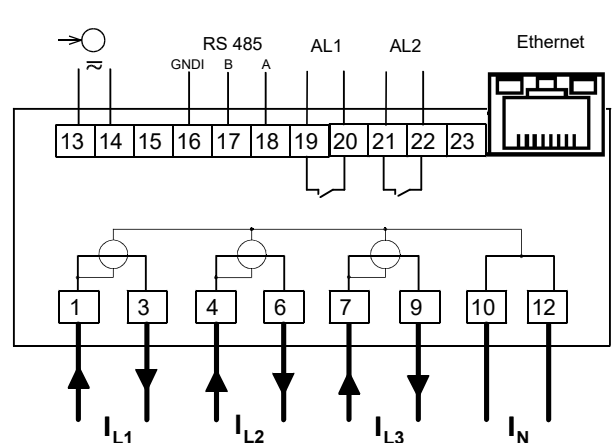
SAFETY AND COMPABILITY REQUIREMENTS

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	Strona 2	Strona 3	Strona 4
U1 232.804 V U2 230.099 V U3 232.099 V	U12 400.306 V U23 399.696 V U31 402.218 V	I1 34.999 A I2 40.002 A I3 30.003 A	P1 7256.724 W P2 6356.399 W P3 5496.909 W
Strona 5	Strona 6	Strona 7	Strona 8
Q1 3705.170 var Q2 6657.176 var Q3 4275.123 var	PF1 0.891 PF2 0.691 PF3 0.789	Ig1 0.511 Ig2 1.047 Ig3 0.778	ΣP 19.110 kW ΣQ 14.637 kvar ΣS 24.316 kVA
Strona 9	Strona 10	Page 11	Page 12
U avg 231.667 V I avg 35.001 A I(N) 5.636 A	PF avg 0.786 Ig avg 0.766 f 49.999 Hz	U1 232.804 V I1 34.999 A P1 7256.724 W	Q1 3705.170 var S1 8147.903 VA PF1 0.891
Page 13	Page 14	Page 15	Page 16
U2 230.099 V I2 40.002 A P2 6356.399 W	Q2 6657.176 var S2 9204.444 VA PF2 0.691	U3 232.099 V I3 30.003 A P3 5496.909 W	Q3 4275.123 var S3 6963.669 VA PF3 0.789
Page 17	Page 18	Page 19	Page 20
P DMD 19.111 kW S DMD 24.318 kVA I DMD 35.001 A	ΣP 19.110 kW EnP+ 0.000 Wh EnP- 0.000 Wh	ΣQ 14.637 kvar EnQ L 319.314 kvarh EnQ C 43.232 kvarh	ΣS 24.316 kVA En S 366.842 kVAh f 49.999 Hz
Page 21	Page 22		
THD U1 6.935 % THD U2 6.926 % THD U3 6.926 %	THD I1 11.660 % THD I2 11.693 % THD I3 11.708 %		

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



ORDERING CODE

Meter NR30	X	X	X	X	XX	X	X
Input current In:							
1/5 A (X/1 ; 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 outputs (2 groups 1 x 0..10 V + 1 x 0/4 .. 20 mA)					03		
supervisory relay					SR		
custom-made**					XX		
Language:							
Polish/ English						M	
other**							X
Acceptance tests:							
without additional quality requirements							0
with an extra quality inspection certificate							1
with calibration certificate							2
acc.to customer's request							X

ORDERING WAY OF ADDITIONAL FUNCTIONS (SUPERVISORY RELAY, MQTT PROTOCOL)

Ordering code	Description of the license key
LKEY WXNR30MQ	activation of the MQTT protocol in NR30
LKEY WXNR30SR	activation of the supervisory relay function in NR30
LKEY WXNR30MS	activation of the MQTT protocol and the supervisory relay function in NR30

Important: When ordering, please provide the meter's execution code and serial number NR30. It is placed on the meter's nominal plate, in the configuration menu in the Information mode or on the bar in the eCon program.

Order example:

The code: **NR30 112100M0** means:

NR30 - NR30 meter

1 – input current 1/5 A (X/1; 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,

M – polish/english language version

0 – without additional quality requirements.

* 4-channel S4AO analog output module will be made in english version with the same power supply as the ordered NR30 meter, unless the customer specifies otherwise. The S4AO module communicates with the NR30 meter via the RS485 Modbus Master interface, therefore cooperation with S4AO excludes the use the NR30 meter RS485 interface for communication with another Master.

**after agreement with the manufacturer

Meter NR30IoT	X	X	X	X	XX	X	X
Input current In:							
1/5 A (X/1 ; 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 with MQTT protocol					MQ		
MQTT protocol + supervisory relay					MS		
with S4AO*: 4 current outputs 0/4 .. 20 mA					01		
with S4AO*: 4 voltage outputs 0 .. 10 V					02		
with S4AO*: 4 outputs (2 groups 1 x 0..10 V + 1 x 0/4 .. 20 mA)					03		
custom-made**					XX		
Language:							
Polish/ English						M	
other**							X
Acceptance tests:							
without additional quality requirements							0
with an extra quality inspection certificate							1
with calibration certificate							2
acc.to customer's request							X

ORDERING WAY OF ADDITIONAL FUNCTIONS (SUPERVISORY RELAY)

Ordering code	Description of the license key
LKEY WXNR30IOTMS	activation of the supervisory relay function in NR30IoT

Important: When ordering, please provide the meter's execution code and serial number NR30IoT. It is placed on the meter's nominal plate, in the configuration menu in the Information mode or on the bar in the eCon program.

Order example:

The code: **NR30IoT 1121MQM0** means:

NR30IoT - NR30IoT meter

1 – input current 1/5 A (X/1; 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.

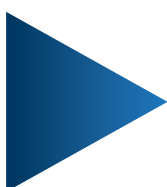
MQ – standard version with MQTT protocol,

M – polish/english language version

0 – without additional quality requirements.

* 4-channel S4AO analog output module will be made in english version with the same power supply as the ordered NR30IoT meter, unless the customer specifies otherwise. The S4AO module communicates with the NR30IoT meter via the RS485 Modbus Master interface, therefore cooperation with S4AO excludes the use the NR30IoT meter RS485 interface for communication with another Master.

**after agreement with the manufacturer



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