



**sifam tinsley**  
PRECISION INSTRUMENTATION

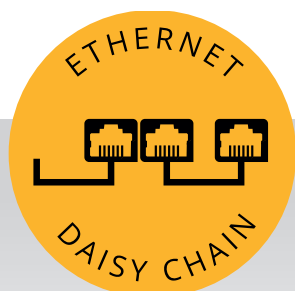
MULTIFUNCTION METER  
[www.sifamtinsley.co.uk](http://www.sifamtinsley.co.uk)



## DATASHEET

Issue 1

**NEW  
PRODUCT**



Multifunction Meters

Transducers & Isolators

Temperature Controllers

Converters & Recorders

Digital Panel Meters

Current Transformers

kWh Energy Meters

Analogue Panel Meters

Shunts

Digital Bargraphs

Digital Multimeters

Protection Relays

Synchroscope Series

Rotary Switches

Power Supplies

Test & Measurement

# ND31U POWER NETWORK METER

WITH ETHERNET DAISY CHAIN  
AND MQTT (IIOT), BACNET/IP  
OR MODBUS TCP/IP PROTOCOLS

**SUBJECT TO CHANGE WITHOUT NOTICE**

This datasheet superseded all previous versions – please keep for future reference

# FEATURES

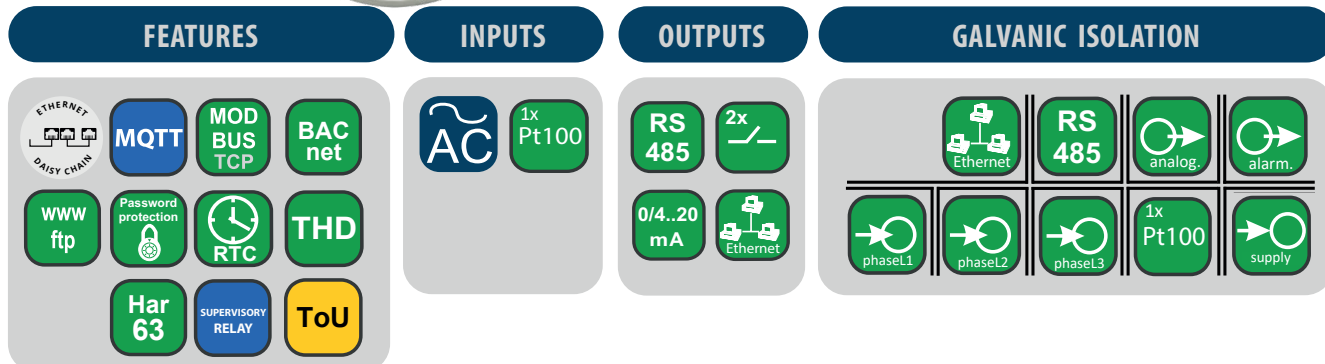
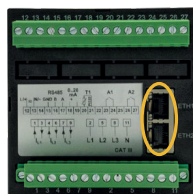
- Measurement of 54 power network parameters, including current and voltage harmonics up to 63rd in 1PW2, 1P3W split phase, 3P3W or 3P4W balanced and unbalanced systems:
  - 120/240 V Split-phase 180°,
  - 3 x 120/208 V,
  - 3 x 400/690 V three-phase Y/Δ 120°
- **Ethernet Daisy Chain Topology.**
- Programmable choice of communication protocols: MQTT, BACnet / IP lub MODBUS TCP/IP.
- Modern and user-friendly BACnet/IP interface.
- High accuracy class (0.2S for active energy).
- Graphical color display: LCD 3.5" typu TFT, 640 x 480 pixels, fully configurable by a user.
- **Time-of-Use function (ToU)** for monitoring energy consumption in individual tariffs according to a user-defined schedule
- 14 predefined screens designed for intuitive operation, including harmonics display, analog-style meter visualization, and a demand power screen useful for forecasting power consumption.
- Memory of minimum and maximum values.
- 2 configurable alarm outputs.
- Supervisory relay mode for alarm outputs.
- Analog output 0/4...20 mA for retransmission of the measured value and Pt 100 input (eg. for measurement of transformer temperature).
- 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,
  - protocol: BACnet/IP,
  - services: www server, ftp server, DHCP client, NTP server,
  - Daisy Chain communication 2 x RJ45; 10/100 Mbit/s; 10Base-T / 100Base-TX.
- Programming of parameters using free eCon software.
- Overall dimensions: 96 x 96 x 77 mm.

## ETHERNET DAISY CHAIN - ONE CABLE, MANY CONNECTIONS

The **ND31U** is equipped with **2 x RJ45 Ethernet ports** that support daisy chain topology — enabling serial connection of Ethernet devices without the need for network switches between them.

What does this mean in practice?

- Saves panel space — no need to install industrial switches,
- Reduces cabling and hardware costs — only one connection between devices,
- Faster installation and fewer errors — simplified wiring,
- Easy system expansion — new devices can be added without modifying the existing infrastructure,
- Improved cabinet organization — fewer cables result in a cleaner setup.



## 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!
- temperature (1 x Pt100 input)

## EXAMPLE OF APPLICATION

### MEASUREMENT OF SMT LINES PARAMETERS.

#### PROMOTIC SCADA WITH POWER GUARD FUNCTION

#### GLOBAL/ DISTRIBUTED MONITORING

COLLECTING DATA FROM THE PRODUCTION LINES TO THE CLOUD, ENABLING PARAMETER MONITORING FROM ANYWHERE IN THE WORLD AND REMOTE DECISION-MAKING.

#### GLOBAL MONITORING

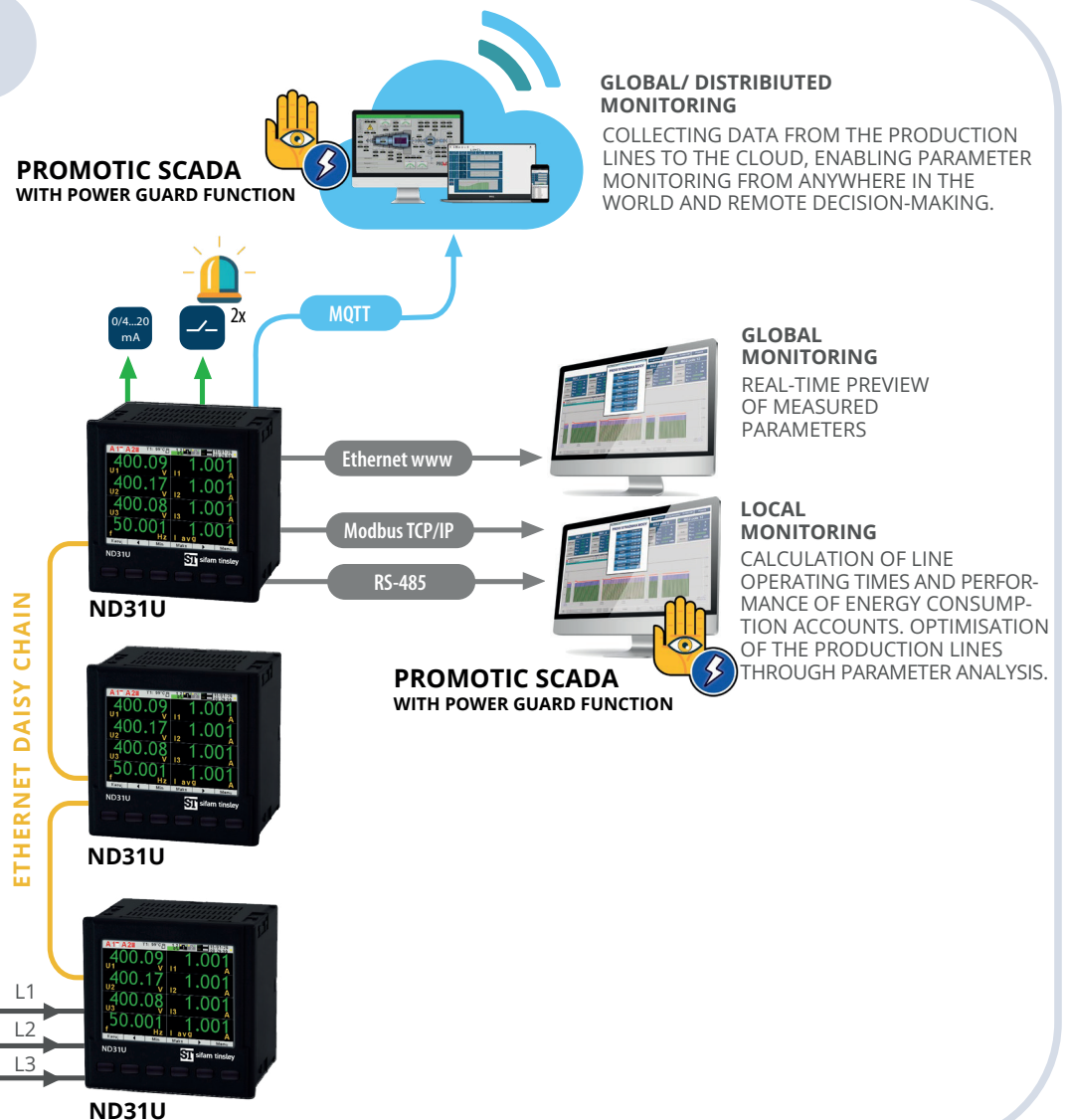
REAL-TIME PREVIEW OF MEASURED PARAMETERS

#### LOCAL MONITORING

CALCULATION OF LINE OPERATING TIMES AND PERFORMANCE OF ENERGY CONSUMPTION ACCOUNTS. OPTIMISATION OF THE PRODUCTION LINES THROUGH PARAMETER ANALYSIS.

#### PROMOTIC SCADA WITH POWER GUARD FUNCTION

#### SMT LINES





## TECHNICAL DATA

### MEASURING RANGE

| Measured value                                                                   | Measuring range                                                                     | L1 | L2 | L3 | Σ | Class                     |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----|----|----|---|---------------------------|
| Current I/S A 1 A~<br>5 A~                                                       | 0.002 ..0.100..1.200 A<br>0.010 ..0.500.. 6.000 A<br>...100.00 kA (tr_I≠1)          | •  | •  | •  |   | 0.2 (EN 61557-12)         |
| Voltage L-N 120 V~<br>400 V~                                                     | 12.000..24.000 ..144.000 V<br>40.000..80.000 .. 480.000 V<br>...1920.0 kV           | •  | •  | •  |   | 0.2 (EN 61557-12)         |
| Voltage L-L 208 V~<br>690 V~                                                     | 20.800 ..41.600..249.000 V<br>69.000..138.000 .. 830.000 V<br>...1999.0 kV (tr_U≠1) | •  | •  | •  |   | 0.5 (EN 61557-12)         |
| Active power P                                                                   | -19999 MW .. 0,000 W ..<br>..19999 MW (tr_U≠1, tr_I≠1)                              | •  | •  | •  | • | 0.5 (EN 61557-12)         |
| Reactive power Q                                                                 | -19999 MVar .. 0,000 Var ..<br>..19999 MVar (tr_U≠1, tr_I≠1)                        | •  | •  | •  | • | 1 (EN 61557-12)           |
| Apparent power S                                                                 | 0.000 .. 1999,9 VA ..<br>..19999 MVA (tr_U≠1, tr_I≠1)                               | •  | •  | •  | • | 0.5 (EN 61557-12)         |
| Active energy EnP<br>(imported or exported)                                      | 0.000 .. 99 999 999.999 kWh                                                         |    |    |    | • | <b>0.25 (EN 62053-22)</b> |
| Reactive energy EnQ<br>(inductive or capacitive)                                 | 0.000 .. 99 999 999.999 kVarh                                                       |    |    |    | • | 1 (EN 61557-12)           |
| Apparent energy EnS                                                              | 0.000 .. 99 999 999.999 kVAh                                                        |    |    |    | • | 0.5 (EN 61557-12)         |
| Active power factor PF                                                           | -1.00 ..0.. 1.00                                                                    | •  | •  | •  | • | 1 (EN 61557-12)           |
| Coefficient tg<br>(ratio of reactive power to active power)                      | -999.99...-1.20 .. 0 .. 1.20.. 999.99                                               | •  | •  | •  | • | 1                         |
| Frequency f                                                                      | 45.00...65.000...100.00 Hz                                                          |    |    |    | • | 0.1 (EN 61557-12)         |
| Total harmonic distortion<br>of voltage THDU and current THDI                    | 0.0 ..100.0 %                                                                       | •  | •  | •  | • | 5 (EN 61557-12)           |
| Amplitudes of the voltage $U_{h2}...U_{h63}$<br>and current $I_{h2} ... I_{h63}$ | 0.0 ..100.0 %                                                                       | •  | •  | •  |   | II (IEC61000-4-7)         |

tr\_I - Current transformer ratio = Transformer primary current / Current transformer secondary current

tr\_U - Voltage transformer ratio = Transformer primary voltage / Voltage transformer secondary voltage

### ADDITIONAL INPUTS

| Input type       | Properties                                                        |
|------------------|-------------------------------------------------------------------|
| Input Pt100 (T1) | 1 x Pt100, 2-wire, measuring range -50...400°C, basic error 0.5 % |

### DIGITAL INTERFACE

| Interface type                                            | Transmission protocol      | Remarks                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ethernet Daisy Chain (2 x RJ45)<br>Ethernet 10/100 Base-T | Modbus TCP, HTTP, FTP      | WWW server, FTP server, DHCP client, NTP server                                                                                                                                                                                                                                                                                                                                                      |
|                                                           | MQTT                       |                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                           | BACnet/IP                  | BACnet Standardized Device Profile (Annex L):<br>BACnet Application Specific Controller (B-ASC);<br><br>BACnet Interoperability Building Blocks (BIBB) Support (Annex K in BACnet Addendum 135d):<br>DS-RP-B, DS-WP-B, DS-RPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B;<br><br>Binding methods support:<br>Recive Who-Is, send I-Am (BIBB, DM-DDB-B);<br>Recive Who-Has, send I-Have (BIBB DM-DOB-B) |
| RS-485                                                    | Modbus RTU 8N2,8E1,8O1,8N1 | Address 1..247<br>baud rate: 4.8, 9.6, 19.2 38.4, 57.6, 115.2 kbit/s                                                                                                                                                                                                                                                                                                                                 |

### EXTERNAL FEATURES

|                    |                                                      |                              |
|--------------------|------------------------------------------------------|------------------------------|
| Readout field      | graphic color display LCD TFT 3,5", 640 x 480 pixels |                              |
| Overall dimensions | 96 x 96 x 77 mm                                      | mounting hole 92.5 x 92.5 mm |
| Weight             | 0.3 kg                                               |                              |
| Protection grade   | from frontal side: IP65                              | from terminal side: IP20     |

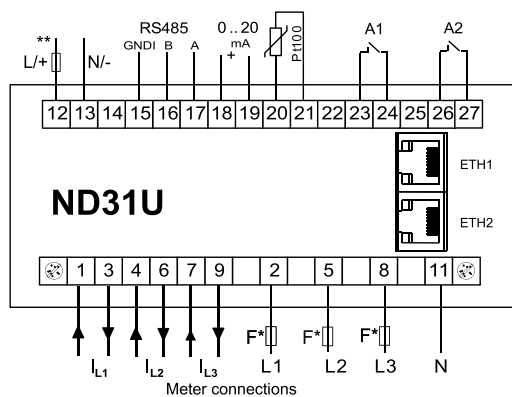
## RATED OPERATING CONDITIONS

|                                                |                                                                          |                                                               |
|------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------|
| Supply voltage                                 | 85...300 V a.c. (50/60 Hz), 90...300 V d.c.                              | power consumption $\leq 6$ VA                                 |
| Power consumption                              | in voltage circuit $\leq 0.5$ VA                                         | in current circuit $\leq 0.1$ VA                              |
| Input signal                                   | 0...0.1...1.2 In; 0.1...0.2...1.2 Un for current, voltage, PF, tg $\phi$ | frequency 45...50...60...100 Hz, sinusoidal (THD $\leq 8\%$ ) |
| Power factor                                   | -1...0...1                                                               |                                                               |
| Preheating time                                | 5 min.                                                                   |                                                               |
| Ambient temperature                            | -10...23...55°C, class K55 acc. to EN61557-12                            |                                                               |
| Humidity                                       | 0...40...60...95%                                                        | without condensation                                          |
| Operating position                             | any                                                                      |                                                               |
| External magnetic field                        | $\leq 40 \dots 400$ A/m d.c.                                             | $\leq 3$ A/m a.c. 50/60 Hz                                    |
| Short-term overload                            | voltage input: 2 Un (5 sec.)                                             | current input 50 A (1 sec.)                                   |
| Admissible crest factor                        | current: 2                                                               | voltage: 2                                                    |
| Additional error (in % of the intrinsic error) |                                                                          | from ambient temperature change: $< 50\% / 10^\circ\text{C}$  |

## SAFETY AND COMPATIBILITY REQUIREMENTS

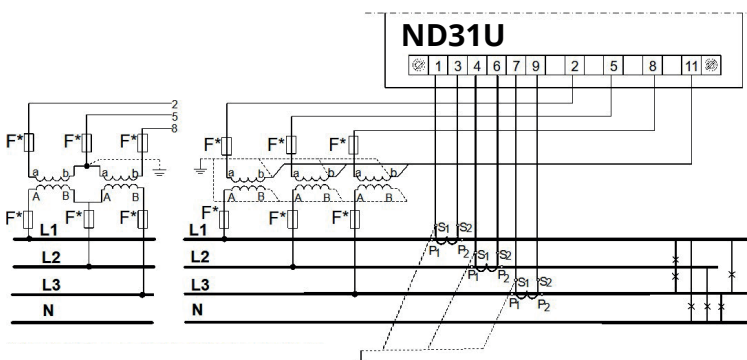
|                                |                                                                                                                                         |                                      |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Electromagnetic compatibility  | noise immunity                                                                                                                          | acc. to EN 61000-6-2, EN IEC 61326-1 |
|                                | radio-frequency common mode:<br>• level 2: 0.15...1 MHz<br>• level 3: 1 MHz...80 MHz                                                    |                                      |
| Isolation between circuits     | noise emissions                                                                                                                         | acc. to EN 61000-6-4, EN IEC 61326-1 |
|                                | basic                                                                                                                                   | acc. to EN 61010-1                   |
| Pollution level                | 2                                                                                                                                       | acc. to EN 61010-1                   |
| Overvoltage category OVC       | III                                                                                                                                     | for voltage to earth up to 300V      |
|                                | II                                                                                                                                      | for voltage to earth up to 600V      |
| Maximal phase-to-earth voltage | • for supply circuit and relay outputs 300 V<br>• for measuring input 500 V<br>• for circuits of RS-485, Ethernet, analog outputs: 50 V | acc. to EN 61010-1                   |
| Altitude a.s.l.                | $< 2000$ m                                                                                                                              |                                      |

## CONNECTION DIAGRAMS



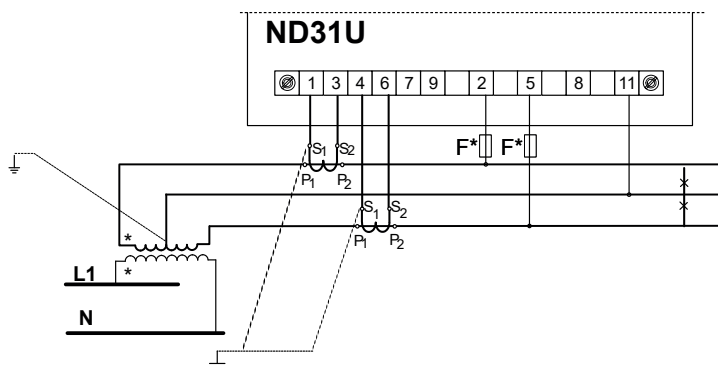
\* Fuses must be provided by the customer

\*\* Connection of supply voltage



\* Fuses must be provided by the customer

### Description of meter connections strips



### Indirect measurement in 4-wire network - connection of input signals

\* Fuses must be provided by the customer.

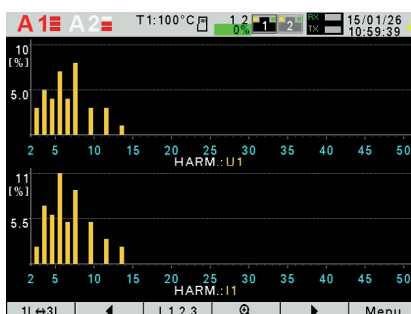
### Measurement in 1-phase 3-wire network

## DISPLAING OF MEASUREMENT PARAMETERS

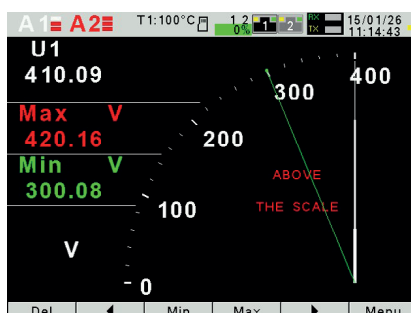
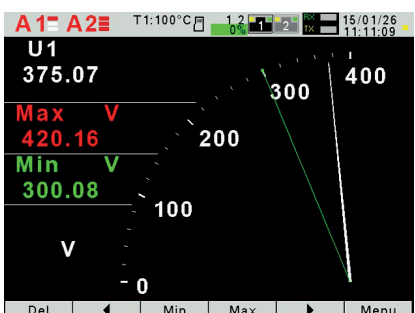


up to 10 programmable screens  
(8 parameters per page);  
ability to change color for all screens

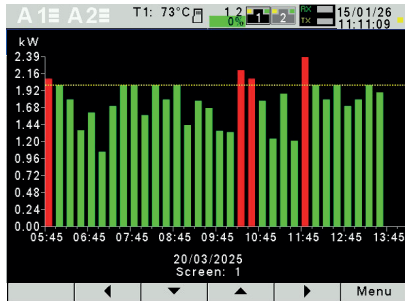
Available colors for digital indications:



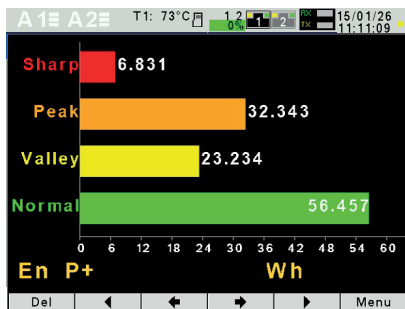
two screens dedicated to harmonics;  
indication of individual harmonic  
for voltages and currents (up to 51st);  
bargraph presentation for all harmonics  
with zoom function



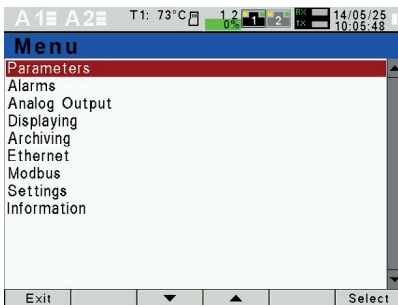
presentation in the form of analog  
meter view with min/max preview  
for display value and zoom function



Contracted power representation (Max Demand) in W, kW or MW, which can be used for forecasting power consumption.

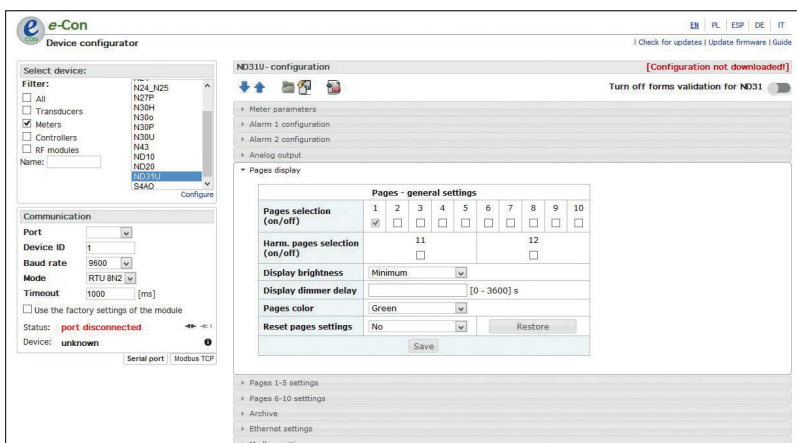


Current energy consumption in four tariffs Sharp/Peak/Valley/Normal in 12 user-defined seasons and 14 schedules



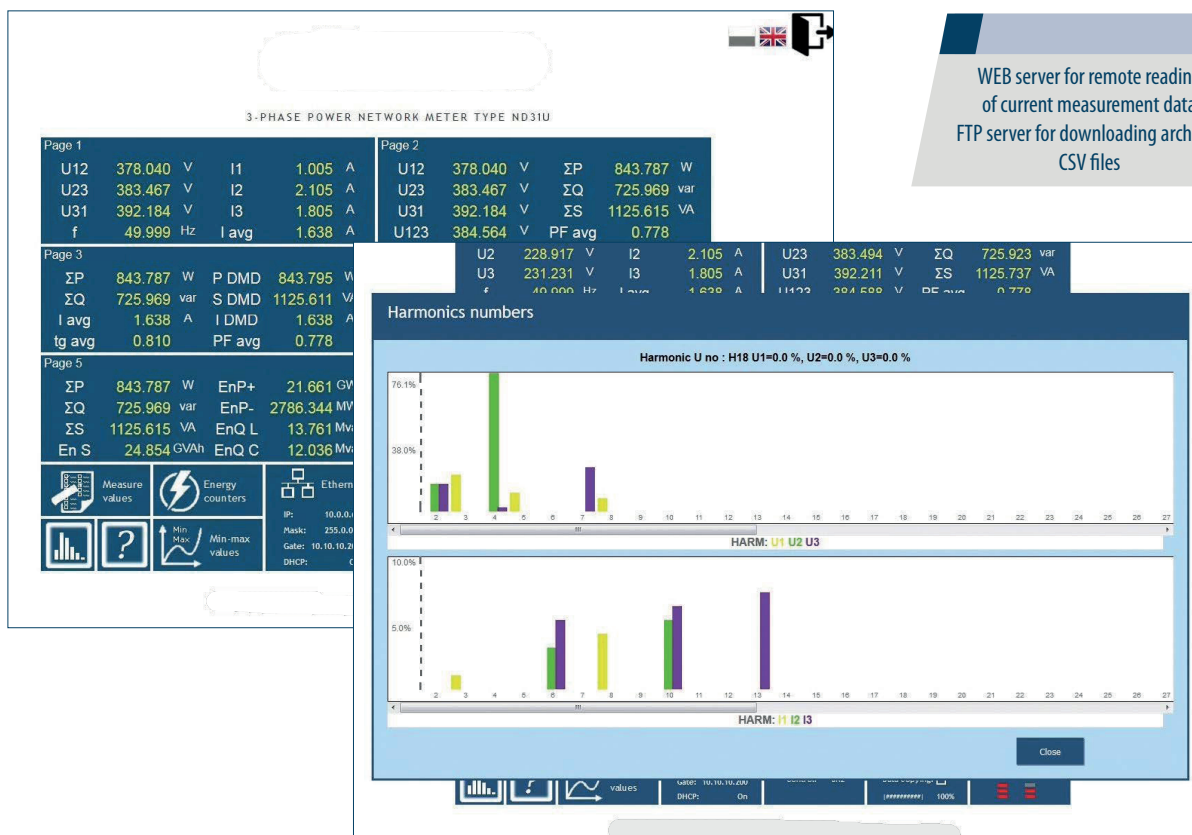
easy to use and intuitive menu; information bar with status of: phase sequence, alarm outputs, temperature measurements, archiving and memory, Ethernet and RS-485 interfaces, time and date

## METER CONFIGURATION WITH FREE eCON SOFTWARE



ability to configure and update ND31U with free eCon software (via RS-485 or Ethernet interface)

## REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW SERVER, FTP



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

## ORDERING CODE

|                                                                                                                                          |   |   |      |
|------------------------------------------------------------------------------------------------------------------------------------------|---|---|------|
| <b>Meter ND31U</b><br>2x relays, 1x analog output 0/4...20mA, 1x Pt100 input,<br>RS-485, dual-port Ethernet, internal file system memory | X | X | XXXX |
| <b>Language</b><br>polish/english                                                                                                        | M |   |      |
| other*                                                                                                                                   | X |   |      |
| <b>Acceptance tests</b><br>without additional quality requirements                                                                       |   | 0 |      |
| with an extra quality inspection certificate                                                                                             |   | 1 |      |
| with an extra calibration certificate                                                                                                    |   | 2 |      |
| acc.to customer's request*                                                                                                               |   | X |      |
| <b>Version</b><br>standard                                                                                                               |   |   |      |
| custom made*                                                                                                                             |   |   | XXXX |

ORDER EXAMPLE, code **ND31U M 0** means:

**ND31U** – ND31U meter,  
**M** – Polish-English language version,  
**0** – no additional requirements,  
– standard version.

\* only by agreement with the manufacturer.

## Contact



### **Sifam Tinsley Instrumentation Ltd**

1 Warner Drive  
Springwood Industrial Estate  
Braintree  
Essex  
CM7 2YW

Tel: 01376 335271  
Email: [sales@sifamtinsley.com](mailto:sales@sifamtinsley.com)

[www.sifamtinsley.co.uk](http://www.sifamtinsley.co.uk)