



sifam tinsley
PRECISION INSTRUMENTATION



A1 A2		AR	
P1	378.94 W	PF1	0.549
P2	607.26 W	PF2	0.880
P3	503.85 W	PF3	0.730
ΣP	1.490 kW	PF avg	0.720
Del	◀	Min	Max
		Menu ▶	

ND31

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ND31

POWER NETWORK METER

WITH DATA RECORDING AND MQTT (IIoT),
BACNET/IP OR MODBUS TCP/IP PROTOCOLS

FEATURES

- **Measurement** of 54 power network parameters, including **current and voltage harmonics up to 63rd** in 1-phase 2-wire or 3-phase 3 or 4-wire balanced and unbalanced systems.
- Programmable choice of communication protocols: **MQTT, BACnet / IP lub MODBUS TCP/IP.**
- **High accuracy class (0.2S for active energy).**
- **Graphical color display:** LCD TFT 3,5", 320 x 240 pixels, **fully configurable by a user** (10 screens, 8 parameters in each).
- **Additional 2 screens for harmonics presentation and 1 dedicated page for visualization in the form of an analog meter.**
- 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 two Pt 100 inputs (eg. for measurement of transformer temperature).
- Archiving of up to 32 measured parameters in the internal memory 8 GB.
- Digital output RS-485 - MODBUS protocol.
- **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.
- Programming of parameters using **free eCon software.**
- Overall dimensions: 96 x 96 x 77 mm.

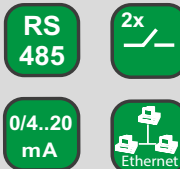
FEATURES



INPUTS



OUTPUTS



GALVANIC ISOLATION



MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS

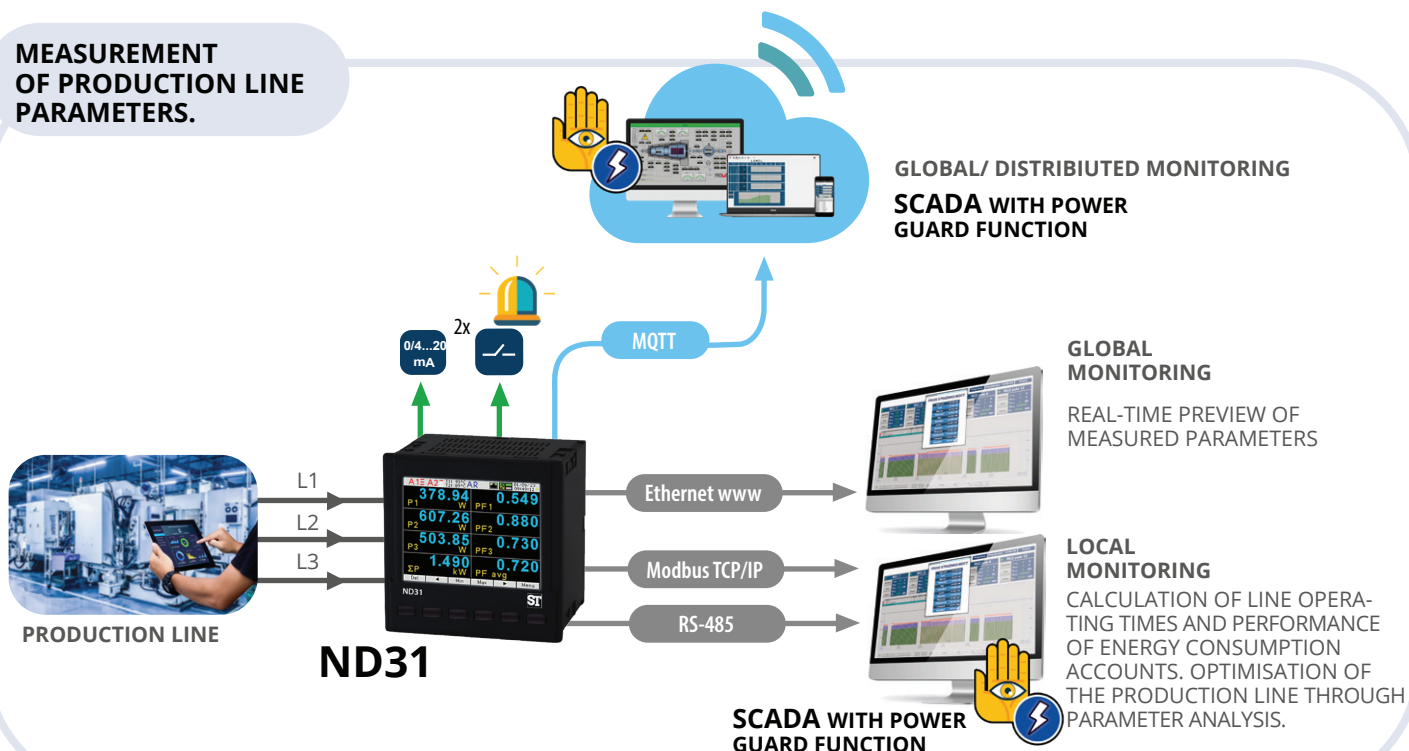
- phase voltages: U_1, U_2, U_3
- phase-to-phase voltages: U_{12}, U_{23}, U_{31}
- phase currents I_1, I_2, I_3
- active phase powers: P_1, P_2, P_3
- reactive phase powers: Q_1, Q_2, Q_3
- apparent phase powers: S_1, S_2, S_3
- active power factors: PF_1, PF_2, PF_3
- reactive/active power factors: $tg\varphi_1, tg\varphi_2, tg\varphi_3$
- active, reactive and apparent 3-phase power: P, Q, S
- mean 3-phase power factors: $PF, tg\varphi$
- 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 (2 x Pt100 input)

ND31 POWER NETWORK METER

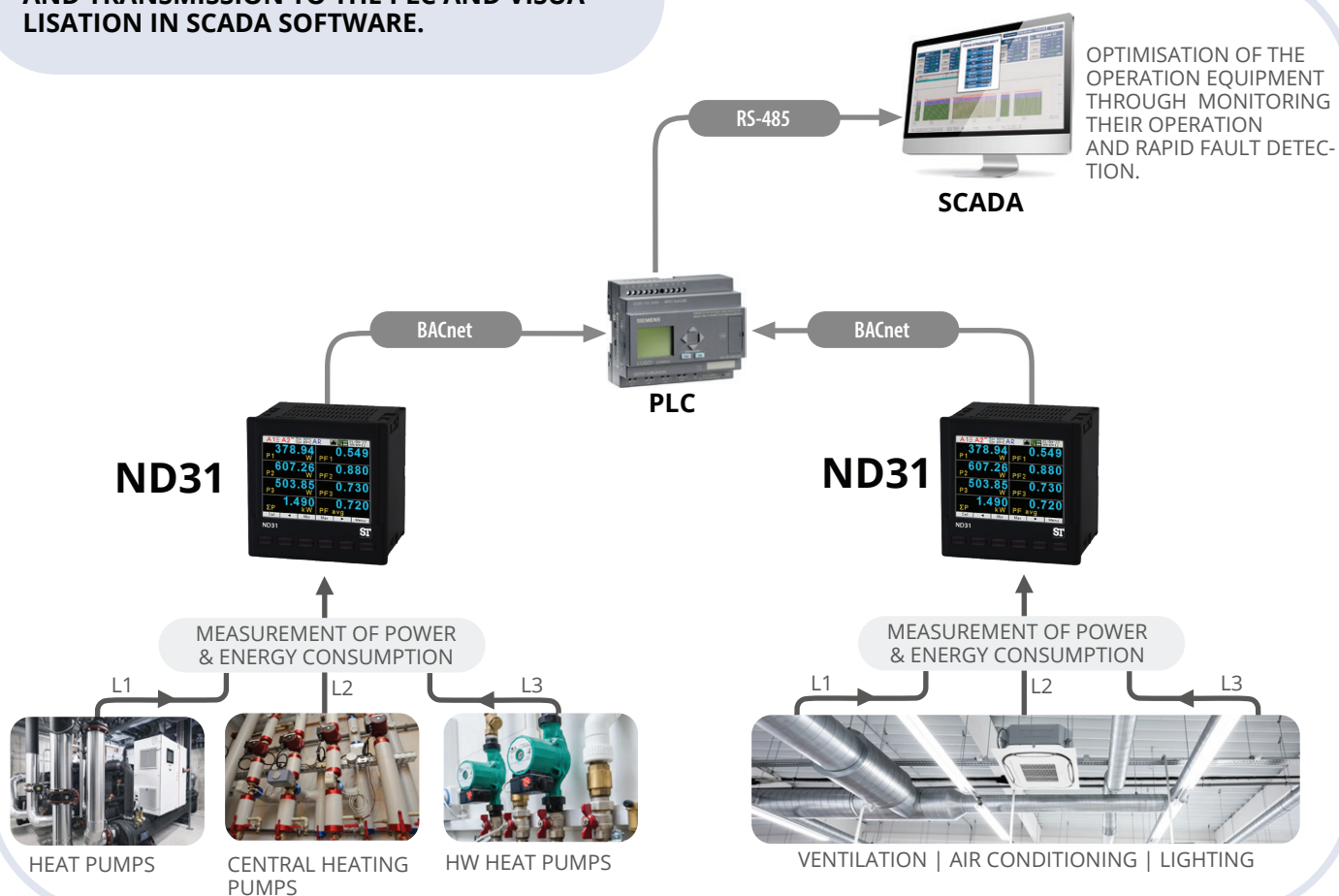
WITH DATA RECORDING AND MQTT (IIoT), BACNET/IP OR MODBUS TCP/IP PROTOCOLS

EXAMPLE OF APPLICATION

MEASUREMENT OF PRODUCTION LINE PARAMETERS.



MEASUREMENT OF EQUIPMENT PARAMETERS AND TRANSMISSION TO THE PLC AND VISUALISATION IN SCADA SOFTWARE.



TECHNICAL DATA

MEASURING RANGE

Measured value	Measuring range	L1	L2	L3	Σ	Class
Current I/5 A 1 A~ 5 A~	0.002 ..0.100..1.200 A 0.010 ..0.500.. 6.000 A ...100.00 kA (tr_I≠1)	•	•	•		0.2 (EN 61557-12)
Voltage L-N 57.7 V~ 110 V~ 230 V~ 400 V~	5.700..11.500 ..70.000 V 11.000..22.000 ..132.000 V 23.000..46.000 .. 276.000 V 40.000..80.000 .. 480.000 V ...1920.0 kV	•	•	•		0.2 (EN 61557-12)
Voltage L-L 100 V~ 190 V~ 400 V~ 690 V~	10.000 ..20.000..120.000 V 19.000 ..38.000..228.000 V 40.000..80.000 .. 480.000 V 69.000..138.000 .. 830.000 V ...1999.0 kV (tr_U≠1)	•	•	•		0.5 (EN 61557-12)
Active power P	-19999 MW .. 0,000 W19999 MW (tr_U≠1, tr_I≠1)	•	•	•	•	0.5 (EN 61557-12)
Reactive power Q	-19999 MVar .. 0,000 Var19999 MVar (tr_U≠1, tr_I≠1)	•	•	•	•	1 (EN 61557-12)
Apparent power S	0.000 .. 1999,9 VA19999 MVA (tr_U≠1, tr_I≠1)	•	•	•	•	0.5 (EN 61557-12)
Active energy EnP (imported or exported)	0.000 .. 99 999 999.999 kWh				•	0.2S (EN 62053-22)
Reactive energy EnQ (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 (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 of voltage THDU and current THDI	0.0 ..100.0 %	•	•	•	•	5 (EN 61557-12)
Amplitudes of the voltage $U_{h2} \dots U_{h63}$ and current $I_{h2} \dots I_{h63}$	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, T2)	2 x Pt100, 2-wire, -50...400°C, basic error 0.5 %

DIGITAL INTERFACE

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

ND31 POWER NETWORK METER

WITH DATA RECORDING AND MQTT (IIoT), BACNET/IP OR MODBUS TCP/IP PROTOCOLS

EXTERNAL FEATURES

Readout field	graphic color display LCD TFT 3,5", 320 x 240 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

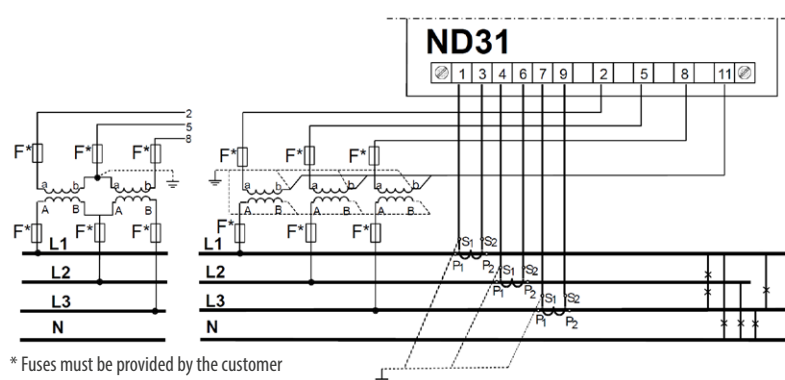
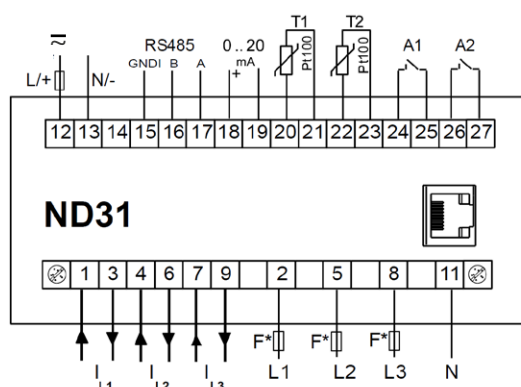
RATED OPERATING CONDITIONS

Supply voltage	→ 85...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
Input signal	0...0.1...1.2 In; 0.1...0.2...1.2 Un for current, voltage, PF, tgφ	frequency 45...50...60...100 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...60...95%	without 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 (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 COMPATIBILITY REQUIREMENTS

Electromagnetic compatibility	noise immunity	acc. to EN 61000-6-2, EN IEC 61326-1
	radio-frequency common mode: • level 2: 0.15...1 MHz • 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 • for measuring input 500 V • for circuits of RS-485, Ethernet, analog outputs: 50 V	acc. to EN 61010-1
Altitude a.s.l.	< 2000 m	

CONNECTION DIAGRAMS

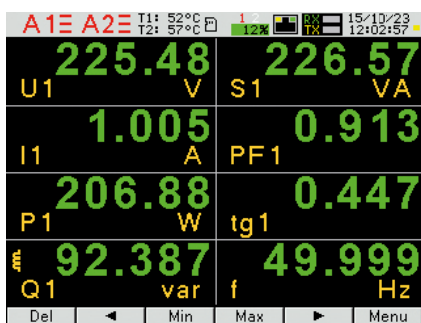


* Fuses must be provided by the customer

Description of meter connections strips

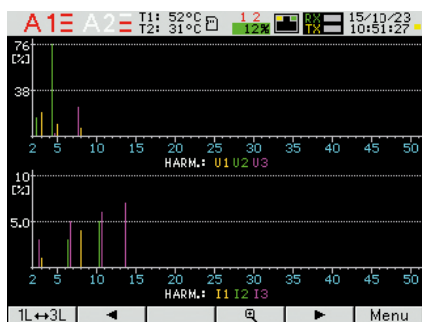
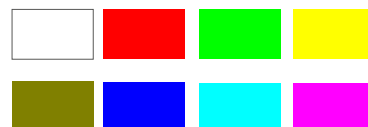
Indirect measurement in 4-wire network - connection of input signals

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

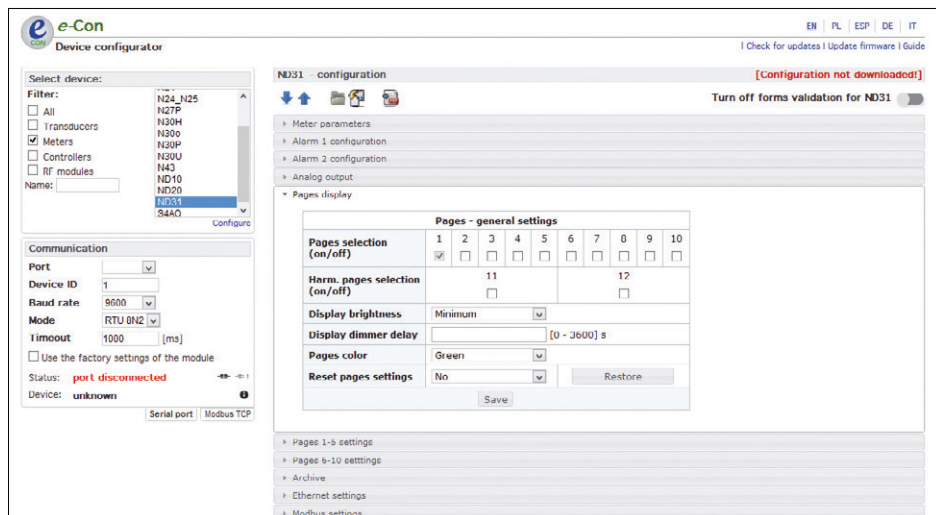


easy to use and intuitive menu;
information bar with status of: phase
sequence, alarm outputs, temperature
measurements, archiving and memory,
Ethernet and RS-485 interfaces,
time and date

ND31 POWER NETWORK METER

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METER CONFIGURATION WITH FREE eCON SOFTWARE



ability to configure and update ND31 with free eCon software (via RS-485 or Ethernet interface)

REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW SERVER, FTP

3-PHASE POWER NETWORK METER TYPE ND31

Page 1 U12 378.040 V I1 1.005 A U23 383.467 V I2 2.105 A U31 392.184 V I3 1.805 A f 49.999 Hz I avg 1.638 A	Page 2 U12 378.040 V ΣP 843.787 W U23 383.467 V ΣQ 725.969 var U31 392.184 V ΣS 1125.615 VA U123 384.564 V PF avg 0.778
Page 3 ΣP 843.787 W P DMD 843.795 W ΣQ 725.969 var S DMD 1125.611 VA I avg 1.638 A I DMD 1.638 A tg avg 0.810 PF avg 0.778	Page 4 THDU12 43.049 % THD I1 4.100 % THDU23 43.359 % THD I2 5.784 % THDU31 22.461 % THD I3 10.879 %
Page 5 ΣP 843.787 W EnP+ 21.661 GWh ΣQ 725.969 var EnP- 2786.344 MWh ΣS 1125.615 VA EnQ L 13.761 Mvarh En S 24.854 GVAh EnQ C 12.036 Mvarh	

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



ORDERING CODE

Meter ND31	X	2	2	X	X	X	XXXX
Input voltage (phase/phase-to-phase) Un:							
3 x 57.7/ 100 V, 3x 230/ 400 V	1						
3 x 110/ 190 V, 3 x 400/ 690 V	2						
Outputs /inputs:							
2 relays, 1 analog output, 2 inputs PT100		2					
Interface:							
RS-485 and Ethernet, internal memory		2					
Supply:							
85...253 V a.c., 90...300 V d.c.			1				
20...40 V a.c., 20...60 V d.c.			2				
Language:							
Polish/ English				M			
other*				X			
Acceptance tests:							
without additional quality requirements						0	
with an extra quality inspection certificate						1	
with an extra calibration certificate						2	
acc.to customer's request*						X	
Version:							
standard							
custom-made*							XXXX

* only after agreeing with the manufacturer

ORDERING EXAMPLE: The code **ND31 1221M0** means:

ND31 – ND31 meter,

1 – input voltage 3 x 57.7/100 V, 3 x 230/400 V,

2 – 2 relays, 1 analog output 0..20 mA, 2 x Pt100 inputs,

2 – RS485 and Ethernet, internal file system memory,

1 – supply 85..253 V a.c., 90..300 V d.c.

M – polish-english version,

0 – without additional quality requirements,

– standard version.

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ND31-19



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PRECISION INSTRUMENTATION

Sifam Tinsley Instrumentation Ltd

1 Warner Drive, Springwood Industrial Estate,
Braintree, Essex CM7 2YW

Contact No. : +44 (0) 1376 335271

Email: sales@sifamtinsley.com

www.sifamtinsley.co.uk