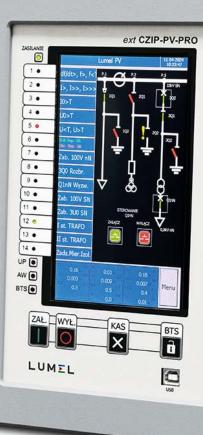
PROTECTION AUTOMATION & CONTROL



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ABOUT US



LUMEL has been known, Since 1953, all over the world, as a manufacturer of top quality industrial automation devices.

Lumel offers consists of product categories, such as: for low voltage:

- Network parameter meters and analyzers,
- Electrical and non-electrical quantity transducers,
- Digital meters,
- Recorders and data loggers,
- Controllers,
- Analog meters,
- Current transformers,
- Shunts.

Depending on the needs of the customer, the automation products and systems our offer relay on various data communication protocols (MODBUS, ETHERNET, PROFINET, BACNET or MQTT).

for medium voltage :

Protection relays.

Apart from the products, Lumel specializes in complex systems used for:

- monitoring and optimizing the cost of electricity and other utilities (water, gas, compressed air)
- monitoring environmental parameters: temperature, humidity, light intensity, CO₂, volatile gases
- ► solar energy.

In addition to its manufacturing activity, Lumel offers also:

- OEM services in the scope of housing designing, elecctronics, mechanics, hardware and software. All under one roof.
- ► EMS services.
- ODM services.

We are a member of an international capital group which consists of the following companies: LUMEL S.A., LUMEL ALUCAST Sp. z o.o., Rishabh Instruments Pvt. Ltd., Sifam Tinsley US, Sifam Tinsley UK, Microsys.

LUMEL S.A. ul. Słubicka 4, 65-127 Zielona Góra, Poland

www.lumel.com.pl/en/

ABOUT US

LUMEL 4.0 - PLANT OF NEW TECHNOLOGIES



OUR NEW PLANT BUILT IN 2020 POWERED BY A 125 KW LUMEL PHOTOVOLTAIC SYSTEM. LUMEL S.A. - PLANT AREA - 3639 m².





LUMEL ARENA (SPORTS AND RECREATION FACILITY FOR EMPLOYEES AND THEIR FAMILIES) - AREA - 1007 m².





extCZIP®-PRO PROTECTION RELAY

DIGITAL PROTECTION, AUTOMATION, MEASUREMENT, CONTROL, RECORDING AND COMMUNICATION

 Underimpedance protection against phase faults in MV lines. An alternative to conventional overcurrent protection in cases where selective coordination and the required sensitivity cannot be achieved.

extCZIP®-PRO extended version of the CZIP® system

- flexibility to choose the number of available input and output ports,
- additional communication ports.



extCZIP®-PRO digital protection relays for medium voltage switchgear and **extCZIP®-2R PRO** automatic transfer switch system are new versions of devices belonging to the **CZIP®** system. The **extCZIP®-PRO** series protection relays are characterized by great flexibility in choosing the number of available input, output and communication ports.

The **CZIP**[®] system devices are 100% Polish products, developed in cooperation with the Institute of Electrical Power Engineering of the Poznań University of Technology.



- extCZIP[®]-PRO digital protection relay for MV switchgear for power utilities and industrial facilities
- extCZIP[®]-2R PRO ATS system implementation (automation transfer switch) for MV switchgear
- CZIP[®]-Set utility software for operating all CZIP[®] system devices, including extCZIP[®]-PRO



Unique protection functions of the CZIP® system

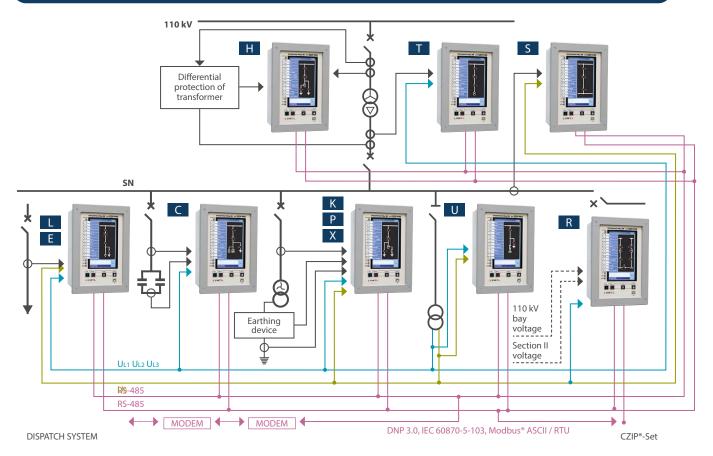
- underimpedance protection against phase faults
- detection of high-impedance earth faults (up to 8 kΩ),
- selective protection against earth faults in earthing transformer bays and earthing circuits.

CHARACTERISTICS

- software for all MV (medium voltage) substation bays in one extCZIP®-PRO device,
- ATS system (automatic transfer switch) implemented in extCZIP®-2R PRO,
- predefined settings of the protection functions and automation systems,
- programmable logic support (50),
- colour LCD TFT 7" screen, 800x480, with a touch panel,
- bay synoptic diagram presentation with mapping of the switch states,
- switch control from the synoptic screen and using telemechanics (up to 11 switches),
- presentation of the recorded events, measurement values and input or output states,
- 28 or 56 opto-isolated binary inputs,
- 20 or 40 output relays,
- 14 bi-colour programmable LEDs, with on-screen description,
- ON and OFF buttons to control the bay circuit breaker from the device keyboard,
- 512 MB internal memory for recording samples of disturbance recorder, event recorder, energy measurements,
- time synchronization via Ethernet network using SNTP
- independent communication interfaces: USB, 2 x RS-485, Ethernet 10/100 BASE-TX (optional fibre optic port and CAN-BUS/RS-485),
- communication protocols: DNP 3.0, IEC 60870-5-103 and 104, IEC 61850, Modbus[®] ASCII / RTU (optional PPM2 protocol on CAN-BUS/RS-485 port),
- 2-bit status monitoring of all switches,
- optional phase current measurement inputs adapted for operation with low-power current transformers based on Rogowski coils.



CONNECTION DIAGRAM



FUNCTIONS

Protection functions	L	Е	Ζ	Т	C	K	Р	X	U	S	Н	R
Three-stage overcurrent protection against phase faults		•1	•1			•						
Directional protection for each stage of overcurrent protection	•	•	•									
Current asymmetry criterion based on the negative sequence current component	•	•	•			•	•	•				
Instantaneous switch onto fault protection	•	•	•	•	•	•	•	•		•	•	
Underimpedance protection against phase faults	•	•	•									
Earth-fault overcurrent	•	•	•	•	•	•	•	•		•	•	
Residual overvoltage as start-up element for other protection functions	•	•	•			•	•	•		•		
Residual overvoltage as autonomous criterion		•	•			•	•		•		•	
Earth-fault overcurrent in the neutral point's earthing circuit						•	•	•				
Earth-fault admittance		•	•			•	•					
Earth-fault admittance incremental	•	•	•									
Earth-fault conductance (directional and non-directional)	•4	•4	•4			•	•			•2		
Earth-fault susceptance directional	•	•	•									
Wattmetric-based earth-fault IOP>				•								
Adaptive earth-fault conductance RG0adapt. (detection of high-impedance faults)	•	•	•									
Overfrequency		•3	•3						•			
Underfrequency		•3	•3									
Rate of change of frequency df/dt		•3	•3									
Overcurrent busbar protection blocking element	•	•	•		•	•	•	•				
Directional protection for overcurrent busbar protection blocking element		•	•									
Overcurrent relay cooperating with busbar protection										•		
Decision element of busbar protection			•	•								
Selective protection against earth faults in earthing transformer and earthing circuit						•	•	•				



Protection functions	L	E	Z	T	C	K	P	X	U	S	Н	R
Overvoltage		•3	•3	•	•							
Undervoltage		•3	•3	•	•							
Overload overcurrent				•	•						•	
Time-delay overcurrent against phase faults					•							
Overcurrent against internal faults					•							
Phase overvoltage (criterion: phase-to-phase voltage)									•			
Phase undervoltage (criterion: phase-to-phase voltage)									•			
Overcurrent-logic busbar protection			•	•						•		
Short-circuit overcurrent against internal phase faults						•	•	•			•	
Directional overpower P3>		•	•									
Directional overpower Q3>		•	•									
Voltage asymmetry				•								
Automation systems	L	E	Z	Т	С	K	Р	Х	U	S	Н	R
Automatic reclosing	•	•	•									
Circuit breaker failure protection			•	•						•		
Capacitor bank controller				•								
Capacitor bank switching automation (clock)					•							
Underfrequency load shedding - 3 stages									•			
Distributed underfrequency load shedding (applied for line bays)		•	•									
Underfrequency load shedding and restoration									•			
Active current forcing scheme with a controller						•						
Resistor controller							•					
Others	L	E	Z	Т	С	K	Р	Х	U	S	Н	R
Cooperation with underfrequency load shedding automation or underfrequency load shedding and restoration system	•	•	•									
Cooperation with circuit breaker failure protection	•	•	•		•	•	•	•			•	
Cooperation with automatic transfer switch			•	•			•	•		•	•	
Operation of automatic transfer switch function for both hot and cold reserve configurations												•
Cooperation with gas detector relay				•		•	•	•				
Cooperation with external differential protection											•	
Second harmonic bias for phase overcurrent protection		•	•									
Synchronism check function when switching on a line with distributed generation		•5	•5									

¹ Settings' change possible after operational switching of the first, second or third stage.

- ² Non-directional.
- ³ With separate automatic reclosing system.
- ⁴ Built-in adaptive algorithm supporting effective detection of high-impedance earth faults.

⁵ Optional function.

• *ext*CZIP[®]-PRO purpose by bay

- line bay without local power plant
- Ine bay with local power plant (also wind power)
- ☑ incoming/ outgoing feeder bay
- MV side of the 110 kV/MV transformer
- **C** capacitor bank
- auxiliary services in compensated networks (also networks with an insulated neutral point)
- auxiliary services in networks with resistor-earthed neutral point
- auxiliary services in networks with parallel reactor resistor earthing system
- voltage measurement
- busbar coupler
- H 110 kV side of the 110 kV/MV transformer

extCZIP®-2R PRO purpose

ATS system (automatic transfer switch)

extCZIP®-PRO PROTECTION RELAY

TECHNICAL DATA

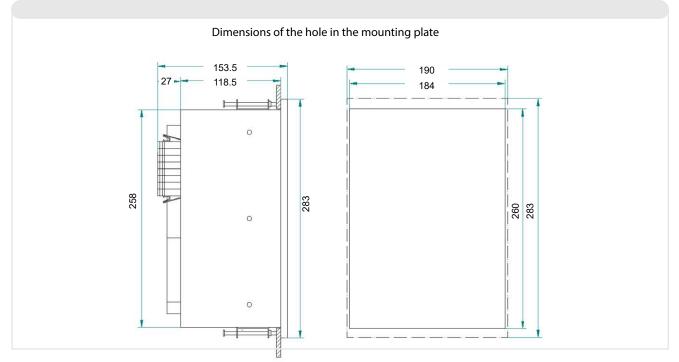
Phase current inputs				
Rated current I	5 A c	or 1 A		
Current range		92 A		
Management				
error 0 A > 0,3550 A < 192 A	< 10% < 1	,5% < 10%		
Rated frequency f _n	50	Hz		
Power consumption at I=I _n	< 0,	5 VA		
Phase voltage inputs				
Rated voltage U _n	10	0 V		
Voltage range	01	30 V		
Measurement error in the measurement range	< 1	,5%		
Rated frequency f _n	50	Hz		
Power consumption at U=U _n	< 0,4 VA			
Zero-sequence current inputs				
Rated current I _{on}	0,5	5 A		
Current range	05 A			
Measurement error 0,023,5 A	< 1,5%			
Rated frequency f _n	50 Hz			
Power consumption at $I=I_{on}$	< 0,4 VA			
Zero-sequence voltage inputs				
Rated voltage U _{on}	10	0 V		
Voltage range	01	30 V		
Measurement error in the measurement range	< 1	,5%		
Rated frequency f _n	50	Hz		
Power consumption at $U=U_{0n}$	< 0,	4 VA		
Binary inputs				
Binary inputs Rated input voltage	24 V	220 V		
	24 V 1732 V	220 V 88253 V		

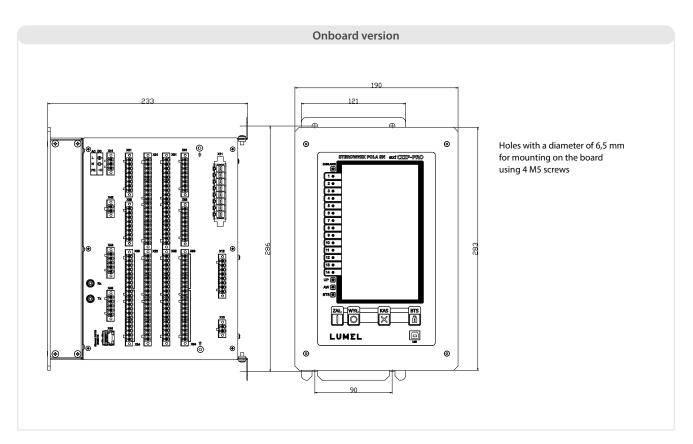
Output rolour							
Output relays		220 V	24 V				
Rated voltage							
Continuous current	, , , ,		5 A				
Breaking capacity of th							
• 220 V DC, L/R = 40			,1 A				
• 220 V AC, $\cos \varphi = 0$			2 A				
Circuit breaker co	nnection circuit	S					
Rated voltage		220 V	24 V				
Continuous current	carrying capacity	ł	8 A				
Breaking capacity of th	e induction circuit						
• 220 V DC, L/R = 40	ms	1,2 A / 3	300 cycles				
Duration of the swite	ch-off impulse	min. 0,1 s					
Duration of the swite	ch-on impulse	min. 0,1 s					
Other data							
Power supply							
• nominal auxiliary voltage	220 V DC 90220300 V	230 V AC 85230265 V	24 V DC 192465 V				
 auxiliary power consumption 		< 20 W					
Environmental cond	itions						
 operating temperating 	ture	-10	.+55°C				
storage temperature	re	-20	.+70°C				
 altitude 		≤ 20	000 m				
 relative humidity 		5	.95%				
Weight		6	i kg				
Dimensions		283 x 190 x 153,5 mm backboard version					
			0 x 233 mm rd version				
Case protection deg	ree	IP 50					



DIMENSIONS

Backboard version



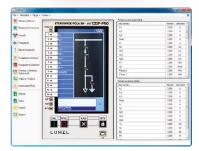


extCZIP®-PRO PROTECTION RELAY

CZIP®-SET extCZIP®-PR0 software

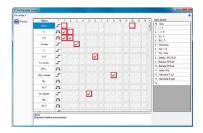
- software supplied with extCZIP®-PRO devices,
- excellent engineering tool supporting the user in specifying settings, configuring all available parameters, checking current configuration, measurement data and event recorder,
- a module enabling reading of samples saved in the disturbance recorder and their comprehensive analysis is also included in the software package,
- the tool includes a programmable logic editor, which enables adaptation of the extCZIP®-PRO device to individual needs and solutions,
- software enables communication with extCZIP®-PRO devices via RS-485 serial ports, optical fiber, USB, Ethernet,
- comparator of configuration files,
- synoptic editor standard connectors + 11 configurable ones,
- remote control of MV and LV switches via Ethernet (VPN).



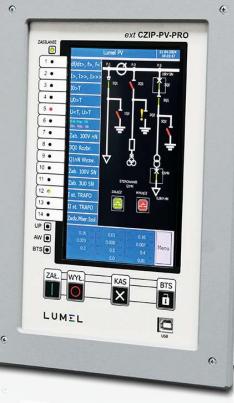


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LUMEL



EXTORING OF CONTROL RELAY

CE

RES/PV RELAYS TO MV/LV NETWORKS

- extCZIP®-PV PRO relay is designed for switchgear at the connection points of renewable energy sources, in particular photovoltaic power plants to MV and LV distribution networks, as well as for the micro-installations.
- It meets all the requirements for power system protection in photovoltaic power plants.
- It includes underimpedance protection against phase-to-phase faults, which enables the short-circuit detection regardless of the short-circuit current values, making the protection reach independent of the fault type.
- CZIP[®]-Set utility software to support all CZIP[®] system devices, including extCZIP[®]-PV PRO.

extCZIP[®]-PV-PRO INTEGRATED PROTECTION AND CONTROL RELAY

The dynamic development of solar power plants, i.e. photovoltaics (PV), requires the use of specialized protection and control relays that ensure protection against various faults. The protection should apply particularly to electrical devices connected to the network and the network itself.

Specific requirements regarding the protection functions were an inspiration to develop the new design of protection relay featured as **extCZIP®-PV PRO**.

The **extCZIP®-PV PRO** relay is intended for switchgear operating at the connection points of photovoltaic plants to the MV or LV distribution networks, as well as for the micro-installations. The device meets all requirements regarding power system protection for PV plants, specified in the Grid Code of the Polish Distribution System Operators (IRiESD) and the PN-EN 50549-1 and PN-EN 50549-2 standards. It includes protections supplied from both MV and LV voltage circuits. To perform the required functions, the new relay is equipped with additional inputs for voltage and current measurement at the LV side.





extCZIP®-PV PRO

It is built on the basis of proven hardware and software solutions known from the **CZIP**[®] system, including the **CZIP[®]-Set** utility software.

It includes the **underimpedance protection**, which is a possible solution to the phase-to-phase short-circuit problems occurring near the PV plants. Underimpedance protection solves the problems related to the fact that the short-circuit

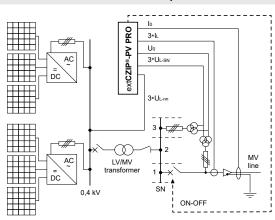
current generated by PV plants is only 10% greater than their rated current.

extCZIP®-PV-PRO INTEGRATED PROTECTION AND CONTROL RELAY

CHARACTERISTICS

- programmable logic support (50),
- colour LCD TFT 7" screen, 800x480, with a touch panel,
- bay synoptic diagram presentation with mapping of the switch states,
- switch control from the synoptic screen and using telemechanics (up to 11 switches),
- presentation of the recorded events, measurement values and input or output states,
- 28 or 56 opto-isolated binary inputs,
- 20 or 40 output relays,
- 14 bi-colour programmable LEDs, with on-screen description,
- ON and OFF buttons to control the bay circuit breaker from the device keyboard,
- 512 MB internal memory for recording samples of disturbance recorder, event recorder, energy measurements,
- time synchronization via Ethernet network using SNTP,
- independent communication interfaces: USB, 2 x RS-485, Ethernet 10/100 BASE-TX (optional fibre optic port and CAN-BUS/RS-485),
- communication protocols: DNP 3.0, IEC 60870-5-103 and 104, IEC 61850, Modbus[®] ASCII / RTU (optional PPM2 protocol on CAN-BUS/RS-485 port),
- 2-bit status monitoring of all switches.

APPLICATION | RECOMMENDED CONNECTION DIAGRAMS OF A PV PLANT TO THE POWER NETWORK



PV plant connection to the MV line with consumers

The PV plant includes the MV/LV transformer and the connection point is upstream in the network.

In the PV plant there is a MV circuit breaker and it is controlled by the extCZIP[®]-PV PRO.

ON-OFF GP7 ¢ extCZIP®-PV PRO **PRO (1E)** 3*I∟ AC U٥ 3*UL-SN extCZIP 3*UL-nr AC = DC Ŏ 2 ΜV LV/MV transform line

SN

0,4 kV

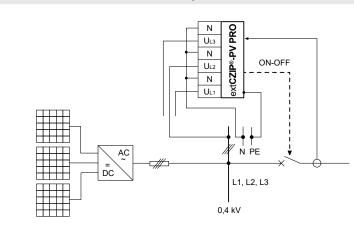
PV plant connection to the MV network with the customer's line

The PV plant includes the MV/LV transformer and it is connected to the MV substation bay (at GPZ or RS) with the customer's line.

If the circuit breaker is located only at the connection point outside the PV plant (e.g. at GPZ substation), then the extCZIP®-PV PRO controls the circuit breaker at LV side.

extCZIP[®]-PV-PRO INTEGRATED PROTECTION AND CONTROL RELAY

PV plant connection to the LV network (microgeneration)



If a specialized protection relay is used in a micro-installation, then there is no need to install voltage transformers (including the U0 filter) and the 230 V/400 V voltage and phase currents are connected directly from the LV side.

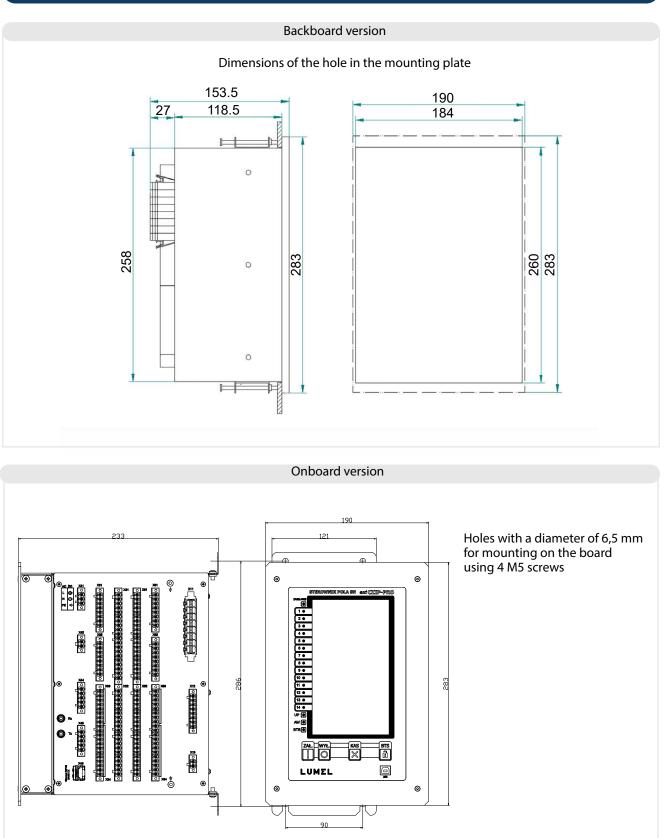
TECHNICAL DATA

Dhase surrout insuts (two	e e t e \						
Phase current inputs (two	sets)	- •					
Rated current I _n			or 1 A				
Current range		0192 A					
$\begin{array}{l} \text{Measurement} \\ \text{error} \end{array} 0 \text{ A} > 0,35 \end{array}$	< 10% < 1,5% < 10%						
Rated frequency f _n	50	Hz					
Power consumption at I=I _n		< 0,5 VA at r	ated current				
Phase voltage inputs (MV)							
Rated voltage U _n		10	0 V				
Voltage range		01	30 V				
Measurement error in the measurement range	0130 V	< 1	,5%				
Rated frequency f		50	Hz				
Power consumption at U=U _n	< 0,4 VA at r	ated voltage					
LV phase voltage inputs							
Rated voltage U _n		100 V o	or 230 V				
Voltage range		03	00 V				
Measurement error in the measu	rement range	< 1	,5%				
Power consumption at U=U _n		< 1,5VA					
Rated frequency f		50 Hz					
Continuous voltage withstand	d	1,4 * U _n					
Zero-sequence voltage inp	outs						
Rated voltage U _{on}		10	0 V				
Voltage range		01	30 V				
Measurement error in the measurement range	0130 V	< 1	,5%				
Rated frequency f		50	Hz				
Power consumption at U=U ₀₀		< 0,4 VA at r	ated voltage				
Binary inputs (28 or 56 inp	outs)						
Input type		opto-i	solated				
Rated input voltage		24 V DC	220 V DC				
Input voltage range		1732 V DC	88253 V DC				
Current drain		< 3 mA	< 3 mA				

Rated voltage220 V24 VContinuous current \Box rying capacity \Box \Box 220 V DC, L/R = 40 \Boxs $0, \bot A$ 220 V AC, cos $\varphi = O.220 VCircuit breaker councircuitsRated voltage220 V220 V AC, cos \varphi = O.220 V220 V AC, cos \varphi = O.220 VRated voltage220 VSated voltage210 \BoxDuration of the switon impulse1,2 A / JDuration of the switon impulse1,2 A / JPower supplyPower supply220 V DC90300 V DC90300 V DC90300 V DC85265 V AC85265 V AC90300 V DC90300 V DC24 V DC24 V DC1965 V DC1965 V DCAuxiliary powerconsumption220 V DC90300 V DC90300 V DC90300 V DC230 V AC85265 V AC9165 V DCAuxiliary powerconsumptioncolspan="2"Pointental collectionsPower supply- 10+55°C- 10+55°C- 10+55°C- 10+55°C- 10+55°C- 20$	Output relays (20 c							
Breaking capacity of the induction circuit220 V DC, L/R = 40 ms0,1 A-220 V AC, cos $\varphi = 0,4$ 2 ACircuit breaker connection circuitsRated voltage220 VContinuous current carrying capacity8 ABreaking capacity of the induction circuit8 ABreaking capacity of the induction circuit1,2 A / 300 cyclesDuration of the switch-off impulsemin. 0,1 sDuration of the switch-on impulsemin. 0,1 sPower supply220 V DC• nominal auxiliary voltage220 V DC90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption220 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC 1965 V DC• operating temperature-10+55°C-20 W• operating temperature-10+55°C-300 V DC 9017 °C• altitude $\leq 200 \circ$ m-20+70°C• altitude <t< td=""><td>Rated voltage</td><td></td><td>220 V</td><td>24 V</td></t<>	Rated voltage		220 V	24 V				
• 220 V DC, L/R = 40 ms0,1 A• 220 V AC, cos $\varphi = 0,4$ 2 ACircuit breaker connection circuitsRated voltage220 VContinuous current carrying capacity8 ABreaking capacity of the induction circuits1,2 A / JOCParation of the switch-off impulsemin.0,1 sDuration of the switch-on impulsemin.0,1 sDuration of the switch-on impulse230 V ACPower supply220 V DC• nominal auxiliary power consumption220 V DC90300 V DC230 V AC• auxiliary power consumption220 V DC• auxiliary power consumption210 V DC• auxiliary power consumption210 V DC• altitude< 20 W	Continuous current c	arrying capacity	5	A				
· 220 V AC, cos φ = 0.4Circuit breaker connection circuitsRated voltage220 V24 VContinuous current ving capacity1,2 A / JBreaking capacity of the induction circuits1,2 A / J220 V DC, L/R = 40 ms1,2 A / JDuration of the switcher on impulsemin. JDuration of the switcher on impulsemin. JPower supplyNominal auxiliary 90300 V DC230 V AC 85265 V AC 90300 V DC230 V AC 90300 V DC24 V DC 1965 V DC 1965 V DCoper supplyNominal auxiliary 90300 V DC230 V AC 85265 V AC 1965 V DC100 auxiliary power consumption-10+55°C 20+55°Coperating temperature-10+55°Coperating temperature-10+55°Coperating temperature-10+55°Coperating temperature-20+70°Celaititude-283 x 190 x 153,5 mm onboart-283 x 190 x 153,5 mm onboart-283 x 190 x 153,5 mm onboartIP improvem colspan="2">-283 x 190 x 153,5 mm onboart-283 x 190 x 153,5 mm onboart-283 x 190 x 153,5 mm onboar	Breaking capacity of	the inductioncirc	uit					
Circuit breaker connection circuitsRated voltage220 V24 VContinuous current carrying capacity8 ABreaking capacity of the induction circuit8Breaking capacity of the induction circuit1,2 A / 300 cyclesDuration of the switch-off impulsemin. 0,1 sDuration of the switch-on impulsemin. 0,1 sDuration of the switch-on impulseMin. 0,1 sPower supply220 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• nominal auxiliary voltage220 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption20 W21 V DC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC 90300 V DC230 V AC 90300 V DC24 V DC 90300 V DC• auxiliary power consumption90300 V DC 90400 V DC 90400 V DC <t< td=""><td>• 220 V DC, L/R = 40 n</td><td>0,</td><td>1 A</td></t<>	• 220 V DC, L/R = 40 n	0,	1 A					
Rated voltage220 V24 VContinuous current <arrying capacity<="" td="">8Breaking capacity of the induction cirvity8Straking capacity of the induction cirvity1,2 A / J220 V DC, L/R = 40 ms1,2 A / JDuration of the switchor impulsemin. 0,1 sDuration of the switchor impulsemin. 0,1 sDuration of the switchor impulsemin. 0,1 sPower supply220 V DC230 V ACPower supply220 V DC230 V ACsuiliary power consumption220 V DC230 V ACsuiliary power consumption220 V DC230 V ACstorage temperature20 W24 V DCoperating temperature-10+50°Cstorage temperature-20+70°Csitude≤ 20 Wrelative humidity$\leq 283 \times 190 \times 1535$ mmDimensions$283 \times 19 \times 1535$ mmDimensions$283 \times 19 \times 1535$ mmCase protection degreeIP 5Case protection degreeIP 5</arrying>	• 220 V AC, $\cos \varphi = 0$,	4	2	A				
Continuous current carrying capacity8 kBreaking capacity of the induction circurcurcurcurcurcurcurcurcurcurcurcurcur	Circuit breaker con	nection circuits	;					
Breaking capacity of the induction circuit $220 \vee DC, L/R = 40 ms$ $1,2 \wedge J \odot 0$ cyclesDuration of the switch-of impulsemin. 0,1 sDuration of the switch-on impulsemin. 0,1 sPower supplyPower supply \cdot nominal auxiliary voltage $220 \vee DC$ $90300 \vee DC230 \vee AC85265 \vee AC24 \vee DC1965 \vee DC\cdot auxiliary powerconsumption220 \vee DC90300 \vee DC230 \vee AC220 W24 \vee DC1965 \vee DC\cdot auxiliary powerconsumption220 \vee DC90300 \vee DC230 \vee AC20 W24 \vee DC1965 \vee DC\cdot auxiliary powerconsumption210 \vee DC90300 \vee DC230 \vee AC1965 \vee DC24 \vee DC1965 \vee DC\cdot auxiliary powerconsumption-10+55^{\circ}C-20+70^{\circ}C-20+70^{\circ}C-20+70^{\circ}C\cdot altitude\leq 20 \cup m\leq 20 \cup m\cdot relative humidity595^{\circ}\leq 20 \cup m\cdot relative humidity283 \times 190 \times 53.5 mmbackboard version283 \times 190 \times 233 mmonboard version283 \times 190 \times 233 mmonboard version2as portection degreeIP \ 50according to$	Rated voltage		220 V	24 V				
1,2 A / J∪C cycles1,2 A / J∪C cyclesDuration of the switch-off impulsemin. 0,1 sDuration of the switch-on impulseSign colspan="2">Sign colspan="2">Sign colspan="2">Sign colspan="2">Sign colspan="2"Power supply230 VAC 90300 VDC24 V DC 1965 VDCA 220 VDC 90300 VDC230 VAC 85265 VAC24 V DC 1965 VDCSign colspan="2"Sign colspan="2"auxiliary power consumption-10+55°C -20+70°CA colspan="2"A colspan="	Continuous current o	arrying capacity	8	A				
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Power supply• nominal auxiliary voltage220 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption90300 V DC $230 V AC$ 85265 V AC24 V DC 1965 V DC• auxiliary power consumption $< 20 W$ $< 20 W$ Environmental conditions $< 20 W$ $< 20 W$ • operating temperature $-10+55^{\circ}C$ $-20+70^{\circ}C$ $< 20+70^{\circ}C$ • altitude ≤ 2000 m $< 20+70^{\circ}C$ • altitude ≤ 2000 m $< 20+70^{\circ}C$ • altitude ≤ 2000 m $< 23+70^{\circ}C$ • relative humidity 595° $< 6 kg$ Weight $6 kg$ $283 \times 190 \times 153,5 mm$ backboard versionDimensions $283 \times 190 \times 233 mm$ onboard versionCase protection degree $IP 50$ according to	Duration of the swite	min.	0,1 s					
Power supply• nominal auxiliary voltage220 V DC 90300 V DC230 V AC 85265 V AC24 V DC 1965 V DC• auxiliary power consumption $< 20 W$ $< 20 W$ Environmental conditions $< 20 W$ $< 20 W$ • operating temperature $-10+55^{\circ}$ C $-20+70^{\circ}$ C• altitude $< 20 U$ m• altitude $< 20 U$ m• relative humidity $< 595^{\circ}$ Weight $6 \ W$ $< 283 \times 190 \ Version$ Dimensions $283 \times 190 \ Version$ $283 \times 190 \ Version$ Case protection degree $IP \ Sonotoring to P \ Sonotoring top$	Duration of the swite	min.	0,1 s					
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voltage90300 V DC85265 V AC1965 V DC• auxiliary power consumption $< 20 W$ $< 20 W$ Environmental conductors $< 20 W$ $< -10+55^{\circ}C$ • operating temperature $-10+55^{\circ}C$ $< -20+70^{\circ}C$ • storage temperature $< 2000 m$ $< 2000 m$ • relative humidity $< 595\%$ $< 6 kg$ Weight $6 kg$ $283 x 190 \times 153,5 mm$ backboard versionDimensions $283 x 190 \times 233 mm$ onboard versionCase protection degree $IP 50$ according to	Power supply							
consumption< 20 WEnvironmental conditions• operating temperature-10+55°C• storage temperature-20+70°C• altitude≤ 2000 m• relative humidity595%Weight6 kg283 x 190 x 153,5 mm backboard versionDimensions283 x 190 x 233 mm onboard versionCase protection degreeIP 50 according to								
\cdot operating temperature $-10+55^{\circ}$ C \cdot storage temperature $-20+70^{\circ}$ C \cdot altitude $\leq 2000 \text{ m}$ \cdot relative humidity 595% Weight 6 kg Dimensions $283 \times 190 \times 153,5 \text{ mm}$ backboard versionDimensions $283 \times 190 \times 233 \text{ mm}$ onboard versionCase protection degreeIP 50 according to			< 20 W					
• storage temperature-20+70°C• altitude≤ 2000 m• relative humidity595%Weight6 kgDimensions283 x 190 x 153,5 mm backboard version283 x 190 x 233 mm onboard version1P 50 according to	Environmental condi	tions						
• altitude≤ 2000 m• relative humidity595%Weight6 kgDimensions283 x 190 x 153,5 mm backboard version283 x 190 x 233 mm onboard version1P 50 according to	 operating temperat 	ure	-10+55°C					
• relative humidity595%Weight6 kgDimensions283 x 190 x 153,5 mm backboard version283 x 190 x 233 mm onboard version19 50 according to	storage temperatur	e	-20	+70°C				
Weight 6 kg Dimensions 283 x 190 x 153,5 mm backboard version 283 x 190 x 233 mm onboard version 1283 x 190 x 233 mm onboard version IP 50 according to 100 mm	 altitude 		≤ 20	00 m				
Dimensions 283 x 190 x 153,5 mm backboard version 283 x 190 x 233 mm onboard version 283 x 190 x 233 mm onboard version IP 50 according to	 relative humidity 		59	95%				
Dimensions backboard version 283 x 190 x 233 mm onboard version IP 50 Case protection degree according to	Weight		6	kg				
283 x 190 x 233 mm onboard version IP 50 Case protection degree according to	Dimensions			,				
Case protection degree according to	Dimensions							
	Case protection degr	ee	accord	ding to				

extCZIP®-PV-PRO INTEGRATED PROTECTION AND CONTROL RELAY

DIMENSIONS



extCZIP[®]-PV-PRO

INTEGRATED PROTECTION AND CONTROL RELAY

PROTECTION FUNCTIONS AVAILABLE AT extCZIP®-PV PRO

extCZIP®-PV PRO is almost identical to **extCZIP®-PRO (1E)** in terms of protections supplied from **MV circuits**. It is equipped with **overcurrent and underimpedance** protection for phase faults, as well as **voltage**, **frequency and earth-fault** protection. Additionally, the **overvoltage** protection has been introduced, the criterion of which is the average voltage value from the last 10 minutes, in accordance with the standards' requirements. It will operate if the start-up condition is met by one of the three phase-to-phase voltages within the set time.

Protections supplied from MV voltage circuits			
Criterion	Symbol	Criterion setting range	Time setting range
Undervoltage I stage	U<	1100 V	0,0560 s
Undervoltage II stage	U<<	1100 V	0,0560 s
Overvoltage I stage	U>	100130 V	0,0560 s
Overvoltage II stage	U>>	100130 V	0,0560 s
Overvoltage for the 10 min. average	U10>	110130 V	-
Negative sequence overvoltage	Uneg>	1100 V	0,0560 s
Residual overvoltage autonomous	U0>	2100 V	0,0560 s
Underfrequency I stage	f<	4550 Hz	0,0110 s
Underfrequency II stage	f<<	4550 Hz	0,0110 s
Overfrequency I stage	f>	5055 Hz	0,0110 s
Overfrequency II stage	f>>	5055 Hz	0,0110 s
Anti-islanding LoM	dfdt< and dfdt>	0,125 Hz/s	0,0110 s
Rated of change of voltage (increase)	dU/dt increase	1500 V/s	0,0560 s
Rated of change of voltage (decrease)	dU/dt decrease	1100 V/s	0,0560 s
Directional overpower I stage	P3>	109900 W	0,1600 s
Directional overpower II stage	P3>>	109900 W	0,1600 s
Directional overpower (reactive power) I stage	Q3>	109900 var	0,1600 s
Directional overpower (reactive power) II stage	Q3>>	109900 var	0,1600 s
Protections supplied from LV voltage circuits (with or v	without the MV/LV trar	nsformer)	
Criterion	Symbol	Criterion setting range	Time setting range
Undervoltage I stage	U<	1400 V	0,0560 s
Undervoltage II stage	U<<	1400 V	0,0560 s
Overvoltage I stage	U>	100500 V	0,0560 s
Overvoltage II stage	U>>	100500 V	0,0560 s
Overvoltage for the 10 min. average	U10>	100470 V	-
Underfrequency I stage	f<	4750 Hz	0,0110 s
Underfrequency II stage	f<<	4750 Hz	0,0110 s
Overfrequency I stage	f>	5052 Hz	0,0110 s
Overfrequency II stage	f>>	5052 Hz	0,0110 s
Anti-islanding LoM	dfdt< and dfdt>	0,510 Hz/s	0,0110 s
Directional overpower I stage	P3>	0,110 kW	0,1600 s
Directional overpower II stage	P3>>	0,110 kW	0,1600 s
Directional overpower (reactive power) I stage	Q3>	0,110 kvar	0,1600 s
Directional overpower (reactive power) II stage	Q3>>	0,110 kvar	0,1600 s

The CZIP*-PV PRO is also equipped with all the protection functions supplied from the current circuits, similarly to the extCZIP-PRO (1E) application for a MV line with local generation.

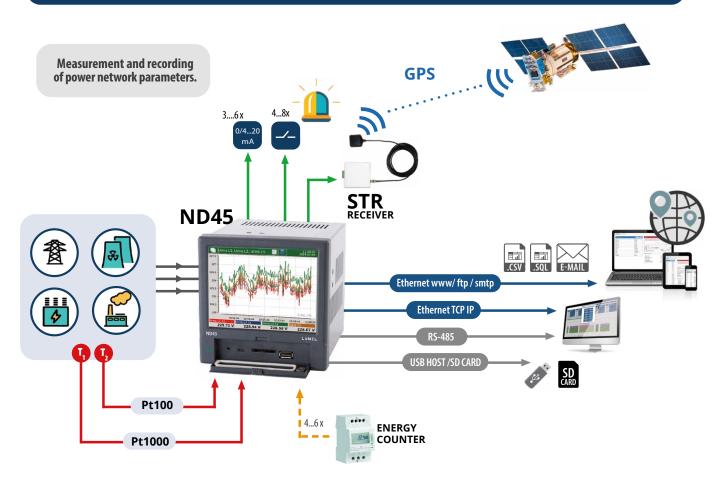


FEATURES

- Measurement and recording of over 500 electric energy quality parameters acc. to EN 50160, EN 61000-4-30 standards.
- Measuring class A*.
- Operation in 3 or 4-wire, 3-phase, balanced or unbalanced power networks.
- Analysis of current and voltage harmonics and interharmonics up to the 51 st for class I.
- Flicker.
- 4-quadrant energy measurement in 4 tariffs.
- Monitoring up to 6 additional energy meters with pulse output.
- Recording of measurements before and after events (dips & swells).
- Configurable archives of actual values and events recording.
- Data archiving on an SD card memory up to 32 GB.
- E-mail messages in case of alarm occurs.
- Web server (HTTP protocol), FTP server, DHCP client.
- Interfaces: RS-485 Modbus Slave, Ethernet 100 Base-T (Modbus TCP/IP), USB Device & Host.
- Colour touch screen: LCD TFT 5.6", 640 x 480 pixels.
- IP54 protection grade from the frontal side.
- Time synchronisation using an external GPS receiver STR receiver (optional).
- Automatic synchronization of RTC clock with the NTP time server.
- IEC 60870-5-104 communication protocol for data transmission in industrial process control systems and energy sector.

* for selected parameters - details in the technical data

EXAMPLE OF APPLICATION



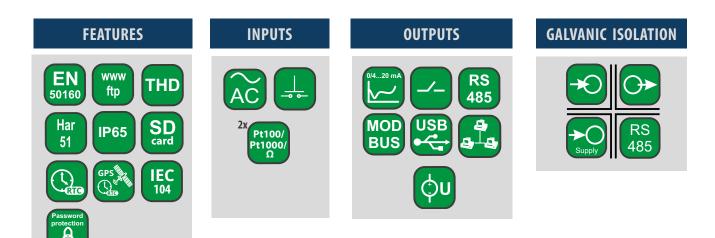
MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS

Aggregated values for 3 seconds, 10 minutes and two hours:

- phase voltages U₁, U₂, U₃, U₁₂₃avg
- phase current $\mathbf{I}_1, \mathbf{I}_2, \mathbf{I}_3, \mathbf{I}_{123}$ avg
- active phase powers P₁, P₂, P₃, ΣP₁₂₃, P₁₂₃avg
- reactive phase powers $\mathbf{Q}_1, \mathbf{Q}_2, \mathbf{Q}_3, \mathbf{\Sigma} \mathbf{Q}_{123}, \mathbf{Q}_{123}$ avg
- apparent phase powers S₁, S₂, S₃, ΣS₁₂₃, S₁₂₃avg
- active power factors PF₁, PF₂, PF₃, PF₁₂₃avg
- power factor distortion dPF₁, dPF₂, dPF₃, dPF₁₂₃avg
- reactive/active power factors $\textbf{tg}\phi_{1'}\textbf{tg}\phi_{2'}\textbf{tg}\phi_{3'}\textbf{tg}\phi_{123}\textbf{avg}$
- phase-to-phase voltages \mathbf{U}_{12} , \mathbf{U}_{31} , \mathbf{U}_{23} , \mathbf{U}_{123} avg
- current in neutral wire I_n
- the angle between the voltage and current $\phi_{1'}\,\phi_{2'}\,\phi_{3'}\,\phi_{1'}\,\phi_{123} avg$ (degrees and radians)
- voltage phase-to-phase angle $\triangleleft \mathbf{U}_{_{12'}} \triangleleft \mathbf{U}_{_{31'}} \triangleleft \mathbf{U}_{_{23'}} \triangleleft \mathbf{U}_{_{123}} \mathbf{avg}$

Other parameters:

- frequency (aggregation for 1 and 10 seconds)
- temperature/ resistance values (two channels)
- Demand values: P, Q , S , U , I (15-minute, 30-minute or 1 hour).
- energy: active imported/exported, reactive imported/exported and apparent. All energies are calculated for each phase and 3-phase parametres.
- factors: THD, THDS, THDG, PWHD. Calculated for currents and voltages of each phase and 3-phase parameters.
- harmonics from 1 up to 51st for each phase of currents and voltages
- interharmonics from 1 up to 51st for each phase of currents and voltages
- the half wave voltage of each phase
- recording of dips, swells and overvoltages
- storage of minimun and maximum of measured values.



TECHNICAL DATA

INPUTS					
INPUIS					
Input type	Measuring ra	nge		Parameters	Basic error
Voltage input	230/400 V	57,7/100V	69.3/ 120 V	0.051.5 Un	± 0.1%
Current input	1 A or 5A			0.0051.5 ln	± 0.1%
Logic input	4 or 6 logic inpu	uts: 0/524 V d.c.		switching frequency up to 50 Hz	
Input for temperature measurement	2 inputs: Pt100	(-200850°C) lub Pt100	0 (-200850°C), resistan	ice: 05000 Ω	± 0.2%
OUTPUTS					
Output type	Properties				
Analog output	3 or 6 program	mable current outputs 0/	420 mA, load resistance	< 500 Ω	
Relay output	4 or 8 program	mable electromagnetic re	lays, voltageless NO conta	cts, load capacity 250 V a.c./1 A a.c.	
DIGITAL INTERFACES					
Interface type	Properties				
RS-485	interface: Modl	ous Slave, baud rate 300	115200 bit/s, transmiss	ion mode ASCII/RTU	
USB	2 interfaces: De	2 interfaces: Device & Host, USB v.2.0			
Ethernet	100 Base-T, RJ45 socket, Modbus TCP/IP, web server (HTTP), FTP server, DHCP client				

RATED OPERATING CO	ONDITIO	DNS					
Supply voltage		85 V253 V a.c., 40400Hz 90 V300 V d.c.		power consumption \leq 20 VA			
Ambient temperature		work: 0 up to 50°C		storage: - 2050°C			
Relative humidity		<75%		Condensation inadmissible			
		supply decays		Data and device state preservation	on		
Reaction against		supply recovery		Continuation of device work			
Short term load (5s)		2 Un (max. 1000 V)		10 ln			
Casing protection grade		IP 54					
		Installation category III					
Safety requirements		Pollution grade 2		EN 61010-1			
Maximum phase-to-earth opera	ating	RS485, temperature/resistance input, USB: 50V		EN 61010 1			
voltage	2	measuring circuit, relays, supply: 300 V		EN 61010-1			
MEASURING RANGES	AND AI	OMISSIBLE BASIC CONVERSION	ERRORS				
Measuring quantity		Measurement method		Range	Basic error		
Voltage U RMS	3 s 10 min 2 hrs	alues: lass: B lass: B class: A or S class: A or S class: A or S	Un = 57.7V Un = 69.3V U RMS L-L (Un = 400 V Un = 100V	23.046345.0 V (Ku=1) 38 MV (Ku≠1) 5.7.11.586.5 V (Ku=1) 280 kV (Ku≠1) 6.913.9104.0 V (Ku=1) 416 kV (Ku≠1)	class A acc. to EN 61000-4-30 U RMS L-N (10% Udin - 150% Udin): ±0.1% Udin.		
Current I RMS	3 s 10 min		I RMS (150% In): In = 1 A - 0.0100.11.5 A (Ki=1) In = 5 A - 0.0500.57.5 A (Ki=1) 480.0 kA (Ki≠1)		I RMS (10% In - 150% In): ±0.1% of measurement		
Frequency	Class A	from 10 or 12 cycles in 200 ms.		57.5 Hz for 50 Hz a.c. of supply 59.0 Hz for 60 Hz a.c. of supply	Class S acc. to EN 61000-4-30 ±0.050 Hz Class A acc. to EN 61000-4-30		
		from 100 or 120 cycles in 10 s.			±0.010 Hz		
Active, reactive and apparent power	Reactive p appointed Apparent	every 10 cycles (50 Hz) or 12 cycles (60 Hz) power: from apparent and active power.	Depends or	ı voltage and actual ratio value.	acc. to EN 61557-12: Active power: \pm 0.5% Pn Reactive power: \pm 1% Qn Apparent power: \pm 0.5% Sn		
Measuring quantity		Measurement method		Range	Basic error		
Active imported/exported energy,	Measured e	every 10 cycles (50 Hz) or 12 cycles (60 Hz).	Depends or	voltage and actual ratio value.	acc. to EN 61557-12:		
reactive imported/exported energy, apparent energy	Separate m reactive e	easurement for exporten, imported active and nergy.			Active power: \pm 0,5% Reactive power: \pm 1% Apparent power: \pm 2%		
Active power factor, Power distortion factor		er factor : 1 U RMS, I RMS and active power. ortion factor depends on THD I.	-1,000 0 .	. 1,000	Power factor PF \pm 0.01% Power distortion factor PFdist \pm 0.05%		
Harmonics of voltages and current	Window: 1 (for 50 Hz),			monics: 0.00 100.00 % monics: 0.00 100.00 %	Voltage harmonics – class I \pm 5% Urdg if Urdg > 1% \pm 0.05% Un if Urdg < 1% Current harmonics – class I \pm 5% Urdg if Urdg > 3% \pm 0.5% Un if Urdg < 3%		
THD U, THD I, THDG U, THDG I, THDS U, THDS I, PWHD U, PWHD I	Window: 1 (for 50 Hz),		THD I: 0.00 THDG U: 0.0 THDG I: 0.0 THDS U: 0.0 THDS U: 0.0 PWHD U: 0.0	100.00 % 100.00 % J0 100.00 % J. 100.00 % J0 100.00 % J0 100.00 % J0 100.00 % J0 100.00 %	$\begin{array}{l} \text{THD U: } \pm 5\% (50/60\text{Hz}) \\ \text{THD I: } \pm 5\% (50/60\text{Hz}) \\ \text{THDG U: } \pm 5\% (50/60\text{Hz}) \\ \text{THDG I: } \pm 5\% (50/60\text{Hz}) \\ \text{THDS U: } \pm 5\% (50/60\text{Hz}) \\ \text{THDS I: } \pm 5\% (50/60\text{Hz}) \\ \text{PWHD U: } \pm 5\% (50/60\text{Hz}) \\ \text{PWHD I: } \pm 5\% (50/60\text{Hz}) \\ \end{array}$		

where: Ku - voltage transformer ratio Ki - current transformer ratio

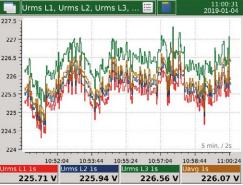
Udin - declared input voltage

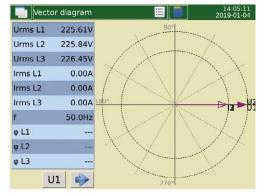
Urdg, Irdg - measurement values Un, In, Pn, Qn - nominal values

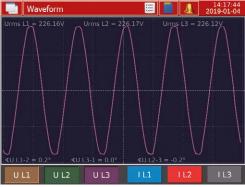
EXAMPLES OF MEASURING DATA PRESENTATION

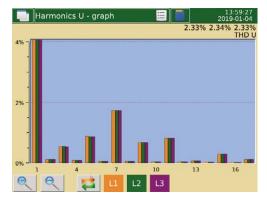
Urms L1, Urms L2, Urms L3, 2019-01-04 ę. Various forms of data display: 226.661 225.01↓ Â do V • digital display General Measuring 226.81↑ 225.15↓ Alarms Visualization L2 settings input analog view, P_A A V • bargraphs, 227.51↑ Archive vector diagrams Ethernet Modbus Security 225.86↓ • V trends a • Y 5 226.991 225.34↓ energy meter • System information Power Quality Outputs Uavg harmonics analysis • energy meter. Urms L1, Urms L2, Urms L3, 11:00:19 2019-01-04 Urms L1, Urms L2, Urms L3, 11:00:31 2019-01-04











📑 Hai	rmonics U - table			:00:48 -01-04
	L1 [%]	L2 [%]	L3 [%]	
THD	2.34	2.35	2.34	
THDG	2.34	2.35	2.34	
THDS	0.00	0.00	0.00	
PWHD	2.34	2.35	2.34	
1	100.00	100.00	100.00	
2	0.05	0.04	0.05	
3	0.78	0.79	0.78	
4	0.02	0.02	0.02	
5	0.63	0.63	0.63	
6	0.02	0.02	0.02	
7	1.78	1.79	1.78	
8	0.03	0.03	0.03	
9	0.66	0.66	0.66	-
10	0.03	0.03	0.03	

Screen system log files.

Screens log alarms.

Control panel.

EXAMPLES OF MEASURING DATA PRESENTATION

Ener	ду		13:08:41 2019-01-04
	value	unit	
∑ EnP+	00000000.0	kWh	
L1	00000000.0	kWh	
L2	00000000.0	kWh	
L3	00000000.0	kWh	
Σ EnP-	00000000.0	kWh	
L1	00000000.0	kWh	
L2	00000000.0	kWh	
L3	00000000.0	kWh	
ΣEnQ+	00000000.0	kVARh	
L1	00000000.0	kVARh	-

📑 Binary in	puts		14:07:45 2019-01-04
	BI1		BI2
	1	u e	0
	BI3		BI4
Ŭ	0		0
	BI5		BI6
Ŭ	0		0

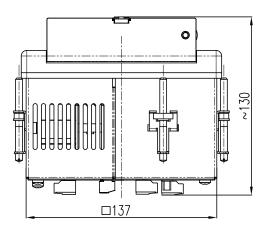
	Alarm logs	5	14:18:23 2019-01-04
No	Date	Time	Description
43	2016-01-20	13:49:54	Alarm 2 - Wł. (Urms L2 200ms 224.811V) (> 210)
42	2016-01-20	13:49:54	Alarm 1 - Wł. (Urms L1 200ms 224.823V) (> 200)
41	2016-01-20	08:53:15	Alarm 1 - Wł. (Urms L1 200ms 240.477V) (> 200)
40	2016-01-19	16:00:19	Alarm 2 - Wł. (Urms L2 200ms 229.91V) (> 210)
39	2016-01-19	16:00:19	Alarm 1 - Wł. (Urms L1 200ms 229.898V) (> 200)
38	2016-01-19	15:36:32	Alarm 2 - Wł. (Urms L2 200ms 228.824V) (> 210)
37	2016-01-19	15:36:31	Alarm 1 - Wł. (Urms L1 200ms 228.798V) (> 200)
•			Alarm 2 - Wk /Hrme I 2 200me

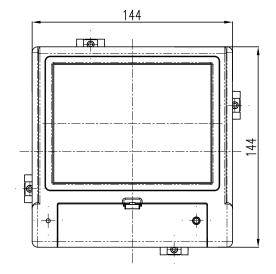
ETHERNET: WWW SERVER, FTP

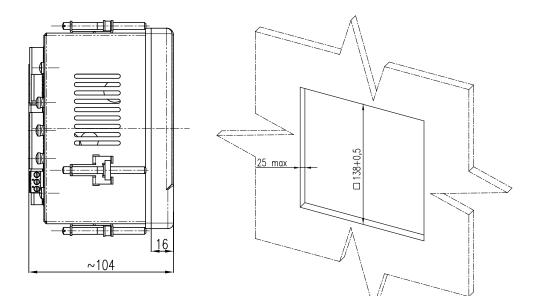
			Indeks ftp://10.0.1.84/ND45/			
Measurement data	User sel #1 ▼ 1s ▼	Alarms	2			
Name	Value	1	Name	Size	Data Modif	ied
Urms L1 1s	226.07V	Alarm 1 (Urms L1 200ms = 226 501V) (:	2019-01-04 08_21_26.ND45Arch 2019-01-04 08_31_30.ND45Arch 2019-01-04 08_35_42.ND45Arch	35 KB	2019-01-04	08:55:00
Urms L2 1s	226.10V			35 KB	2019-01-04	09:01:00
Urms L3 1s	226.04V	✓ C		35 KB	2019-01-04	09:07:00
Irms L1 1s	0.0603A		2019-01-04 08 44 37.ND45Arch	35 KB	2019-01-04	09:13:00
Irms L2 1s	0.0603A	 ▲ Files: /ND40 	alarm.log.csv audit.log.csv	2 KB	2019-01-04	09:21:00
Irms L3 1s	0.0603A			2 KB	2019-01-04 09:.	09:22:00
Pavg 1s	0.0071kW					
ΣP 1s	0.0214kW	Name				
ΣQ 1s	-0.0349kvar	Config_20190104_1026.ND45	2019-01-04 10:26:39 10.7 kB			
Σ5 1s	0.0409kvA					
PFavg 1s	0.52	System information				
Umfavg 1s	0.2533V	Device name	ND45			
		Device description				
			Power Analyzer			
		Serial number	16010002			
		System version	0.2.11			



DIMENSIONS AND ASSEMBLY









ORDERING CODE

POWER NETWORK ANALYZER ND45

Code	Description
ND45 1010M000*	Power Network Analyzer/ Recorder ND45 Input current 1A/5A, X/1A, X/5A, Input voltage 3x57.7/100V, Measuring class S, Ethernet, RS485, USB interfaces,memory up to 32GB, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate
ND45 1011M000*	Power Network Analyzer/ Recorder ND45 Input current 1A/5A, X/1A, X/5A, Input voltage 3x57.7/100V, Measuring class A/S, Ethernet, RS485, USB interfaces,memory up to 32GB, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate
ND45 2010M000*	Power Network Analyzer/ Recorder ND45 Input current 1A/5A, X/1A, X/5A, Input voltage 3x230/400V, Measuring class S, Ethernet, RS485, USB interfaces,memory up to 32GB, supply 85-253V a.c. or 90-300V d.c., documentation and descriptions in Polish and English version, test certificate
ND45 2011M000*	Power Network Analyzer/ Recorder ND45 Input current 1A/5A, X/1A, X/5A, Input voltage 3x230/400V, Measuring class A/S, Ethernet, RS485, USB interfaces,memory up to 32GB, supply 85-253V a.c. or 90-300V d.c., 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. **ND45 2011M002**. The customer will then receive a standard test certificate and a calibration certificate (against payment).

By agreement, an option to order the analyser with IEC 104 communication protocol is available for a fee. In this case, the value **03**, e.g. ND45 2011M**03**0, should be entered in the version code in place of the penultimate character.

ACCESSORIES

Description	GPS SIGNAL RECEIVER Note: 1 unit is included with ND45 analyser	ADAPTER TO CONNECT A GPS RECEIVER
Code	STR 00M0	CZ/20-001-00-00004
View		
Technical data	Receiver type: 50 channels GPS L1 C/A Accuracy: 2.5 m CEP Digital interface: R5-485 Voltage: 928 V d.c. Power consumption: < 2 VA Ambient temp: -2060°C Dimensions: 71 x 71 x 27 mm Weight: < 0.3 kg	JACK 3.5 mm, plug with 3 screw terminals Dimensions: 12 x 18 x 43 mm Weight: 0.009 kg

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LUMEL has been known, Since 1953, all over the world, as a manufacturer of top quality industrial automation devices.

Lumel offers consists of product categories, such as: for low voltage:

- Network parameter meters and analyzers,
- Electrical and non-electrical quantity transducers,
- Digital meters,
- Recorders and data loggers,
- ► Controllers,
- Analog meters,
- Current transformers,
- ► Shunts.

Depending on the needs of the customer, the automation products and systems our offer relay on various data communication protocols (MODBUS, ETHERNET, PROFINET, BACNET or MQTT).

for medium voltage :

Protection relays.

Apart from the products, Lumel specializes in complex systems used for:

- monitoring and optimizing the cost of electricity and other utilities (water, gas, compressed air)
- monitoring environmental parameters: temperature, humidity, light intensity, CO₂, volatile gases
- ► solar energy.

In addition to its manufacturing activity, Lumel offers also:

- OEM services in the scope of housing designing, elecctronics, mechanics, hardware and software. All under one roof.
- EMS services.
- ODM services.

We are a member of an international capital group which consists of the following companies: LUMEL S.A., LUMEL ALUCAST Sp. z o.o., Rishabh Instruments Pvt. Ltd., Sifam Tinsley US, Sifam Tinsley UK, Microsys.

CATALOG ONLINE





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