



CE

# extCZIP<sup>®</sup>-PRO

## PROTECTION RELAY

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

- extCZIP<sup>®</sup>-PRO extended version of the CZIP<sup>®</sup> 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

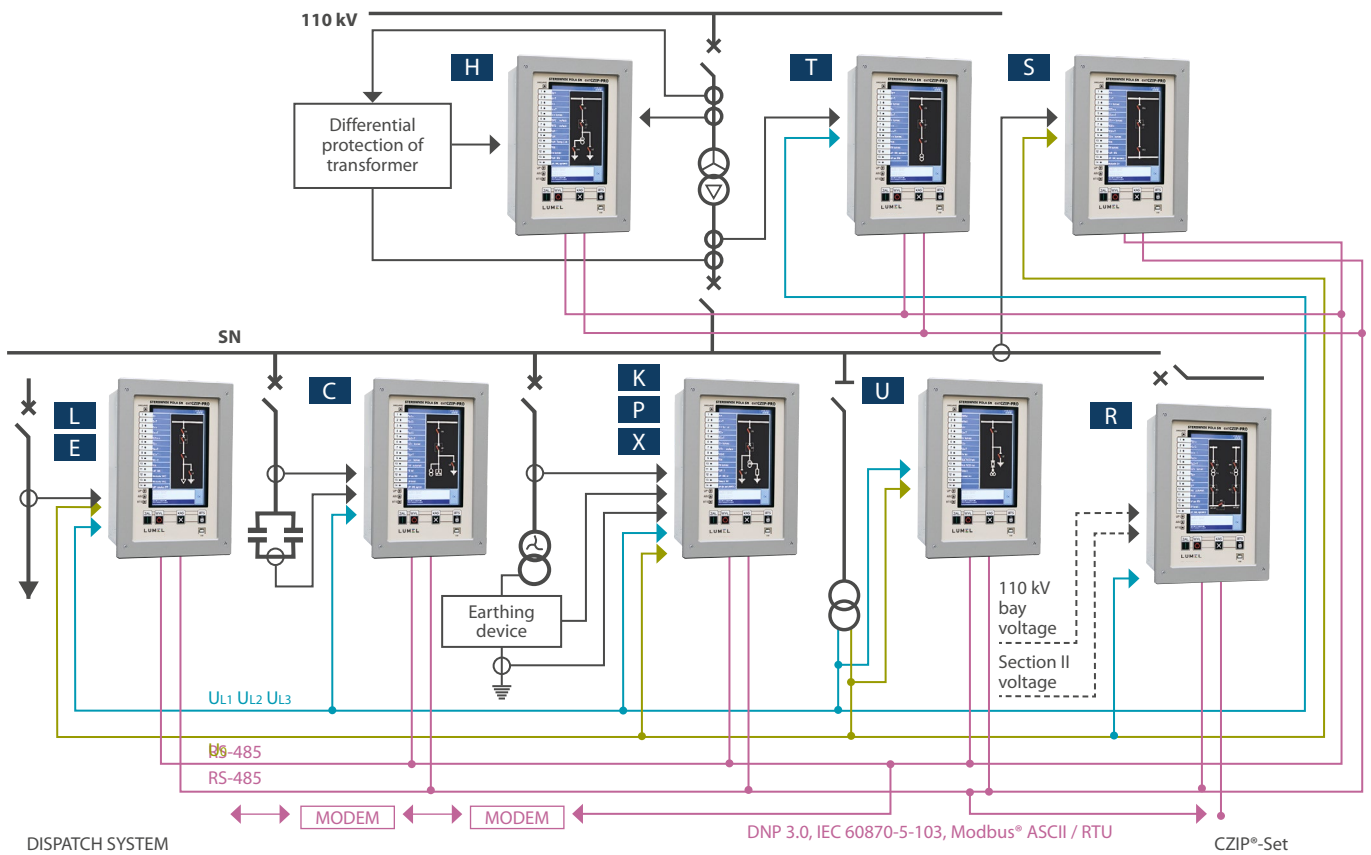
## Unique protection functions of the CZIP<sup>®</sup> system

- **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<sup>®</sup>-PRO** device,
- ATS system (automatic transfer switch) implemented in **extCZIP<sup>®</sup>-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<sup>®</sup> 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	E	Z	T	C	K	P	X	U	S	H	R
Three-stage overcurrent protection against phase faults	•1	•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	H	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	T	C	K	P	X	U	S	H	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	T	C	K	P	X	U	S	H	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									

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

<sup>2</sup> Non-directional.

<sup>3</sup> With separate automatic reclosing system.

<sup>4</sup> Built-in adaptive algorithm supporting effective detection of high-impedance earth faults.

<sup>5</sup> Optional function.

## ● extCZIP®-PRO purpose by bay

- L** line bay without local power plant
- E** line bay with local power plant (also wind power)
- Z** incoming/ outgoing feeder bay
- T** MV side of the 110 kV/MV transformer
- C** capacitor bank
- K** auxiliary services in compensated networks (also networks with an insulated neutral point)
- P** auxiliary services in networks with resistor-earthed neutral point
- X** auxiliary services in networks with parallel reactor – resistor earthing system
- U** voltage measurement
- S** busbar coupler
- H** 110 kV side of the 110 kV/MV transformer

## ● extCZIP®-2R PRO purpose

- R** ATS system (automatic transfer switch)

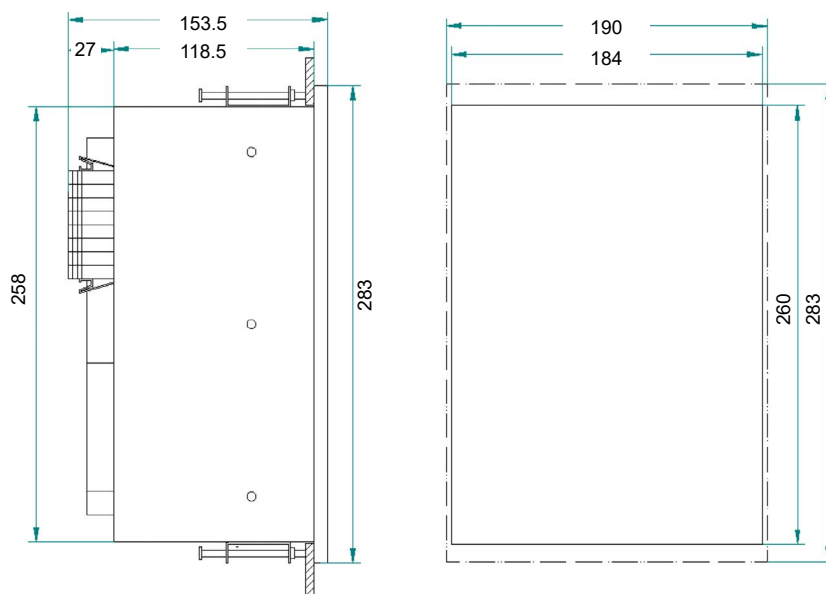
## TECHNICAL DATA

Phase current inputs	
Rated current $I_n$	5 A or 1 A
Current range	0...192 A
Measurement error	$0 A >   0,35...50 A   < 192 A < 10\%   < 1,5\%   < 10\%$
Rated frequency $f_n$	50 Hz
Power consumption at $I=I_n$	< 0,5 VA
Phase voltage inputs	
Rated voltage $U_n$	100 V
Voltage range	0...130 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 $I_{0n}$	0,5 A
Current range	0...5 A
Measurement error	0,02...3,5 A < 1,5%
Rated frequency $f_n$	50 Hz
Power consumption at $I=I_{0n}$	< 0,4 VA
Zero-sequence voltage inputs	
Rated voltage $U_{0n}$	100 V
Voltage range	0...130 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	
Rated input voltage	24 V    220 V
Input voltage range	17...32 V    88...253 V
Current drain	< 3 mA    < 3 mA
Output relays	
Rated voltage	220 V    24 V
Continuous current carrying capacity	5 A
Breaking capacity of the induction circuit	0,1 A 2 A
• 220 V DC, L/R = 40 ms	
• 220 V AC, $\cos \varphi = 0,4$	
Circuit breaker connection circuits	
Rated voltage	220 V    24 V
Continuous current carrying capacity	8 A
Breaking capacity of the induction circuit	1,2 A / 300 cycles
• 220 V DC, L/R = 40 ms	
Duration of the switch-off impulse	min. 0,1 s
Duration of the switch-on impulse	min. 0,1 s
Other data	
Power supply	
• nominal auxiliary voltage	220 V DC    230 V AC    24 V DC 90...220...300 V    85...230...265 V    19...24...65 V
• auxiliary power consumption	< 20 W
Environmental conditions	
• operating temperature	-10...+55°C
• storage temperature	-20...+70°C
• altitude	≤ 2000 m
• relative humidity	5...95%
Weight	6 kg
Dimensions	283 x 190 x 153,5 mm backboard version 283 x 190 x 233 mm onboard version
Case protection degree	IP 50

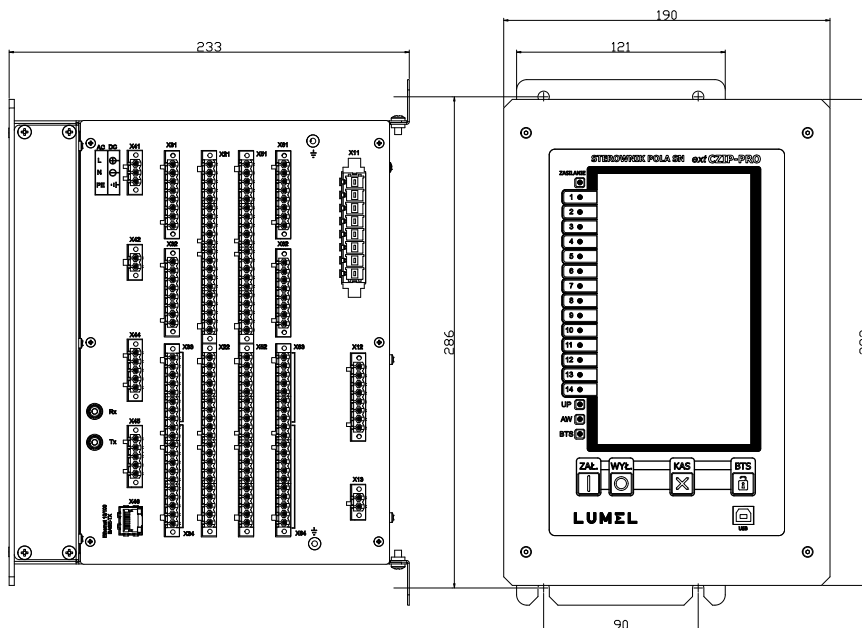
## DIMENSIONS

### Backboard version

Dimensions of the hole in the mounting plate



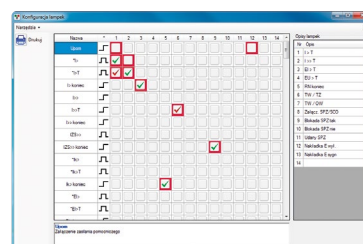
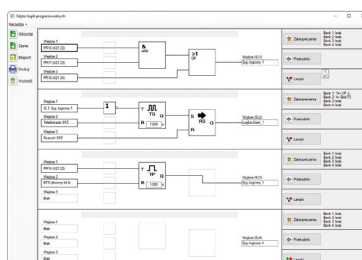
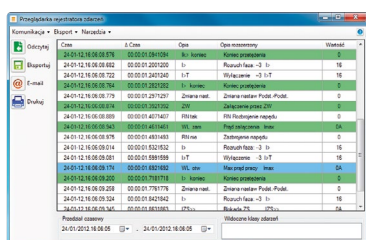
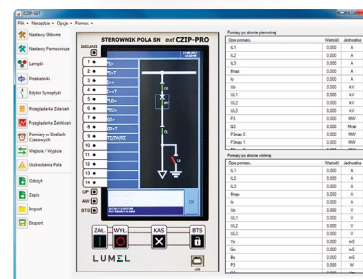
Onboard version



Holes with a diameter of 6,5 mm for mounting on the board using 4 M5 screws

## CZIP<sup>®</sup>-Set extCZIP<sup>®</sup>-PRO SOFTWARE

- software supplied with extCZIP<sup>®</sup>-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<sup>®</sup>-PRO device to individual needs and solutions,
- software enables communication with extCZIP<sup>®</sup>-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).



SEE ALSO:

**extCZIP®-PV-PRO**  
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