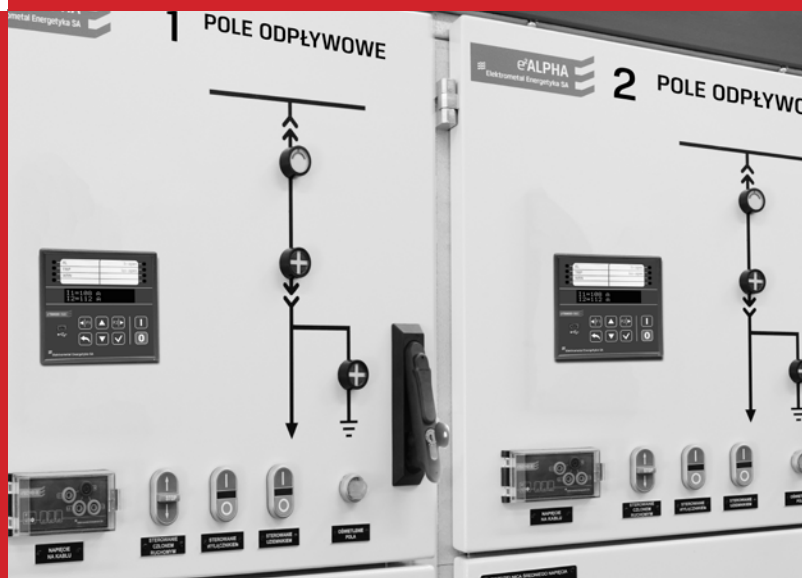




Elektrometal Energetyka SA®



# e<sup>2</sup>TANGO<sup>®</sup>-150 Protection Relay





## WE CREATE IDEAS WITH POWER!

The e<sup>2</sup>TANGO-150 protection relay is a solution developed by ELEKTROMETAL ENERGETYKA SA R&D team consisting of engineers with extensive know-how and many years of experience in the industry. Applied solutions and concepts address the problems that our customers face on a daily basis. These challenges were our key inspiration during design work. This allowed us to develop a compact, user-friendly protection relay which is intuitive in daily use and does not require any advanced training for operating personnel. The e<sup>2</sup>TANGO-150 is the perfect complementation to the e<sup>2</sup>TANGO family of protection devices. It has an interface consistent with the controllers.

The protection relay stands out in more than one way. However, ease and comfort of use are significant advantages. We wanted to develop a unique user-friendly and intuitive device for everyday use. e<sup>2</sup>TANGO-150 versatility and compact size allow for easy adaptation to specific requirements of users and protected loads. A special emphasis was put on safety because we know how important it is in power industry. All our products, including the e<sup>2</sup>TANGO-150 family of protection relays, are certified for full type testing in the most demanding laboratories.

e<sup>2</sup>TANGO-150 is a unique protection relay. We are sure about it, that is why we are confident in recommending this device to our customers.



Aleksander Piekarski  
Protection Automation Development Coordinator  
Elektrometal Energetyka SA



## APPLICATION

The e<sup>2</sup>TANGO-150 protection relay is designed to work in medium and low voltage networks, in either 1-, 2- or 3-phase systems. The product is equipped with short-circuit, overcurrent and earth fault protections, thanks to which it can be used in various types of bays as basic and backup protection and also as protection for medium and low voltage motors.

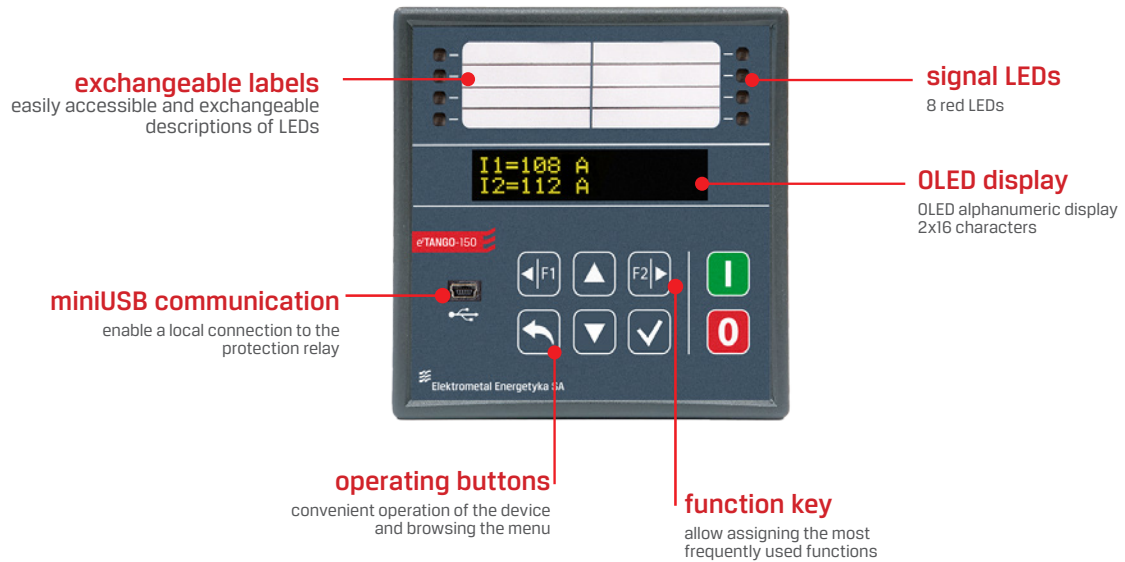


## ADVANTAGES OF THE PROTECTION RELAY



## STRUCTURE

The e<sup>2</sup>TANGO-150 protection relay is equipped with a 2x16 character OLED alphanumeric display and an 8-button keypad for convenient operation. The front panel has 8 red LEDs which enable optical indication of the device's status. In addition, there are two function keys: F1 and F2, the purpose of which is assigned by the user. A pocket in the relay front panel is provided for the exchangeable LEDs description.



## PROTECTION FUNCTIONS

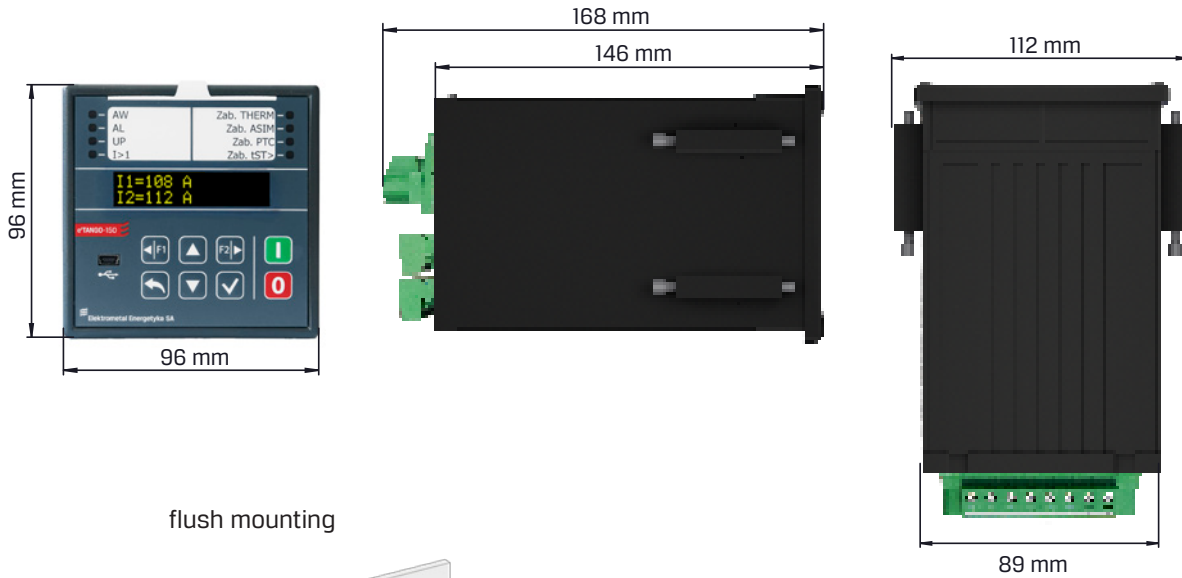
e <sup>2</sup> TANGO-150		M	L	G	LG
21NY	Admittance directional protection	-	-	•	•
23/26	Temperature protection (PTC sensor)	•	-	-	-
37	Undercurrent protection	•	-	-	•
46	Phase balance or reverse sequence current protection	•	-	-	-
48	Incomplete Sequence	•	-	-	-
49	Thermal protection	•	-	-	-
50	Overcurrent	•	•	-	•
50N/50Ns/50G	Ground overcurrent protection	-	-	•	•
50HS/SOTF	Switch on to fault protection	•	•	-	•
50LR/51LR	Locked rotor	•	-	-	-
51/51N	Inverse overcurrent protection	•	•	-	•
51/51N/51Ns/51G	Time overcurrent / ground time overcurrent protection	•	•	•	•
51N/59N	Ground time overcurrent with voltage interlock	-	-	•	•
51Ns/51G	Inverse ground overcurrent protection	-	-	•	•
59N	Ground overvoltage	-	-	•	•
62	Temperature protection (binary)	•	•	•	•
66	Notching or Jogging Device/Maximum Starting Rate/Starts Per Hour/Time Between Starts	•	-	-	-
67N/67Ns/67G	Ground directional overcurrent protection	-	-	•	•

•/- available/non-available

## RECORDERS

- event recorders, 200 events
- disturbance recorder up to 20 s
- sampling frequency 1 kHz

## DIMENSIONS AND MOUNTING METHODS



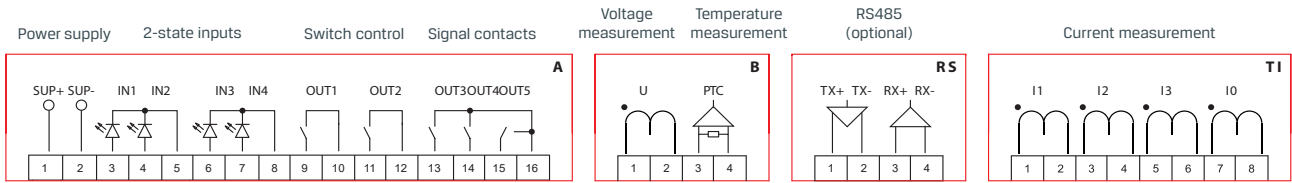
## VERSIONS

e <sup>2</sup> TANGO-150	M	L	G	LG
Protection type	motor	overcurrent	earth fault	overcurrent and earth fault
Measurement inputs	$I_1, I_2, I_3$	$I_1, I_2, I_3$	$I_0, U_0$	$I_1, I_2, I_3, I_0, U_0$
Possibility to calculate $I_0$ values	-	-	-	IO
RS485 communication	optional	optional	optional	optional
Input for PTC temperature measurement	•	-	-	-
Number of 2-state inputs	4	4	4	4
Number of 2-state outputs	5	5	5	5

• /- – available / not available

# WIRING DIAGRAM

## Connection of power supply, inputs and outputs



# TECHNICAL PARAMETERS

Voltage (UNI)	110 V, 220 V (80-300 V DC)	Operating time of the overcurrent protection	35 ms typically
DC	230 V (88-265 V AC)	Measurement accuracy $I_1, I_2, I_3$ (0.2-150 A)	2%
AC		$I_0$ measurement accuracy measured (0.005-10 A)	2%
Maximum power consumption	3 W	$U_0$ measurement accuracy measured (7-276 V)	2%
Rated frequency	50 Hz	$I_0$ measurement accuracy for transformers ( $U_0 > 7$ V, 0.005 A < 10 < 10 A)	1°
Phase rated current	5 A (1 A optional))	Measurement accuracy $\varphi_0$ for transformers ( $U_0 > 7$ V, 0.005 A < 10 < 10 A)	1°
Phase rated voltage for transformers	57,7/100/230 V	Operating temperature	-25°C ... +55°C
Phase current measurement range for core transformers	0.2-150 A Other at request	Degree of protection (from the connections)	IP4X/IP54 (option)
Phase voltage measurement range for transformers	7-276 V		
$I_0$ current measurement range	0.005-10 A		
$U_0$ voltage measurement range	3-230 V		

## STANDARISATION

PN-EN 60255-1	Measuring relays and protection equipment. Part 1: Common requirements
PN-EN 60255-26	Measuring relays and protection equipment. Part 26: Electromagnetic compatibility requirements
PN-EN 60255-27	Measuring relays and protection equipment. Part 27: Product safety requirements

## CERTIFICATES AND AWARDS



Mazovian Quality Award



Minister of Energy Cup  
ENERGETAB 2018 trade fair



Forbes Diamonds 2025

## ELEKTROMETAL ENERGETYKA SA QUALITY

Implemented Integrated Management System based on the following standards:

- PN-EN ISO 9001 Quality Management Systems
- PN-EN ISO 14001 Environmental Management Systems
- PN-EN ISO 45001 Health and Safety Management System

# ORDER FORM

To order the e<sup>2</sup>TANGO-150 protection relay, please fill in this part of the form according to the INSTRUCTIONS FOR FILLING IN THE FORM presented below.

## STEP 1

① version	<input type="checkbox"/> 150-M	<input type="checkbox"/> 150-L	<input type="checkbox"/> 150-G	<input type="checkbox"/> 150-LG
② phase current measurement method	<input type="checkbox"/> P	<input type="checkbox"/> P	<input type="checkbox"/> X	<input type="checkbox"/> P
③ input for I <sub>0</sub> measurement <sup>1)</sup>	<input type="checkbox"/> X	<input type="checkbox"/> X	<input type="checkbox"/> F	<input type="checkbox"/> F
④ binary input voltage	<input type="checkbox"/> UNI (110-230 V AC/DC)	<input type="checkbox"/> 220V (220 V DC)	<input type="checkbox"/> 24V (24/48 V AC/DC)	<input type="checkbox"/> other (on consultation with the manufacturer) .....
⑤ protection class	<input type="checkbox"/> IP4X	<input type="checkbox"/> IP54		
⑥ communication	<input type="checkbox"/> X	<input type="checkbox"/> RS485		
⑦ language version	<input type="checkbox"/> PL	<input type="checkbox"/> EN	<input type="checkbox"/> other (on consultation with the manufacturer) .....	

1) Input for U<sub>0</sub> measurement from an open triangle available in G and LG versions.

Legend:

- P - phase current measurement in cooperation with current transformers 5 A or 1 A on the secondary side, measuring range up to 150A
- F - measurement with Feranti transformer
- X - none

additional requirements:

## STEP 2

e<sup>2</sup>TANGO

①

②

③

④

⑤

⑥

⑦

# INSTRUCTIONS FOR FILLING IN THE FORM

## STEP 1

The table below shows the basic technical parameters of the e<sup>2</sup>TANGO-150 protection relay. Only 1 item should be selected from each item numbered 1 to 8. If „other“ is selected, enter the ordered value in the corresponding field in STEP 2.

## STEP 2

The above-selected e<sup>2</sup>TANGO-150 protection relay parameters must be entered in the corresponding fields. The e<sup>2</sup>TANGO code created in such a way together with other requirements or a scanned page of the form should be sent with the order to: [export@elektrometal-energetyka.pl](mailto:export@elektrometal-energetyka.pl)

Example of the e<sup>2</sup>TANGO-150 protection relay configuration:

① motor design	_____
② measurement using transformers, phase current measurement range up to 150 A	_____
③ without I <sub>0</sub> measurement input	_____
④ universal power supply 110-230 V AC/DC	_____
⑤ protection class IP4X	_____
⑥ RS485 communication	_____
⑦ EN	_____

Example of correct code completion:

e<sup>2</sup>TANGO

150-M

P

X

UNI

IP4X

RS485

EN

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[www.elektrometal-energetyka.pl](http://www.elektrometal-energetyka.pl)