Energetyka

AZZ 4.xx

smart energy management

Independent short-circuit protection

Technical specifications

Document revision: 36972_7
Update: 11/09/2025

Safety

Dangerous voltages may appear on the connectors when no auxiliary voltage (power supply) is present.

The national and industry safety regulations must be observed during installation and operation

Use of a damaged device may result in improper operation of the monitored facility, which may result in a threat to life or health.

Correct and trouble-free operation of the device requires proper transport, storage, assembly, installation and commissioning, as well as proper operation, maintenance and service.

The installation and operation of the device should only be carried out by appropriately trained personnel.

Comments

We reserve the right to introduce changes to the device

The device for supervision and monitoring of industrial facilities

Other documents about the device can be downloaded from energetyka.itr.org.pl

Table of contents:

1. General

1.1. Symbols

Electrical warning sign, indicating important information regarding the presence of a hazard that may cause an electrical shock.

Warning sign indicating important information about a hazard, that may cause damage to the device or its malfunction.

Information sign highlights important device features and parameters.

1.2. Intended purpose of the device

Independent short-circuit protection AZZ 4.03, is intended for the protection of MV lines against short-circuits and overloads.

Fig. 1.1 AZZ 4.03 device view

AZZ 4.03 is equipped with a **Protections and Automatics Test (PAT)** mechanism– a mechanism that verifies the correctness of protection and automatics using external testing systems. It can be used to check the correct functioning of the protection, along with measuring transformers and measuring circuits.

The device is equipped with a protective cover, preventing direct access to its front panel. During normal operation, the protective cover should be closed. It should only be opened to carry out measurements and adjust settings. After their completion, it should be reinstalled.

1.3. Device characteristics

Diagnostics and Self-tests

- SC – Self-check
  - voltages: power supply, reference
  - memory: programme
  - calibration coefficients of the measuring circuits
- PAT – Protections and Automatics Test

Enclosure

- compact size 170 / 120 / 48 mm

User interface

- DIP or HEX type toggle switches
- test port for verification of the correctness of the protection I> dependent, I>> and Io>
- display enabling the preview of the measurement values

Indication

- LED indicator for the correct POWER operation and TRIP protection tripping/activation

1.4. Front panel

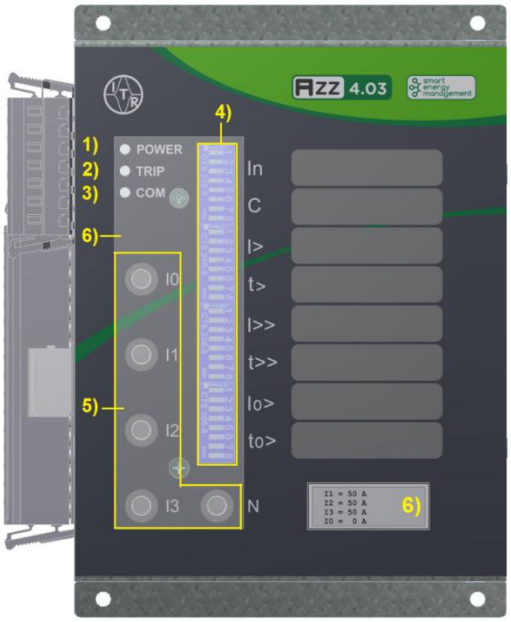


Fig. 1.2 Front panel view

The front panel features:

1) LED signalling the correct power supply of the device with test currents
2) Protection tripping/activation signalling LED
3) DIP or HEX type switch for parametrisation of the protections
4) Test port
5) Protective cover preventing access to the test port and switches
6) LCD display

1.5. Visual signalling

Table 1.5.1. Meaning of pre-defined LEDs:

Symbol/Name	Colour	Description
POWER	green	Signals that the test current has exceeded the minimum value required to correctly power the device – lights up continuously.
TRIP	red	Protection tripping/activation signalling: I> dependent, I>>, I0> – lights up continuously.

1st6th Setting the I0 current measurement method

Table 1.6.1. Meaning of DIP switch 5:

DIP 5-1	OFF	ON
DIP 5-2	OFF	OFF
DIP 5-3	OFF	OFF
DIP 5-4	OFF	OFF
I0	Measurement	Calculated

2. Functional tests

2.1. EC Directives and harmonised standards

EC Directives:

- electromagnetic compatibility (EMC) 2004/108/EC;
- low-voltage electrical devices (LVD) 2006/95/EC.

Table 2.1.1 General and harmonised standards

Standard No	Standard title
PN-EN 60255-1:2010	Measuring relays and protection equipment -- Part 1: Common requirements
PN-EN 60255-26:2014	Measuring relays and protection equipment -- Part 26: Electromagnetic compatibility requirements
PN-EN 60255-27:2014	Measuring relays and protection equipment -- Part 27: Product safety requirements
PN-EN 60529:2003	Degrees of protection provided by enclosures (IP Code)

2.2. Electromagnetic compatibility

Table 2.2.1 Disturbance emission

Port	Frequency range	Permissible values	Base standard
Enclosure	30 MHz – 230 MHz	40 dB(µV/m) quasi-peak value measured at a distance of 10 m	CISPR11
	230 MHz – 1000 MHz	47 dB(µV/m) quasi-peak value measured at a distance of 10 m	
Auxiliary power supply	0.15 MHz – 0.5 MHz	79 dB(µV) quasi-peak value	CISPR 22
		66 dB(µV) average value	
	0.5 MHz – 30 MHz	73 dB(µV) quasi-peak value	
		60 dB(µV) average value	

2.2.1. Disturbance immunity

Table 2.2.1.1 Input and output ports (including measuring circuits)

Type of disturbance	Scope of research	Description	Base standard	Acceptance criteria
Conducted disturbances induced by radio-frequency fields. Amplitude modulated	frequency sweep		PN-EN 61000-4-6	A
	0.15-80 MHz	Frequency		
	10 V	r.m.s.		
	80% AM (1 kHz)	% AM (1 kHz)		
	150 Ω	Source impedance in ohms		
	frequency scanning			
	27 MHz, 68 MHz	Frequencies		
	10 V	(r.m.s.)		
	80% AM (1 kHz)	Amplitude modulation		
	150 Ω	Source impedance		
	100 %	Duty cycle		
Electrical fast transients – Zone A	5/50 ns	Tr/Th	PN-EN 61000-4-4	B
	5 kHz	Repetition frequency		
	4 kV	Peak voltage		
Damped oscillatory wave	1 MHz	Voltage oscillation frequency	PN-EN 61000-4-12	B
	75 ns	Tr – Voltage rise time		
	400 Hz	Repetition frequency		
	200 Ω	Source output impedance		
	1 kV	Differential peak voltage		
	2.5 kV	Common mode peak voltage – to PE		
Surge – Zone A	1.2/50 (8/20) µs	Voltage (current) rising edge / time to half value Tr/Th	PN-EN 61000-4-5	B
	2 kV	L – N		
	4 kV	(L, N – PE)		
	2 Ω	Source output impedance		
Power frequency – Zone B (Applicable to binary inputs only)	Differential voltage 100 V	Voltage test (r.m.s.) (line to line)	PN-EN 61000-4-16	A
	Common mode voltage 300 V	Voltage test (r.m.s.) (line to PE)		

Table 2.2.1.2 Enclosure access port

Type of disturbance	Scope of research	Base standard	Acceptance criteria
Radiated radio-frequency electromagnetic field. Amplitude modulated	80-1000 MHz 10 V/m (r.m.s.) 80% AM (1 kHz)	IEC 61000-4-3	A
Electrostatic discharge	Contact discharge 6 kV (charging voltage) Air discharge 8 kV (charging voltage)	IEC 61000-4-2	B
Power frequency magnetic field	50 Hz frequency 30 A (r.m.s.)/m – continuous 300 A (r.m.s.)/m – 1 to 3 s	IEC 61000-4-8	A B

2.3. Product safety

Permanent insulation voltage tests and insulation resistance of measuring circuits

Table 2.3.1 Product safety

Type of insulation test	Value	Base standard
Long-term dielectric strength at power frequency 50 Hz	2.2 kV/AC 1 minute or 3.1 kV/DC 1 minute	PN-EN 60255-27
Impulse voltage withstand	5 kV impulse 1.2/50 µs; 0.5 J	
Insulation resistance	>100 MOhm 500 VDC	

2.4. Environmental conditions

Table 2.4.1 Environmental tests

Test	Standard	Test description
Cold	PN-EN 60068-2-1:2009	Minimum operating temperature -20˚C/16 hours Minimum storage temperature -30˚C/16 hours
Dry heat	PN-EN 60068-2-2:2009	Maximum operating temperature +55˚C/16 hours Maximum storage temperature +70˚C/16 hours
Damp heat, steady state	PN-EN 60068-2-78:2013-11	+40˚C; 95% rh/10 days

2.5. Mechanical resistance

Table 2.5.1 Mechanical tests

Test	Standard	Class
Sinusoidal vibration resistance and withstand tests	PN-EN 60255-21-1:1999	Class 2
Single and multiple shock resistance and withstand tests	PN-EN 60255-21-2:2000	Class 2
Seismic tests	PN-EN 60255-21-3:1999/Ap1:2002P	Class 0

2.6. Ingress protection

Table 2.6.1 Ingress protection

Test	Description	Standard	Ingress protection
Degree of protection provided by the enclosure (IP Code)	From the face panel side	PN-EN 60529:2003	IP 60
	From the connectors side without connectors installed		IP 20
	From the connectors side with connectors installed		IP 30

2.7. Installation requirements

Table 2.7.1 Installation requirements

Definition	Requirement
Protection rating	1
Overvoltage category	III
Contamination degree	2
Industrial environment zone	B

3. Technical parameters

3.1. Input circuits

The device is compatible with 50 Hz or 60 Hz grids

Frequency measuring range	45 Hz … 65 Hz

3.1.1. Current input circuits

Collaboration with the following types of current transformers:

- W1: SVA100 8-28 A
- W2: SVA100 16–56 A
- W3: SVA100 32–112 A
- W4: SVA100 64–224 A
- W5: SVA100 128–448 A

3.1.2. Zero-sequence current input circuit

Rated current I_{0n}:	0.05 A
Long-term current carrying capacity	1.2 I_{0n}
One-second current carrying capacity	50 I_{0n}
Power consumption at rated current	<0.2 VA
Measuring range	up to 5 I_{0n}

The zero-sequence current value can be calculated based on the phase currents.

3.2. Output circuits

3.2.1 Magnetic trip and signalling output circuit

Tripping energy	> 0.1 Ws
Output voltage	24 V

After the tripping of the protection, a rectangular signal (50 ms – active, 400 ms – inactive) is generated until the short-circuit current is broken.

3.3. Power supply

Autonomous

Minimum current required for correct operation	
Single-phase	0.075 A

Power supply

Nominal voltage (external power supply)	DC 120 V … 270 V AC 85 V … 265 V
Power consumption	< 25 VA

3.4. Connectors

Type	WAGO/Wieland disconnectable
Cross-section of connection wires	0.25..2.50 mm^2

3.5. Reset ratio

Reset ratio	+0.95

3.6. Measurement accuracy

Current measurement accuracy	5 %

3.7. Environmental conditions

Operating temperature	-20˚C ... +55 ˚C
Storage temperature	-35˚C ... +70 ˚C
Maximum relative humidity	no condensation or frost or ice formation

3.8. Ingress protection

From the face panel side	IP60
From the connectors side	IP20
From the connectors side with connectors installed	IP30

4. Device operation

The device is equipped with eight groups of HEX or DIP type switches. The protection settings are selected by setting the switches, as described, in the correct positions. Tripping or activation of the protections is indicated by the lighting up of the TRIP LED. The correct operation of the device is indicated by the lighting up of the POWER light (min. operating current: 75 mA/phase).

Table 4.1. Description of the functions of the toggle switches.

DIP	HEX	Description
1 (1-4)	1	In – current transformer rated current
1 (5-8)	2	C – choice of dependent characteristics
2 (1-4)	3	I> – dependent overcurrent protection starting value
2 (5-8)	4	t> – time of delay for I> dependent protection
3 (1-4)	5	I>> – short-circuit protection I>> starting value
3 (5-8)	6	t>> – time of delay for I>> protection
4 (1-4)	7	I0 > – earth fault overcurrent protection starting value
4 (5-8)	8	t0> – time of delay for earth fault overcurrent protection

Fig. 4.1. View of the toggle switches

AZZ4.03 devices with HEX type switches are manufactured on special order.

5. Protections

Individual values can be changed using DIP or HEX toggle switches, depending on the design version (see the *Procurement Specification*).

Table 5.1 "In" switches

DIP 1-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 1-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 1-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 1-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
W1	8	9	10	11	12	13	14	15	16	17	18	20	22	24	26	28
W2	16	18	20	22	24	26	28	30	32	34	36	40	44	48	52	56
W3	32	36	40	44	48	52	56	60	64	68	72	80	88	96	104	112
W4	64	72	80	88	96	104	112	120	128	136	144	160	176	192	208	224
W5	128	144	160	176	192	208	224	240	256	272	288	320	352	384	416	448

5.1. I> dependent short-circuit protection

The short-circuit protection features six dependent characteristics. The selection of the characteristic is determined by the setting of the "C" switches. There is also an independent protection operation setting (see table 5.1.1). The protection is activated when the current exceeds the value set on the "I>" switch and it is indicated by the lighting up of the "TRIP" LED. Tripping of the protection causes energisation of outputs O1 and O2 (generating a 24 V DC rectangular signal to the magnetic trip of the circuit breaker and to the signalling).

Table 5.1.1 "C" switches

DIP 1-5	OFF	ON	OFF	ON	OFF	ON	OFF
DIP 1-6	OFF	OFF	ON	ON	OFF	OFF	ON
DIP 1-7	OFF	OFF	OFF	OFF	ON	ON	ON
DIP 1-8	OFF	OFF	OFF	OFF	OFF	OFF	OFF
HEX 2	0	1	2	3	4	5	6
Characteristics	Independent	Steep	V. steep	IEC normally dependent	IEC very dependent	IEC extremely dependent	IEC long time dependent

Setting the "C" switch to the OFF position causes independent operation of the protection.

Table 5.1.2 "I>" switches

DIP 2-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 2-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 2-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 2-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 3	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
x In	+0.9	+0.95	+1.0	+1.05	+1.1	+1.15	+1.2	+1.3	+1.4	+1.5	+1.6	+1.8	+2.0	+2.25	+2.5	-

Table 5.1.3 "t>" switches

DIP 2-5	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 2-6	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 2-7	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 2-8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 4	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
time (s)	+0.04	1	2	3	4	5	6	8	+10	+15	+30	+60	+120	+180	+240	+300

5.1.1. I> protection characteristics

$$T_Z = \frac{T \cdot \beta}{\left(\frac{I}{I_r}\right)^{\alpha} - 1}$$

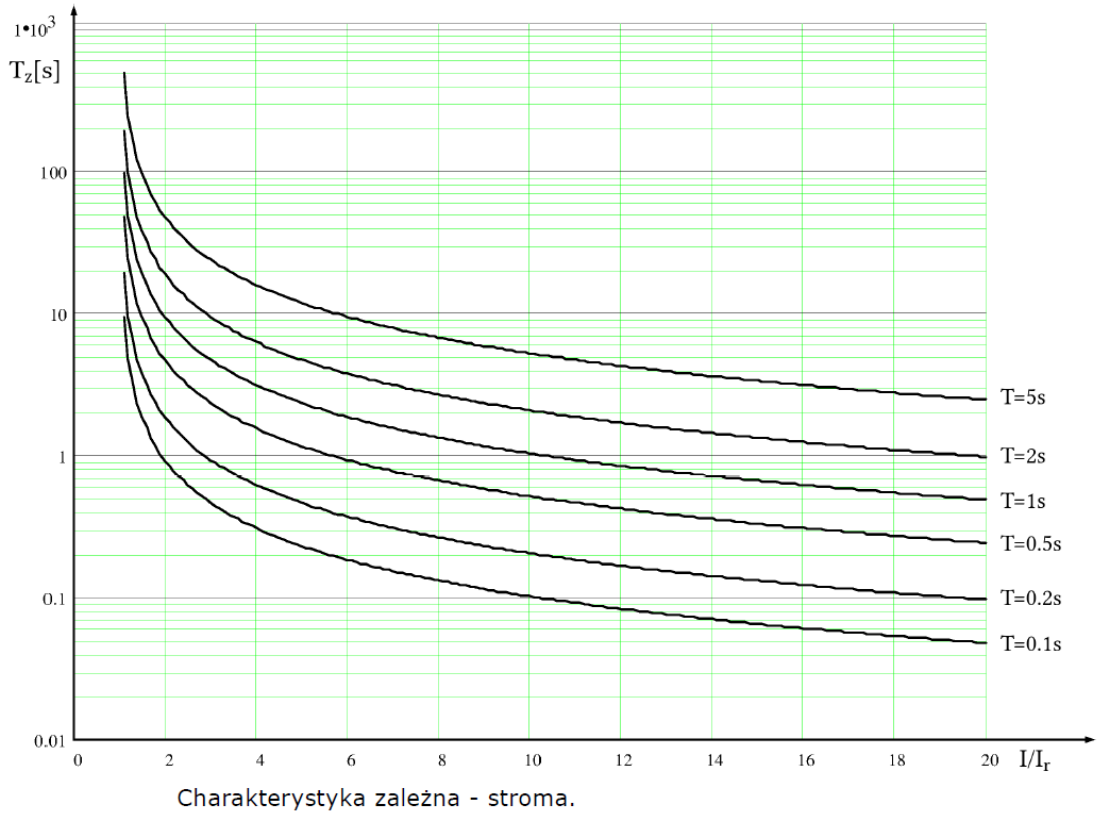
where:

I – current value measured during activation;

T, Ir – protection setting parameters;

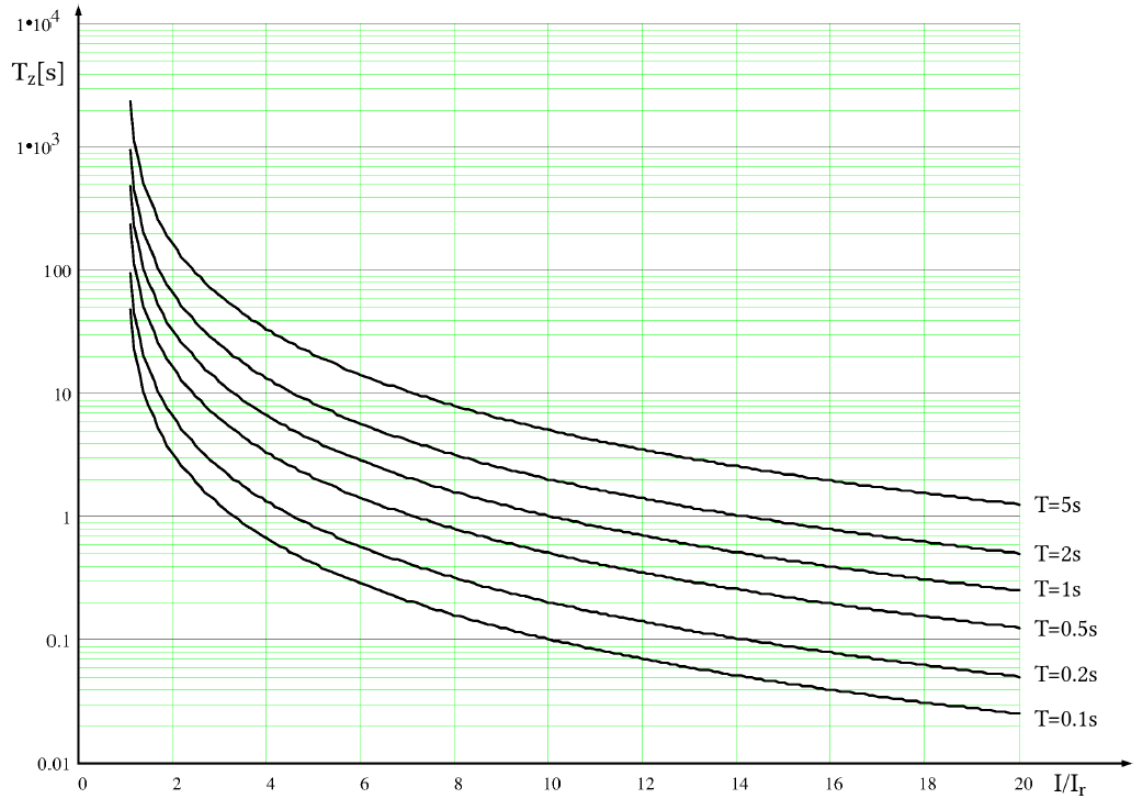
α, β – define the characteristic type according to the table:

Characteristics	Name	Standard	α	β
Steep	Dependent characteristics – steep	-	1	9
Very steep	Dependent characteristics – very steep	-	2	+99
IEC normally dependent	Dependent characteristics – IEC (standard inverse)	IEC	+0.02	+0.14
IEC very dependent	Very dependent characteristics – IEC (very inverse)	IEC	1	+13.5
IEC extremely dependent	Extremely dependent characteristic – IEC (extremely inverse)	IEC	2	+80
IEC long time dependent	Dependent characteristics with extended time – IEC (long time inverse)	IEC	1	+120



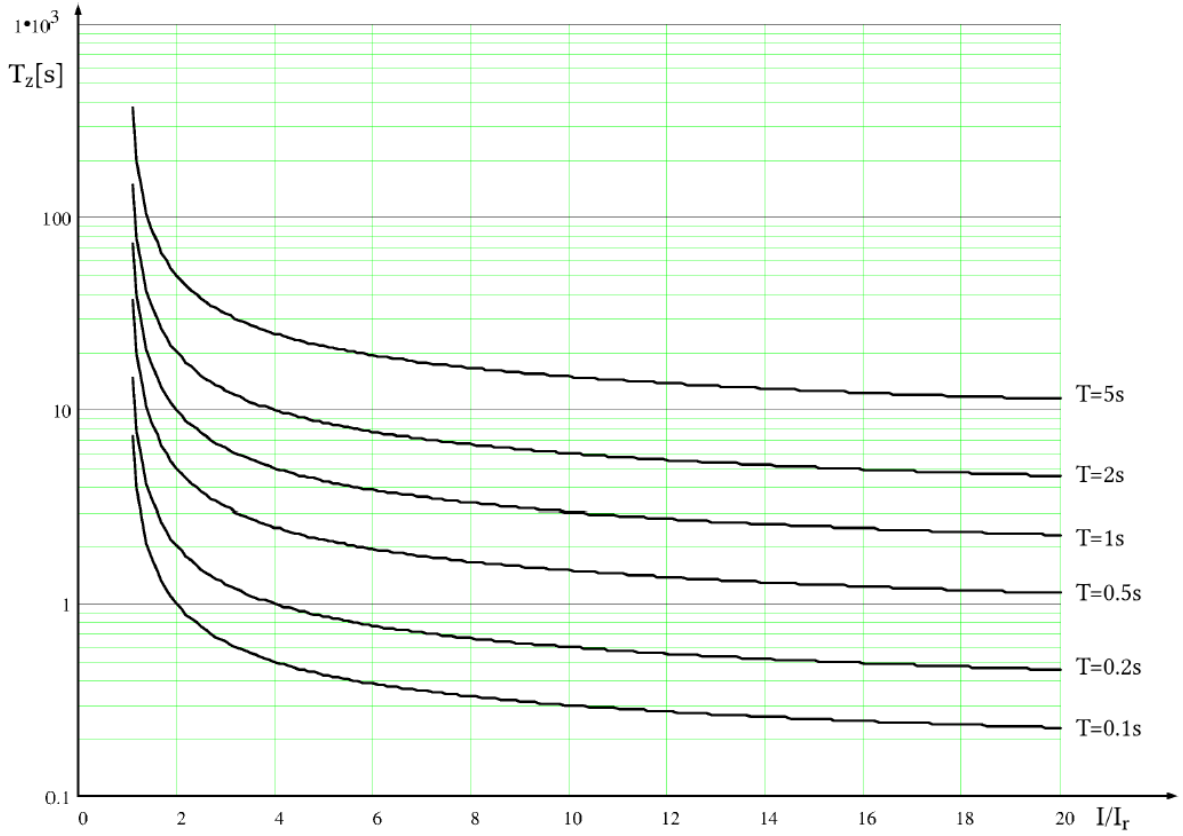
Charakterystyka zależna - stroma.

Charakterystyka zależna – stroma.	Dependent characteristics – steep.



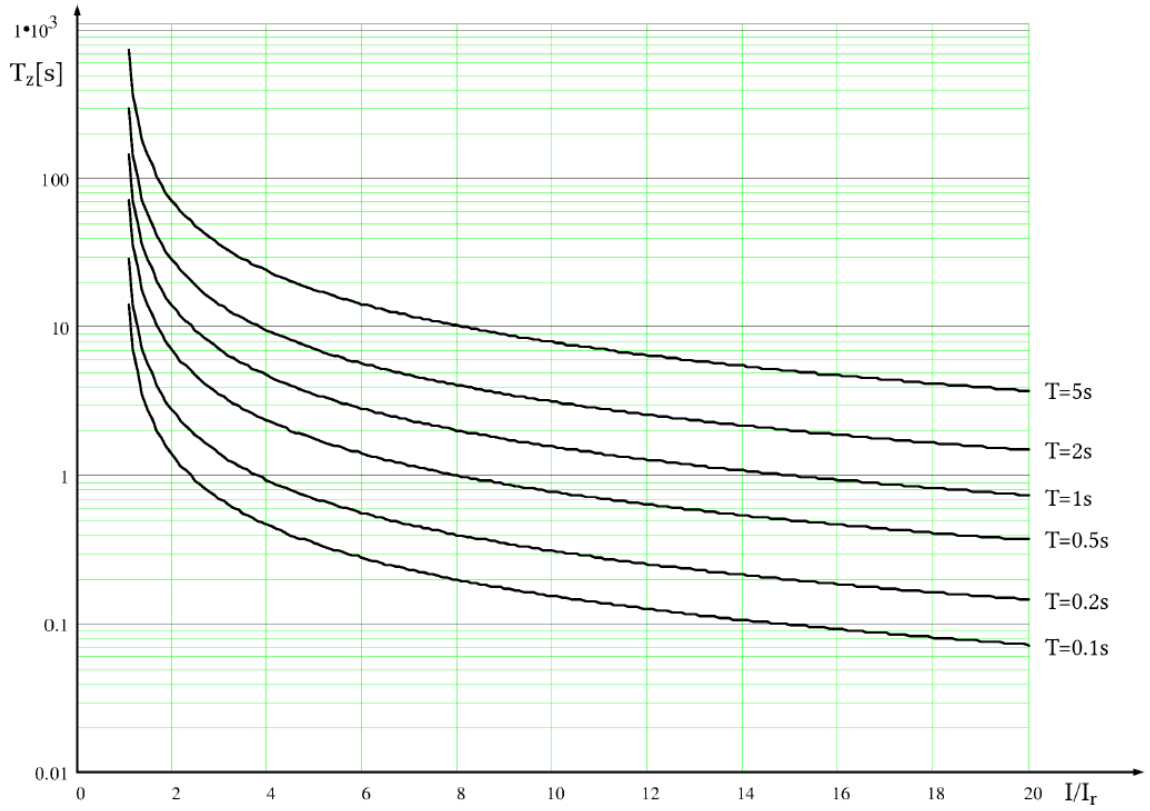
Charakterystyka zależna - bardzo stroma.

Charakterystyka zależna – bardzo stroma.	Dependent characteristics – very steep.



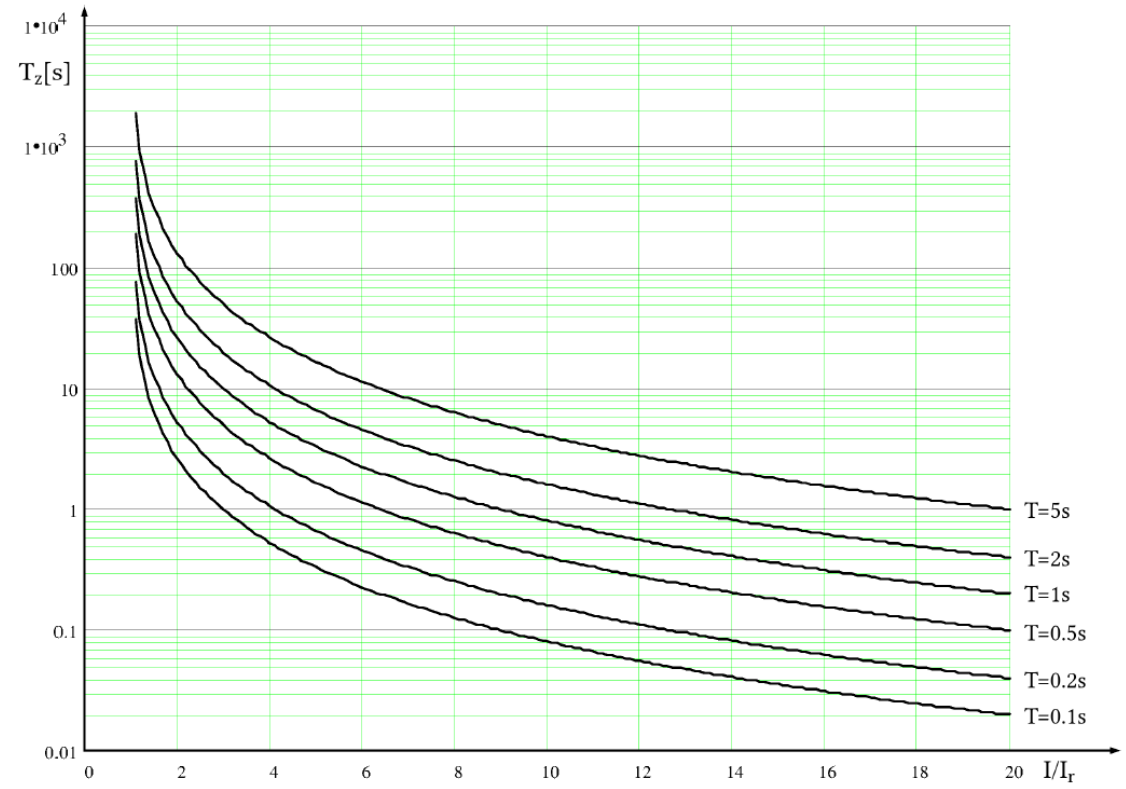
Charakterystyka zależna -IEC (standard inverse).

Charakterystyka zależna – IEC (standard inverse).	Dependent characteristics – IEC (standard inverse).



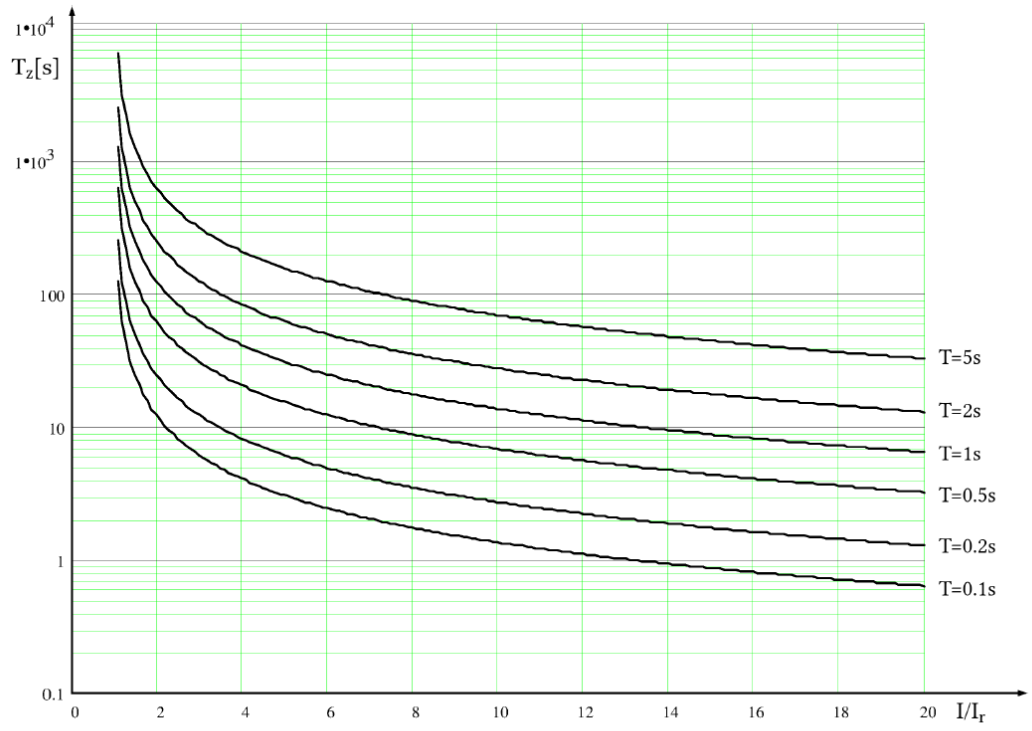
Charakterystyka bardzo zależna -IEC (very inverse).

Charakterystyka bardzo zależna – IEC (very inverse).	Very dependent characteristics – IEC (very inverse).



Charakterystyka ekstremalnie zależna - IEC (extremely inverse)

Charakterystyka ekstremalnie zależna – IEC (extremely inverse)	Extremely dependent characteristic – IEC (extremely inverse)



Charakterystyka zależna o wydłużonym czasie - IEC (long time inverse).

Charakterystyka zależna o wydłużonym czasie – IEC (long time inverse).	Dependent characteristics with extended time – IEC (long time inverse).

5.2. Short-circuit protection I>> independent

The protection is activated when the current exceeds the value set on "I>>" switch and it is indicated by lighting up of the "TRIP" LED. Tripping of the protection causes energisation of outputs O1 and O2 (generating a 24 V DC rectangular signal to the magnetic trip of the circuit breaker and to the signalling).

Table 5.2.1 "I>>" switches

DIP 3-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 3-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 3-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 3-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 5	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
x In	1	2	3	4	5	6	7	8	9	+10	+12	+14	+16	+18	+20	-

Table 5.2.2 "t>>" switches

DIP 3-5	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 3-6	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 3-7	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 3-8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 6	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
time (s)	+0.04	+0.07	+0.1	+0.15	+0.2	+0.25	+0.3	+0.4	+0.6	+0.8	+1.0	+1.4	+1.8	+2.2	+2.6	+3.0

5.3. Earth fault protection I0>

The starting value of the protection is determined by the setting of switches "I0>". The protection tripping delay time is set using switch "tI0>". The protection is activated when I0 current exceeds the starting value set and it is indicated by the lighting up of the LED

"TRIP". Tripping of the protection causes energisation of outputs O1 and O2 (generating a 24 V DC rectangular signal to the magnetic trip of the circuit breaker and to the signalling).

Table 5.3.1 "I0>" switches

DIP 4-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 4-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 4-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 4-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 7	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
x In	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	+1.2	+1.4	+1.6	+1.8	+2.0	+2.5	-

Table 5.3.2 "t0>" switches:

DIP 4-5	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP 4-6	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP 4-7	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP 4-8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
HEX 8	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
time (s)	+0.1	+0.2	+0.4	+0.6	+0.8	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5	+4.0	+6.0	+8.0	+10	+20

5.4. Settings calculator

The AZZ protection settings calculator is a web application available at: https://energetyka.itr.org.pl/kalkulator/index.html.
It allows the user to conveniently select transformer ratio settings, starting values, times and characteristics of I>, I>>, I0> protections. After selecting the appropriate DIP switch configuration, the specific row is highlighted along with the starting setting and time of delay.

Kalkulator zabezpieczenia AZZ	AZZ protection calculator
Kalkulator I0	Calculator I0
Kalkulator I	Calculator I
Powrót do strony urządzenia	Return to device page
Kalkulator nastawy I0>	I0> setting calculator
Strona pierwotna	Primary side
Strona wtórna	Secondary side
DIP Switch	DIP Switch
OFF	OFF
ON	ON
Nastawa DIP switch 4	DIP switch 4 setting
Próg zadziałania I0>	I0> tripping threshold
Nastawa DIP switch 2	DIP switch 2 setting
Próg zadziałania I0>	I0> tripping threshold

5.5. Remote tripping

The device has one external tripping input. Energising the output causes energisation of the outputs that generate a 24 V DC rectangular signal to the magnetic trip of the circuit breaker and to the signalling.

5.6. Changing RS485 transmission parameters

To change the communication port configuration:

- Launch ELF2 software,
- Install the library – **Tools** > **Install libraries…** > **internet** > **AZZ403_XX_XX** (XX – model can be found on the device nameplate)
- Create a new project **AZZ403_XX _XX**, save and close,
- Connect to the device – **Tools** > **Communication** (select the COM communication port, then manual connection)
- Select menu **Tabs** > **Configuration**, then the icon.

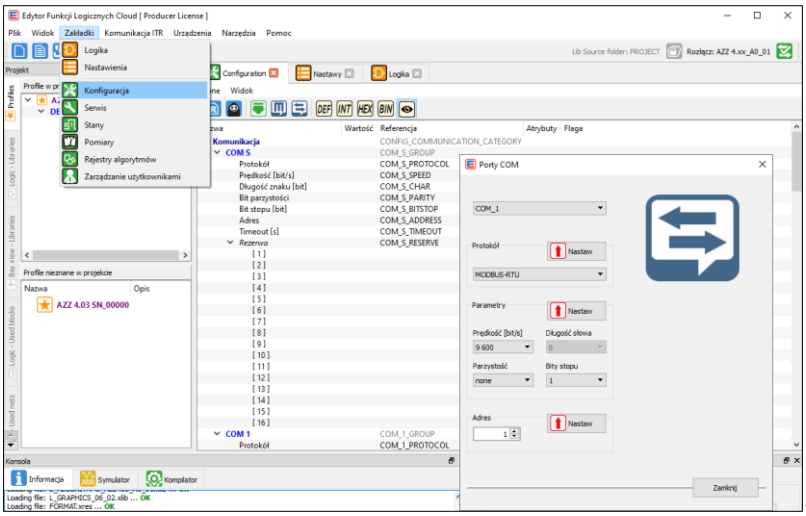


Figure 5.5.1 View of the ELF 2 utility software window

6. Diagnostics

6.1. SC – Self-check

The following are subject to self-check: power supply and reference voltages, programme memory and calibration coefficients of the measuring circuits. If a fault is detected that could endanger the safe operation of the switchgear, the following occurs: interruption of the device operation and lighting up of the POWER and TRIP visual signalling on the front panel with a flashing light. Such a condition requires service action.

6.2. Self-tests

6.2.1. PAT – Protections Test

PAT – Protections and Automatics Test is used to verify the correctness of protection operation using external testing systems. It enables testing of selected protections, including the input circuits (measuring and binary) used by the given protection. Systems generating test signals, which are connected to the device inputs, are required to carry out the test. After the test signal is applied, the response of the selected protections is checked.

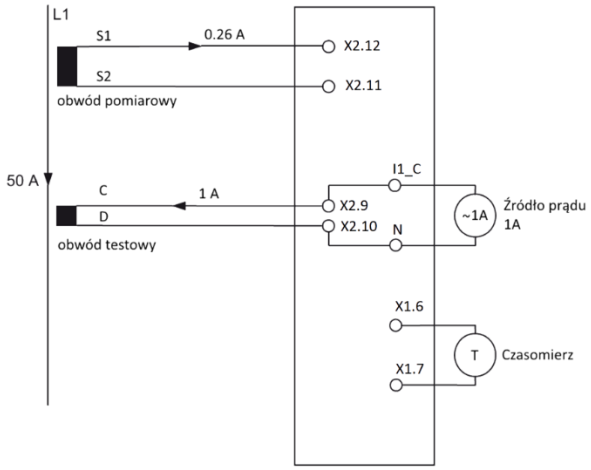


Fig. 6.2.1 Test device wiring diagram on the example of SVA100 16–56 A

Obwód pomiarowy	Measuring circuit
Obwód testowy	Test circuit
Źródło prądu	Current source
Czasomierz	Timer

In order to verify the correctness of the operation of the device and the installed wiring, a 1A 50Hz current source should be connected to the X1 connector, according to Fig. 6.2.1, and a timer or a different signalling device should be connected to pulse output O_2. The current transformer test winding is selected to have a 1A current flow, offset by 50A primary current (SVA100 16-56A type transformer). The AZZ device should be parametrised to have the device (selected protection) tripped for the desired forced current flow. Additionally, using the timer, the tripping delay time can be checked.

If no tripping takes place when the current flow is forced, this may mean damage to the device, incorrect wiring or incorrect parametrisation of the device.

The verification of the correct operation of the earth fault protections requires the supply of power to the device via phase circuits.

7. Dimensions of the device

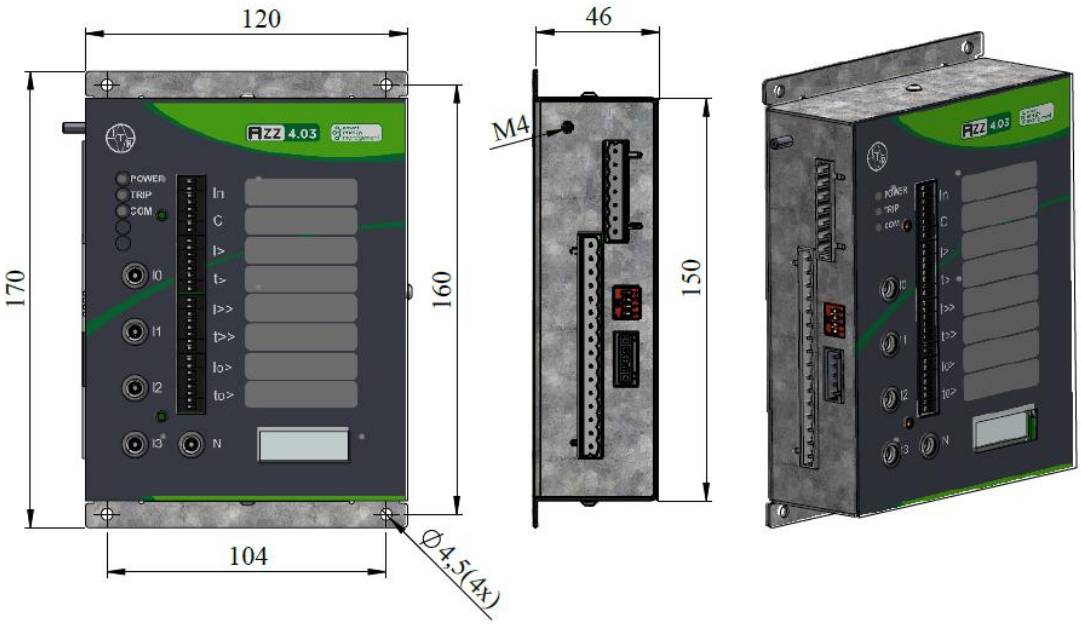


Fig. 7.1. Enclosure dimensions

8. Connection diagram

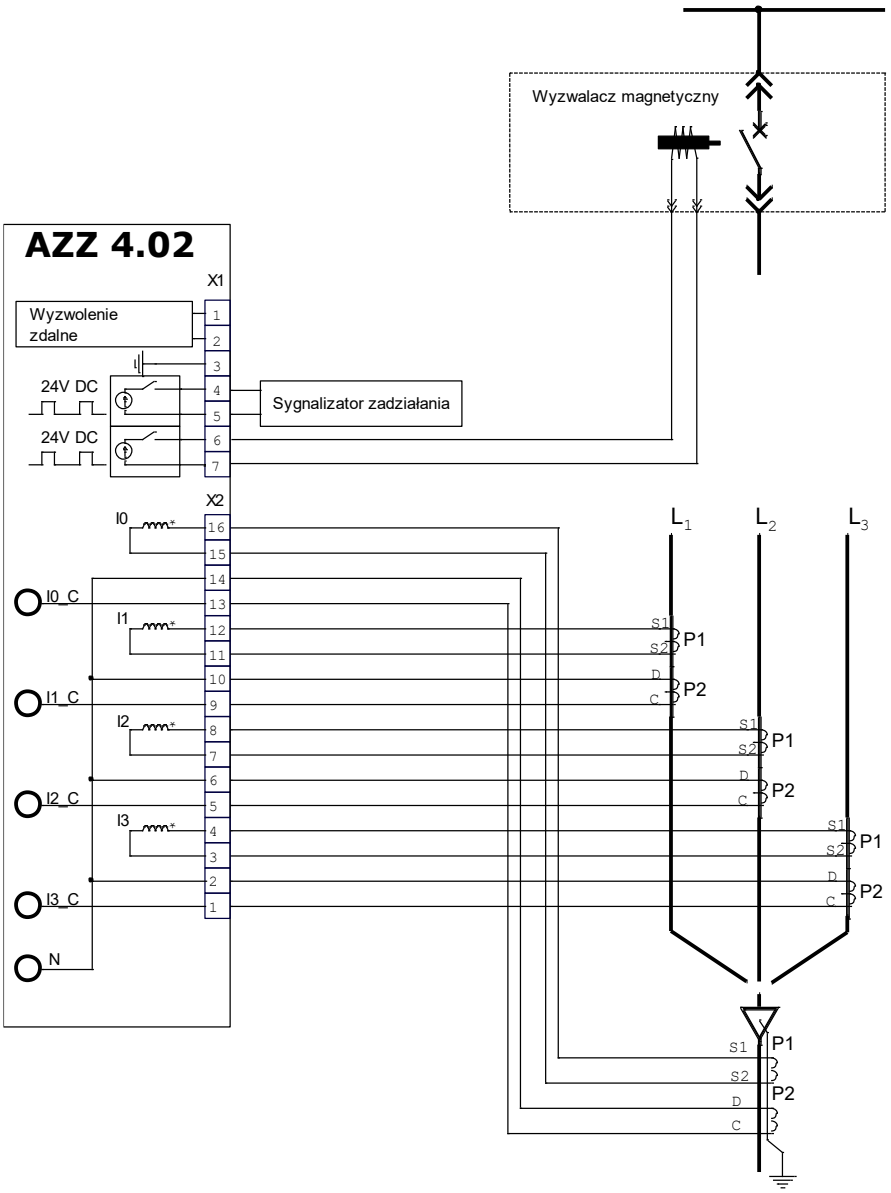


Fig. 8.1. AZZ 4.03 connection diagram

Wyzwalacz magnetyczny	Magnetic trip
Wyzwolenie zdalne	Remote tripping
Sygnalizator zadziałania	Triggering indicator

9. Description of connection sockets

Table 9.1. X1 socket description

Terminal No	Designation	Description/Designation
1	EXT1	Remote tripping
2	EXT2	
3	PE	PE protective earthing
4	O_1 (+)	Pulse output – triggering signalling
5	O_1 (-)	
6	O_2 (+)	Pulse output – magnetic trip
7	O_2 (-)	

Table 9.2. X2 socket description

Terminal No	Designation	Description/Designation
1	L3(C)	Phase L3 – start of test winding
2	L3(D)	Phase L3 – end of test winding
3	L3(S1)	Phase L3 – end of winding
4	L3(S2)	Phase L3 – start of winding
5	L2(C)	Phase L2 – start of test winding
6	L2(D)	Phase L2 – end of test winding
7	L2(S1)	Phase L2 – end of winding
8	L2(S2)	Phase L2 – start of winding
9	L1(C)	Phase L1 – start of test winding
+10	L1(D)	Phase L1 – end of test winding
+11	L1(S1)	Phase L1 – end of winding
+12	L1(S2)	Phase L1 – start of winding
+13	L0(C)	Io – start of test winding
+14	L0(D)	Io – end of test winding
+15	L0(S1)	Io – end of winding
+16	L0(S2)	Io – start of winding

Table 9.3. X3 socket description (applicable to AZZ4.03)

Terminal No	Designation	Description/Designation
1	24V(+)	Communication modem power supply voltage
2	RT	Terminating resistor, short circuit with pin No 3 when in use
3	A	RS485-A data line
4	B	RS485-B data line
5	24V(-)	Communication modem power supply voltage

Table 9.4. Description of the test ports on the front panel

Designation	Description/Designation
Io	Io test input
I1	L1 phase test input
I2	L2 phase test input
I3	L3 phase test input
N	Common for L1, L2, L3 and Io

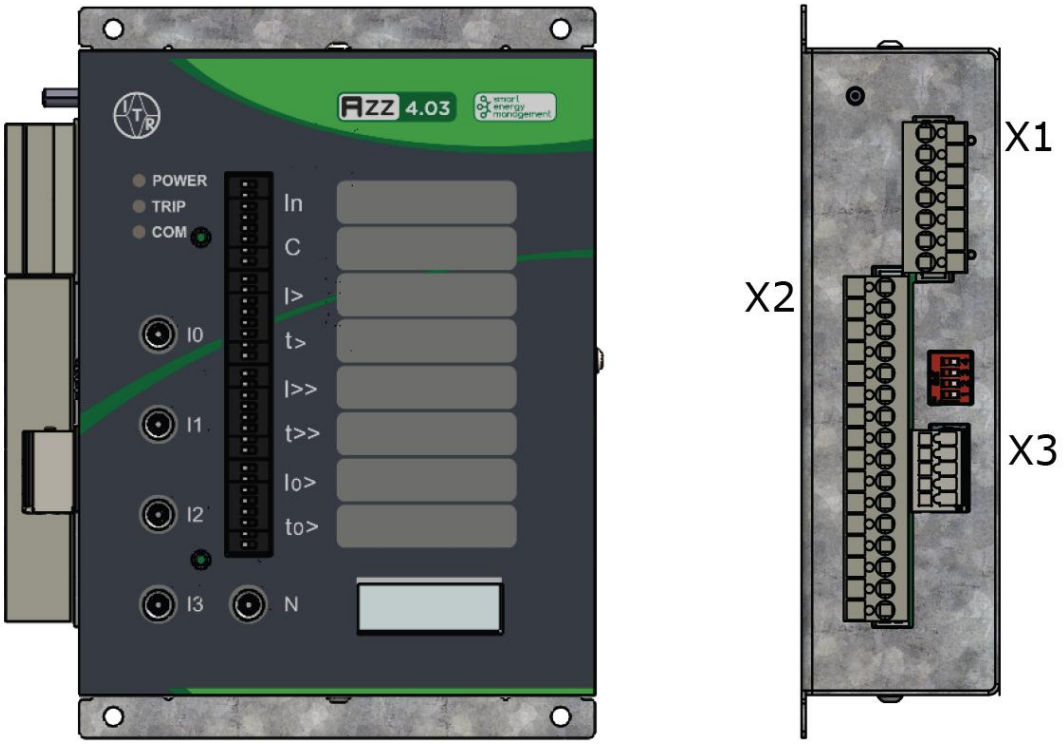


Fig. 9.1. View of the device from the connectors side

The red point on the connector means the first pin.

10. Manufacturer's comments

10.1. Maintenance, inspections, repairs

The manufacturer recommends that the device be checked for correct operation:

a) each time – during commissioning,
b) at least once a year – in mine face facilities,
c) at least every 5 years – in environments other than mine face facilities.

It is also necessary that checks provided for by industry regulations be carried out.

10.2. Storage and transport

The devices are packaged in transport packaging in a manner that protects them from damage during transport and storage.
The devices should be stored in transport packaging, in spaces that are: enclosed, free from vibrations, not directly exposed to atmospheric conditions, dry, ventilated and free from harmful vapours and gases. The ambient air temperature should not be lower than -35°C or higher than +70°C; the relative humidity should not exceed 80%.
The shipped devices are accompanied by the user manual and the warranty card.

10.3. Installation location

The AZZ 4.03 device is intended for board mounting. The total length of cables connected to the input and output ports must not exceed 3 m.
The device installation is carried out according to the following sub-sections:

- mounting of the device at the target location
- tightening of fixing bolts
- installation of circuits connectors

10.4. Disposal

The devices have been manufactured predominantly from materials that can be recycled or disposed of without causing any risk to the environment. End-of-life devices may be collected for re-processing, provided that their condition corresponds to normal wear and tear. Any components that are not refurbished will be disposed of in an environmentally friendly manner.

10.5. Warranty and service

The product is covered by a 36-month warranty. If the sale was preceded by a contract signed by the Buyer and the Seller, the provisions of that contract shall apply. The warranty covers the free removal of defects revealed during use, subject to the terms and conditions specified in the warranty card. Detailed terms and conditions of the warranty can be found at energetyka.itr.org.pl_in the document General Terms and Conditions of Sale of “ITR Energetyka” products.

- The warranty period is counted from the date of sale.
- The warranty is extended by the period during which the product is under repair.
- Unauthorised tampering with the product will render the warranty void.
- The warranty does not cover damage resulting from improper use of the product.

11. Order specification

	A
Enclosure version	
DIP switch	1
HEX switch	2

Example of an order:

- AZZ 4.03 A100 – design with DIP toggle switches
- AZZ 4.03 A111 – design with DIP toggle switches, a display and an RS485 communication module

12. Contact us

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