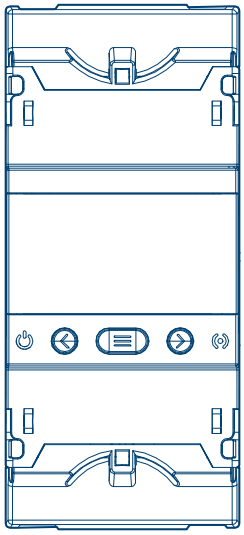
Operating and installation instructions

Protection and monitoring relay

Residual current protection relay



Residual current protection relay 0.03–3 A, type A 4-channel

HR535

CE UK CA

hager

EN

1 Safety instructions

Electrical devices may only be installed and assembled by a qualified electrician in accordance with the relevant installation standards, guidelines, regulations, directives, and safety and accident prevention regulations of the country of installation.

Failure to comply with these installation instructions may result in damage to the device, fire or other dangers.

2 Design and layout of the device

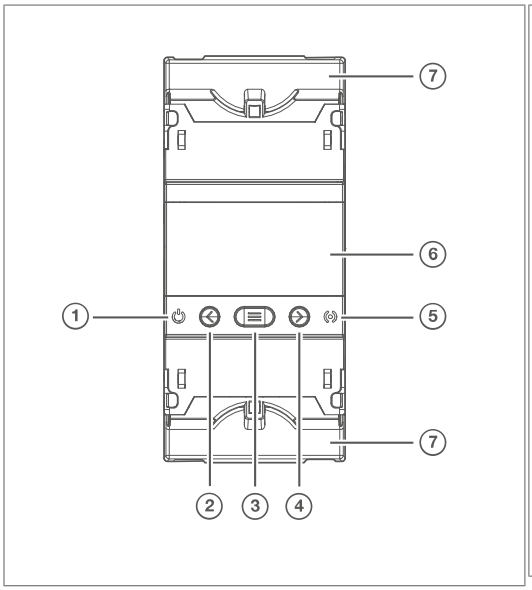


Fig. 1: Front view

1. CPU LED
2. **T** button
3. Menu button
4. **R** button
5. Status LED
6. LCD screen
7. Cover for connecting terminals

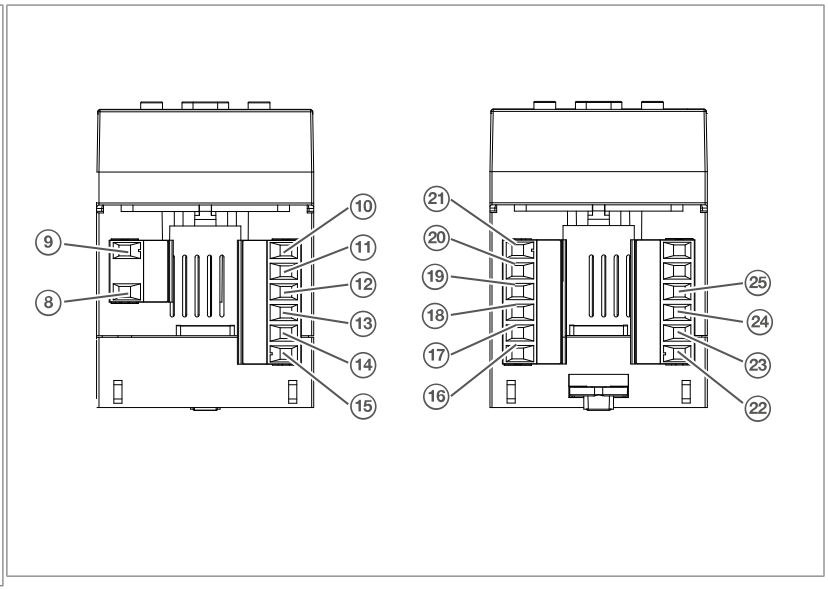


Fig. 2: View of connecting terminals

8. Power supply L (terminal A1)
9. Power supply N (terminal A2)
10. R1, trip relay (NO) channel 1 (terminal 1)
11. R2, trip relay (NO) channel 2 (terminal 2)
12. C1, trigger relay (common) (terminal 3)
13. R3, trip relay (NO) channel 3 (terminal 4)
14. R4, trip relay (NO) channel 4 (terminal 5)
15. C2, pre-alarm relay (common) (terminal 6)
16. S1, transformer connection channel 1 (terminal 7)
17. S2, transformer connection channel 1 and 2 (common) (terminal 8)
18. S1, transformer connection channel 2 (terminal 9)
19. S1, transformer connection channel 3 (terminal 10)
20. S2, transformer connection channel 3 and 4 (common) (terminal 11)
21. S1, transformer connection channel 4 (terminal 12)
22. Pre-alarm relay (NO) (terminal 19)
23. Pre-alarm relay (common) (terminal 20)
24. TRIP/RESET, input for external trigger or reset (terminal 21)
25. TRIP/RESET, input for external trigger or reset (terminal 22)

3 Function

The device is a type A differential protection and monitoring relay with 4 independent channels, configurable pre-alarm and remote reset.

Correct use

- Residual current monitoring
- Installation on DIN rail according to IEC 60715:2017
- Connection to external transformers (HR...)

▶ Detailed information can be found at https://hgr.io/r/HR535

Functional description

The device enables continuous monitoring of earth fault currents in earthed power grids. The current induced in the external transformer is detected in the device, measured and the effective value (TRMS) is calculated.

LCD screen description

- White LCD screen: Regular use
- Blue LCD screen: Configuration
- Yellow LCD screen: Pre-alarm activated
- Red LCD screen: Fault display/test

LED	Function
CPU (1) ON	Device switched on
Status (5), fast flashing	Signal processing
Status (5), slow flashing and yellow background	Triggering of the pre-alarm relay
Status (5), ON and red background	Device triggered by leakage, toroidal core fault or ext. trigger

Buttons	Function
<T	Short: change display or setting Long (> 3s): test relay
>R	Short: change display or setting Long (> 3 s): carry out a reset
☰	Short: confirm selection Long (> 3s): go back to the previous step

4 Information for qualified electricians

4.1 Installation and electrical connection

Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Isolate all connection cables before working on the device and cover any live parts in the area!

1. Remove the cover (7) of the connecting terminals.
2. Fix the device on the DIN rail.

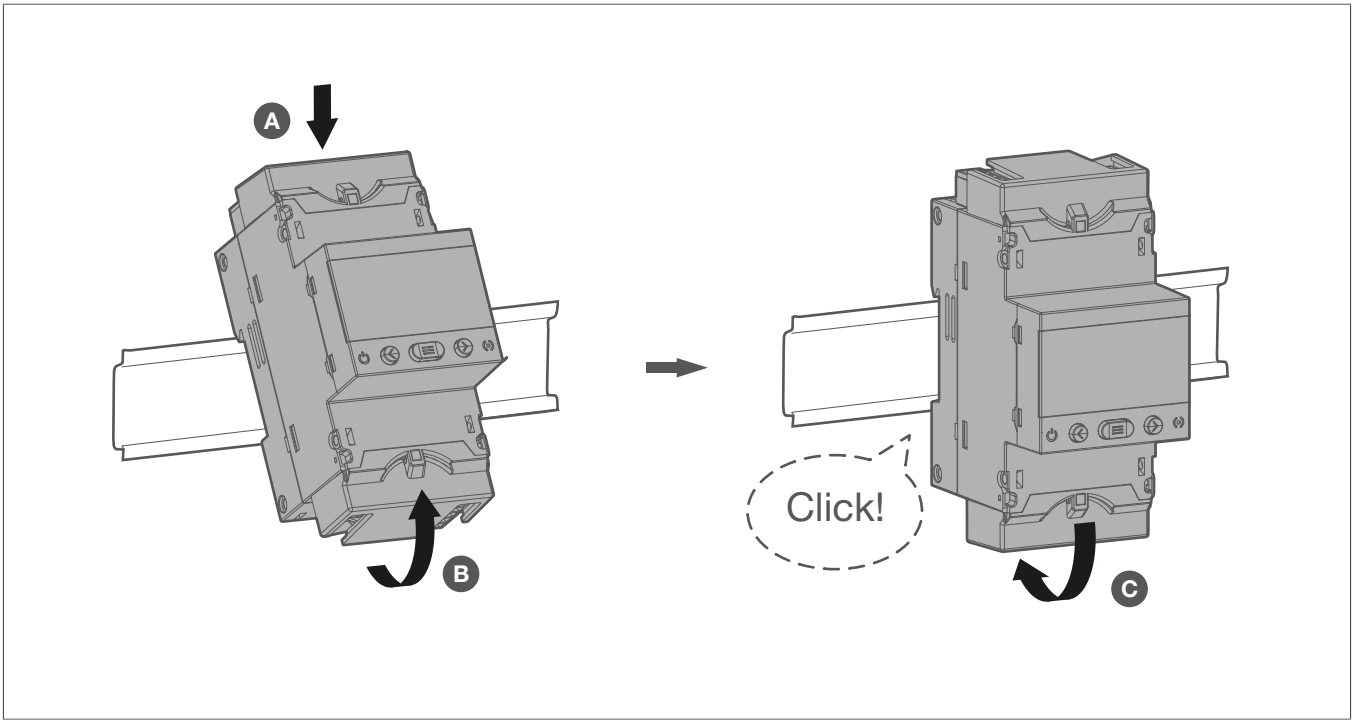


Fig. 3: Fixing the device on the DIN rail

3 Connect and wire the device (Fig. 4: Connecting the device).

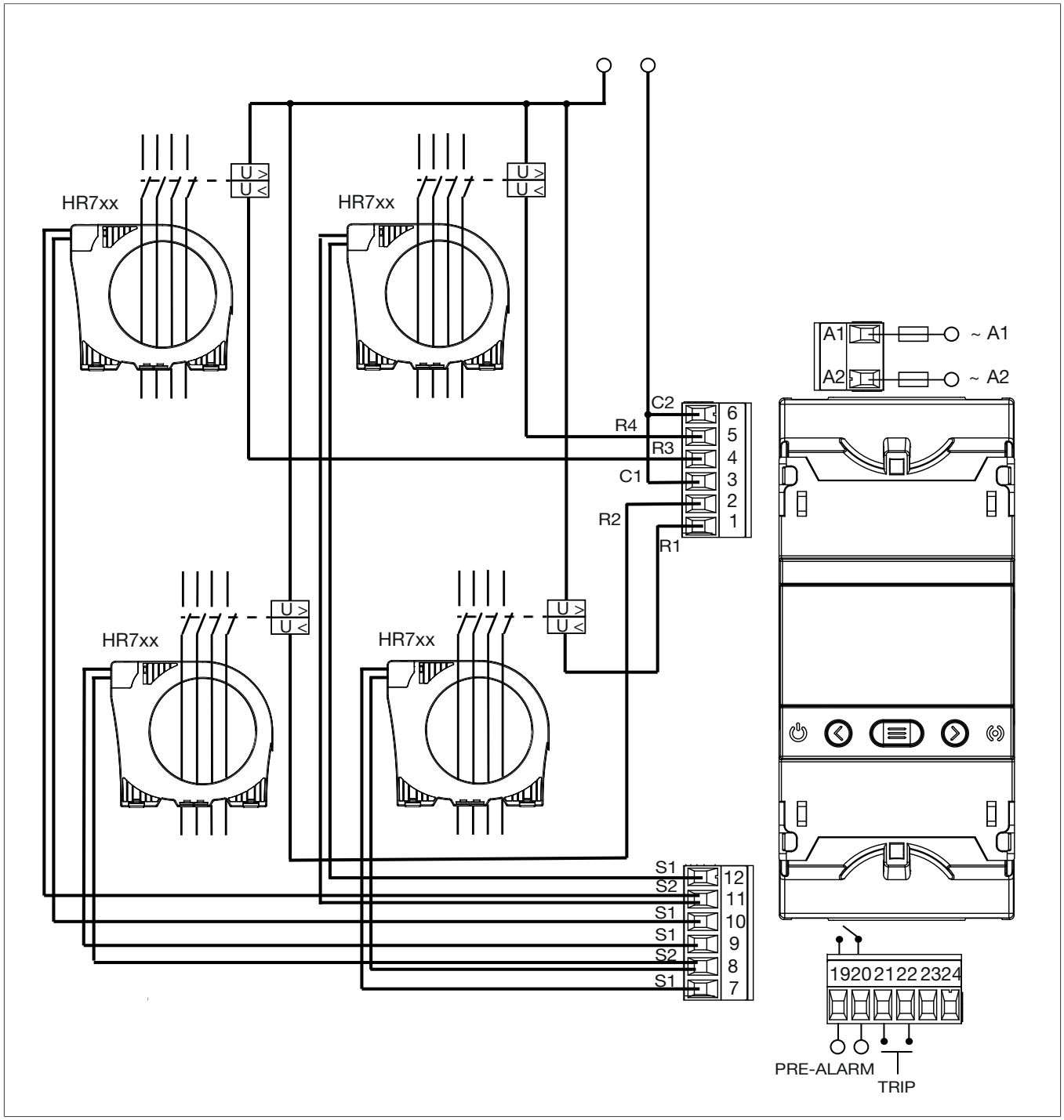


Fig. 4: Connecting the device

4 Attach the cover of the connecting terminals.

4.2 Installation and electrical connection of toroidal transformer

1. Guide the cables through the device.

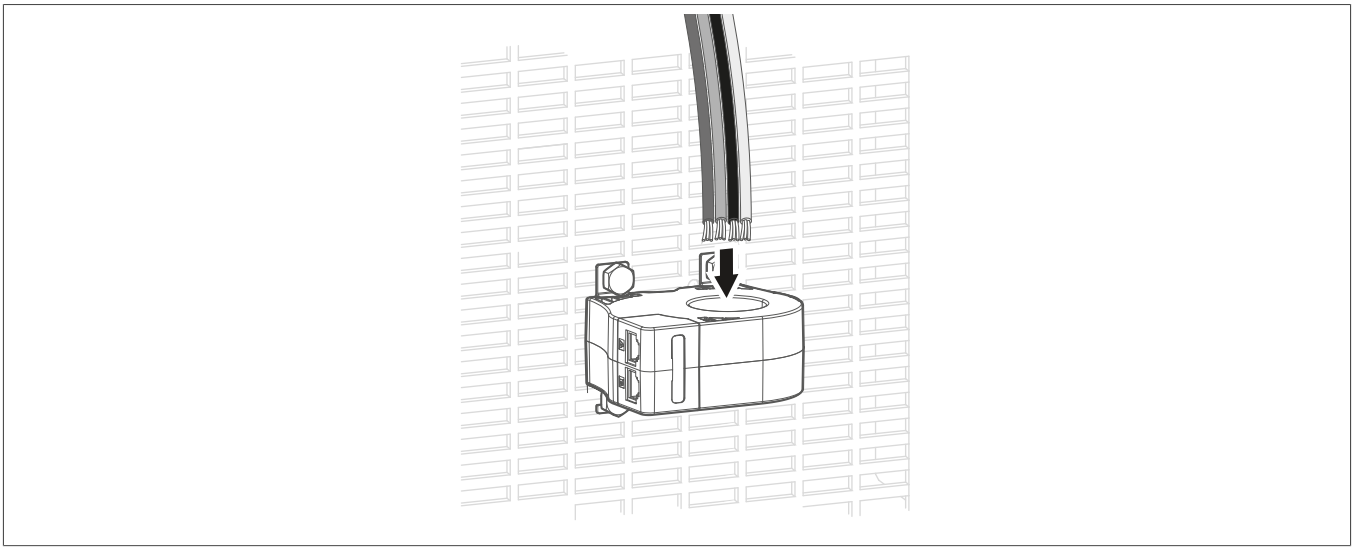


Fig. 5: Guiding the cables

Warning

Risk of destruction!

The device may be damaged if the cables are guided through incorrectly.

The cables must be guided through the centre of the toroidal transformer.

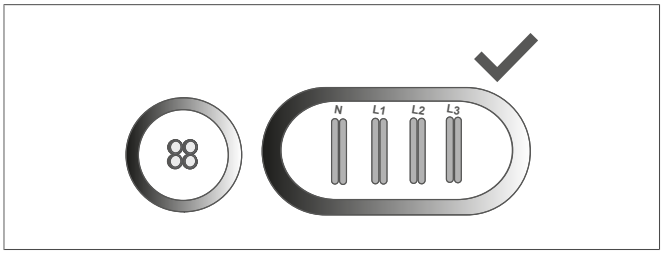


Fig. 6: Correct distribution of cables

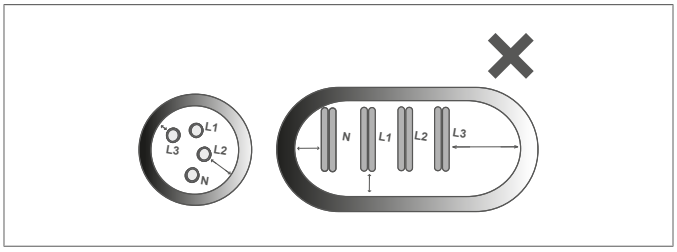


Fig. 7: Incorrect distribution of cables

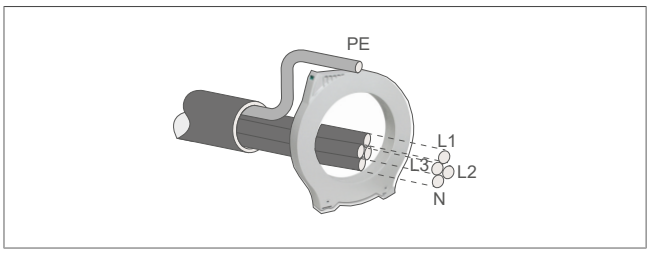


Fig. 8: Distribution of cables

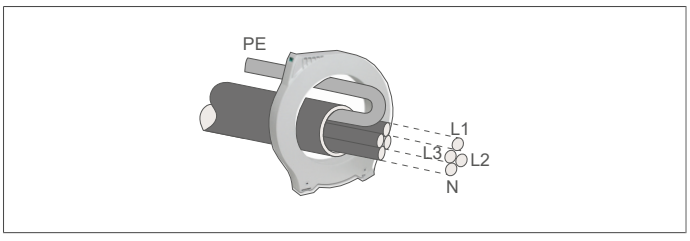


Fig. 9: Cable distribution (cable conduit)

Note

The length of the cables must be greater than the diameter of the toroid transformer.

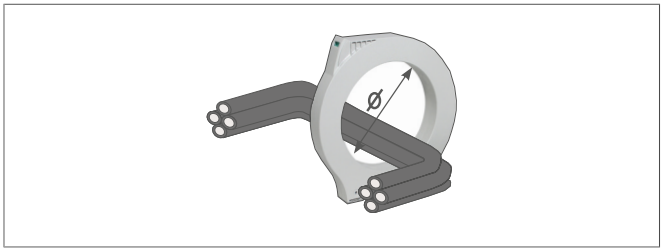


Fig. 10: Avoid cable bends

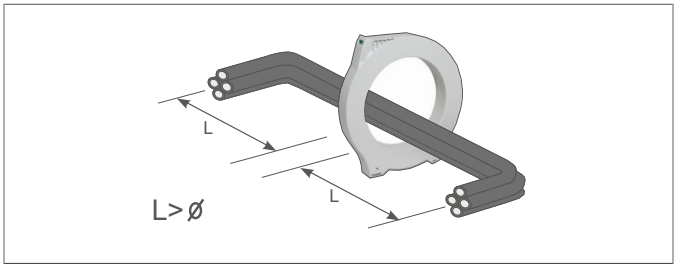
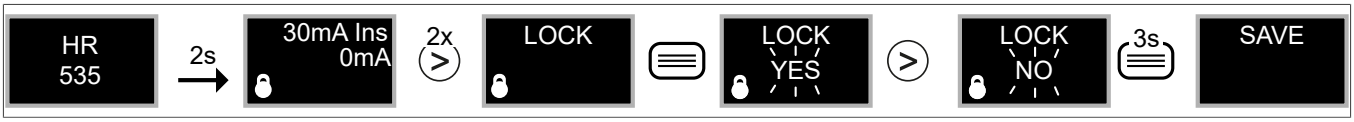


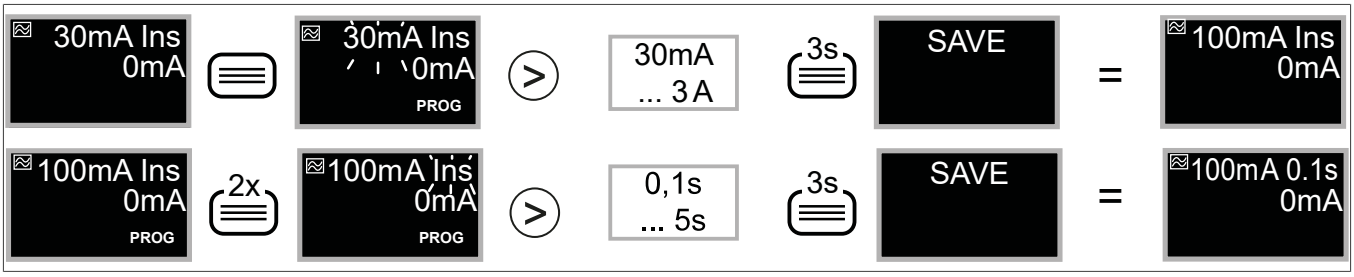
Fig. 11: Bögen in Leitern vermeiden

4.3 Commissioning

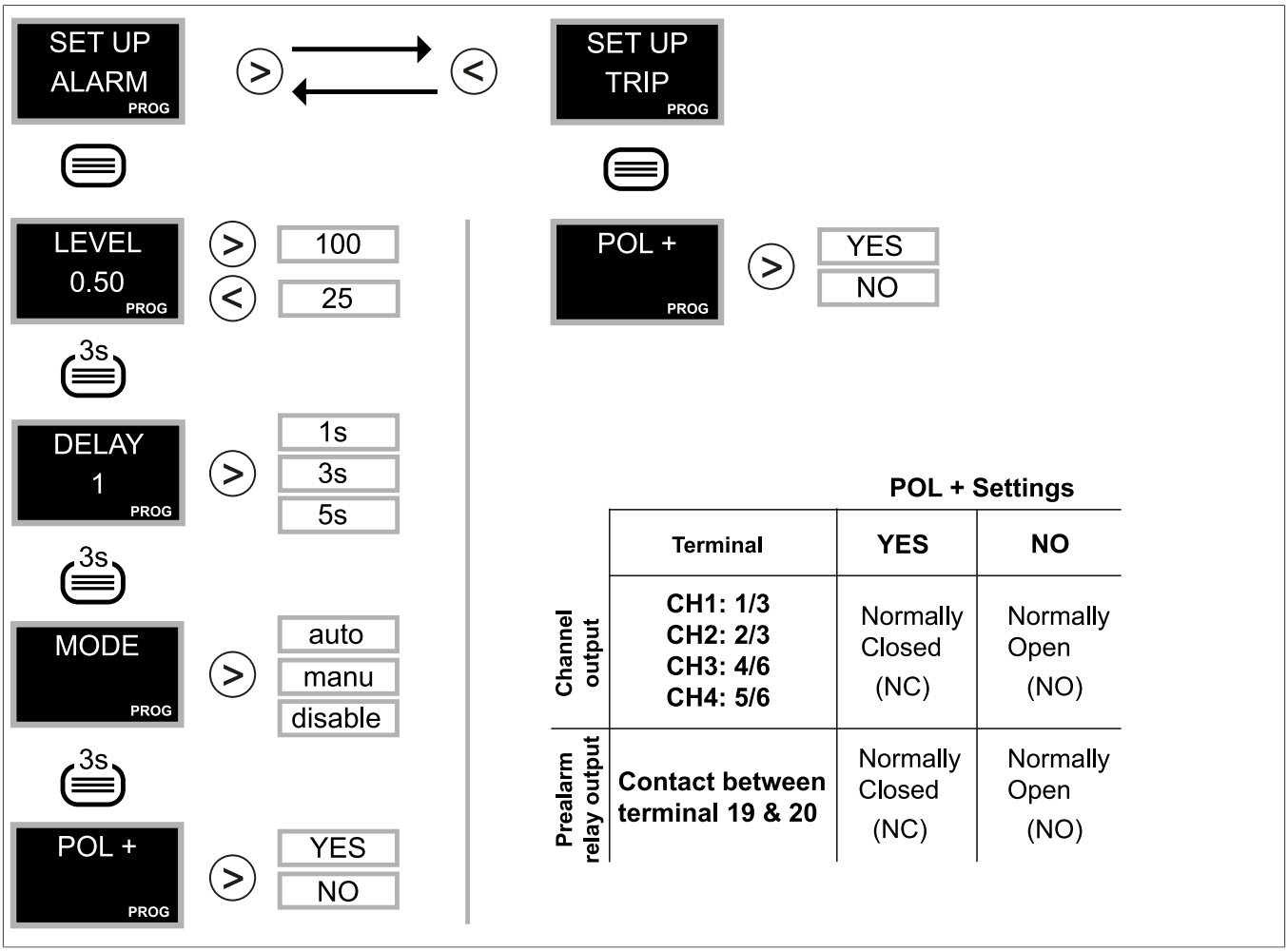
1. Unlock the device.



2. Set the trigger conditions.



3. Set the alarm and trigger.



POL + Settings

	Terminal	YES	NO
Channel output	**CH1: 1/3 CH2: 2/3 CH3: 4/6 CH4: 5/6**	Normally Closed (NC)	Normally Open (NO)
Prealarm relay output	**Contact between terminal 19 & 20**	Normally Closed (NC)	Normally Open (NO)

Fig. 12: Set the alarm and trigger

Alarm state reached.

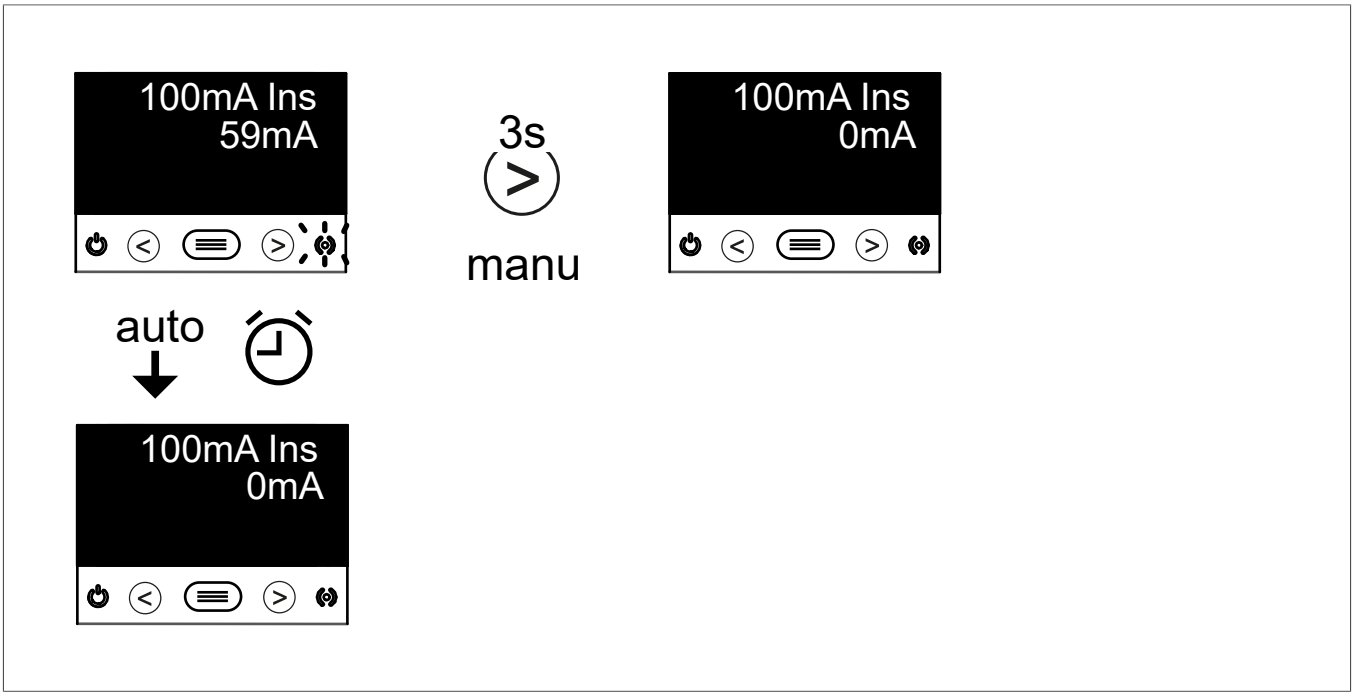


Fig. 13: Alarm state reached

Danger

☑ The device has triggered.

If the device triggers, the values that caused this malfunction are output. The ‘TRIP’ logo appears.

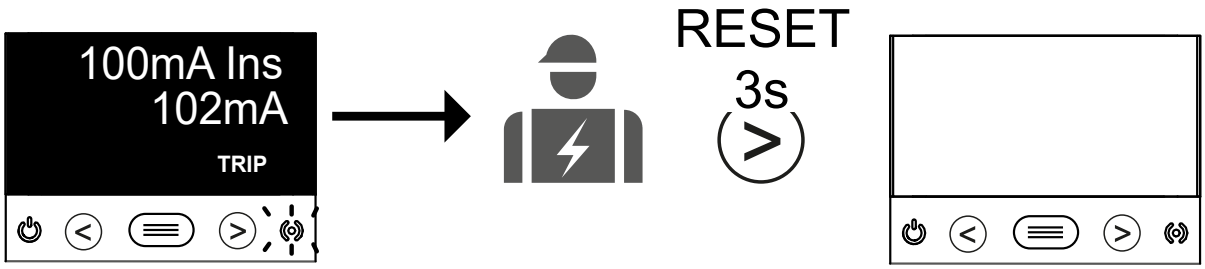


Fig. 14: The device has triggered

5 Technical data

Nominal voltage	230 V~ +/- 15%
Frequency	50/60 Hz
Consumption	6.5 VA
Category of the installation	CAT III 300 V
Monitoring functions	
Degree of protection	Type A, highly immunised
Sensitivity (IΔn)	0.03 – 0.1 – 0.2 – 0.3 – 0.5 – 0.75 – 1 – 1.5 – 2 – 3 A
Settable trigger delay	INS – [S] – 0.1 – 0.2 – 0.3 – 0.4 – 0.5 – 0.8 – 1 – 3 – 5 s
Rated frequency of monitored circuit	50/60 Hz
Rated differential current (non-operating)	0.5 Idn
Rated short-time withstand current (Icw)	32 kA / 1s
Conditional short-circuit differential current (IΔc)	1500 A
Uimp of the voltage source	4 kV (CAT III)
Compatible HR transformer	HR70x/83x
Relay output	
Number	4
Max. voltage of open contacts	230 V~ +/- 15%
Current	max. 6 A
Switching capacity	max. 1500 VA
Service life	
Electrical (250 V ~ /5A)	$60x10^3$ switching operations
Mechanical	$10x10^6$ switching operations
TRIP/RESET input	
Type	Voltage 230 V~
Insulation	3 kV
Input resistance	94 kΩ
Operating temperature	-10°C ... +60°C
Storage temperature	-20°C ... +70°C
Relative humidity	5 ... 95%
Other data	
Maximum height	2000 m
Degree of protection	IP20
Impact resistance	IK08
Degree of contamination	2
Utilization	Indoor
Conductor cross-section	2.5 mm^2
Cable length	Max. 10 m
Dimensions	52.5 x 118 x 70 mm
Standard	IEC 60947-2

6 Accessories

Transformer, round	HR70x
Transformer, rectangular	HR83x

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