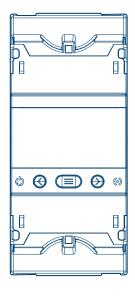
Operating and installation instructions

Protection and monitoring relay Residual current protection relay



Residual current protection relay 0.03–30 A, type A 4-channel

HR535

C€ CH





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1 Safety instructions

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

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



2 Design and layout of the device

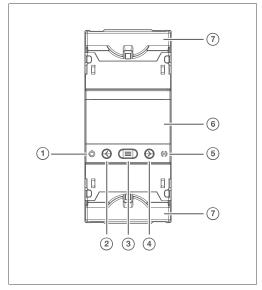


Fig. 1: Front view

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

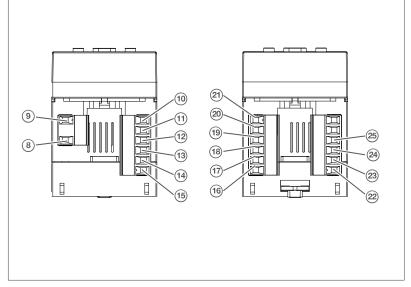


Fig. 2: View of connecting terminals

- 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)
- (7) S2, transformer connection channel 1 and 2 (common) (terminal 8)
- (8) S1, transformer connection channel 2 (terminal 9)
- (9) S1, transformer connection channel 3 (terminal 10)

(16) S1, transformer connection channel 1 (terminal 7)

- 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 useBlue LCD screen: Configuration

Yellow LCD screen: Pre-alarm activatedRed LCD screen: Fault display/test

LED Funct	ion
-----------	-----

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

5



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

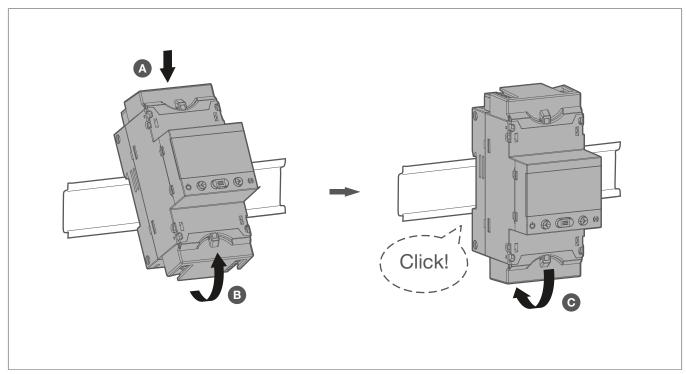


Fig. 3: Fixing the device on the DIN rail



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

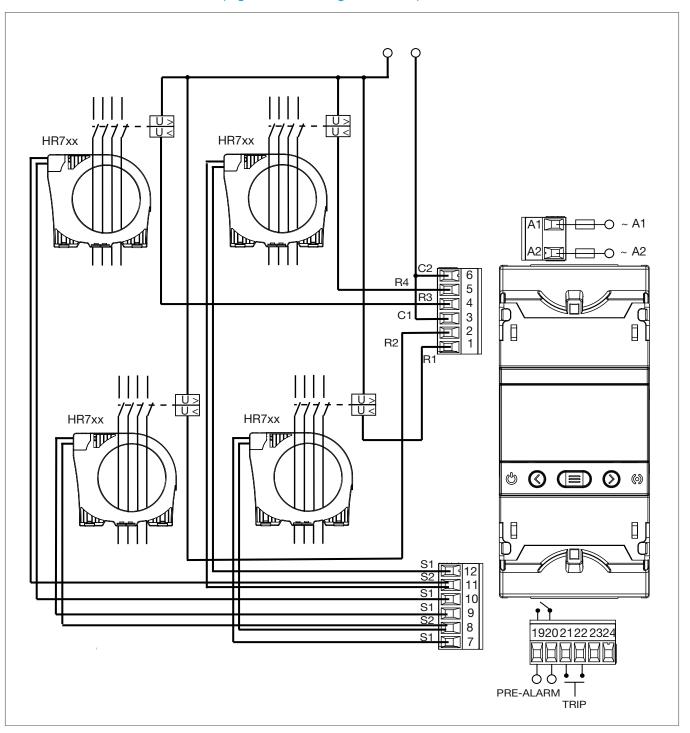


Fig. 4: Connecting the device

Attach the cover of the connecting terminals.



4.2 Installation and electrical connection of toroidal transformer

Guide the cables through the device.

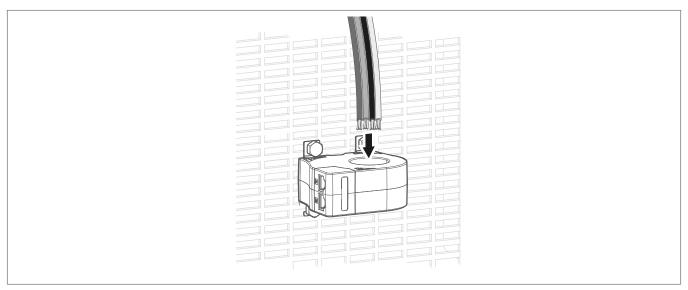


Fig. 5: Guiding the cables



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.

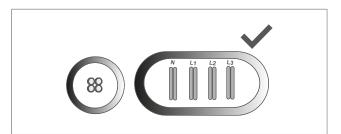


Fig. 6: Correct distribution of cables

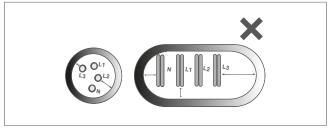


Fig. 7: Incorrect distribution of cables

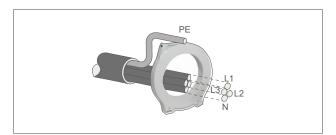


Fig. 8: Distribution of cables

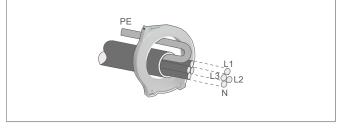
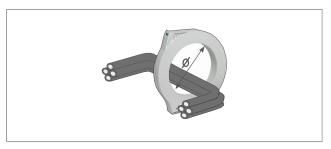


Fig. 9: Cable distribution (cable conduit)



Note

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





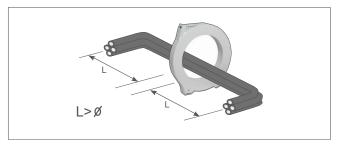


Fig. 11: Bögen in Leitern vermeiden



4.3 Commissioning

Unlock the device.



Fig. 12: Unlock the device

2 Set the trigger conditions.

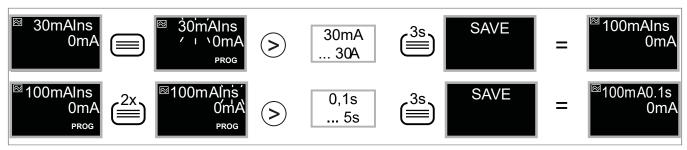


Fig. 13: Set the trigger condition

3 Set the alarm and trigger.

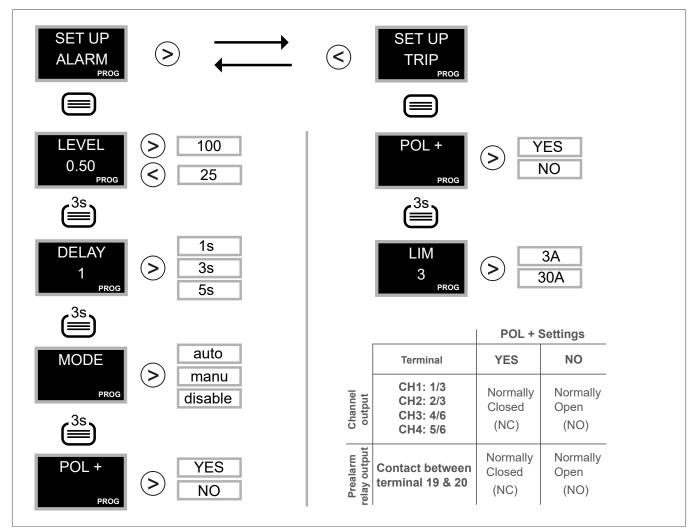


Fig. 14: Set the alarm and trigger



Alarm state reached.

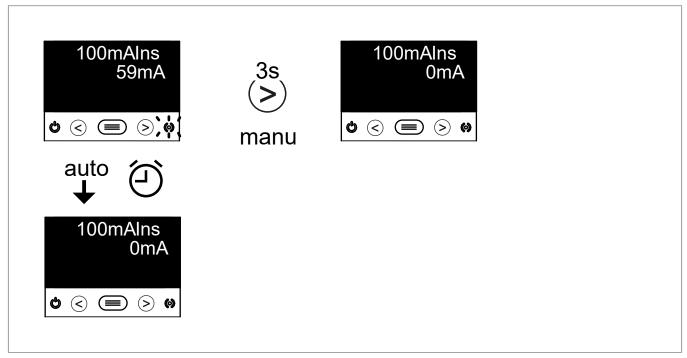


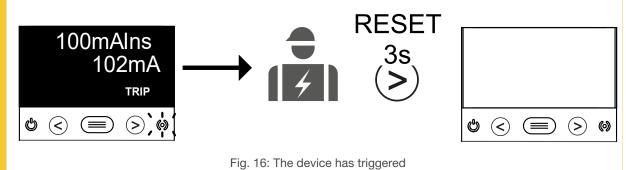
Fig. 15: Alarm state reached



Danger

☑ The device has triggered.

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





5 Appendix

5.1 Technical data

Consumption	Nominal voltage	230 V~ +/- 15%
Category of the installation	Frequency	50/60 Hz
Monitoring functions Type A, highly immunised Sensitivity (IΔn) Type A, highly immunised Sensitivity (IΔn) Settable trigger delay INS – [S] – 0.1 – 0.2 – 0.3 – 0.4 – 0.5 – 0.8 – 1 – 3 – 5 .	Consumption	6.5 VA
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 - 5 - 10 - 30 /s Settable trigger delay INS - [S] - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.8 - 1 - 3 - 5 (-3 - 5)	Category of the installation	CAT III 300 V
Sensitivity (IΔn) 0.03 - 0.1 - 0.2 - 0.3 - 0.5 - 0.75 - 1 - 1.5 - 2 - 3 - 5 - 10 - 30 / 4	Monitoring functions	
Settable trigger delay INS – [S] – 0.1 – 0.2 – 0.3 – 0.4 – 0.5 – 0.8 – 1 – 3 – 5 · 5 · 8 rated frequency of monitored circuit 50/60 H:	Degree of protection	Type A, highly immunised
Rated frequency of monitored circuit 50/60 H. Rated differential current (non-operating) 0.5 ldn Rated short-time withstand current (lcw) 32 kA / 1s Conditional short-circuit differential current (lΔc) 1500 A Uimp of the voltage source 4 kV (CAT III) Compatible HR transformer HR70x/83: Relay output HR70x/83: Max. voltage of open contacts 230 V~ +/- 15% Current amax. 6 A Switching capacity max. 1500 W Service life Electrical (250 V ~ /5A) 60x10° switching operations Mechanical 10x10° switching operations TRIP/RESET input 3 kV Type Voltage 230 V Insulation 3 kV Input resistance 94 kG Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height	Sensitivity (I∆n)	0.03 - 0.1 - 0.2 - 0.3 - 0.5 - 0.75 - 1 - 1.5 - 2 - 3 - 5 - 10 - 30 A
Rated differential current (non-operating) 0.5 Idn Rated short-time withstand current (lcw) 32 kA / 13 Conditional short-circuit differential current (l∆c) 1500 ℓ Uimp of the voltage source 4 kV (CAT III Compatible HR transformer HR70x/833 Relay output HN0mber Max. voltage of open contacts 230 V~ +/- 15% Current max. 6 ℓ Switching capacity max. 1500 Vℓ Service life Electrical (250 V ~ /5A) 60x10³ switching operations Mechanical 10x10⁵ switching operations TRIP/RESET input 3 kV Type Voltage 230 V Insulation 3 kV Input resistance 94 kC Operating temperature -10°C +60°C Storage temperature -10°C +70°C Relative humidity 5 95% Other data Maximum height	Settable trigger delay	INS - [S] - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.8 - 1 - 3 - 5 s
Rated short-time withstand current (lcw) 32 kA / 15 conditional short-circuit differential current (lΔc) 1500 A conditional short-circuit differential current (lΔc) 4 kV (CAT III conditional short-circuit differential current (lΔc) HR70x/83: 280 V conditional short-circuit differential current (lΔc) 230 V conditional s	Rated frequency of monitored circuit	50/60 Hz
Conditional short-circuit differential current (IΔc) 1500 A Uimp of the voltage source 4 kV (CAT III Compatible HR transformer HR70x/83; Relay output Number Max. voltage of open contacts 230 V~ +/- 15% Current max. 6 A Switching capacity max. 1500 W Service life Electrical (250 V ~ /5A) 60x10³ switching operations Mechanical 10x10⁵ switching operations TRIP/RESET input Voltage 230 V Insulation 3 kV Insulation 3 kV Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height	Rated differential current (non-operating)	0.5 ldn
Uimp of the voltage source 4 kV (CAT III Compatible HR transformer Relay output Number 4 kV (CAT III Compatible HR transformer Max. voltage of open contacts 230 V~ +/- 15% Current Current max. 6 / Max. 1500 V/ Max. 1500 V	Rated short-time withstand current (lcw)	32 kA / 1s
Compatible HR transformer HR70x/83: Relay output Number Amount of the properties o	Conditional short-circuit differential current (I∆c)	1500 A
Relay output Number Amalog Max. voltage of open contacts 230 V~ +/- 15% Current max. 6 Amalog Switching capacity max. 1500 V/max. 1500 V/m	Uimp of the voltage source	4 kV (CAT III)
Number 230 V~ +/- 15% Max. voltage of open contacts 230 V~ +/- 15% Current max. 6 /r Switching capacity max. 1500 V/r Service life Electrical (250 V ~ /5A) Electrical (250 V ~ /5A) 60x10³ switching operations Mechanical 10x10⁶ switching operations TRIP/RESET input Voltage 230 V/r Type Voltage 230 V/r Insulation 3 k/r Input resistance 94 k/r Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height	Compatible HR transformer	HR70x/83x
Max. voltage of open contacts 230 V~ +/- 15% Current max. 6 A Switching capacity max. 1500 VA Service life Electrical (250 V ~ /5A) 60x10³ switching operations Mechanical 10x10⁵ switching operations TRIP/RESET input Type Voltage 230 V Insulation Insulation 3 kV Input resistance 94 kC Operating temperature 5-10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height	Relay output	
Current max. 6 A Switching capacity Service life Electrical (250 V ~ /5A) Electrical (250 Image) 60x10³ switching operations Mechanical 10x10⁶ switching operations TRIP/RESET input Voltage 230 V Insulation 3 kV Input resistance 94 kC Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height	Number	4
Switching capacity Service life Electrical (250 V ~ /5A) Mechanical TRIP/RESET input Type Insulation Input resistance Operating temperature Storage temperature Storage temperature Relative humidity Other data Maximum height max. 1500 V/ 60x10³ switching operations 10x106 sw	Max. voltage of open contacts	230 V~ +/- 15%
Service life Electrical (250 V ~ /5A) 60x10³ switching operations Mechanical 10x106 switching operations TRIP/RESET input Type Voltage 230 V Insulation 3 kV Input resistance 94 kC Operating temperature 5-10°C +60°C Storage temperature 7-20°C +70°C Relative humidity 5 95% Other data Maximum height	Current	max. 6 A
Electrical (250 V ~ /5A) Mechanical TRIP/RESET input Type Insulation Input resistance Operating temperature Storage temperature Relative humidity Other data Maximum height 60x10³ switching operations 10x10⁶ switching oper		max. 1500 VA
Mechanical10x106 switching operationsTRIP/RESET inputVoltage 230 V-TypeVoltage 230 V-Insulation3 kVInput resistance94 kCOperating temperature-10°C +60°CStorage temperature-20°C +70°CRelative humidity5 95%Other dataAuximum height		
TRIP/RESET input Type Insulation Input resistance Operating temperature Storage temperature Storage temperature Relative humidity Other data Maximum height Voltage 230 V- Voltage 230 V- 1 3 kV 94 kC -10°C +60°C -20°C +70°C 5 95% Other data Maximum height	,	
Type Voltage 230 V		10x10 ⁶ switching operations
Insulation 3 kN Input resistance 94 kC Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height 2000 m	•	
Input resistance 94 kg Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height 2000 n	• •	· ·
Operating temperature -10°C +60°C Storage temperature -20°C +70°C Relative humidity 5 95% Other data Maximum height 2000 n		3 kV
Storage temperature Relative humidity Other data Maximum height -20°C +70°C 5 95% 2000 n	·	94 kΩ
Relative humidity 5 95% Other data Maximum height 2000 n		
Other data Maximum height 2000 n		
Maximum height 2000 n		5 95%
		2000 m
		IP20
		IK08
9		2
		Indoor
		2.5 mm ²
		Max. 10 m
	Dimensions	52.5 x 118 x 70 mm
Standard IEC 60947-2-N	Standard	IEC 60947-2-M

5.2 Accessories

Transformer, round	HR70x
Transformer, rectangular	HR83x



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